

# **Education at a Glance**

## **OECD Indicators 2011**

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

#### **Chapter B: Financial investment in education**

Table: Specific notes by country in the different indicators

	B1			B2	B3	B4	B5	B6	B7
	coverage	method	interpretation	coverage	coverage	coverage	coverage	coverage	coverage
Australia	<a href="#">AUS</a>			<a href="#">AUS</a>	<a href="#">AUS</a>	<a href="#">AUS</a>	<a href="#">AUS</a>	<a href="#">AUS</a>	<a href="#">AUS</a>
Austria	<a href="#">AUT</a>	<a href="#">AUT</a> <a href="#">AUT2</a>	<a href="#">AUT</a>						
Belgium			<a href="#">BEL</a>	<a href="#">BEL</a>	<a href="#">BEL</a>		<a href="#">BEL</a>		
Canada							<a href="#">CAN</a>		
Chile			<a href="#">CHL</a>	<a href="#">CHL</a>					
Czech Republic				<a href="#">CZE</a>			<a href="#">CZE</a>		
Denmark				<a href="#">DNK</a>		<a href="#">DNK</a>	<a href="#">DNK</a>		
Estonia	<a href="#">EST</a>		<a href="#">EST</a>						
Finland			<a href="#">FIN</a>	<a href="#">FIN</a>					
France	<a href="#">FRA</a>	<a href="#">FRA</a> <a href="#">DEU</a>		<a href="#">FRA</a>			<a href="#">FRA</a>		
Germany	<a href="#">DEU</a>	<a href="#">DEU2</a>		<a href="#">DEU</a>	<a href="#">DEU</a>	<a href="#">DEU</a>		<a href="#">DEU</a>	
Greece		<a href="#">GRC</a>		<a href="#">GRC</a>					
Hungary	<a href="#">HUN</a>	<a href="#">HUN</a>		<a href="#">HUN</a>			<a href="#">HUN</a>	<a href="#">HUN</a>	
Iceland		<a href="#">ISL</a>			<a href="#">ISL</a>				
Ireland			<a href="#">IRL</a>	<a href="#">IRL</a>			<a href="#">IRL</a>	<a href="#">IRL</a> <a href="#">ISR</a> <a href="#">ISR2</a>	
Israel	<a href="#">ISR</a>			<a href="#">ISR</a>					
Italy		<a href="#">ITA</a>						<a href="#">ITA</a>	
Japan		<a href="#">JPN</a>	<a href="#">JPN</a>	<a href="#">JPN</a>					
Korea	<a href="#">KOR</a>	<a href="#">KOR</a>							
Luxembourg	<a href="#">LUX</a>								
Mexico	<a href="#">MEX</a>			<a href="#">MEX</a>					
Netherlands	<a href="#">NLD</a>		<a href="#">NLD</a>						
New Zealand	<a href="#">NZL</a>				<a href="#">NZL</a>				
Norway	<a href="#">NOR</a>			<a href="#">NOR</a>			<a href="#">NOR</a> <a href="#">NOR2</a>	<a href="#">NOR</a>	
Poland	<a href="#">POL</a>			<a href="#">POL</a>	<a href="#">POL</a>		<a href="#">POL</a>		
Portugal	<a href="#">PRT</a>			<a href="#">PRT</a>					
Slovak Republic							<a href="#">SVK</a>		
Slovenia	<a href="#">SVN</a>	<a href="#">SVN</a>							
Spain	<a href="#">ESP</a>								
Sweden	<a href="#">SWE</a>						<a href="#">SWE</a> <a href="#">SWE2</a>	<a href="#">SWE</a>	
Switzerland		<a href="#">CHE</a>	<a href="#">CHE</a>				<a href="#">CHE</a>		
Turkey				<a href="#">TUR</a>					
United Kingdom	<a href="#">UKM</a>	<a href="#">UKM</a>	<a href="#">UKM</a>						
United States	<a href="#">USA</a>								<a href="#">USA</a>
Brazil			<a href="#">BRA</a>						
Russian Federation	<a href="#">RUS</a>			<a href="#">RUS</a>					

## TABLE OF CONTENTS

<b>INDICATOR B1: How much is spent per student? .....</b>	<b>5</b>
■ General notes.....	5
■ Notes on specific countries .....	6
<b>INDICATOR B2: What proportion of national wealth is spent on education? .....</b>	<b>11</b>
■ General notes.....	11
■ Notes on specific countries .....	13
<b>INDICATOR B3: How much public and private investment is there in education?.....</b>	<b>16</b>
■ Notes on specific countries .....	16
<b>INDICATOR B4: What is the total public spending on education?.....</b>	<b>17</b>
<b>INDICATOR B5: How much do tertiary students pay and what public subsidies do they receive? .....</b>	<b>18</b>
■ Notes on specific countries .....	18
<b>INDICATOR B6: On what services and resources is education funding spent? .....</b>	<b>19</b>
■ Notes on specific countries .....	19
<b>INDICATOR B7: How efficiently are resources used in education? .....</b>	<b>20</b>
■ Notes on specific countries .....	20

## CHAPTER B: FINANCIAL INVESTMENT IN EDUCATION

- **Changes in the coverage of all indicators introduced in *Education at a Glance 2011***

**Norway:** Due to the extreme oil prices in 2008 and its implications for the GDP, the GDP and GDP deflator used in Indicator B2 and for trend indicators on finance data is the Mainland GDP Deflator, so as to describe real changes in expenditure.

## **INDICATOR B1: How much is spent per student?**

See also notes on Indicator B2. [Back to table](#)

### ■ **General notes**

Expenditure reported in *Education at a Glance* are collected by source of funds, type of transaction, and level of education (Indicators B2, B3, B4 and B5) or by type of institutions (Indicators B1 and B6). The two sources are not the same therefore the totals can differ in some countries. Table 1 in Annex3\_chapter B.xls illustrates the differences between the two sources.

The number of students is adjusted to the financial year in the methodology to calculate expenditure per student. Table 2 in Annex3\_chapter B.xls provides the row data used for the computation of the indicator.

