

**Education at a Glance**  
**OECD Indicators 2004**

**Annex 3: Sources, methods and technical notes**

**Chapter B: Financial and human resources invested in education**

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## CHAPTER B: FINANCIAL AND HUMAN RESOURCES INVESTED IN EDUCATION

### INDICATOR B1: Educational expenditure per student

*See also notes on Indicator B1.*

#### ■ General notes

##### *Methodology*

#### • Reference period

Adjustments were made for countries in which the financial year and the school year do not coincide. In order to match the enrolment data with the financial year 2001, a weighted average of the enrolment data for the academic years 2000/01 and 2001/02 was calculated. The data were weighted in accordance with the proportion of each school year that fell within the financial year 2001 (see Annex 2).

#### • Estimation of expenditure per tertiary student over the duration of studies.

Two alternative methods were employed to calculate the average duration of tertiary studies: the approximation formula and the chain method. For both methods, it should be noted that the result does not give the average duration needed for a student to graduate since all students participating in tertiary education are taken into account, including drop-outs. Hence, the figure can be interpreted as the average length of time for which students stay in tertiary education until they either graduate or drop out. However, in the case of countries with low drop-out rates (see Indicator A2), the result can serve as a good proxy for duration until graduation.

The estimates of cumulative expenditure on education over the average duration of tertiary studies were obtained by multiplying annual expenditure per student by an estimate of the average duration of tertiary studies.

Using the **approximation formula**, the latter estimate was approximated by the rate of turnover of the existing stock of enrolments, obtained from the ratio of flow data (entrants and leavers) to the corresponding numbers of students enrolled. The formula  $D = (S_{t-1} + S_t)/(Z_t + A_t)$  was used for this calculation, where  $S_t$  is the number of students enrolled at the end of year  $t$ ,  $S_{t-1}$  is the number of students at the beginning of year  $t$  (approximated by the number of students enrolled at the end of the

preceding school year),  $Z_t$  is the number of students who are in their first year of study in year  $t$ , and  $A_t$  is the number of leavers in school year  $t$  (approximated by  $S_{t-1} + Z_t - S_t$ ). Full-time equivalents were used to estimate enrolments. The number of entrants to full-time programmes was used to estimate the inflow. All participants were included, even those who might not obtain a degree.

The estimate is based on a number of simplifying assumptions: first, it is assumed that transition rates are constant over time. Second, expenditure in the current reference year is assumed to be typical of the total duration of studies.

Using the **chain method**, the duration of study is defined as the sum of the probabilities, for each year of study, that a student who has entered tertiary education will still be enrolled in that year of study.

The duration is therefore defined as  $D = \sum_{i=1}^{10} q_i$ , where  $q_i$  is the probability that a student will reach the  $i$ -

th year of study, *i.e.*, the proportion of individuals in the  $i$ -th year of study relative to those studying in the first year  $i-1$  years before. With the chain method all conditional probabilities are derived from data for two adjacent years, the reference year and the preceding year. Given the number of students  $s$  in year  $i$  of study in year  $t$  and the number of students in year  $i-1$  of study in year  $t-1$ , the transition rates can be calculated for each year of study as  $a_{i,t} = s_{i,t}/s_{i-1,t-1}$ . The transition rates give, for each year of study, the probability that a student in year  $i-1$  will continue studying in year  $i$ . The product of all transition rates 1 to  $I$  gives the probability, for year  $i$  of study, that a student who started  $i-1$  years before will still be enrolled in year  $i$  of study. Finally, the sum of all conditional probabilities gives an estimate of the average duration of tertiary education. Expenditure in the current reference year is assumed to be typical of the total duration of studies.

- **Data for the financial year 1995**

The data on expenditure for 1995 were obtained by a special survey conducted in 2001 and updated in 2003. OECD countries were asked to collect the 1995 data according to the definitions and the coverage of the UOE 2003 data collection. All expenditure data, as well as the GDP for 1995, are adjusted to 2001 prices using the GDP price deflator.

