

Education at a Glance

OECD Indicators 2004

Annex 3: Sources, methods and technical notes

Chapter A: The output of educational institutions and the impact of learning

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CHAPTER A: THE OUTPUT OF EDUCATIONAL INSTITUTIONS AND THE IMPACT OF LEARNING

INDICATOR A1: Educational attainment of the adult population

■ Table A1.1, A.1.1.a, A1.1.b

Methodology

Data on population and educational attainment are taken from OECD and EUROSTAT databases, which are compiled from National Labour Force Surveys.

National sources:

Table 1: Sources

	Statistical agency	Source	Reference period	Coverage	Primary sampling unit	Size of the sample	Overall rate of non-response	Remarks
Australia	Australian Bureau of Statistics	Australian Bureau of Statistics, Labour Force Survey	May-02	Data refer to persons aged 15 to 64.	Respondents within households	45,100	3.0%	Households are selected and all non-visiting adults aged 15-64 are interviewed
Austria	Austrian Central Statistical Office	Quarterly Mikrocensus	The data refer to annual averages of quarterly the Mikrocensus sample survey	Data refer to persons aged 15 and over.				
Belgium	Statistical office	Labour Force Survey	Annual average	Data refer to persons aged 15 and over.	Households			
Canada	Statistics Canada	Monthly Labour Force Survey	The annual data are averages of monthly estimates	Data refer to persons aged 15 and over.	Households	Approx 92 500 persons		
Czech Republic	Czech Statistical Office (CSU)	Labour Force Sample Survey	Annual average of quarterly estimates	Data refer to persons aged 15 and over.	Persons	Around 24 000 households, i.e., approx 60 000 persons, ie approx 53 000 persons aged 15 and over.	30%	Classification according to LFS questionnaire until 1997 used.
Denmark	Eurostat	European Labour Force Survey	Spring quarter	Data refer to persons aged 15 to 64.				
Finland	Statistics Finland	Labour Force Survey	First quarter	Data refer to persons over 14 year olds.	Person	12 000 / month	14,4%	
France	INSEE	Labour Force Survey		Data refer to persons aged 15 and over.	Households			
Germany	Federal Statistical Office	Labour Force Survey (Microcensus)	22 April - 28 April 2002	Data refer to persons aged 15 and over.	Households	0,45% of households	4 percent for Questions on Educational Attainment.	
Greece	National Statistical Services of Greece	Labour Force Survey	2nd quarter	Total population of private households.	Households		5% of the total surveyed households	Households are selected and all non-visiting adults aged 15-64 are interviewed
Hungary	Hungarian Central Statistical Office	Labour Force Survey	Annual averages of quarterly estimates	Data refer to persons aged 15-74.	Households	Around 32 500 households, i.e., approx 88 000 persons, ie approx 66 000 persons aged 15-74	12-13 %	Conscripts are not included.
Iceland	Statistics Iceland	Icelandic Labour Force Survey	The annual data are averages of bi-annual (April and November) estimates	All resident persons aged 16 to 74 years.	Individuals	4 200	12%	
Ireland	Central Statistics Office	Beginning 4th quarter 1997, a new Quarterly National Household Survey (QNHS) was implemented replacing the annual Labour Force Survey (LFS)	The QNHS is a continuous survey. Results are compiled for seasonal quarters - ie quarter two refers to March, April and May	Data refer to persons aged 15 and over.	Households	Nationwide sample of about 3 000 households every week		
Israel	Israel's Central Bureau of Statistics	Labour Force Survey	Annual average for 2002.	Permanent residents aged 15+.	Households	Approx. 22,500 households.	11.30%	
Italy	ISTAT	Household Labour Force Survey	The data refers to the 2nd quarter of each year (2nd week of April)	Data refer to persons aged 15 and over.				The questionnaire has changed in 1997
Japan	Statistics Bureau, Ministry of Public Management, Home Affairs, Posts and Telecommunications	The Labour Force Survey detailed tabulation	Average of 2002	Data refer to persons aged 15 and over.	Households			The special Survey of the Labour Force Survey was integrated into the Labour Force Survey in January 2002.
Korea	National Statistical Office	Monthly Economically Active Population Survey	Annual average of monthly estimates	Data refer to persons aged 15 and over.	Households	Approx. 33,000 households.		Members of the armed forces, prisoners and foreigners are excluded.
Luxembourg	Eurostat	European Labour Force Survey	Spring quarter	Data refer to persons aged 15 to 64.				
Mexico	Secretaría del Trabajo y Previsión Social (STPS)	Encuesta Nacional de Empleo (ENE)	Biennial survey since 1991, yearly since 1995	The survey covers civilian resident population aged 12 years and over excluding armed forces.	Households	In odd years the survey is representative for state, what increases the sample significantly.	Around 15%	
Netherlands	Centraal Bureau voor de Statistiek, Statistics Netherlands	Labour Force Survey						
New Zealand	Statistics New-Zealand	Household Labour Force Survey	The annual data are averages of quarterly estimates	Data refer to civilian non-institutionalised persons aged 15 and over.	Households	15000 Households per quarter	8,50%	
Norway	Statistik Sentralbyraa	Labour Force Survey						
Poland	Główny Urząd Statystyczny	Labour Force Survey	The data are averages of published quarterly figures	Data refer to persons aged 15 and over.	Households	About 22 000 households.		
Portugal								
Slovak Republic	Statistical Office of the Slovak Republic	Labour Force Sample Survey	Annual average of quarterly estimates	Data refer to persons aged 15 and over.	Households	Around 10 250 households, i.e., approx 29 300 persons, ie approx 25 000 persons aged 15+	7,7%	Classifications according to LFS questionnaire until 1999 and from 2000 used
Spain	Instituto Nacional de Estadística	Active Population Survey (quarterly)	Yearly average	Data refer to persons aged 16 and over.	Enumeration area	62 607 households (Average year 2002)	8,42% (average year 2002)	Part of the non-response is treated. Final rate of non-response: 6,29% (average year 2002).
Sweden	Statistiska Centralbyran	Labour Force Survey	The annual average	Data refer to persons aged 16-64.	Individuals	21 300	15,9%	
Switzerland	OF8	Labour Force Survey	The annual data refer to the second quarter (April-June)	Data refer to persons aged 15 and over.	Persons within households	41 000		The reference person within the household is selected randomly. All data refer only to the reference person (no proxy data).
Turkey	State Institute of Statistics (SIS)	Household Labour Force Survey	Semi-annual survey since October 1988 Annual average of April and October	Data refer to persons aged 15 and over.	Households	15 000 Household in each survey.	10% (1 500 Households in each survey)	
United Kingdom	ONS	Labour Force Survey	Spring Labour Force Survey	Data refer to persons aged 16 and over.				
United States	Census Bureau and Bureau of Labour Statistics	March Current Population Survey (CPS)	The annual data are averages of monthly estimates	Data refer to persons aged 16 and over.				

The attainment profiles are based on the percentage of the population aged 25 to 64 years that has completed a specified level of education. The International Standard Classification of Education (ISCED-97) is used to define the levels of education.

Description of ISCED-97 education programmes and attainment levels and their mappings for each country:

Table 2 : Standardised ISCED-97 presentation of national codes on attainment in LFS (2002)¹

	Pre-primary and primary education	Lower secondary education	Upper secondary education				Post-secondary non-tertiary education	Tertiary education			Advanced research programmes
	ISCED 0/1	ISCED 2	ISCED 3C Short	ISCED 3C Long	ISCED 3B	ISCED 3A	ISCED 4	ISCED 5B	ISCED 5A	ISCED 5A/6	ISCED 6
Australia		0/1/2, 2B/2C			3B	3A, 3A/4		5B	5A	5A/6	
Austria		0/1/2			3B	3A	4A, 4B	5B	5A		
Belgium	0/1	2		3C		3A	4	5B	5A		6
Canada	0/1	2				3	4	5B	5A	5A/6	
Czech Republic	0/1	2		3CL		3AB/4				5AB/6	
Denmark (ELFS)	1	2		3CL		3A	4	5B	5A		6
Finland		0/1/2				3	4	5B	5A		6
France	0, 1	2A, 2B	3CS	3CL	3B	3A	4A, 4	5B, 5AI	5A	5A/6	
Germany	1	2A			3B	3A	4	5B	5A		6
Greece	0/1	2	3C	3CL	3B	3A	4C	5B	5A		6
Hungary	1	2		3C		3A	4A	5B	5A		6
Iceland	0/1	2A, 2C	3CS			3A	4C	5B	5A		6
Ireland	0, 1	2				3/3A/3C	4C	5B		5A/6	
Italy	0/1	2	3CS	3CL		3A/3B	4C		5A/5B		6
Japan		OECD estim. from 0/1/2/3				OECD estim. from 0/1/2/3				5B	5A/6
Korea	0/1	2				3A		5B	5A	5A/6	
Luxembourg (ELFS)	1	2	3CS	3CL	3B	3A,3	4	5B	5A		6
Mexico	0, 1	2, 2/3A		3CL				5B		5A/6	
Netherlands	0, 1, 1A, 1B, 1C	2, 2A, 2B, 2C		3C		3A,3	4A,4B,4C	5B	5, 5A		6
New Zealand		0, 1		3CL		3A	4C	5B	5A	5A/6	
Norway	0, 1A	2A		3C		3A	4A, 4C	5B	5A		6
Poland		1/2	3CS			3A	4B			5B/5A/6	
Portugal	0/1	2				3		5B	5A		6
Slovak Republic	0, 1	2		3C		3A		5B	5A		6
Spain	0, 1	2A, 2C	3C		3B	3A	4C	5B	5A		6
Sweden	1	2				3A, 3		4/5B	5A	5A/6	
Switzerland	0/1	2A	3CS	3CL	3B	3A	4	5B	5A		6
Turkey	0, 1	2			3B	3A				5A/6	
United Kingdom	0/1	2	3C, 3CS	3C, 3CL		3A		5B	5A		6
United States	0/1	2				3		5B, 5AI	5A		6
Israël	0	1/2				3A/3C		5B	5A		6

1. The cells of this table indicate, for each country, the national programme categories that are included in the international levels of education indicated by the column headings. The national codes received do not reflect always perfectly all the national educational system possibilities.

Note: ISCED 5AI (tertiary-type A, intermediate degree).