### *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 2008, a weighted average of the enrolment data for the academic years 2007/08 and 2008/09 was calculated. The data were weighted in accordance with the proportion of each school year that fell within the financial year 2008 (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, 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 dropouts. Hence, the figure can be interpreted as the average length of time during which students stay in tertiary education until they either graduate or drop out. However, in the case of countries with low dropout 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 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. [Back to table](#)

- **Trend data collection (financial years 1995, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008)**

The trend data on expenditure were obtained by a special survey updated in 2006. OECD countries were asked to revise trend data for the **financial years 1995, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007** according to the definitions and the coverage of the UOE 2010 data collection and then consistently with 2008 data.

All expenditure data, as well as the GDP for 1995, 2000, 2001, 2002, 2003, 2004, 2005, 2006 and 2007 are adjusted to 2008 prices using the GDP price deflator. [Back to table](#)

## ■ Notes on specific countries

### *Coverage*

*See also notes on Indicator B2.*

**Australia:** The methodology for calculating all finance expenditure has been revised for *Education at a Glance 2010*. Comparisons with previous publications are inadvisable. For more information, see the

notes on the coverage of all indicators. In addition, expenditure data from private universities, which have previously been excluded from Australia data, have been included since *Education at a Glance 2010*. Australian Bureau of Statistics Government Finance Statistics has been used wherever possible. [Back to table](#)

**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*). [Back to table](#)

**Estonia:** Expenditure on R&D in the tertiary sector is excluded. The R&D expenditures (in higher education institutions) would increase the expenditure on higher education by about 25%. [Back to table](#)

**France:** Since *Education at a Glance 2010* (2007 data) the frame of the budget data which are collected by finances Ministry changed. This is due to the introduction of the LOLF (“*loi organique relative aux lois de finances*”). The comparability with the data transmitted in previous years has been impacted. This looks like as a new "basis" of account. The most important change related to the level of the social contributions (in particular the “imputed contributions”) which were underestimated before. This fact leads to a higher level of the total compensation which is the biggest part of education expenditure. One other important change deals with the higher education expenditure: some research expenditure cannot be separated from the higher education expenditure. This also leads to a higher level of the education expenditure.

Since *Education at a Glance 2006*, research expenditure has been aligned with the DSTI data and now includes all R&D expenditure (higher education expenditure on R&D – HERD) without any exclusion.

Since *Education at a Glance 2004* (2003 data), the finance indicators include the following modifications:

- Change in the geographic area covered with the inclusion of overseas departments (*départements d’outre-mer* – DOM). Indicators for 2003 and following years refer to France as a whole and are therefore coherent with the area covered in national accounting aggregates (GDP, public spending, etc.). In trend data indicators, previous years are marked as “m” to ensure consistency across years.
- Change in the R&D spending areas covered so as to match the coverage of R&D spending on higher education used in the DSTI/OCDE data collection (reference to the *Frascati Manual*).
- Update of the treatment methods used for information sources and of the statistical tools employed: in particular, overhaul of assessment techniques for certain types of spending, such as spending on payroll taxes, spending by local authorities (towns and cities, departments, regions) or spending by households. [Back to table](#)

**Germany:** In previous years, programmes at Berufsfachschulen aimed at qualifying Kindergarten teachers and school-based vocational education for medical assistants, nurses, midwives or social assistants had been allocated to ISCED 3B. While the respective programmes at health-sector schools, or Fachschulen, had been allocated to ISCED 5B. Now all these programmes, regardless of the type of school, are allocated to ISCED 5B. [Back to table](#)

**Hungary:** Compared to data published in *Education at a Glance 2010*, expenditure per student at tertiary-type B level increased significantly (expenditure were slightly underestimated at this level the previous year). However when 2008 data are compared to 2006 data, expenditure on education increased by 19% at this level, while the total expenditure increased by 13%. [Back to table](#)

**Israel:** Expenditure on R&D cannot be separated from total expenditure but is included in the UOE data collection.

Since *Education at a Glance 2009* all expenditure on ancillary services for upper secondary boarding schools are included. Compared to data published in *Education at a Glance 2008* and previously, expenditure on ancillary services at upper secondary levels of education for 2007 reference year increased a lot because of a better estimation of this expenditure. [Back to table](#)

**Korea:** Expenditure on some educational programmes provided by ministries other than the Ministry of Education is excluded (police college, polytechnic college, military academy, etc.). [Back to table](#)

**Luxembourg:** The small difference between general and vocational programmes (see also Indicator C1) is due to the fact that expenditure occurring during the time spent in class is included. All other expenditure (for example expenditure of private enterprises) is not included in the calculation so that the costs of vocational programmes (especially dual programmes) are underestimated.

Expenditure of central level of government (*i.e.* for development of curricula, psychological aid or academic/professional guidance, or part of transport services), have been attributed to public institutions only, even if student from private institutions benefit from part of these services. As a consequence, expenditure on private institutions are underestimated. [Back to table](#)

**Mexico:** Only public expenditure on separately funded or separately budgeted research are included. [Back to table](#)

**Netherlands:** Compared to data published in *Education at a Glance 2009*, there are large increases in student numbers and expenditure in private institutions at ISCED levels 2 and 5A/6. These variations result from the use of a new data source compared to previous years (labour force survey). [Back to table](#)

**New Zealand:** Compared to data published in *Education at a Glance 2010*, there have been some significant changes in expenditure per student. From 39% at the pre-primary level to 15% at primary and secondary levels, and 16% at the tertiary-type B level. Around 75% of the increase at pre-primary level was a real increase due to the introduction of a new government policy in 2007 to provide free Early Childhood Education (ECE) for up to 20 hours a week for those aged 3 and over. Changes at other levels reflect, in part, real growth, and in part, changes in methodology. Improvements were made to the methods used to distribute expenditure across levels. Some items incorrectly excluded or allocated in previous returns were revised for this edition. Schools also shifted to International Financial reporting standards and this is the first year of reporting under these reporting standards. This affected the definition and scope of private expenditure. At post-secondary levels there were some moderate real increases in government expenditure, including increases in student support (loans and grants) and inflation-adjustments to subsidies and fees, as well as some volume growth due to the impacts of the recession. [Back to table](#)

