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Higher Education to 2030
Volume 1: Demography

Chapter 2

What is the Impact of Demography on Higher Education Systems? A Forward-looking Approach for OECD Countries

by

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This chapter aims to evaluate the impact of demographic changes on the student population, on student-teacher ratios and expenditure in higher education and on the level to which the populations are educated. It shows that demographic changes are only one of the factors determining student enrolment trends, teaching staff numbers or costs in higher education. It also demonstrates that policy responses to falling student enrolments and rising enrolments in periods of expansion are often similar, albeit for sometimes different reasons. The investigation is based on forward-looking quantitative scenarios that provide a heuristic insight into these changes and their consequences, though without claiming that they can actually be forecast.

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Demography has become a subject of concern in a growing number of countries. The population of some OECD countries is rapidly ageing, especially in Japan, Korea and Southern and Eastern Europe. By contrast, in countries such as Mexico and Turkey, the population is continuing to grow, in spite of a decrease in the fertility rate. While demographic issues have not featured prominently in debates on higher education in recent decades, ongoing demographic trends are giving rise to unprecedented concern. How far will the demography of higher education systems mirror that of the population as a whole? How is one to manage rising and falling student enrolment levels? What are the budgetary implications of such trends? What are the implications for the educational level of the population and the replenishment of teaching staff resources?

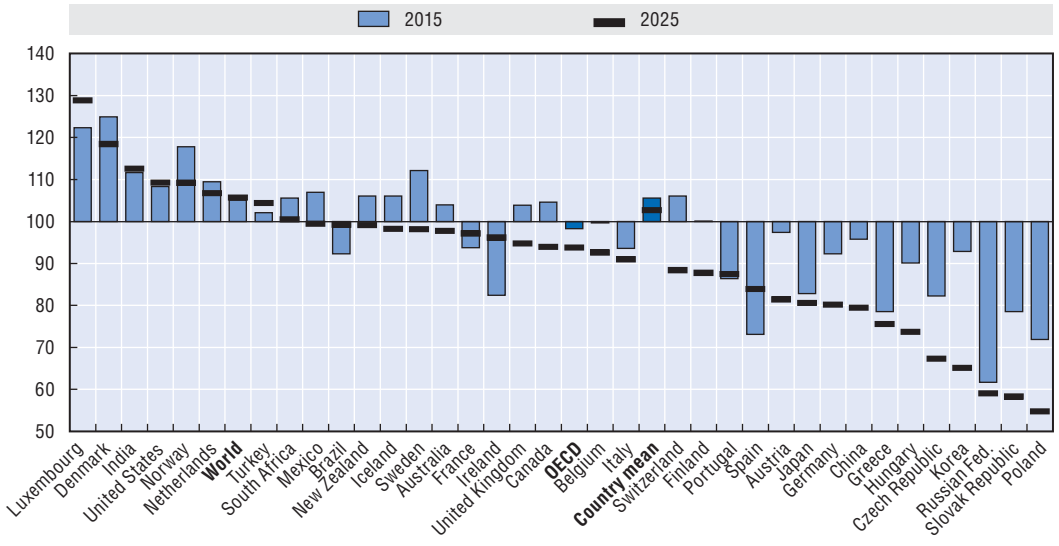
The present chapter seeks to evaluate the impact of demographic changes on the student population, student-teacher ratios and expenditure in higher education and on the level to which the populations are educated. It shows that demographic changes are far from decisive in determining student enrolment trends, teaching staff numbers or costs in higher education. It also demonstrates that policy responses to falling student enrolments and rising enrolments in periods of expansion are often similar, albeit for sometimes different reasons. The investigation is based on forward-looking quantitative scenarios that provide a heuristic insight into these changes and their consequences, though without claiming that they can actually be forecast. In a sense, these forward projections provide for a better understanding of recent trends by magnifying them.

The chapter is structured as follows. The first section offers projections of student enrolments in higher education in the case of two scenarios, showing that the expansion of systems seems set to continue in the decades ahead; Sections 2.2 and 2.3 examine more closely the impact of enrolment levels on total public expenditure in higher education and student-teacher ratios, respectively. Section 2.4 discusses the possible impact of these trends on academic staff recruitment. Section 2.5 indicates how the percentage of the population with higher education graduate qualifications might evolve in accordance with various trend scenarios, and the implications of such changes for the relative availability of graduate resources. Section 2.6 deals with the possible impact of these trends on broader participation and equity in higher education. Section 2.7 discusses various possible policy responses to the growth and contraction of student enrolment. The final section sums up the main conclusions of the chapter.

2.1. The impact of demography on student enrolment

The population of the OECD countries is ageing as fertility rates decrease and people live longer. The average percentage of the population aged over 65 in those countries is thus expected to rise from 14% to 21% between 2005 and 2030, and is already over 18% in some of them (Germany, Greece, Italy and Japan). The proportion of elderly non-working persons with respect to the total active population will thus increase on average from 26% to 42% between 2005 and 2030, with substantial proportions of non-working people in certain OECD

Figure 2.1. **Population projections for the 18-24 age group in 2015 and 2025**
(2005 = 100)



Source: United Nations, median projections (2006 revision).

countries (OECD, 2007a). According to UN median demographic projections (as revised in 2006), the 18-24 age group, which customarily accounts for the lion's share of student enrolments in OECD countries, will have fallen on average by 9% by 2025. This decrease will be gradual, as the 18-24 age cohort is expected to increase in 16 OECD countries in the period up to 2015, and in 10 up to 2020, but in just seven by 2025. Between 2005 and 2025, the number of young people aged 18-24 should rise by over 10% in two OECD countries (Denmark and Luxembourg), and is expected to fall by over 15% in 10 countries (Austria, the Czech Republic, Germany, Greece, Hungary, Japan, Korea, Poland, the Slovak Republic and Spain). Figure 2.1 summarises these trends and illustrates the demographic profile of a few other countries (Brazil, Russia, India, China and South Africa) (see Table 2.A2.1 for full details).

Sluggish trends in demography and student enrolments

All other things being equal, demography directly affects student enrolments in higher education because the size of younger age cohorts is a partial determinant of the number of students. Given that in OECD countries for which information is available, around 80% of students in higher education on average are aged less than 25, the relative impact of younger age cohorts has a major bearing on student enrolment levels. If rates of entry to higher education, together with survival rates, the average length of courses and other student-related factors (age, etc.) remain unchanged, countries in which those cohorts decrease in size will normally experience a fall in their student enrolments.

Yet the relationship between demography – or more specifically the size of the younger age cohorts – and higher education enrolment levels is a complex one. Student numbers depend on the access (or entry) rates of different cohorts in the population at different ages and, therefore, on the distribution of admissions and the duration of studies irrespective of whether the latter result in drop-out or a graduate qualification (see Annex 2.A1).

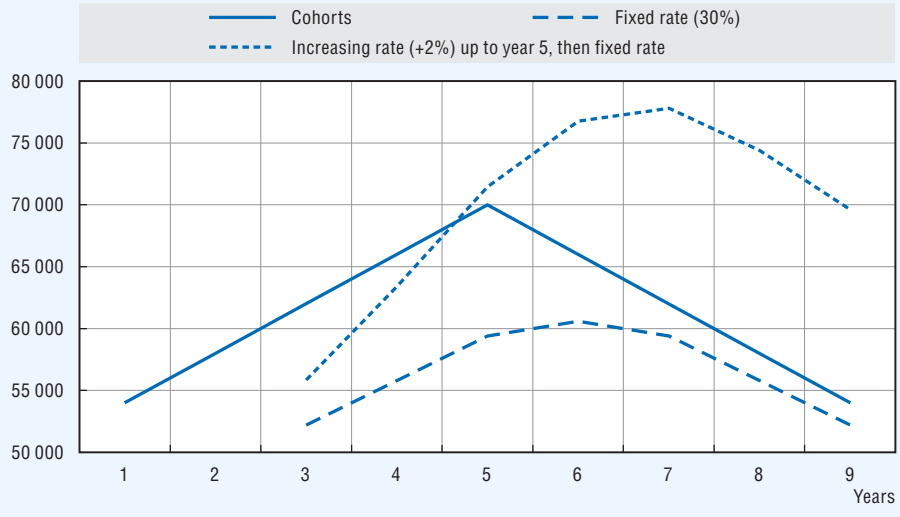
Several factors may offset decreases in cohort size, such as an increase in rates of access to higher education or a change in the length of studies. Where the structure of courses

remains unchanged, studies may last longer because of a fall in drop-out rates, a growth in part-time student enrolments or an increase in the general level of education. Access rates clarify and depend on several factors, including the proportion of persons with the qualifications required to enter higher education (the eligibility rate) and the proportion of those eligible who do indeed enrol, which may be governed by their own particular aspirations, incentives and sometimes the number of places available. The actual proportion of entrants also depends, among other things on the cost of higher education, the financial pressures confronting those otherwise eligible, pecuniary (and non-pecuniary) advantages that they hope to gain from higher education and the length of their studies from an opportunity cost perspective. Access rates also take account of international students, whose numbers are unrelated to the size of cohorts of young people resident in the country of study (bearing in mind however that population projections include foreigners resident in that country).

The distribution of admissions and the length of studies explain why student enrolment levels to some extent lag behind changes in the size of younger age cohorts. A big demographic change in the size of these cohorts will not have a noticeable impact on enrolment for several years. Consider a situation in which the number of young people decreases. When this decrease gets under way, young people in earlier cohorts will still be entering higher education, and it will be several years before the succession of smaller cohorts finally affects the system (entering it gradually over a given period): this corresponds

Box 2.1. **The lagging impact of demographic changes on student enrolment**

Let us assume that 30% of a cohort enters the higher education system each year and that each student studies for three years. If cohorts increase before decreasing in size, the number of students will only begin to fall one year after the demographic change and at first no more than gradually before starting to follow the downward slope of the cohort curve. If entry rates are allowed to increase regularly by 2% during the first five years, from 30% to 40%, before being held constant in subsequent years, it is clear that two years will now elapse before any fall in enrolments is observed. This example will appear more or less striking depending on the precise figures selected and is intended merely to convey the persistence of the trends occurring over time: with sometimes longer courses of study, many different cohorts entering higher education over an extended period, and differing drop-out rates, etc., these effects may be more sustained.



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to the continued impact of past cohorts. The second reason for the time lag stems from past changes in entry rates: even if all students were to enter higher education at the same time, which is far from the case, their numbers could be reflected more in some cohorts than others in the system. Box 2.1 illustrates this with a simple hypothetical example.

Given this complexity, projections of future student enrolments have been made with effect from the entrance to the system of several cohorts of 17-year-olds over an extended period – in accordance with a model which, though simplified, captures some of this complexity (for the methodology, see Annex 2.A1).

The "status quo" *scenario (scenario 1)*

The first scenario considered is one of *status quo*. Table 2.1 sets out projections of student enrolments in the OECD countries if entry and survival rates remain as they were

Table 2.1. **Enrolment projections for tertiary students if entry rates remain at the 2004 level: scenario 1**

Thousands, full- and part-time

	Tertiary education (ISCED 5/6)				Index (2005 = 100)			Absolute difference		
	2005	2015	2020	2025	2015	2020	2025	2015	2020	2025
Australia	*1 025*	1 150	1 126	1 116	112	110	109	125	102	92
Austria	*244*	273	261	243	112	107	100	28	17	–1
Belgium	*390*	404	387	378	104	99	97	14	–2	–12
Canada	*m*	m	m	m	m	m	m	m	m	m
Czech Republic	*336*	361	307	286	107	91	85	25	–29	–50
Denmark	*232*	311	320	309	134	138	133	79	88	77
Finland	*306*	310	294	280	101	96	91	4	–12	–26
France	*2 187*	2 219	2 248	2 322	101	103	106	32	61	135
Germany	*2 269*	2 373	2 212	2 060	105	97	91	105	–57	–209
Greece	*647*	583	555	544	90	86	84	–63	–91	–102
Hungary	*436*	439	381	353	101	87	81	3	–55	–83
Iceland	*15*	18	17	16	117	110	107	3	2	1
Ireland	*187*	164	171	190	88	91	102	–23	–16	3
Italy	*2 015*	2 090	2 112	2 107	104	105	105	75	97	92
Japan	*4 038*	3 514	3 505	3 298	87	87	82	–524	–533	–740
Korea	*3 210*	2 921	2 613	2 115	91	81	66	–290	–597	–1 096
Luxembourg	*m*	m	m	m	m	m	m	m	m	m
Mexico	*2 385*	2,544	2 503	2 418	107	105	101	159	118	33
Netherlands	*565*	633	630	631	112	111	112	68	65	66
New Zealand	*240*	m	m	m	m	m	m	m	m	m
Norway	*214*	253	253	244	118	118	114	39	39	30
Poland	*2 118*	1 624	1 327	1 171	77	63	55	–494	–791	–947
Portugal	*381*	m	m	m	m	m	m	m	m	m
Slovak Republic	*181*	161	132	121	89	73	67	–20	–50	–61
Spain	*1 809*	1 382	1 348	1 467	76	74	81	–428	–462	–342
Sweden	*427*	559	504	478	131	118	112	132	78	51
Switzerland	*200*	244	230	212	122	115	106	44	31	13
Turkey	*2 106*	2 358	2 336	2 237	112	111	106	252	229	131
United Kingdom	*2 288*	2 445	2 290	2 252	107	100	98	157	2	–36
United States	*17 272*	19 287	19 082	19 256	112	110	111	2 015	1 810	1 984
OECD	***47 723***	**48 621**	**47 145**	**46 104**	**103**	**100**	**98**	**898**	**–578**	**–1 619**
Country mean					**104**	**100**	**96**			

m = missing.

Note: Estimates are based on the number of students enrolled both full-time and part-time, and on the entry and drop-out rates for 2004, as well as on the UN median population projections for 2000 (as revised in 2006). These estimates are not precise forecasts but projections intended purely as a guide. For the methodology, see Annex 2.A1.

in 2004. In this scenario, the changes are essentially demographic and depend solely on the size of the younger age cohorts (a simplified model in the sense that access to higher education terminates at the age of 28), and on changes in entry rates between 1998 and 2004. As has been noted, the impact of the increase in these rates is observed at a later stage when the distribution of individual entrance to higher education is taken into account, so this scenario in which entry rates are frozen is not strictly consistent with the demographic trends.

According to this scenario, countries would on average have 3% more students in 2015, with their numbers then falling back, but just gradually, to the same level in 2020 as in 2005, and then to 2% beneath the 2005 level in 2025. Because of the demographic changes anticipated, the higher education systems of several countries would contract in the years ahead, if there were no growth in their student access rates: the Czech Republic, Hungary, Japan, Korea, Poland, the Slovak Republic and Spain would experience a contraction of over 15% in 2025 compared to 2005. The decrease might already have reached this level in 2015 in Poland and Spain, and in 2020 in Korea and the Slovak Republic. In comparison to their current enrolment levels, Denmark, Iceland, Norway, Sweden and Switzerland would for their part experience an increase of over 15% by 2015, but only Denmark would still be in this position in 2025.

In highlighting a phenomenon that is essentially (though not exclusively) demographic, this scenario reveals that individual OECD countries exhibit very contrasting situations but that the overall picture remains fairly unspectacular.

The trend scenario (scenario 2)

The rise in entry rates may offset decreases in student enrolments or accelerate their growth. The "massification" of higher education in many countries did not always occur at a time of demographic growth: in the United States, the most recent major phase of expansion coincided with a decrease in the size of its younger age cohorts (Anderson and Cook, 2008).

Table 2.2 illustrates projections of student enrolments in higher education systems in accordance with a trend scenario. Rather than freezing rates of entry to higher education at their 2004 level, the rates are extrapolated linearly on the basis of the trends in each country between 2000 and 2004. Aside from the quality of the data available, one reason for selecting a short time series is to limit the perceived impact of the previous expansion of systems. In some countries such as Germany or France, this decision may have a bearing on the projections, because of renewed growth in participation during these years after a period of very little change. As previously, the survival rates are those for 2004, and the demographic projections those of the UN (as revised in 2006, for the median scenario). The underlying reasoning here is that rates of entry to higher education will increase in future years in countries in which they are fairly low, whereas countries that have already achieved "universal" participation are at saturation point so that the size of their cohorts is a more decisive factor. The upper limit on entry rates has been set at 90% in line with the principle that "universal" participation in higher education can never reach the same levels as in primary and secondary education – quite simply because the students concerned are young adults among whom a certain minimum proportion will always refuse to embark on non-compulsory education. While the ceiling has been set at a high level to accommodate significant potential for growth in the various countries, it in fact represents the prevailing level in Korea (in which,

Table 2.2. **Enrolment projections for tertiary students if entry rates continue to grow: scenario 2**

Thousands, full- and part-time

	Tertiary education (ISCED 5/6)				Index (2005 = 100)			Absolute difference		
	2005	2015	2020	2025	2015	2020	2025	2015	2020	2025
Australia	*1 025*	1 163	1 172	1 192	114	114	116	139	147	168
Austria	*244*	297	309	314	121	126	128	52	65	69
Belgium	*390*	393	377	368	101	97	94	4	–13	–22
Canada	*m*	m	m	m	m	m	m	m	m	m
Czech Republic	*336*	426	397	404	127	118	120	90	61	68
Denmark	*232*	325	335	323	140	144	139	93	102	91
Finland	*306*	324	316	307	106	103	100	18	10	1
France	*2 187*	2 372	2 549	2 776	108	117	127	185	361	589
Germany	*2 269*	2 731	2 840	2 911	120	125	128	462	571	642
Greece	*647*	604	616	650	93	95	101	–42	–31	4
Hungary	*436*	461	401	372	106	92	85	25	–35	–64
Iceland	*15*	18	17	17	119	113	110	3	2	1
Ireland	*187*	175	197	234	94	105	125	–11	10	47
Italy	*2 015*	2 239	2 405	2 569	111	119	127	224	390	554
Japan	*4 038*	3 714	3 857	3 765	92	96	93	–325	–182	–273
Korea	*3 210*	2 971	2 694	2 208	93	84	69	–239	–516	–1 002
Luxembourg	*0*	m	m	m	m	m	m	m	m	m
Mexico	*2 385*	3 062	3 307	3 468	128	139	145	677	922	1 083
Netherlands	*565*	701	746	793	124	132	140	136	181	228
New Zealand	*240*	240	240	240	m	m	m	m	m	m
Norway	*214*	269	277	271	126	129	127	55	63	57
Poland	*2 118*	1 742	1 482	1 343	82	70	63	–376	–636	–775
Portugal	*381*	m	m	m	m	m	m	m	m	m
Slovak Republic	*181*	182	163	162	100	90	89	0	–19	–19
Spain	*1 809*	1 457	1 466	1 646	81	81	91	–352	–343	–164
Sweden	*427*	570	516	489	134	121	115	143	89	62
Switzerland	*200*	264	269	266	132	135	133	64	70	66
Turkey	*2 106*	3 066	3 453	3 687	146	164	175	960	1 347	1 580
United Kingdom	*2 288*	2 594	2 528	2 578	113	110	113	306	240	290
United States	*17 272*	19 796	20 045	20 679	115	116	120	2 524	2 773	3 407
OECD	***47 723***	**52 538**	**53 354**	**54 412**	**112**	**113**	**116**	**4 815**	**5 632**	**6 689**
Country mean					**113**	**113**	**114**			

m = missing.

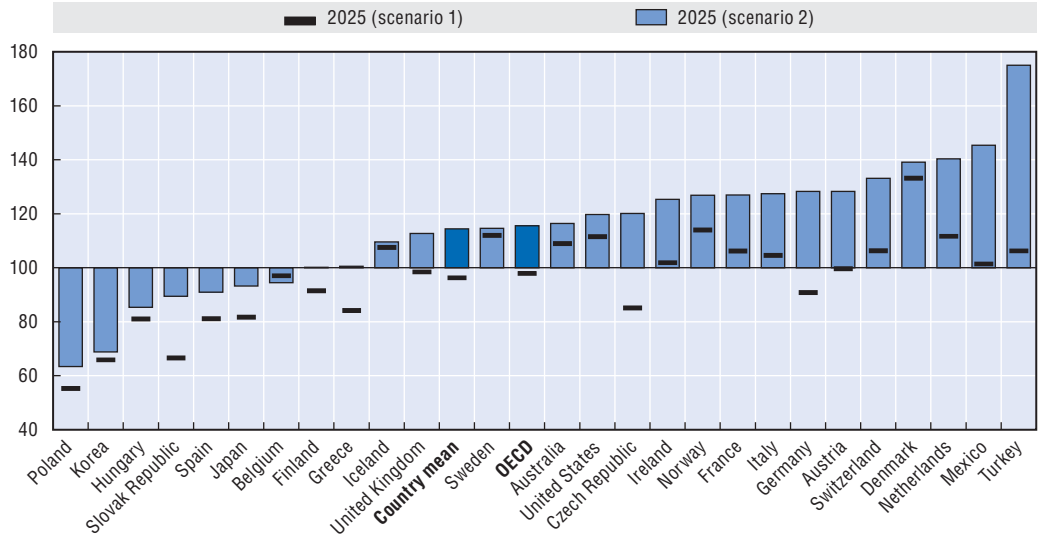
Note: Estimates are based on the number of students enrolled both full- and part-time, and on the entry and drop-out rates for 2004, as well as on the UN median population projections for 2000 (as revised in 2006). In the case of the United States, scenarios 1 and 2 are identical because entry rates in recent years have remained at a fixed upper level. The figures shown correspond to a "third" scenario in which entry rates increase very gradually by an annual average of 0.25%. These estimates are not precise forecasts but projections intended purely as a guide. For the methodology, see Annex 2.A1.

according to national data, around 80% of 18-year-olds enter higher education). The high level also compensates for the simplified perspective of the model in which access to higher education is limited to those aged 17-28.

In comparison with the first scenario, the situation changes very markedly (see Figure 2.2). On average, student enrolment levels in countries in 2005 would increase by 13% in 2015 and 2020, and by 14% in 2025 – with the growth in enrolments slightly higher in 2025 when expressed in terms of weighted averages. In the case of certain countries, the difference between the two scenarios is substantial. While in the first scenario a country like the Czech Republic would experience a 15% decrease in enrolments

Figure 2.2. **Trends in student enrolments between 2005 and 2025 on the basis of scenarios 1 and 2**

(2005 = 100)



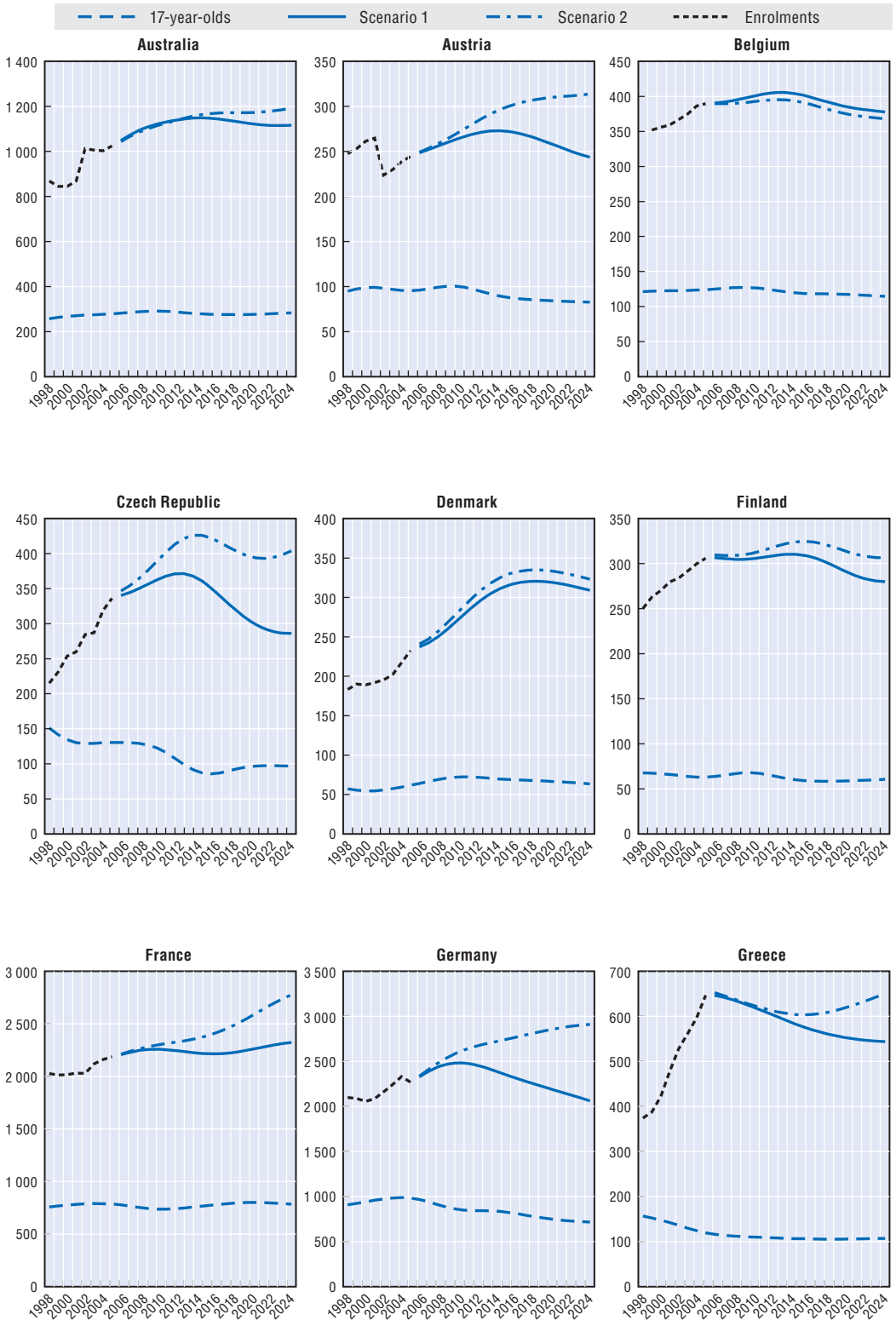
in 2025, in this trend scenario the system would continue to expand and could well grow by 20% in the years up to 2025. The scope in this country for greater participation in higher education thus remains a very significant factor. The difference is also considerable in Austria or Germany, for example, or indeed in the Slovak Republic, in which the decrease in enrolments remains very limited. In the United States, Korea, Poland or Sweden, the two scenarios barely differ because the rates of entry to higher education in these countries have changed very little in recent years, or because the rates were already high and therefore unlikely to grow strongly any further. In Germany, Mexico or Turkey, the growth in rates of entry to higher education is the main factor driving the growth in enrolments. In certain countries, such as Mexico and above all Turkey, growth will probably be more restrained however, simply because it is easier for systems to expand rapidly when they are small (relatively speaking) than when they are already large: linear extrapolation tends to accentuate long-term future growth when current growth is very fast. Nevertheless, in both these countries today, the demand for higher education easily exceeds the provision the system has to offer.