Source: national reports (data 2002, data collection 2003, Education at a Glance 2004)

The calculation of the average number of year in formal education is based upon the weighted theoretical duration of schooling to achieve a given level of education, according to the current duration of educational programmes as reported in the UOE data collection. Hence, it is more an estimate of the “replacement value” of the current human capital than an estimate of the average duration of studies effectively attended by the population in the past.

■ **Notes on specific countries**

Japan : The Special Survey of the Labour Force Survey, which had been the source of the Questionnaire III, was abolished, and the Labour Force Survey is used as a source of the Questionnaire III from 2002 data.

The questionnaire of the Labour Force Survey ask the people about their education and select appropriate answer from the following.

- Primary school, junior high school or senior high school (Isced 1/2/3)
- Junior college (Isced 5B)
- College or university, including graduate school (Isced 5A)

Therefore, the data are not distributed by Isced0/1/2 and 3.

The distribution between the 0/1/2 and 3/4 levels of education for 2002 is based on 2001 one.

United Kingdom : Others qualifications which are currently assigned to ISCED3 are assigned as follows 10% to ISCED97 3A (V), 35% to ISCED97 3CL (V 3+), 55% to ISCED97 3CS (V <3 years).

■ **Table A1.2**

Methodology

The data on projections are based on the UN database and not on the UOE data collection; therefore, it is not possible to reproduce the figures from the UOE data collection. Data on the percentage of 5 to 14-, 15 to 19- and 20 to 29-year-olds in the total population refer to 2001/2002 and are based on the UOE data collection and the World Education Indicators Project. The changes in the sizes of the respective populations over the period 1992 to 2012 are expressed as percentages relative to the size of the population in 2002 (index = 100). The statistics cover residents in the country, regardless of citizenship and of educational or labour market status. These projections derive from the UN Population Database.

INDICATOR A2: Current upper secondary graduation rates and educational attainment of the adult population

■ **Table A2.1**

Methodology

In order to calculate gross graduation rates, countries identified the age at which graduation typically occurs. The graduates themselves, however, could be of any age. To estimate gross graduation rates, the number of graduates is divided by the population at the typical graduation age (Annex 1). In many countries, defining a typical age of graduation is difficult because ages of graduates vary. Typical ages of graduation are shown in Annex 1.

The *unduplicated count of all ISCED 3 graduates* gives the number of persons who graduate in the reference period from any ISCED 3 programme **for the first time**, i.e., students who have not obtained an ISCED 3 (A, B or C) qualification in **previous** reference periods. For example, students who graduated from ISCED 3A programmes in the period of reference but obtained a short ISCED 3C graduation in an earlier year should (correctly) be reported as ISCED 3A graduates, but must be excluded from the unduplicated count of graduates in column 2 of Table C2.2. Similar cases may occur in the reporting of vocational and general programmes.

■ **Notes on specific countries**

Australia: The growth in the number of foreign students in Australia is definitely a contributing factor in the rise in this indicator over the past few years.

Luxembourg: A significant proportion of the youth cohort study in neighbouring countries at the ISCED 3 level.

Spain: The length of secondary programmes was recently extended, therefore upper secondary graduation rates are lower in 2001.

Turkey: Open education faculties are excluded.

■ **Table A2.2**

Methodology

Data on population and educational attainment are taken from OECD and EUROSTAT databases, which are compiled from National Labour Force Surveys.

For sources and classification programmes, please see notes of table A1.1.

■ **Table A2.3**

Methodology

Please see notes of Table A2.1.

INDICATOR A3: Current tertiary graduation and survival rates and educational attainment of the adult population

■ **Table A3.1**

Methodology

• **Calculation of the country mean for medium and long tertiary-type A programmes**

Countries which included the graduates of medium tertiary-type A programmes among the graduates of long programmes (*x*-code for short programmes) are counted as zero in the calculation of the country mean for medium programmes. In a similar manner, the countries using an *x*-code for long programmes, caused by inclusion of long programmes in the category for short programmes, are counted as zero in the country average for long programmes. This is necessary in order to ensure that the country averages for short programmes and long programmes add up to the correct country average for all first-stage university programmes.

• **Duration categories**

Tertiary-type A programmes can be sub-classified by the theoretical cumulative duration of programmes. For initial programmes at tertiary level, the cumulative theoretical duration is simply the theoretical full-time equivalent duration of those programmes from the beginning of Level 5. For second programmes, cumulative duration is calculated by adding the minimum entrance requirements of the programme (*i.e.*, full-time equivalent years of prerequisite tertiary education) to the full-time equivalent duration of the programme. For degrees or qualifications where the full-time equivalent duration is unknown (*i.e.*, courses of study designed explicitly for flexible or part-time study), cumulative duration is calculated on the basis of the duration of more traditional degree or qualification programmes with a similar level of educational content. The following duration categories are included in ISCED-97:

- Short: 2 to less than 3 years.
- Medium: 3 to less than 5 years.
- Long: 5 to 6 years.

- Very long: more than 6 years.

As “short” programmes would not meet the minimum duration requirement for classification at ISCED 5A, this category is only appropriate for intermediate programmes in the national qualification and degree structure (see below). That is, programmes of less than three years’ duration must be a component or a stage of a longer programme in order to be classified at level 5A. Individuals who complete these short programmes would not be counted as 5A graduates, however.

Typical ages of graduation are shown in Annex 1.

■ Notes on specific countries

Czech Republic: All Bachelor's programmes are now classified as ISCED5A (according to Czech law), hence the increase of ISCED 5A graduates.

Finland: Due to a structural change in tertiary educational system in Finland ISCED 5B programmes (vocational college) are being phased out. At the same time the volume of polytechnic education (ISCED 5A) has been increased, hence the increase of ISCED 5A graduates.

Iceland: There is an increase in the number of ISCED 5A graduates mainly due to reclassification of certain education programmes from ISCED 5B to 5A.

Ireland: The graduation rates at ISCED 5A for Ireland, as published in EAG 2002, included those students with second qualifications at this level (e.g. Masters).

Luxembourg: A significant proportion of the youth cohort study in neighbouring countries at the ISCED 5 and 6 levels.

Classification of tertiary programmes: Australia

ISCED5A	
First	"Bachelor's" (Honours) (4yr); Bachelor of Dentistry (5yr); Bachelor of Veterinary Medicine and Surgery (5yr); Bachelor of Medicine and Surgery (7yr)
Second	Graduate Diplomas (1.5yr); Master's Degree (2yr); Doctorate (by course work) (2yr)
ISCED 5B	
First	Vocational Education and Training Institutions - Diplomas, Advanced Diplomas (2yr); Universities – Undergraduate Diplomas (2 yr); Associate Degree (2 yr)
Second	a
ISCED 6	
	Doctorates (3yr)

■ **Classification of tertiary programmes: Austria**

ISCED 5A	
First	University „Bakkalaureat“ (3yr); University “Fachhochschulstudium – Magister (FH)/ Diplomingenieur (FH)“ (4yr); University “Magister/ Diplomingenieur/ Doktor (1 st)” (4-6yr)
Second	University “Magisterstudium – Magister/ Diplomingenieur” (2yr); Post-graduate studies “MBA, MAS” (2yr)
ISCED 5B	
First	Master craftsmen/ foremen courses “Meisterprüfung/ Werkmeisterprüfung” (2yr); Technical and vocational education colleges “Diplomprüfung”(2yr); Post-secondary colleges for teacher training / medical services/ social work “Lehramtsprüfung/ Diplom”(3yr);Vocationally oriented studies at university “Kurzstudium – akademisch geprüfter...” (3yr);
Second	Post-secondary colleges for teacher training “Aufbaustudium – Lehramtsprüfung” (1yr)
ISCED 6	Doctorate “Doktor”(2yr)

■ **Classification of tertiary programmes: Czech Republic**

ISCED 5A	
First	Bachelor University study “bakalář (umění)” (3yr & 3-4yr); Teacher training for primary education Master’s “Magistr” (4yr) University Master of Arts/ Engineering/ Architecture “magistr umeni/ inženýr (architekt)” (5-6yr); University Master's in (Veterinary) Medicine “doktor (veterinární) medicíny” (6yr)
Second	Post-graduate Pedagogical Certificate “osvědčení” (1yr); Post-graduate Certificate “osvědčení”(2yr); University Master of Arts/ Engineering/ Business “magistr umeni/ inženýr”(2-3yr)
ISCED 5B	
First	Higher Technical School for technicians, hotel managers, bank clerks, nurses “Vyšší odborná škola” (2-2.5yr and 3-3.5 yr); Performing Arts and Dance Conservatoire Certificate on Maturita or Absolutorium “vysvědčení o maturitní zkoušce”(6 yr & 8 yr)
Second	a
ISCED 6	University Doctoral Study “Doktor” 3yr

■ **Classification of tertiary programmes: Denmark**

ISCED 5A	
First	Tertiary education medium cycle “Diplomingeniør, maskin- mester, sygeplejerske, folke- skolelærer m.fl.” (3-5yr); Bachelor’s Degree (3yr)
Second	Tertiary education long cycle “Cand. Mag., cand. Scient., cand. Polyt., etc” (2yr); Tertiary education long cycle, museum conservator, e.g. from Music Academy “Konservator, konservatorieuddannelserne” (5-7yr)
ISCED 5B	
First	Tertiary education short cycle, including technician qualification “Datamatiker/ byggetekniker/ Maskintekniker” (2-3yr)
Second	a
ISCED 6	Doctoral Programmes “Ph.D.” (3yr); Doctorate “Doktorgrad” (5-10yr)

■ **Classification of tertiary programmes: Finland**

ISCED 5A	
First	Lower University Programmes 3yr; Polytechnic Programmes 3.5-4.5yr; Higher University Programmes 5-6yr
Second	Specialists in Medicine/Dentistry/Veterinary Science 5-6yr
ISCED 5B	
First	Vocational College Programmes 2-3yr
Second	a
ISCED 6	Doctorate Programmes – “Licentiate” 2yr; Doctorate Programmes – “Doctor” 4yr

