

Education at a Glance

OECD Indicators 2005

Annex 3: Sources, methods and technical notes

Chapter B: Financial and human resources invested in education

TABLE OF CONTENTS

INDICATOR B1: Educational expenditure per student.....	3
■ General notes	3
■ Notes on specific countries	4
INDICATOR B2: Expenditure on educational institutions relative to Gross Domestic Product.....	7
■ General notes	7
■ Notes on specific countries	9
INDICATOR B3: Relative proportions of public and private investment in educational institutions	11
■ Notes on specific countries	11
INDICATOR B4: Total public expenditure on education.....	12
INDICATOR B5: Support for students and households through public subsidies.....	12
■ Notes on specific countries	12
INDICATOR B6: Expenditure on institutions by service category and by resource category	13
■ Notes on specific countries	13

CHAPTER B: FINANCIAL AND HUMAN RESOURCES INVESTED IN EDUCATION

INDICATOR B1: Educational expenditure per student

See also notes on Indicator B2.

■ 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 2002, a weighted average of the enrolment data for the academic years 2001/02 and 2002/03 was calculated. The data were weighted in accordance with the proportion of each school year that fell within the financial year 2002 (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 2004 data collection. All expenditure data, as well as the GDP for 1995, are adjusted to 2002 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.

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% of GDP, or 50% 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% of all expenditure on tertiary R&D, and for 2% of total expenditure on ISCED 5 and 6.

Israel: Expenditure on R&D can not be separated of total expenditure but are included in UOE data collection.

Korea: 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: Only expenditure on separated funded or separated budgeted research.

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**

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.

Germany: Table is calculated based on the chain method. Survey has been updated and refers to the academic year 2002.

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, and 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 Tertiary-Type B 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% of all students at the tertiary level.

Interpretation

Changes in expenditure per student between EAG 2003, 2004 and 2005

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.

Flemish community of Belgium: Data on indirect public transfers and payments to the private sector have been updated in the UOE 2004 data collection. Expenditure for child allowance for youngsters older than 18 years in secondary and post-secondary non-tertiary education has been included for the first time.

Denmark: Part of the increase in expenditure per student between EAG 2003 and EAG 2004-EAG 2005 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 2002 in expenditure on tertiary education is partly due to a change in coverage of tertiary institutions in the accounting system.

Finland: In EAG 2005 Finland reports for the second time students at ISCED 5A/6 divided to full-time/part-time students based on their study activities. Also for the second 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.

Expenditure data on educational programmes preparing for further and specialist vocational qualifications at ISCED 3/4 are for the second time included in EAG 2005.

Italy: For ISCED levels 0,1,2,3, the most important reason of the increase in expenditure per student observed in EAG 2004-EAG 2005 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 second time between ISCED levels 0 to 3 and 5b in EAG 2005.

Korea: The increase between EAG 2003 and EAG 2004-EAG 2005 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 and EAG 2005. 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.

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

■ General notes

Methodology

The “domestic” approach (reference to the GDP) is preferred to the “national” one (reference made to the GNP) in the calculation of Indicator B2 because it is consistent with other concepts used in education statistics and in the 2004 UOE data collection. Thus, educational programmes and providers and student mobility are considered in the UOE data collection from the domestic point of view. For example, funds from international agencies and other foreign sources are counted in the educational expenditure requested to be reported (see the OECD Handbook, 4.6.2 and 4.6.3); the coverage of the statistics on enrolment or on the activities of education institution is made on a domestic basis, *i.e.* the host country must report foreign students' enrolment and educational activities of foreign institutions. However, if the GNP was taken as reference in place of GDP, expenditure in percentage of GNP will be at least 5% higher than expenditure in percentage of GDP in Czech Republic, Hungary, Luxembourg and New Zealand and would be more than 20% higher in the case of Ireland (see Table 1)

Table 1: Differences between Gross Domestic Product and Gross National Product (reference period: calendar year 2002, 2002 current prices)