Figure 2.3 illustrates the continuous projected trends, country by country.

Why will expansion probably continue?

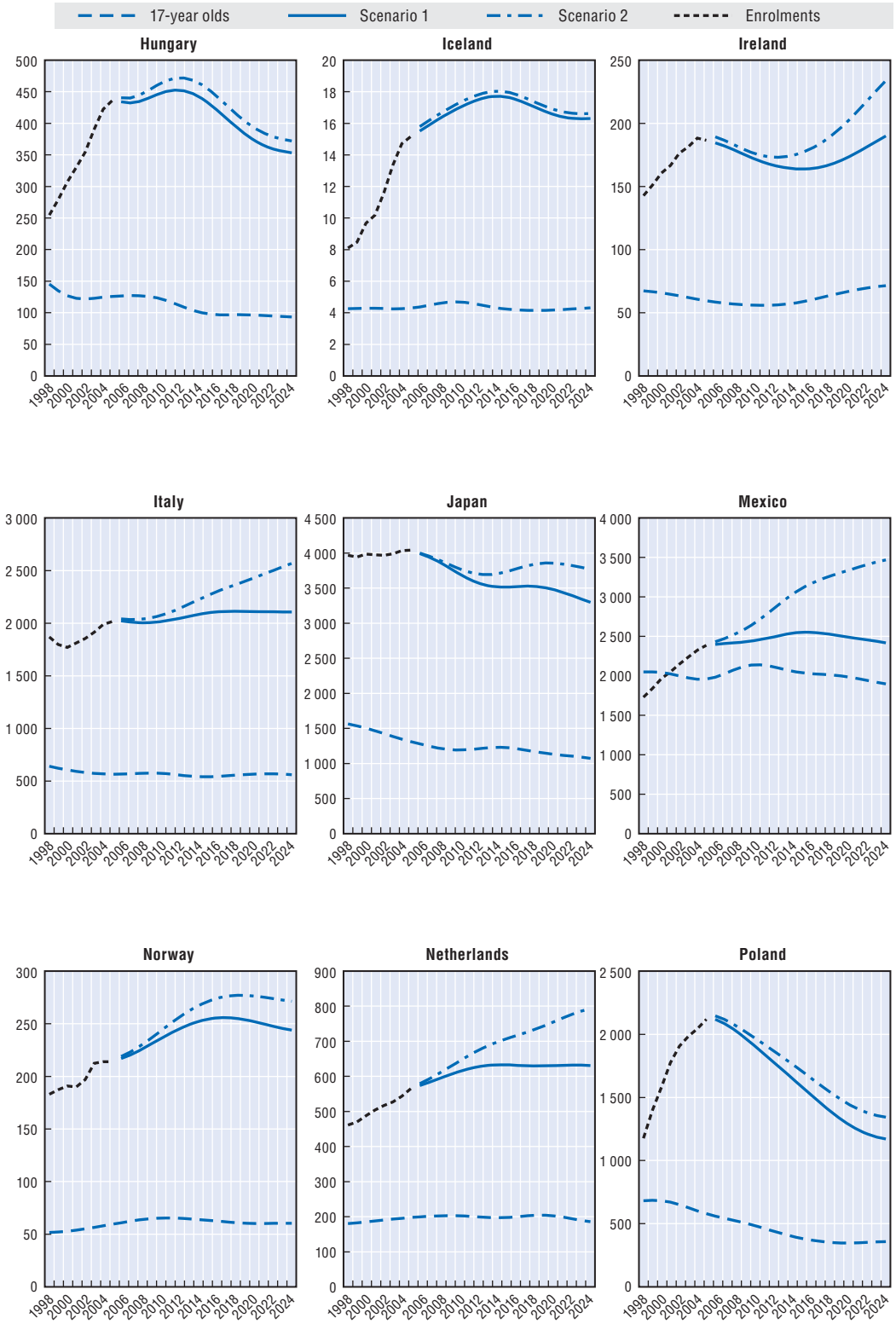
How far may recent trends reasonably be expected to continue? They might be affected by a change in higher education policy or labour market conditions. In countries in which the overall advantages enjoyed by graduates in terms of income-earning potential are relatively modest (or perceived to be so), a change in the economic fortunes of a country may immediately influence whether people decide to study. Thus Sweden experienced two small successive decreases in student enrolment (in 2004-05 and 2005-06) at a time of economic revival, although the model indicates that enrolments will increase. The continued growth of "massification" is also beset by many uncertainties. While countries such as Japan or Korea demonstrate that virtually universal participation in higher

Figure 2.3. **Size of cohorts of young people aged 17 and student enrolments according to the two scenarios: trends and country projections**



Source: OECD and UN Population Division (as revised in 2006).

Figure 2.3. **Size of cohorts of young people aged 17 and student enrolments according to the two scenarios: trends and country projections** *(cont.)*



Source: OECD and UN Population Division (as revised in 2006).

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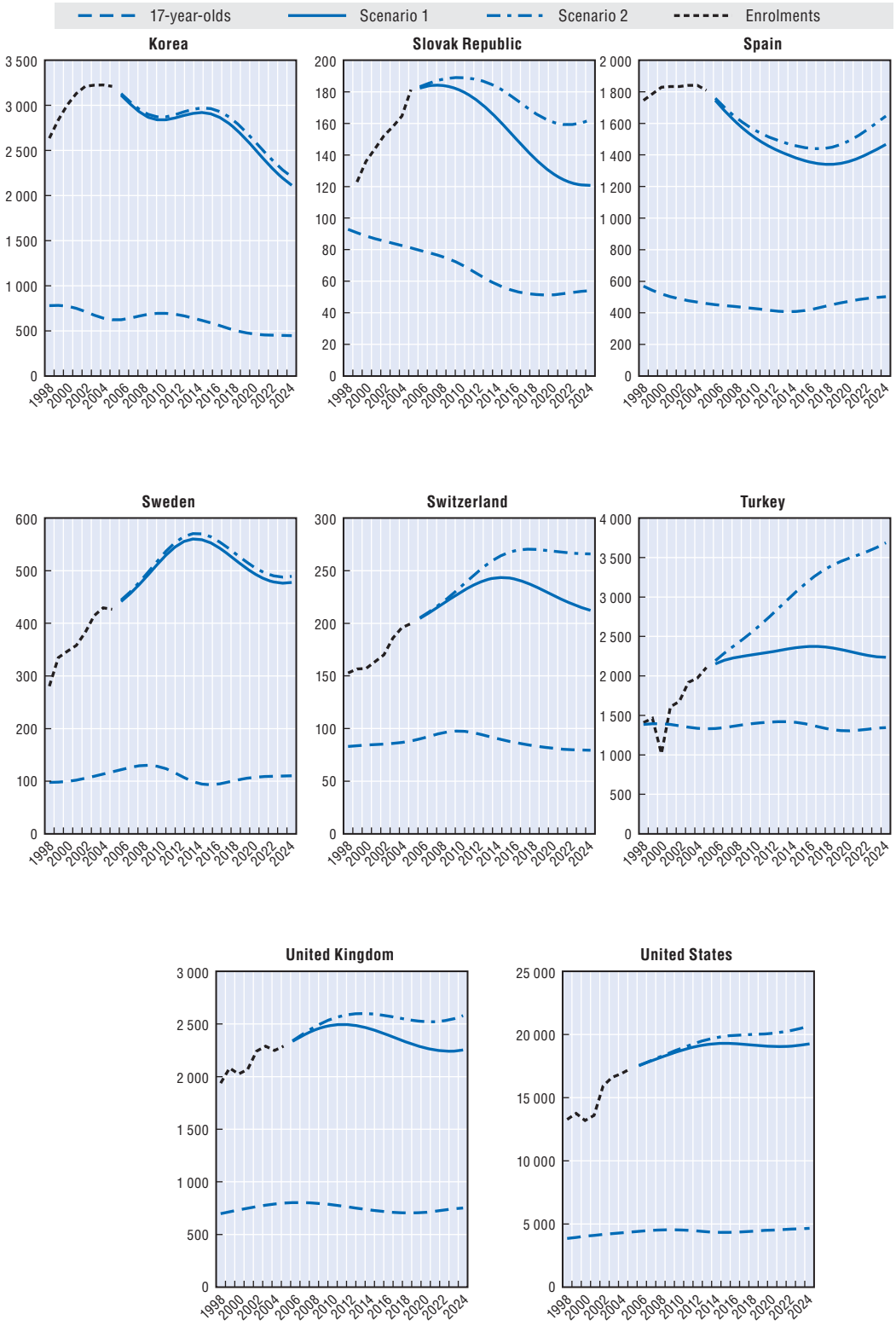
Figure 2.3. **Size of cohorts of young people aged 17 and student enrolments according to the two scenarios: trends and country projections** *(cont.)*



Source: OECD and UN Population Division (as revised in 2006).

education is possible, entry rates in other countries such as the United States have changed very little in recent years so that it is not unreasonable to suppose that other western countries might experience the same kind of stability. Conversely, the United States and other countries in which the growth in entry rates is sluggish might well deliberately increase access to higher education so that it reaches the levels of Korea or Japan. The trend scenario thus presupposes that the political, economic and social conditions that have shaped the earlier trend will exercise the same kind of impact in the decades ahead, though possibly for other reasons.

For all that, several factors suggest that systems will probably continue to expand and that scenario 2 is more likely than scenario 1. First, the political will to pursue the expansion of higher education systems exists in most countries. Many of them (such as Denmark, France, the United Kingdom or the United States) have set themselves the goal of broadening access or increasing the educational level of their adult population – often aiming to ensure that half an age group is either enrolled in or graduates from higher education. This stance is shaping the policies and strategies of higher education institutions, and suggests that the provision of higher education will not be rationed but encouraged by policy makers and the heads of institutions. Furthermore, there is still significant potential for growth in participation rates in many countries. Finally, the demand for higher education will probably continue to increase.

It might be thought that the expansion of higher education would lead to a lower return on investment for its graduates. For example, the bonuses they receive are often more modest in OECD countries than in the developing countries, in which participation in higher education is lower. However, recent trends do not suggest that the individual benefits of higher education are becoming more uniformly comparable to those possible for young people with a final secondary school leaving qualification: in many cases, the returns associated with degrees are changing little or increasing (OECD, 2007b). There are therefore strong incentives for people to graduate so as to increase their employment prospects and further their chances of earning a good living. It is possible that policies for funding and cost-sharing will lower these individual rewards, but the cases of Australia and the United Kingdom demonstrate that introducing and then increasing registration fees have had very little effect on student participation (Santiago *et al.*, 2008; Marks and McMillan, 2007). It is unlikely that in two decades the cost of higher education would be such as to discourage large numbers of students from pursuing their education at this level.

Tables 2.1 and 2.2 show the scale of growth or contraction of the higher education system in the two scenarios. The many simplified theories derived from the projection model mean that they should be used for guidance purposes rather than forecasting.

The trend estimates are comparable to those carried out at national level, where these exist (and are known to us). In the United States, the National Center for Education Statistics has thus estimated that the number of full-time or part-time students enrolled in higher education in 2014 would be 19.5 million[1] – a level comparable to the scenario 1 projection of 19.2 million in 2015. In Germany, projections have estimated that the student population would be 2.5 million in 2015 and 2.4 million in 2020, corresponding to comparable scales and rates of growth and then contraction.[2] In Hungary, projections put student enrolments by 2015, 2020 and 2030 at 520 000, 543 000 and 625 000 respectively.[3] This trend runs counter to the projections in our model which suggest that enrolments in

Hungary might fall because of a decrease in the size of the younger age cohorts and a tendency for higher education access rates to remain level. Inconsistencies of this kind serve as a reminder once more of the care required in interpreting estimates and projections, and of the significance of their underlying assumptions which contain simplifications not necessarily fully consistent with the circumstances of particular countries. Indeed, projections carried out on a country-by-country basis might well have produced slightly different results, if only because they could have reflected the potential impact of recent or publicly announced policies: as an example one might cite the admission of cohorts twice the normal size to higher education in Germany as a result of shortening general secondary education in the *Gymnasium* from nine years to eight between 2007 and 2014 in a majority of *Länder* (Gabriel, von Stuckrad and Witte, 2007).

In certain countries in which part-time study is a common occurrence, there may be a sizeable difference between the number of students enrolled full-time and part-time, and the number of full-time equivalent enrolments. Projections for the number of full-time equivalent enrolments are also annexed in Tables 2.A2.2 and 2.A2.3.

2.2. Impact on the budget for higher education

The ageing of the population has many implications for public expenditure and its distribution across various generations and age cohorts, as well as for the workforce. Many countries will have to contend with increasingly high dependence rates (expressed as the percentage of non-working persons with respect to the workforce): between 2005 and 2030, the dependence rate for the OECD is expected to rise from 26% to 42%, and from 36% to 54% in the case of the 15 initial European Union member countries (OECD, 2007a).

The ageing of the population might have an indirect impact on the funding of higher education: in societies in which a large proportion of the population and the electorate are elderly, education and higher education may appear to be a lower priority in terms of social options than in the past. Funding for pensions, health care and other services associated with ageing is a challenge that might lead to financial settlements prejudicial to public expenditure on higher education. In such a context, increasing public expenditure in this sector might be difficult. That said, it is also possible that elderly persons and policy makers will attach as much if not more importance to education and higher education than at present, either on altruistic grounds or because they stand to benefit indirectly from doing so (Poterba, 1998; Gradstein and Kaganovich, 2004). For example, the novel demands of an ageing society might change the priorities of governments and institutions, so that greater emphasis is placed on health disciplines, etc. Empirical research on this subject yields no firm conclusions. While, in Switzerland, educational expenditure is slowly coming to reflect demographic changes, the presence of an elderly population in the cantons has a distinctly negative impact on the level of educational funding (Grob and Wolter, 2007). In the United States, the elderly do not appear to have negative attitudes to education, and while a more elderly population is generally associated with lower levels of educational spending in the individual States, this does not apply to the "micro" level of districts (Poterba, 1997, 1998; Harris, Evans and Schwab, 2001).

In any event, increases or decreases in student enrolments have direct budgetary implications for all those with a stake in higher education. Expenditure on higher education depends on the level of enrolment and the cost of educational provision per student. In many countries, public-sector institutions receive grants on the basis of their

enrolments or graduates (Santiago *et al.*, 2008). A decrease in enrolments may provide scope for increasing the funding per student, for example by lowering the student-teacher ratio. All other things being equal, it reduces the budgetary pressure on public expenditure. At institutional level and depending on its magnitude, it may result in an improvement in learning or working conditions – and thus may have a positive impact on the quality of higher education. However, a decrease in enrolments may also amount to a budgetary "crisis" if they become too low to support the costs incurred by institutions.

Given that in most OECD countries, education is still funded primarily from public sources (though Korea and Japan are two exceptions), the issue of the budget is primarily one of public expenditure, bearing in mind that it is politically easier to maintain a public budget at around the same level than to increase it significantly.

The budgetary impact of changes in student demography on the cost of higher education may be estimated in the two foregoing scenarios. This is a means of understanding how possible trends in student enrolment affect the cost of higher education and, in particular, funding from public sources. But it also provides an illustration of how the cost of education depends on several factors other than demography.

The budgetary projections are based on simple assumptions regarding trends in costs and the level of national resources. The first is that GDP and costs per student in higher education (at constant prices) both grow at similar moderate rates: the annual GDP growth rate has been set at 2%, and the rate of growth in expenditure per student attending higher education institutions at its average annual rate of 1.6% between 1995 and 2005 (in countries for which information was available). As countries are at different stages of investing or decreasing their investment, it may be considered that reasoning in terms of the average will minimise the seasonal effects involved.

Tables 2.3 and 2.4 show the impact of changes in student enrolments on the total budget earmarked for higher education in scenarios 1 and 2, as well as the corresponding breakdown into public and private expenditure if the distribution of costs between public and private sources were to remain the same as in 2005. Public expenditure on higher education institutions includes public grants to them, as well as transfers to families later passed on to institutions. Scenario 1 (*status quo*) would imply that total expenditure on higher education between 2005 and 2025 remained unchanged at 1.4% of GDP, with a slight increase to 1.6% by 2015. Public expenditure in countries would fall on average by 0.1 percentage points of GDP if cost-sharing between public and private sources of funding remained the same as in 2005. Scenario 2 (trend-related) would imply an average increase in expenditure between 2005 and 2025, to 1.6% of GDP, with a slight rise to 1.7% by 2015. The share of public expenditure would also increase slightly by 0.1 percentage points of GDP. However, this general tendency to stability belies differing trends between countries, with increases of 0.7 percentage points of GDP or more in Denmark, Mexico and the United States, and a decrease of 0.7 percentage points in Korea. While in most countries, the impact on public expenditure is similar to that on total expenditure, this is not so in some countries given the scale of their private contributions to the funding of higher education. Thus in the United States the total projected increase is relatively high (0.7 percentage points of GDP), although the rise in public expenditure (0.2 percentage points of GDP) remains close to the average for other countries.

Table 2.5 shows these same projections expressed as a percentage of total public expenditure (if this were to remain at the same current level as a proportion of GDP). It

Table 2.3. **Impact of scenario 1 on total expenditure for tertiary education institutions**

	Projected expenditure as share of projected GDP				Projected public and private expenditure as share of projected GDP							
	2005	2015	2020	2025	*2005*		2015		2020		2025	
					Public	*Private*	Public	Private	Public	Private	Public	Private
Australia	*1.6*	1.8	1.7	1.7	*0.8*	*0.8*	0.9	0.9	0.8	0.9	0.8	0.9
Austria	*1.3*	1.4	1.3	1.2	*1.2*	*0.1*	1.4	0.1	1.3	0.1	1.1	0.1
Belgium	*1.2*	1.3	1.2	1.2	*1.2*	*0.1*	1.2	0.1	1.2	0.1	1.1	0.1
Canada	*2.6*	m	m	m	*1.4*	*1.1*	m	m	m	m	m	m
Czech Republic	*1.0*	1.1	0.9	0.8	*0.8*	*0.2*	0.9	0.2	0.8	0.2	0.7	0.2
Denmark	*1.7*	2.4	2.4	2.3	*1.6*	*0.1*	2.3	0.1	2.3	0.1	2.2	0.1
Finland	*1.7*	1.8	1.6	1.5	*1.7*	*0.1*	1.7	0.1	1.6	0.1	1.5	0.1
France	*1.3*	1.4	1.4	1.4	*1.1*	*0.2*	1.2	0.2	1.2	0.2	1.2	0.2
Germany	*1.1*	1.1	1.0	1.0	*0.9*	*0.2*	1.0	0.2	0.9	0.2	0.8	0.1
Greece	*1.5*	1.5	1.4	1.4	*1.4*	*n*	1.5	0.1	1.4	0.0	1.3	0.0
Hungary	*1.1*	1.4	1.2	1.1	*0.9*	*0.2*	1.1	0.3	0.9	0.3	0.9	0.2
Iceland	*1.2*	1.5	1.4	1.3	*1.1*	*0.1*	1.4	0.1	1.3	0.1	1.2	0.1
Ireland	*1.2*	1.1	1.2	1.3	*1.0*	*0.1*	1.0	0.1	1.0	0.1	1.1	0.1
Italy	*0.9*	1.1	1.0	1.0	*0.6*	*0.3*	0.7	0.3	0.7	0.3	0.7	0.3
Japan	*1.4*	1.1	1.1	1.0	*0.5*	*0.9*	0.4	0.7	0.4	0.7	0.3	0.7
Korea	*2.4*	2.4	2.1	1.7	*0.6*	*1.8*	0.6	1.8	0.5	1.6	0.4	1.3
Luxembourg	*m*	m	m	m	*m*	*m*	m	*m*	m	m	m	m
Mexico	*1.3*	1.9	1.8	1.7	*0.9*	*0.4*	1.3	0.6	1.3	0.5	1.2	0.5
Netherlands	*1.3*	1.6	1.5	1.5	*1.0*	*0.3*	1.2	0.3	1.2	0.3	1.2	0.3
New Zealand	*1.5*	m	m	m	*0.9*	*0.6*	m	m	m	m	m	m
Norway	*1.3*	m	m	m	*1.3*	*m*	m	m	m	m	m	m
Poland	*1.6*	1.3	1.1	0.9	*1.2*	*0.4*	1.0	0.3	0.8	0.3	0.7	0.2
Portugal	*1.4*	m	m	m	*0.9*	*0.4*	m	m	m	m	m	m
Slovak Republic	*0.9*	0.9	0.7	0.6	*0.7*	*0.2*	0.7	0.2	0.5	0.1	0.4	0.1
Spain	*1.1*	1.0	0.9	1.0	*0.9*	*0.2*	0.8	0.2	0.7	0.2	0.8	0.2
Sweden	*1.6*	2.2	1.8	1.7	*1.5*	*0.2*	1.9	0.2	1.6	0.2	1.5	0.2
Switzerland	*1.4*	m	m	m	*1.4*	*m*	m	m	m	m	m	m
Turkey	*m*	m	m	m	*m*	*m*	m	m	m	m	m	m
United Kingdom	*1.3*	1.5	1.4	1.3	*0.9*	*0.4*	1.0	0.5	0.9	0.5	0.9	0.4
United States	*2.9*	3.5	3.3	3.3	*1.0*	*1.9*	1.2	2.3	1.2	2.2	1.2	2.2
Country mean	***1.4***	**1.6**	**1.4**	**1.4**	***1.1***	***0.4***	**1.2**	**0.4**	**1.1**	**0.4**	**1.0**	**0.4**

m = missing.

Note: In the case of all countries, annual growth in GDP and expenditure per student at constant prices have been set at 2% and 1.6%, respectively. Public expenditure includes transfers to households, which are subsequently passed on to institutions (*cf.* OECD, 2007b).

corresponds therefore to the national public commitment to direct expenditure on higher education following an increase in the budget – or, on the contrary, shows how the decrease in enrolments might unlock extra public resources whether for reinvestment in higher education or other publicly funded activities. Scenario 1 would represent scope for reinvestment of 0.3% of public expenditure on average, with the proportion of public expenditure on higher education falling from 2.5% to 2.2%. Scenario 2 would represent an average rise of 0.2% in public expenditure on higher education. Here again, countries exhibit significant differences. However, the impact of demographic changes would remain limited in a majority of countries.

Table 2.4. **Impact of scenario 2 on total expenditure for tertiary education institutions**

	Projected expenditure as share of projected GDP				Projected public and private expenditure as share of projected GDP							
	2005	2015	2020	2025	*2005*		2015		2020		2025	
					Public	*Private*	Public	Private	Public	Private	Public	Private
Australia	*1.6*	1.9	1.9	1.9	*0.8*	*0.8*	0.9	1.0	0.9	1.0	0.9	1.0
Austria	*1.3*	1.6	1.7	1.6	*1.2*	*0.1*	1.5	0.1	1.6	0.1	1.6	0.1
Belgium	*1.2*	1.3	1.2	1.2	*1.2*	*0.1*	1.2	0.1	1.2	0.1	1.1	0.1
Canada	*2.6*	m	m	m	*1.4*	*1.1*	m	m	m	m	m	m
Czech Republic	*1.0*	1.4	1.3	1.3	*0.8*	*0.2*	1.2	0.3	1.0	0.2	1.0	0.2
Denmark	*1.7*	2.5	2.5	2.4	*1.6*	*0.1*	2.4	0.1	2.5	0.1	2.3	0.1
Finland	*1.7*	1.8	1.7	1.6	*1.7*	*0.1*	1.8	0.1	1.7	0.1	1.6	0.1
France	*1.3*	1.5	1.6	1.7	*1.1*	*0.2*	1.3	0.2	1.4	0.2	1.4	0.2
Germany	*1.1*	1.3	1.3	1.3	*0.9*	*0.2*	1.1	0.2	1.1	0.2	1.1	0.2
Greece	*1.5*	1.5	1.5	1.6	*1.4*	*n*	1.5	0.1	1.5	0.0	1.5	0.1
Hungary	*1.1*	1.5	1.3	1.2	*0.9*	*0.2*	1.2	0.3	1.0	0.3	0.9	0.3
Iceland	*1.2*	1.7	1.5	1.5	*1.1*	*0.1*	1.5	0.1	1.4	0.1	1.3	0.1
Ireland	*1.2*	1.2	1.3	1.5	*1.0*	*0.1*	1.1	0.1	1.2	0.1	1.4	0.2
Italy	*0.9*	1.1	1.2	1.2	*0.6*	*0.3*	0.8	0.3	0.8	0.4	0.9	0.4
Japan	*1.4*	1.2	1.2	1.1	*0.5*	*0.9*	0.4	0.8	0.4	0.8	0.4	0.8
Korea	*2.4*	2.4	2.1	1.7	*0.6*	*1.8*	0.6	1.8	0.5	1.6	0.4	1.3
Luxembourg	*m*	m	m	m	*m*	*m*	m	m	m	m	m	m
Mexico	*1.3*	2.2	2.4	2.4	*0.9*	*0.4*	1.6	0.7	1.6	0.7	1.7	0.7
Netherlands	*1.3*	1.7	1.8	1.9	*1.0*	*0.3*	1.4	0.4	1.4	0.4	1.5	0.4
New Zealand	*1.5*	m	m	m	*0.9*	*0.6*	m	m	m	m	m	m
Norway	*1.3*	m	m	m	*1.3*	*m*	m	m	m	m	m	m
Poland	*1.6*	1.5	1.2	1.1	*1.2*	*0.4*	1.1	0.4	0.9	0.3	0.8	0.3
Portugal	*1.4*	m	m	m	*0.9*	*0.4*	m	m	m	m	m	m
Slovak Republic	*0.9*	1.1	0.9	0.9	*0.7*	*0.2*	0.8	0.2	0.7	0.2	0.7	0.2
Spain	*1.1*	1.0	1.0	1.2	*0.9*	*0.2*	0.8	0.2	0.8	0.2	0.9	0.2
Sweden	*1.6*	2.1	1.8	1.8	*1.5*	*0.2*	1.9	0.2	1.6	0.2	1.6	0.2
Switzerland	*1.4*	m	m	m	*1.4*	*m*	m	m	m	m	m	m
Turkey	*m*	m	m	m	*m*	*m*	m	m	m	m	m	m
United Kingdom	*1.3*	1.6	1.5	1.6	*0.9*	*0.4*	1.1	0.5	1.0	0.5	1.0	0.5
United States	*2.9*	3.5	3.5	3.6	*1.0*	*1.9*	1.2	2.3	1.2	2.3	1.2	2.3
Country mean	***1.4***	**1.7**	**1.6**	**1.6**	***1.1***	***0.4***	**1.3**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**

m = missing.
Note: See Table 2.3.

