



ECONOMIC POLICY COMMITTEE

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**Budgetary challenges posed by ageing population:  
the impact on public spending on education**

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## 1. BACKGROUND AND OUTLINE OF THE REPORT.

Public expenditure in education as a share of GDP has increased or remained constant during 1990s, while most other items of public expenditure decreased. As a consequence, the share of education over total public spending increased and represents currently more than 10% of total public spending. During the same period, the population target for education systems, i.e. those aged between 3 and 24 years old, decreased substantially in most Member States. Understanding these trends, and project the likely development for education expenditure is relevant to assess the overall impact of ageing population.

The Stockholm European Council (March 2001) gave mandate to the EPC for a comprehensive report assessing the overall impact of ageing population on public finances. A first round of projections was produced in late 2001, and included pensions, health care and long-term care. These projections showed that an increase between 3% of GDP and 5% of GDP is foreseen in EU countries during the next 50 years due to ageing population<sup>1</sup>.

This report aims at improving the knowledge of the impact of ageing population on public finances through the inclusion of public education spending. Broadly speaking, spending on pensions represents around half of the age-related expenditures, a quarter is represented by health care and long-term care expenditure, and the remaining quarter consists of education spending, spending on unemployment benefits and some other minor items.<sup>2</sup> Regarding the latter, the issue is whether one could expect some savings for public budget through a reduction of public expenditure on education, due to the shift in the demographic pyramid towards older cohorts.

Education spending is driven by many factors.<sup>3</sup> Fertility rates during next years will affect young cohorts and therefore the potential number of beneficiaries of education policies. At EU-15 level, total fertility rate has dropped from 1.8 at the beginning of 1980s to 1.5 at the beginning of 2000s. According to the baseline Eurostat demographic scenario, this trend is expected to reverse in the following years. In several countries (BE, DK, NL, FI, SE) the expected total fertility rate in 2050 will be similar as at the beginning of 1980s or even higher.

While considering the results of public education expenditure projections, it is important to bear in mind that demographic changes are not the only driving force<sup>4</sup>. Specific institutional factors (as eligibility criteria or length of education programmes) can play a key role in determining trends and levels of expenditure. Also, the development of the labour markets can affect enrolment in education, particularly for non-compulsory education. Changes in the skill composition of labour demand could lead to additional education if there is a general need for

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<sup>1</sup> See EPC (2001).

<sup>2</sup> For the overall assessment of the impact of ageing population on public finances, see "The impact of ageing populations on public finances: overview of analysis carried out at EU level and proposals for a future work programme. Note for the attention of the Ageing Working Group", ECFIN/339/03-EN.

<sup>3</sup> For a survey of the variables affecting education spending see Hanushek J. (1986).

<sup>4</sup> Analysis on long term trends of public expenditure focussed mainly on public transfers as pension payments. However, the projections of public consumption, as it is mainly education, need a different methodology. See, for example Balassone and Franco, 2000.

upgrading skills in the labour markets. Enrolment rates can change as well because of changes in the behaviour of the agents, caused by changes in personal income and other personal factors.

Public expenditure in education is also affected by the share education between the public and the private sector. A wide range of different education models can be depicted between the two extremes: the one in which education is provided entirely by public institutions, and the expenses are all paid by the State, and the other where there is a large share of private education and the State can (partly) finance it through transfers (vouchers) or not finance it at all.

The report is organised as follows. Section 2 summarises the main results;<sup>5</sup> section 3 depicts some basic facts about public education expenditure in EU countries; section 4 presents the results of the projections of the evolution in the number of students in public education and the underlying factors; and section 5 analyses the development of expenditure on public education to GDP ratios according to the central projection scenario. Section 6 presents some sensitivity tests, where different assumptions on enrolment rates and expenditure per student trends are taken into account. Section 7 concludes. Two annexes are added at the end of the report: annex one details the methodology used to run the projections while annex two includes country-specific results.

## **2. SUMMARY OF MAIN RESULTS**

The main results of the projection exercise are the following:

- Total public expenditure in education to GDP ratio is projected to decline in most EU Member States over the next 50 years with the exception of Germany where it remains constant. However, significant savings (1% of GDP or more) are foreseen in only 3 countries (Spain, Austria and Ireland). These results confirm that ageing population poses serious challenges to the long term sustainability of public finances, and that in a no-policy change scenario education expenditure cannot contribute substantially to re-equilibrate the unbalances due to the likely growth in pension and health care expenditures. In addition, the EU policy approach<sup>6</sup> aiming at shifting the composition of public spending towards "productive" items could lead in the near future to policy changes, and end up with higher than projected values of education expenditure to GDP ratios.
- Factors behind these trends are both demographic and institutional. On the demographic side, according to the Eurostat central scenario the population target of the education system for EU-15 (those aged 3-24 years) is expected to decline from around 100 millions in 2000 to less than 80 millions in 2050. By 2025 population aged 65 or more will be more than population aged 3-24 years.
- Institutional changes will affect participation in public education (enrolment rates) and expenditure per student. A relevant institutional component that affect enrolment rates in public education is the development of labour markets. The necessary upgrading of skills in response to changes in the labour demand should lead to a higher demand for upper-secondary and tertiary education. However, the increase in participation rates in the labour

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<sup>5</sup> Results are presented for 14 EU countries. Luxembourg is missing due to the lack of data. UK data refers to England only.

<sup>6</sup> This approach has been expressed in several European Council's conclusions. See also guideline no. 14 in the 2003 Broad Economic Policy Guidelines adopted by the Council in June 2003.

market aimed at in the context of the Lisbon agenda could reduce enrolment in non-compulsory education. In order to assess the impact of labour market changes on enrolment rates, projections took on board the expected development of participation rates in those age groups where education can be seen as an alternative to labour activity.

- Taking under consideration both institutional and demographic factors, the total number of students in EU-14 is expected to drop from 69 millions in 2000 to 56 millions in 2050 (central scenario). It should be noted that the number of students will likely drop significantly in basic and upper-secondary education but not in tertiary education.
- If it is assumed a catching-up process in education systems so that enrolment rates converge to 100% for compulsory and upper-secondary education and to the level currently experienced by the Member State with the highest enrolment rate for tertiary education, then expenditure to GDP ratio will increase in almost half of the EU countries.
- In the central scenario, the increase of expenditure per student is assumed to be equal to the increase of labour productivity. It implicitly means that the education system adapts immediately to demographic changes. In particular, the student/teacher ratio is held constant and wages in the education sector evolve as labour productivity. If these assumptions are relaxed, and it is assumed that expenditure per student can be partly affected by past trends so that some inertia effect in institutional changes is taken into account, then expenditure to GDP ratios can also increase in most countries.

### 3. SOME FACTS ABOUT PUBLIC EDUCATION IN EU COUNTRIES

Education is classified according to a standard international classification system (ISCED) into seven different levels. The EPC projections have aggregated the ISCED classification in 4 different education levels: pre-primary, basic, upper-secondary and tertiary<sup>7</sup>. This classification takes into account a critical difference across education levels, namely it aims at distinguishing two broad categories: the compulsory and the non-compulsory levels. This is a core element to take into account when producing long term projections on the impact of demographic changes on expenditure since it allows to take under consideration the links between the education system and the labour market. In fact, being enrolled in non-compulsory education is an

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<sup>7</sup> Pre-primary education, Level 0 of ISCED classification. It is defined as the initial stage of organised instruction, designed primarily to introduce very young children to a school-type environment. Such programmes are designed in general for children of at least 3 years. Basic (primary plus lower secondary) education, Level 1 and 2 of ISCED classification. Level 1 is the start of compulsory education (the first stage of basic education) with a legal age of entry usually not lower than five years old and higher than seven years old. This level covers in principle six years of full-time schooling. Level 2 is lower secondary school (or second stage of basic education). The end of this stage is usually after nine years of schooling after the beginning of primary education and often coincides with the end of the compulsory education. It includes general education as well as pre-vocational or pre-technical education and vocational and technical education. Upper-secondary education, Level 3 and 4 of ISCED classification. Level 3 is upper-secondary school and the entry age is typically 15 or 16 years old. It also includes vocational and technical education. Level 4 is post-secondary non-tertiary education and these programmes are typically designed to prepare students to the following level (university). Tertiary education, Level 5 and 6 of ISCED classification. Level 5 covers at least two years of education and the minimal access requirement is the completion of level 3 or 4. A cycle of at least 3 full-time years of education gives the access to advanced research education. However a Master course, that implies up to 6 years of tertiary education is included in level 5. Level 6 includes tertiary programmes which lead to the award of an advance research qualification. See Unesco, 1997.

alternative to being part of the labour force. This is the norm. However, there is also the option that part-time education match with part-time work, which is taken into consideration in the projections.

**Table 1 - "Official" age brackets between levels of education**

Age brackets between levels of education				
	Pre-primary	Basic	Upper secondary	Tertiary
<b>BE</b>	3 - 5	6 - 13	14 - 17	18 - 22
<b>DK</b>	3 - 6	7 - 15	16 - 18	19 - 23
<b>DE</b>	3 - 5	6 - 15	16 - 18	19 - 25
<b>EL</b>	4 - 6	7 - 15	16 - 18	18 - 22
<b>ES</b>	3 - 5	6 - 11	12 - 17	18 - 24
<b>FR</b>	3 - 5	6 - 14	15 - 17	18 - 22
<b>IE</b>	4 - 5	6 - 14	15 - 17	18 - 22
<b>IT</b>	3 - 5	6 - 13	14 - 18	19 - 24
<b>NL</b>	4	5 - 15	16 - 17	18 - 21
<b>AT</b>	3 - 5	6 - 14	15 - 18	19 - 24
<b>PT</b>	3 - 5	6 - 14	15 - 17	18 - 23
<b>FI</b>	3 - 6	7 - 15	16 - 18	19 - 23
<b>SE</b>	3 - 6	7 - 15	16 - 18	19-23
<b>UK</b>	3 - 5	5 - 10	11 - 17	18 - 21

Notes: DE : tertiary education includes post secondary; UK : no distinction between secondary and upper secondary.

Source: Economic Policy Committee working group on ageing population

Each country sets up its own education system, with specific age-breaks, which therefore differ across Member States. In table 1, the different age-breaks currently in place in EU Member States and used to produce the projections are presented. Compulsory education (so-called basic education, i.e. primary plus lower secondary) starts in general at the age of 6 years and ends at the age of 14-15 years. Upper-secondary education ends around 17-18 years old, while for tertiary education there is no 'legal' upper age-limit. Therefore, while comparing the data for different Member States, it should be borne in mind that the effective upper age-limit can differ considerably from the usual one<sup>8</sup>.

Public expenditure in education represents a relevant share of GDP and of total public expenditure in most EU Member States (table 2). EU countries spend currently around 4-7% of GDP every year in public education policies, with some peaks in Nordic countries.

As shown in table 2, there has not been a marked downward trend in education expenditure during the 1990s. This is a counter-intuitive result since the population target, i.e. those between 3 and 24 years old, has declined in almost all EU countries (see fig.1).<sup>9</sup> In particular, significant reductions have been recorded in south European countries (Greece, Spain, Italy and Portugal) where the decrease of target population has been more than 10% in 10 years, with a peak of

<sup>8</sup> A notable example here is Denmark, where according to national estimates approximately 2/3 of tertiary education students are over the 'official' age of 19-23. It is also the case for several other countries, e.g. Sweden.

<sup>9</sup> The only significant increase is registered in Luxembourg, not included in the graph because EPC projections do not cover this country.

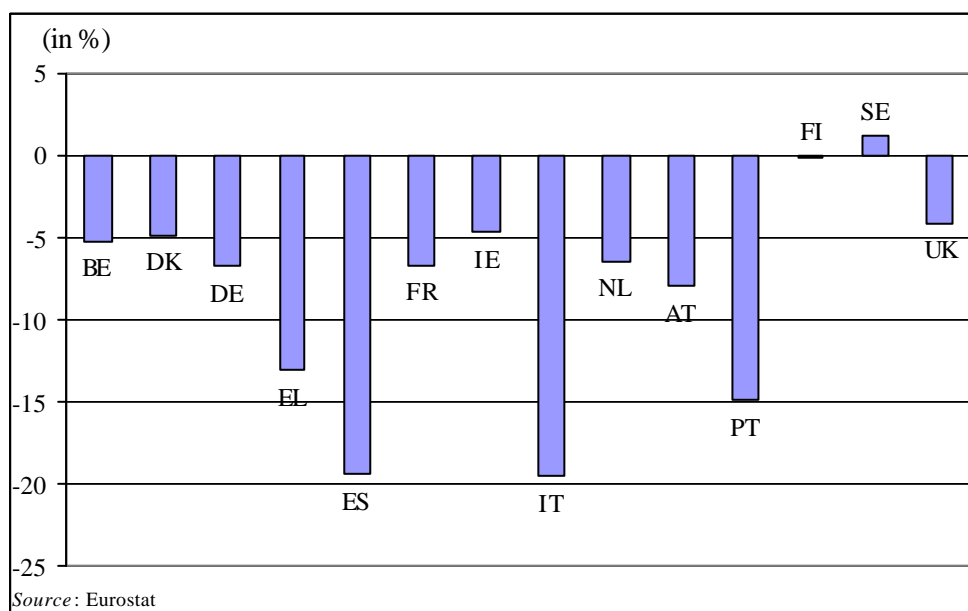
almost 20% in Spain and Italy<sup>10</sup>. In addition, during the same period most EU countries consolidated their budgetary positions. As a result, the share of education expenditure over total public expenditure tended to increase during the nineties and at the beginning of 2000s it amounted to above 10% for most countries.