- **Notes on specific countries**

*Coverage*

*See also notes on Indicator B2.*

**Australia:** Previously, university enrolments included some students in overseas campuses. These have been excluded, starting with EAG 2001. This correction affects the number of tertiary students, and consequently the expenditure per student, by 2.8 per cent. There are breaks in series in ISCED 2, 3, 4 and 5B enrolments in the Vocational Education and Training sector; from 1999, data are based on the Australian Qualification Framework (AQF) rather than the stream classification.

**Austria:** Expenditure on R&D in the tertiary sector is partially excluded. Some expenditure by public institutions other than the Ministry of Education is excluded (social insurance bodies, chambers of trade and crafts, and federal funds - *Sozialversicherungsträger, Kammern, Bundesfonds*).

**Belgium:** Research expenditure has been tuned with the DSTI-data, so it now includes all the R&D expenditure (HERD) without any exclusion.

**Canada:** Sponsored research is currently being reported in the UOE data collection without overhead costs. Total expenditure on R&D is therefore underestimated.

**France:** Expenditure on R&D excludes all funds specifically allocated to R&D, such as subsidies, contracts and special funds. These are included in the OECD/DSTI reporting and account for approx. 0.2 per cent of GDP, or 50 per cent of total expenditure on R&D.

**Ireland:** Some expenditure on R&D, which is reported to DSTI, is excluded from UOE reporting (16.5 million IEP). This accounts for approx. 10 per cent of all expenditure on tertiary R&D, and for 2 per cent of total expenditure on ISCED 5 and 6.

**Korea:** Expenditure on R&D in tertiary education institutions is excluded with the exception of R&D funded by the Ministry of Education. Expenditure on educational programmes provided by ministries other than the Ministry of Education is excluded (KAIST, Police College, College of External Affairs, Tax Officers' College and Military Academy).

**Mexico:** Expenditure on separately funded or separately budgeted research only.

**Russian Federation:** Expenditure per student at the tertiary level of education is underestimated due to missing private expenditure while tuition fees are paid exclusively from private funds for about one-third of tertiary type-A students and tertiary type-B students.

**United Kingdom:** Upper secondary vocational students are excluded from the calculation of expenditure per student, as they were counted on a "whole year" rather than on a "snapshot" basis.

**United States:** Funds for major federal R&D centres administered by universities are excluded.

- **Estimation of the duration of tertiary education calculated using the chain method**

**Canada:** The 6th year of study includes the 7th, 8th, 9th and 10th years of study.

**Germany:** The model for the calculation of the average duration of tertiary studies was modified. Students beyond the 10th year of study were not taken fully into consideration. Students in the 10th year of study or beyond amounted to around 10 per cent of total enrolment in the academic year 1994/5. The reported duration is a lower boundary of total duration and probably underestimated. In general, non-university tertiary education has a duration of 2 years, but part-time courses take up to 4 years.

**Germany and Italy:** No distinction is made between part-time and full-time studies at the university level. However, for expenditure over the duration of studies the effect balances out, since reporting part-time students as full-time students leads both to an underestimate of annual expenditure and to an overestimate of duration of studies.

**Greece:** The 5th year of tertiary-type B study includes the 6th year and beyond. The 7th year of tertiary-type A and advanced research programmes includes the 8th year and beyond. This leads to an underestimate of duration.

**Hungary:** Distribution is estimated between ISCED levels 1,2,3.

**Iceland:** Data were partly estimated, as students in programmes at level 5A (2nd degree) and level 6 are often not signed up for thesis credits until the thesis is completed. Data were therefore adjusted to correct for consequent overestimating of the number of part-time students and underestimating of full-time equivalents.

**Korea:** The maximum duration of non-university education is 3 years. The 6th and 8th years and beyond of university education are included in the 7th year of study.