Can increases and decreases in the budget be attributed to changes in student demographic trends? Only up to a point. Table 2.6 indicates that demographic changes would account for an average increase of 0.16 percentage points of GDP between 2005 and 2025 in the trend scenario (compared to 0.25 altogether), and a decrease of 0.1 percentage points in scenario 1 (instead of very little change). Changes in costs are not related just to changes in the number of students, but also to trends in expenditure per student and in the level of national resources – and, in the case of public expenditure, to the relative share of public and private funding. The *relative* reduction in expenditure sometimes stems from its being expressed as a proportion of national assets. Figure 2.4 shows the difference between the growth in expenditure and in student enrolments in the trend scenario (scenario 2).

The budgetary projections shown should be interpreted with caution because of a series of limitations: once more, their purpose is primarily heuristic.

Table 2.5. **Impact of projections on total expenditure for tertiary education institutions, as share of public expenditure**

	Public expenditure for tertiary education institutions as share of all public expenditure, 2005 and projections						
	2005	Scenario 1			Scenario 2		
		2015	2020	2025	2015	2020	2025
Australia	*m*	2.5	2.4	2.3	2.7	2.6	2.7
Austria	*2.4*	2.7	2.5	2.3	3.1	3.2	3.1
Belgium	*2.2*	2.5	2.3	2.2	2.5	2.3	2.2
Canada	*3.5*	m	m	m	m	m	m
Czech Republic	*1.9*	2.1	1.7	1.6	2.6	2.4	2.4
Denmark	*3.1*	4.4	4.4	4.2	4.6	4.6	4.4
Finland	*3.3*	3.4	3.1	2.9	3.5	3.3	3.1
France	*2.1*	2.2	2.2	2.2	2.4	2.5	2.7
Germany	*2.0*	2.1	1.9	1.7	2.4	2.5	2.5
Greece	*m*	3.2	3.0	2.9	3.2	3.2	3.3
Hungary	*1.7*	2.2	1.8	1.7	2.3	1.9	1.8
Iceland	*2.6*	3.1	2.9	2.7	3.4	3.1	3.0
Ireland	*2.8*	3.0	3.1	3.4	3.2	3.5	4.1
Italy	*1.3*	1.5	1.5	1.5	1.6	1.7	1.8
Japan	*1.3*	1.0	1.0	0.9	1.1	1.1	1.0
Korea	*2.0*	2.1	1.8	1.5	2.1	1.9	1.5
Luxembourg	*m*	m	m	m	m	m	m
Mexico	*3.8*	m	m	m	m	m	m
Netherlands	*2.2*	2.7	2.6	2.6	3.0	3.1	3.3
New Zealand	*2.8*	m	m	m	m	m	m
Norway	*m*	m	m	m	m	m	m
Poland	*2.7*	2.2	1.8	1.5	2.4	2.0	1.9
Portugal	*1.9*	m	m	m	m	m	m
Slovak Republic	*3.5*	1.7	1.3	1.1	2.1	1.8	1.7
Spain	*2.3*	2.0	1.9	2.1	2.1	2.1	2.4
Sweden	*2.5*	3.4	2.9	2.7	3.3	2.7	2.7
Switzerland	*3.1*	m	m	m	m	m	m
Turkey	*m*	m	m	m	m	m	m
United Kingdom	*2.0*	2.2	2.0	2.0	2.4	2.3	2.3
United States	*2.7*	3.3	3.2	3.2	3.4	3.3	3.4
Country mean	***2.5***	**2.5**	**2.3**	**2.2**	**2.7**	**2.6**	**2.7**

m = missing.
Note: See Table 2.3.

There are many unknowns as regards the determining factors in the expenditure of higher education institutions. Some of it is linked to investment in infrastructure: if a country's past growth has been strongly tied to such investment, there is no reason why growth should continue if enrolments fall; conversely, if this is not the case, infrastructural investment may be expected to boost costs in countries about to experience sustained growth. Another share of expenditure – in fact the most important part – corresponds to the total wages bill of teaching and administrative staff, which is strongly related to the age of staff in salary systems based (mainly) on length of service. A major change in the age structure of staff might thus lead to an increase or decrease in institutional expenditure. The financial data shown also take account of staff retirement funds, thus incorporating a future-oriented budgetary factor.

A further limiting factor is that the reasoning here relates to expenditure finally allocated to higher education institutions. Yet indirect expenditure tied for example to

Table 2.6. **Impact of changes in enrolments on the budget for tertiary education institutions**

	Change in public and private expenditure for tertiary education institutions attributable to enrolment change as share of GDP						Change in public expenditure for tertiary education institutions attributable to enrolment change as share of all public expenditure					
	Scenario 1			Scenario 2			Scenario 1			Scenario 2		
	2015	2020	2025	2015	2020	2025	2015	2020	2025	2015	2020	2025
Australia	–0.02	–0.07	–0.07	0.14	0.13	0.18	–0.03	–0.10	–0.10	0.19	0.18	0.25
Austria	0.08	0.02	–0.07	0.29	0.35	0.37	0.16	0.04	–0.14	0.55	0.67	0.70
Belgium	0.01	–0.05	–0.08	–0.01	–0.06	–0.09	0.01	–0.09	–0.14	–0.01	–0.11	–0.16
Canada	m	m	m	m	m	m	m	m	m	m	m	m
Czech Republic	0.01	–0.17	–0.23	0.29	0.18	0.20	0.02	–0.31	–0.42	0.53	0.33	0.37
Denmark	0.58	0.63	0.53	0.70	0.74	0.64	1.05	1.14	0.96	1.27	1.35	1.16
Finland	0.06	–0.08	–0.12	0.11	0.02	–0.01	0.12	–0.15	–0.24	0.22	0.03	–0.02
France	0.03	0.05	0.09	0.14	0.24	0.38	0.05	0.08	0.15	0.22	0.39	0.60
Germany	0.05	–0.02	–0.09	0.23	0.27	0.30	0.10	–0.04	–0.17	0.42	0.50	0.55
Greece	–0.11	–0.18	–0.20	–0.13	–0.10	–0.01	–0.24	–0.38	–0.43	–0.27	–0.21	–0.03
Hungary	0.02	–0.18	–0.24	0.10	–0.11	–0.17	0.03	–0.28	–0.37	0.15	–0.17	–0.26
Iceland	0.14	0.04	0.01	0.28	0.17	0.14	0.29	0.09	0.02	0.57	0.36	0.29
Ireland	–0.09	–0.04	0.09	–0.03	0.12	0.37	–0.24	–0.11	0.24	–0.09	0.31	0.97
Italy	0.05	0.06	0.05	0.11	0.19	0.27	0.07	0.08	0.08	0.17	0.28	0.39
Japan	–0.15	–0.15	–0.21	–0.09	–0.04	–0.07	–0.14	–0.14	–0.19	–0.08	–0.04	–0.06
Korea	–0.20	–0.44	–0.81	–0.19	–0.41	–0.77	–0.17	–0.38	–0.71	–0.17	–0.36	–0.68
Luxembourg	m	m	m	m	m	m	m	m	m	m	m	m
Mexico	0.13	0.10	0.04	0.50	0.66	0.76	m	m	m	m	m	m
Netherlands	0.17	0.16	0.16	0.36	0.46	0.56	0.30	0.27	0.27	0.61	0.79	0.97
New Zealand	m	m	m	m	m	m	m	m	m	m	m	m
Norway	m	m	m	m	m	m	m	m	m	m	m	m
Poland	–0.43	–0.66	–0.75	–0.30	–0.49	–0.56	–0.72	–1.09	–1.23	–0.49	–0.80	–0.92
Portugal	m	m	m	m	m	m	m	m	m	m	m	m
Slovak Republic	–0.54	–0.75	–0.82	–0.35	–0.49	–0.48	–1.03	–1.45	–1.57	–0.67	–0.93	–0.92
Spain	–0.70	–0.72	–0.59	–0.63	–0.60	–0.42	–1.46	–1.49	–1.22	–1.31	–1.25	–0.87
Sweden	0.61	0.28	0.24	0.56	0.21	0.25	0.96	0.44	0.37	0.87	0.33	0.39
Switzerland	m	m	m	m	m	m	m	m	m	m	m	m
Turkey	m	m	m	m	m	m	m	m	m	m	m	m
United Kingdom	0.17	0.07	0.06	0.29	0.25	0.30	0.24	0.11	0.09	0.42	0.37	0.44
United States	0.29	0.21	0.28	0.36	0.36	0.51	0.28	0.20	0.27	0.34	0.35	0.49
Country mean	**0.01**	**–0.08**	**–0.10**	**0.13**	**0.11**	**0.16**	**–0.03**	**–0.18**	**–0.21**	**0.16**	**0.12**	**0.20**

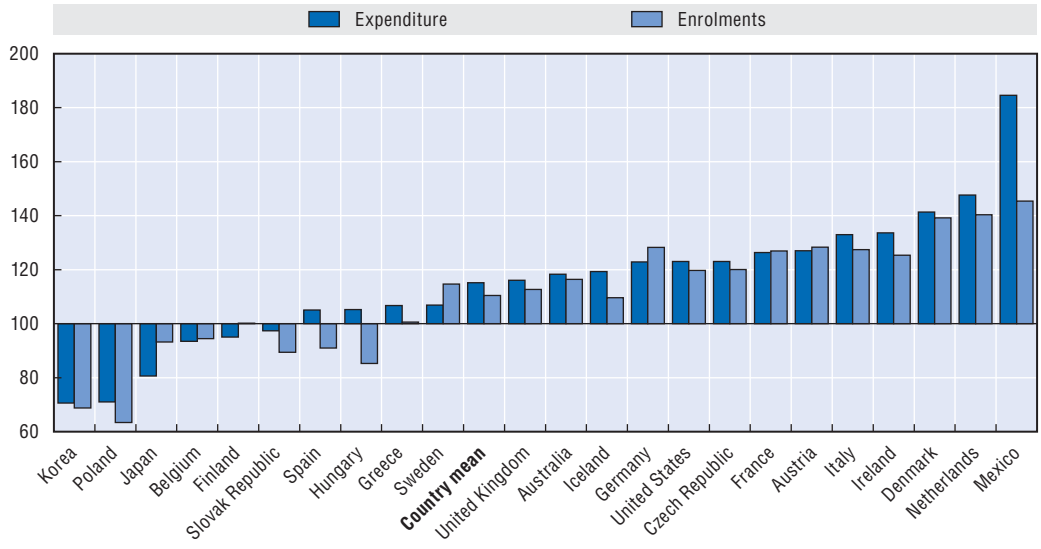
m = missing.
Note: See Table 2.3.

student grants or loans is rising in public higher education budgets. One reason for not taking account of such indirect expenditure is the question of comparability and the fact that loans, which will be repaid at a later date, do not strictly speaking constitute expenditure. However, in the case of the Nordic countries, it is hard not to take this indirect expenditure into account, as it represents a major share of public expenditure and, to a large extent, real expenditure that will not be reimbursed.

Other budgetary projections are annexed (see Tables 2.A2.4 to 2.A2.7). They are based on the assumption that the total expenditure per student earmarked for higher education institutions would continue to grow in each country at the same rate as between 1995 and 2005, and that the GDP of countries would continue to grow at the same average rate as between 1995 and 2005 (all at constant prices). Public and private costs per student and national resources are thus extrapolated linearly country by country. The foregoing

Figure 2.4. **A comparison of the growth in the budget and in student numbers between 2005 and 2025 in scenario 2**

(2005 = 100)



assumption enables one to understand what would occur if recent trends were maintained in the 20 countries for which all relevant data are available. (The projections for Belgium, France, Iceland and Korea are not included in the averages: they are based on the growth in costs per student between 2000 and 2005.) The results stand in much greater contrast than those in the budget scenario shown above.[4] In reality, decreases no less than increases can only correspond to transitional stages subsequent either to under-investment or, conversely, to a drive for sustained funding. These tables show that, in some countries, it will probably be hard to sustain the trends of the last decade in those ahead.

In conclusion, the projections in this section show that, on the basis of conservative assumptions, foreseeable demographic changes should not exert pressure on budgets limiting budgetary options or policy implementation in higher education to any significant extent.

2.3. Impact on student-teacher ratios

Another way of considering the impact of changes in the size of systems is in relation not to their budget but to the student-teacher ratio (*i.e.* the number of students for every teacher): at constant staffing levels, a decrease in student enrolments could lead to more favourable student-teacher ratios, with possible improvements in the quality of teaching, whereas an increase in enrolments might have the opposite effect. The expected negative impact of increases in the student-teacher ratio on quality presupposes that productivity in education remains constant, which is not necessarily so. It might indeed be hoped that innovations in teaching and administration result in greater productivity. In many cases, the expansion of higher education has gone hand in hand with an increase in student-teacher ratios (with larger classes and fuller lecture halls in first degree courses).

Table 2.7 shows how projected student enrolments would affect student-teacher ratios (assuming that teaching staff numbers remained constant). In scenario 1 (*status quo*), the student-teacher ratio in countries would fall on average by 1.9 students per teacher by 2025, whereas it would rise by 1.6 students by 2025 in scenario 2 (trend-based). Here

Table 2.7. **Impact of scenarios 1 and 2 on the student/teacher ratio (ISCED 5/6)**

	Student/staff ratio	Change in student/teacher ratio if same teaching staff as 2005						Teaching staff (FTE)	Additional teaching staff needed to keep student-teacher ratio at 2005 level (2005 = 100)					
		Scenario 1 (*status quo*)			Scenario 2 (trend)				Scenario 1 (*status quo*)			Scenario 2 (trend)		
	2005	2015	2020	2025	2015	2020	2025	*2005*	2015	2020	2025	2015	2020	2025
Australia	*20.7*	0.6	0.0	–0.1	2.4	2.4	2.9	*35 872*	103	103	100	111	111	114
Austria	*16.1*	0.9	0.1	–1.0	3.3	4.2	4.5	*15 223*	105	105	93	121	126	128
Belgium	*19.6*	0.3	–0.6	–1.0	0.1	–0.7	–1.1	*17 912*	102	102	95	101	96	94
Canada	*m*	m	m	m	m	m	m	*m*	m	m	m	m	m	m
Czech Republic	*20.7*	0.2	–3.2	–4.4	5.3	3.4	3.9	*15 755*	101	101	79	126	116	119
Denmark	*m*	m	m	m	m	m	m	*m*	m	m	m	m	m	m
Finland	*12.5*	0.4	–0.7	–1.0	0.7	0.0	–0.1	*17 940*	103	103	92	106	100	99
France	*16.7*	0.1	0.3	0.9	1.4	2.8	4.5	*130 970*	101	101	105	108	117	127
Germany	*12.4*	0.6	–0.3	–1.1	2.5	3.1	3.5	*178 086*	105	105	91	121	125	129
Greece	*30.6*	–2.2	–3.5	–4.1	–2.5	–2.0	–0.3	*21 119*	93	93	87	92	94	99
Hungary	*15.9*	0.1	–2.2	–2.9	1.0	–1.4	–2.1	*21 181*	101	101	82	107	91	87
Iceland	*10.7*	0.7	0.0	–0.3	1.8	1.0	0.8	*1 240*	107	107	97	117	109	107
Ireland	*17.0*	–1.9	–1.2	0.7	–1.0	1.1	4.7	*9 925*	89	89	104	94	106	128
Italy	*21.4*	0.9	1.1	1.1	2.3	4.1	5.8	*94 371*	104	104	105	111	119	127
Japan	*11.0*	–1.4	–1.5	–2.0	–0.9	–0.5	–0.8	*350 919*	87	87	81	92	96	93
Korea	*24.4*	–1.9	–4.2	–8.0	–1.9	–4.0	–7.7	*131 358*	92	92	67	92	84	69
Luxembourg	*m*	m	m	m	m	m	m	*m*	m	m	m	m	m	m
Mexico	*14.9*	1.0	0.7	0.2	4.2	5.7	6.7	*159 930*	107	107	101	128	138	145
Netherlands	*14.5*	1.6	1.5	1.5	3.5	4.7	5.9	*35 511*	111	111	111	124	132	141
New Zealand	*16.3*	m	m	m	m	m	m	*10 848*	m	m	m	m	m	m
Norway	*m*	0.0	0.0	0.0	0.0	0.0	0.0	*m*	m	m	m	m	m	m
Poland	*18.2*	–4.1	–6.6	–7.7	–2.7	–4.8	–5.7	*98 330*	77	77	58	85	74	69
Portugal	*m*	m	m	m	m	m	m	*28 824*	m	m	m	m	m	m
Slovak Republic	*16.2*	–2.0	–4.7	–5.6	0.1	–1.6	–1.6	*11 196*	87	87	65	101	90	90
Spain	*13.6*	–2.9	–3.1	–2.2	–2.3	–2.2	–0.7	*123 509*	79	79	84	83	84	95
Sweden	*8.9*	3.2	1.3	1.1	2.9	0.9	1.2	*33 010*	136	136	112	132	110	113
Switzerland	*18.2*	3.7	2.4	0.9	5.8	6.1	5.9	*9 755*	120	120	105	132	134	132
Turkey	*25.8*	3.2	2.9	1.7	11.6	16.3	19.1	*81 551*	112	112	107	145	163	174
United Kingdom	*18.2*	0.8	–0.4	–0.6	2.5	2.1	2.9	*93 439*	105	105	97	114	112	116
United States	*15.7*	1.9	1.6	1.9	2.2	2.3	3.1	*835 926*	112	112	112	114	115	120
OECD	***17.2***	**–0.5**	**–1.5**	**–1.9**	**1.0**	**1.1**	**1.6**	***2 563 698***	**102**	**102**	**93**	**111**	**110**	**113**
EU19	***17.0***	**–0.2**	**–1.4**	**–1.6**	**1.1**	**0.9**	**1.6**	***946 300***	**100**	**100**	**91**	**108**	**106**	**110**

m = missing.

Note: Student enrolments and the teaching staff are expressed in full-time equivalents (FTE).

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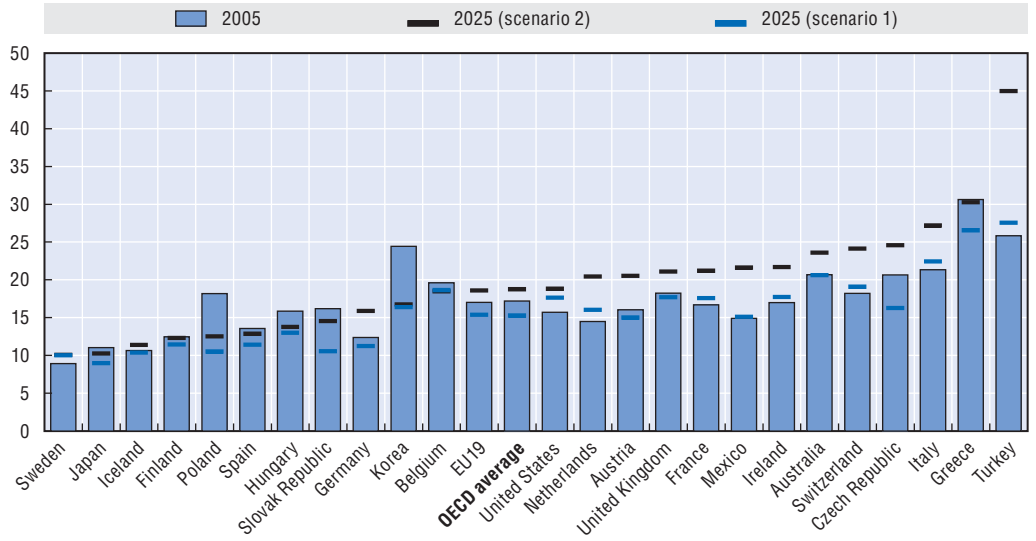
again, there are significant variations between the two scenarios and from one country to the next. However, it is hard to reach general conclusions, bearing in mind that the impact on quality of one extra student per teacher is probably not the same for all initial class sizes (an increasing marginal diminution in quality probably occurs): in the case of countries with low student-teacher ratios, one extra student per teacher may not greatly affect quality; on the other hand, in countries in which the student-teacher ratio is already high, continuing to increase it may have a negative impact on the quality of provision (if teaching methods remain the same) or student performance. In particular, certain skills that are more readily imparted by teaching small groups of students would be hard to develop, such as the teamwork or communication skills that are regarded as essential in post-industrial economies (OECD, 2007e).

Figure 2.5. **Student-teacher ratios in each of the two scenarios in 2005 and 2025 if (full-time equivalent) teaching staff numbers were to remain at their 2005 level**



Note: Korea, the Netherlands, Switzerland: 2004 instead of 2005. The student-teacher ratio in Australia is possibly not comparable to that in the other countries. Student enrolment and teaching staff numbers are in full-time equivalents.

Source: OECD (except Australia: DEST, 2004).

As Figure 2.5 reveals, in the trend scenario, student-teacher ratios in certain countries could rise by over 3 students per teacher in the period up to 2025. This might apply to countries such as Australia, the Czech Republic, France, Ireland, Italy, Switzerland and Turkey, in which the student-teacher ratio exceeded the OECD country average in 2005 (17.2 students per teacher). Barring any revolution in teaching, quality will probably come under pressure in these systems if they do not increase their staffing. To cite an extreme case, student-teacher ratios in Turkey would soar (scenario 1 included): managing expansion there while the budget and quality changed very little would doubtless be a tall order. Mexico would also experience considerable pressure, even though its initial student-teacher ratio is lower. Other countries such as Greece and Korea would probably witness a decrease in their ratios, without them however falling below the current OECD country average. In the case of these countries, the decline in enrolment could be an unexpectedly welcome means of lowering the student-teacher ratio. Countries like Poland or Spain could

use the decrease in their ratios to establish innovative teaching methods and perhaps raise their achievement rates (which would also slow down the fall in their student enrolments). Finally, in countries in which student-teacher ratios have changed little, ratios may be used as an adjustment variable to deal with changes in student enrolments.

Table 2.7 also indicates the order of magnitude of the increase or decrease in academic teaching staff that would be required if one wished to maintain the 2005 student-teacher ratio. It will be noted that these increases or decreases do not correspond to the number of teachers that should be recruited. For this to be determined, it is necessary to take account of the number of retirements and turnover among teaching staff, as well as the varied categories of teacher status. Changes in student enrolments in the trend scenario would lead to an average rise of 10% in the number of teachers in 2025 compared to 2005. In some countries, this increase would be quite big (Turkey, Mexico and the Netherlands), but would correspond to an average annual growth rate of 2-4%.

2.4. Impact on teacher recruitment requirements

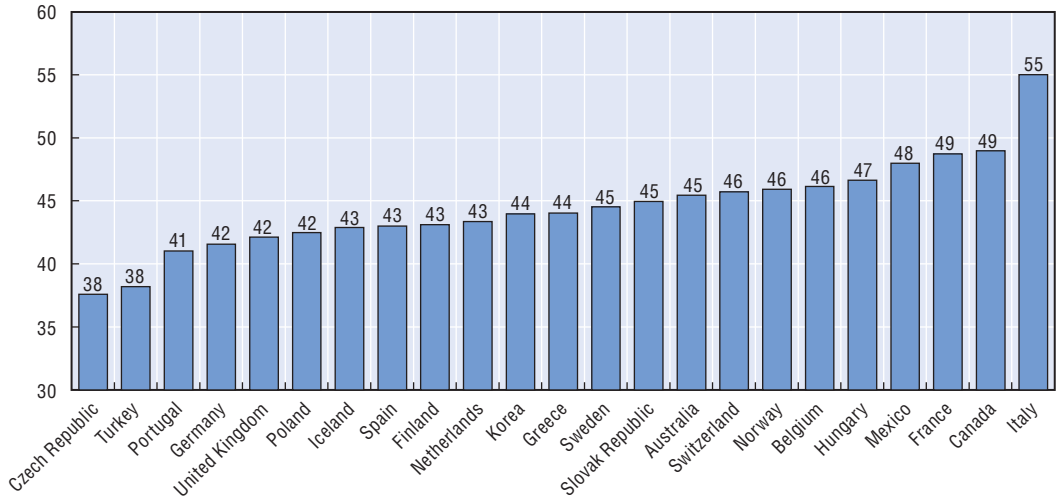
One of the difficulties with the rapid expansion of higher education systems is that their teaching staff cannot always be recruited or replaced at will, because of a lack of appropriately qualified human resources. Conversely, where systems shrink markedly, one may be faced with "overproduction" of doctoral graduates if non-university sectors do not manage to absorb them. In the OECD countries, this scenario appears unlikely.