**Norway:** Public spending on educational core services is included for all ISCED-levels as well as public spending on university research. Public spending on ancillary services is partly covered in

tertiary education only. Public spending on private enterprises to cover the cost of apprenticeship training in ISCED3 is included (as public expenditures). Private spending covers tuition fees in ISCED 0 and ISCED 5 only. Expenditure data are adjusted to constant prices using the GDP Mainland price deflator. Due to the high impact of oil prices on the GDP deflator for Norway, the GDP deflator used for trend indicators on finance data is the Mainland GDP Deflator, so as to describe real changes in expenditure. 2008 expenditure on education are converted to equivalent USD using PPPs for GDP (and not the PPPs for GDP mainland, as these were not available). [Back to table](#)

**Poland:** Expenditure, particularly private expenditure, is underestimated. [Back to table](#)

**Portugal:** Compared to data published in *Education at a Glance 2010*, expenditure per student at tertiary level of education excluding R&D activities decreased significantly as the amount of R&D increased by 50% compared to last year.

Since data published in *Education at a Glance 2008*, at the tertiary level, data from private institutions are reported, namely: i) expenditure with the teachers and other pedagogical, administrative and professional personnel; ii) expenditure of households (private expenditure) – payments to independent private institutions. However data from some of them, such as *Universidade Católica*, and the institutions belonging to *Fundação Minerva* and *Fundação Fernando Pessoa* are not included. [Back to table](#)

**Russian Federation:** Expenditure per student at the tertiary level of education is underestimated owing to missing private expenditure and because tuition fees are paid exclusively from private funds for about one-third of tertiary type-A and tertiary type-B students (see footnote in table B1.5).

The low value of R&D expenditure per student is explained by specific organisational structure of the research sector in the Russian Federation. The substantial part of research, especially theoretical ones, is carried out by the institutes of Academy of Science rather than in the higher education sector.

Compared to data published in *Education at a Glance 2010*, there are large variations in expenditure on educational institutions as a result of different factors: the economic crisis dramatically influenced the regional budget capacity and private companies' capabilities in expenditure on education; the population at typical ages of enrolment at secondary and tertiary levels decreased; the data for private expenditure on public institutions was included in standard statistical questionnaires for the second time in 2008 and improved compared to last year. However, the combination of variations balanced and did not result in dramatic changes in annual expenditure per student. [Back to table](#)

**Slovenia:** Expenditure for basic education is not divided according to ISCED between primary and lower secondary education. All expenditure for basic education (primary and lower secondary together) is shown under lower secondary education. Expenditure per student in lower secondary education is thus expenditure per student in basic (primary and lower secondary) education.

Expenditure for basic education also includes expenditure for some units of pre-primary education organised in some basic education schools, so that expenditure per student for basic education is slightly overestimated and expenditure per student for pre-primary education is slightly underestimated.

Expenditure for upper secondary education also includes expenditure for units of post-secondary tertiary vocational education (first short tertiary-type B programmes) organised in some upper

secondary schools. Consequently expenditure per student for upper secondary education is slightly overestimated and expenditure per student for tertiary education is slightly underestimated. [Back to table](#)

**Spain:** Expenditure for retirement of personnel other than teachers in public institutions is not included. [Back to table](#)

**Sweden:** Since *Education at a Glance 2010* (reference year 2007) Sweden identifies all activities for children from 3 years of age in pre-primary education institutions as education. Earlier the expenditure per student only included the pre-school part of three hours per day during term-time, which is free of charge for the parents.

Some components of the cost estimates for post-secondary non tertiary education and tertiary-type B programmes are based on rough assumptions, which are likely to underestimate the total cost at these levels. [Back to table](#)

**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. [Back to table](#)

**United States:** Funds for major federal R&D centres administered by universities are excluded. [Back to table](#)

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

**Austria 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 the duration of studies. [Back to table](#)

**Austria:** The estimation of the average duration is affected by methodological changes over time. Data underlying the estimated duration in Table B1.3b were collected separately on tertiary-type A and advanced research programmes for the first time in the UOE data collection 2005. The duration, however, was calculated for tertiary-type A and advanced research programmes combined and explicitly took into account entrants to tertiary-type A as well as to advanced research programmes. In previous years, in contrast, only total entrants to university education (*i.e.* to tertiary-type A and advanced research programmes combined) were reported; continuing students, who progressed to level 6 without having left university after completion of tertiary-type A, were not counted as entrants. Therefore the current results are not directly comparable with those published in *Education at a Glance 2006*. [Back to table](#)

**France:** Panel data were used to estimate the average duration of tertiary studies. [Back to table](#)

**Germany:** The average duration of university studies calculated by the chain method does not include students in the 11th year of study or beyond in the denominator. As a consequence the calculated average duration and cost of university studies are about 7% too high. [Back to table](#)

**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 underestimation of the duration. [Back to table](#)

**Hungary:** Distribution between ISCED levels 1, 2, and 3 is estimated. [Back to table](#)

**Iceland:** Panel data were used to estimate average duration of tertiary studies. [Back to table](#)

**Japan:** Expenditure on specialised training colleges (general course), miscellaneous schools and educational administration are not allocated by level. [Back to table](#)

**Korea:** The maximum duration of tertiary-type B education is four years. The 6th and 8th years and beyond of university education are included in the 7th year of study. [Back to table](#)

**Slovenia:** Compared to data published in *Education at a Glance 2009*, the methodology to distribute expenditure between pre-primary and basic (primary + lower secondary) education has been improved and this results in changes in expenditure per student. [Back to table](#)

**Switzerland:** Compared to data published in *Education at a Glance 2010*, the methodology used to report Finance data has changed, and therefore data are not comparable with data published in the previous edition. [Back to table](#)

**United Kingdom:** The chain method was amended slightly in order to use the available 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 paths 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; these account for less than 10% of all students at the tertiary level. [Back to table](#)

### *Interpretation*

Changes in expenditure per student between *Education at a Glance* 2005, 2006, 2007, 2008, 2009, 2010 and 2011.