**Table 2 - Expenditure on education as share of GDP and total public expenditure**

	Expenditure/GDP			Education exp/total public exp		
	early 1990s	mid 1990s	late 1990s	early 1990s	mid 1990s	late 1990s
BE	6.1	6.4	6.2	11.5	12.1	12.4
DK	7.2	7.7	8.0	13.7	12.7	14.3
DE	4.2	4.5	4.3	8.9	8.0	8.9
EL	3.5	3.2	3.7	7.0	6.3	7.7
ES	n.a.	n.a.	4.4	n.a.	n.a.	10.8
FR	n.a.	n.a.	6.3	n.a.	n.a.	11.7
IE	n.a.	5.1	4.2	n.a.	12.2	12.0
IT	5.6	4.9	5.0	10.3	9.1	10.2
LU	4.9	5.0	4.8	11.1	10.9	11.6
NL	n.a.	5.1	4.8	n.a.	9.0	10.1
AT	n.a.	6.3	5.9	n.a.	11.1	11.0
PT	5.2	6.5	6.9	12.3	14.4	15.3
FI	n.a.	7.3	6.3	n.a.	12.2	12.4
SE	n.a.	7.1	7.6	n.a.	10.5	12.6
UK	4.4	4.5	4.5	12.0	11.3	12.6

Source: Eurostat COFOG classification

**Figure 1 - Rate of change of population aged 3-24 between 1990 and 1999**



<sup>10</sup> For Spain it warrants consideration the fact that Eurostat projections differ significantly from national demographic projections.

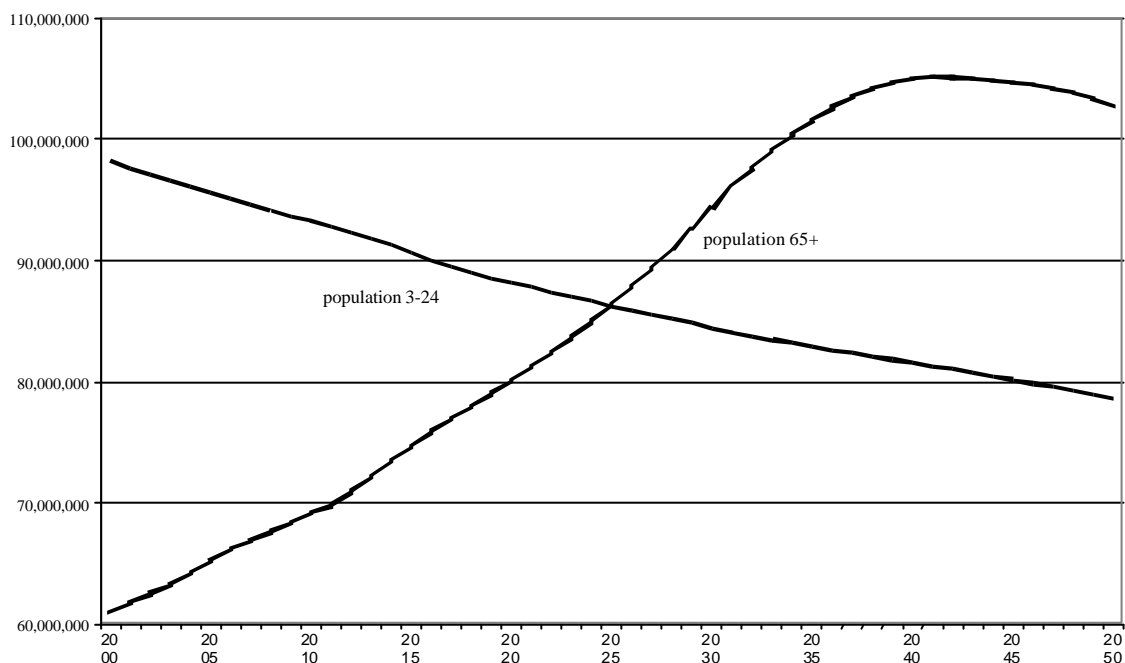


#### 4. TRENDS IN THE NUMBER OF STUDENTS IN PUBLIC EDUCATION AND THE UNDERLYING FACTORS IN THE NEXT 50 YEARS

##### 4.1. Main demographic trends

Future trends in the number of students are affected by several factors. The main driving force is, of course, the demographic development of the relevant age-cohort. According to the Eurostat baseline scenario, population in EU Member States is expected to grow slowly, from 376 million in 2000 to 386 million in 2020, and then decline down to 365 millions in 2050<sup>11</sup>. The main effect of the demographic transition is a shift between young and old cohorts. While old cohorts (persons aged 65 and above) will rise from 61 million in 2000 to 103 million by 2050, young cohorts potentially affected by education policies (people aged 3-24 years) will decrease from 98 million in 2000 to 79 million by 2050 (-24%, see fig.2). Within 20 years the number of elderly people will be higher than that of younger ones.

**Figure 2 - Number of population aged 3-24 and over 65 in the EU (2000-2050)**



Source: Eurostat.

The overall trend hides differences across countries. Table 3 presents the number of target population and the young age dependency ratio, calculated as the ratio between population aged 3-24 and total population. The strongest decline of young population is expected to occur in Spain (-36%), Italy (-33%) and Austria (-29%), while in the Netherlands and Denmark the number will remain broadly constant. On average, while in 2000 there were around 26 young out of 100 people, in 2050 there will be less than 22 out of 100. The biggest drops in young age dependency ratios are expected in Ireland (-10.8 points) and Spain (-7.6 points) while again in Denmark and the Netherlands the structure of the population would not change much.

<sup>11</sup> The demographic projections on which the education projections are based were produced by Eurostat in 2000 for the EPC, in order to perform pension, health care and long-term care projections.

**Table 3 - Change in population aged 3-24 and young-age dependency ratio between 2000 and 2050**

	Target population (age 3-24) - in millions			Dependency ratio		
	2000	2050	change 2050-2000	2000	2050	change 2050-2000
<b>BE</b>	2.7	2.3	-0.4	26.4	23.0	-3.4
<b>DK</b>	1.4	1.4	0.0	26.3	24.6	-1.7
<b>DE</b>	19.6	15.3	-4.3	23.9	20.2	-3.7
<b>EL</b>	2.8	2.1	-0.7	26.3	20.6	-5.7
<b>ES</b>	10.6	6.8	-3.8	26.8	19.2	-7.6
<b>FR</b>	16.7	14.4	-2.3	28.2	23.2	-5.0
<b>IE</b>	1.3	1.2	-0.2	35.0	24.2	-10.8
<b>IT</b>	13.5	9.0	-4.5	23.5	18.8	-4.7
<b>NL</b>	4.2	4.3	0.1	26.6	24.2	-2.4
<b>AT</b>	2.1	1.5	-0.6	25.6	19.7	-5.9
<b>PT</b>	2.8	2.5	-0.3	28.2	23.2	-5.0
<b>FI</b>	1.4	1.1	-0.3	27.7	22.4	-5.2
<b>SE</b>	2.4	2.1	-0.3	27.0	23.0	-4.0
<b>UK</b>	16.5	14.5	-2.0	27.7	23.5	-4.2
<b>EU-14</b>	98.2	78.7	-19.5	26.1	21.6	-4.5

Source: Eurostat central demographic scenario

#### 4.2. Labour markets, public education's shares and student trends

In principle, the smaller size of the target population should lead, other things being equal, to a reduction in the number of students. However, developments in enrolment rate<sup>12</sup> should be also taken into account to project student trends in public education. For basic education enrolment rates tend to be close to 100%, and remain broadly constant over time. For this level of education, the driving force is simply the degree of enforcement of the legislation, since education is compulsory. Enrolment rates for pre-primary education are generally lower, around 70%, because of the non-compulsory nature of this education level.

In the case of upper-secondary and tertiary education, studying can represent an option to professional activity. However, while - particularly for tertiary education - part-time students can cope with part-time work activity, and then both enrolment and participation<sup>13</sup> rates could increase, in practice it is doubtful whether one should forecast a significant evolution in the number of part-time students<sup>14</sup>. Taking it into consideration, enrolment rates in the future are expected to move in line with trends in labour force in the respective age-cohorts for upper-secondary and tertiary education. Enrolment rates are thus calculated as a complement to participation rates, assuming that the percentage of part-time students and of those neither in the labour force nor in education remains constant over the entire projection period at the average level of the second half of 1990s<sup>15</sup>.

<sup>12</sup> Enrolment rate is defined as gross rate, i.e. the number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the population in the relevant age group.

<sup>13</sup> Participation rate is defined as the ratio of labour force in a given age group to the total population in that age group. The latter has been taken from the Eurostat database, while the former has been provided by the Member States.

<sup>14</sup> This does not exclude policy changes that could increase incentives for increasing part-time studies.

<sup>15</sup> See annex 1 for detailed methodological aspects.

**Table 4 - Participation rates in the age groups relative to upper secondary and tertiary education (2000-2050)**

Participation rates						
	Upper Secondary			Tertiary		
	2000	2050	change 2050-2000	2000	2050	change 2050-2000
<b>BE</b>	10.7	10.5	-0.1	61.0	63.3	2.4
<b>DK</b>	60.6	59.7	-0.9	76.6	76.5	0.0
<b>DE</b>	34.1	27.0	-7.1	72.7	67.0	-5.7
<b>EL</b>	13.8	13.8	0.0	70.8	70.8	0.0
<b>ES</b>	6.0	6.5	0.5	55.0	54.4	-0.6
<b>FR</b>	10.0	10.0	0.0	64.0	64.0	0.0
<b>IE</b>	34.4	34.4	0.0	61.4	57.5	-3.9
<b>IT</b>	14.0	13.4	-0.6	54.6	52.3	-2.3
<b>NL</b>	13.3	13.3	0.0	70.8	70.8	0.0
<b>AT</b>	36.5	37.2	0.8	69.4	64.7	-4.7
<b>PT</b>	9.6	10.7	1.1	50.3	51.7	1.4
<b>FI</b>	33.0	33.0	0.0	63.3	63.0	-0.3
<b>SE</b>	25.2	25.1	-0.2	62.1	63.0	0.9
<b>UK</b>	15.0	12.4	-2.6	69.9	66.2	-3.6

Source: European Commission services based on the data of the EPC working group on ageing population

**Table 5 - Gross enrolment rates in the upper-secondary and tertiary education (2000-2050)**

Enrolment rates						
	Upper Secondary			Tertiary		
	2000	2050	change 2050-2000	2000	2050	change 2050-2000
<b>BE</b>	107.7	107.8	0.2	46.5	43.7	-2.8
<b>DK</b>	140.9	134.6	-6.2	62.6	53.2	-9.3
<b>DE</b>	100.2	111.1	10.9	39.0	47.6	8.6
<b>EL</b>	77.3	77.3	0.0	28.7	28.7	0.0
<b>ES</b>	121.6	121.0	-0.6	40.7	41.2	0.5
<b>FR</b>	90.0	90.0	0.0	44.4	44.4	0.0
<b>IE</b>	56.7	56.7	0.0	35.0	38.5	3.5
<b>IT</b>	89.0	90.7	1.7	41.3	44.3	3.0
<b>NL</b>	83.5	83.5	0.0	59.0	59.0	0.0
<b>AT</b>	105.5	104.2	-1.3	46.5	53.7	7.1
<b>PT</b>	124.2	122.7	-1.5	47.0	45.7	-1.3
<b>FI</b>	80.8	80.8	-0.1	56.7	57.2	0.5
<b>SE</b>	102.8	102.8	0.0	64.5	69.1	4.5
<b>UK</b>	80.3	82.8	2.5	46.4	52.0	5.6

Source: European Commission services based on the data of the EPC working group on ageing population

Tables 4 and 5 present the projections of participation rates and enrolment rates only for upper-secondary and tertiary education in the EU-14 Member States<sup>16</sup>. Participation rates are assumed to increase slightly or remain constant for people aged in the upper secondary school group, even if in some countries as Germany and UK a marked reduction is foreseen in the

<sup>16</sup> In several countries gross enrolment rates exceeds 100%. This is due to the fact that while calculating it the value of numerator (number of students enrolled in a given level of education, regardless of age) may exceed the value of denominator (population in the relevant age-group). That is the case if there is a large share of students enrolled in a given level of education, but older (or younger) than the 'official' age breaks for that level of education.

participation in the labour market for this age-cohort. In tertiary education the trends are mixed. While an increase is foreseen in Belgium and Portugal, a rather strong decline is expected in Germany, Ireland, Austria and UK. Conversely, enrolment rates in tertiary education should increase in the latter group of countries.

A final issue to be considered when projecting the number of students in public education is that not all education is run or financed by the State<sup>17</sup>. In most Member States the share of publicly funded education is close to 100% for basic and upper-secondary education. Some differences arise for pre-primary and tertiary education, where the share of public education is lower (see table 6).

**Table 6 - Share of publicly funded education**

<b>Share of publicly funded education</b>				
	<b>Pre-primary</b>	<b>Basic</b>	<b>Upper secondary</b>	<b>Tertiary</b>
<b>BE</b>	100	100	100	100
<b>DK</b>	81.9	100	100	100
<b>DE</b>	62.0	100	100	92.3
<b>EL</b>	100	100	100	100
<b>ES</b>	76.2	88.2	87.1	73.5
<b>FR</b>	95.8	92.7	92.7	85.4
<b>IE</b>	n.a.	100	100	100
<b>IT</b>	72.0	94.4	95.0	93.0
<b>NL</b>	n.a.	96.4	92.6	71.2
<b>AT</b>	100	100	100	100
<b>PT</b>	72.9	90.9	86.7	65.2
<b>FI</b>	85.2	100	100	100
<b>SE</b>	100	100	100	100
<b>UK</b>	91.2	90.4	89.1	63.4

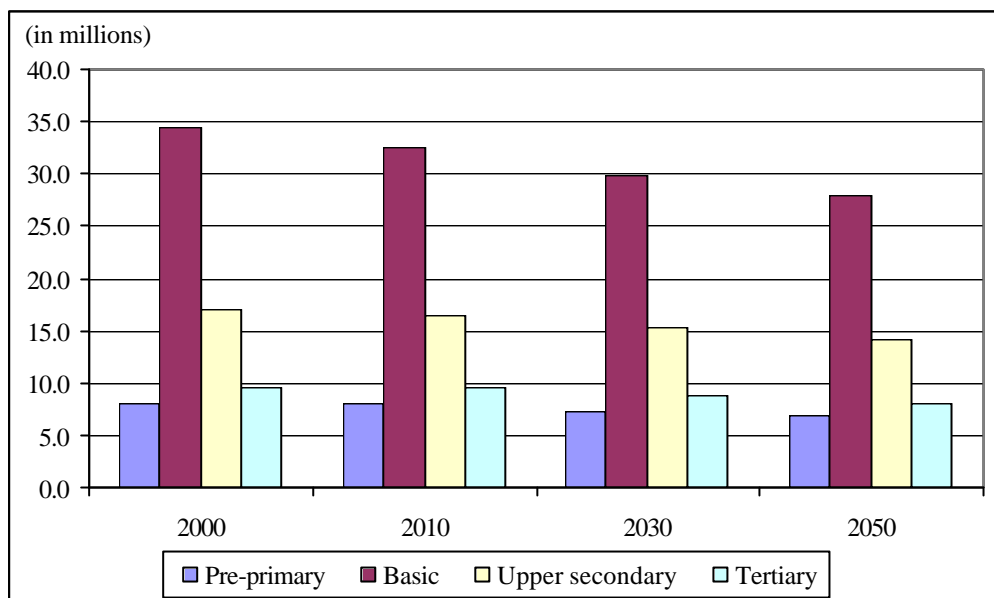
*Source:* EPC working group on ageing population

Given the projected trends of the above described variables, the number of students enrolled in public education in EU is expected to decline in EU-14 from 69.4 million in 2000 to 56.2 millions in 2050 (see figure 3). The drop is mainly due to the contraction of students in basic and upper-secondary education as a consequence of demographic changes, while the number of students enrolled in the two other levels of education, in particular in tertiary education, tends to remain constant. This is because an increase of enrolment rates counterbalances the reduction in the target population in the relevant age-groups.