■ **Classification of tertiary programmes: France**

ISCED 5A	
First	First University Diploma (First cycle 2 years “DEUG” + Second cycle 1 year “Licence”) (3yr); Higher engineering school diploma “Diplôme d’ingénieur” (3-4yr); Higher business school diploma “Diplôme d’ingénieur commercial” (3yr); Specialised Higher Schools diverse professional diplomas including in architecture, veterinary surgery, art etc “Diplômes professionnels divers (notaire, architecte, vétérinaire, journaliste,...)” (3-4yr); University pharmacy diploma “Diplôme de pharmacien” (5yr); University Diploma in Medicine/ Dentistry “Docteur en médecine/ Diplôme de dentiste” (7yr)
Second	University education 2 nd cycle 2 year “Maîtrise” (1yr); Teaching in university institute of training Master (IUFM) “CAPES, Professeur des écoles, etc” (2yr); Special diploma in Health “Diplôme d’études spécialisées” (3yr)
Third	University education 3 rd cycle “Diplôme d’études supérieures spécialisées (DESS) » (1yr)
ISCED 5B	
First	Specific vocational training diploma “Diplôme universitaire de technologie (DUT) » (2yr) ; Specialised higher school short professional diploma e.g. in special education, laboratory technician, social worker “Diplômes professionnels divers (éducateur spécialisé, laborantin, assistante sociale, etc.) » (2-3yr); High-level technician award (school or school and work-based) “Brevet de technicien supérieur (BTS)” (2yr)
Second	
ISCED 6	University education 3 rd cycle 1st year “Diplôme d’études approfondies (DEA)” (1yr); Doctorate Programmes “Diplôme de docteur” (3yr)

■ **Classification of tertiary programmes: Germany**

ISCED 5A	
First	University “Fachhochschulen” degree “Diplom (FH)” (4yr); University „Univeritäten” degree “Diplom oder Staatsprüfung” (5yr)
Second	a
ISCED 5B	
First	Specialised academies (Bavaria) “Abschluss der Fachakademie/ Fachhochschulreife” (2yr); Health sector schools for assistants/ nurses “Abschlusszeugnis für medizinische Assistenten, Krankenschwestern/ -pfleger” (3yr); Trade and technical schools “Fachschulabschluss, Meister/Techniker, Erzieher” (2yr & 3-4yr); Colleges of public administration diploma „Diplom (FH)” (3yr);
Second	a
ISCED 6	Doctoral studies “Promotion” (2-5yr)

■ **Classification of tertiary programmes: Iceland**

ISCED 5A	
First	First University Degree “Háskólanám 3ja/ 4ra/ 5/ 6 ára til fyrstu gráðu” (3yr, 4yr, 5yr or 6yr); Tertiary Technical Programmes - First University Degree “Háskólanám í tæknifræði til fyrstu gráðu” (3.5-4yr);
Second	Master’s degree after 3-4yr 1 st degree “Háskólanám, 1,5-2 viðbótarár ofan á 3-4 ár, tekin viðbótargráða” (1.5-2yr); Master's degree after 5-6yr 1 st degree “Háskólanám, 2 viðbótarár ofan á 5-6 ár, tekin viðbótargráða” (2yr)
ISCED 5B	
First	Tertiary Diploma “Æðra nám í 2 ár án háskólagráðu” (2 yr or 3 yr); Fine and Applied Arts at Tertiary Level “Listnám í æðri skóla, 3ja/ 4ra ára” (3yr or 4yr); Teacher's Qualification (No degree) “Nám til kennsluréttinda án háskólagráðu” (1yr)
Second	a
ISCED 6	Doctoral Programme (Ph.D.) “Doktorsnám” (4yr)

■ **Classification of tertiary programmes: Ireland**

ISCED 5A	
First	Bachelor's Degree (3-4yr); Bachelor's Degree in (Veterinary) Medicine/ Dental Science/ Architecture (5-6yr)
Second	Post-graduate Diploma (1yr); Master's Degree (taught) (1yr); Master's Degree (by research) (2yr)
ISCED 5B	
First	Technical certificate "NCEA/ HETTAC/ IoT" (2yr); National Diploma in Police Studies (2yr); Cadetship (Army, Air Corps and Naval Service Training) "Diploma in Military Studies" (1.75yr)
Second	Technical Diploma "NCEA/ HETAC/ IoT" (3yr)
ISCED 6	Doctorate "Ph.D." (3yr)

■ **Classification of tertiary programmes: Italy**

ISCED 5A	
First	University Degree "Diploma di Laurea" (4-6yr); University Degree "Diploma Universitario" (3yr)
Second	Professional Post-graduate Diploma "Diploma di specializzazione" 2-5yrs; Post-graduate Certificate "Attestato di partecipazione al Corso di perfezionamento" (1yr)
ISCED 5B	
First	Diploma from Fine-arts Academy "Diploma di Accademia di Belle Arti" (4yr); Dramatic Art Studies Diploma "Accademia di arte drammatica – Diploma di attore o diploma di regista" (3yr); Higher Artistic Studies Diploma "Diploma di Istituto Superiore Industrie Artistiche" (4yr); Sport Studies Diploma "Istituto superiore di educazione fisica" (3yr); Music Conservatory Diploma "Conservatorio musicale (specializzazione di 2 anni)" (2yr); Dance Studies Diploma "Accademia di Danza – Diploma di avviamento e/o perfezionamento" (3yr)
Second	a
ISCED 6	Doctorate "Titolo di Dottore di ricerca" (3yr)

■ **Classification of tertiary programmes: Japan**

ISCED 5A	
First	Bachelor's Degree "Gakushi"(4yr); Bachelor's Degree in Medicine/Dentistry/Veterinary Medicine "Gakushi" (6yr);
Second	Master's Degree "Shushi" (2yr); University Advanced Course Certificate of Completion "Daigaku Senkoka" (1yr+)
ISCED 5B	
First	Specialised Training College Postsecondary Course Technical Associate Qualification "Senmonshi" (1yr+); Junior College Associate Qualification "Jun-gakushi" (2-3yrs); College of Technology Associate Qualification "Jun-gakushi" (2yr);
Second	Junior College Advanced Qualification "Tanki-daigaku Senkoka" (1+yr); College of Technology Advanced Qualification "Koto-senmon-gakko Senkoka" (1+yr);
ISCED 6	Doctor's Degree "Hakushi" (5yr); Doctor's Degree in Medicine/Dentistry/Veterinary Medicine "Hakushi" (4yr)

■ **Classification of tertiary programmes: New Zealand**

ISCED 5A	
First	Bachelor's Degree "Bachelor, National Diploma (Level 7)" (3yr)
Second	Post-graduate qualification "Master's Degree/ Post-graduate Certificate/ Post-graduate Diploma/ Bachelor's Honours" (1-2yr)
ISCED 5B	
First	Vocational Diploma "National Diplomas (Levels 5 or 6)" (3yr)
Second	a
ISCED 6	Doctorate/ Higher Doctorate (3-5yr)

■ **Classification of tertiary programmes: Poland**

ISCED 5A	
First	Professional degree (Licentiate) "Licencjat" (3yr); Professional Degree (Engineer) "Inzynier" (3.5-4yr); Master's Degree (Art/ Education/ Engineering/ Veterinary Medicine, etc) "Magister" (5-5.5yr); Degree in Medicine or Dental Science "Lekarz (Stomatolog)" (6yr)
Second	Post-licentiate Master's Degree "Magister" (1.5-2yr); Post-graduate Certificate "Studia Podyplomowe" (0.5-2yr)
ISCED 5B	
First	Teacher Training Diploma for pre-school, primary and other educational institutions "Kolegium nauczycielskie" (3yr); Foreign Language Teacher Training Diploma/ Qualification to teach foreign European languages "Nauczycielskie kolegium języków obcych" (3yr)
Second	a
ISCED 6	Scientific Doctorate "Studia Doktoranckie"(4yr)

■ **Classification of tertiary programmes: Slovak Republic**

ISCED 5A	
First	"Bachelor's" Degree 3-4yr; "Master's" Degree 4 yr; "Master's" Degree in Engineering 5-5.5yr; Degree in Engineering/Architecture/Medicine/Veterinary Medicine 6yr
Second	Supplementary Educational Study - "Certificate" 2yr; Teaching an Additional Subject - "Diploma" 2-4yr
ISCED 5B	
First	Post-secondary Specialisation Study - "Graduate's Diploma" 2-3yr; Higher Professional Studies - "Graduate's Diploma" 3yr; Dance Conservatory - "Graduate's Diploma" and "Certificate on Maturita Examination" 8yr; Conservatory and Secondary Schools Specialising in Arts - "Graduate's Diploma" and "Certificate on Maturita Examination" 6yr
Second	
ISCED 6	Examina Rigorosa - "Academic Degree (JUDr., PaedDr., RNDr., PhDr., etc)" usually 1yr; Doctorate Study (Ph.D., ArtD.) 3yr

■ **Classification of tertiary programmes: Spain**

ISCED 5A	
First	Bachelor's Degree "Diplomado Universitario, Arquitecto Técnico e Ingeniero Técnico" (3yr); Conservation and Restoration of Cultural Assets "Conservación y Restauración de Bienes Culturales" (3yr); University Degree - First and Second Cycle "Licenciado, Arquitecto e Ingeniero" (4-6yr); Higher Dramatic Art Studies Degree "Título Superior de Arte Dramático" (4yr); Music Studies Advanced Degree "Titulación Superior por especialidad musical" (4yr); Military Programme - Medium Grade "Militar de carrera de la escala media (Diplomado Universitario)" (3yr); Military Programme - Higher Grade "Militar de carrera de la escala superior (Licenciado universitario)" (5yr)
Second	Master's Degree "Licenciado e Ingeniero" (2yr)
ISCED 5B	
First	Specific Vocational Training of Plastic Arts and Design - Advanced Level Qualification "Técnico Superior - Ciclos Formativos de Artes Plásticas y Diseño de Grado Superior" (2yr); Specific Vocational Training - Advanced Level Qualification "Técnico Superior - Ciclos Formativos de Formación Profesional de Grado Superior" (2yr); Specific Vocational Training - Advanced Level (Distance Learning) "Técnico Superior - Ciclos Formativos de Formación Profesional de Grado Superior (Distancia)" (2yr); Military Programme Basic Grade "Militar de carrera de la escala básica" (2yr);
Second	a
ISCED 6	Doctorate "Doctor" (4-6yr)