**United Kingdom:** The chain method was amended slightly in order to use the available UK data. Average durations were calculated separately using the chain method for each of the main types of course at tertiary level. To take account of the fact that many students go on to take a further course after their initial course, these figures were then combined according to the numbers of students following each of the main pathways at tertiary level. The total average durations shown for university and all tertiary levels are therefore weighted averages of the individual average durations of each type of course. Coverage excludes those studying in further education institutions, though these account for less than 10 per cent of all students at the tertiary level.

### *Interpretation*

#### Changes in expenditure per student between EAG 2003 and 2004

**Belgium:** Data on pensions are included for the first time in EAG 2004 and lead to an increase of the figures published in the financial chapter compared to EAG 2003 and also to former editions of EAG. Data correspond to pensions paid to the currently retired educational personnel, rather than an estimate of government/employer contributions for future pensions of the currently employed educational personnel.

**Denmark:** Part of the increase in expenditure per student between EAG 2003 and 2004 is due to a multi-year agreement on financing of medium-cycle higher education (2001-2004), which increased the grants for medium-cycle higher education. An extension of the coverage of expenditure on tertiary education also explained the change. Thus, the increase between 1995 and 2001 in expenditure on tertiary education is partly due to a change in coverage of tertiary institutions in the accounting system.

**Finland:** In EAG 2004 Finland reports for the first time students at ISCED 5A/6 divided to full-time/part-time students based on their study activities. Also for the first time full-time equivalent data (FTE) is reported at ISCED 5A/6. Previously all students were reported as full-time students. The division to full-time and part-time students is made based on the study credits which students have been taken during the academic year.

The change in FTE numbers for the academic year 2000-2001 and 2001-2002 has a big effect on the calculation of expenditure per student in tertiary education in EAG 2004 compared to EAG 2003 (expenditure per student increases at tertiary education). The new calculation method takes into account the division to full-time/part-time students at tertiary education and is in accordance with the international instructions for the reporting of educational statistical data.

Expenditure data on educational programmes preparing for further and specialist vocational qualifications at ISCED 3/4 are for the first time included in EAG 2004.

**Italy:** For ISCED levels 0,1,2,3, the most important reason of the increase in expenditure per student compared to EAG 2003 is due to the increase in teachers' remunerations appeared during the financial year 2001 of the previous year 2000. Another reason is due to the fact that the data to allocate by level in EAG 2003 are split for the first time between Isced levels 0 to 3 and 5b.

**Korea:** The increase between EAG 2003 and 2004 in expenditure as a percentage of GDP and expenditure per student is due to the implementation of a new school accounting system for ISCED 1-3 from year 2001. Due to this new accounting system, private expenditure on all the ancillary services are now included in the calculation. Secondly, the government put in place in July 2001 and the next 3 years a new policy and budget in order to reduce the class size under 35.

**Switzerland:** Expenditure per student is very high at the university level in EAG 2004. This is mainly due to the structure of the university system: a high number of universities in relation to the size of the country (partly due to the three language regions), the small size of some universities, a wide range of provision at each university, and relatively low student/teaching staff ratios. Furthermore, teachers' salaries at university level are comparatively high. Advanced research programmes are not included in tertiary education.

#### *Sources*

2003 UNESCO/OECD/EUROSTAT (UOE) data collection on education statistics. National sources are:

**Australia:** Department of Education, Science and Training, Higher Education Group, Canberra; Australian Bureau of Statistics, "Expenditure on Education Finance" collection; in the case of regional government expenditure, state government data (for public institutions) and school data (for private institutions) were used; "Collection of National Financial Data on Vocational Education and Training".

**Austria:** Austrian Central Statistical Office, Vienna.

**Belgium:** Flemish Community: Ministry of the Flemish Community, Education Department, Brussels; French Community: Ministry of the French Community, Education, Research and Training Department, Brussels; German Community: Ministry of the German-speaking Community, Eupen.