Looking at country-specific development of the number of students, for all countries but the Netherlands a reduction in the number of students is projected (table 7). A detail breakdown of different education levels reveals that it is mainly the increase of the number of students in upper-secondary and tertiary education that write off simultaneous reductions in lower levels (see annex 2).

**Figure 3 - Total number of students in the four levels of education in EU-14**

<sup>17</sup> Public education expenditure is defined as current and capital expenditures on education by local, regional and national governments, including municipalities. Household contributions are normally excluded.



Source: European Commission services based on the data of the EPC working group on ageing population

A key policy issue is whether the decreasing tendency in the number of students is likely to materialise. Apparently, there are two conflicting policy priorities. On the one hand, Member States are committed to increase labour force participation rates in order to limit the risk of decreasing employment (in absolute terms) due to ageing populations<sup>18</sup>. On the other hand, making the EU *'the most competitive and dynamic knowledge-based economy in the world'* implies that investment in education should increase: more financial resources should be devoted to increase the quality of the education system, the number of students and the length of education<sup>19</sup>. The contrast between the two can only partially be solved through an increase in the number of part-time jobs. This will surely let young workers attend tertiary education on a part-time basis, but it is not clear whether this model would be encouraged instead of full-time studies. It is also unknown whether there would be a shift in the preferences from full-time studies (the far and most relevant in EU countries) to part-time studying.

Taking all factors into account, a rise in the enrolment rates in tertiary education is expected in most countries but this is not enough to counterbalance demographic changes. The decline is more prominent in basic education where enrolment rates are already close to the maximum and cannot increase further. The strong increase projected in enrolment rates in tertiary education will maintain the number of students in this level of education broadly constant at the EU level.

### Table 7 - Total number of students (2000-2050)

<sup>18</sup> The Lisbon strategy recommends explicitly the Member States to "consider setting national targets for an increased employment rate (...), by enlarging the labour force (...)". Lisbon European Council, 23-24 March 2000, Presidency Conclusions, para. 30.

<sup>19</sup> In the area of education, among others the following targets have been set up in the Lisbon strategy: "a substantial annual increase in per capita investment in human resources; [...] the number of 18 to 24 year olds with only lower-secondary level education who are not in further education and training should be halved by 2010". Lisbon European Council, 23-24 March 2000, Presidency Conclusions, para. 26.

Total number of students (in millions)					
	2000	2010	2030	2050	change 2050-2000
BE	2.2	2.1	2.0	1.9	-0.3
DK	1.3	1.4	1.2	1.2	-0.1
DE	15.7	15.3	14.0	12.7	-3.0
EL	1.6	1.4	1.4	1.4	-0.3
ES	7.8	6.8	5.8	5.2	-2.6
FR	11.5	11.0	10.4	9.8	-1.6
IE	0.7	0.6	0.6	0.6	-0.1
IT	9.7	9.1	7.5	6.7	-3.0
NL	3.0	3.2	3.0	3.0	0.0
AT	1.7	1.5	1.3	1.2	-0.4
PT	2.0	2.0	1.8	1.8	-0.1
FI	1.1	1.0	0.9	0.8	-0.2
SE	2.0	1.9	1.9	1.8	-0.2
UK	9.5	9.4	8.8	8.3	-1.2
<b>EU-14</b>	<b>69.7</b>	<b>66.7</b>	<b>60.8</b>	<b>56.5</b>	<b>-13.2</b>

Source: European Commission services based on the data of the EPC working group on ageing population

## 5. EXPENDITURE IN EDUCATION TO GDP RATIOS IN THE NEXT 50 YEARS

### 5.1. Main macroeconomic assumptions

Table 8 below presents a summary of the assumptions on labour productivity growth and real GDP growth rates. Labour productivity and GDP development has been discussed and agreed at the Ageing Working Group when the first set of projections on age-related expenditure were run. It has been agreed that labour productivity growth converges towards a common rate, although some leeway for higher rates are provided for catching-up countries. However, these projections takes into account also more recent available figures for both GDP and labour productivity. Data for 2000, 2001 and 2002 are actual data<sup>20</sup> while from 2003 onwards the trends of these two variables are projected as the trends depicted in the previous EPC long term projection exercise on pensions and health care<sup>21</sup>.

**Table 8 - Assumptions on labour market productivity and real GDP growth**

<sup>20</sup> Source: ECFIN AMECO database.

<sup>21</sup> EPC (2001).

Assumptions on labour market productivity and real GDP growth				
	Productivity		Real GDP	
	2000-2005	2000-2050	2000-2005	2000-2050
BE	1.0	1.8	1.8	1.6
DK	1.6	1.6	1.4	1.6
DE	1.3	1.7	1.6	1.3
EL	3.0	2.1	3.5	2.0
ES	0.9	1.9	2.8	1.7
FR	1.1	1.7	1.9	1.7
IE	3.5	2.1	5.4	2.6
IT	1.0	1.7	1.9	1.3
NL	0.9	1.6	1.7	1.7
AT	1.5	1.8	1.8	1.6
PT	1.4	1.8	1.9	1.9
FI	2.2	1.8	2.8	1.5
SE	1.2	1.7	2.1	1.7
UK	1.9	1.8	2.1	1.7

Note: annual average change

Source: European Commission services based on the data of the EPC working group on ageing population

## 5.2. The results

For what concerns the development of education expenditure, the other element to be considered in addition to student trends is expenditure per student. As explained in detail in annex 1, it depends on three main components: a) gross wages of teachers and non-teaching staff, b) pupil/staff ratio and c) other costs but wages, both current and capital. The Ageing Working Group has agreed to assume that in the central scenario expenditure per student increases as GDP per worker. This assumption implies that wages increase as labour productivity and that the pupil/staff ratios remain constant, i.e. that any reduction in the number of students due to demographic factors is accompanied by a similar reduction in the education staff.

**Table 9 - Central scenario: total expenditure on education as a share of GDP (2000-2050)**

	Total expenditure on education / GDP								
	2000	2010	2030	2050	Change 2000-2050 due to:				Total
					Pre-primary	Basic	Upper secondary	Tertiary	
BE	5.7	5.3	5.2	5.1	0.0	-0.1	-0.2	-0.2	-0.6
DK	8.6	8.8	8.3	8.4	-0.1	0.0	0.2	-0.2	-0.1
DE	5.4	5.3	5.5	5.5	0.0	-0.2	0.0	0.2	0.0
EL	4.0	3.0	3.0	3.2	0.0	-0.1	-0.3	-0.3	-0.7
ES	5.0	3.8	3.4	3.7	-0.1	-0.2	-0.5	-0.5	-1.3
FR	6.4	5.8	5.7	5.5	-0.1	-0.4	-0.2	-0.2	-0.9
IE	4.7	3.7	3.3	3.2	n.a.	-0.6	-0.3	-0.6	-1.5
IT	4.6	4.3	3.9	4.0	-0.1	-0.2	-0.1	-0.2	-0.6
NL	5.0	5.0	4.8	4.9	n.a.	-0.2	0.0	0.1	-0.1
AT	6.0	5.5	5.1	5.0	-0.1	-0.6	-0.3	0.0	-1.0
PT	5.6	5.3	4.9	5.1	0.0	-0.1	-0.1	-0.3	-0.6
FI	6.1	5.7	5.6	5.4	-0.1	-0.3	-0.2	-0.2	-0.7
SE	7.8	7.5	7.1	7.0	0.0	-0.7	-0.1	0.1	-0.8
UK	5.3	5.3	5.1	5.0	0.0	-0.2	-0.2	0.1	-0.2

Source: European Commission services based on the data of the EPC working group on ageing population

Table 9 presents the main results for the development of expenditure on education to GDP ratios. It includes direct expenditure and transfers to households and institutions (see annex 2 for a breakdown between the two). Projections show a decrease of public expenditure on education to GDP ratios in all countries but Germany, where it remains constant. Significant savings (i.e. more than 1% of GDP) are foreseen in Spain, Austria and Ireland. The overall change in public education expenditure hide different behaviour at the level of the four different levels of education considered, namely pre-primary, basic (compulsory), upper-secondary and tertiary education. As shown in table 9, limited savings are foreseen from pre-primary education. This is due to the projected increase of fertility rates in the long term and to the relatively low level of public resources devoted to this level of education (around 0.5% of GDP, see annex 2 for country-specific data). Also, significant savings from tertiary education are limited to few countries as Ireland, Spain. In all countries but Spain trends in basic education are responsible for around half of the total savings. In Spain the relative strong increase foreseen in participation rates for those belonging to the age group of tertiary education, determine a decrease in tertiary education expenditure. For Spain and Austria the significant decrease in the number of students over the next 50 years is mainly responsible for the foreseen savings under the central scenario (-33% in Spain, -31.4% in Austria).

### 5.3. Factors driving the changes in public spending on education

To get a better understanding of the factors driving the changes in education expenditure as a share of GDP, it is possible to decompose the results in four explanatory factors<sup>22</sup>, namely:

- A pure demographic effect which measures the changes over the projection period in the ratio of the persons aged 3-24 to the total population (young-age dependency ratio).
- A benefit effect which measures the changes over the projection period of the ratio between expenditure per student and labour productivity (benefit ratio).
- An eligibility effect which measures the changes in the ratio between the number of students and the population aged 3-24 (eligibility ratio).
- A labour market effect which measures the changes in the population over total employment (activity ratio)<sup>23</sup>.

Table 10 presents the effect of each of these components in the changes of total public expenditure in education as a share of GDP.<sup>24</sup> By definition, in the central scenario here

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<sup>22</sup> The decomposition follows closely the methodology used for decomposing pension spending in the EPC report, Economic Policy Committee (2001), "Budgetary challenges posed by ageing populations: the impact on public spending on pensions, health and long term care for the elderly and possible indicators of the long term sustainability of public finances", pp.24-27.

<sup>23</sup> Here it is considered the inverse of the total activity rate, i.e. population as a share of labour force.

<sup>24</sup> The following equation is used:

$$\frac{EDU}{GDP} = \frac{ES}{p} * \frac{S}{POP_{3-24}} * \frac{POP_{3-24}}{POP_{tot}} * \frac{POP_{tot}}{N} \text{ where}$$



presented, expenditure per student increases as labour productivity and therefore the contribution of the first component to spending changes is zero. However, in the first sensitivity test performed (see section 6 below), this factor plays a significant role since expenditure per student follows its past trend at the beginning of the projection period and converge to labour productivity from 2020 onwards. Eligibility will have a mixed effect across EU countries. In most cases the impact is negligible but in Greece, Spain and Portugal it will affect positively education expenditure.

**Table 10 - Central scenario: decomposing changes in expenditure on education as a share of GDP (2000-2050)**

Decomposing expenditure on education as a % of GDP between 2000 and 2050					
	Benefit	Eligibility	Dependency	Activity	Total*
BE	0.0	0.0	-0.8	0.3	-0.6
DK	0.0	-0.2	-0.4	0.5	-0.2
DE	0.0	0.1	0.0	-0.3	0.0
EL	0.0	0.2	-1.1	0.3	-0.7
ES	0.0	0.2	-1.6	0.0	-1.3
FR	0.0	0.0	-1.2	0.3	-0.9
IE	0.0	0.1	-1.6	-0.1	-1.5
IT	0.0	0.1	-0.9	0.0	-0.6
NL	0.0	-0.1	-0.4	0.3	-0.1
AT	0.0	0.1	-1.5	0.3	-1.0
PT	0.0	0.2	-0.9	0.2	-0.6
FI	0.0	0.0	-1.2	0.4	-0.7
SE	0.0	0.0	-1.3	0.2	-1.1
UK	0.0	0.1	-0.9	0.5	-0.2

Source: European Commission services based on the data of the EPC working group on ageing population

\* including residual factors

## 6. A SENSITIVITY TEST AND FURTHER CONSIDERATIONS

In order to assess the sensitivity of the central scenario to basic institutional assumptions, one sensitivity test has been performed. It includes a catching-up process in education systems, where enrolment rates converge to common values. This is expressed by a convergence trend in the enrolment rates towards 100% for compulsory and upper-secondary education and towards the level reached at the threshold of the projection period by the country(s) with the highest enrolment rate. As for tertiary education, the countries with the highest enrolment rate are the Netherlands (59%), Denmark (63%) and Sweden (64%). In the following test, the enrolment rates is assumed to converge from the current level in 2000 to a target level of around 60% in 2020, and then remain constant.

Table 11 shows the trend of enrolment rates in the four different levels of education for EU 14 at an aggregate level. Compared with the central scenario, a strong increase is recorded for pre-primary and tertiary education. Since data on labour force is the same in the central scenario and the discussed one, it means that a strong increase in the number of part-time students (and part-time workers) must be assumed under this scenario.