■ **Classification of tertiary programmes: Sweden**

ISCED 5A	
First	Diploma (2-4yr); Bachelor's Degree (3yr); Master's Degree (4yr); Bachelor's Degree in Pharmacy/ Horticulture/ Forestry/ Landscape Architecture/ Medicine/ Psychology/ Dentistry/ Veterinary Medicine (5-5.5yr)
Second	Nursing Specialisation Qualification (1-1.25yr); Midwifery/ Psychotherapy/ Special Education (1.5yr)
ISCED 5B	
First	Diploma in Engineering (Lower Level) (2yr); Diploma in Dance and The Arts (2yr); Degree Certificate in Advanced Vocational Education (2-3yr)
Second	
ISCED 6	"Licentiate" 2yr; "Doctorate" 4yr (including "Licentiate")

■ **Classification of tertiary programmes: Switzerland**

ISCED 5A	
First	<p>Pedagogical University Certificate « Pädagogische Hochschule/ Haute École Spécialisée Pédagogique » (3yr);</p> <p>University of Applied Science Diploma “Fachhochschul diplom/ diploma” (3yr);</p> <p>University Diploma and Bachelor's Degree “Hochschulen - Lizentiat, Diplom, Staatsexamen” (4yr)</p>
Second	<p>Postgraduate Degree “Fachhochschul Nachdiplom” (1yr); University Postgraduate Diploma “Nachdiplom/ Diplôme du troisième cycle/ Postgrade” (1yr)</p>
ISCED 5B	
First	<p>Diploma of Higher Vocational Education - Stage I "Berufsprüfung/ Examen professionnel" (1-2yr);</p> <p>Diploma of Technical School "Höhere Fach- und Berufsschule/ École technique" (2yr); Teacher's Certificate - Teacher Training II "Primarlehrerpatent/ Fachlehrerpatent" (3yr);</p> <p>Polytechnic School Diploma from a Higher Vocational College “Höhere Fachschule/ École Professionnelle Supérieure/ Scuola Professionale Superiore” (3yr)</p>
Second	<p>Trade Master's Diploma or equivalent in Higher Vocational Education - Stage II “Höhere Fachprüfung/ Examen Professionnel Supérieur” (1-2yr)</p>
ISCED 6	
	<p>University Doctorate “Doktorat/ Ph.D.” (2yr)</p>

■ **Classification of tertiary programmes: United Kingdom**

ISCED 5A	
First	<p>Bachelor's Degree “BA, BSc, etc” (3-4yr); Bachelor of Education “BEd” (4yr); Bachelor of Medicine “MB” (5yr+)</p>
Second	<p>Master's Degree taught “MA, MSc, MBA, etc” (1yr); "Postgraduate Diploma/Certificate “PG Dip/PG Cert” (9m); Teaching Qualification - Postgraduate Certificate in Education “PGCE” (1yr); Master's Degree by Research “Mphil, etc” (2yr+)</p>
ISCED 5B	
First	<p>Higher National Certificate “HNC” (1yr); Diploma of Higher Education “DipHE” (2yr); Higher National Diploma “HND” (2yr)</p>
Second	a
ISCED 6	
	<p>Doctor of Philosophy “Ph.D.” (3yr+)</p>

■ **Table A3.2**

■ **Notes on specific countries**

Australia and the United States: The survival rates calculated using the standard OECD methodology are significantly higher than those calculated in national studies.

Belgium (Flemish Community): Social advancement education is not included.

France: Does not include all tertiary graduates included in Table A3.1, only those where new entrants data are available.

United Kingdom: Excludes foreign students.

■ **Table A3.3**

Methodology

Data on population and educational attainment are taken from OECD and EUROSTAT databases, which are compiled from National Labour Force Surveys.

For sources and classification programmes, please see notes of table A1.1.

■ **Table A3.4**

■ **General notes**

Historical data on educational attainment are only available for the three major levels of education:

Less than upper secondary education -- 0/1/2 (ISCED 97 equivalent levels)

Upper secondary and some postsecondary education -- 3/4 (ISCED 97 equivalent levels)

Tertiary non-university and university -- 5/6 (5A/5B/6 ISCED 97 equivalent levels)

Before 1997, educational attainment levels were coded according to international mapping ISCED 76. The ISCED 76 levels have been translated into ISCED 97 levels.

Sources

National Labour Force Surveys except for Belgium (1997-1999), Denmark (1998-2001); Luxembourg (1998-2001) and the Netherlands (1998-1999) for which data come from European Labour Force Survey.

■ **Notes on specific countries :**

Czech Republic : from 1994 to 1996, distributions are adjusted considering the 1997 distribution.

Denmark : There is a break in the time series between 1994 and 1995. There has been a revision of the Danish ISCED97 implementation. The revision is due to reforms of the education system. As a result of these reforms most medium-cycle higher education programmes (with a duration of at least 3 years) have been moved from ISCED 5B to ISCED 5A. Furthermore, the majority of short-cycle higher education programmes are now classified as ISCED 5B. The ISCED mapping has been revised.

Ireland : Data provided for the period 1999-2002 are revised figures.

Portugal : From 1991 to 1996, the distribution of the “unknown” category has been adjusted on the basis of the known distribution.

Sweden : There is a break in the time series between 2000 and 2001. This is a result of new data sources and improved information about immigrants.

Switzerland : New mapping in 2001.

United States : For 1991, the distribution is adjusted on the basis of the 1992 distribution.

INDICATOR A4: Graduates by field of study

Classification

The fields of education used follow the revised ISCED classification by field of education. For definitions and instructions refer to the ISCED Classification (UNESCO, 1997). The classification is in accordance with the fields of training defined in the *Fields of Training – Manual* (EUROSTAT, 1999).

INDICATORS A5-A9

Some of the indicators are derived from the IEA Trends in Reading Literacy Study or from Progress in Reading Literacy Study (indicators A5, A6 and A9).

Indicators A6-A9 are mainly derived from the PISA 2000 assessment of knowledge and skills, undertaken by the OECD in 2000. For further information see also *Knowledge and Skills for Life – First results from PISA 2000* (OECD, 2001).

1) The PIRLS IEA' Reading Literacy Studies:

The publication, database and all information concerning PIRLS' studies can be found at the following address:

www.pirls.com

■ 2) The PISA concept of “yield” and the definition of the PISA target population

PISA 2000 provides an assessment of the cumulative yield of education and learning at a point at which most young adults are still enrolled in initial education.

A major challenge for an international survey is to operationalise such a concept in ways that guarantee the international comparability of national target populations.

Differences between countries in the nature and extent of pre-primary education and care, the age of entry to formal schooling, and the institutional structure of educational systems do not allow the definition of internationally comparable grade levels of schooling. Consequently, international comparisons of educational performance typically define their populations with reference to a target age. Some previous international assessments have defined their target population on the basis of the grade level that provide maximum coverage of a particular age cohort. A disadvantage of this approach is that slight variations in the age distribution of students across grade levels often lead to the selection of different target grades in different countries, or between education systems within countries, raising serious questions about the comparability of results across, and at times within, countries. In addition, because not all students of the desired age are usually represented in grade-based samples, there may be a more serious potential bias in the results if the unrepresented students are typically enrolled in the next higher grade in some countries and the next lower grade in others. This would exclude students with potentially higher levels of performance in the former countries and students with potentially lower levels of performance in the latter.

In order to address this problem, PISA uses an age-based definition for its target population, *i.e.* a definition that is not tied to the institutional structures of national education systems: PISA assessed students who were aged between 15 years and 3 (complete) months and 16 years and 2 (complete) months at the beginning of the assessment period and who were enrolled in an educational institution, regardless of the grade levels or type of institution in which they were enrolled, and regardless of whether they were in full-time or part-time education (15-year-olds enrolled in Grade 6 or lower were excluded from PISA but, among the countries participating in PISA 2000, such students only exist in significant numbers in Brazil). Educational institutions are generally referred to as *schools* in this publication, although some educational institutions (in particular some types of vocational education establishments) may not be termed schools in certain countries. As expected from this definition, the average age of students across OECD countries was 15 years and 8 months years, a value which varied by less than 0.2 years between participating countries).

As a result of this population definition, PISA 2000 makes statements about the knowledge and skills of a group of individuals who were born within a comparable reference period, but who may have undergone different educational experiences both within and outside schools. In PISA, these knowledge and skills are referred to as the *yield* of education at an age that is common across countries. Depending on countries' policies on school entry and promotion, these students may be

distributed over a narrower or a wider range of grades. Furthermore, in some countries, students in PISA's target population are split between different education systems, tracks or streams.

If a country's scale scores in reading, scientific or mathematical literacy are significantly higher than those in another country, it cannot automatically be inferred that the schools or particular parts of the education system in the first country are more effective than those in the second. However, one can legitimately conclude that the cumulative impact of learning experiences in the first country, starting in early childhood and up to the age of 15 and embracing experiences both in school and at home, have resulted in higher outcomes in the literacy domains that PISA measures.

The PISA target population did not include residents attending schools in a foreign country.

To accommodate countries that desired grade-based results for the purpose of national analyses, PISA 2000 provided an international option to supplement age-based sampling with grade-based sampling.

■ Population coverage

All countries attempted to maximise the coverage of 15-year-olds enrolled in education in their national samples, including students enrolled in special educational institutions. As a result, PISA 2000 reached standards of population coverage that are unprecedented in international surveys of this kind (for more information please refer to *Knowledge and Skills for Life, First Results from the OECD programme for International Student Assessment (PISA), 2000*).

The sampling standards used in PISA permitted countries to exclude up to a total of 5 per cent of the relevant population either by excluding schools or by excluding students within schools. All but three countries achieved the required coverage of at least 95 per cent of the national desired target population, and half of countries achieved 98 per cent or more. The ceiling for population exclusions of 5 per cent ensures that potential bias resulting from exclusions is likely to remain within one standard error of sampling.

Exclusions within the above limits include:

- *At the school level: i) schools which were geographically inaccessible or where the administration of the PISA assessment was not considered feasible; and ii) schools that provided teaching only for students in the categories defined under "within-school exclusions", such as schools for the blind. The percentage of 15-year-olds enrolled in such schools had to be less than 2.5 per cent of the nationally desired target population. The magnitude, nature and justification of school-level exclusions is documented in the PISA 2000 Technical Report.*
- *At the student level: i) students who were considered in the professional opinion of the school principal or of other qualified staff members, to be educable mentally retarded or who had been defined as such through psychological tests (including students who were emotionally or mentally unable to follow the general instructions given in PISA); ii) students who were permanently and physically disabled in such a way that they could not perform in the PISA assessment situation (functionally disabled students who could respond were to be included in the assessment); and iii) non-native language speakers with less than one year of instruction in the language of the assessment. Students could not be excluded solely because of normal discipline problems. The percentage of 15-year-*

olds excluded within schools had to be less than 2.5 per cent of the *nationally desired target population*.

