Chapter

A

THE OUTPUT OF EDUCATIONAL INSTITUTIONS AND THE IMPACT OF LEARNING

INDICATOR A1: EDUCATIONAL ATTAINMENT OF THE ADULT POPULATION

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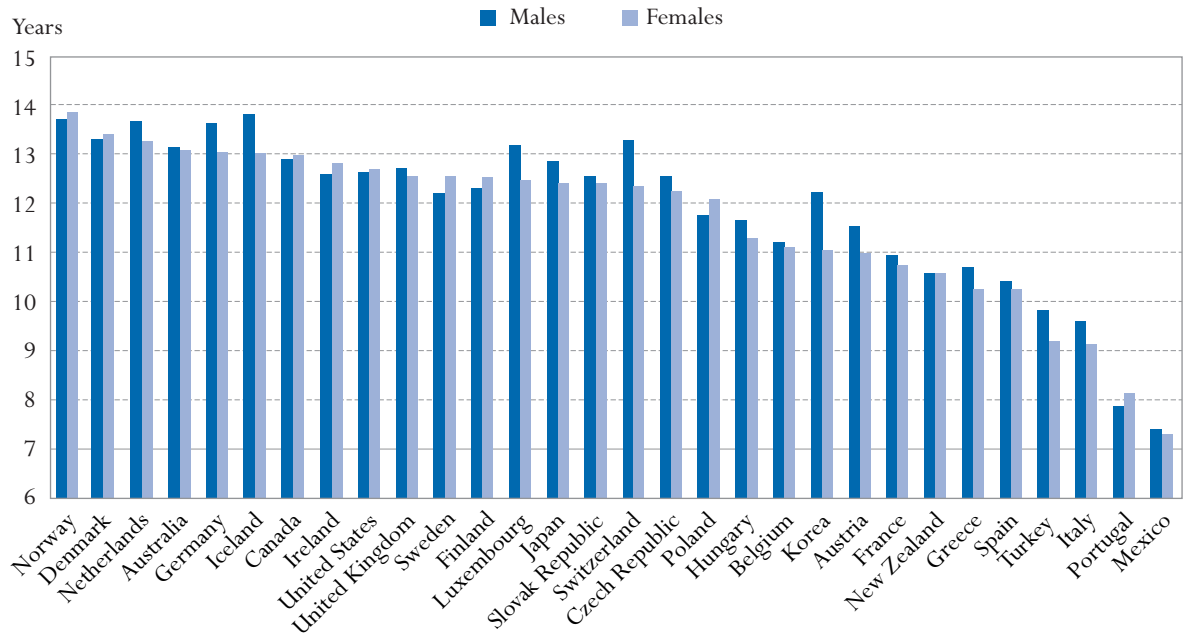
- The average educational attainment of the adult population in OECD countries corresponds to 11.8 years, based on the duration of current formal educational programmes. For the 18 countries ranking above the OECD average, average years of schooling range from 11.8 to 13.8 years. For the remaining 12 countries, the spread is greater, ranging from 7.4 to 11.8 years.
- The sharp decline in youth populations during the 1970s and 1980s has generally slowed; however, population forecasts suggest that the proportion of 5 to 14-year-olds will decline in many OECD countries.

Chart A1.1. Educational attainment of the adult population (2002)

Average number of years in formal education of the 25 to 64-year-old population



Countries are ranked in descending order of the average number of years in formal education of the 25 to 64-year-old female population.
Source: OECD. Tables A1.1a and A1.1b. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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This indicator shows a profile of the educational attainment of the adult population as a proxy for the knowledge and skills available to economies and societies.

Policy context

A well-educated and well-trained population is important for the social and economic well-being of countries and individuals. Education plays a key role in providing individuals with the knowledge, skills and competencies to participate effectively in society and the economy. Education also contributes to an expansion of scientific and cultural knowledge. This indicator shows the distribution of levels of educational attainment in the adult population. It also examines demographic factors shaping the future supply of educational qualifications.

The educational attainment of the adult population can be summarised by the average years of schooling.

The level of educational attainment of the population is a commonly used proxy for the stock of "human capital", that is, the skills available in the population and labour force. Assuming that one year of education is equivalent at all levels, the educational attainment of the adult population can be summarised by the average years of schooling. It must be noted, however, that the calculation is based on the length of current educational programmes and therefore represents an estimate of the "replacement value" of the current human capital rather than an estimate of the actual average duration of studies attained by past populations.

Evidence and explanations

The average educational attainment of the adult population within OECD countries, considered in terms of years of schooling of the current programmes needed to achieve – and replace – a given level of attainment, corresponds to 11.8 years. For the 18 countries ranking above the average, the dispersion is limited within a range of two years, from 11.8 years to 13.8 years. Below the average, for the remaining 12 countries, the spread is much greater, covering more than four years from the lowest duration of 7.4 years to 11.8 years.

In 20 out of the 30 OECD countries, men's level of educational attainment is still higher than women's.

In ten OECD countries the educational attainment of women aged 25 to 64 – measured by the average number of years of schooling – is virtually the same as for men, or even slightly higher; these countries are Canada, Denmark, Finland, Ireland, New Zealand, Norway, Poland, Portugal, Sweden and the United States. In all other OECD countries, the educational attainment of men is higher, sometimes considerably, as in Iceland, Korea, Luxembourg and Switzerland (Chart A1.1).