**Austria:** Owing to different reporting standards between the UOE questionnaire and Austrian accounting systems, figures on expenditure per student as published in *Education at a Glance* differ considerably from expenditure per student as calculated and published in Austria. [Back to table](#)

**Brazil:** In the text of indicator B1, Brazil is included among the countries where expenditure did not keep up with the expansion of enrolment in tertiary education. However, Brazils' data includes only public expenditure (because private expenditure is missing) whereas most of the other countries have data available for private expenditure (see footnote in Table B1.5). Considering only public expenditure (as in Table B3.4), the difference in expenditure per student between these countries and Brazil will be smaller compared to the one shown in Indicator B1. [Back to table](#)

**Flemish Community of Belgium:** Data on average theoretical duration for lower and upper secondary education do not take into account ISCED 4 while in the expenditure data - on which the

expenditure per student is based - ISCED 4 is included in the total expenditure for all secondary education.

The information on 'not allocated by level' refers to part-time art education. The pupils enrolled in part-time art education are not included in the ENRL-tables (double counting with other programmes) which explains the difference in the two columns referring to 'not allocated by level' in Table B1.7.

Belgium: Data on the German speaking Community are not included in the indicator.

**Chile:** An estimation of the expenditure of public schools based on data provided by municipalities was included for the first time in *Education at a Glance 2007*. This information was not available in previous years. An adjustment is now made from primary to upper secondary education. Because of this, comparison of 2007 and 2004 data shows a very small increase in the indicator for "primary to tertiary level" and a decline in some levels (secondary education especially). In *Education at a Glance 2007* a change was made in the methodology to classify the programmes offered at tertiary level into the ISCED level classification. This led to important changes in enrolments between tertiary-type B level on the one hand and, on the other hand, tertiary-type A level and advanced research programmes in the data for 2004 and 2005. [Back to table](#)

**Estonia:** Compared to data published in *Education at a Glance 2010* there is a significant increase in expenditure per student at pre-primary, primary and secondary levels of education. This results from the combination of a decrease in student numbers and a substantial increase in expenditure, especially at pre-primary level and in general programmes at primary and secondary levels of education. [Back to table](#)

**Finland:** Compared to data published in *Education at a Glance 2010*, the high increase of expenditure per student is partly related to the decrease of student numbers in the tertiary-type A and advanced research programmes (3.6%). This decrease is caused especially by the decrease of student numbers in university education due to the ending of the transition period connected to the university degree revision (Bologna process). In 2008, the number of graduates was record high in university education due to the Bologna process. This is reflected as a decrease of the student stock (student/enrolment number) in university education. At the same time (in 2008) the total expenditure continued to increase in the tertiary-type A and advanced research programmes (by 6.7% compared to 2007).

Expenditure and student numbers on tertiary-type A government-dependent private institutions have also increased in 2008 (by 50.6% and 46.0% respectively). These increases were caused by two fusions of polytechnic education institutions in 2008. EVTEK Polytechnic and Helsinki Polytechnic were merged and continued as Helsinki Metropolia Polytechnic. In the fusion the type of the institutions changed from public to government-dependent private. Also Sydväst Polytechnic and Swedish Polytechnic were merged and continued as Novia Polytechnic. The institution type of Swedish Polytechnic was public and the institution type of Novia Polytechnic is government-dependent private. [Back to table](#)

**Ireland:** Compared to data published in *Education at a Glance 2010*, expenditure per student increased significantly, by about 15% at all levels of education combined and by nearly 30% at the tertiary level. At the tertiary level, apart from changes in the number of students (and PPPs), one half of this increase per student can be accounted for by increases in public funding for tertiary education, 32% accounted for by wider coverage of private expenditure and the remaining 18% accounted for by wider data coverage in public expenditure. [Back to table](#)

**Japan:** Since data were published in *Education at a Glance 2008*, calculation methods used for private expenditure were modified. Although trend indicators in *Education at a Glance 2011* are comparable since those are developed by modified data, indicators for private expenditure are not comparable with previous versions of *Education at a Glance*.

Previously national universities were positioned as a part of the government organization and thus classified as “public institutions”. Since April 2004, national universities have been incorporated, given corporation status and autonomous management is ensured. However, some authority relating to important administrative matters remains with the Minister of Education, Culture, Sports, Science and Technology, such as the appointment of the president of each national university, approving medium-term plans, approving issues of university bonds, and dismissal of university directors who have voting rights on important items regarding the administration of the university. Therefore national university corporations are still classified as “public institutions”. [Back to table](#)

**Switzerland:** Expenditure per student at the university level is very high. This is mainly due to the structure of the university system: a large 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-to-teaching staff ratios. Furthermore, teachers’ salaries at the university level are comparatively high. Advanced research programmes are not included in tertiary education. In addition to this Switzerland has a high level of R&D spending. Spending on education per student would be considerably lower if the R&D component were excluded. [Back to table](#)

**Netherlands:** Between 2000 and 2008 expenditure on educational institutions per student decreased in the Netherlands: expenditure did not keep up with expanding enrolments at this level, as R&D expenditure did not follow the increase in student enrolment. [Back to table](#)

**United Kingdom:** Compared to data published in *Education at a Glance 2009*, changes in the share of public and private funds at the pre-primary level reflect both improvements in the data capture/analysis and (more significant) the ongoing expansion of Government investment in pre-primary education/day care for young children.

For tertiary level of education, compared to data published in *Education at a Glance 2009*, at the tertiary level of education there is a significant shift in the way the HEI sector is funded with an increased emphasis on the use of tuition fees. There is a significant increase in household expenditure on tuition fees. From the 2006/07 academic year onwards the cap on annual tuition fees for domestic students was raised from £1 100 to £3 000. The significant increase in household expenditure reported is almost exactly offset by the reduction in direct public expenditure. The increase in expenditure from other private entities reflects the inclusion for 2006-07 of HEI income from health authorities (intended to cover the cost of teaching for medical students, £330m), a small increase in R&D funding from the business and private not-for-profit sectors (£60m) and an increase in funding from employers towards the cost of HE programmes provided in the FE (College) sector (£238m).

Since data published in *Education at a Glance 2008*, expenditure per student at the pre-primary level decreased significantly and expenditure per student at the tertiary level increased significantly as a result of a change in methodology and greater consistency in the data.