**Canada:** Statistics Canada, Ottawa.

**Czech Republic:** Closing account of the Government of the Czech Republic; regular survey of the Institute for Information on Education; unpublished information from the Ministry of Education, Youth and Sports and the Ministry of Agriculture.

**Denmark:** Ministry of Education, Department of Economic Affairs, Copenhagen.

**Finland:** Statistics Finland, Helsinki.

**France:** Ministry of National Education, Higher Education and Research, Directorate of Evaluation and Planning, Paris.

**Germany:** Federal Office of Statistics, Wiesbaden.

**Greece:** Ministry of National Education and Religious Affairs, Directorate of Investment Planning and Operational Research, Athens.

**Hungary:** Ministry of Culture and Education, Ministry of Finance, Central Statistical Office, Budapest.

**Iceland:** Statistics Iceland, Reykjavik.

**Ireland:** Department of Education, Statistics Section, Dublin.

**Italy:** National Institute of Statistics (ISTAT), Rome; Ministry of Public Education, Statistical Service, Rome.

**Japan:** Ministry of Education, Culture, Sports, Science and Technology, Tokyo.

**Korea:** Korean Educational Development Institute, Educational Information Research Centre, Seoul.

**Luxembourg:** Ministry of National Education

**Mexico:** Secretariat of Public Education.

**Netherlands:** Central Bureau for Statistics, Department for Statistics of Education, Voorburg; Ministry of Education and Science, Zoetermeer.

**New Zealand:** Ministry of Education, Wellington.

**Norway:** Statistical Central Office, Division for Population, Education and Regional Conditions, Kongsvinger; The Royal Norwegian Ministry of Education, Research and Church Affairs, Oslo.

**Poland:** Central Statistical Office, Republic of Poland, Warsaw.

**Portugal:** Ministry of Education, Office of Research and Planning, Department of Programming, Lisbon.

**Slovak Republic:** Institute of Information and Prognoses of Education

**Spain:** National Institute of Statistics, Sub-directorate General of Social Research and Statistics, Madrid; Ministry of Education, Planning and Statistical Office, Madrid; Ministry of Labour, Madrid.

**Sweden:** Swedish National Agency for Education (*Skolverket*), Stockholm; Swedish National Agency for Higher Education (*Hogskoleverket*); Statistics Sweden, Örebro.

**Switzerland:** Swiss Federal Statistical Office, Neuchâtel. **Turkey:** Ministry of National Education and Higher Education Council, Final financial record.

**United Kingdom:** Department for Education and Skills, Darlington.

**United States:** Department of Education, Office of Educational Research and Improvement, National Centre for Education Statistics, Washington, D.C.

## **INDICATOR B2: Expenditure on educational institutions relative to Gross Domestic Product**

### ■ **General notes**

#### *Methodology*

#### • **GDP data**

The theoretical framework underpinning the calculation of GDP has been provided for many years by the United Nations' publication *A System of National Accounts*, which was released in 1968. An updated version was released in 1993 (commonly referred to as SNA93).

Statistics on educational expenditure relate to the financial year 2001. For countries where GDP is not reported for the same reference period as data on educational finance, GDP is estimated as:  $w_{t-1} (GDP_t - 1) + w_t (GDP_t)$ , where  $w_t$  and  $w_{t-1}$  are the weights for the respective portions of the two reference periods for GDP which fall within the educational financial year. Adjustments were made for **Australia, Canada, Japan, the United Kingdom and the United States** (see Annex 2).

#### • **Calculation of index in Table B2.2**

Table B2.2 shows the changes in expenditure on educational services between 1995 and 2001. All expenditure reported for 1995 was expressed in 2001 constant dollars, adjusted to the price level of 2001 using the GDP deflator (see Annex 2). The data on expenditure for 1995 were obtained by a special survey in 2001 and updated in 2003.