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$EDU/GDP$  is total public expenditure in education as a share of GDP,  $ES$  is expenditure per student,  $p$  is GDP per worker,  $S$  is the number of students,  $POP_{3-24}$  is population aged 3-24,  $POP_{tot}$  is total population,  $N$  is employment.

**Table 11 - Average enrolment rates in EU-14 (2000-2050)**

Average enrolment rates in EU-14					
	2000	2010	2030	2050	change 2050-2000
Pre-primary	84.7	92.3	100.0	100.0	15.3
Basic	101.8	100.9	100.0	100.0	-1.8
Upper secondary	96.9	98.5	100.0	100.0	3.1
Tertiary	44.5	52.0	60.0	60.0	14.5

Note: Unweighted average

Source: European Commission services based on the data of the EPC working group on ageing population

Results presented in table 12 show that some increase in public expenditure on education as a share of GDP cannot be excluded in a number of countries as Greece, Finland and UK. Most changes (both increases and reductions) are expected to occur in the first ten-twenty years of the projection period, while enrolment rates are subject to the catch-up process.

**Table 12 - Sensitivity test: total expenditure on education as a share of GDP (2000-2050)**

Total expenditure on education / GDP									
	2000	2010	2030	2050	Change 2000-2050 due to:				
					Pre-primary	Basic	Upper secondary	Tertiary	Total
BE	5.7	5.3	5.3	5.3	-0.1	-0.2	-0.3	0.2	-0.4
DK	8.6	8.9	7.6	7.7	-0.1	-0.6	-0.2	0.0	-0.9
DE	5.4	5.3	5.6	5.6	0.0	-0.3	-0.1	0.6	0.2
EL	4.0	3.7	4.2	4.5	0.0	0.1	0.1	0.4	0.6
ES	5.0	3.8	3.5	3.7	-0.1	-0.3	-0.8	-0.2	-1.3
FR	6.4	6.3	6.6	6.4	0.0	-0.4	-0.1	0.5	0.0
IE	4.7	4.5	4.8	4.3	0.0	-0.3	-0.1	0.0	-0.4
IT	4.6	4.4	4.2	4.3	-0.1	-0.2	0.0	0.0	-0.3
NL	5.0	5.1	4.8	5.0	0.0	-0.3	0.2	0.1	-0.1
AT	6.0	5.8	5.7	5.4	0.0	-0.4	-0.3	0.3	-0.5
PT	5.6	5.4	5.2	5.3	0.1	-0.6	-0.1	0.3	-0.4
FI	6.1	6.3	6.6	6.4	0.1	-0.3	-0.1	0.5	0.3
SE	7.8	7.4	6.8	6.7	0.1	-0.7	-0.1	-0.3	-1.1
UK	5.3	5.7	6.0	5.9	0.2	-0.2	0.3	0.3	0.7

Source: European Commission services based on the data of the EPC working group on ageing population

## 6.1. Further considerations

In the central scenario discussed previously, expenditure per student was assumed to increase at the same rate as labour productivity. This assumption has a strong economic background since public consumption (as it is public education) tends to show the same long-term trend as some indicators of per capita income<sup>25</sup>. However, education spending includes a relevant component of quasi-fixed costs and in particular the number of staff (teachers and non-teachers) tend to adjust slowly compared to changes in the number of students. Any decrease in the student/staff ratio, other things being equal, implies that expenditure per student tends to increase, while the opposite holds if there is an increase in the ratio. Full details on student/staff

<sup>25</sup> The so-called Wagner law. See: European Commission, *Public Finances in EMU - 2002*.

ratio developments during the last 10-15 years are not always available for all Member States. However, information collected by the Ageing Working Group of the EPC show that - on average - the ratio tends to decline slightly. For instance, the student/staff ratio in France decreased from 16.5 in 1992 to 15.0 in 1999, and in Portugal from 15.6 in 1993 to 13.5 in 1999. For basic education only, it fell from 7.6 in 1990 to 7.3 in 1999 in Italy and from 17.4 in 1993 to 16.0 in 1999 in the Netherlands. For that level of education some relevant increase is registered only in Germany (from 15.0 in 1993 to 15.8 in 1999) and Finland (from 10.1 in 1990 to 10.5 in 1999).

In order to take these aspects under considerations, one could check which would be the likely trends of public expenditure on education to GDP ratio if expenditure per student in the future partly follows the past trends<sup>26</sup>. These trends incorporate institutional inertia, which makes the system only slowly adapt to changes in the number of students and to labour productivity developments<sup>27</sup>. In the short to medium-term it is not implausible to assume that wages can develop at a different (higher) pace than labour productivity and that pupil-teacher ratios can increase for a while (see annex 1 for a detailed description of the components behind expenditure per student).

Available past series to perform such exercise are rather short. However, with the available data one can assume that the rate of change of expenditure per student in the first year of the projection period equals the average annual rate of change during the second half of 1990s and it converges linearly to the rate of change of labour productivity. From 2020 onwards expenditure per student and labour productivity develop at the same rate, as in the central scenario. This assumption allows to consider that some structural changes are needed to adapt to a different (usually lower) number of students and that these changes need time to occur. However, it does not invalidate the main assumption that in the long run expenditure per student and labour productivity have a similar trend.

In general, these assumptions on past trends lead to higher expenditure to GDP ratios than those observed under the central scenario. This is due to the fact that labour productivity in the recent past developed at a slower pace than expenditure per student and, in few cases, also one-off expenditure increase play a role.

## 7. CONCLUSIONS

Education represents a strategic public policy for EU Member States. It will contribute to make EU economy the 'most competitive and dynamic knowledge-based economy in the world'<sup>28</sup>. It already plays a significant role in the overall budgetary position of EU Member States: total public education expenditure to GDP is currently around 4.7% of GDP, with peaks in some

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<sup>26</sup> See Balassone and Franco (2000), where this argument is strongly supported in the case of health care.

<sup>27</sup> It also includes policy decisions with one-off impact on expenditure. If available data to calculate past trends for expenditure per student covers a short period, this could lead to misleading results. A clear case is that of Portugal: during the second half of the nineties, several measures have been taken, that changed substantially the education system. These measures include the increase of financial transfers to primary and secondary schools and new investment in facilities.

<sup>28</sup> Presidency Conclusions. Lisbon European Council 23 and 24 March 2000.

Nordic countries. The overall assessment of budgetary challenges posed by ageing population asks to look deeper at the development of those public expenditures - as education - where potentially there could be some gains from ageing. In fact, the number of the youngest will be in 20 years time lower than that of the eldest, as a consequence of both an increase of elderly generations and a decrease of younger ones.

However, savings on education expenditures are uncertain and generally very limited. Under a central scenario where mainly "pure" demographic effects are considered, some significant savings are projected in around 1/5 of EU current Member States. When it is assumed that enrolment rates in EU-14 countries could converge to the current highest levels among the 14 countries, savings higher than 1% of GDP are foreseen only for Spain and Sweden. If, alternatively, it is assumed that expenditure per student is partly affected by past trends, savings due to the reduction of the number of students can be offset by the increase in expenditure per student.

Overall, the projections confirm that ageing population poses serious challenges for long term sustainability of public finances and that education expenditure cannot contribute substantially to re-equilibrate the unbalances due to the increase in pension and health care expenditures. In addition, the wish of the EU countries to shift budgetary priorities towards productive public expenditures may eventually lead to an increase of education expenditure to GDP ratios.

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# **ANNEX 1**

## **The methodology for long-term projections of public education expenditure**

When modelling future trends of public education expenditures there are specific factors to take into account:

- First, education is not only public, but it can be carried out by private institutions which are not funded by the State. Therefore, not all expenditure in education can be referred to the public sector.
- Second, education sector can be divided into at least two sub-sectors. One where education is compulsory and in which the vast majority of the population in the relevant age group is assumed to participate, and the other where education is an alternative to work. In order to take properly into account this particular feature of education, assumptions on the development of labour force for the relevant age groups where education is an alternative to work are needed. This raises the issue of consistency between the goal of raising participation rates and the one of raising enrolment rates, in particular in tertiary education. In addition, education is not only an alternative to work but it can be seen as a complementary activity because part time jobs can coexist with part-time education. This requires assumptions on the number of workers that are also students, so that they can be included in education expenditure calculations.
- Third, public education expenditure can be carried over through transfers or as public consumption (direct expenditure). However, the latter represents by far the most relevant component and should be modelled appropriately.

The following model has been used to produce long term projections of education direct expenditure. Transfers to households have been added once direct expenditure has been projected, maintaining constant the proportions between the two components of total expenditure<sup>29</sup>. The model takes explicitly into account demographic factors as one of the driving forces of expenditure. Also institutional components such as enrolment rates, the share of publicly funded education and expenditure per students are considered. As underlined by Balassone and Franco (2000) "demographic change is just one of the several factors affecting public expenditure dynamics. [...] The continuation of structural expenditure trends [...] are considered because they are consistent with a constant policy approach".

Third, already validated macroeconomic assumptions have been used to project GDP and GDP per worker dynamics. Data for 2000, 2001 and 2002 are actual data<sup>30</sup> while from 2003 onwards the trends of these two variables are projected as the trends depicted in the previous EPC long term projection exercise on pensions and health care<sup>31</sup>. The model is based on a simple accounting mechanism, where expenditure as a share of GDP is first decomposed in different components and then re-aggregate to reach the result.<sup>32</sup>

Public expenditure as a share of GDP (*EXP*) in a specific year *t* is equal to :

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<sup>29</sup> OECD (2002) provides the proportion between direct expenditure and transfers. For Italy, both direct expenditure and transfers have been projected using the main methodology.

<sup>30</sup> Source: ECFIN AMECO database.

<sup>31</sup> EPC (2001).

<sup>32</sup> Long-term projections of public spending in education are a novelty in Europe. For a comparison with other methodologies, see Canadian projections ("Fiscal Prospects for the Federal and Quebec Governments. Report Prepared for the Commission of Fiscal Imbalances", February 2002) and projections run in the US (National Center for Education Statistics, "Projections of Education Statistics to 2012").

$$EXP = \sum_{x=1}^n EXP_x \quad [1]$$

i.e. is the sum of expenditures in each age-cohort  $x$ . The latter can be decomposed as follows:

$$EXP_x = \frac{ES_x}{p} * \frac{POP_x * e_x}{N} * PUB_x \quad [2]$$

where:

- $ES_x$  is the average expenditure per beneficiary (student) of age cohort  $x$ ;
- $p$  is labour productivity;
- $POP_x$  is the dimension of age cohort  $x$ ;
- $e_x$  is the enrolment rate;
- $N$  is employment;
- $PUB_x$  indicates the share of publicly funded education for those education level related to cohort  $x$ .

As shown in equation [2], four dependent variables explain total expenditure in education for cohort  $x$  in year  $t$ : expenditure per student, the dimension of the target population, the enrolment rate and the share of publicly funded education. Let us investigate each of them.

*Expenditure per student ( $ES_x$ ).*

Expenditure per student in a specific year  $t$  can be defined as follows:

$$ES = \frac{T}{POP * e} * w + \frac{K}{POP * e} \quad [3]$$

where

- $T$  is the total number of teachers and non-teaching staff;
- $w$  is the average gross wage plus social contributions paid for each teacher and member of non-teaching staff;
- $K$  are other costs – current and capital - function of technological changes and institutional features.

Once decomposed, it can be assumed that expenditure per capita grows at the same rate as some driving variables like: labour productivity, public consumption, GDP per capita etc. Alternatively, it can be considered constant in real terms at some “optimal” level, that maximises efficiency of public education sector. All those hypotheses can be valid, but none takes into account the role of technological changes or institutional factors (as unionisation or patterns of wage indexation). In practice, when the number of beneficiaries (students) changes, expenditure



could not change or change at a slower pace, determining an increase in expenditure to student ratio. However, it is reasonable that sooner or later fixed costs adjust to the new population structure; in particular, the teacher/pupil ratio would adjust to some steady state level. Also technological changes can impact on the non-wage component of costs, allowing for some reduction.

In the presented projection it is assumed that expenditure per student changes in line with the changes in GDP per worker. Data on past trends are in fact rather limited and it would be difficult to calculate a "structural" trend in some countries. Therefore, it is implicitly assumed that wages increase as labour productivity and the teacher/student ratio remains constant. However, some projections have been run also keeping on board past trends, assuming that the yearly rate of change of expenditure per student converges in 2020 from the average yearly rate of change observed in the second half of the nineties to the rate of change in labour productivity<sup>33</sup>. From 2020 onwards it evolves in line with changes in labour productivity<sup>34</sup>.

### *Enrolment rates ( $e_x$ )*

Enrolment rates are defined as gross rates, i.e. the number of students enrolled in the given level of education, regardless of age, expressed as a percentage of the population in the relevant official age-group. The methodology to project enrolment rates differs between age groups. For pre-primary and basic level of education, where students are not included in the labour force and the education is compulsory, future enrolment rates are considered to remain constant at the level of the base year.

For upper-secondary and tertiary education, where people basically may decide to stay in the education system, to take up a paid job, to combine those two activities or neither work nor study, enrolment rates are projected as follows. Total population is first divided between labour force, students and others. However, since there is a certain number of professionally active students, one cannot calculate the enrolment rate as a mere complement to the participation rate, so that:

$$e \neq 1 - p$$

where  $e$  is the enrolment rate and  $p$  is the participation rate<sup>35</sup>. In addition, this approach does not consider those that are neither in education nor in the labour force. Total enrolment rate may

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<sup>33</sup> The use of past trends to project public consumption is a standard methodology (see, for instance the projection exercises conducted in the US or in Canada for education expenditures). However, a limit of the EPC exercise is that the past series on key education variables are short due to a lack of data.

<sup>34</sup> For all three scenarios, expenditure per student in the base year (2000) is calculated as expenditure as a share of GDP (from OECD database) multiplied by GDP (from AMECO database) and then divided by the number of students provided by Members of the AWG.