Table 4: The PISA target populations and samples

Country	Population and sample information										Coverage indices				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Total population of 15-year-olds	Total enrolled population of 15-year-olds	Total in national desired target population	School-level exclusions	Total in national desired target population after school exclusions and before within-school exclusions	Percentage of school-level exclusions	Number of participating students	Weighted number of participating students	Number of excluded students	Weighted number of excluded students	Within-school exclusion rate (%)	Overall exclusion rate (%)	Coverage Index 1: Coverage of national desired population	Coverage Index 2: Coverage of national enrolled population	Coverage Index 3: Coverage of 15-year-old population
	SF 2[e]	SF 2[b]	SF 3[e]	SF 3[b]	SF 3[c]	3[b]/3[e]	P	P	E	E/(P+E)			$P/(P+E) \cdot (3[c]/3[e])$	$P/(P+E) \cdot (3[c]/2[b])$	$P/2[e]$
Albania	58 720	25 080	25 080	94	24 986	0,37	4 980	23 773	1	6	0,02	0,40	1,00	1,00	0,40
Argentina	662 014	505 404	505 404	5 736	499 668	1,13	3 983	512 687	23	2 424	0,47	1,60	0,98	0,98	0,77
Australia	266 878	248 908	248 738	2 850	245 888	1,15	5 176	229 152	63	2 688	1,16	2,29	0,98	0,98	0,86
Austria	95 041	90 354	90 354	32	90 322	0,04	4 745	71 547	41	500	0,69	0,73	0,99	0,99	0,75
Belgium	121 121	119 055	118 972	1 091	117 881	0,92	6 670	110 085	100	1 596	1,43	2,33	0,98	0,98	0,91
Brazil	3 464 330	1 841 843	765 502	6 633	1 830 603	0,36	4 893	2 402 280	14	7 842	0,33	0,69	0,99	0,99	0,69
Bulgaria	96 000	92 200	92 200	1 200	91 000	1,30	4 650	87 781	33	394	0,45	1,74	0,98	0,98	0,91
Canada	403 803	396 423	391 788	2 035	389 990	0,52	29 687	348 481	1 584	16 197	4,44	4,94	0,95	0,94	0,86
Chile	263 863	230 538	229 757	3 738	226 019	1,63	4 889	216 305	9	616	0,28	1,91	0,98	0,98	0,82
Czech Republic	134 627	132 508	132 508	2 181	130 327	1,65	5 365	125 639	13	297	0,24	1,88	0,98	0,98	0,93
Denmark	53 693	52 161	52 161	345	51 816	0,66	4 235	47 786	119	1 195	2,44	3,08	0,97	0,97	0,89
Finland	66 571	66 561	66 319	550	65 769	0,83	4 864	62 826	58	673	1,06	1,88	0,98	0,98	0,94
France	788 387	788 387	750 460	17 728	732 732	2,36	4 673	730 494	59	8 208	1,11	3,45	0,97	0,92	0,93
Germany	927 473	924 549	924 549	5 423	919 126	0,59	5 073	826 816	60	9 163	1,10	1,68	0,98	0,98	0,89
Greece	128 175	124 656	124 187	200	123 987	0,16	3 644	111 363	21	682	0,61	0,77	0,99	0,99	0,87
Hong Kong - China ¹	80 000	77 567	77 567	1 408	76 159	1,82	4 405	69 967	0	0	0,00	1,82	0,98	0,98	0,87
Hungary	120 759	115 325	115 325	0	115 325	0,00	4 887	107 460	34	765	0,71	0,71	0,99	0,99	0,89
Iceland	4 062	4 044	4 044	18	4 026	0,45	3 372	3 869	79	79	2,01	2,44	0,98	0,98	0,95
Indonesia ²	4 558 817	3 247 422	3 102 630	7 611	3 095 019	0,25	7 368	1 796 969	0	0	0,00	0,25	1,00	0,95	0,39
Ireland	65 339	64 370	63 572	1 021	62 551	1,61	3 854	56 209	134	1 734	2,99	4,55	0,95	0,94	0,86
Israel ³	128 913	108 784	108 784	1 441	107 343	1,32	4 498	78 507	130	1 623	2,03	3,32	0,97	0,97	0,61
Italy	584 417	574 864	574 864	775	574 089	0,13	4 984	510 792	117	12 247	2,34	2,47	0,98	0,98	0,87
Japan	149 000,00	148 526,90	145 929,60	34 124,00	142 517,20	2,34	5256,00	144 659,95	0,00	0,00	0,00	2,34	0,98	0,96	0,97

Table 4: The PISA target populations and samples (cont'd)

Country	Population and sample information										Coverage indices				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Total population of 15-year-olds	Total enrolled population of 15-year-olds	Total in national desired target population	School-level exclusions	Total in national desired target population after school exclusions and before within-school exclusions	Percentage of school-level exclusions	Number of participating students	Weighted number of participating students	Number of excluded students	Weighted number of excluded students	Within-school exclusion rate (%)	Overall exclusion rate (%)	Coverage Index 1: Coverage of national desired population	Coverage Index 2: Coverage of national enrolled population	Coverage Index 3: Coverage of 15-year-old population
	SF 2[a]	SF 2[b]	SF 3[a]	SF 3[b]	SF 3[c]	3[b]/3[a]	P	P	E	E/(P-E)	E/(P-E)	P/(P-E)	P/(P-E) * (3[c]/3[a])	P/(P-E) * (3[e]/2[b])	P/2[a]
Korea	712 812	602 605	602 605	1 820	600 785	0.30	4 982	579 109	6	826	0.14	0.44	1.00	1.00	0.81
Latvia	38 000	35 981	35 981	886	35 095	2.46	3 920	30 063	62	402	1.32	3.75	0.96	0.96	0.78
Liechtenstein	415	326	326	326	0	0.00	314	325	2	2	0.61	0.61	0.99	0.99	0.91
Luxembourg	4 556	4 556	4 556	416	4 140	9.13	3 528	4 138	0	0	0.00	9.13	0.91	0.91	0.91
Macedonia	33 420	20 312	20 166	218	19 948	1.08	4 511	20 001	0	0	0.00	1.08	0.99	0.99	0.60
Mexico	2 127 504	1 098 605	1 073 317	0	1 073 317	0.00	4 600	960 011	2	564	0.06	0.06	1.00	1.00	0.45
New Zealand	54 220	51 464	51 464	976	50 488	1.90	3 667	46 757	137	1 590	3.29	5.12	0.95	0.95	0.86
Norway	52 165	51 587	51 474	420	51 054	0.82	4 147	49 579	93	944	1.87	2.67	0.97	0.97	0.95
Peru ⁴	546 601	358 780	355 422	12 244	343 178	3.44	4 429	274 185	9	775	0.28	3.72	0.96	0.95	0.50
Poland ⁵	665 500	643 528	643 528	56 524	587 004	8.78	3 654	542 005	53	5 484	1.00	9.70	0.90	0.90	0.81
Portugal	132 325	127 165	127 165	0	127 165	0.00	4 585	99 988	122	2 777	2.70	2.70	0.97	0.97	0.76
Russian Federation	2 268 566	2 259 985	2 259 985	10 867	2 249 118	0.48	6 701	1 968 131	22	4 960	0.25	0.73	0.99	0.99	0.82
Spain	462 082	451 685	451 685	2 180	449 505	0.48	6 214	399 055	153	8 988	2.21	2.68	0.97	0.97	0.86
Sweden	100 940	100 940	100 940	1 360	99 580	1.35	4 416	94 338	174	3 349	3.43	4.73	0.95	0.95	0.93
Switzerland	81 350	79 232	79 232	954	78 278	1.20	6 100	72 010	62	822	1.13	2.32	0.98	0.98	0.89
Thailand ⁶	968 760	765 502	765 502	7 655	757 847	1.00	5 340	525 912	0	0	0.00	1.00	0.99	0.99	0.54
United Kingdom	731 743	705 875	705 875	17 674	688 201	2.50	9 340	643 041	219	15 990	2.43	4.87	0.95	0.95	0.88
United States	3 876 000	3 836 000	3 836 000	0	3 836 000	0.00	3 846	3 121 874	211	132 543	4.07	4.07	0.96	0.96	0.81
Netherlands ⁶	178 924	178 924	178 924	7 800	171 124	4.36	2 503	157 327	1	23	0.01	4.37	0.96	0.96	0.88

1. The reported figure for Hong Kong, China concerning the total population of 15-year-olds was 80000-90000, so 80000 was used above.
2. Indonesia seems to have a high drop out rate among the older half of this age cohort. Additionally, the S value is inflated because of the poor frame enrollment measures of size. Indices using this value should be ignored.

3. Israel sent updated numbers for 15-year-olds in 2002 (103,207) which, after applying ratios based on their sampling form information, arrives at a 3[c] value that is much closer to their P+E value. Additionally, Israel did classroom sampling in a few schools.

4. Peru included grades 4 and below in sf2[b] and then took them off in exclusions. This was revised to that above. Additionally, Peru's (P+E)/S is a bit low but this is explained by the high drop out rate for this age group through the school year.

5. Thailand did not list all students in some of the largest schools. They also tested some students who were 1 month too old.

6. Response rate is too low to ensure comparability (see Annex A3). For details see the PISA 2000 Technical Report (OECD, 2002a).

Table 4 describes the target population of the countries participating in PISA 2000. Further information on the target population and the implementation of PISA sampling standards can be found in the *PISA 2000 Technical Report*.