The retirement of academic teaching staff in large numbers creates both opportunities and challenges for institutions and systems of higher education: opportunities to improve the quality of teachers or the way their skills are distributed, but above all a chance to alter organisational or professional culture; challenges in terms either of recruiting large numbers of staff without making any quality concessions at a time when other institutions are doubtless in the same situation, or of retaining the best aspects of the organisational culture and its social capital.

The growth in student enrolments is conducive to changes in teaching staff and the employment of younger teachers (at constant student-teacher ratios): it enables the recruitment of new teachers who may be either young or different, without awaiting the departure of those already employed, and thus encourages some measure of responsiveness to social and academic changes. Permanent teaching staff either age or, as Willekens (2008) demonstrates, experience cyclic changes in their age structure. The percentage of non-statutory teaching staff increases, yet offers university heads, deans or ministries some degree of flexibility in managing their staff, though subject to the possible disadvantages of dual labour markets (Enders and Musselin, 2008).

One indicator of this potential problem lies in the average age of teachers in higher education.[5] As Willekens (2008) reveals, this is less the reflection of ageing in the population than the product of a particular employment system (characterised by tenure or "job security") combined with a change of size in the system at a constant student-teacher ratio. In most OECD countries, teachers in higher education are not that old on average, as Figure 2.6 indicates. Their average age is 45 in the 23 countries for which data are available. Italy is the only country in which the ageing of teaching staff is problematic, with an average age of 55 among these staff, 63% of whom have to be replaced by 2020 if their numbers are to remain constant, representing an average annual replacement rate of 4.2% (excluding replacements attributable to turnover).[6] France, Hungary and the Slovak

Figure 2.6. **Average age of teachers in higher education (2005)**



Note: Australia, Canada and the Czech Republic: 2000; Norway: 2004; Mexico: solely public education, 2004.
Source: OECD; Mexico: Bensusán and Ahumada Lobo (2006).

Republic are also experiencing a slightly difficult situation, with more than 40% of their teaching staff aged over 50 (and thus average annual replacement rates of 2.8-3% solely for those retiring). As retirement age and the regulations governing retirement vary from one country to the next, the problems posed by the age pyramid and the need to replace teachers differ depending on the regulations concerned. In the United States, in which retirement is no longer mandatory, the management of ageing involves for example the development of appropriate pension schemes (Clark, 2004).

In fact, the replacement and demography of teachers in higher education are more pertinent issues for individual academic subjects than for teaching staff as a whole. On the one hand, the age pyramid of teachers may vary markedly from one discipline to the next, sometimes for reasons peculiar to a particular field. Subjects with a strong practical dimension, such as education (in the sense of teacher training) or management, call for teachers who have acquired prior practical experience in their field, which means that the staff concerned are older on average than in the case of primarily research-oriented disciplines. On the other hand, certain subject areas may face greater problems in the recruitment or retention of teachers, depending on the level of competition from professional occupations in which the same basic skills are appreciated on the labour market. Finally, the recruitment of academic staff does not draw exclusively on trained human resources in the country concerned, but also on foreign graduates, especially in the English-speaking countries (Enders and Musselin, 2008).

A recent British study on the demography of the social sciences in the United Kingdom reveals the extent to which the position of teacher-researchers in the social sciences depends on the particular discipline (Mills *et al.*, 2007). While social sciences academics are older than their colleagues in the natural sciences, their age within each of the social sciences varies considerably: out of the 18 specific disciplines examined, academics were relatively more elderly in four sectors, namely education (over half of the staff aged over 50), social work (47%), social policy (42%) and management (41%), all of which are subjects with a dominant practical dimension. In the case of those that are research oriented,

sociology and linguistics displayed the most elderly demographic profile, with 42% and 40% respectively of their staff aged over 50. Yet in the qualitative study, problems of retention or recruitment were related to specific skills and did not appear to be immediately associated with the demographic issue. In the United Kingdom, many teacher-researchers are recruited from graduates who though they do not have British nationality obtained their doctorate in the United Kingdom or the United States. Thus, in anthropology, economics and linguistics, under 70% of teaching staff were of British nationality in 2004. In economics, only 35% of teachers aged under 35 were British, with 32% of them European Union foreign citizens.

Another study in the Commonwealth countries also shows that the problems of recruiting and retaining academic staff are closely related to particular disciplines: management, business studies, information technology, and science and technology pose more problems because of openings in the private sector for doctoral graduates in these fields (Kubler and DeLuca, 2006).

Here once more, the demographics of the teaching profession do not appear to be of critical significance in any problems with recruiting teachers in higher education.

2.5. Impact on the percentage of higher education graduates in the population

An important quantitative aspect of demographic change has to do with its impact on the percentage of higher education graduates in the population (tertiary educational attainment).

The increase in the educational level of the population and, in particular, of its younger members is important for several reasons. Among them are a whole set of social reasons concerned with public health, criminality and individual and national welfare (OECD, 2007c; OECD, 2001). Then comes a further range of economic reasons: many models of economic growth demonstrate that the educational attainment of the population has a considerable bearing on national economic growth, because a good level of education has both a positive impact on worker productivity and is conducive to improved performance in terms of innovation. In countries at the highest level of economic development and closest to the "frontiers of knowledge", innovation is arguably even more important than in the remainder (Aghion and Howitt, 1998; OECD, 2006a; OECD, 2006b).

Next, there are two main considerations justifying interest in the education of young people: first, it is they who are generally best trained and educated, and the most likely to contribute to national innovation; the level of (formal) education of individuals changes little over their lifetime, notwithstanding attempts to develop policies for lifelong learning. This means that the political action most likely to raise the educational level of a population involves raising that of its young people. However, the percentage of graduates in the population is only really meaningful if the degrees they obtain are of sound quality: quantitative comparisons of educational level are based on the assumption that the quality of degrees both within and across countries is similar, although little conclusive information is yet available on this subject.[7]

What effect do the drive for expansion and the ageing of the population have on the overall educational level of the working population? Will the declared aim in certain countries of enabling 50% of their young age cohorts to obtain degrees be achieved? How will the relative level of education and training in countries develop if past trends persist (and population projections materialise)? And how are countries and regions going to

Table 2.8. **Proportion of graduates in the population, 2005 and projections**

	2005					2025 (30-year trend)					2025 (20-year trend)					2025 (10-year trend)				
	25-64	25-34	35-44	45-54	55-64	**25-64**	25-34	35-44	45-54	55-64	**25-64**	25-34	35-44	45-54	55-64	25-64	25-34	35-44	45-54	55-64
Australia	**32**	38	32	31	24	**42**	47	49	41	32	**41**	44	48	41	32	**43**	50	52	41	32
Austria	**18**	20	19	17	14	**27**	24	33	26	26	**27**	22	32	26	26	**26**	21	31	26	26
Belgium	**31**	41	33	27	22	**43**	53	47	41	34	**43**	54	48	41	34	**44**	55	48	41	34
Canada	**46**	54	50	43	36	**52**	66	57	47	40	**52**	66	57	47	40	**51**	62	55	47	40
Czech Republic	**13**	14	14	13	11	**16**	17	18	16	14	**16**	16	17	16	14	**15**	14	17	16	14
Denmark	**34**	40	35	32	27	**48**	48	58	47	41	**48**	47	58	47	41	**49**	50	60	47	41
Finland	**35**	38	41	34	27	**52**	49	62	48	47	**49**	43	59	48	47	**48**	39	57	48	47
France	**25**	39	25	18	16	**38**	52	43	38	23	**41**	59	47	38	23	**45**	69	53	38	23
Germany	**25**	22	26	26	23	**25**	24	29	21	25	**25**	24	29	21	25	**25**	24	29	21	25
Greece	**21**	25	26	19	12	**28**	37	32	24	23	**27**	32	29	24	23	**24**	25	25	24	23
Hungary	**17**	20	17	16	15	**22**	22	23	22	19	**22**	23	23	22	19	**22**	24	24	22	19
Iceland	**31**	36	34	29	21	**42**	48	45	38	36	**40**	43	42	38	36	**38**	39	40	38	36
Ireland	**29**	41	30	22	17	**44**	55	51	42	31	**46**	59	53	42	31	**47**	61	54	42	31
Italy	**12**	16	13	11	8	**18**	21	23	17	13	**17**	21	23	17	13	**18**	23	24	17	13
Japan	**40**	53	47	38	22	**60**	76	68	55	49	**58**	68	63	55	49	**57**	66	62	55	49
Korea	**32**	51	36	18	10	**57**	78	71	52	35	**60**	85	75	52	35	**59**	82	73	52	35
Luxembourg	**27**	37	27	22	19	**45**	47	56	45	33	**47**	51	59	45	33	**50**	58	63	45	33
Mexico	**15**	18	16	14	8	**22**	25	24	20	18	**21**	23	22	20	18	**21**	23	23	20	18
Netherlands	**30**	35	30	30	24	**40**	42	44	40	34	**39**	40	43	40	34	**41**	45	46	40	34
New Zealand	**27**	31	28	27	21	**32**	37	37	30	23	**30**	34	35	30	23	**32**	37	37	30	23
Norway	**33**	41	35	30	24	**42**	52	49	38	32	**42**	52	49	38	32	**43**	53	50	38	32
Poland	**17**	26	16	12	13	**25**	31	29	24	15	**27**	38	33	24	15	**30**	44	36	24	15
Portugal	**13**	19	13	10	7	**17**	26	21	15	10	**18**	27	22	15	10	**19**	32	25	15	10
Slovak Republic	**14**	16	13	14	11	**18**	19	19	18	15	**17**	18	19	18	15	**19**	23	22	18	15
Spain	**28**	40	30	22	14	**45**	56	51	44	33	**45**	58	52	44	33	**46**	59	53	44	33
Sweden	**30**	37	28	28	25	**34**	43	39	33	24	**35**	45	40	33	24	**39**	55	46	33	24
Switzerland	**29**	31	32	29	22	**38**	39	46	36	33	**36**	34	43	36	33	**35**	31	42	36	33
Turkey	**10**	12	8	9	7	**11**	14	13	11	5	**12**	14	14	11	5	**13**	19	16	11	5
United Kingdom	**30**	35	30	28	24	**39**	42	44	39	33	**39**	41	44	39	33	**41**	46	47	39	33
United States	**39**	39	40	39	37	**45**	41	47	45	46	**44**	39	46	45	46	**44**	40	46	45	46
Country average	**26**	**32**	**27**	**24**	**19**	**36**	**41**	**41**	**34**	**28**	**35**	**41**	**41**	**34**	**28**	**36**	**42**	**42**	**34**	**28**
EU19	**25**	**31**	**26**	**22**	**17**	**31**	**37**	**36**	**30**	**24**	**32**	**38**	**37**	**30**	**24**	**33**	**42**	**39**	**30**	**24**

compare in terms of their graduate numbers (and no longer just the percentage of graduates in their population)?

To throw further light on these questions, the educational level of the population and its various age groups have been projected with reference to past growth rates in this level. Projecting the number of graduates produced by domestic systems using the model adopted for student enrolment projections poses problems here, given that the level of incoming or outgoing migration, whether or not the migrants themselves are highly qualified, may have a telling impact on the educational level of the population, as too may the possible reclassification of previously obtained degrees.

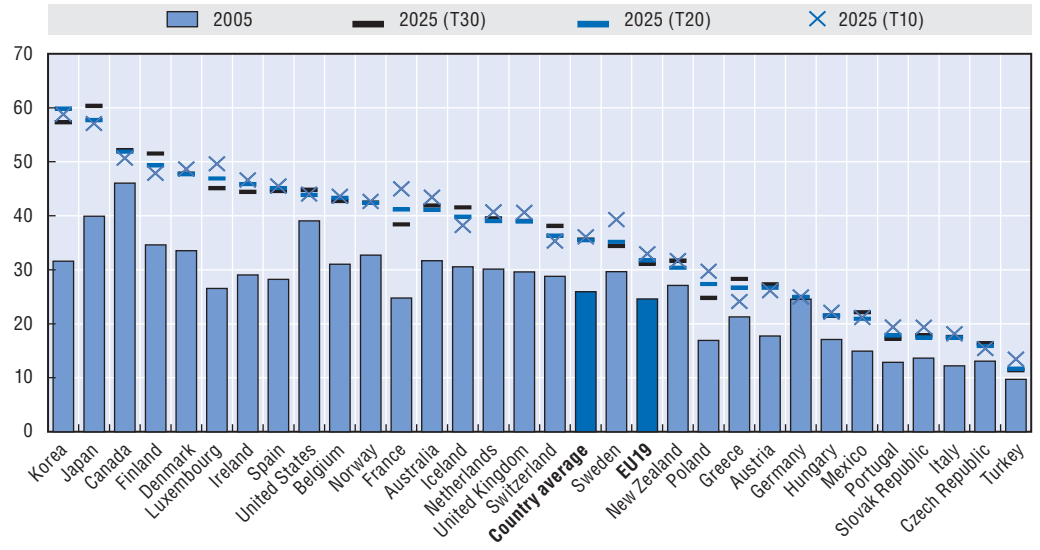
The present study has thus somewhat relied on the fact that the educational level of the various age cohorts was, for the most part, already known in 2005: those aged between 35 and 44 in 2005 will be aged between 55 and 64 in 2025, etc. The educational level of a generation generally increases little over time, although to an extent which varies between countries. Data available on the educational level of the population in 1995 and 2005 (OECD, 1997 and 2007b) provide for a comparison of trends in the education of three generations during this decade (those aged between 35 and 44 in 1995 were aged between 45 and 54 in 2005, etc.), and thus to record changes in the higher education of these age cohorts over time. One may thus estimate the average growth in the educational level of these cohorts and take similar trends into account in the extrapolations, though with differences depending on the particular country.

Table 2.8 shows the tertiary educational attainment of the population in OECD countries in 2005, and projections for 2025 based on trends in the last 10, 20 and 30 years (scenarios referred to as T10, T20 and T30 respectively). Projections based on trends over the last ten years might be more relevant than those based on the last 20 or 30 years, but they are less reliable. The comparison with different scenarios is a reminder that they are no more than projections, and thus possible future scenarios. Figure 2.7 shows the percentage of graduates in the 25-64 age group of the population in 2005 and then the corresponding projections for 2025 in the three scenarios selected.

First, it will be noticed that there is little difference between the projected tertiary educational attainment levels in the three scenarios for the population aged 25-64. The percentage of graduates in the 25-64 age group in an OECD country lies between 35.5% and 36.1%, depending on the particular scenario, compared to an average 26% in 2005 – or an average increase of 10 percentage points. Even though the proportion of graduates in the youngest cohorts (aged 25-34 and 35-44) varies sometimes considerably from one scenario to the next, this has finally little bearing on the educational level of the total population. This clearly indicates the sluggishness of demographic changes and the influence of the oldest cohorts: many decades are required for a big change in the educational level of young people to impact significantly on the entire population.

Increases in tertiary educational attainment vary from one country to another on the evidence of changes over the last 10, 20 or 30 years, reflecting how it has tended to surge or slacken in past decades. Nevertheless, differences between most countries remain somewhat limited in all three scenarios, and especially in those for 20 and 30 years, in which the variation is no more than three percentage points (in France, Japan, Korea and Poland). The variation between the scenarios for 10 and 20 years is four percentage points at most (in France and Sweden). The greatest differences are apparent between the scenarios for 10 and 30 years, with variations between 4 and 7 percentage points (in

Figure 2.7. **Percentage of the population aged 25-64 who were graduates in 2005, and projections for 2025 based on trends in the last 10, 20 and 30 years**



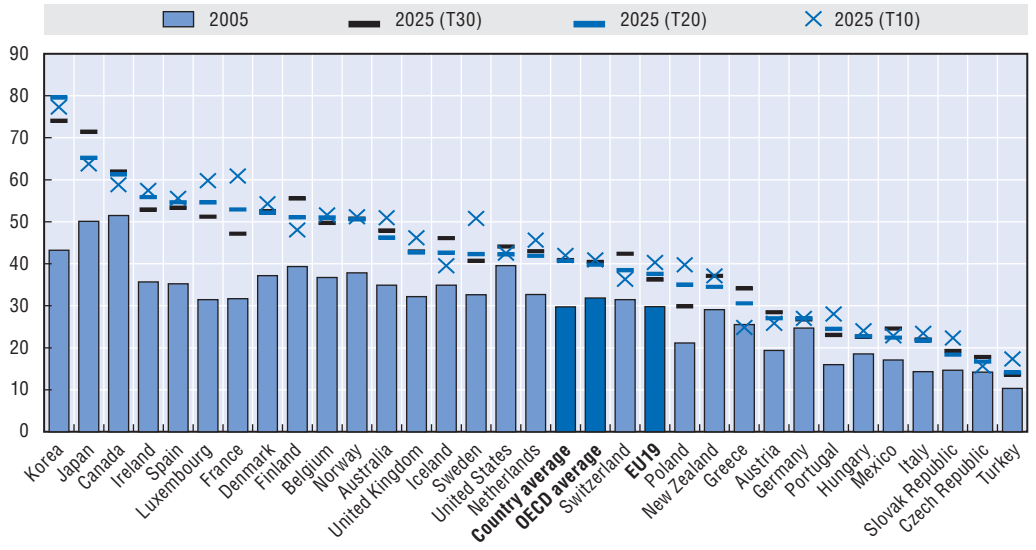
Note: Countries are classified in the descending order of the T20 scenario, corresponding to trends in the last 20 years.

Finland, France, Greece, Luxembourg, Poland and Sweden). Given differences in past growth rates, proportions of graduates in the populations of OECD countries would appear to be diverging rather than converging, with a standard deviation between them rising from 9 to 13 between 2005 to 2025 (in all three scenarios). This is partly attributable to the strong growth in provision in some countries (Japan, Korea and Canada), but also to the fact that growth has probably been underestimated in the case of emerging countries (Turkey, the Czech Republic, the Slovak Republic and Mexico), in which strong future economic growth will probably lead to more rapid growth than previously in the educational levels of their people in the decades ahead.

Depending on the particular scenario, 50% or more of the population aged between 25 and 64 would be graduates in three to four countries: this applies to Japan, Korea and Canada in all scenarios, and Finland in scenario T30. Japan and Korea would dominate with the greatest proportion of graduates. The United States would slightly lose its relative lead over the other OECD countries, as would Germany, because of weaker growth than the others. However, it should be noted that the proportion of graduates is not fully comparable across all countries: in those such as Germany which possess a dual apprenticeship system, non-tertiary post-secondary education (ISCED 4) may perform a role similar to the one played by some forms of higher education in other countries. Thus for men, an apprenticeship diploma (ISCED 4) in Germany has the same value (or income-earning capacity) on the labour market as a practically-oriented higher education qualification (ISCED 5B) awarded by a *Fachhochschule* (OECD, 2007b).

On observing the youngest cohorts, namely those consisting of people aged 25-44 whose tertiary educational attainment in the three scenarios differs, the differences are more marked (Figure 2.8). The proportion of graduates in the two youngest cohorts would again rise by 10 or 11 percentage points, with the proportion in this group in OECD countries increasing on average from 30% to 41-42% between 2005 and 2025. In the case of these (25-44) age cohorts, 13 countries would reach a proportion of graduates of 50% or over in at least one of the

Figure 2.8. **Percentage of the population aged 25-44 who were graduates in 2005, and projections for 2025 based on trends in the last 10, 20 and 30 years**



scenarios, and 9 of them would do so in all three. Here once more, country trends would diverge rather than converge, with a standard deviation rising from 11 to 16 between 2005 and 2025. The United States would lose more ground in terms of the relative educational levels of its younger age cohorts than in the case of its entire population of 25-64-year-olds.

What is the situation regarding the number of graduates available in the various countries? It would indeed appear that, depending on the size of populations and age cohorts, changes in the absolute number of graduates in a country may differ from trends in the educational level of the population. For example, although projections for the tertiary educational attainment of those aged 25-64 or 25-44 in Germany do not correspond to a decrease, its levelling out would be reflected in a fall of 8-9% in the number of graduates aged 25-64 depending on the particular scenario, and of 18-19% among those aged 25-44 (Figures 2.9 and 2.10). Or yet again, the strong growth in the tertiary educational attainment of the population in Japan might nevertheless be consistent with a decrease in the number of graduates aged 25 to 44, because of the diminishing size of the cohorts concerned. The situation is different in Korea, in which the projected decrease in the population will occur later than in Japan (Yonezawa and Kim, 2008). For the period up to 2025, Korea would thus witness a doubling in the number of its 25-64-year-old graduates compared to 2005, while the total number of its youngest graduates might rise by around 50%.

On the whole and in spite of ageing populations in some countries, the number of graduates will increase in almost all OECD countries, irrespective of the particular scenario, and in the case of both the 25-64 and 25-44 age groups. The average increase for countries would be 42-46% for those aged 25-64, depending on the scenario, and 23-29% for 25-44-year-olds (with weighted averages of 35-37% and 16-20%, respectively). There is still a difference between the graduate numbers and the graduate share. Notwithstanding an absolute increase in graduate numbers in the United States, and in particular a stronger increase than in the European Union, the former would account for a smaller share of all graduates in the OECD area than in 2005, both among those aged 25-64 and in the youngest

Figure 2.9. **Projected growth in the number of graduates aged 25-64**

(2005 = 100)

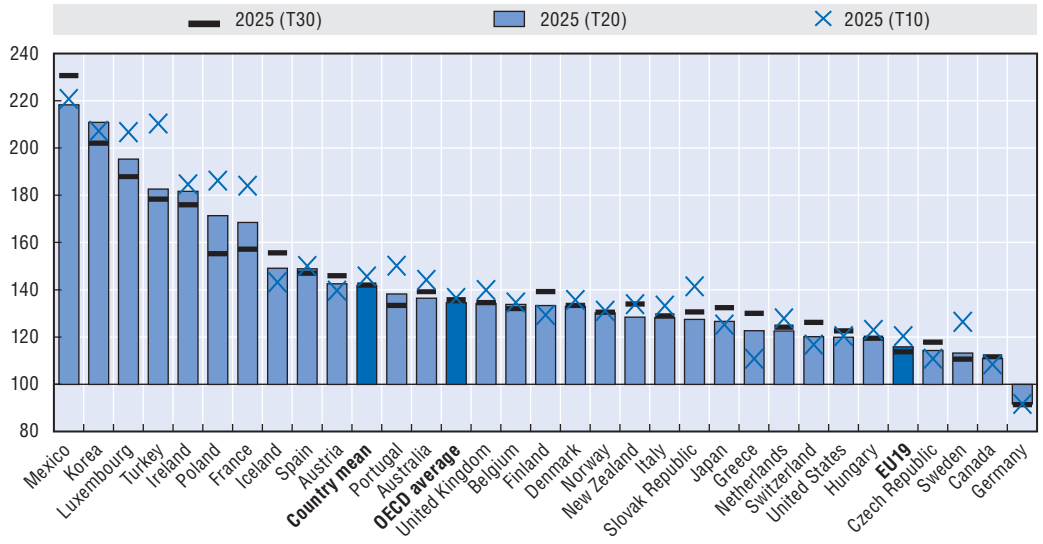
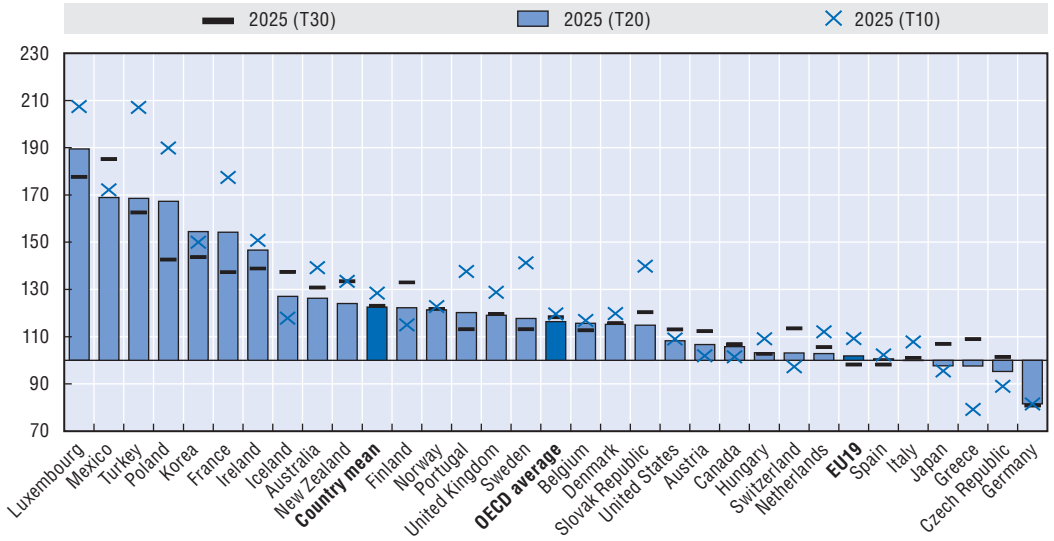


Figure 2.10. **Projected growth in the number of graduates aged 25-44**

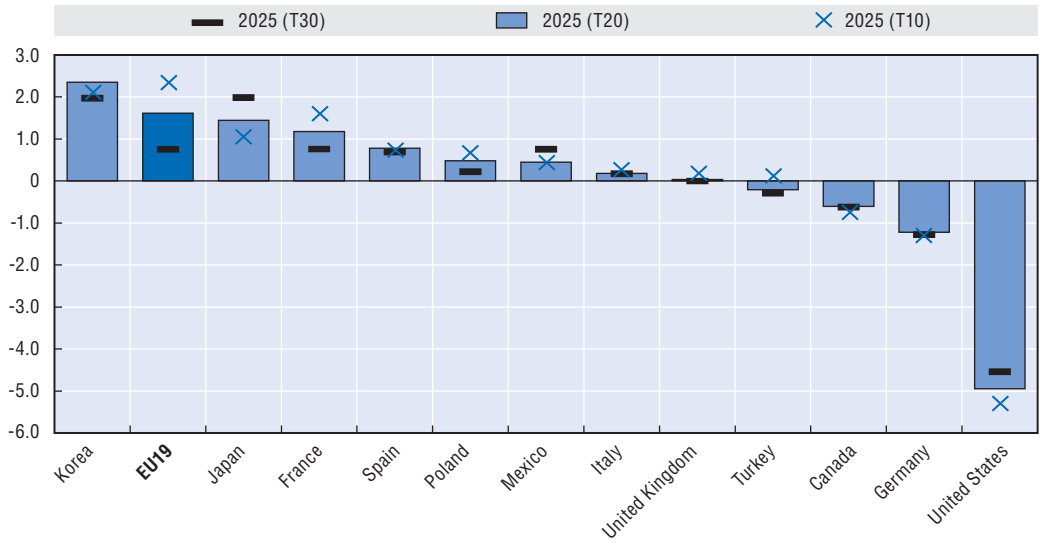
(2005 = 100)



age cohorts (Figure 2.11). The projected growth in the number of graduates is indeed higher in many other member countries. Nevertheless, because of the shrinking size of younger cohorts in Europe, the European Union could experience a more marked decrease in the proportion of its graduates in the 25-44 age cohort (Figure 2.12).