<sup>35</sup> Participation rate is calculated as labour force in the specific age group as a share of population at that age group. However, labour force data are expressed in terms of the age at the time each interview conducted (there are four interviews in one year) whilst the statistics of population are expressed according to the age on the 1<sup>st</sup> of January. An improvement would be to recalculate labour force per age group at the age on the 1<sup>st</sup> of January. Italian projections include this methodology.

be therefore decomposed into the enrolment rate relative to ‘full time’ students ( $e_{FT}$ ) and the enrolment rate relative to ‘part time’ students ( $e_{PT}$ ):

$$e = e_{FT} + e_{PT} \quad (1)$$

Enrolment rate relative to ‘full time’ students is a complement to participation rate:

$$e_{FT} = 1 - p \quad (2)$$

and enrolment rate relative to ‘part time’ students is a constant share  $c$  of total enrolment rate.

$$e_{PT} = c * e \quad (3)$$

Substituting both (2) and (3) into (1), total enrolment rate may be expressed as:

$$e = (1 - p) + c * e \quad (4)$$

After some modifications, the final formula for the enrolment rate is the following:

$$e = (1 - p) / (1 - c) \quad (5)$$

And the formula for  $c$ :

$$c = 1 - (1 - \tilde{p}) / \tilde{e} \quad (6)$$

where  $\tilde{p}$  and  $\tilde{e}$  are, respectively, the last five years average value for participation and enrolment rate. In this way, since  $c$  is assumed to be constant over time, it will be calculated on the basis of the past data using (6), and then inserted to (5) in order to extrapolate the future values of  $e$ . The factor  $c$  allows also to take into account cases where the sum between participation and enrolment rate is less than one due to the presence of those that are neither in the labour force nor in education.

The use of gross enrolment rates per age groups is a second best. Ideally, it would be better to use net enrolment rates, calculated as students in a certain age group as a share of the population in the same age group. It would be even better to have information on students per each age and level of education. Since these data are not easily available, a simplification is to use gross enrolment rates.

Enrolment rates have been projected as described above in the central scenario. The second sensitivity test is based on a Lisbon scenario that target to reduce the number of young without upper-secondary and tertiary education. Therefore, it is assumed a catch-up process, according to which all Member States will follow the path marked by the best performing countries. It is thus assumed that education systems should aim at converging to the levels of enrolment rates reached by the country whose enrolment rate is the highest. For pre-primary, basic and upper-secondary education, the target level of enrolment rates is considered to be 100%, whereas for tertiary education the benchmark is the enrolment rate observed in the best performing country (The Netherlands). It is assumed that such process of convergence takes 20 years to reach the target. Therefore, the enrolment rate is projected to converge from year 2000 to the target level in 2020, and to remain at that level from 2020 onwards.

*Share of publicly funded education ( $PUB_x$ )*

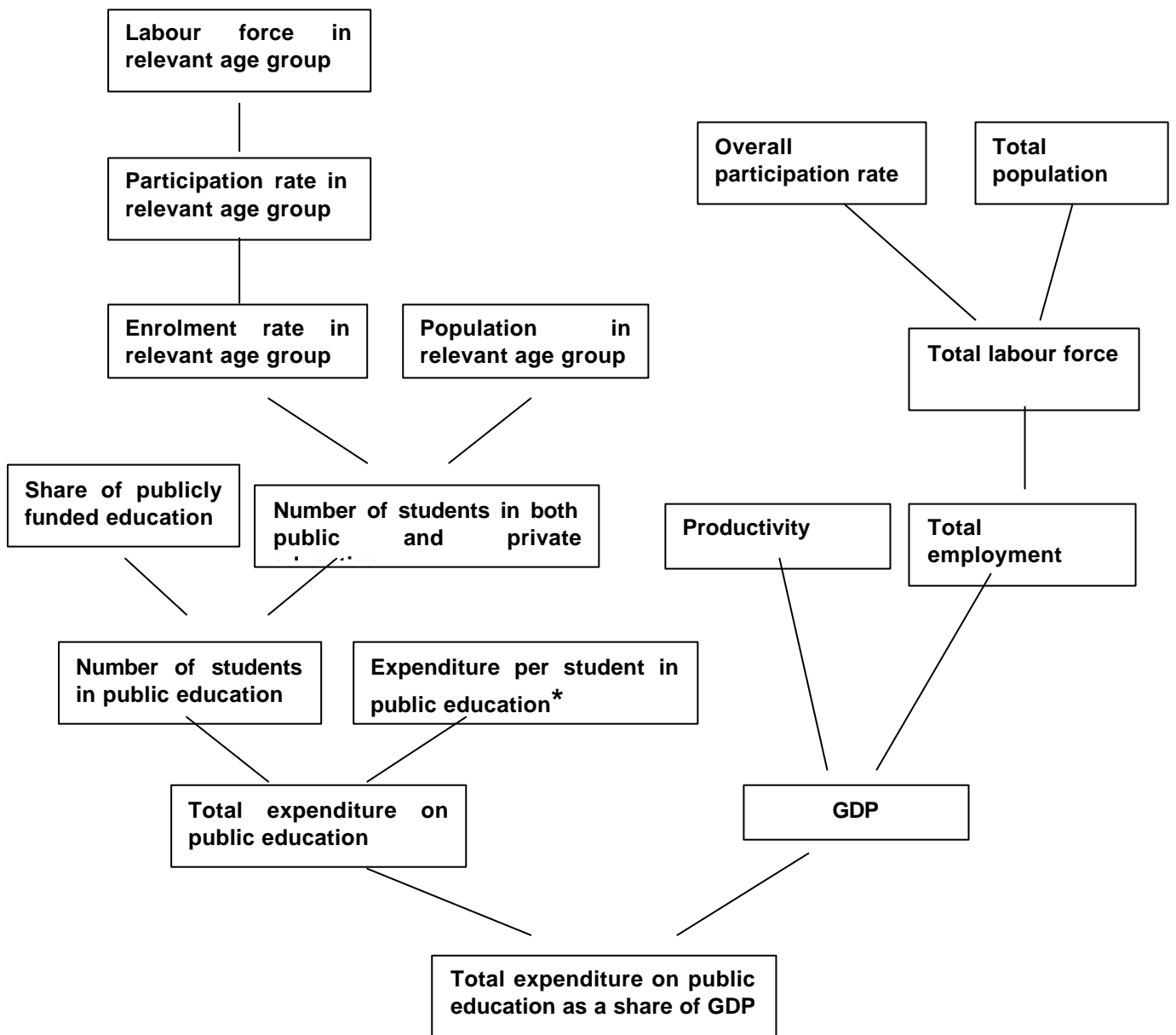
Members of the Ageing Working Group provided information about the share of education that is publicly funded. This share has been taken constant for the whole projection period and used to calculate the number of students enrolled in the public education, given the total number of students.

*The projection of transfers to households*

The methodology used to include transfers in the education expenditures is the following: first, the current share of transfers over total public education expenditure has been calculated using OECD data. Then, this share has been applied to the projected direct expenditure, taking the share as constant over time. The sum between direct expenditure plus transfers give total expenditure in public education.

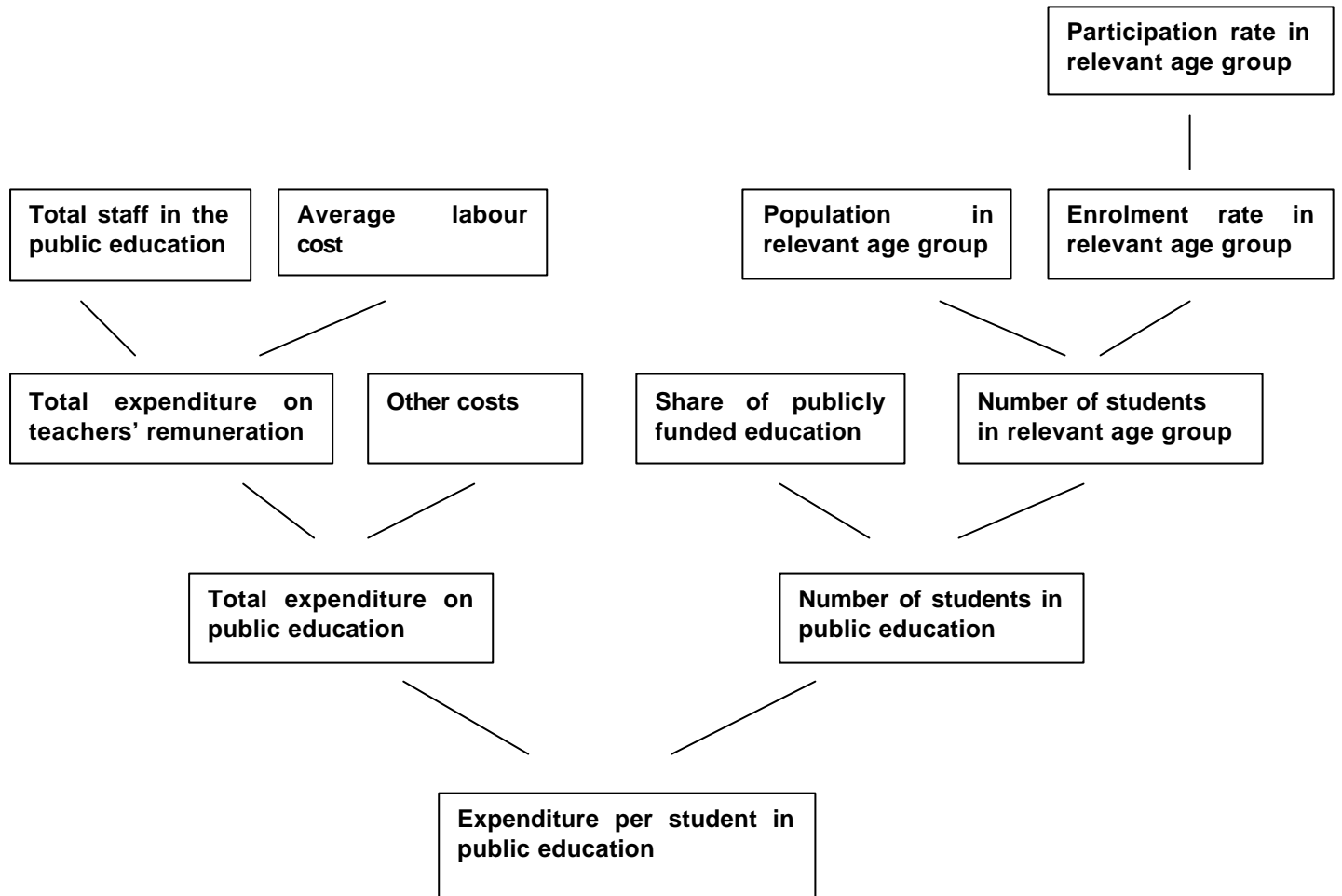
The two following graphs give a schematic presentation of the methodology applied to project direct education expenditure.

**Graph A. Schematic presentation of underlying methodology.**



\* see graph B below

**Graph B. Implicit decomposition of expenditure per student.**



## **ANNEX 2**

### **Country tables**

BELGIUM					
					change
					2000-2050
	2000	2010	2030	2050	
<b>Macroeconomic assumptions</b>					
Real GDP (yearly rate of change)	3.7	2.3	1.2	1.5	
Total population (in millions)	10.23	10.36	10.54	10.09	-0.14
GDP per employee (yearly rate of change)	3.7	2.1	1.7	1.7	

BELGIUM						
CENTRAL SCENARIO						
					change	
					2000-2050	
	2000	2010	2030	2050		
<b>Expenditure on education / GDP</b>						
Total	Total	5.7	5.3	5.2	5.1	-0.6
	of which: Transfers	0.3	0.3	0.2	0.2	0.0
Pre-primary	Total	0.5	0.4	0.5	0.5	0.0
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	1.2	1.0	1.1	1.1	-0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Upper Secondary	Total	2.4	2.3	2.3	2.2	-0.2
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	1.6	1.6	1.3	1.3	-0.2
	of which: Transfers	0.3	0.3	0.2	0.2	0.0
<b>Pre-primary education</b>						
Population (in millions)		0.35	0.31	0.32	0.31	-0.04
Number of students (in millions)		0.39	0.36	0.36	0.35	-0.05
Real expenditure per student (yearly rate of change)		1.8	2.1	1.7	1.7	
<b>Basic education</b>						
Population (in millions)		0.99	0.87	0.88	0.83	-0.16
Number of students (in millions)		1.03	0.91	0.91	0.86	-0.17
Real expenditure per student (yearly rate of change)		1.8	2.1	1.7	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		0.48	0.48	0.44	0.42	-0.06
Number of students (in millions)		0.51	0.51	0.48	0.45	-0.06
Real expenditure per student (yearly rate of change)		1.8	2.1	1.7	1.7	
<b>Tertiary education</b>						
Population (in millions)		0.63	0.64	0.55	0.54	-0.09
Number of students (in millions)		0.29	0.31	0.25	0.23	-0.06
Real expenditure per student (yearly rate of change)		1.8	2.1	1.7	1.7	

BELGIUM						
SENSITIVITY TEST 2						
					change	
					2000-2050	
	2000	2010	2030	2050		
<b>Expenditure on education / GDP</b>						
Total	Total	5.7	5.3	5.3	5.3	-0.4
	of which: Transfers	0.3	0.3	0.3	0.3	0.0
Pre-primary	Total	0.5	0.4	0.4	0.4	-0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	1.2	1.0	1.0	1.0	-0.2
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Upper Secondary	Total	2.4	2.2	2.1	2.1	-0.3
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	1.6	1.7	1.7	1.8	0.2
	of which: Transfers	0.3	0.3	0.3	0.3	0.0
<b>Pre-primary education</b>						
Population (in millions)		0.35	0.31	0.32	0.31	-0.04
Number of students (in millions)		0.39	0.34	0.32	0.31	-0.09
Real expenditure per student (yearly rate of change)		1.8	2.1	1.7	1.7	
<b>Basic education</b>						
Population (in millions)		0.99	0.87	0.88	0.83	-0.16
Number of students (in millions)		1.03	0.89	0.88	0.83	-0.20
Real expenditure per student (yearly rate of change)		1.8	2.1	1.7	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		0.48	0.48	0.44	0.42	-0.06
Number of students (in millions)		0.51	0.50	0.44	0.42	-0.10
Real expenditure per student (yearly rate of change)		1.8	2.1	1.7	1.7	
<b>Tertiary education</b>						
Population (in millions)		0.63	0.64	0.55	0.54	-0.09
Number of students (in millions)		0.29	0.34	0.32	0.32	0.02
Real expenditure per student (yearly rate of change)		1.8	2.1	1.7	1.7	