- **Column 1** shows the total number of 15-year-olds according to 2000 national population registers.
- **Column 2** shows the number of 15-year-olds enrolled in schools (as defined above), which is referred to as the *eligible population*.
- **Column 3** shows the national desired target population. As part of the school-level exclusions, countries were allowed to exclude up to 0.5 per cent of students *a priori* from the eligible population, essentially for practical reasons. The following a priori exclusions exceed this limit but were agreed with the PISA Consortium: **Canada** excluded 1.17 per cent of the eligible population, of which 0.73 per cent accounted for schools on Federal Indian reservations and 0.43 per cent were in the Yukon, Northwest, and Nunuvuk territories. In the case of France, the eligible population included students in the Territoires d’Outre-Mer, but because countries were not required to assess students in outlying territories not subject to the national education systems, it was permissible to exclude these students. French students in outlying *départements* were, as required, included in PISA 2000. **Ireland** excluded 1.61 per cent of the eligible population. This covered 1.15 per cent of students enrolled in schools not aided by the Department of Education and Science, 0.36 per cent in very small schools, and 0.12 per cent in “designated disadvantaged schools”. **Japan** excluded 4.0 per cent of the eligible population, of which 1.7 per cent were students educated by mail and students in “other small streams (Bekka, Koto-senmon-gakko)”, and 2.3 per cent were in part-time education (“Teiji-sei”). **Mexico** excluded 2.3 per cent of its eligible population in geographically remote schools. Among the non-OECD countries, **Brazil** excluded 15-year-olds enrolled in grades 1 to 6 which accounted for 16 per cent of 15-year-olds enrolled in Brazil. This exclusion was legitimate because such students are not part of the PISA target population. Subtracting the students excluded *a priori* from the eligible population results in the national desired target population in Column 3.
- **Column 4** shows the number of students enrolled in schools that were excluded from the national desired target population.
- **Column 5** shows the size of the national desired target population after subtracting the students enrolled in excluded schools. This is obtained by subtracting Column 4 from Column 3.
- **Column 6** shows the percentage of students enrolled in excluded schools. This is obtained by dividing Column 4 by Column 3.
- **Column 7** shows the *number of students participating in PISA 2000*. Note that this number does not account for 15-year-olds assessed as part of additional national options. These national options account for an additional 82105 15-year-old students across all countries.
- **Column 8** shows the *weighted number of participating students, i.e.*, the number of students in the nationally defined target population that the PISA sample represents.

- Each country attempted to maximise the coverage of PISA’s target population within the sampled schools. In the case of each sampled school, all eligible students, namely those 15 years of age, regardless of grade, were first listed. Sampled students who were to be excluded had still to be included in the sampling documentation, and a list drawn up stating the reason for their exclusion. **Column 9** indicates the number of *excluded students*, *i.e.* students who fell into one of the categories specified above. **Column 10** indicates the *weighted number of excluded students*, *i.e.*, the overall number of students in the nationally defined target population represented by the number of students excluded from the sample.
- **Column 11** shows the *percentage of students excluded within schools*. This is calculated as the weighted number of excluded students (Column 10) divided by the weighted number of excluded and participating students (Column 8 plus Column 10).
- **Column 12** shows the *overall exclusion rate* which represents the weighted percentage of the national desired target population excluded from PISA either through school-level exclusions or through the exclusion of students within schools. It is obtained by multiplying the percentage of school-level exclusions (Column 6) by 100, minus the percentage of students excluded within schools (Column 11) and adding the percentage of students excluded within schools (Column 11) to the result.
- **Column 13** presents an *index of the extent to which the national desired target population is covered by the PISA sample*. The index is expressed in per cent of the national desired target population covered. Luxembourg, Poland and Brazil are the only countries in which less than 95 per cent of the population that PISA seeks to cover is represented by the PISA samples. In the case of **Poland**, the exclusion rate is 10 per cent. This includes the 6.7 per cent of 15-year-olds enrolled in primary schools. The performance of these students in the PISA assessments can be expected to be lower than the performance of 15-year-olds in secondary schools, and this exclusion may imply that the performance of Polish students on the combined reading literacy scale is overestimated by two rank-order positions and on the scientific literacy scale by about three rank-order positions. No rank-order shifts are expected on the mathematical literacy scale. **Luxembourg** has an exclusion rate of 9.1 per cent, due largely to students instructed in languages other than the languages of assessment in Luxembourg. Permissible exclusions included 28 students with special needs; 297 students attending the European School; 32 students attending the American International School; 45 students attending other schools not under the authority of the Ministry of Education; and 14 students attending small schools. It is not expected that the exclusions in Luxembourg overestimate its rank-order position on the PISA scales. Among non-OECD countries, in **Brazil**, the school-level exclusion rate is 18 per cent but much of this is explained by 15-year-olds enrolled in Grade 5 and 6 who do not belong to the PISA target population. No rank order shifts are expected of the exclusions in Brazil. For further information see the *PISA 2000 Technical Report*.
- **Column 14** presents an *index of the extent to which 15-year-olds enrolled in schools are covered by the PISA sample*. The index measures the overall proportion of the national enrolled population that is covered by the non-excluded portion of the student sample. The index takes into account both school-level and student-level exclusions. Values close to 100 indicate that the PISA sample represents the entire education system as defined for PISA 2000. The index is the weighted number of participating students (Column 9) divided by the weighted number of participating and excluded students (Columns 9 plus Column 11), times the nationally defined target population (Column 5) divided by the national desired target population (times 100).

■ Sampling procedures and response rates

The accuracy of any survey results depends on the quality of the information on which national samples are based as well as on the sampling procedures. Quality standards, procedures, instruments and verification mechanisms were developed for PISA that ensured that national samples yielded comparable data and that the results could be compared with confidence.

Most PISA samples were designed as two-stage stratified samples (where countries applied different sampling designs, these are documented in the *PISA 2000 Technical Report*). The first stage consisted of sampling individual schools in which 15-year-old students were enrolled. Schools were sampled systematically with probabilities proportional to size, the measure of size being a function of the estimated number of eligible (15-year-old) students enrolled. A minimum of 150 schools were selected in each country (where this number existed), although the requirements for national analyses often required a somewhat larger sample. As the schools were sampled, replacement schools were simultaneously identified, in case a sampled school chose not to participate in PISA 2000.

In the case of **Iceland**, **Liechtenstein** and **Luxembourg**, all schools and all eligible students within schools were included in the sample. However, since not all students in the PISA samples were assessed in mathematical and scientific literacy, these national samples represent a complete census only in respect of the assessment of reading literacy, and a partial census of the assessment of mathematical and scientific literacy.

Experts from the PISA Consortium monitored the sample selection process in each participating country.

The second stage of the selection process sampled students within sampled schools. Once schools were selected, a list of each sampled school's 15-year-old students was prepared. From this list, 35 students were then selected with equal probability (all 15-year-old students were selected if fewer than 35 were enrolled).

Data quality standards in PISA required minimum participation rates for schools as well as for students. These standards were established to minimise the potential for response biases. In the case of countries meeting these standards, it is likely that any bias resulting from non-response will be negligible, *i.e.* typically smaller than the sampling error.

A minimum response rate of 85 per cent was required for the schools initially selected. Where the initial response rate of schools was between 65 and 85 per cent, however, an acceptable school response rate could still be achieved through the use of replacement schools. This procedure brought with it a risk of increased response bias. Participating countries were, therefore, encouraged to persuade as many of the schools in the original sample as possible to participate. Schools with a student participation rate between 25 and 50 per cent were not regarded as participating schools, but data from these schools were included in the database and contributed to the various estimations. Data from schools with a student participation rate of less than 25 per cent were excluded from the database.

PISA 2000 also required a minimum participation rate of 80 per cent of students within participating schools (original sample and replacement). This minimum participation rate had to be met at the national level, not necessarily by each participating school. Make-up sessions were required in schools in which too few students had participated in the original assessment sessions. Student participation

rates were calculated over all participating schools, whether original sample or replacement schools, and from the participation of students in both the original assessment and any make-up sessions. A student who did not participate in the first assessment session was not regarded as a participant but was included in the international database and contributed to the statistics presented in this publication if he or she participated in the second assessment session and provided at least a description of his or her father's or mother's occupation.

Table 5 shows the response rates for students and schools, before and after replacement.

For the Netherlands, the response rate was too low to give confidence that the sample results reflect those for the national population reliably, with the level of accuracy and precision required for PISA 2000. Mean performance scores for the Netherlands can therefore not be compared with those from other countries. Where the performance of sub-groups is shown, only the relative differences in performance between the relevant sub-groups within the Netherlands should be considered, and the sub-group means should not be compared with those from other countries. Assuming negligible to moderate levels of bias due to non-response, the rank-order position of the Netherlands may be expected, with 95 per cent confidence, to lie between 2nd and 14th among countries on the combined reading literacy scale, between 1st and 4th on the mathematical literacy scale, and between 3rd and 14th on the scientific literacy scale.