#### *Interpretation*

**Norway:** The measured decline in expenditure between 1995 and 2001 is due to a substantial change in the price deflator at the level of total GDP, caused primarily by an increase in oil prices. The Table thus does not reflect the changes in real expenditures.

#### ■ Notes on specific countries

##### *Coverage*

**Australia:** Starting with EAG 2001, data on educational finance are reported on an academic/calendar year basis and not on a financial year (from July to June) basis, which was used in previous editions. The financial data for 1999, 2000 and 2001 are not comparable with data from previous finance returns. The major reasons for differences between the 1998 and 1999 finance data are the introduction of accrual accounting in the government school sector, the attribution of expenditure on transport subsidies to institutional spending rather than being classified as government grants to households, changes to methodologies in attributing expenditure in the government school sector between ISCED 2 and ISCED 3; and using the Australian Qualification Framework rather than 'stream' in the Vocational Education and Training sector to allocate students to ISCED levels. The 1995 data were compiled using the same methodology.

**Canada :** In comparison to EAG 2001, there is a large difference in private post-secondary education expenditures. The reason is a methodological one. A new estimate of private post-secondary expenditures, derived from the National Accounts area at Statistics Canada has been implemented in EAG 2002. This new estimate is significantly higher than the previous estimates.

**Czech Republic:** Data from the Ministries of Justice, Defence and Internal Affairs are not included.

**Denmark:** The allocation of expenditure on early childhood, primary and lower secondary education is estimated on the basis of the corresponding enrolments. Expenditure on pre-primary education includes some expenditure on day care. Day care activities are fully integrated into the school day and not costed separately. It is debatable whether this expenditure should be classified as educational or not. While Denmark includes this expenditure, **Finland** and **Sweden** exclude expenditure on similar programmes.

**Finland:** The coverage of expenditure on pre-primary education changed considerably in comparison with previous editions starting from EAG 2001. Estimated kindergarten expenditure on day care and child care for 3 to 6-year-olds was excluded. Expenditure on apprenticeship training was included for the first time in EAG 2001. The OECD/DSTI/HERD data was used as a source for the definition of research expenditure at tertiary education starting from EAG 2002. Expenditure data on educational programmes preparing for further and specialist vocational qualifications at ISCED 3/4 are for the first time included in EAG 2004. These changes in reporting are also implemented in the trend data presented in EAG 2004 in order to ensure the best possible comparability over time.

Government transfers and payments to private entities, except financial aid to students, are excluded. Funds from foreign sources are excluded. Local government expenditure also contains private expenditure.

**France:** All expenditure excludes overseas departments (*départements d'outre mer*, DOM). Gross domestic product and total public expenditure were adjusted accordingly.

**Germany:** Expenditure on the following programmes is not included in total expenditure: training of trainee civil servants in public service; colleges of nursing; agricultural training centres; and public and private expenditure on institutions providing ancillary services at the tertiary level (*Studentenwerk*). Payments by private households and other private entities to government-dependent institutions are excluded.

**Greece:** Expenditure on early childhood education is included in expenditure on primary education.

**Japan:** Expenditure on special training colleges, “miscellaneous schools” and educational administration are not allocated by level.

**Netherlands:** Figures, as shown in the chapter B are influenced to a considerable degree by three changes in the Dutch FINANCE data submission for the years 1999, 2000 and 2001 made by Statistics Netherlands. These changes (which were discussed during the 2nd Finance Comparability Study visit), compared to 1998, are:

- A lower proportion of public subsidies are attributed to ‘public grants attributable for tuition fees to educational institutions’ and by consequence more to public grants NOT attributable for tuition fees to educational institutions. This new division is based on the calculation standards in our student grant system. As a consequence the net private expenditure to all educational institutions is considerably higher compared to EAG2001.
- Private expenditure on R&D (3<sup>e</sup> geldstroom onderzoek) is included. As a consequence, the total educational expenditure on tertiary institutions is higher, also the private expenditure to tertiary institutions is considerably higher compared to EAG2001.
- A substantial part of student loans in the Netherlands are loans that will be converted into grants when students pass their exams. We estimate the conversion rate of these so called ‘prestatiebeurzen’ (performance grants) at more than 90%. In the 1998 data, these loans/performance grants were reported as student loans. In the 1999 data these loans/performance grants are reported as grants. As a consequence the proportion of loans in the total public expenditure is lower in EAG 2002, EAG 2003 and EAG 2004.