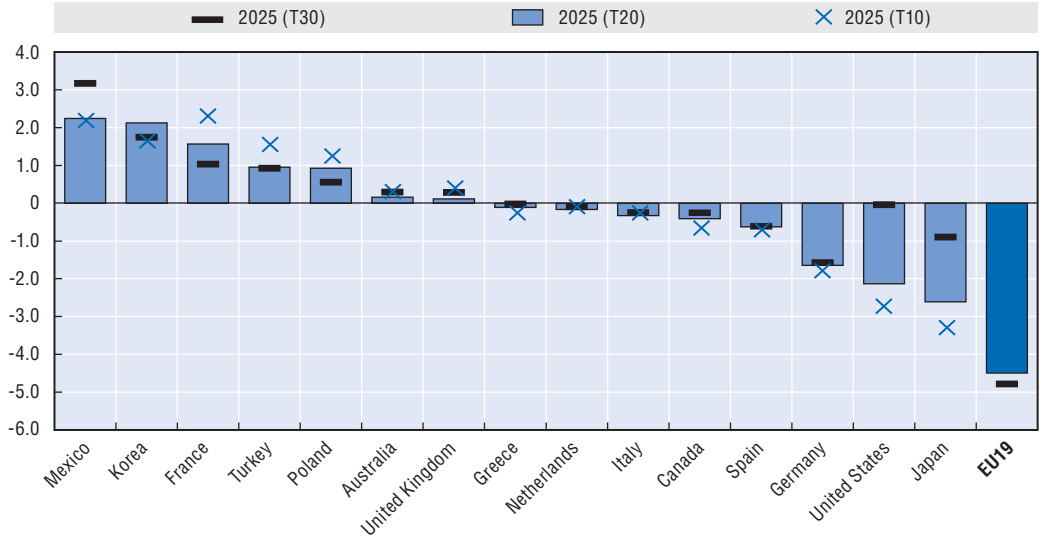
However, the absolute number of graduates is not necessarily important, as most studies that associate growth with educational level focus on relative numbers. It might be thought that a larger stock of young graduates would result in a greater number of innovative ideas (Eberstadt, 2007), but much more is made of their significance in supporting the formation of a "critical mass".

Figure 2.11. **Loss or gain in the relative share of graduates aged 25-64 in the OECD area between 2005 and the three scenarios for 2025**



Note: Only countries in which the (positive or negative) change exceeds 0.1% in at least one of the scenarios are shown.

Figure 2.12. **Loss or gain in the relative share of graduates aged 25-44 in the OECD area between 2005 and the three scenarios for 2025**



Note: Only countries in which the (positive or negative) change exceeds 0.1% in at least one of the scenarios are shown.

2.6. How will social inequality evolve in higher education?

Demographic changes are not merely quantitative but qualitative, and relate to the composition of the student population. The projections in the previous sections assume that in the decades ahead higher education will expand in some countries, such as Japan and Korea, to the point at which access will reach a maximum level tantamount to full participation. Given that higher education will probably continue to expand (in terms of participation if not enrolment), the key question is whether this can contribute to a lowering of social inequality in the sector and indeed be fuelled by such a trend. This

section does not seek to provide an in-depth answer to this complex question which is already the subject of abundant research (see Vallet, 2003; Hout and DiPrete, 2004; Breen *et al*., 2005; Santiago *et al*., 2008), but aims to offer some summary material for further thought and discussion on trends observed in this area over past decades.

First, the very varied possible forms of inequality should be borne in mind, ranging from inequality between the sexes, inequalities between socio-economic, ethnic and religious groups, between immigrants and the remainder of the population, and between people from urban and rural communities and castes, etc. From one country to the next, the relevant bounds defining or governing the perception of inequalities differ, even though social inequalities may be more uniformly understood from an international standpoint (Hout and DiPrete, 2004). The variety of ways in which inequalities may be articulated or apparent in higher education should also be remembered: social inequalities may be embedded in access to or participation in higher education, but also in access to certain types of provision (elite institutions, etc.), certain disciplines or levels of study, or in attainment levels and the final award of qualifications, etc. Thus some types of inequality may diminish as others increase; or certain inequalities may be lessened among some groups while becoming more marked in others. Indeed, there is a very wide range of possible targets for anyone wishing to fight (or study) social inequality, and often they are shifting.

Next, the question of how inequalities change over time is itself fraught with a great many technical and theoretical problems. The measurement of social inequalities may indeed assume several appropriate forms which remain however quite distinct, so that ideally it helps to concentrate on monitoring an array of similarly focused indicators in order to establish whether inequalities have changed or diminished (Clancy and Goastellec, 2007). Given that society as well as its economic and social structures are changing, it is not always easy to judge how inequalities may also be changing: for example, what it means to come from a rural background today and what it meant 40 years ago are very different in real socio-economic terms, although one has to proceed as if this were not the case when studying inequalities over time.

Inequalities in access to higher education are the result of two combined influences, namely attainment at school and the decisions taken at each transitional point in education (Boudon, 1973, 1974). First of all, children from disadvantaged backgrounds often perform less well at school and are thus less likely to reach the level at which they would be eligible for higher education. This occurs for a variety of cultural, educational, nutritional, social or economic reasons as a result of which they do not confront these transitional stages in the same way as children from more privileged backgrounds (Field, Kuczera and Pont, 2007). Thus inequalities in higher education are partly the consequence of earlier schooling at primary and secondary levels, and they may be diminished (or increased) as a direct result of educational policies. For example, in Sweden as in France, the reform of lower secondary education appears to have been a crucial factor in lessening inequality (Erikson, 1996; Thélot and Vallet, 2000). Secondly, at all transitional stages in education and especially that of eligibility for higher education, children from disadvantaged backgrounds, whose achievement levels are the same as those of their more privileged peers, generally have fewer opportunities than they do to continue their studies, or to choose courses that are as ambitious, whether because of real or perceived financial pressures, or different aspirations, etc. (see for example Carnevale and Desrochers, 2003,

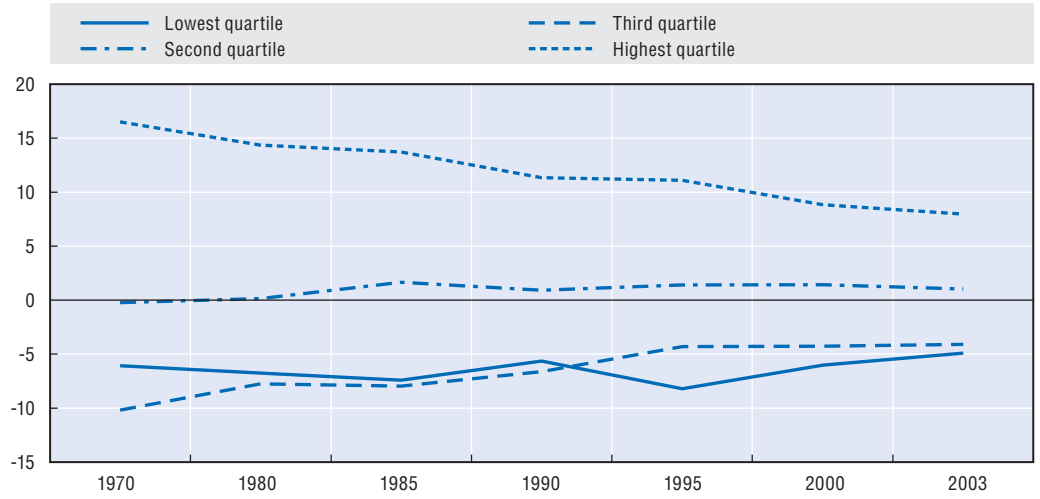
on the United States, or Erikson and Jonsson, 1996, for Sweden, and Breen *et al.*, 2005, for a discussion of both factors).

The literature shows that as higher education has expanded, access to it has become more broadly based in most – perhaps even all – OECD countries, so that quantitative inequalities have been lessened: nowadays, a greater proportion of children from under-privileged backgrounds than 10, 20 or 30 years ago enter higher education (and obtain a qualification at that level). This applies to the 13 countries studied by Shavit and Blossfeld (1993) (western Germany, Hungary, Israel, Italy, Japan, the Netherlands, Poland, the Czech Republic, the United Kingdom, Sweden, Switzerland, Taiwan and the United States), but also to France (Vallet and Selz, 2007), Chile (Brunner, 2007), Spain (Ballarino *et al.*, 2008), Australia and Korea (Shavit, Arum and Gamoran, 2007), etc. This finding is often played down: yet it means that a child from a disadvantaged background is now more likely to enter higher education than at any time previously with consequently better prospects. Otherwise put and to paraphrase Rawls (1971): if we had to choose from behind a veil of ignorance the fairest society, in which the least privileged could be the most fortunate, we should be well advised to choose from those of today with their "massified" higher education rather than from those of the past, whether the past means 10, 20 or 50 years ago. As education is not simply a "positional good" whose value depends solely on the education of others but includes intrinsic personal benefits that are not exclusively economic (OECD, 2007c), this far greater openness is a sign of real social progress. It is probable that this will continue with the expansion of higher education in the decades ahead.

The second aspect of quantitative openness is apparent from the social make-up of students in higher education. While students from upper middle class backgrounds (or even higher in the social scale) accounted for a very high proportion of those in the system a few decades ago, their proportions have decreased although they remain over-represented. The upshot of this is that the student experience in higher education has changed qualitatively for those from all social backgrounds with a truly greater social mix – and varied consequences in terms of the real social capital of institutions. Figure 2.13 illustrates the situation in the case of the United States: the over-representation of students from the richest families has fallen in recent decades. The socio-economic composition of higher education systems has become much broader and closer to that of society. However, forms of social composition vary widely with types of institution: broadening of access has often begun in the least prestigious institutions, while the most prestigious, which give access to the dominant positions in society, have frequently retained a far more uniform social composition (Bowen, Kurzweil and Tobin, 2005; Shavit, Arum and Gamoran, 2007; Vallet and Selz, 2007).

While quantitative "democratisation" of higher education systems is well established, many sociologists do not equate it necessarily with lesser injustice, defined as inequality of educational opportunity. Expansion and increasingly open access have indeed been associated with a hierarchical stratification of systems (Duru-Bellat, 2006; Shavit, Arum and Gamoran, 2007), and it is possible that this works more to the advantage of children from the most privileged social backgrounds. In this respect, a decrease in inequality of opportunity and a fairer society only materialise when expansion offers greater benefits to the least fortunate rather than the most privileged (Shavit and Blossfeld, 1993; Shavit, Arum and Gamoran, 2007; Rawls, 1971). If education is regarded as a "positional good", a proportional rise in the educational level of all has nothing to offer those from the most

Figure 2.13. **Trends in the differing proportions of students who come from households in different quartiles of income distribution in the United States**



Note: Full representativeness occurs if the deviation in percentage points equals 0. A positive deviation of 15 points means that the group is over-represented and that it represents 15% more among the students than among the youth aged 18-23 years. It should be noted that students from the third quartile were under-represented more than those in the last quartile up to early 1990s.

Source: OECD (based on NCES data).

disadvantaged backgrounds, since differences in education between groups do not change (Duru-Bellat, 2006).

The influential book by Shavit and Blossfeld (1993) created the lasting impression that inequalities were more likely to persist than diminish during periods of expansion. It identified a lowering of inequality of educational opportunity in just two of the 13 countries studied (Sweden and the Netherlands) – and concluded that inequalities were "maximally maintained" until the participation of the most privileged group reached saturation point, etc. These findings have since been challenged or qualified by Shavit, Arum and Gamoran (2007), among others, who highlight the more inclusive or democratising effect of expansion on a system in which inequality of opportunity remains unchanged.

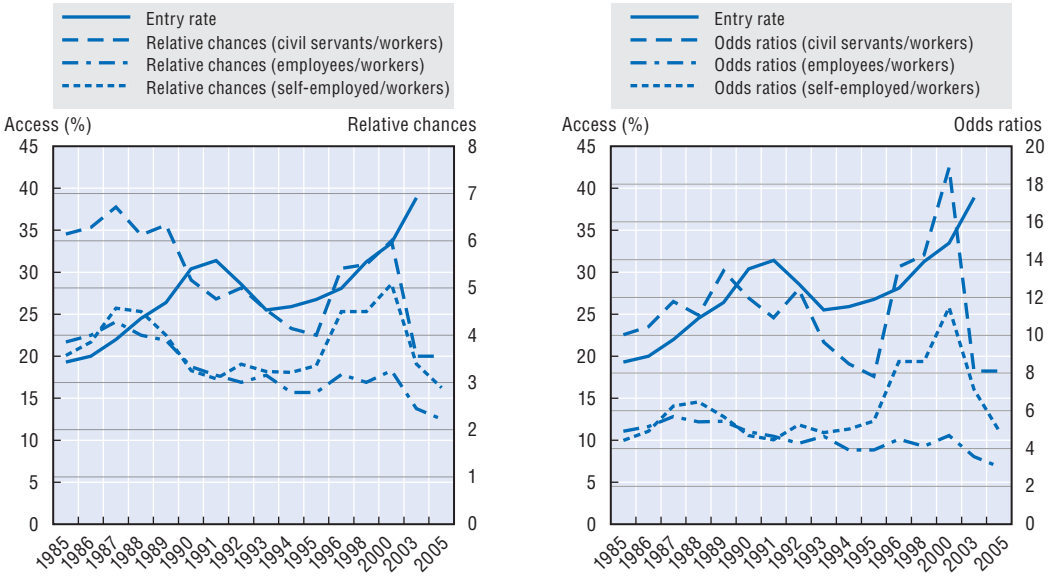
The most recent research shows that the influence of socio-economic background on access to higher education or the likelihood of graduating has in fact diminished in recent decades in many countries: besides the cases of Sweden and the Netherlands, studies have reached similar conclusions for Germany, France, Italy, Japan, Korea, Taiwan, the United States, Great Britain, Poland and Australia (Breen *et al.*, 2005; Shavit, Arum et Gamoran, 2007; Vallet and Selz, 2007). Yet there is no causal relationship or systematic association between expansion and a lowering of social inequalities of opportunity. Inequalities of opportunity in education have in fact increased in Ireland (Breen *et al.*, 2005) and Spain (Ballarino *et al.*, 2008), and levelled out in Switzerland (Buchmann *et al.*, 2007). They have also tended to grow in Eastern European countries by comparison with the Soviet era, as in the Czech Republic (Matějů, Řeháková and Simonová, 2007), Hungary, the Slovak Republic, Romania (Iannelli, 2003) and Russia itself (Breen *et al.*, 2005; Shavit, Arum and Gamoran, 2007). There is thus no firmly established relation between expansion and inequality of opportunity.

The examples of France, Germany and Australia reveal that the relation between expansion and a lowering of social inequality (measured in terms of the occupation of the father or head of the household) is far from clear-cut (Figure 2.14), even when expansion is associated with a decrease in inequalities of opportunity.

Figure 2.15 shows that if the cohorts born in 1955 and 1975 are compared, inequalities of opportunity in terms of the father's education have diminished or remained virtually unchanged in many countries: only the Czech Republic and Hungary have experienced a significant increase in social inequality.

Figure 2.14. **Expansion of higher education and decrease in inequality of opportunity: 3 examples**

Germany: A drop in the inequality of educational opportunities more or less correlated to the increase in the entry rates



France: A rise in the entry rates and a decrease in the social inequality of educational opportunities

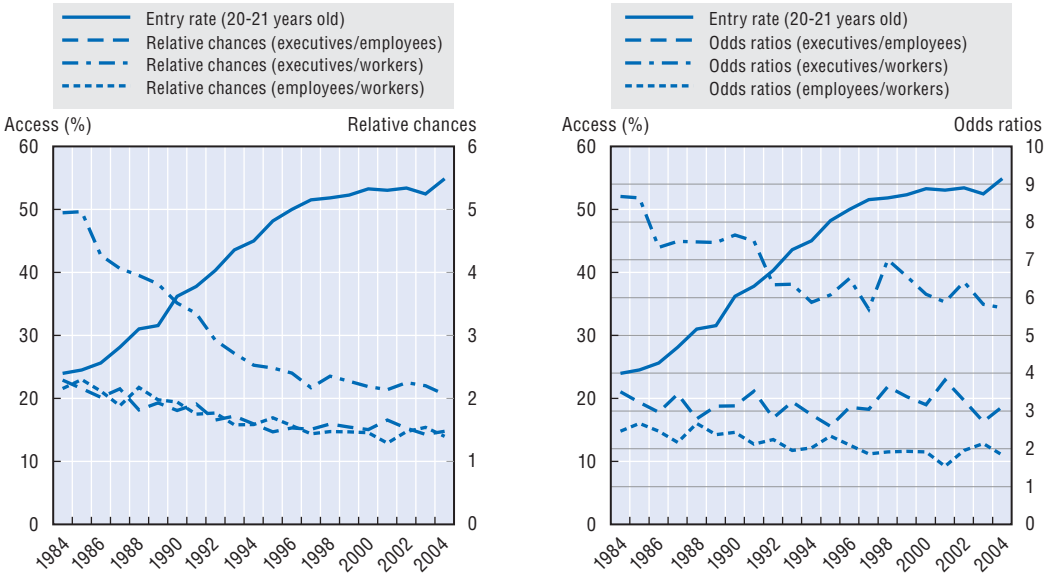


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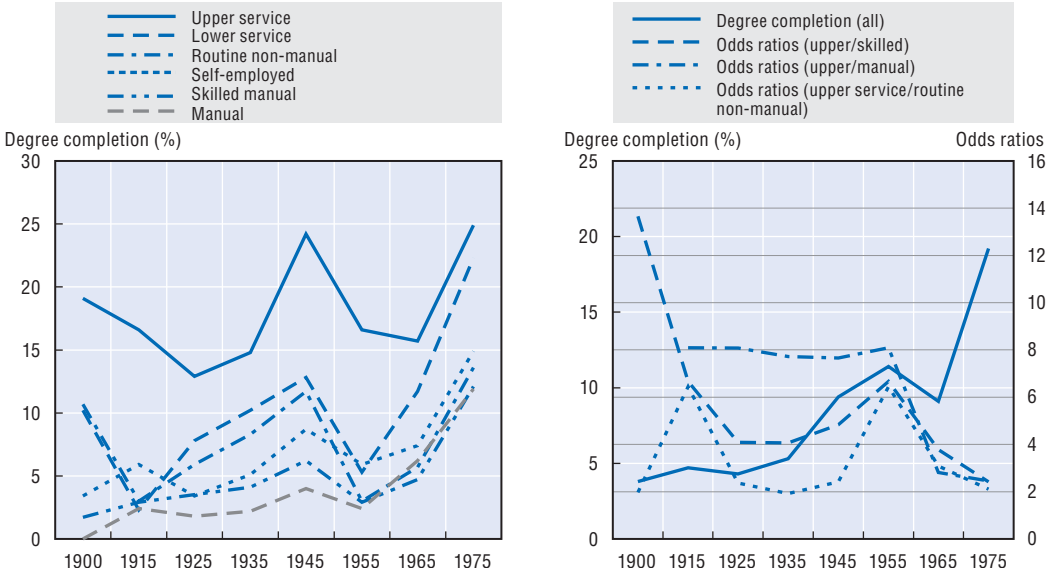
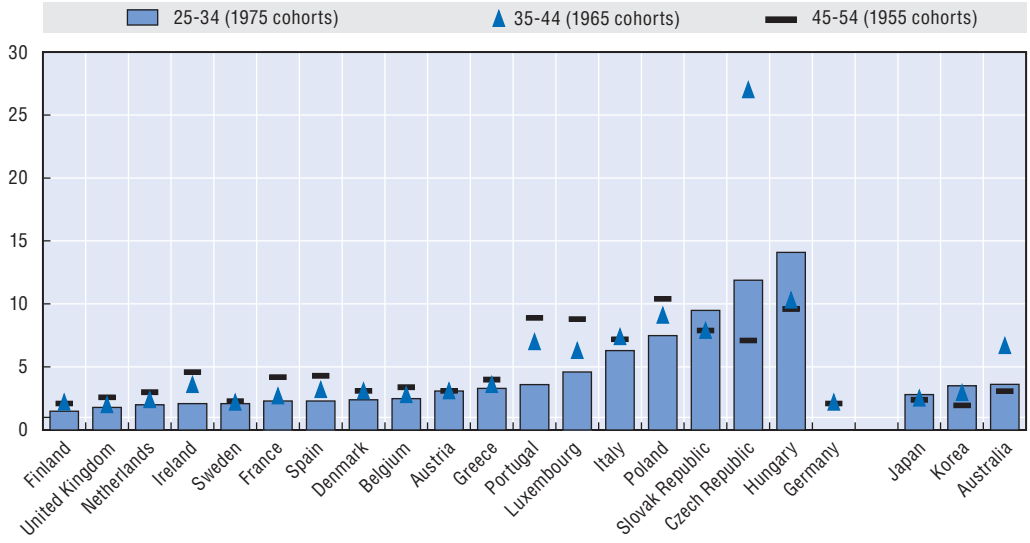
Figure 2.14. **Expansion of higher education and decrease in inequality of opportunity: 3 examples** *(cont.)*

Australia: An increase in the graduation rate at Bachelor level along with democratisation and an irregular decrease in inequality of educational opportunities



Source: Germany (*Statistische Ämter des Bundes und der Länder, Hochschulstatistik*; HIS-Hochschul-Information-System), France (Ministry of Education), Australia (Marks and McMillan, 2007).

Figure 2.15. **Trends in odds ratios for participation in higher education between people whose fathers have high and low levels of education respectively**



Note: Equality of opportunity is greater, the closer the odds ratios are to unity. An odds ratio of 2 means that it is twice as likely that a person whose father is educated to a high level (ISCED 5-6) will undertake higher education and that one whose father is relatively poorly educated (ISCED 0-2) will not do so, than the contrary. Odds ratios should not be confused with relative chances. In Australia, this applies specifically to cohorts born in 1961 (instead of 1955), 1965 and 1975. Data for Korea, Japan and Australia use different databases and are not necessarily comparable with each other, or with the other data.

Source: EOSS (2007); Australia: Marks and McMillan (2007); Japan and Korea: Ishida (2007).

On this basis it is possible that continued expansion of higher education is matched by a decrease in inequalities of opportunity, as has been observed in many countries in recent decades. However, given that this trend has occasionally discontinued or stagnated in the last ten years, the opposite might also occur. There is no causal relationship between expansion and equality of educational opportunity (except where access of the most privileged groups reaches saturation point), even though the two may often be correlated.

Clearly, the fact that inequalities decrease or increase tells us nothing about the absolute degree of inequality, so that a country in which inequality is spreading may be more egalitarian than one in which it is diminishing or remains unchanged. Moreover, a decrease in social inequalities in higher education does not necessarily lead to greater social mobility, which depends in the last resort on the transition between higher education and the labour market and then on career paths themselves.

2.7. Higher education policies *vis-à-vis* growth or falls in student enrolment

Demographic changes may bring certain types of issue to the attention of public policy makers and higher education institutions. Some of these matters are related to the growth of higher education systems, and others to their contraction. While the past expansion of systems points to several possible options for managing it into the future, the contraction of systems is a novel phenomenon corresponding to their saturation, or a levelling out of entry rates, as younger age cohorts become smaller. The previous sections suggest that the scale of the demographic problem will be limited in most OECD countries and that both major contractions and periods of strong growth will be very uncommon.

OECD countries have now acquired a certain amount of experience in managing the expansion of their higher education systems. Expansion has indeed been characteristic of the last 50 years of their development, albeit to a varying extent. In order both to encourage and cope with the expansion of their systems, countries have generally relied on large-scale public investment – however much this may have sometimes been regarded as inadequate – which has led to an increase in their student-teacher ratios, the development of a private sector, a new balance between public and private cost-sharing, and not least of all a diversification of their provision, with short-course and professional qualifications supplementing general higher education. The development of new technologies might also point the way towards fresh approaches for both higher education institutions and governments.

The prospect of a decline in student enrolments in some countries appears to be more unusual. In a sense, it might be viewed as less problematic: with fewer students, might it not be enough to close down institutions or discontinue courses which are under-subscribed? Would there not naturally be increased budgetary resources for improving the infrastructure and quality of higher education? The reality is more complex. Yet, as in the case of expansion, there are many possible ways forward even though the justification for them differs.