Compared to data published in *Education at a Glance 2008*, expenditure per student increased due to methodological changes and improvements in the reporting accuracy for enrolment and finance numbers. [Back to table](#)

## INDICATOR B2: What proportion of national wealth is spent on education?

### ■ General notes

#### *Methodology*

The “domestic” approach (reference to GDP) is preferred to the “national” one (reference to GNP) in the calculation of Indicator B2 because it is consistent with other concepts used in education statistics and in the 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 included in the educational expenditure requested (see the *OECD Handbook*, 4.6.2 and 4.6.3); the coverage of the statistics on enrolments or on the activities of education institutions is made on a domestic basis, *i.e.* the host country must report enrolments of foreign students and the educational activities of foreign institutions. However, by taking GNP instead of GDP as reference, expenditure as a percentage of GNP would be at least 5% higher than expenditure as a percentage of GDP in Chile, the Czech Republic, Estonia, Hungary, Iceland, New Zealand and Switzerland and would be more than 15% higher in Iceland, Ireland and Luxembourg (see Table 1).

**Table 1:** Differences between gross domestic product and gross national product (reference period: calendar year 2008, current prices)

	Gross Domestic Product	Gross National Product	% Change
<b>OECD countries</b>			
Australia	1,253,121	1,203,420	4
Austria	283,085	279,166	1
Belgium	345,006	350,100	-1
Canada	1,599,608	1,581,013	1
Chile	89,262,568	82,318,975	8
Czech Republic	3,688,997	3,522,722	5
Denmark	1,740,843	1,763,842	-1
Estonia	252,015	238,423	6
Finland	184,649	185,608	-1
France	1,948,511	1,967,248	-1
Germany	2,481,200	2,520,850	-2
Greece	235,679	229,196	3
Hungary	26,753,906	25,033,342	7

Iceland	1,477,938	1,163,726	27
Ireland	179,989	155,985	15
Israel	725,861	711,247	2
Italy	1,567,851	1,543,620	2
Japan	505,111,900	521,125,400	-3
Korea	1,026,451,811	1,034,115,400	-1
Luxembourg	39,640	29,754	33
Mexico	12,091,797	11,982,653	1
Netherlands	596,226	584,899	2
New Zealand	184,802	172,385	7
Norway	2,516,800	2,505,733	0
Poland	1,275,432	1,249,754	2
Portugal	172,022	165,836	4
Slovak Republic	2,025,101	1,964,125	3
Slovenia	37,305	36,289	3
Spain	1,088,124	1,057,769	3
Sweden	3,204,320	3,317,569	-3
Switzerland	544,196	505,998	8
Turkey	950,534	m	
United Kingdom	1,445,580	1,471,758	-2
United States	14,296,900	14,334,900	0
<b>Other G20 countries</b>			
Brazil	3,004,881	m	
Russian Federation	41,668,034	40,222,497	4

Source: OECD Analytical Data Base, June 2011.

- **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 2008. For countries in which GDP is not reported for the same reference period as data on educational funding, 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 that fall within the educational financial year. Adjustments were made for **Australia**, **Japan**, the **United Kingdom** and the **United States** (see Annex 2).

- **Calculation of the index in Table B2.4 and Indicator B3**

Tables B3.1 (columns 8 and 9), B3.2a (columns 13 and 14), and B3.2b (columns 8 and 9) show the changes in expenditure on educational services between 2000 and 2008. All expenditure reported for

2000 was expressed in 2008 constant USD, adjusted to the 2008 price level using the GDP deflator (see Annex 2). The data on expenditure for 2000 were obtained by a survey updated in 2010.

Table B2.4 also shows the index of change between 1995 and 2008 in expenditure on educational institutions from public and private sources. Data for calendar years 2000, 2001, 2002, 2003, 2004, 2005, 2006 and 2007 were already collected in previous versions of *Education at a Glance* but were updated in 2010. [Back to table](#)

**Norway:** Educational expenditures are reported as percent of Mainland GDP (excluding off-shore oil and international shipping). This is new from Education at a Glance 2011. Comparisons with earlier editions are inadvisable as the total GDP was used before 2011. [Back to table](#)

#### ■ Notes on specific countries

##### *Coverage*

**Australia:** The methodology for calculating all finance expenditure has been revised for *Education at a Glance 2010*. Comparisons with previous publications are inadvisable. For more information, see the notes on the coverage of all indicators.

At the tertiary level of education, the proportion of public expenditure on educational institutions decreased from 64.6% in 1995 to 44.8% in 2008. 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 2006 and will affect future indicator results. The changes in HECS were part of a reform process aimed at providing more funds overall for higher education, partly through increased contributions from students and former students.

Most of the HECS payments made to universities are funded in the first instance by the government. In 2005, of about AUD 2.3 billion in HECS charges paid to universities, only about AUD 396 million was paid up front by students. These students received a 20% subsidy (about AUD 99 million from the government), which was paid directly to universities on their behalf. Most of the balance represented HECS loans from the government paid directly to universities. In the indicator, the AUD 99 million in HECS subsidies for those who paid up front and the HECS loans are treated as transfers from the government. Subsequently, all of the AUD 2.3 billion in HECS is counted as private final expenditure on universities.

The contribution of households to 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 AUD 2 billion), and the lack of recognition in the indicators of HECS interest subsidies and HECS debts that are never repaid. [Back to table](#)

**Belgium:** Data on the German-speaking Community are not integrated into the data for Belgium in the 2009 UOE data collection. [Back to table](#)

In Table B2.3 private expenditure is underestimated since payments to independent private institutions are not available as they are not collected by the Ministry of Education. [Back to table](#)

**Chile:** Data on public and private expenditure are missing in Table B2.3. However, Chile implemented a system to guarantee the payment of loans to students made by private lenders. This

indirect form of subsidy is very significant and is growing rapidly every year, and is completely attributable for tuition fees to educational institutions. These expenditure should be included with public expenditure on tertiary educational institutions. In this case, public expenditure on tertiary educational institutions will represent 0.6 % of GDP in Chile whereas private expenditure represents 1.7 % of GDP. [Back to table](#)

**Czech Republic:** Data from the Ministries of Justice, Defence and Internal Affairs are not included. [Back to table](#)

**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** and **Finland** exclude expenditure on similar programmes. **Sweden** excludes expenditure on the daycare component of similar programmes (50% of the cost for children 3-5 years of age in integrated programmes is allocated to the education component).