DENMARK						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Macroeconomic assumptions</b>						
Real GDP (yearly rate of change)		2.90	1.20	1.34	1.74	
Total population (in millions)		5.33	5.48	5.64	5.55	0.22
GDP per employee (yearly rate of change)		2.38	1.53	1.68	1.63	
		-0.18	0.28	0.25	-0.06	

DENMARK						
CENTRAL SCENARIO						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Expenditure on education / GDP</b>						
Total	Total	8.57	8.77	8.28	8.44	-0.13
	of which: Transfers	1.97	1.88	1.83	1.90	-0.07
Pre-primary	Total	0.95	0.87	0.91	0.81	-0.14
	of which: Transfers	0.15	0.14	0.15	0.13	-0.02
Basic	Total	3.33	3.81	3.45	3.33	0.00
	of which: Transfers	0.53	0.61	0.55	0.53	0.00
Upper Secondary	Total	1.67	2.01	1.74	1.91	0.24
	of which: Transfers	0.27	0.32	0.28	0.31	0.04
Tertiary	Total	2.62	2.08	2.18	2.39	-0.23
	of which: Transfers	1.02	0.81	0.85	0.93	-0.09
<b>Pre-primary education</b>						
Population (in millions)		0.28	0.25	0.26	0.23	-0.05
Number of students (in millions)		0.21	0.18	0.19	0.17	-0.04
Real expenditure per student (yearly rate of change)		2.38	1.53	1.68	1.63	
<b>Basic education</b>						
Population (in millions)		0.56	0.62	0.55	0.53	-0.02
Number of students (in millions)		0.67	0.75	0.66	0.65	-0.03
Real expenditure per student (yearly rate of change)		2.38	1.53	1.68	1.63	
<b>Upper-secondary education</b>						
Population (in millions)		0.17	0.22	0.17	0.19	0.02
Number of students (in millions)		0.23	0.28	0.23	0.26	0.02
Real expenditure per student (yearly rate of change)		2.38	1.53	1.68	1.63	
<b>Tertiary education</b>						
Population (in millions)		0.32	0.33	0.31	0.33	0.01
Number of students (in millions)		0.20	0.16	0.16	0.18	-0.02
Real expenditure per student (yearly rate of change)		2.38	1.53	1.68	1.63	

DENMARK						
SENSITIVITY TEST 2						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Expenditure on education / GDP</b>						
Total	Total	8.57	8.91	7.60	7.71	-0.86
	of which: Transfers	1.97	2.03	1.78	1.84	-0.13
Pre-primary	Total	0.95	0.91	1.01	0.89	-0.06
	of which: Transfers	0.15	0.15	0.16	0.14	-0.01
Basic	Total	3.33	3.47	2.84	2.75	-0.59
	of which: Transfers	0.53	0.56	0.45	0.44	-0.09
Upper Secondary	Total	1.67	1.89	1.30	1.42	-0.25
	of which: Transfers	0.27	0.30	0.21	0.23	-0.04
Tertiary	Total	2.62	2.64	2.45	2.65	0.03
	of which: Transfers	1.02	1.03	0.95	1.03	0.01
<b>Pre-primary education</b>						
Population (in millions)		0.28	0.25	0.26	0.23	-0.05
Number of students (in millions)		0.21	0.19	0.21	0.19	-0.02
Real expenditure per student (yearly rate of change)		2.38	1.53	1.68	1.63	
<b>Basic education</b>						
Population (in millions)		0.56	0.62	0.55	0.53	-0.02
Number of students (in millions)		0.67	0.68	0.55	0.53	-0.14
Real expenditure per student (yearly rate of change)		2.38	1.53	1.68	1.63	
<b>Upper-secondary education</b>						
Population (in millions)		0.17	0.22	0.17	0.19	0.02
Number of students (in millions)		0.23	0.26	0.17	0.19	-0.04
Real expenditure per student (yearly rate of change)		2.38	1.53	1.68	1.63	
<b>Tertiary education</b>						
Population (in millions)		0.32	0.33	0.31	0.33	0.01
Number of students (in millions)		0.20	0.20	0.18	0.20	-0.01
Real expenditure per student (yearly rate of change)		2.38	1.53	1.68	1.63	



GERMANY						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Macroeconomic assumptions</b>						
Real GDP (yearly rate of change)		2.86	1.99	0.80	1.14	
Total population (in millions)		82.14	83.44	81.98	76.01	-6.13
GDP per employee (yearly rate of change)		1.06	1.69	1.69	1.69	
		-0.63	-0.15	1.10	0.49	

GERMANY						
CENTRAL SCENARIO						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Expenditure on education / GDP</b>						
Total	Total	5.44	5.28	5.48	5.49	0.05
	of which: Transfers	0.34	0.35	0.36	0.37	0.03
Pre-primary	Total	0.63	0.57	0.60	0.60	-0.03
	of which: Transfers	0.03	0.02	0.03	0.03	0.00
Basic	Total	2.19	1.93	2.00	1.97	-0.22
	of which: Transfers	0.09	0.08	0.08	0.08	-0.01
Upper Secondary	Total	1.46	1.47	1.51	1.51	0.05
	of which: Transfers	0.06	0.06	0.06	0.06	0.00
Tertiary	Total	1.16	1.31	1.37	1.41	0.25
	of which: Transfers	0.16	0.18	0.19	0.20	0.03
<b>Pre-primary education</b>						
Population (in millions)		2.39	2.24	2.09	1.90	-0.49
Number of students (in millions)		1.42	1.34	1.24	1.13	-0.29
Real expenditure per student (yearly rate of change)		1.06	1.69	1.69	1.69	
<b>Basic education</b>						
Population (in millions)		8.95	8.15	7.48	6.66	-2.29
Number of students (in millions)		9.22	8.39	7.70	6.86	-2.36
Real expenditure per student (yearly rate of change)		1.06	1.69	1.69	1.69	
<b>Upper-secondary education</b>						
Population (in millions)		2.74	2.56	2.34	2.11	-0.63
Number of students (in millions)		2.75	2.84	2.60	2.35	-0.40
Real expenditure per student (yearly rate of change)		1.06	1.69	1.69	1.69	
<b>Tertiary education</b>						
Population (in millions)		6.38	6.92	5.70	5.31	-1.08
Number of students (in millions)		2.32	2.70	2.50	2.33	0.01
Real expenditure per student (yearly rate of change)		1.06	1.69	1.69	1.69	

GERMANY						
SENSITIVITY TEST 2						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Expenditure on education / GDP</b>						
Total	Total	5.44	5.33	5.62	5.64	0.20
	of which: Transfers	0.34	0.37	0.40	0.41	0.07
Pre-primary	Total	0.63	0.58	0.62	0.62	0.00
	of which: Transfers	0.03	0.02	0.03	0.03	0.00
Basic	Total	2.19	1.91	1.94	1.91	-0.28
	of which: Transfers	0.09	0.08	0.08	0.08	-0.01
Upper Secondary	Total	1.46	1.32	1.36	1.36	-0.10
	of which: Transfers	0.06	0.06	0.06	0.06	0.00
Tertiary	Total	1.16	1.53	1.70	1.75	0.58
	of which: Transfers	0.16	0.21	0.24	0.24	0.08
<b>Pre-primary education</b>						
Population (in millions)		2.39	2.24	2.09	1.90	-0.49
Number of students (in millions)		1.42	1.36	1.29	1.18	-0.25
Real expenditure per student (yearly rate of change)		1.06	1.69	1.69	1.69	
<b>Basic education</b>						
Population (in millions)		8.95	8.15	7.48	6.66	-2.29
Number of students (in millions)		9.22	8.27	7.48	6.66	-2.56
Real expenditure per student (yearly rate of change)		1.06	1.69	1.69	1.69	
<b>Upper-secondary education</b>						
Population (in millions)		2.74	2.56	2.34	2.11	-0.63
Number of students (in millions)		2.75	2.56	2.34	2.11	-0.63
Real expenditure per student (yearly rate of change)		1.06	1.69	1.69	1.69	
<b>Tertiary education</b>						
Population (in millions)		6.38	6.92	5.70	5.31	-1.08
Number of students (in millions)		2.32	3.14	3.10	2.89	0.57
Real expenditure per student (yearly rate of change)		1.06	1.69	1.69	1.69	

GREECE					
	2000	2010	2030	2050	change 2000-2050
<b>Macroeconomic assumptions</b>					
Real GDP (yearly rate of change)	4.4	3.1	1.7	1.4	
Total population (in millions)	11.04	11.36	11.67	11.54	0.50
GDP per employee (yearly rate of change)	4.6	2.9	1.9	1.5	

GREECE						
CENTRAL SCENARIO						
	2000	2010	2030	2050	change 2000-2050	
<b>Expenditure on education / GDP</b>						
Total	Total	4.0	3.0	3.0	3.2	-0.7
	of which: Transfers	0.1	0.0	0.0	0.0	0.0
Pre-primary	Total	0.1	0.1	0.1	0.1	0.0
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	1.1	0.9	1.0	1.0	-0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Upper Secondary	Total	1.8	1.3	1.3	1.5	-0.3
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	1.0	0.6	0.6	0.6	-0.3
	of which: Transfers	0.1	0.0	0.0	0.0	0.0
<b>Pre-primary education</b>						
Population (in millions)		0.22	0.21	0.22	0.19	-0.01
Number of students (in millions)		0.14	0.13	0.14	0.12	-0.01
Real expenditure per student (yearly rate of change)		4.6	2.9	1.9	1.5	
<b>Basic education</b>						
Population (in millions)		1.09	0.97	1.00	0.97	-0.10
Number of students (in millions)		0.94	0.83	0.87	0.84	-0.09
Real expenditure per student (yearly rate of change)		4.6	2.9	1.9	1.5	
<b>Upper-secondary education</b>						
Population (in millions)		0.44	0.34	0.33	0.35	-0.11
Number of students (in millions)		0.34	0.26	0.25	0.27	-0.08
Real expenditure per student (yearly rate of change)		4.6	2.9	1.9	1.5	
<b>Tertiary education</b>						
Population (in millions)		0.72	0.49	0.44	0.46	-0.26
Number of students (in millions)		0.21	0.14	0.13	0.13	-0.07
Real expenditure per student (yearly rate of change)		4.6	2.9	1.9	1.5	

GREECE						
SENSITIVITY TEST 2						
	2000	2010	2030	2050	change 2000-2050	
<b>Expenditure on education / GDP</b>						
Total	Total	4.0	3.7	4.2	4.5	0.6
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
Pre-primary	Total	0.1	0.1	0.2	0.1	0.0
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	1.1	1.0	1.2	1.2	0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Upper Secondary	Total	1.8	1.5	1.7	1.9	0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	1.0	1.0	1.2	1.3	0.4
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
<b>Pre-primary education</b>						
Population (in millions)		0.22	0.21	0.22	0.19	-0.03
Number of students (in millions)		0.14	0.17	0.22	0.19	0.05
Real expenditure per student (yearly rate of change)		4.6	2.9	1.9	1.5	
<b>Basic education</b>						
Population (in millions)		1.09	0.97	1.00	0.97	-0.12
Number of students (in millions)		0.94	0.90	1.00	0.97	0.03
Real expenditure per student (yearly rate of change)		4.6	2.9	1.9	1.5	
<b>Upper-secondary education</b>						
Population (in millions)		0.44	0.34	0.33	0.35	-0.10
Number of students (in millions)		0.34	0.30	0.33	0.35	0.01
Real expenditure per student (yearly rate of change)		4.6	2.9	1.9	1.5	
<b>Tertiary education</b>						
Population (in millions)		0.72	0.49	0.44	0.46	-0.26
Number of students (in millions)		0.21	0.22	0.26	0.27	0.07
Real expenditure per student (yearly rate of change)		4.6	2.9	1.9	1.5	



FRANCE						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Macroeconomic assumptions</b>						
Real GDP (yearly rate of change)		3.8	1.9	1.5	1.6	
Total population (in millions)		59.2	61.4	63.7	62.2	2.95
GDP per employee (yearly rate of change)		1.1	1.6	1.7	1.7	

FRANCE						
CENTRAL SCENARIO						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Expenditure on education / GDP</b>						
Total	Total	6.4	5.8	5.7	5.5	-0.9
	of which: Transfers	0.3	0.3	0.2	0.2	0.0
Pre-primary	Total	0.7	0.7	0.7	0.6	-0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	2.9	2.6	2.6	2.5	-0.4
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
Upper Secondary	Total	1.6	1.4	1.4	1.3	-0.2
	of which: Transfers	0.1	0.0	0.0	0.0	0.0
Tertiary	Total	1.2	1.1	1.1	1.0	-0.2
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
<b>Pre-primary education</b>						
Population (in millions)		2.16	2.13	1.99	1.89	-0.27
Number of students (in millions)		1.76	1.74	1.62	1.54	-0.22
Real expenditure per student (yearly rate of change)		1.1	1.6	1.7	1.7	
<b>Basic education</b>						
Population (in millions)		6.77	6.51	6.15	5.81	-0.96
Number of students (in millions)		6.27	6.04	5.70	5.39	-0.89
Real expenditure per student (yearly rate of change)		1.1	1.6	1.7	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		2.29	2.15	2.11	1.98	-0.32
Number of students (in millions)		1.91	1.80	1.76	1.65	-0.26
Real expenditure per student (yearly rate of change)		1.1	1.6	1.7	1.7	
<b>Tertiary education</b>						
Population (in millions)		3.97	3.84	3.57	3.35	-0.62
Number of students (in millions)		1.50	1.45	1.35	1.27	-0.23
Real expenditure per student (yearly rate of change)		1.1	1.6	1.7	1.7	