Diversification of student enrolment

One strategy of institutions for managing the fall in student enrolments is to attempt to halt it, by diversifying their intake and provision. This differentiated approach is possible given the existence of several "new" kinds of students:

- part-time students in countries in which this kind of participation remains uncommon.

- international students: their numbers have grown rapidly in the last ten years and institutions (and countries) are increasingly attempting to develop strategies for boosting their recruitment (OECD, 2006c).
- older less "traditional" students: in many countries, higher education institutions are offering easier access to courses for students with some professional experience or a family, who are seeking to retrain or obtain qualifications enabling them to change career or further their professional development. This process may or may not involve degree courses, or may lead to "certificates" awarded for evening or weekend classes.
- company employees: the provision of continuing education and training for people employed in firms, in such a way that the latter rather than their employees are the "client", is also expanding in some countries, even though it is not widespread in all OECD countries.
- retired people: the ageing of the population, with people living longer in good health, arguably creates a fresh demand for students from among the ranks of the retired whose desire to study is unrelated to their career development and envisaged more for its own sake. This would appear all the more likely if they already have a sound basic education.

While the diversification of enrolment may seem like a strategy for shoring up the fall in enrolments when higher education systems contract, it may also occur during expansion and indeed fuel it. It is thus more often viewed as a strategy for fair access and for diversity, and as a public service responsive to social demand, or a mechanism for diversifying the income of institutions.

Although institutions with falling enrolments have every reason to strive for diversification, this is often hard to achieve in practice in the short term.

The number of international students has grown strongly in the past decade, and countries and institutions have been increasingly active in seeking to attract them. In countries with low percentages of these students, recruiting them more intensively might arguably help to stem falling enrolments. Given that the past increase in international students has been included in the trends projected in Section 2.1, such compensatory action would correspond to an increase in the average admission rate of these students in the country concerned. Depending on the particular country, this approach appears more or less realistic. Not all countries are equally well placed to attract international students for a variety of reasons ranging from the reputation or climate of a country to its language or its openness to immigration (OECD, 2006c; Vincent-Lancrin, 2008; Marginson and van der Wende, 2007; Santiago *et al.*, 2008). This solution is not therefore universally applicable.

Turning to older students or retired people, as well as extending course provision for adults, may also appear to be ways of offsetting the decrease in the number of students who enrol when they leave school. For example, the American community colleges have devised strategies for adjusting to their demographic (and budgetary) circumstances by diversifying their various roles and provision. An increase in the average age of their students was observed just when the younger age cohorts were shrinking in size, as the colleges had given priority to recruiting less traditional students. With renewed expansion in the numbers of young people, a decrease in the average age of students is once again clearly apparent. Given that older students are statistically less likely to obtain their qualification, institutions might have fewer incentives to recruit them if substantial student flows are arriving from secondary education, especially whenever public expectations regarding student achievement are high (Bailey and Smith-Morest, 2007).

In practice however, the successful development of diversification may take time. Indeed, if higher education institutions lack the appropriate cultural reflexes or are faced with competition from a sector that specialises in the kind of provision just considered, they may find that there is inadequate demand for these new services. Furthermore, institutions themselves may have difficulty in adapting their provision to these new target groups, as a result of the organisational and cultural adjustments entailed or their perception of their own underlying purpose. From this angle, international students may be less of a challenge for institutions, as their expectations are often similar to those of "traditional" students.

Closures and mergers

For political and economic reasons, it is often hard to close higher education institutions, and especially those in the public sector. The first ones to face difficulty are often small private institutions or small public institutions with only a modest reputation located in rural or remote regions. Above all, the closure of public establishments in particular poses a political problem: the elected representatives of these regions or towns (and possibly other regions in similar circumstances) will tend to join forces to prevent these closures. While this may partly occur for reasons of form or prestige, local economic concerns are also an important issue. The fact that higher education institutions can make a major contribution to the economic vitality of their region (OECD, 2007d) is no less true if the latter is in economic decline. The presence of higher education institutions may encourage young people to remain in their region, or enable them to do so; moreover, through their teachers and students, not to mention their business purchases, institutions generate local economic activity the preservation of which is in the best interests of local leaders. These public players thus have legitimate reasons for seeking to sustain the activity of institutions, even if this is not very productive in national terms.

Mergers of institutions would thus appear to be more acceptable in the first instance, as they enable certain resources to be shared and savings achieved, while generally maintaining a variety of different locations. In conjunction with the forces of globalisation, which also stimulate merger for reasons to do with international visibility and the pooling of research funds, the likelihood that the student population will decrease should accentuate this trend in some countries.

Diversifying the higher education sector

The diversification of higher education may also be viewed in relation to demography, even though it constitutes a response to many other issues too, such as the appropriate matching of particular types of graduate to demand on the labour market, or research excellence. The division of labour between institutions or sub-sectors of higher education, or even courses within a single institution, has contributed to the expansion of higher education, and the management of that expansion.

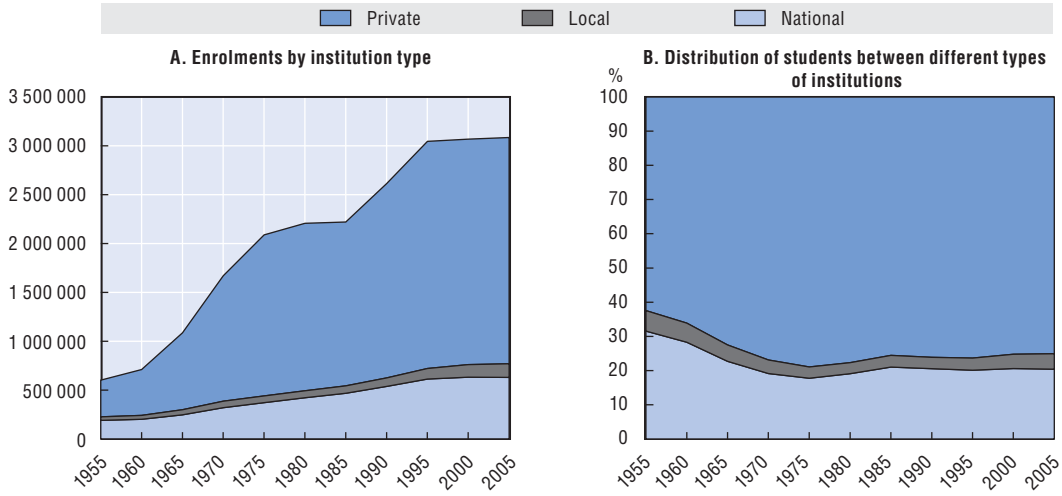
To simplify matters, the various forms of diversification (or diversity) are of two main kinds, corresponding to the division between public and private institutions, or between general and professional (or long and short) higher education. General higher education is itself shared between institutions for research and for teaching, etc. Where systems are expanding, diversification provides a means of managing expenditure, broadening access to higher education and enhancing the performance of students. The cost of provision may indeed vary strongly from one type of institution to another, so that costs can be kept in check when the system is growing. Diversity may also help to satisfy more varied student

demand, thereby attracting new groups of people into higher education and improving student achievement rates as long as institutions and students within the system are well matched – which also presupposes the existence of sound admissions and guidance systems. The main risk inherent in this diversity is that it can result in a hierarchy and real or perceived stratification, which may pose problems of equity (with inequality of opportunities). Where systems are contracting, diversification may be a way of limiting the decrease in enrolments, as a result of the potential effect of broadening student access. However, contraction may also lessen this diversity, with the disappearance of one or more of the least prestigious sectors.

Studies on private higher education suggest that the expansion of the private sector may often be viewed as a response – not necessarily anticipated – to restrictions on access to public higher education when the system is expanding (Levy, 2002; Teixeira and Amaral, 2007; Teixeira, 2009). For example, this has clearly been the case in Mexico, Portugal, Poland (Figure 2.16) and Chile. In Japan, private higher education has also contributed to expansion

Figure 2.16. **Student enrolment trends in the public and private sectors**

Japan: An expansion that benefited a traditionally dominant private sector



Mexico: An expansion drawing on the private sector

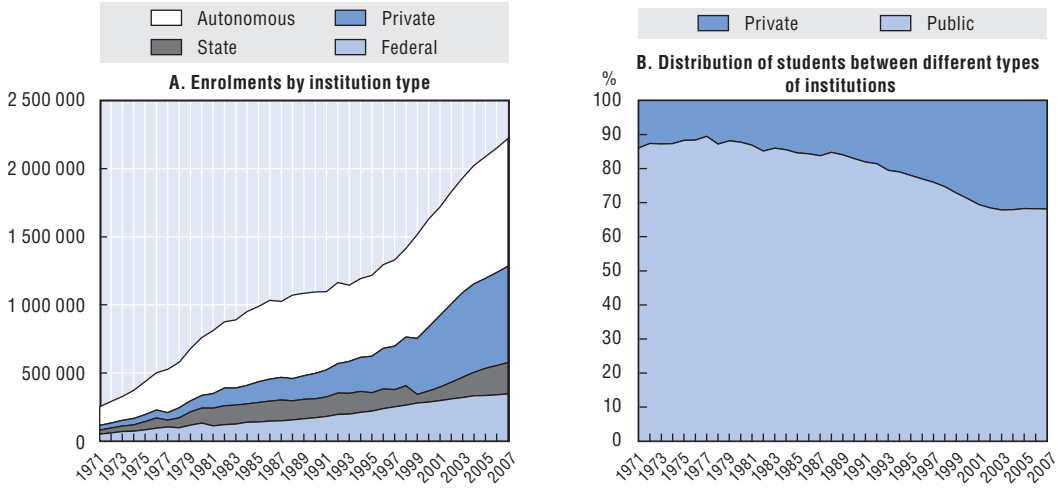
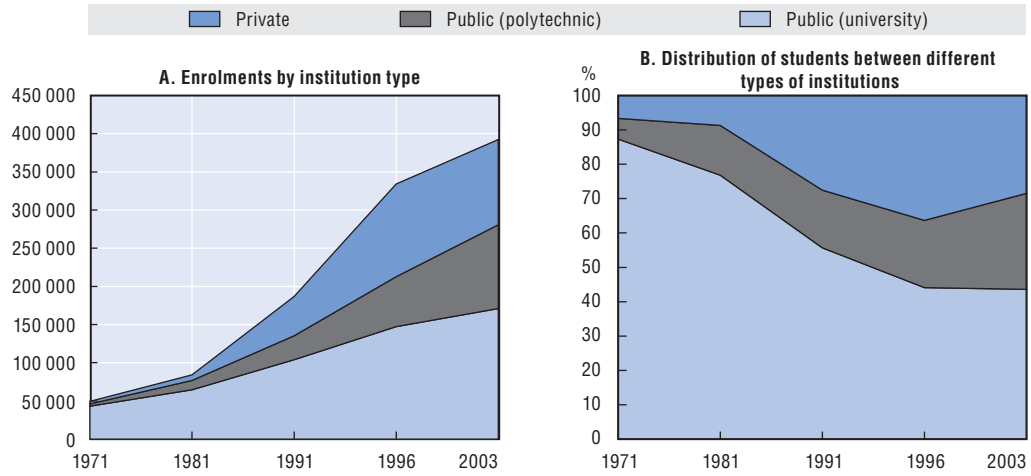
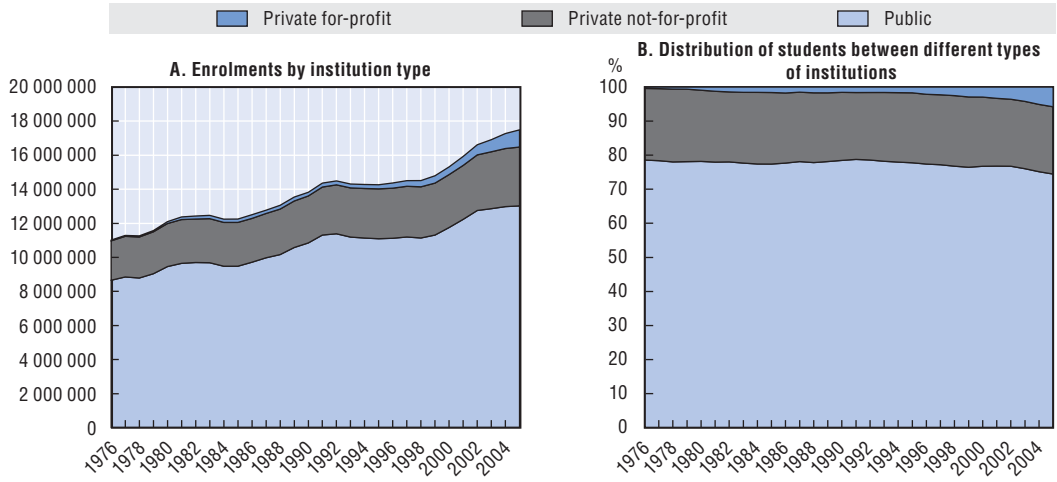


Figure 2.16. **Student enrolment trends in the public and private sectors** *(cont.)*

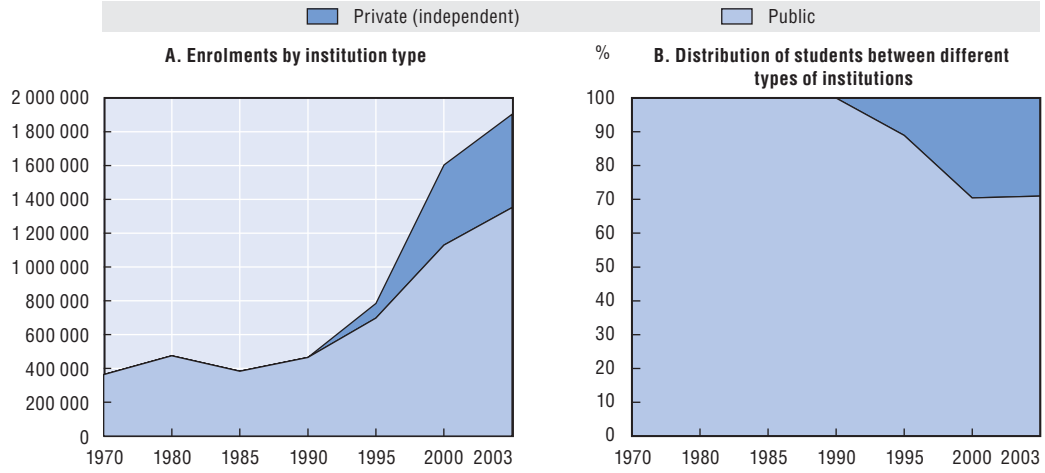
Portugal: An expansion drawing on the private sector and on the public polytechnics



United States: An expansion with a relatively stable private sector during the recent decades



Poland: An expansion drawing on the private sector since the 1990s



Source: MEXT (Japan), Ministry of Education (Mexico), NCES (United States), CSO (Poland), Teixeira and Amaral (2007) (Portugal).

but corresponds to a long established sector. In the United States, the expansion of the private sector has followed in the wake of increased student enrolment, rather than accentuating it. In most OECD countries, the expansion of higher education has not led to sustained expansion of the private sector, at least in the last two decades (Vincent-Lancrin, 2007).

From the standpoint of governments, the coexistence of a private sector has the merit of being far less costly than an entirely public system, even when private institutions are partly government dependent, and also of satisfying a social demand that governments cannot or do not wish to meet. This amounts to an attractive development option in countries in which systems are growing very fast. Where systems are contracting for demographic reasons, one of several open questions is whether this will affect the entire system or whether its impact on the public and private sectors will differ, leading in particular to the disappearance of the so-called demand-absorbing part of the private sector. It will thus be interesting to observe the development of the sector in the countries of Southern and Eastern Europe (such as Portugal and Poland), in which contraction can be anticipated.

Another aspect of diversification in systems corresponds to the main responsibilities of higher education institutions rather than whether they are publicly or privately owned. In this respect, the OECD countries reflect a wide variety of formally recognised possibilities, and countries confronted with such diversification have also reacted in a wide range of different ways in recent decades. Some of them have retained sectoral stability (Denmark), whereas others have granted priority to their universities (Germany and Hungary) and yet others – though to a variable extent – to institutions of professional or specialised education (Switzerland, Ireland, Poland and France) (Figure 2.17). While most systems are binary and distinguish between institutions of professional (short course)

Figure 2.17. **Expansion and diversification of systems**

France: A very diversified system that has been fairly stable between 1981 and 2004, whose expansion has partly relied on short tertiary educational programmes (STS and IUT)

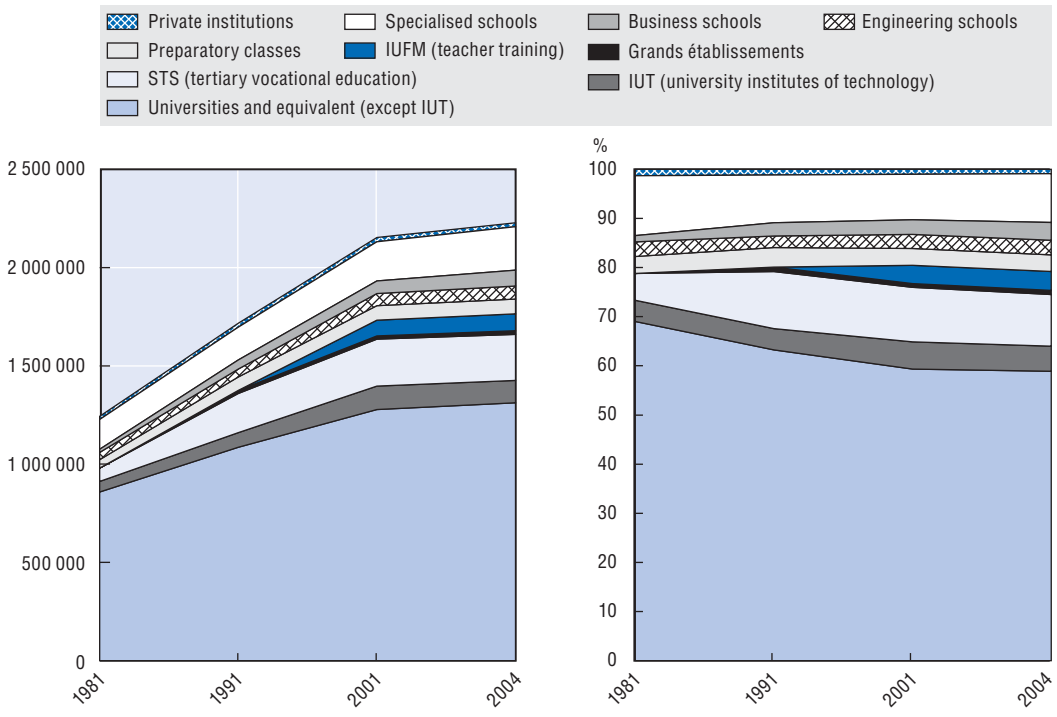
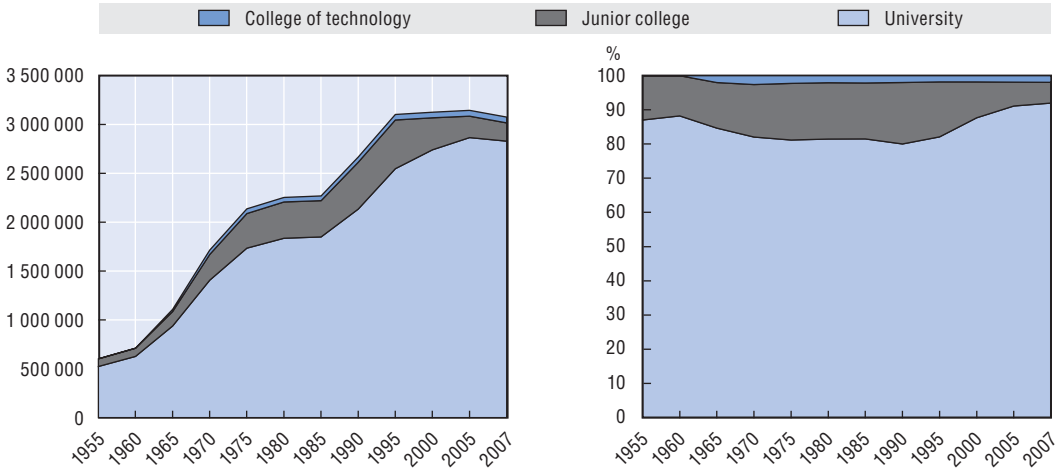
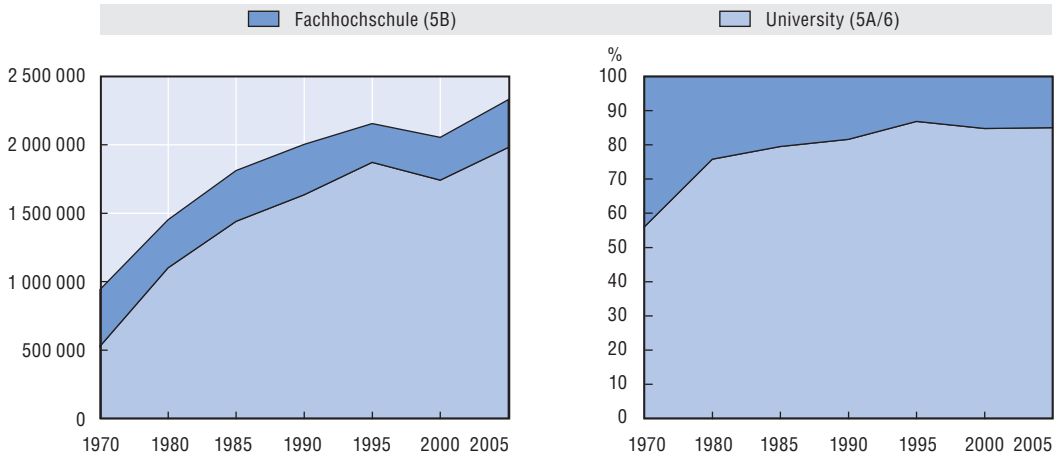


Figure 2.17. **Expansion and diversification of systems** *(cont.)*

Japan: An expansion that has first benefited junior colleges, before the university sector has regained its share with the stabilisation of enrolments



Germany: An expansion relying mainly on the university sector



Denmark: An expansion keeping the share of the different sectors stable

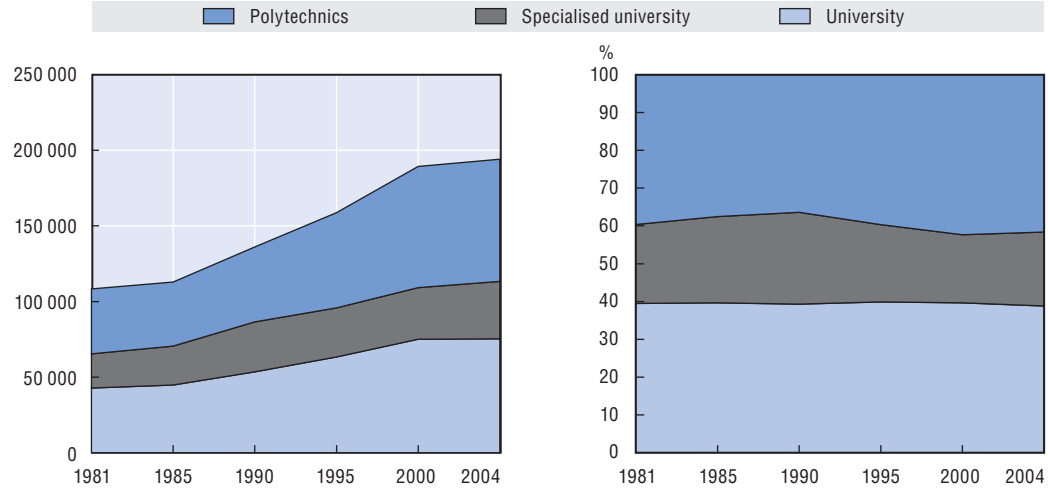


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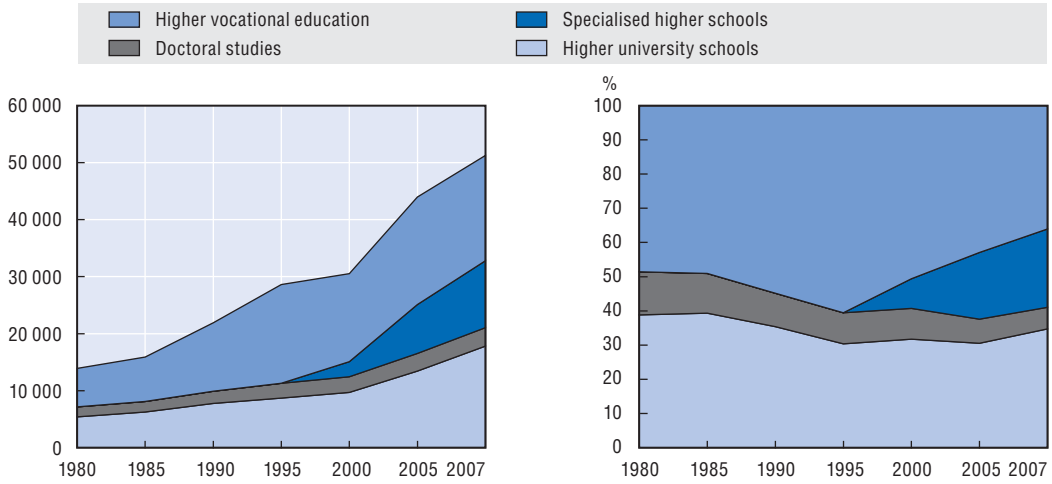
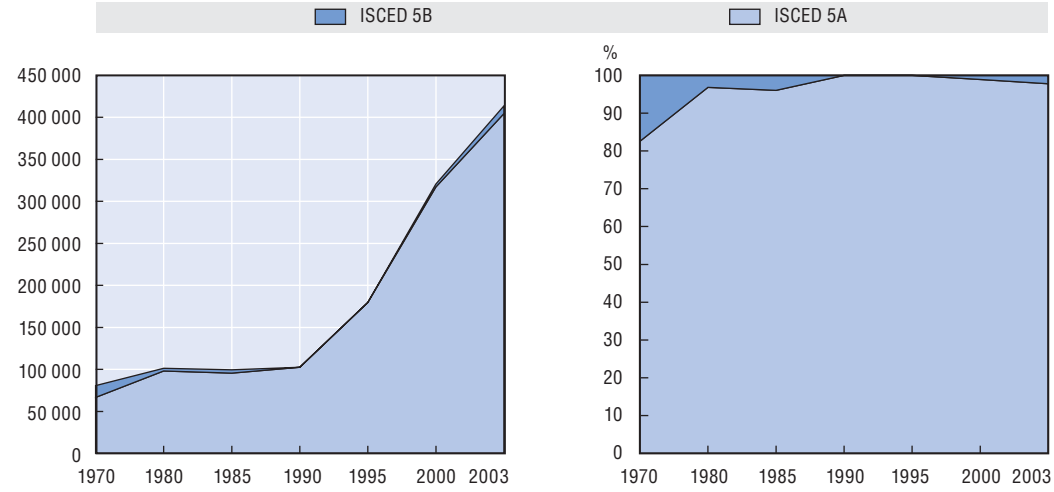
Figure 2.17. **Expansion and diversification of systems** *(cont.)*