As a result of the revision of financial data, the data from 2002 and before are not directly comparable with the data from 2003, 2004, 2005, 2006, 2007 and 2008. [Back to table](#)

**Finland:** Government transfers and payments to private entities, except financial aid to students, are excluded. [Back to table](#)

**France:** Since and including data published in *Education at a Glance 2006*, all expenditures included overseas departments (*départements d'outre mer*, DOM). Gross domestic product and total public expenditure were adjusted accordingly. [Back to table](#)

**Germany:** Expenditure for instruction by enterprises in the “so-called dual system” (*i.e.* programme that combines school- and work-based instruction) is included in this indicator and in B1.

Public expenditure on education as a percentage of total public expenditure (Indicator B4) seems to rise between 1995 and 2008 (from 8.6% to 10.4%). However the low value in reference year 1995 is due solely to the liquidation of the *Treuhand*.

In previous years, programmes at *Berufsfachschulen* aimed at qualifying Kindergarten teachers and school-based vocational education for medical assistants, nurses, midwives or social assistants had been allocated to ISCED 3B. While the respective programmes at health-sector schools, or *Fachschulen*, had been allocated to ISCED 5B. Now all these programmes, regardless of the type of school, are allocated to ISCED 5B. [Back to table](#)

**Greece:** Expenditure on early childhood education is included in expenditure on primary education. [Back to table](#)

**Hungary:** Data do not include the private expenditure of private educational institutions. [Back to table](#)

**Ireland:** Compared to data published in *Education at a Glance 2010*, expenditure on education as a percentage of GDP increased significantly. This results from the combination of a decrease in GDP

(nominal decrease of 5% between 2007 and 2008), a better coverage of expenditure reported in the UOE data collection and an increase of public expenditure on education. [Back to table](#)

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

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

Since 2007, data on depreciation is excluded from expenditure, in order to be in accordance with the OECD methodology. [Back to table](#)

**Japan:** Expenditure on specialised training colleges, “miscellaneous schools” and educational administration are not allocated by level. [Back to table](#)

**Mexico:** Since data published in *Education at a Glance 2008*, there has been a change of the basis year for the calculation of GDP in Mexico so it reflects a remarkable increase in this value for the year 2006. [Back to table](#)

**Poland:** 1995 data cover public expenditure only. At the pre-primary level of education expenditures on care are included. [Back to table](#)

**Portugal:** Regional and local transfers to the private sector are not included. Local direct expenditure on educational institutions is not included. [Back to table](#)

**Russian Federation:** Since data published in *Education at a Glance 2008*, expenditure on education increased significantly. The reason is the increase in the rate of inflation (about 10%) and in purchasing power parities (about 15%). However, public expenditure on education as well as all public expenditure (46%) increased, and expenditure on educational institutions as a percentage of GDP remains at the same level. The increase in expenditure at ISCED levels 5/6 may be partially explained by the substantial increase in expenditure for R&D. [Back to table](#)

**Turkey:** Regional and local (except Special Provincial Administration) direct expenditure on educational institutions is not included. Transfers are also not included. [Back to table](#)

*Sources*

*See Indicator B1.*

## INDICATOR B3: How much public and private investment is there in education?

### ■ Notes on specific countries

See notes on Indicators B1 and B2.

#### Coverage

**Australia:** The methodology for calculating all finance expenditure has been revised for *Education at a Glance 2010*. Comparisons with previous publications are inadvisable. For more information, see the notes on the coverage of all indicators. [Back to table](#)

**Belgium:** Tables B3.2b and B3.3 only include expenditure charged by institutions. As of 2004 data, the survey on private expenditure on educational institutions does not allow for a breakdown of private expenditure between that imposed by institutions and that not imposed by institutions. Therefore a large part of expenditure imposed by institutions is included in total private expenditure. The private expenditure taken into account in Tables B3.2b and B3.3 is therefore underestimated. [Back to table](#)

Private expenditure is underestimated since data on payments to independent private institutions are not collected/not available. [Back to table](#)

**Germany:** In previous years, programmes at *Berufsfachschulen* aimed at qualifying Kindergarten teachers and school-based vocational education for medical assistants, nurses, midwives or social assistants had been allocated to ISCED 3B. While the respective programmes at health-sector schools, or *Fachschulen*, had been allocated to ISCED 5B. Now all these programmes, regardless of the type of school, are allocated to ISCED 5B. [Back to table](#)

**Iceland:** Compared to data published in *Education at a Glance 2010*, public expenditure on education as a percentage of total public expenditure decreased significantly because of a considerable increase in total public expenditure between 2007 and 2008. [Back to table](#)

**New Zealand:** Compared to data published in *Education at a Glance 2009*, there is a marked shift towards public funding at the pre-primary level of education. This is due to a major change in the funding regime for pre-primary education introduced in 2007. This change was designed to provide three and four year olds at qualifying institutions with free Early Childhood Education (ECE) up to 20 hours per week. This led to the marked increase in public funding and a corresponding decrease in private funding. [Back to table](#)

**Poland:** In Table B3.1 data for 2008 exclude household expenditure for post-secondary non-tertiary and tertiary-type B levels of education and only include expenditure of other private entities for tertiary-type A and advanced research programmes. [Back to table](#)

## INDICATOR B4: What is the total public spending 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 the expenditure on debt servicing (*i.e.* interest payments) that is 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 may be underestimated in countries in which interest payments represent a large proportion of total public expenditure on all services.