Table 5 : Response rates

Country	Initial sample - before school replacement			Final sample - after school replacement			Final sample - students within schools after school replacement				
	(1) Weighted school participation rate before replacement (%)	(2) Number of responding schools (weighted by enrolment)	(3) Number of schools sampled (responding and non-responding) (weighted by enrolment)	(4) Weighted school participation rate after replacement (%)	(5) Number of responding schools (weighted by enrolment)	(6) Number of schools sampled (responding and non-responding) (weighted by enrolment)	(7) Weighted student participation rate after replacement (%)	(8) Number of students assessed (weighted)	(9) Number of students sampled (assessed and absent) (weighted)	(10) Number of students assessed (unweighted)	(11) Number of students sampled (assessed and absent) (unweighted)
Albania	98,46	25 963	26 369	98,80	26 067	26 383	95,31	22 456	23 562	4 979	5 214
Argentina	86,04	441 434	513 079	87,28	447 824	513 079	89,26	375 701	420 904	3 940	4 450
Australia	80,95	197 639	244 157	93,65	228 668	244 175	84,24	161 607	191 850	5 154	6 173
Austria	99,38	86 062	86 601	100,00	86 601	86 601	91,64	65 562	71 547	4 745	5 164
Belgium	69,12	81 453	117 836	85,52	100 833	117 911	93,30	88 816	95 189	6 648	7 103
Brazil	97,38	2 425 608	2 490 788	97,96	2 439 152	2 489 942	87,15	1 463 000	1 678 789	4 885	5 613
Bulgaria	99,33	87 004	87 589	99,41	87 030	87 546	90,83	79 520	87 545	4 666	5 142
Canada	87,91	335 100	381 165	93,31	355 644	381 161	84,89	276 233	325 386	29 461	33 736
Chile	97,69	220 466	225 685	100,00	225 685	225 685	96,16	209 100	217 452	4 912	5 111
Czech Republic	95,30	123 345	129 422	99,01	128 551	129 841	92,76	115 371	124 372	5 343	5 769
Denmark	83,66	42 027	50 236	94,86	47 689	50 271	91,64	37 171	40 564	4 212	4 592
Finland	96,82	63 783	65 875	100,00	65 875	65 875	92,80	58 303	62 826	4 864	5 237
France	94,66	704 971	744 754	95,23	709 454	744 982	91,19	634 276	695 523	4 657	5 115
Germany	94,71	885 792	935 222	94,71	885 792	935 222	85,65	666 794	778 516	4 983	5 788
Greece	83,91	92 824	110 622	99,77	130 555	130 851	96,83	136 919	141 404	4 672	4 819
Hong Kong - China	66,60	50 992	76 566	92,63	70 926	76 566	91,63	59 418	64 846	4 388	4 797
Hungary	98,67	209 153	211 969	98,67	209 153	211 969	95,31	100 807	105 769	4 883	5 111
Iceland	99,88	4 015	4 020	99,88	4 015	4 020	87,09	3 372	3 872	3 872	3 872
Indonesia	96,23	5 803 095	6 030 135	100,00	6 024 643	6 024 643	94,81	1 703 746	1 796 969	7 368	7 806
Ireland	85,56	53 164	62 138	87,53	54 388	62 138	85,59	42 088	49 172	3 786	4 424
Israel	79,87	79 052	98 972	91,90	90 978	98 999	86,81	59 119	68 105	4 416	5 108
Italy	97,90	550 932	562 763	100,00	562 755	562 755	93,08	475 446	510 792	4 984	5 369
Japan	82,05	1 165 576	1 420 533	90,05	1 279 121	1 420 533	96,34	1 267 367	1 315 462	5 256	5 450
Korea	100,00	589 018	589 018	100,00	589 018	589 018	98,84	572 767	579 470	4 982	5 045
Latvia	82,39	29 354	35 628	88,51	31 560	35 656	90,73	24 403	26 895	3 915	4 305
Liechtenstein	100,00	327	327	100,00	327	327	96,62	314	325	314	325
Luxembourg	93,04	3 852	4 140	93,04	3 852	4 140	89,19	3 434	3 850	3 434	3 850
Macedonia	100,00	20 135	20 135	100,00	20 135	20 135	96,11	19 224	20 001	4 511	4 696
Mexico	92,69	985 745	1 063 524	100,00	1 063 524	1 063 524	93,95	903 100	961 283	4 600	4 882
New Zealand	77,65	39 328	50 645	86,37	43 744	50 645	88,23	35 616	40 369	3 667	4 163
Norway	85,95	43 207	50 271	92,25	46 376	50 271	89,28	40 908	45 821	4 147	4 665
Peru	94,49	348 960	369 310	100,00	369 516	369 516	91,58	261 537	285 595	4 499	4 892
Poland	79,11	432 603	546 842	83,21	455 870	547 847	87,70	393 675	448 904	3 639	4 169
Portugal	95,27	120 521	126 505	95,27	120 521	126 505	86,28	82 395	95 493	4 517	5 232
Russian Federation	98,84	4 445 841	4 498 235	99,29	4 466 335	4 498 235	96,21	1 903 348	1 978 266	6 701	6 981
Spain	95,41	423 900	444 288	100,00	444 288	444 288	91,78	366 301	399 100	6 214	6 764
Sweden	99,96	100 534	100 578	99,96	100 534	100 578	87,96	82 956	94 312	4 416	5 017
Switzerland	91,81	89 208	97 162	95,84	92 888	96 924	95,13	65 677	69 037	6 084	6 389
Thailand	94,82	712 097	751 009	99,97	750 988	751 225	97,19	519 549	534 590	5 340	5 461
United Kingdom	61,27	400 737	654 095	82,14	537 219	654 022	80,97	419 713	518 358	9 250	11 300
United States	56,42	2 013 101	3 567 961	70,33	2 503 666	3 559 661	84,99	1 801 229	2 119 392	3 700	4 320
Netherlands ¹	27,13	49 019	180 697	55,50	100 283	180 697	84,03	72 656	86 462	2 503	2 958

1. Response rate is too low to ensure comparability (see above).

Column 1 shows the *weighted participation rate of schools before replacement*. This is obtained by dividing Column 2 by Column 3. The Netherlands, the United Kingdom and the United States did not meet PISA's requirements for response rates before replacement. In the **United Kingdom**, the initial response rate fell short of the requirements by 3.7 per cent and in the **United States** by 8.6 per cent. Both countries provided extensive evidence to the PISA Consortium that permitted an assessment of the expected performance of non-participating schools. On the basis of this evidence, PISA's Technical Advisory Group determined that the impact of these deviations on the assessment results was negligible. The results from these countries were included in all analyses. The initial response rate for the **Netherlands** was only 27 per cent. As a result, the PISA Consortium initiated supplementary analyses that confirmed that the data from the Netherlands might be sufficiently reliable and could be used in some relational analyses. Despite this conclusion, the response rate was too low to give confidence that the sample results reflect those for the national population reliably, with the level of accuracy and precision required in PISA 2000. Assuming negligible to moderate levels of bias due to non-response, the rank-order position of the Netherlands may be expected, with 95 per cent confidence, to lie between 2nd and 14th among countries on the combined reading literacy scale,

between 1st and 4th on the mathematical literacy scale, and between 3rd and 14th on the scientific literacy scale (for further details see the *PISA 2000 Technical Report*). Mean performance scores for the Netherlands can, therefore, not be compared with those from other countries. In tables where the focus is on the comparison of mean scores, the Netherlands has been excluded. Where the performance of sub-groups is shown, only the relative differences in performance between the relevant sub-groups within the Netherlands should be considered, and the sub-group means should not be compared with those from other countries.

- **Column 2** shows the *weighted number of responding schools before school replacement* (weighted by student enrolment)
- **Column 3** shows the *weighted number of sampled schools before school replacement* (including both responding and nonresponding schools).
- **Column 4** shows the *weighted participation rate of schools after replacement*. This is obtained by dividing Column 5 by Column 6.
- **Column 5** shows the *weighted number of responding schools after school replacement* (weighted by student enrolment).
- **Column 6** shows the *weighted number of schools sampled after school replacement* (including both responding and nonresponding schools).
- **Column 7** shows the *weighted student participation rate after replacement*. This is obtained by dividing Column 8 by Column 9.
- **Column 8** shows the *weighted number of students assessed*.
- **Column 9** shows the *weighted number of students sampled* (including both students that were assessed and students who were absent on the day of the assessment).
- **Column 10** shows the *unweighted number of students assessed*.
- **Column 11** shows the *unweighted number of students sampled* (including both students that were assessed and students who were absent on the day of the assessment).

■ Standard errors, significance tests and multiple comparisons

The statistics in this report represent *estimates* of national performance based on samples of students rather than values that could be calculated if every student in every country had answered every question. Consequently, it is important to have measures of the degree of uncertainty of the estimates. In PISA 2000, each estimate has an associated degree of uncertainty, which is expressed through a *standard error*. The use of *confidence intervals* provides a way to make inferences about the population means and proportions in a manner that reflects the uncertainty associated with the sample estimates. From an observed sample statistic it can, under the assumption of a normal distribution, be inferred that the corresponding population result would lie within the confidence interval in 95 out of 100 replications of the measurement on different samples drawn from the same population.

In many cases, readers are primarily interested in whether a given value in a particular country is different from a second value in the same or another country, *e.g.*, whether females in a country perform better than males in the same country. In the tables and charts used in this report, differences are labelled as *statistically significant* when a difference of that size, or larger, would be observed less than 5 per cent of the time, if there was actually no difference in corresponding population values. Similarly, the risk of reporting as significant if there is, in fact, no correlation between two measures is contained at 5 per cent.

Although the probability that a particular difference will falsely be declared to be statistically significant is low (5 per cent) in each single comparison, the probability of making such an error increases when several comparisons are made simultaneously.

It is possible to make an adjustment for this which reduces to 5 per cent the maximum probability that differences will be falsely declared as statistically significant at least once among all the comparisons that are made. Such an adjustment, based on the Bonferroni method, has been incorporated into the multiple comparison since the likely interest of readers in those contexts is to compare a country's performance with that of all other countries.

For all other tables and charts readers should note that, if there were no real differences on a given measure, then the *multiple comparison* in conjunction with a 5 per cent significance level, would erroneously identify differences on 0.05 times the number of comparisons made, occasions. For example, even though the significance tests applied in PISA for identifying gender differences ensure that, for each country, the likelihood of identifying a gender difference erroneously is less than 5 per cent, a comparison showing differences for 27 countries would, on average, identify 1.4 cases (0.05 times 27) with significant gender differences, even if there were no real gender difference in any of the countries. The same applies for other statistics for which significance tests have been undertaken in this publication, such as correlations and regression coefficients.

■ Development of the PISA assessment instruments

The development of the PISA 2000 assessment instruments was an interactive process between the PISA Consortium, the various expert committees, OECD governments and national experts. A panel of international experts led, in close consultation with participating countries, the identification of the range of skills and competencies that were, in the respective assessment domains, considered to be crucial for an individual's capacity to fully participate in and contribute to a successful modern society. A description of the assessment domains – the assessment framework – was then used by participating countries, and other test development professionals, as they contributed assessment materials.

The Main Study included 37 Reading Units with 141 items (counting different parts of questions as separate items). The stimulus for 14 of these units came from national contributions, the PISA Consortium was the source of the stimulus material for 13 units, and 10 units came from the International Adult Literacy Survey. The Main Study instruments also included 16 Mathematics Units (32 Items) and 14 Science Units (35 Items).

Five item types were used in the PISA assessment instruments:

- **Multiple-choice items:** these items required students to circle a letter to indicate one choice among four or five alternatives, each of which might be a number, a word, a phrase or a sentence. They were scored dichotomously.
- **Complex multiple-choice items:** in these items, the student made a series of choices, usually binary. Students indicated their answer by circling a word or short phrase (for example *yes* or *no*) for each point. These items were scored dichotomously for each choice, yielding the possibility of full or partial credit for the whole item.
- **Closed constructed-response items:** these items required students to construct their own responses, there being a limited range of acceptable answers. Most of these items were scored dichotomously with a few items included in the marking process.
- **Short response items:** as in the closed constructed-response items, students were to provide a brief answer, but there was a wide range of possible answers. These items were hand-marked, thus allowing for dichotomous as well as partial credit.
- **Open constructed-response items:** in these items, students constructed a longer response, allowing for the possibility of a broad range of divergent, individual responses and differing viewpoints. These items usually asked students to relate information or ideas in the stimulus text to their own experience or opinions, with the acceptability depending less on the position taken by the student than on the ability to use what they had read when justifying or explaining that position. Partial credit was often permitted for partially correct or less sophisticated answers, and all of these items were marked by hand.