**Portugal:** Regional and local transfers to the private sector are not included. Local direct expenditure on educational institutions is not included.

**Turkey:** Regional direct expenditure on educational institutions is not included.

**United States:** Pre-primary education only includes pre-primary classes in public and private primary schools. It excludes independent private schools, which provide a large part of pre-primary education.

*Sources*

*See Indicator B1.*

### **INDICATOR B3: Relative proportions of public and private investment in educational institutions**

#### ■ Notes on specific countries

*See notes on Indicators B1 and B2.*

### **INDICATOR B4: Total public expenditure on education**

#### ● Data on total public expenditure

The theoretical framework underpinning the calculation of total public expenditure has been provided for many years by the United Nations' publication *A System of National Accounts*, which was released in 1968. An updated version was released in 1993 (commonly referred to as SNA93). Notes on specific countries.

Total public expenditure on all services, excluding education, includes expenditure on debt servicing (*e.g.* interest payments) that are not included in public expenditure on education. The reason for this exclusion is that some countries cannot separate interest payment outlays for education from those for other services. This means that public expenditure on education as a percentage of total public expenditure can be underestimated in countries where interest payments represent a high proportion of total public expenditure on all services.

*See notes on Indicator B2.*

### **INDICATOR B5: Support for students and households through public subsidies**

#### ■ Notes on specific countries

*See notes on Indicator B2.*

**Canada, Denmark and Germany:** Subsidies in kind, such as free or reduced-price travel on public transport systems, is excluded.

**Czech Republic:** Some scholarships awarded by central government are included in direct payments to educational institutions.

**Ireland:** Students in tertiary education benefit from subsidised travel on the bus and rail systems, which are owned and funded by the State. The expenditure involved in this subsidy is currently unknown. Students in tertiary colleges and universities can make use of limited on-campus medical facilities funded both from central (exchequer) grants and from registration fees paid by the students themselves. The level of government funding in this area is not known.

**Switzerland:** Fees for health insurance are publicly subsidised for students from low-income backgrounds. These subsidies amount to several tens of millions of Swiss francs but are excluded.

## **INDICATOR B6: Expenditure on institutions by service category and by resource category**

*See also notes on Indicators B1 and B2.*

### ■ **Notes on specific countries**

#### *Coverage of ancillary services*

Expenditure by educational institutions on ancillary services, such as student meals, boarding and housing on campus and student transportation should include fees paid by students and families for those services. However, countries have uneven coverage of private spending on ancillary services. While a number of countries exclude private spending on ancillary services, Australia, France, Hungary, Spain, Turkey and the United States provide information on private spending on ancillary services.

**Ireland:** Ancillary services at the primary to post-secondary non-tertiary level include only school transport.

#### *R&D coverage (see indicator B1)*

#### *Notes on distribution of current and capital expenditure*

**Canada:** Current expenditure in independent private institutions at ISCED 5B includes capital expenditure.

**Hungary:** The significant decrease in government support for capital expenditure in tertiary education can be attributed to the fact that substantial investments were made in the previous year, 1997.

**Italy:** In comparison with previous editions, educational expenditure by resource category shows a lower percentage of staff compensation (for teaching and non-teaching staff) and a higher percentage of other current expenditure. This is due to the introduction of a new tax, "IRAP", and to the concurrent abolition of some additions to gross salaries.

**Sweden:** School and university buildings are rented. Payments for rent are included in current expenditure.

#### *Sources*

*See Indicator B1.*