See notes on Indicator B2. [Back to table](#)

**Australia:** The methodology for calculating all finance expenditure has been revised for *Education at a Glance 2010*. Comparisons with previous publications are inadvisable. For more information, see the notes on the coverage of all indicators. [Back to table](#)

**Denmark:** The drop in *public expenditure on education to total public spending* is explained by the huge increase in *total public spending* between 2007 and 2008 (5% increase). [Back to table](#)

**Germany:** In previous years, programmes at *Berufsfachschulen* aimed at qualifying Kindergarten teachers and school-based vocational education for medical assistants, nurses, midwives or social assistants had been allocated to ISCED 3B. While the respective programmes at health-sector schools, or *Fachschulen*, had been allocated to ISCED 5B. Now all these programmes, regardless of the type of school, are allocated to ISCED 5B. [Back to table](#)

## **INDICATOR B5: How much do tertiary students pay and what public subsidies do they receive?**

### *Methodology*

Data on tuition fees charged by educational institutions were collected through a survey updated in 2010 and refer to the academic year 2008/09. The figures represent the weighted average of the main tertiary-type A programmes and do not cover all educational institutions. The figures reported can be considered as good proxies and show the difference among countries in terms of tuition fees charged by the main educational institutions and for the majority of students. [Back to table](#)

### ■ **Notes on specific countries**

*See notes on Indicator B2.*

**Australia:** The methodology for calculating the average tuition fees for mobile students was revised for 2009 data. Due to the break in the series, older years should not be compared to 2009 data as fees for mobile students were previously underreported. [Back to table](#)

**Flemish Community of Belgium:** The government mainly finances higher education indirectly (by public subsidies to institutions). Also for students with nationalities outside of EEA, the government will fund the institutions for as long as their number does not exceed 2% of the total student population of the institution. Also all students who receive grants through other channels (development, international exchange students, etc.) are not included in this 2%-standard. Institutions are not allowed to demand higher tuition fees as long as the 2% is not reached. In reality this has not occurred. Conclusion: up until now there has been no differentiation in tuition fees based upon nationality.

There has not been a significant increase in tuition fees over the last 15 years. Especially not for type A institutions (universities). For type B institutions (university colleges), there has been the introduction of a standardized tuition fee across Flanders since 1995. This may have caused some changes (increase) in some of the university colleges. Since then, the levels have been consistent. [Back to table](#)

**Canada, Denmark, Germany, Norway, Poland and Sweden:** Subsidies in kind, such as free or reduced-price travel on public transport systems, are excluded. [Back to table](#)

**Czech Republic:** Scholarships are included in direct expenditure for educational institutions. [Back to table](#)

**France:** The amount of financial aid to students is underestimated. The indicator does not take into account family allowances (the share that goes to the student cannot be estimated), housing allowances (*allocations de logement social* and *allocations personnalisées au logement*, which represent about 70% of the total amount of scholarships/grants and concern one-third of students), and tax reductions (which represent about 75% of the amount of scholarships/grants and benefit families that pay income taxes and generally do not benefit from scholarships/grants). Taking these financial aids (except family allowances) into account would multiply the amount of financial aid to students by about 2.5.

Data on tuition fees in tertiary-type A education refer to the distribution of students enrolled in public university, including tertiary B. [Back to table](#)

**Hungary:** Data in table B5.2 come from the Student Loan Centre database, 2007. Methodology: Figures are based on a sample survey completed by TÁRKI Social Research Institute (www.tarki.hu) on behalf of the Student Loan Centre in November 2007.

In Hungary, the student loan scheme is considered to be private because the funds are raised on the money market and there are no direct subsidies, although it has characteristics of a public scheme as well (universal access, state regulation, state-owned company, relatively preferential rate). [Back to table](#)

**Ireland:** Students in tertiary education benefit from subsidised bus and rail travel (systems 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 the registration fees paid by students. The level of government funding in this area is not known. [Back to table](#)

**Norway:** Students who do not benefit from either loans or grants include both students that do not apply for support and those who no longer are entitled to student support due to academic delay, etc. Students who just benefit from grants are those who choose to apply for grants only. [Back to table](#)

**Slovak Republic:** Students who are simultaneously enrolled in one academic year in two or more study programmes offered by a public university in the same level, are required to pay annual tuition fees for the second and the other study programs in the academic year. Students studying longer than the standard duration of study are required to pay annual tuition for each additional year of study. [Back to table](#)

**Sweden:** All students are entitled to government grants and loans to finance their studies. The continued entitlement is conditional upon their pass in their previous studies. There is also an income threshold. [Back to table](#)

**Switzerland:** Fees for health insurance are publicly subsidised for students from low-income backgrounds. These subsidies amount to several tens of millions of CHF but are excluded. [Back to table](#)

## **INDICATOR B6: On what services and resources is education funding spent?**

*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, room and board on campus and student transport, should include fees paid by students and families for those services.

However, countries' coverage of private spending on ancillary services is uneven. While a number of countries exclude private spending on ancillary services, Australia, France, Hungary, Norway, Spain, Turkey and the United States provide information on private spending on ancillary services. [Back to table](#)

**Australia:** The methodology for calculating all finance expenditure has been revised for *Education at a Glance 2010*. Comparisons with previous publications are inadvisable. For more information, see the notes on the coverage of all indicators. [Back to table](#)

**Germany:** In previous years, programmes at *Berufsfachschulen* aimed at qualifying Kindergarten teachers and school-based vocational education for medical assistants, nurses, midwives or social assistants had been allocated to ISCED 3B. While the respective programmes at health-sector schools, or *Fachschulen*, had been allocated to ISCED 5B. Now all these programmes, regardless of the type of school, are allocated to ISCED 5B. [Back to table](#)

**Hungary:** The expenditure on ISCED levels 1 to 3 is estimated on the basis of the number of students at each level. [Back to table](#)

**Ireland:** Ancillary services at the primary to post-secondary non-tertiary level include only school transport. [Back to table](#)

**Israel:** Ancillary services are included in total expenditure on educational institutions. [Back to table](#)

**Norway:** Expenditure on ancillary services includes welfare services, preparation of studies abroad and contributions to housing on campus in tertiary education. No ancillary services are estimated for ISCED 1-4. [Back to table](#)

*R&D coverage (see Indicator B1)*

*Notes on distribution of current and capital expenditure*

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

Expenditure of non-profit institutions from own sources is not included in the UOE data collection. [Back to table](#)