	Gross Domestic Product	Gross National Product
Australia	758 147	736 678
Austria	221 008	217 956
Belgium	261 124	267 366
Canada	1 140 428	1 109 546
Czech Republic	2 414 669	2 298 422
Denmark	1 360 710	1 330 049
Finland	139 803	141 147
France	1 483 720	1 487 776
Germany	2 107 300	2 120 860
Greece	141 502	141 745
Hungary	16 740 421	15 812 166
Iceland	779 295	759 994
Ireland	127 992	105 882
Italy	1 260 428	1 250 435
Japan	498 102 000	506 090 200
Korea	684 263 469	685 069 000
Luxembourg	22 805	20 873
Mexico	6 256 382	6 145 890
Netherlands	445 160	438 862
New Zealand	129 890	123 219
Norway	1 522 176	1 523 265
Poland	781 112	773 414
Portugal	128 458	126 492
Slovak Republic	1 098 658	1 097 135
Spain	698 589	717 434
Sweden	2 352 938	2 346 225
Switzerland	431 064	446 796
Turkey	277 574	275 032
United Kingdom	1 044 145	1 070 230
United States	10 434 800	10 477 200

Source: OECD Analytical Data Base, January 2005.

- **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 2002. 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 2002. All expenditure reported for 1995 was expressed in 2002 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 2002 and updated in 2003.

Interpretation

Norway: The measured decline in expenditure between 1995 and 2002 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.

Australia: The index of expenditures (1995 to 2002) is 92 for the public expenditure on tertiary institutions and 178 for private expenditure on educational institutions. The main reason for the increase in the private share of spending on tertiary institutions for Australia was changes to the Higher Education Contribution Scheme (HECS) that took place in 1997. A further change/HECS increase took effect in 2005 and will impact on future indicator results. The changes in HECS were part of a reform process aimed at providing more funds in total for higher education, partly through increased student/former student contributions.

Australia: Most of the HECS payments made to universities are funded in the first instance by the government. In 2002, of about \$1.9 billion in HECS charges paid to universities, only about \$310 million was paid up front by students. These students received a 25% subsidy (about \$103 million from the Government), which was paid direct to universities on their behalf and most of the balance comprised HECS loans from Government paid direct to universities. In the Indicator, the \$103 million in HECS subsidies for those who paid up front, and all the HECS loans are treated as transfers from

Government. Subsequently all of the \$1.9 billion in HECS is counted as private final expenditure on universities.

Australia: The contribution households in funding educational institutions is also overstated by indicators B2 and B3 because the results are also affected by the inclusion of fees paid by a substantial numbers of foreign students (about \$1 billion), and the lack of recognition in the indicators of HECS interest subsidies and HECS debts that are never repaid.

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 but **Denmark, 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 second time included in EAG 2005. These changes in reporting are also implemented in the trend data presented in EAG 2005 in order to ensure the best possible comparability over time.

Government transfers and payments to private entities, except financial aid to students, are excluded.

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

Germany: Expenditure made by enterprises in the “so-called Dual-System” (*i.e.* programme that combine school and work based) are included in this indicator and in B1.

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

Israel: Scholarships and other grant to students include the gross amount of student loans due to lack of data on repayment of such loans.

Expenditure by own sources of non-profit institutions is not included.

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^e 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 since EAG 2002.

Norway: At pre-primary level of education, expenditure on care are included leading to slight over-estimation of expenditure in percentage of GDP.

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.

Coverage

Flemish community of Belgium: Data on indirect public transfers and payments to the private sector have been updated in the UOE 2004 data collection. Expenditure for child allowance for youngsters older than 18 years in secondary and post-secondary non-tertiary education has been included for the first time.

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.

Israel:

Ancillary services are included in total expenditure on educational institutions

R&D coverage (see indicator B1)

Notes on distribution of current and 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.

Israel: Total personnel compensation includes taxes on employment and current expenditure other than compensation of personnel includes consumption of fixed capital.

Expenditure by own sources of non-profit institutions is included in UOE data collection.

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.