For further information on the development of the PISA assessment instruments and the PISA assessment design, see the *PISA 2000 Technical Report*.

INDICATOR A10: Labour force participation by level of educational attainment

■ **General notes**

Methodology

Data on population and educational attainment are taken from OECD and EUROSTAT databases, which are compiled from National Labour Force Surveys.

For sources and classification programmes, please see notes of table A1.1.

Definitions

The labour force participation rate for a particular age group is equal to the percentage of individuals in the population of the same age group who are either employed or unemployed, as defined according

to the guidelines of the International Labour Office (ILO). The employment rates used for this indicator are calculated in the same way but for employed only.

The unemployed are defined as individuals who are without work, actively seeking employment and currently available to start work. The employed are defined as those who during the survey reference week: *i*) work for pay (employees) or profit (self-employed and unpaid family workers) for at least one hour, or *ii*) have a job but are temporarily not at work (through injury, illness, holiday, strike or lock-out, educational or training leave, maternity or parental leave, etc.) and have a formal attachment to their job.

INDICATOR A11: The returns to education: Education and earnings

■ **Tables A11.1a, A11.2**

■ **General notes**

Methods and definitions

The total M+F is NOT the average for the Male and Female figures, but a ratio based on the - relative-earnings of the total population M+F. Not only because the levels of earnings between M and F are different but also because the relative proportion of M and F at different levels of attainment (and therefore of earnings) is different the ratio of the total cannot be the average of the ratios.

Upper secondary education (=100) is the basis of comparison for figures reported in tables A11.1a while figures reported in Tables A11.2, A11.2a, A11.2b are compared to upper secondary and post-secondary non tertiary education (=100) for trend data reasons.

■ **Notes on specific countries**

Earnings data for Belgium, Hungary, Portugal and United States exclude part time, part year or seasonal employment. Earnings data for Korea exclude part year or seasonal employment.

Earnings for Belgium are considered after income tax.

The length reference period is week for Australia, Ireland, New Zealand and United Kingdom; month for France, Hungary, Germany, Korea and Portugal; the calendar year for Belgium, Canada, Czech Republic, Denmark, Finland, Italy, Netherlands, Norway, Spain and Sweden; and other 12-month period for Switzerland and United States.

Provided earnings data are expressed in national currencies for Australia, Canada, Czech Republic, Denmark, Italy, New Zealand, Norway, Spain, Sweden, Switzerland, United Kingdom and United States; and in euros for Belgium, Finland and Germany.

Sources

Australia : Survey of Education and Training

Belgium : Labour Force Survey

Canada : Survey of Labour and Income Dynamics (SLID)

Czech Republic : Microcensus
 Denmark : a) Income register (end of 2001); b) Register of edu.attainment (october 2001)
 Finland : The Register-based Employment Statistics
 France : French life force survey
 Germany : German socioeconomic panel study (GSOEP)
 Hungary : Individual Salary and earnings of employee
 Ireland : Living in Ireland Survey
 Italy : Bank of Italy Survey on Household Incomes and Wealth
 Korea : Survey on wage structure
 Netherlands : Structure of Earnings Survey 1997
 New Zealand : Labour Market Statistics
 Norway : Income Statistics for Persons and Families
 Portugal : List of Personnel
 Spain: European Household Panel, Eight wave
 Sweden : National income register
 Switzerland : Labour Force Survey
 United Kingdom : UK Labour Force Survey
 United States : 2003 March Current Population Survey

■ **Table A11.4 to A11.7**

Methodology

Point I. deals with a conceptual framework for the evaluation of returns to education. Point II is a technical definition of the rate of return (ROR). Point III presents the costs and benefits used in the model. Point IV addresses data requirements and the assumptions of the model.

I. Introduction

The rate of return represents a measure of the returns obtained, over time, relative to the cost of the initial investment in education. Rates of return can be measured from the private individual's point of view or from society's point of view. Private rates of return measure the future net economic payoff to an individual of increasing the amount of education undertaken. Social rates of return measure the benefits to society of additional education. The formulae for calculating both types of return are the same, although the costs and benefits included differ between the two.

II. Technical definition of the Internal Rate of Return (IRR)

The internal rate of return calculation is based on the actuarial method of calculating *net present value* (NPV). NPV is a means for comparing the value at a common date of various streams of future costs and benefits. NPV is a traditional criterion for making investment choices in the face of a certain future. It is widely used in such fields as financial management, project selection, and by insurance companies when assessing the schedule of receipts and expenditures.

NPV is calculated as follows:

$$NPV = -\sum_{t=0}^{d-1} C_t/(1+i)^t + \sum_{t=d}^{64-a-d} B_t/(1+i)^t$$

where:

C_t = costs at period t ($t \in 0, d-1$)

B_t = benefits at period t ($t \in d, 64-a-d$)

i : = the discount rate

d : = the duration of studies (in years)

a : = age at the beginning of education/training

64 : = age at the last year of activity in the labour market.

The IRR is the discount rate at which $NPV=0$. In project evaluation, a key criterion for project approval is to accept the project if the IRR is greater than the (opportunity) cost of capital.

III. The composition of costs and benefits

Framework: for a hypothetical 40 year-old individual who decides to invest in training in order to reach a higher level of education, the cost elements are the following:

1. Foregone earnings during the training period
2. Training costs

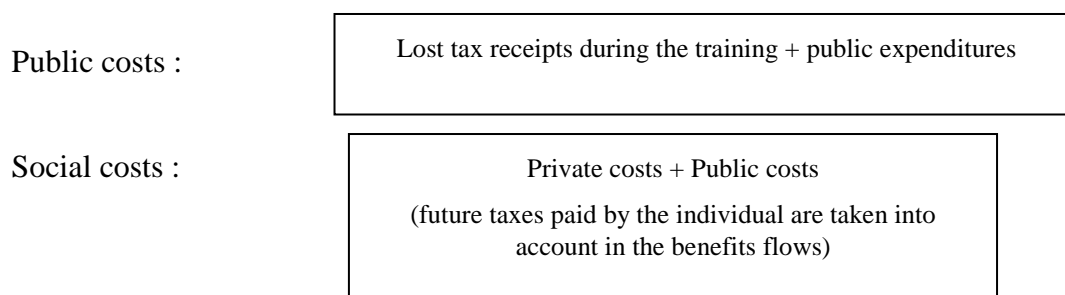
Three forms of educational expenditure are taken into account in the analysis:

- direct public expenditures on education (for infrastructure, teachers' wages, etc.).
 - indirect public expenditures (such as subsidies).
 - direct private expenditures (tuition, other fees, etc.).
3. Additional tax payments resulting from an education-induced increase in taxable income.

These costs can be grouped as follows:

Private costs:

Foregone earnings + direct private expenditures + increased future taxes

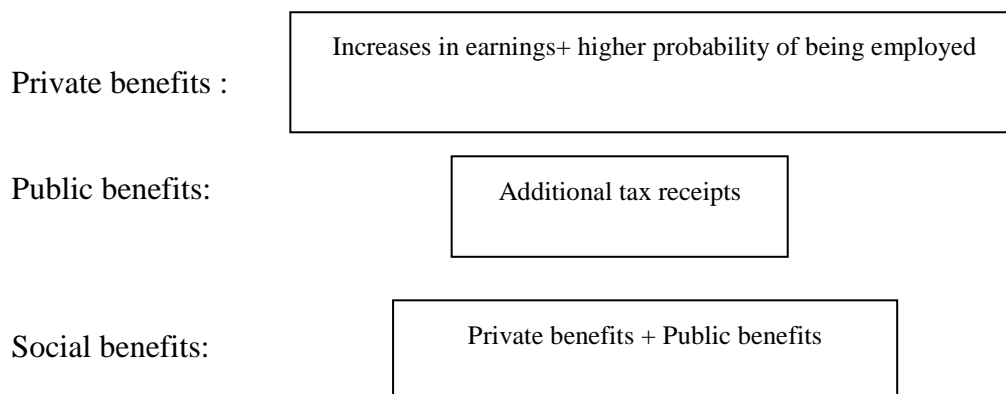


In the calculation of private rates of return private costs are included, and in the calculation of social rates of return social costs are included.

The benefits associated with the same hypothetical 40 year-old individual's decision to invest in training are the following:

1. Increased earnings arising from a higher level of education
2. A higher probability of being employed.
3. For the public sector, additional tax receipts.

These can be grouped as follows:



In calculating the private rates of return private benefits are included. In calculating the social rates of return social benefits are included.

IV. Data and model assumptions

This model calculates IRR from the point of view of the individual and society (social returns are the sum of the net individual and public benefits).

Data:

1. Earnings correspond to annual money earnings (direct payment for labor services provided in local currency (before deduction of income taxes or employee social security contributions). They do not include employer social security contributions, government social transfers, investment income, net increases in the value of an owner-operated business or any other income not directly related to work. The source of these data is Statistics Sweden.
2. Tax rates on earnings are taken from the OECD database.
3. Lifetime earnings streams are estimated from cross-section data. That is, the average annual earnings of today's older population cohorts are taken to represent a reasonable estimate of future average annual earnings. In cross-section data the positive earnings differentials between age cohorts reflect productivity growth due to accumulated work experience. A consequence of approximating cross-sectional data to time-series data is that we omit the impact of technological progress on earnings. This could be particularly important if the data were being analysed by industry or occupational category (which is not the case here).

The assumptions of the model

Assumptions are made on the following:

- The typical starting and ending age by level of education.
- The duration of studies.
- The real long-term interest rate. When this rate increases the NPV decreases. The IRR is compared with this discount rate.
- The growth rate of productivity (to reflect the impact of technological progress on average real annual earnings) is fixed at 1 % per year. It is assumed that the growth rate is the same for all levels of education. Each country should choose a growth rate that reflects its reality of labour productivity growth as well as the productivity growth rate for population cohorts with different levels of education.
- How the model handles the problem of unemployment. Specifically, average annual earnings for a given education cohort are weighted by the probability of being employed (1 minus the unemployment rate).
- The earnings of the individual after the training period are assumed to be 10 % more than at the previous level of education. Earnings increase in a linear fashion over 3 years until reaching parity with those of individuals who had already attained the higher level of education.