Switzerland (awarded degrees): An expansion drawing on a slight growth of the non-university sector



Hungary: A growth based on tertiary type-A education, without much formal differentiation



Ireland: A growth mainly based on the non-university sector

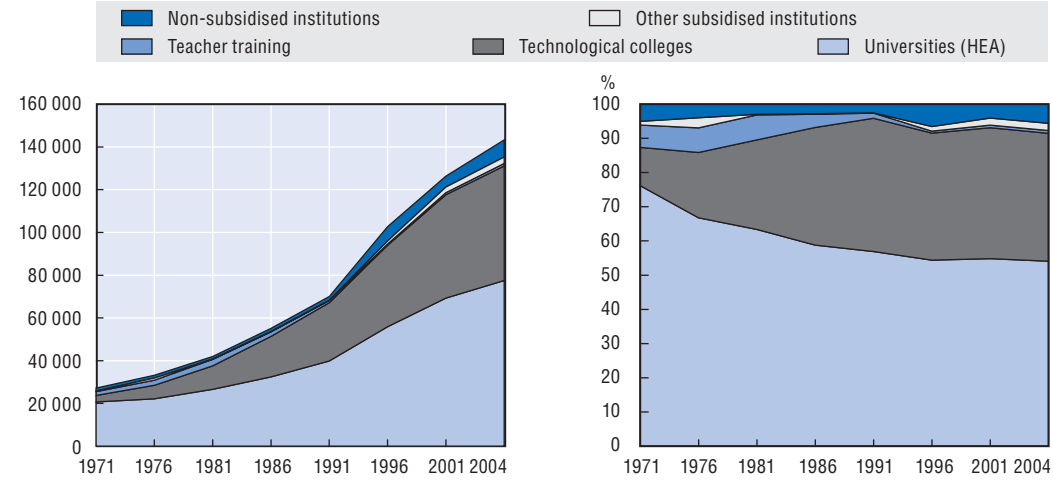
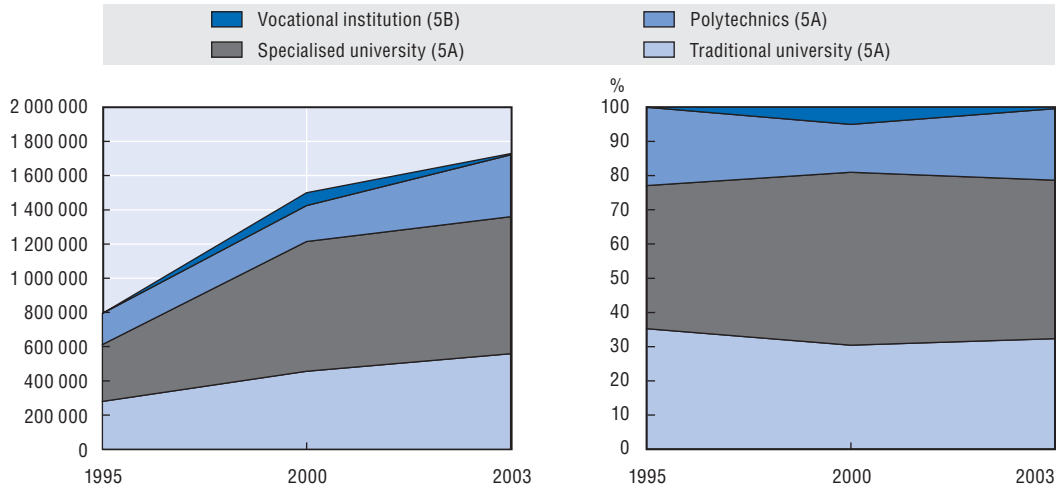


Figure 2.17. **Expansion and diversification of systems** *(cont.)*

Poland: A recent expansion keeping the structure of the system fairly stable



Source: France (Ministry of Education), Japan (MEXT), Germany (Federal Office of Statistics, Yearbook of East Germany for east German data up to 1990), Denmark (Statistics Denmark), Switzerland (Office fédéral de la statistique), Hungary (*Statisztikai Tájékoztató, Felsőoktatás*), Ireland (Department of Education and Science), Poland (CSO).

higher education and general (or long) higher education (as in Germany, Austria, Denmark, Finland, Ireland, Japan, the Netherlands and Switzerland, etc.), others are unitary (as in the United Kingdom since 1992, or Australia) or, on the contrary, possess several different types of higher education institutions and provision (for example, the United States or France). Over and above these formal distinctions, there is often a *de facto* if not a legally recognised stratification or division of labour within each of these sub-sectors, so that most systems may be studied from several different angles and all of them are diversified in some respects.

From the demographic standpoint, the first benefit of such diversification lies in the difference in cost per student in the different types of institution. Diversification may thus provide for lower cost expansion compared to the situation in a totally uniform higher education system. For example, the cost (or expenditure) per student may vary widely from one university to the next, depending on the level of its research commitment. In most OECD countries, the cost per student in (short) professional higher education (ISCED 5B) is lower than in general higher education (ISCED 5A) (OECD, 2007b).

Within general higher education, the difference in cost may be very variable, depending as a rule on an institution's research commitment. Although the British system is nominally a unitary one, the United Kingdom has witnessed a clear stratification of its institutions in terms of their research intensiveness: in 2007 according to the Higher Education Statistics Agency (HESA, 2008a and 2008b), 4 of the 170 higher education institutions in the United Kingdom accounted for 27% of its research expenditure and educated 4% of its students (and 7% of first degree students); 66% of the expenditure on research was concentrated in 19 institutions (21% of students and 29% of first degree students) and 80% in the first 32 (30% of students and 40% of first degree students). Similarly, only around 200 of the 6 000 higher education institutions in the United States are regarded as research universities. In Germany, the implicit hierarchy among universities is becoming increasingly explicit, with the "Excellence Initiative" (*Excellenzinitiative)* introduced by the Federal Ministry in 2006 in an effort to boost excellence in research by rewarding elite

institutions on both a financial and honorary basis. Their research intensiveness is one of several criteria taken into account. France provides an example of another type of stratification with its *grandes écoles*, whose foremost concern is to train elites rather than undertake research: public expenditure per student both in the special classes preparing candidates for entry to the *grandes écoles* and within the *écoles* themselves is around twice that of the universities, with public expenditure per student in professional training courses lying somewhere between the two (Renaut, 2002).

The other benefit of system diversity is that it offers a means of satisfying the wide variety of educational goals and needs among the population. The emergence of short-course provision in higher education has contributed to its expansion in recent decades (Teichler and Bürger, 2008). In France, for example, the vocational baccalaureates and higher education programmes have made it possible to broaden access to higher education. This also applies to the United States community colleges with their two-year short courses mainly offering general education (Bailey and Smith-Morest, 2007).

If the diversification of provision both drives the expansion of systems and is a response to it, making it possible, among other things, to limit the cost of their higher education in comparison with the elite systems that often preceded them, one may well ask how a decrease in the size of systems will affect it. From one angle, countries seeking to check the fall in their enrolments will be able to continue to promote extensive differentiation within their systems, so that it becomes easier for greater numbers of students to enrol in them and do well. Furthermore, it is hard to see why countries would wish to deprive themselves of the other potential advantages of a differentiated system, in terms of relevance and excellence. On the other side, where there is a clear-cut stratification between different sectors, it is reasonable to enquire whether students in the least prestigious sector might not prefer to join the most prestigious sector if its places are less strictly limited. In Japan, it may thus be observed that the "junior colleges" sector is becoming steadily less attractive, essentially because women are increasingly deciding to go to university (Yonezawa and Kim, 2008). It might be considered that the decrease in student enrolments can only further this contraction. Yet this does not mean that the university sector will be less stratified. Since the number of places at the most prestigious universities will always remain extremely limited compared to the number of students, competition to secure admission to these institutions is unlikely to diminish.

For purpose-oriented diversification to result in higher participation and an increase in the number of qualifications awarded, it is important to establish transfer points between different courses, as well as the different types of provision and institution. This will enable students to select alternative options if they fail to progress in a particular branch or course of study, and free them from any obligation to terminate their studies rather than doing so when they wish. It is especially important for students to be able to transfer from short-course (or professional) education to long (or general) education, and *vice versa*. The development of modular courses and the possibility of accumulating credits for them over a long or indefinite period are also conducive to this kind of diversity and change the age profile of students. The diversification of systems of higher education or institutional provision at this level also presupposes a certain measure of diversification among teaching staff. Such diversity may make it easier to replace or recruit teachers by broadening the range of knowledge, expertise and experience that may be appropriate for this purpose.

It should be noted that the same diversity of purpose and costs may exist within an institution as within a system, so that the distinction between sectors is just one possible form

of differentiation. However, the advantage of differentiating between the basic role of each sector is that it prevents institutions from drifting towards the university model, in which research is the foremost priority.

Public funding and cost-sharing

One of the most frequently emphasised effects of the expansion of higher education systems concerns the pressure it puts on public expenditure. It may indeed be the case that, for political or budgetary reasons, governments cannot continue to fund in an appropriate manner their higher education systems or to support systems for the least privileged students. Under these circumstances and to prevent any deterioration in the quality or equity of systems, one way of responding when they expand is to alter the share of costs borne by public and private sources, and to increase the share of private funding in the system, possibly by channelling some of the public expenditure into support for the least privileged students (Santiago *et al.*, 2008). The private financial sources correspond in most cases to the students themselves (and their families), even though institutions in certain countries (such as the United States, Canada, Hungary or Korea) manage to attract other forms of private funding on a significant scale.

An increased contribution from students and their families may have a negative impact on participation and equity if it is not paralleled by a student loans system; on the other hand, exclusively public funding with little financial support for families may sometimes limit access to higher education to a greater extent than a system in which the most affluent families contribute more (Santiago *et al.*, 2008; Johnstone, 2006). It is not our purpose here to engage in the complex debate on cost-sharing in higher education, but simply to note that the increase in private funding represents one possible pragmatic response to the expansion of higher education systems. However, there are limits to this solution, since if students have to bear excessively high private costs, this could in principle lead to decreased student participation or possibly even to downward pressure on birth rates in some countries (Yonezawa and Kim, 2008).

If one way of responding to the expansion of systems involves increasing the funding of higher education from private sources, does the opposite apply when student enrolments fall? Maybe but not necessarily. From the standpoint of institutions, a lowering of registration fees may constitute an appropriate response for them, as they can then activate competitive pricing to their own advantage to attract students into a more competitive environment. From the system point of view, the contraction of systems in absolute terms will probably correspond to their expansion or levelling out in relative terms, so that budgetary resources will not necessarily become available (see, for example, the projections for Japan in Table 2.4). Besides, in countries in which a culture of private funding is well entrenched, it is unlikely that governments will change their policy. In countries like Korea or Japan, in which fairly high registration fees exist alongside only modest student financial support, the budgetary windfall resulting from contraction might reasonably be reinvested by lowering registration fees and increasing financial support, especially if the private cost of education in those countries does indeed limit their birth rate.

As already noted, it has to be borne in mind that the relation between expansion or contraction and public expenditure is far from automatic, as the public cost of higher education depends also on the growth in costs per student, on economic growth and on the public investment that countries are politically willing to make in higher education. In many OECD countries in which the number of pupils in primary and secondary education is going

to decrease for demographic reasons, the expansion in higher education might possibly be funded by reinvesting the savings achieved at those levels. Conversely, if in other countries the cost per student continues to rise faster than the level of their national resources, the contraction of systems might be paralleled by a sharp increase in the public cost of higher education and prompt the public authorities to redistribute the share of costs borne by public and private sources. In all cases, political considerations will be decisive.

The attainment, quality and number of graduates

Policies concerned with access to higher education have long sought to encourage access rather than enhance student performance. As is demonstrated by changes in policy such as those clearly apparent at the ministerial meeting on education in 2006 (OECD, 2006d), or again changes in attitudes to access regarding persons with disabilities (Ebersold, 2008), many OECD countries today pay greater attention to the achievement or graduation rates of students. It is all the more important that governments should seek to improve student attainment levels now that their societies are ageing. Despite an increase in the educational level of the population, some countries will witness a decrease in the total number or relative proportions of their graduates, especially among the younger age groups, and improving the attainment rates of their students may be one way of limiting it. In certain countries, in which the proportion of graduates in the population is relatively low compared to higher education participation rates, improving student achievement rates may also be a means of increasing graduate numbers. Student attainment is related to teaching quality in higher education, as well as to the quality of student guidance and supervision, and the way in which paths of study between different levels and types of course are structured. It should be noted here that the balance between flexibility and firmness in the structure of these study paths is important: too rigid a system which fails to provide for easy transfer between branches or disciplines, or from one institution to another, or in which students are unable to opt for alternative courses without starting their studies again from scratch, or to discontinue and then return to their studies, will tend to result in high drop-out rates, given that some students who would like to change direction or to continue their studies cannot do so easily; on the other hand, excessively flexible study paths may produce the same outcome, in this case because incentives for students to complete their studies within a given period are too weak (as may be the case in the United States).

Quality assurance and the recognition of qualifications

Because of the circumstances in which it originated, it is often thought that quality assurance is of special importance in the expansionary phases of higher education systems. Quality assurance was indeed first developed as a response to the diversification and expansion of higher education (Lewis, 2009). The proliferation of providers and forms of provision is thought to increase the risk that the quality of courses and qualifications will be compromised. It is thus becoming essential to achieve at least minimum quality standards to ensure that public money is spent efficiently or protect the various interests with a stake in higher education, including students and employers. While many countries have tended to restrict the use of quality assurance and accreditation to the private sector in their system, the likelihood that quality standards will slip is just as great in public higher education institutions.

However, quality assurance is no less important in periods of contraction. This is doubtless one of the reasons why Japan and Korea have undertaken major reforms in the

area of quality assurance in recent years (Yonezawa and Kim, 2008; Santiago *et al.*, 2008). Where institutions are closed or courses discontinued, it is vital for the students affected to be able to pursue their studies in another institution without sacrificing the benefits of their previous coursework. To this end, governments have to further the recognition of qualifications, credits and previously completed courses. While quality assurance and academic recognition are two distinct mechanisms, quality assurance unquestionably promotes mutual recognition and confidence among institutions. This is why, for example, the two go hand in hand in the Bologna Process in Europe (OECD, 2004).

E-learning

New information and communication technology may also have an important part to play in managing access to higher education when student enrolments are either expanding or contracting. Its key asset in this respect is that it can make participation in higher education more flexible. In this context, e-learning is thus used primarily to deliver entire courses (in virtual universities) or, in institutions offering conventional classroom provision, to deliver certain courses or modules by distance means (OECD, 2005). In either case, this enables students to study at home and spend less time on the campus and in classrooms. On the one hand, therefore, e-learning may be used to broaden access to higher education for those who would be unable to study if they had to attend all their lectures on campus, whether prevented from doing so for health reasons (Ebersold, 2008), or because they lived in remote areas, or had to meet family or professional obligations. Potentially, if not always in practice, it thus provides an opportunity to broaden the scope for student participation in institutions and systems which wish to do so, for example because of falling enrolments. On the other hand, e-learning may also provide a better way of managing the expansion of student enrolment, by limiting the amount of face-to-face provision and, by the same token, the cost of physical infrastructure and use of buildings, or even staff costs.

Numerical impact, geographical distribution and variations over time

In certain cases, as discussed in Section 2.1, it is likely that growth (or contraction) of the system will cause little concern, either because the numbers involved are relatively small or because it is evenly distributed geographically. Regardless of their size, all OECD countries could cater, with no great difficulty, for an increase of 30 000 or even 60 000 students: if this intake could not be spread across existing institutions, a few new establishments would be enough to accommodate it. The creation of one or two million extra places in 10 or 20 years could be a challenge even for the biggest countries if it were concentrated on just a small section of their territory. The nature of the challenge is thus essentially related to the distribution of these new students across the area they occupy – as a given country might well experience simultaneously a surge in prospective enrolments in some regions and a marked contraction in others. Another organisational difficulty is linked to a possible increase followed by a decrease in student enrolment, given that this kind of variation over time may pose planning problems (Gabriel, von Stuckrad and Witte, 2007). Germany, for example, is experiencing both problems. Some *Länder* will witness a fall in their enrolments while others will experience a sharp increase. Furthermore, enrolments will first rise and then later fall.

2.8. Summary

The main conclusions of this chapter may be summed up as follows:

- Demography is only one of several factors determining the size of higher education systems: decreases in the size of younger age cohorts do not necessarily lead to a fall in student enrolments and may sometimes go hand in hand with the expansion of systems.
- Except in just a few countries, demographic changes should on the whole have a fairly limited impact on the size of higher education systems in the OECD area, whether the scenario is one that maintains the *status quo*, or the continuation of past trends in participation. Broadening of access to higher education is likely to continue, without preventing decreases in student enrolment in some countries.
- The projections carried out illustrate the relative sluggishness in the dynamics of demography as regards, on the one hand, the time lag between changes in the numerical strength of younger age cohorts and changes in the size of systems and, on the other, the impact that more elderly cohorts have on the proportion of graduates in the population: that proportion did not therefore differ radically in the scenarios considered, despite the very different growth rates they depicted.
- While changes in the size of higher education systems increase total costs in the sector, they should not necessarily result in greater pressure on national public expenditure or on the investment of national resources in higher education: in fact increases in costs are partly unrelated to changes in student enrolments, which leaves policy makers with some room for political manoeuvre.
- If past trends persist, the proportion of graduates in the 25-44 age group of the population will exceed or be close to 50% in many countries. The countries with easily the greatest proportion of graduates will be Japan, Korea and Canada. The United States will concede its relative advantage to a minor extent and the European Union (19 countries) will come close to equalling it for the 25-64 age group. By contrast, the United States will slightly increase its lead over the European Union in terms of the youngest graduates.
- The expansion of higher education has often been associated with the growth of far more inclusive access, meaning an increase in the probability that the least privileged groups in society (but also the remainder) will enter higher education. The make-up of the student population may thus reflect more faithfully the social composition of the population as a whole. While expansion does not necessarily lead to more equal opportunities among the different groups, this is what has occurred in most countries in the course of recent decades. It is possible that this will continue as expansion is pursued, but the association between expansion and inequality of opportunity is far from systematic. It is thus hard to predict the impact of continued expansion on inequalities of opportunity, even if it is likely to support efforts to increase the inclusiveness of systems still further.
- Changes in the size of higher education systems partly depend on policies in this sector, and particularly on those concerned with access, while also exerting a reciprocal influence on them, for example as regards cost-sharing or the diversification of systems. Responses to these changes and strategies for dealing with them do not basically differ whether higher education is contracting or expanding. The main issues confronting policies for higher education concerned with access, quality, its various purposes or objectives and the funding of systems, or the way in which all these issues are addressed, do not appear to be radically affected by any change in the size of systems,

even though geographical variations or changes over time may pose specific problems. The nature and management of student demography are just one aspect of more general concerns regarding appropriate relations between higher education and the labour market, or again globalisation or policy in the field of science and innovation, etc.

Notes

1. *Cf. http://nces.ed.gov/programs/digest/d04/tables/dt04_173.asp*
2. Estimates of the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany (*KultusministerKonferenz*): *http://www.kmk.org/statist/home.htm*.
3. Data provided by the *Statisztikai Tájékoztató, Felsőoktatás*.
4. In Australia for example, GDP per capita, like GDP per student, has grown more rapidly than expenditure on higher education institutions in the last decade, so that the increase in student enrolments would correspond to a lowering of expenditure as a percentage of GDP if past trends continued – to a level of 0.6% which corresponds to long-term national projections of public expenditure on universities (Australian Treasury, 2007). In Hungary, expenditure per student fell whereas there was a strong growth in GDP; in Ireland, GDP also rose much faster than expenditure per student in higher education. Conversely, in Portugal and Spain, expenditure per student in higher education grew more rapidly than GDP, with the result that even the projected big fall in enrolments in Spain would not prevent the increase in expenditure on higher education if the past trend continued.
5. The average age of teachers does not however give a clear idea of the replacement problem, as the distribution of teachers across different age groups may vary while their average age remains the same.
6. Retirement age has been arbitrarily set at 65 in all calculations.
7. In 2008, the OECD initiated a feasibility study for an international comparison of higher education learning outcomes in OECD countries: *www.oecd.org/edu/ahelo*.

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ANNEX 2.A1

Model Description

by

Alexander A. Antonyuk*

In this document we adopt the terminology used in Rogers (2005) that describes the double exponential function of Coale and McNeil. This function, when integrated (summed in our discrete case) to any age *x* and then multiplied by the size of the group that will ever experience an event, *e.g.* enter higher education, yields the proportion of the group who have already experienced the event (*e.g.* entered higher education) at each age.

We take the same approach to model three key events in tertiary education: entry to tertiary education, survival on the course (or discontinuing the study), and graduation. For each of those we defined parametric functions. We fixed the shape and the mean of the entry and discontinue ("drop-out") functions for all countries to values approximately equal to the average for OECD countries. Then we fitted graduation functions for each country individually.

Parameter fitting was done by comparing output to observed data. For fixed *input* to the model we used:

- UN demographic data and median projections (as revised in 2006), namely the size of the 17-year-old cohorts for each country and for each required year.
- OECD estimates of entry and discontinue rates prior to 2004.

The *output* of the model was compared to the OECD data on the number of enrolled students in 2004. Thus, for each country we varied the mean of the graduation function (keeping the shape fixed) and found the parameters that produced output which is very close to the observed enrolment data in 2004.

Figure 2.A.1 shows an example of the three functions. Note that the area under the curves does have a simple interpretation unlike the transition rate curves in multi-state modelling (Willekens, 2008). For example, consider the entry rate curve. In the figure it has the area of 0.6, which is the sum of the function values for all ages. This means that 60% of the cohort will enter tertiary education at some point in their life. Also, we can deduce from the figure that approximately 24% of the cohort will start tertiary education by the age of 18 (2% at 16, 6% at 17, and 16% at 18).

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Once all three distributions are established the number of students (from a given year cohort) enrolled in a course is calculated as follows. The number is cumulative and is calculated from the previous year *x–1:*

$$Enrolled(x) = Enrolled(x\text{-}1) + Cohort\_Size^{*}Entry(x) - Total\_Discontinue^{*}Discontinue(x) - Total\_Graduate^{*}Graduate(x),$$

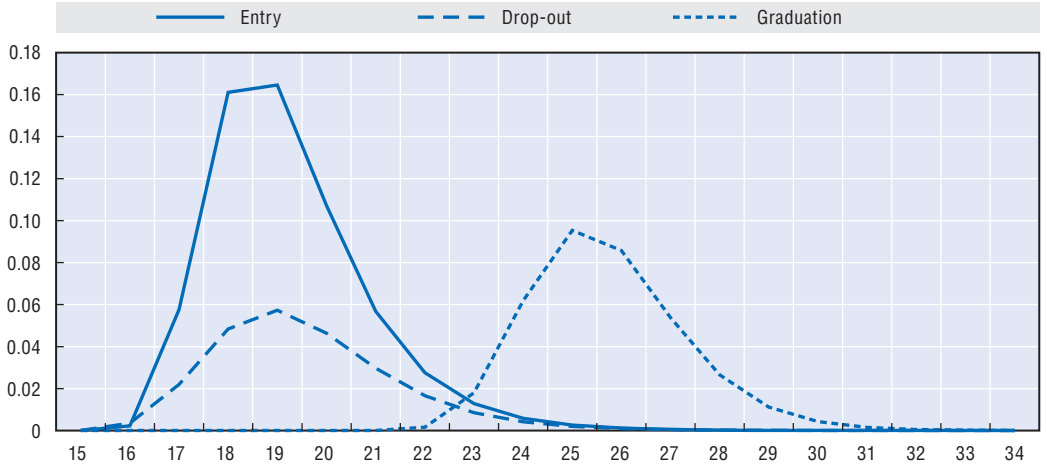
where *Entry(x)*, *Discontinue(x)* and *Graduate(x)* are the values of the parametric functions at year *x,* and *Total_Discontinue* and *Total_Graduate* are the total number of people in the cohort who will ever discontinue the course and graduate respectively. They are easy to calculate once we know the *Entry_Rate* and *Survival_Rate* for the cohort:

$$Total\_Discontinue = Cohort\_Size^{*}Entry\_Rate^{*}(1 - Survival\_Rate),$$

$$Total\_Graduate = Cohort\_Size^{*}Entry\_Rate^{*}Survival\_Rate.$$

The model was designed to allow us to take into account the timing of changes (*e.g.* following a change in government policy) and the dynamics of the changes in demographics. For instance, while predicting enrolments in 2015, the model can account for a change in entry rates in 2010, which will only affect subsequent years.