FRANCE						
SENSITIVITY TEST 2						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Expenditure on education / GDP</b>						
Total	Total	6.4	6.3	6.6	6.4	0.0
	of which: Transfers	0.3	0.3	0.3	0.3	0.0
Pre-primary	Total	0.7	0.7	0.8	0.7	0.0
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	2.9	2.6	2.6	2.5	-0.4
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
Upper Secondary	Total	1.6	1.5	1.5	1.5	-0.1
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
Tertiary	Total	1.2	1.4	1.7	1.7	0.5
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
<b>Pre-primary education</b>						
Population (in millions)		2.16	2.13	1.99	1.89	-0.27
Number of students (in millions)		1.76	1.89	1.91	1.81	0.05
Real expenditure per student (yearly rate of change)		1.1	1.6	1.7	1.7	
<b>Basic education</b>						
Population (in millions)		6.77	6.51	6.15	5.81	-0.96
Number of students (in millions)		6.27	6.04	5.70	5.39	-0.89
Real expenditure per student (yearly rate of change)		1.1	1.6	1.7	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		2.29	2.15	2.11	1.98	-0.32
Number of students (in millions)		1.91	1.90	1.95	1.83	-0.08
Real expenditure per student (yearly rate of change)		1.1	1.6	1.7	1.7	
<b>Tertiary education</b>						
Population (in millions)		3.97	3.84	3.57	3.35	-0.62
Number of students (in millions)		1.22	1.56	1.80	1.69	0.47
Real expenditure per student (yearly rate of change)		1.1	1.6	1.7	1.7	



ITALY						
						change
						2000-2050
						2000
						2010
						2030
						2050
<b>Macroeconomic assumptions</b>						
Real GDP (yearly rate of change)		3.14	2.01	0.91	1.21	
Total population (in millions)		57.59	57.28	54.04	48.07	-9.52
GDP per employee (yearly rate of change)		1.37	1.83	1.69	1.69	
		-0.56	-0.09	0.86	0.40	

ITALY						
CENTRAL SCENARIO						
						change
						2000-2050
						2000
						2010
						2030
						2050
<b>Expenditure on education / GDP</b>						
Total	Total	4.59	4.30	3.87	4.01	-0.58
	of which: Transfers	0.19	0.16	0.15	0.15	-0.04
Pre-primary	Total	0.48	0.44	0.39	0.39	-0.08
	of which: Transfers	0.00	0.00	0.00	0.00	0.00
Basic	Total	1.95	1.93	1.71	1.80	-0.16
	of which: Transfers	0.02	0.02	0.02	0.02	0.00
Upper Secondary	Total	1.33	1.25	1.14	1.20	-0.13
	of which: Transfers	0.01	0.01	0.01	0.01	0.00
Tertiary	Total	0.83	0.68	0.64	0.62	-0.21
	of which: Transfers	0.15	0.13	0.12	0.11	-0.04
<b>Pre-primary education</b>						
Population (in millions)		1.60	1.54	1.25	1.10	-0.50
Number of students (in millions)		1.15	1.10	0.90	0.79	-0.36
Real expenditure per student (yearly rate of change)		1.37	1.83	1.69	1.69	
<b>Basic education</b>						
Population (in millions)		4.53	4.27	3.45	3.15	-1.38
Number of students (in millions)		4.34	4.10	3.31	3.03	-1.31
Real expenditure per student (yearly rate of change)		1.37	1.83	1.69	1.69	
<b>Upper-secondary education</b>						
Population (in millions)		3.03	2.81	2.33	2.13	-0.91
Number of students (in millions)		2.56	2.42	2.00	1.83	-0.73
Real expenditure per student (yearly rate of change)		1.37	1.83	1.69	1.69	
<b>Tertiary education</b>						
Population (in millions)		4.37	3.51	3.13	2.67	-1.70
Number of students (in millions)		1.68	1.52	1.31	1.10	-0.58
Real expenditure per student (yearly rate of change)		1.37	1.83	1.69	1.69	

ITALY						
SENSITIVITY TEST 2						
						change
						2000-2050
						2000
						2010
						2030
						2050
<b>Expenditure on education / GDP</b>						
Total	Total	4.59	4.41	4.17	4.31	-0.27
	of which: Transfers	0.19	0.17	0.19	0.19	0.00
Pre-primary	Total	0.48	0.44	0.40	0.40	-0.08
	of which: Transfers	0.00	0.00	0.00	0.00	0.00
Basic	Total	1.95	1.92	1.68	1.77	-0.19
	of which: Transfers	0.02	0.02	0.02	0.02	0.00
Upper Secondary	Total	1.33	1.32	1.26	1.32	-0.01
	of which: Transfers	0.01	0.01	0.01	0.01	0.00
Tertiary	Total	0.83	0.74	0.84	0.83	0.00
	of which: Transfers	0.15	0.14	0.16	0.15	0.00
<b>Pre-primary education</b>						
Population (in millions)		1.60	1.54	1.25	1.10	-0.50
Number of students (in millions)		1.15	1.11	0.91	0.80	-0.35
Real expenditure per student (yearly rate of change)		1.37	1.83	1.69	1.69	
<b>Basic education</b>						
Population (in millions)		4.53	4.27	3.45	3.15	-1.38
Number of students (in millions)		4.34	4.07	3.26	2.98	-1.37
Real expenditure per student (yearly rate of change)		1.37	1.83	1.69	1.69	
<b>Upper-secondary education</b>						
Population (in millions)		3.03	2.81	2.33	2.13	-0.91
Number of students (in millions)		2.56	2.54	2.21	2.02	-0.54
Real expenditure per student (yearly rate of change)		1.37	1.83	1.69	1.69	
<b>Tertiary education</b>						
Population (in millions)		4.37	3.51	3.13	2.67	-1.70
Number of students (in millions)		1.68	1.65	1.72	1.47	-0.21
Real expenditure per student (yearly rate of change)		1.37	1.83	1.69	1.69	

THE NETHERLANDS					
					change
					2000-2050
	2000	2010	2030	2050	
<b>Macroeconomic assumptions</b>					
Real GDP (yearly rate of change)	3.5	1.8	1.3	1.7	
Total population (in millions)	15.86	16.69	17.72	17.68	1.82
GDP per employee (yearly rate of change)	1.6	1.4	1.7	1.6	

THE NETHERLANDS						
CENTRAL SCENARIO						
					change	
					2000-2050	
	2000	2010	2030	2050		
<b>Expenditure on education / GDP</b>						
Total	Total	5.0	5.0	4.8	4.9	-0.1
	of which: Transfers	0.7	0.7	0.7	0.7	0.0
Pre-primary	Total	n.a.	n.a.	n.a.	n.a.	n.a.
	of which: Transfers	n.a.	n.a.	n.a.	n.a.	n.a.
Basic	Total	2.5	2.4	2.3	2.3	-0.2
	of which: Transfers	0.2	0.2	0.2	0.2	0.0
Upper Secondary	Total	0.9	0.9	0.9	0.9	0.0
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
Tertiary	Total	1.6	1.7	1.6	1.7	0.1
	of which: Transfers	0.4	0.5	0.4	0.5	0.0
<b>Pre-primary education</b>						
Population (in millions)		n.a.	n.a.	n.a.	n.a.	n.a.
Number of students (in millions)		n.a.	n.a.	n.a.	n.a.	n.a.
Real expenditure per student (yearly rate of change)		n.a.	n.a.	n.a.	n.a.	n.a.
<b>Basic education</b>						
Population (in millions)		2.15	2.22	2.08	2.07	-0.09
Number of students (in millions)		2.20	2.27	2.13	2.11	-0.09
Real expenditure per student (yearly rate of change)		1.6	1.4	1.7	1.6	
<b>Upper-secondary education</b>						
Population (in millions)		0.73	0.82	0.75	0.80	0.07
Number of students (in millions)		0.57	0.63	0.58	0.62	0.05
Real expenditure per student (yearly rate of change)		1.6	1.4	1.7	1.6	
<b>Tertiary education</b>						
Population (in millions)		0.75	0.82	0.76	0.81	0.06
Number of students (in millions)		0.31	0.35	0.32	0.34	0.03
Real expenditure per student (yearly rate of change)		1.6	1.4	1.7	1.6	

THE NETHERLANDS						
SENSITIVITY TEST 2						
					change	
					2000-2050	
	2000	2010	2030	2050		
<b>Expenditure on education / GDP</b>						
Total	Total	5.0	5.1	4.8	5.0	-0.1
	of which: Transfers	0.7	0.7	0.7	0.7	0.0
Pre-primary	Total	n.a.	n.a.	n.a.	n.a.	n.a.
	of which: Transfers	n.a.	n.a.	n.a.	n.a.	n.a.
Basic	Total	2.5	2.4	2.2	2.2	-0.3
	of which: Transfers	0.2	0.2	0.2	0.2	0.0
Upper Secondary	Total	0.9	1.0	1.0	1.1	0.2
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
Tertiary	Total	1.6	1.7	1.6	1.7	0.1
	of which: Transfers	0.4	0.5	0.4	0.5	0.0
<b>Pre-primary education</b>						
Population (in millions)		n.a.	n.a.	n.a.	n.a.	n.a.
Number of students (in millions)		n.a.	n.a.	n.a.	n.a.	n.a.
Real expenditure per student (yearly rate of change)		n.a.	n.a.	n.a.	n.a.	n.a.
<b>Basic education</b>						
Population (in millions)		2.15	2.22	2.08	2.07	-0.09
Number of students (in millions)		2.20	2.21	2.01	1.99	-0.21
Real expenditure per student (yearly rate of change)		1.6	1.4	1.7	1.6	
<b>Upper-secondary education</b>						
Population (in millions)		0.73	0.82	0.75	0.80	0.07
Number of students (in millions)		0.57	0.70	0.70	0.74	0.17
Real expenditure per student (yearly rate of change)		1.6	1.4	1.7	1.6	
<b>Tertiary education</b>						
Population (in millions)		0.75	0.82	0.76	0.81	0.06
Number of students (in millions)		0.31	0.35	0.32	0.34	0.03
Real expenditure per student (yearly rate of change)		1.6	1.4	1.7	1.6	

AUSTRIA						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Macroeconomic assumptions</b>						
Real GDP (yearly rate of change)		3.5	2.0	1.2	1.3	
Total population (in millions)		8.09	8.15	8.11	7.61	-0.48
GDP per employee (yearly rate of change)		2.6	1.9	1.7	1.7	

AUSTRIA						
CENTRAL SCENARIO						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Expenditure on education / GDP</b>						
Total	Total	6.0	5.5	5.1	5.0	-1.0
	of which: Transfers	0.4	0.4	0.3	0.3	0.0
Pre-primary	Total	0.5	0.4	0.4	0.4	-0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	2.6	2.2	2.2	2.0	-0.6
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Upper Secondary	Total	1.3	1.3	1.1	1.1	-0.3
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	1.5	1.5	1.4	1.5	0.0
	of which: Transfers	0.3	0.3	0.3	0.3	0.0
<b>Pre-primary education</b>						
Population (in millions)		0.26	0.22	0.21	0.19	-0.08
Number of students (in millions)		0.22	0.18	0.17	0.15	-0.06
Real expenditure per student (yearly rate of change)		2.6	1.9	1.7	1.7	
<b>Basic education</b>						
Population (in millions)		0.85	0.73	0.66	0.58	-0.27
Number of students (in millions)		0.78	0.67	0.61	0.53	-0.24
Real expenditure per student (yearly rate of change)		2.6	1.9	1.7	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		0.38	0.38	0.30	0.27	-0.11
Number of students (in millions)		0.40	0.40	0.32	0.29	-0.12
Real expenditure per student (yearly rate of change)		2.6	1.9	1.7	1.7	
<b>Tertiary education</b>						
Population (in millions)		0.57	0.58	0.47	0.45	-0.12
Number of students (in millions)		0.26	0.28	0.24	0.24	-0.02
Real expenditure per student (yearly rate of change)		2.6	1.9	1.7	1.7	

AUSTRIA						
SENSITIVITY TEST 2						
						change
						2000-2050
		2000	2010	2030	2050	
<b>Expenditure on education / GDP</b>						
Total	Total	6.0	5.8	5.7	5.4	-0.5
	of which: Transfers	0.4	0.4	0.4	0.4	0.0
Pre-primary	Total	0.5	0.5	0.5	0.5	0.0
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	2.6	2.3	2.4	2.2	-0.4
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Upper Secondary	Total	1.3	1.3	1.0	1.0	-0.3
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	1.5	1.7	1.7	1.7	0.3
	of which: Transfers	0.3	0.3	0.3	0.3	0.0
<b>Pre-primary education</b>						
Population (in millions)		0.26	0.22	0.21	0.19	-0.08
Number of students (in millions)		0.22	0.20	0.21	0.19	-0.03
Real expenditure per student (yearly rate of change)		2.6	1.9	1.7	1.7	
<b>Basic education</b>						
Population (in millions)		0.85	0.73	0.66	0.58	-0.27
Number of students (in millions)		0.78	0.70	0.66	0.58	-0.20
Real expenditure per student (yearly rate of change)		2.6	1.9	1.7	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		0.38	0.38	0.30	0.27	-0.11
Number of students (in millions)		0.41	0.39	0.30	0.27	-0.13
Real expenditure per student (yearly rate of change)		2.6	1.9	1.7	1.7	
<b>Tertiary education</b>						
Population (in millions)		0.57	0.58	0.47	0.45	-0.12
Number of students (in millions)		0.25	0.30	0.28	0.26	0.01
Real expenditure per student (yearly rate of change)		2.6	1.9	1.7	1.7	



PORTUGAL						
						change
						2000-2050
						2000
						2010
						2030
						2050
<b>Macroeconomic assumptions</b>						
Real GDP (yearly rate of change)		3.7	2.1	1.7	1.7	
Total population (in millions)		10.00	10.31	10.68	10.67	0.67
GDP per employee (yearly rate of change)		1.5	2.0	1.7	1.7	