**Italy:** Since the financial year 1998, at ISCED levels 0-3 IRAP, other than compensation of personnel, is reported in current expenditure. [Back to table](#)

**Sweden:** School and university buildings are rented. Rent payments are included in current expenditure. [Back to table](#)

*Sources*

*See Indicator B1*

## INDICATOR B7: How efficient is public spending on education?

### Methodology

Contribution of various factors to salary cost per student

Method: This table shows the salary cost per student at the upper secondary level of education, as a percentage of GDP per capita, the difference from the OECD average and the contribution of various factors to the difference from the OECD average. The salary cost per student is calculated as the teacher's salary multiplied by annual instruction time for the student, divided by the annual amount of teaching time of teachers and the average class size.

$$CCS = SAL \times instT \times \frac{1}{teachT} \times \frac{1}{ClassSize} = \frac{SAL}{Ratio_{stud / teacher}}$$

Data used refer to *Education at a Glance 2009* (see table below): salaries (SAL) refer to statutory salaries of teachers with 15 years of experience and minimum training (Indicator D3); instruction time (instT) refers intended instruction time for 15-year-olds (Indicator D1); teaching time (teachT) refers to net teaching time (Indicator D4); and class size (ClassSize) has been estimated based on the ratio of students to teaching staff, teaching time and instruction time (see Box D2.1 in Indicator D2). Some estimations have been made for missing data.

For explanation of the method used, see [www.mels.gouv.qc.ca/stat/Bulletin/bulletin\\_31an.pdf](http://www.mels.gouv.qc.ca/stat/Bulletin/bulletin_31an.pdf).

### Contribution of various factors to explain the difference between two variables

The analysis of the contribution of various factors to a difference between two variables is assessed, based on an assumption relating to the mathematical relationship between these variables and the explanatory factors (based on method shown in Education Statistics Bulletin (n°29 and 31 and further explanations from Marius Demers (Ministère de l'Éducation, du Loisir et du Sport, Québec, Canada).

For example, for two countries (Country 1 and Country 2):

$$\begin{aligned} X_1 &\equiv Q_1 \times R_1 \times S_1 \times T_1 \\ X_2 &\equiv Q_2 \times R_2 \times S_2 \times T_2 \end{aligned}$$

then :

$$\frac{X_2}{X_1} = \frac{Q_2 \times R_2 \times S_2 \times T_2}{Q_1 \times R_1 \times S_1 \times T_1}$$

and,

$$1 + \frac{X_2 - X_1}{X_1} = \left(1 + \frac{Q_2 - Q_1}{Q_1}\right) \times \left(1 + \frac{R_2 - R_1}{R_1}\right) \times \left(1 + \frac{S_2 - S_1}{S_1}\right) \times \left(1 + \frac{T_2 - T_1}{T_1}\right)$$

Which can also be written as:

$$1 + V = (1 + U) \times (1 + W) \times (1 + Y) \times (1 + Z)$$

where :

$$V = \frac{X_2 - X_1}{X_1}, \quad U = \frac{Q_2 - Q_1}{Q_1}, \quad W = \frac{R_2 - R_1}{R_1}, \quad Y = \frac{S_2 - S_1}{S_1}, \quad Z = \frac{T_2 - T_1}{T_1}$$

The right part of the equation can also be written as:

$$V = U + W + Y + Z + UW + UY + UZ + WY + WZ + YZ + UWY + UWZ + UYZ + WYZ + UWYZ$$

where, « V » is the relative variation between  $X_2$  and  $X_1$  ( $V = (X_2 - X_1)/X_1$ ).

Then, the contribution of the different explanatory factors to the relative variation between  $X_2$  and  $X_1$  is:

i) for factor « Q »:

$$U + \frac{UW}{2} + \frac{UY}{2} + \frac{UZ}{2} + \frac{UWY}{3} + \frac{UWZ}{3} + \frac{UYZ}{3} + \frac{UWYZ}{4} = A$$

ii) for factor « R »:

$$W + \frac{UW}{2} + \frac{WY}{2} + \frac{WZ}{2} + \frac{UWY}{3} + \frac{UWZ}{3} + \frac{WYZ}{3} + \frac{UWYZ}{4} = B$$

iii) for factor « S »:

$$Y + \frac{UY}{2} + \frac{WY}{2} + \frac{YZ}{2} + \frac{UWY}{3} + \frac{UYZ}{3} + \frac{WYZ}{3} + \frac{UWYZ}{4} = C$$

iv) for factor « T »:

$$Z + \frac{UZ}{2} + \frac{WZ}{2} + \frac{YZ}{2} + \frac{UWZ}{3} + \frac{UYZ}{3} + \frac{WYZ}{3} + \frac{UWYZ}{4} = D$$

where:  $A + B + C + D = V$

With this method, we measure the direct and indirect contribution of each factor to the variation of the variable between the two countries. For example, if a worker receives a 10% increase of the hourly wage and increases the number of hours of work from 20%, his earnings will increase from 32%, resulting from the direct contribution of each of these variations (0.1 +0.2) and the indirect contribution of these variations due to the combination for these two factors (0.1\*0.2).

The contribution of explanatory factors to the absolute difference between the two variables ( $X_2 - X_1$ ) is:

i) factor « U »:

$$\frac{A}{V} \times (X_2 - X_1) = AX_1 = a$$

ii) factor « R »:

$$\frac{B}{V} \times (X_2 - X_1) = BX_1 = b$$

iii) factor « S »:

$$\frac{C}{V} \times (X_2 - X_1) = CX_1 = c$$

iv) factor « T »:

$$\frac{D}{V} \times (X_2 - X_1) = DX_1 = d$$

with

$$a + b + c + d = X_2 - X_1$$

[Back to table](#)

#### ■ Notes on specific countries

**Australia:** The methodology for calculating all finance expenditure has been revised for *Education at a Glance 2010*. Comparisons with previous publications are inadvisable. For more information, see the notes on the coverage of all indicators. [Back to table](#)

**United States:** Instruction time for the United States at the primary and secondary levels is an estimation of the instruction time of 14-year-olds in 2000, the last year for which the United States provided data. [Back to table](#)