Figure 2.A1.1. **Age functions used in the model**



The projections have then been corrected by comparing the model output with the value actually observed in 2005.

For ISCED 6 tertiary courses, there are not enough data to carry out the same analysis so we used a simpler method to predict enrolment and attainment for these advanced degrees. We calculated the ratio of the number of students enrolled in 5A and 5B courses to that in level 6 courses in 2004. Thus we used the more detailed model to predict the 5A and 5B numbers and then calculated level 6 numbers based on those predictions. We believe that the assumption of constant ratio is quite realistic, since the ratio probably does not change very quickly and very significantly.

The reasons for having adopted such a model are the following: the availability of data, so that the model uses entry and survival rates that are available in the OECD education database; the ease of interpretation of the Coale and McNeil function; the possibility (necessity) to use an automated fitting procedure for the 30 analysed countries, given that the trial and error approach used in other research was not possible given time constraints.

The limitations and assumptions of the model are the following:

- the real patterns (shapes of the curve) of entry, survival and graduation can be to some degree different from the ones we used;
- there are no entry and survival rates estimates before 2000, so we assumed that before 2000 they were the same as in 2000;
- we assumed no mortality for people before the age of 64, which should not introduce much discrepancy for OECD countries;
- the entry function assumes that no one in a cohort enters tertiary education after the age of 28.

The whole analysis was done in exactly the same way for Type A and Type B tertiary education, and for the full-time and part-time and full-time equivalent enrolments.

Two types of projections have been made: a *status quo* scenario that freezes entry rates at the 2004 level, and a trend scenario that allows entry rates to grow according to a linear extrapolation, with growth capped at 90%.

ANNEX 2.A2

Supplementary Tables

Table 2.A2.1. **Population projections for the 18-24 age group in 2015 and 2025**

2005 = 100

	1995	2005	2015	2020	2025
Australia	96	100	104	100	98
Austria	109	100	97	86	81
Belgium	106	100	100	95	93
Canada	92	100	105	97	94
Czech Republic	125	100	82	67	67
Denmark	126	100	125	124	118
Finland	93	100	100	92	88
France	105	100	94	96	97
Germany	96	100	92	87	80
Greece	112	100	79	77	76
Hungary	125	100	90	78	74
Iceland	96	100	106	100	98
Ireland	94	100	82	85	96
Italy	141	100	94	91	91
Japan	132	100	83	83	81
Korea	119	100	93	81	65
Luxembourg	107	100	122	126	129
Mexico	101	100	107	104	100
Netherlands	114	100	110	109	107
New Zealand	96	100	106	102	99
Norway	113	100	118	115	109
Poland	89	100	72	59	55
Portugal	120	100	86	88	88
Slovak Republic	101	100	79	64	58
Spain	124	100	73	76	84
Sweden	105	100	112	95	98
Switzerland	101	100	106	98	88
Turkey	93	100	102	105	104
United Kingdom	95	100	104	99	95
United States	88	100	108	106	109
OECD	**102**	**100**	**98**	**95**	**94**
Country mean	**107**		**98**	**93**	**91**
Brazil	85	100	92	96	99
China	112	100	96	88	80
India	84	100	112	113	113
Russian Federation	84	100	62	54	59
South Africa	87	100	106	104	101
World	**90**	**100**	**105**	**104**	**106**

Source: UN Population Division, median projections (as revised in 2006).

Table 2.A2.2. **Scenario 1: observed and projected enrolments in tertiary education (FTE) under current conditions**

Thousands

	Total tertiary (ISCED 5/6)				Index (2005 = 100)			Absolute difference		
	2005	2015	2020	2025	2015	2020	2025	2015	2020	2025
Australia	*742*	763	740	739	103	100	100	21	–2	–3
Austria	*244*	258	246	228	105	101	93	13	2	–16
Belgium	*351*	357	341	334	102	97	95	6	–10	–18
Canada	*m*	m	m	m	m	m	m	m	m	m
Czech Republic	*326*	329	275	256	101	85	79	4	–50	–69
Denmark	*208*	275	282	272	132	136	131	67	74	64
Finland	*224*	230	212	205	103	95	92	6	–12	–18
France	*2 187*	2 201	2 229	2 304	101	102	105	14	42	116
Germany	*2 203*	2 305	2 150	2 003	105	98	91	102	–54	–200
Greece	*647*	600	572	561	93	88	87	–47	–75	–86
Hungary	*336*	339	290	275	101	86	82	3	–46	–61
Iceland	*13*	14	13	13	107	100	97	1	–0	–0
Ireland	*169*	150	157	176	89	93	104	–18	–12	7
Italy	*2 015*	2 100	2 123	2 118	104	105	105	85	108	103
Japan	*3 871*	3 364	3 357	3 152	87	87	81	–507	–514	–719
Korea	*3 210*	2 960	2 652	2 154	92	83	67	–251	–558	–1 057
Luxembourg	*m*	m	m	m	m	m	m	m	m	m
Mexico	*2 385*	2 544	2 503	2 417	107	105	101	159	118	33
Netherlands	*515*	572	568	570	111	110	111	57	53	55
New Zealand	*177*	m	m	m	m	m	m	m	m	m
Norway	*184*	221	220	211	120	119	115	37	35	27
Poland	*1 788*	1 385	1 142	1, 034	77	64	58	–403	–646	–754
Portugal	*m*	m	m	m	m	m	m	m	m	m
Slovak Republic	*181*	159	129	118	87	71	65	–23	–52	–63
Spain	*1 678*	1 318	1 289	1 411	79	77	84	–360	–388	–267
Sweden	*295*	399	339	331	136	115	112	105	44	36
Switzerland	*178*	214	201	186	120	113	105	36	24	8
Turkey	*2 106*	2 366	2 342	2 246	112	111	107	259	236	140
United Kingdom	*1 705*	1 783	1 665	1 653	105	98	97	79	–39	–52
United States	*13 126*	14 730	14 431	14 735	112	110	112	1 604	1 306	1 610
OECD	***41 064***	**41 935**	**40 472**	**39 702**	**103**	**99**	**97**	**872**	**–592**	**–1 362**
Country mean					**103**	**98**	**95**			

m = missing.

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Table 2.A2.3. **Scenario 2: observed and projected enrolments in tertiary education (FTE) under recent trends**[1]

Thousands

	Total tertiary (5A, 5B, 6)				Index (2004 = 100)			Absolute difference		
	2005	2015	2020	2025	2015	2020	2025	2015	2020	2025
Australia	*742*	827	827	847	111	111	114	85	85	105
Austria	*244*	295	308	312	121	126	128	51	63	68
Belgium	*351*	354	338	331	101	96	94	2	–13	–20
Canada	*m*	m	m	m	m	m	m	m	m	m
Czech Republic	*326*	409	379	387	126	116	119	83	53	62
Denmark	*208*	289	296	285	139	142	137	81	88	77
Finland	*224*	237	225	221	106	100	99	13	1	–3
France	*2 187*	2 373	2 550	2 777	108	117	127	185	362	590
Germany	*2 203*	2 656	2 764	2 831	121	125	129	453	561	628
Greece	*647*	593	605	639	92	94	99	–53	–42	–7
Hungary	*336*	358	307	292	107	91	87	22	–29	–44
Iceland	*13*	15	14	14	117	109	107	2	1	1
Ireland	*169*	158	179	215	94	106	128	–10	11	47
Italy	*2 015*	2 236	2 402	2 566	111	119	127	221	387	551
Japan	*3 871*	3 563	3 701	3 605	92	96	93	–308	–170	–266
Korea	*3 210*	2 965	2 688	2 202	92	84	69	–246	–522	–1 008
Luxembourg	*m*	m	m	m	m	m	m	m	m	m
Mexico	*2 385*	3 052	3,297	3 457	128	138	145	667	912	1,073
Netherlands	*515*	640	681	726	124	132	141	125	166	211
New Zealand	*177*	m	m	m	m	m	m	m	m	m
Norway	*184*	235	240	235	128	131	128	51	56	51
Poland	*1 788*	1 525	1 321	1 232	85	74	69	–262	–467	–556
Portugal	*m*	m	m	m	m	m	m	m	m	m
Slovak Republic	*181*	182	163	163	101	90	90	1	–18	–18
Spain	*1 678*	1 393	1 409	1 589	83	84	95	–284	–269	–88
Sweden	*295*	389	325	333	132	110	113	95	31	38
Switzerland	*178*	234	238	235	132	134	132	56	60	58
Turkey	*2 106*	3 056	3 436	3 667	145	163	174	950	1 329	1 560
United Kingdom	*1 705*	1 943	1 904	1 972	114	112	116	238	199	267
United States	*13 126*	15 001	15 061	15 733	114	115	120	1 875	1 935	2 608
OECD	***41 064***	**44 979**	**45 657**	**46 869**	**110**	**112**	**115**	**3 915**	**4 593**	**5 805**
Country mean					**112**	**112**	**115**			

m = missing.

1. Estimates are based on the number of students enrolled both full- and part-time, and on the entry and drop-out rates for 2004, as well as on the UN median population projections for 2000 (as revised in 2006). In the case of the United States, scenarios 1 and 2 are identical because entry rates in recent years have remained at a fixed upper level. The figures shown correspond to a "third" scenario in which entry rates increase very gradually by an annual average of 0.25%. These estimates are not precise forecasts but projections intended purely as a guide. For the methodology, see Annex 2.A1.

Table 2.A2.4. **Impact of scenario 1 on total expenditure for tertiary education institutions: other budgetary projections**

	Projected expenditure as share of projected GDP				Projected public and private expenditure as share of projected GDP							
					2005		2015		2020		2025	
	2005	2015	2020	2025	*Public*	*Private*	Public	Private	Public	Private	Public	Private
Australia	*1.6*	1.3	1.1	1.0	*0.8*	*0.8*	0.6	0.7	0.6	0.6	0.5	0.5
Austria	*1.3*	1.5	1.5	1.4	*1.2*	*0.1*	1.4	0.1	1.4	0.1	1.3	0.1
Belgium	*1.2*	1.1	0.9	0.8	*1.2*	*0.1*	1.0	0.1	0.9	n.	0.8	n.
Canada	*2.6*	m	m	m	*1.4*	*1.1*	m	m	m	m	m	m
Czech Republic	*1.0*	0.6	0.4	0.2	*0.8*	*0.2*	0.5	0.1	0.3	0.1	0.2	0.0
Denmark	*1.7*	2.5	2.5	2.4	*1.6*	*0.1*	2.4	0.1	2.4	0.1	2.3	0.1
Finland	*1.7*	1.4	1.2	1.1	*1.7*	*0.1*	1.4	0.0	1.1	0.0	1.0	0.0
France	*1.3*	1.2	1.1	1.1	*1.1*	*0.2*	1.0	0.2	1.0	0.2	0.9	0.2
Germany	*1.1*	1.1	1.0	0.9	*0.9*	*0.2*	1.0	0.2	0.9	0.1	0.8	0.1
Greece	*1.5*	1.8	1.8	1.8	*1.4*	*n*	1.7	0.1	1.7	0.1	1.7	0.1
Hungary	*1.1*	0.7	0.4	0.3	*0.9*	*0.2*	0.6	0.2	0.3	0.1	0.2	0.1
Iceland	*1.2*	1.2	1.0	1.0	*1.1*	*0.1*	1.1	0.1	1.0	0.1	0.9	0.1
Ireland	*1.2*	0.7	0.7	0.7	*1.0*	*0.1*	0.7	0.1	0.6	0.1	0.6	0.1
Italy	*0.9*	1.2	1.3	1.3	*0.6*	*0.3*	0.9	0.4	0.9	0.4	0.9	0.4
Japan	*1.4*	1.2	1.3	1.2	*0.5*	*0.9*	0.4	0.8	0.4	0.8	0.4	0.8
Korea	*2.4*	2.0	1.6	1.2	*0.6*	*1.8*	0.5	1.5	0.4	1.2	0.3	0.9
Luxembourg	*m*	m	m	m	*m*	*m*	m	m	m	m	m	m
Mexico	*1.3*	1.5	1.4	1.3	*0.9*	*0.4*	1.1	0.5	1.0	0.4	0.9	0.4
Netherlands	*1.3*	1.2	1.1	1.0	*1.0*	*0.3*	1.0	0.3	0.9	0.2	0.8	0.2
New Zealand	*1.5*	m	m	m	*0.9*	*0.6*	m	m	m	m	m	m
Norway	*1.3*	m	m	m	*1.3*	*m*	m	m	m	m	m	m
Poland	*1.6*	0.9	0.7	0.5	*1.2*	*0.4*	0.7	0.2	0.5	0.2	0.4	0.1
Portugal	*1.4*	0.0	0.0	0.0	*0.9*	*0.4*	0.0	0.0	0.0	0.0	0.0	0.0
Slovak Republic	*0.9*	0.6	0.4	0.3	*0.7*	*0.2*	0.5	0.1	0.3	0.1	0.2	0.1
Spain	*1.1*	1.2	1.2	1.4	*0.9*	*0.2*	0.9	0.2	1.0	0.2	1.1	0.3
Sweden	*1.6*	1.7	1.2	1.1	*1.5*	*0.2*	1.5	0.2	1.1	0.1	1.0	0.1
Switzerland	*1.4*	m	m	m	*1.4*	*m*	m	m	m	m	m	m
Turkey	*m*	m	m	m	*m*	*m*	m	m	m	m	m	m
United Kingdom	*1.3*	1.3	1.2	1.1	*0.9*	*0.4*	0.9	0.4	0.8	0.4	0.8	0.4
United States	*2.9*	3.6	3.5	3.6	*1.0*	*1.9*	1.2	2.3	1.2	2.3	1.2	2.3
Country mean	***1.4***	**1.3**	**1.2**	**1.1**	***1.1***	***0.4***	**1.0**	**0.3**	**0.9**	**0.3**	**0.8**	**0.3**

m = missing.

Note: GDP and educational expenditure per student at constant prices have been projected linearly on the basis of the 1995 and 2005 trends. For Belgium, France, Iceland and Korea, the figures are based on the trends per student between 2000 and 2005. Public expenditure includes transfers to households, which are subsequently passed on to institutions.

Table 2.A2.5. **Impact of scenario 2 on total expenditure for tertiary education institutions: other budgetary projections**

	Projected expenditure as share of projected GDP				Projected public and private expenditure as share of projected GDP							
					2005		2015		2020		2025	
	2005	2015	2020	2025	*Public*	*Private*	Public	Private	Public	Private	Public	Private
Australia	*1.6*	1.5	1.3	1.2	*0.8*	*0.8*	0.7	0.7	0.6	0.7	0.6	0.6
Austria	*1.3*	1.7	1.8	1.9	*1.2*	*0.1*	1.7	0.1	1.7	0.1	1.8	0.1
Belgium	*1.2*	1.0	0.9	0.8	*1.2*	*0.1*	1.0	n.	0.9	n.	0.8	n.
Canada	*2.6*	m	m	m	*1.4*	*1.1*	m	m	m	m	m	m
Czech Republic	*1.0*	0.8	0.5	0.3	*0.8*	*0.2*	0.6	0.1	0.4	0.1	0.3	0.1
Denmark	*1.7*	2.6	2.6	2.5	*1.6*	*0.1*	2.5	0.1	2.5	0.1	2.4	0.1
Finland	*1.7*	1.5	1.3	1.1	*1.7*	*0.1*	1.4	0.0	1.2	0.0	1.1	0.0
France	*1.3*	1.3	1.3	1.3	*1.1*	*0.2*	1.1	0.2	1.1	0.2	1.1	0.2
Germany	*1.1*	1.3	1.3	1.3	*0.9*	*0.2*	1.1	0.2	1.1	0.2	1.1	0.2
Greece	*1.5*	1.8	1.9	2.0	*1.4*	*n*	1.7	0.1	1.8	0.1	1.9	0.1
Hungary	*1.1*	0.8	0.4	0.3	*0.9*	*0.2*	0.6	0.2	0.4	0.1	0.2	0.1
Iceland	*1.2*	1.3	1.1	1.0	*1.1*	*0.1*	1.2	0.1	1.0	0.1	1.0	0.1
Ireland	*1.2*	0.8	0.8	0.9	*1.0*	*0.1*	0.7	0.1	0.7	0.1	0.8	0.1
Italy	*0.9*	1.3	1.5	1.6	*0.6*	*0.3*	0.9	0.4	1.0	0.4	1.1	0.5
Japan	*1.4*	1.3	1.4	1.4	*0.5*	*0.9*	0.4	0.9	0.5	0.9	0.5	0.9
Korea	*2.4*	2.0	1.7	1.3	*0.6*	*1.8*	0.5	1.5	0.4	1.2	0.3	1.0
Luxembourg	*m*	m	m	m	*m*	*m*	m	m	m	m	m	m
Mexico	*1.3*	1.8	1.8	1.8	*0.9*	*0.4*	1.3	0.6	1.3	0.6	1.2	0.5
Netherlands	*1.3*	1.4	1.3	1.3	*1.0*	*0.3*	1.1	0.3	1.0	0.3	1.0	0.3
New Zealand	*1.5*	m	m	m	*0.9*	*0.6*	m	m	m	m	m	m
Norway	*1.3*	m	m	m	*1.3*	*m*	m	m	m	m	m	m
Poland	*1.6*	1.0	0.8	0.6	*1.2*	*0.4*	0.8	0.3	0.6	0.2	0.5	0.2
Portugal	*1.4*	0.0	0.0	0.0	*0.9*	*0.4*	0.0	0.0	0.0	0.0	0.0	0.0
Slovak Republic	*0.9*	0.7	0.5	0.4	*0.7*	*0.2*	0.6	0.2	0.4	0.1	0.3	0.1
Spain	*1.1*	1.3	1.4	1.6	*0.9*	*0.2*	1.0	0.3	1.1	0.3	1.3	0.3
Sweden	*1.6*	1.6	1.2	1.1	*1.5*	*0.2*	1.4	0.2	1.1	0.1	1.0	0.1
Switzerland	*1.4*	m	m	m	*1.4*	*m*	m	m	m	m	m	m
Turkey	*m*	m	m	m	*m*	*m*	m	m	m	m	m	m
United Kingdom	*1.3*	1.5	1.4	1.3	*0.9*	*0.4*	1.0	0.5	0.9	0.4	0.9	0.4
United States	*2.9*	3.7	3.7	3.8	*1.0*	*1.9*	1.3	2.4	1.3	2.4	1.3	2.5
Country mean	***1.4***	**1.5**	**1.4**	**1.4**	***1.1***	***0.4***	**1.1**	**0.4**	**1.0**	**0.4**	**1.0**	**0.4**

m = missing.
Note: See Table 2.A.4.

Table 2.A2.6. **Impact of projections on total expenditure for tertiary education institutions as share of public expenditure: other budgetary projections**

	Public expenditure for tertiary education institutions as share of all public expenditure, 2005 and projections						
	2005	Scenario 1			Scenario 2		
		2015	2020	2025	2015	2020	2025
Australia	*m*	1.9	1.6	1.4	2.0	1.8	1.6
Austria	*2.4*	2.9	2.8	2.6	3.3	3.5	3.6
Belgium	*2.2*	2.0	1.7	1.5	2.0	1.7	1.5
Canada	*3.5*	m	m	m	m	m	m
Czech Republic	*1.9*	1.2	0.7	0.4	1.5	0.9	0.6
Denmark	*3.1*	4.5	4.5	4.3	4.7	4.8	4.5
Finland	*3.3*	2.7	2.3	2.0	2.8	2.4	2.2
France	*2.1*	1.9	1.8	1.7	2.1	2.0	2.1
Germany	*2.0*	2.1	1.9	1.7	2.4	2.4	2.4
Greece	*m*	3.7	3.7	3.7	3.7	3.9	4.2
Hungary	*1.7*	1.1	0.7	0.4	1.2	0.7	0.4
Iceland	*2.6*	2.5	2.2	2.0	2.7	2.4	2.2
Ireland	*2.8*	2.0	1.8	1.9	2.1	2.1	2.3
Italy	*1.3*	1.8	1.9	1.9	1.9	2.1	2.3
Japan	*1.3*	1.1	1.1	1.1	1.2	1.3	1.3
Korea	*2.0*	1.7	1.4	1.1	1.7	1.4	1.1
Luxembourg	*m*	m	m	m	m	m	m
Mexico	*3.8*	m	m	m	m	m	m
Netherlands	*2.2*	2.2	1.9	1.7	2.4	2.3	2.2
New Zealand	*2.8*	m	m	m	m	m	m
Norway	*m*	m	m	m	m	m	m
Poland	*2.7*	1.6	1.1	0.9	1.7	1.3	1.1
Portugal	*1.9*	m	m	m	m	m	m
Slovak Republic	*3.5*	1.2	0.7	0.5	1.4	1.0	0.9
Spain	*2.3*	2.5	2.5	2.9	2.7	2.8	3.4
Sweden	*2.5*	2.6	1.9	1.7	2.5	1.9	1.7
Switzerland	*3.1*	m	m	m	m	m	m
Turkey	*m*	m	m	m	m	m	m
United Kingdom	*2.0*	2.0	1.8	1.7	2.1	2.0	2.0
United States	*2.7*	3.4	3.4	3.4	3.5	3.5	3.7
Country mean	***2.5***	**2.2**	**2.0**	**1.8**	**2.4**	**2.3**	**2.2**

m = missing.
Note: See Table 2.A.4.

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Table 2.A2.7. **Impact of changes in enrolments on budget for tertiary education institutions: other budgetary projections**

	Change in public and private expenditure for tertiary education institutions imputable to enrolment change as share of GDP						Change in public expenditure for tertiary education institutions imputable to enrolment change as share of all public expenditure					
	Scenario 1			Scenario 2			Scenario 1			Scenario 2		
	2015	2020	2025	2015	2020	2025	2015	2020	2025	2015	2020	2025
Australia	–0.02	–0.05	–0.05	0.10	0.09	0.11	–0.02	–0.07	–0.06	0.14	0.12	0.15
Austria	0.09	0.02	–0.08	0.31	0.39	0.42	0.17	0.04	–0.16	0.59	0.74	0.80
Belgium	0.01	–0.04	–0.05	0.00	–0.04	–0.06	0.01	–0.07	–0.10	–0.01	–0.09	–0.11
Canada	m	m	m	m	m	m	m	m	m	m	m	m
Czech Republic	0.01	–0.07	–0.06	0.16	0.07	0.05	0.01	–0.13	–0.11	0.30	0.13	0.10
Denmark	0.59	0.64	0.55	0.71	0.77	0.66	1.07	1.17	1.00	1.29	1.39	1.21
Finland	0.05	–0.06	–0.09	0.09	0.01	–0.01	0.09	–0.11	–0.16	0.17	0.02	–0.01
France	0.03	0.04	0.07	0.12	0.20	0.29	0.04	0.06	0.11	0.19	0.32	0.46
Germany	0.05	–0.02	–0.09	0.23	0.27	0.30	0.10	–0.04	–0.17	0.41	0.50	0.55
Greece	–0.13	–0.22	–0.26	–0.15	–0.12	–0.02	–0.28	–0.47	–0.55	–0.32	–0.25	–0.03
Hungary	0.01	–0.06	–0.06	0.05	–0.04	–0.04	0.01	–0.10	–0.09	0.08	–0.06	–0.06
Iceland	0.12	0.03	0.01	0.22	0.13	0.10	0.24	0.07	0.02	0.46	0.27	0.20
Ireland	–0.06	–0.02	0.05	–0.02	0.07	0.20	–0.16	–0.07	0.13	–0.06	0.18	0.54
Italy	0.05	0.07	0.07	0.13	0.24	0.35	0.08	0.10	0.10	0.19	0.35	0.51
Japan	–0.17	–0.18	–0.26	–0.10	–0.05	–0.09	–0.15	–0.16	–0.23	–0.09	–0.04	–0.08
Korea	–0.16	–0.34	–0.61	–0.16	–0.32	–0.58	–0.14	–0.30	–0.53	–0.14	–0.28	–0.51
Luxembourg	m	m	m	m	m	m	m	m	m	m	m	m
Mexico	0.11	0.08	0.03	0.41	0.51	0.56	m	m	m	m	m	m
Netherlands	0.14	0.12	0.11	0.28	0.33	0.38	0.24	0.20	0.19	0.49	0.58	0.65
New Zealand	m	m	m	m	m	m	m	m	m	m	m	m
Norway	m	m	m	m	m	m	m	m	m	m	m	m
Poland	–0.31	–0.41	–0.42	–0.21	–0.31	–0.32	–0.51	–0.68	–0.70	–0.35	–0.51	–0.53
Portugal	m	m	m	m	m	m	m	m	m	m	m	m
Slovak Republic	–0.36	–0.43	–0.41	–0.23	–0.28	–0.24	–0.69	–0.82	–0.78	–0.44	–0.53	–0.46
Spain	–0.87	–0.95	–0.82	–0.78	–0.80	–0.59	–1.82	–1.98	–1.72	–1.63	–1.66	–1.22
Sweden	0.47	0.19	0.15	0.42	0.14	0.15	0.73	0.30	0.23	0.66	0.23	0.24
Switzerland	m	m	m	m	m	m	m	m	m	m	m	m
Turkey	m	m	m	m	m	m	m	m	m	m	m	m
United Kingdom	0.15	0.06	0.05	0.26	0.22	0.26	0.22	0.09	0.08	0.38	0.33	0.38
United States	0.30	0.22	0.30	0.37	0.38	0.55	0.29	0.21	0.29	0.35	0.36	0.52
Country mean	**0.00**	**–0.06**	**–0.07**	**0.11**	**0.10**	**0.14**	**–0.02**	**–0.12**	**–0.15**	**0.12**	**0.10**	**0.18**

m = missing.
Note: See Table 2.A.4.