PORTUGAL						
CENTRAL SCENARIO						
						change
						2000-2050
						2000
						2010
						2030
						2050
<b>Expenditure on education / GDP</b>						
Total	Total	5.6	5.3	4.9	5.1	-0.6
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
Pre-primary	Total	0.3	0.3	0.3	0.3	0.0
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	2.9	3.1	2.7	2.8	-0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Upper Secondary	Total	1.2	1.1	1.0	1.1	-0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	1.2	0.9	0.9	0.9	-0.3
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
<b>Pre-primary education</b>						
Population (in millions)		0.33	0.36	0.32	0.31	-0.02
Number of students (in millions)		0.17	0.19	0.17	0.16	-0.01
Real expenditure per student (yearly rate of change)		1.5	2.0	1.7	1.7	
<b>Basic education</b>						
Population (in millions)		1.00	1.08	0.97	0.98	-0.01
Number of students (in millions)		1.12	1.21	1.09	1.10	-0.02
Real expenditure per student (yearly rate of change)		1.5	2.0	1.7	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		0.37	0.34	0.34	0.34	-0.03
Number of students (in millions)		0.40	0.36	0.36	0.37	-0.03
Real expenditure per student (yearly rate of change)		1.5	2.0	1.7	1.7	
<b>Tertiary education</b>						
Population (in millions)		0.89	0.69	0.75	0.70	-0.18
Number of students (in millions)		0.27	0.21	0.22	0.21	-0.06
Real expenditure per student (yearly rate of change)		1.5	2.0	1.7	1.7	

PORTUGAL						
SENSITIVITY TEST 2						
						change
						2000-2050
						2000
						2010
						2030
						2050
<b>Expenditure on education / GDP</b>						
Total	Total	5.6	5.4	5.2	5.3	-0.4
	of which: Transfers	0.1	0.1	0.2	0.2	0.0
Pre-primary	Total	0.3	0.4	0.4	0.4	0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	2.9	2.8	2.2	2.3	-0.6
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Upper Secondary	Total	1.2	1.1	1.1	1.1	-0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	1.2	1.2	1.5	1.5	0.3
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
<b>Pre-primary education</b>						
Population (in millions)		0.33	0.36	0.32	0.31	-0.02
Number of students (in millions)		0.17	0.23	0.23	0.23	0.06
Real expenditure per student (yearly rate of change)		1.5	2.0	1.7	1.7	
<b>Basic education</b>						
Population (in millions)		1.00	1.08	0.97	0.98	-0.01
Number of students (in millions)		1.12	1.10	0.88	0.89	-0.22
Real expenditure per student (yearly rate of change)		1.5	2.0	1.7	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		0.37	0.34	0.34	0.34	-0.03
Number of students (in millions)		0.31	0.29	0.30	0.30	-0.02
Real expenditure per student (yearly rate of change)		1.5	2.0	1.7	1.7	
<b>Tertiary education</b>						
Population (in millions)		0.89	0.69	0.75	0.70	-0.18
Number of students (in millions)		0.21	0.21	0.29	0.27	0.06
Real expenditure per student (yearly rate of change)		1.5	2.0	1.7	1.7	

FINLAND					
	2000	2010	2030	2050	change 2000-2050
<b>Macroeconomic assumptions</b>					
Real GDP (yearly rate of change)	5.1	1.1	1.5	1.4	
Total population (in millions)	5.17	5.27	5.29	4.95	-0.22
GDP per employee (yearly rate of change)	2.8	1.3	2.0	1.7	

FINLAND						
CENTRAL SCENARIO						
	2000	2010	2030	2050	change 2000-2050	
<b>Expenditure on education / GDP</b>						
Total	Total	6.1	5.7	5.6	5.4	-0.7
	of which: Transfers	0.5	0.5	0.5	0.5	-0.1
Pre-primary	Total	0.4	0.4	0.4	0.4	-0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	2.4	2.1	2.2	2.0	-0.3
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
Upper Secondary	Total	1.2	1.2	1.1	1.1	-0.2
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	2.1	2.0	1.9	1.9	-0.2
	of which: Transfers	0.4	0.4	0.3	0.3	0.0
<b>Pre-primary education</b>						
Population (in millions)		0.25	0.22	0.21	0.19	-0.06
Number of students (in millions)		0.14	0.12	0.12	0.11	-0.03
Real expenditure per student (yearly rate of change)		2.8	1.3	2.0	1.7	
<b>Basic education</b>						
Population (in millions)		0.58	0.53	0.50	0.44	-0.14
Number of students (in millions)		0.57	0.52	0.49	0.43	-0.14
Real expenditure per student (yearly rate of change)		2.8	1.3	2.0	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		0.20	0.20	0.17	0.15	-0.05
Number of students (in millions)		0.16	0.16	0.14	0.12	-0.04
Real expenditure per student (yearly rate of change)		2.8	1.3	2.0	1.7	
<b>Tertiary education</b>						
Population (in millions)		0.33	0.33	0.28	0.26	-0.06
Number of students (in millions)		0.18	0.19	0.16	0.15	-0.03
Real expenditure per student (yearly rate of change)		2.8	1.3	2.0	1.7	

FINLAND						
SENSITIVITY TEST 2						
	2000	2010	2030	2050	change 2000-2050	
<b>Expenditure on education / GDP</b>						
Total	Total	6.1	6.3	6.6	6.4	0.3
	of which: Transfers	0.5	0.6	0.6	0.6	0.1
Pre-primary	Total	0.4	0.5	0.6	0.6	0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	2.4	2.1	2.2	2.1	-0.3
	of which: Transfers	0.1	0.1	0.1	0.1	0.0
Upper Secondary	Total	1.2	1.3	1.2	1.2	-0.1
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	2.1	2.4	2.6	2.6	0.5
	of which: Transfers	0.4	0.4	0.5	0.5	0.1
<b>Pre-primary education</b>						
Population (in millions)		0.25	0.22	0.21	0.19	-0.06
Number of students (in millions)		0.14	0.16	0.18	0.16	0.03
Real expenditure per student (yearly rate of change)		2.8	1.3	2.0	1.7	
<b>Basic education</b>						
Population (in millions)		0.58	0.53	0.50	0.44	-0.14
Number of students (in millions)		0.57	0.52	0.50	0.44	-0.13
Real expenditure per student (yearly rate of change)		2.8	1.3	2.0	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		0.20	0.20	0.17	0.15	-0.05
Number of students (in millions)		0.18	0.19	0.17	0.15	-0.03
Real expenditure per student (yearly rate of change)		2.8	1.3	2.0	1.7	
<b>Tertiary education</b>						
Population (in millions)		0.33	0.33	0.28	0.26	-0.06
Number of students (in millions)		0.14	0.17	0.17	0.16	0.02
Real expenditure per student (yearly rate of change)		2.8	1.3	2.0	1.7	

SWEDEN					
	2000	2010	2030	2050	change 2000-2050
<b>Macroeconomic assumptions</b>					
Real GDP (yearly rate of change)	4.36	2.10	1.36	1.59	
Total population (in millions)	8.86	8.95	9.26	9.20	0.34
GDP per employee (yearly rate of change)	1.87	1.69	1.69	1.69	
	-0.57	-0.19	0.24	0.06	

SWEDEN						
CENTRAL SCENARIO						
	2000	2010	2030	2050	change 2000-2050	
<b>Expenditure on education / GDP</b>						
Total	Total	7.81	7.45	7.06	7.01	-0.80
	of which: Transfers	1.31	1.35	1.21	1.23	-0.08
Pre-primary	Total	0.56	0.46	0.53	0.52	-0.04
	of which: Transfers	0.06	0.05	0.06	0.06	0.00
Basic	Total	3.37	2.50	2.84	2.64	-0.73
	of which: Transfers	0.37	0.28	0.32	0.29	-0.08
Upper Secondary	Total	1.46	1.65	1.36	1.36	-0.11
	of which: Transfers	0.16	0.18	0.15	0.15	-0.01
Tertiary	Total	2.41	2.85	2.32	2.48	0.07
	of which: Transfers	0.71	0.84	0.68	0.73	0.02
<b>Pre-primary education</b>						
Population (in millions)		0.40	0.35	0.39	0.38	-0.02
Number of students (in millions)		0.34	0.30	0.33	0.32	-0.02
Real expenditure per student (yearly rate of change)		1.87	1.69	1.69	1.69	
<b>Basic education</b>						
Population (in millions)		1.06	0.84	0.91	0.84	-0.22
Number of students (in millions)		1.06	0.84	0.91	0.84	-0.22
Real expenditure per student (yearly rate of change)		1.87	1.69	1.69	1.69	
<b>Upper-secondary education</b>						
Population (in millions)		0.30	0.36	0.29	0.28	-0.02
Number of students (in millions)		0.31	0.37	0.30	0.29	-0.02
Real expenditure per student (yearly rate of change)		1.87	1.69	1.69	1.69	
<b>Tertiary education</b>						
Population (in millions)		0.51	0.62	0.47	0.50	-0.01
Number of students (in millions)		0.33	0.42	0.32	0.34	0.01
Real expenditure per student (yearly rate of change)		1.87	1.69	1.69	1.69	

SWEDEN						
SENSITIVITY TEST 2						
	2000	2010	2030	2050	change 2000-2050	
<b>Expenditure on education / GDP</b>						
Total	Total	7.81	7.36	6.80	6.71	-1.10
	of which: Transfers	1.31	1.32	1.12	1.13	-0.18
Pre-primary	Total	0.56	0.50	0.63	0.62	0.06
	of which: Transfers	0.06	0.06	0.07	0.07	0.01
Basic	Total	3.37	2.50	2.84	2.64	-0.73
	of which: Transfers	0.37	0.28	0.32	0.29	-0.08
Upper Secondary	Total	1.46	1.62	1.33	1.32	-0.14
	of which: Transfers	0.16	0.18	0.15	0.15	-0.02
Tertiary	Total	2.41	2.73	1.99	2.12	-0.29
	of which: Transfers	0.71	0.81	0.59	0.63	-0.09
<b>Pre-primary education</b>						
Population (in millions)		0.40	0.35	0.39	0.38	-0.02
Number of students (in millions)		0.34	0.32	0.39	0.38	0.04
Real expenditure per student (yearly rate of change)		1.87	1.69	1.69	1.69	
<b>Basic education</b>						
Population (in millions)		1.06	0.84	0.91	0.84	-0.22
Number of students (in millions)		1.06	0.84	0.91	0.84	-0.22
Real expenditure per student (yearly rate of change)		1.87	1.69	1.69	1.69	
<b>Upper-secondary education</b>						
Population (in millions)		0.30	0.36	0.29	0.28	-0.02
Number of students (in millions)		0.31	0.37	0.29	0.28	-0.03
Real expenditure per student (yearly rate of change)		1.87	1.69	1.69	1.69	
<b>Tertiary education</b>						
Population (in millions)		0.51	0.62	0.47	0.50	-0.01
Number of students (in millions)		0.33	0.40	0.28	0.29	-0.04
Real expenditure per student (yearly rate of change)		1.87	1.69	1.69	1.69	



UNITED KINGDOM					
	2000	2010	2030	2050	change 2000-2050
<b>Macroeconomic assumptions</b>					
Real GDP (yearly rate of change)	3.1	2.2	1.2	1.5	
Total population (in millions)	59.52	60.88	63.17	61.79	2.27
GDP per employee (yearly rate of change)	2.0	1.9	1.7	1.7	

UNITED KINGDOM						
CENTRAL SCENARIO						
	2000	2010	2030	2050	change 2000-2050	
<b>Expenditure on education / GDP</b>						
Total	Total	5.3	5.3	5.1	5.0	-0.2
	of which: Transfers	0.2	0.2	0.2	0.2	0.0
Pre-primary	Total	0.4	0.4	0.4	0.4	0.0
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	1.2	1.1	1.1	1.0	-0.2
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Upper Secondary	Total	2.5	2.5	2.4	2.3	-0.2
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	1.1	1.4	1.2	1.2	0.1
	of which: Transfers	0.1	0.2	0.2	0.2	0.0
<b>Pre-primary education</b>						
Population (in millions)		2.21	2.19	2.11	2.02	-0.20
Number of students (in millions)		1.26	1.25	1.20	1.15	-0.11
Real expenditure per student (yearly rate of change)		2.0	1.9	1.7	1.7	
<b>Basic education</b>						
Population (in millions)		3.92	3.54	3.49	3.18	-0.74
Number of students (in millions)		3.55	3.21	3.16	2.88	-0.67
Real expenditure per student (yearly rate of change)		2.0	1.9	1.7	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		5.30	5.30	4.82	4.56	-0.74
Number of students (in millions)		3.79	3.91	3.55	3.37	-0.43
Real expenditure per student (yearly rate of change)		2.0	1.9	1.7	1.7	
<b>Tertiary education</b>						
Population (in millions)		2.97	3.21	2.72	2.71	-0.26
Number of students (in millions)		0.88	1.07	0.91	0.89	0.02
Real expenditure per student (yearly rate of change)		2.0	1.9	1.7	1.7	

UNITED KINGDOM						
SENSITIVITY TEST 2						
	2000	2010	2030	2050	change 2000-2050	
<b>Expenditure on education / GDP</b>						
Total	Total	5.3	5.7	6.0	5.9	0.7
	of which: Transfers	0.2	0.2	0.2	0.2	0.0
Pre-primary	Total	0.4	0.5	0.6	0.6	0.2
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Basic	Total	1.2	1.1	1.1	1.0	-0.2
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Upper Secondary	Total	2.5	2.7	2.9	2.8	0.3
	of which: Transfers	0.0	0.0	0.0	0.0	0.0
Tertiary	Total	1.1	1.4	1.4	1.5	0.3
	of which: Transfers	0.1	0.2	0.2	0.2	0.0
<b>Pre-primary education</b>						
Population (in millions)		2.21	2.19	2.11	2.02	-0.20
Number of students (in millions)		1.26	1.62	1.92	1.84	0.58
Real expenditure per student (yearly rate of change)		2.0	1.9	1.7	1.7	
<b>Basic education</b>						
Population (in millions)		3.92	3.54	3.49	3.18	-0.74
Number of students (in millions)		3.55	3.21	3.15	2.87	-0.68
Real expenditure per student (yearly rate of change)		2.0	1.9	1.7	1.7	
<b>Upper-secondary education</b>						
Population (in millions)		5.30	5.30	4.82	4.56	-0.74
Number of students (in millions)		3.79	4.25	4.29	4.07	0.28
Real expenditure per student (yearly rate of change)		2.0	1.9	1.7	1.7	
<b>Tertiary education</b>						
Population (in millions)		2.97	3.21	2.72	2.71	-0.26
Number of students (in millions)		0.85	1.06	1.02	1.01	0.17
Real expenditure per student (yearly rate of change)		2.0	1.9	1.7	1.7	