Countries differ widely in the distribution of educational attainment across their populations.

In 24 out of 30 OECD countries, more than 60% of the population aged 25 to 64 years has completed at least upper secondary education (Chart A1.2). The proportion is equal to or exceeds 85% in the Czech and Slovak Republics, Norway, Switzerland and the United States. In other countries, especially in southern Europe, the education levels of the adult population show a different profile: in Italy, Mexico, Portugal, Spain and Turkey, more than half of the population aged 25 to 64 years has not completed upper secondary education.

The proportion of young people who have attained at least a tertiary qualification has increased.

The more complicated skill requirements of labour markets, an increase in unemployment during recent years and higher expectations by individuals and society have raised the proportion of young people who obtain at least a tertiary qualification.

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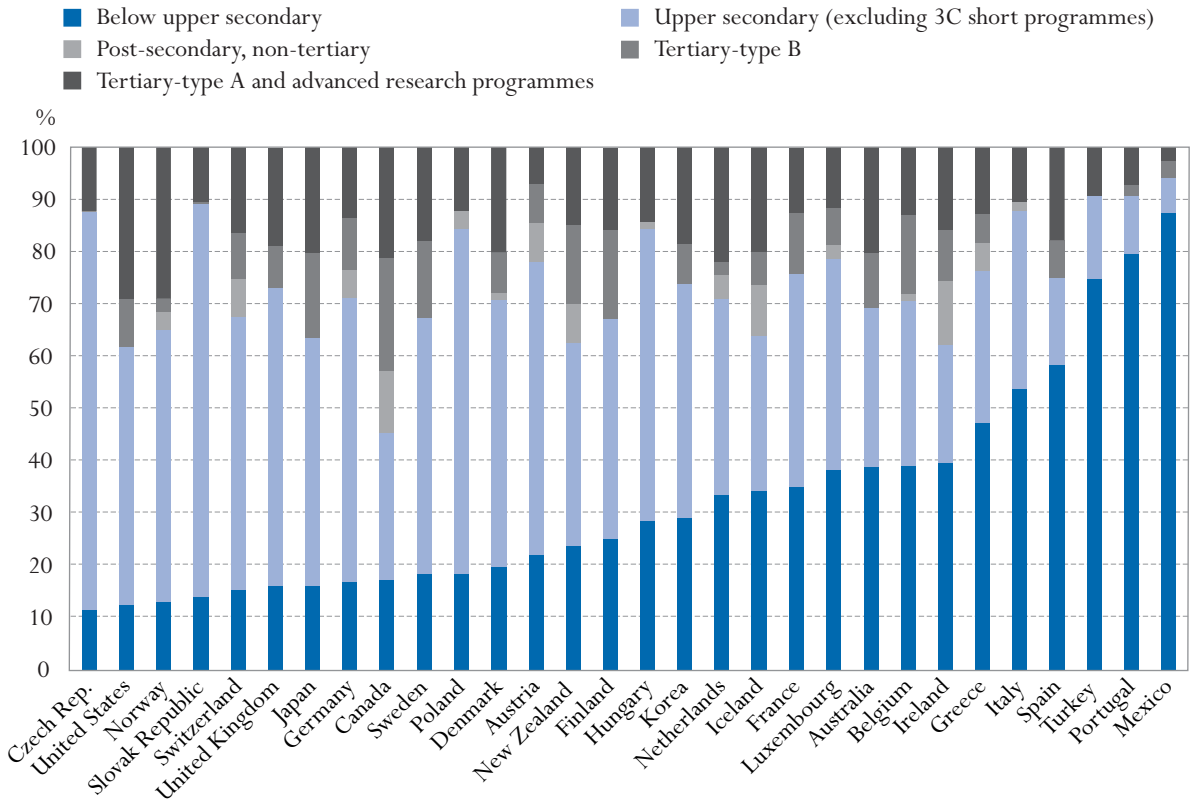
Chart A1.2. Level education attained by the adult population (2002)

Distribution of 25- to 64-year-old population



Countries are ranked in descending order of the 25 to 64-year-olds who have completed at least upper secondary education.
Source: OECD. Tables A1.1. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

Consequently, the proportion of 25 to 64-year-olds in OECD countries who have completed tertiary-type A or advanced research programmes ranges from less than 10% in Austria, Mexico, Portugal and Turkey to 20% or more in Australia, Canada, Denmark, Iceland, Japan, the Netherlands, Norway and the United States. However, certain countries also have a vocational tradition at the tertiary level (tertiary-type B). The proportion of persons who have attained tertiary-type B level is equal to or exceeds 15% in Belgium, Canada, Finland, Japan, New Zealand and Sweden (Table A1.1).

Men have, on average, a higher level of attainment than women.

In 23 out of 30 countries, a larger proportion of men than women aged 25 to 64 years have attained at least upper secondary education. For tertiary-type A and advanced research qualifications, the gap between men and women in the 25 to 64 age group is 5 percentage points or more in favour of men in Belgium, Germany, Japan, Korea, Luxembourg and Switzerland (Tables A1.1a and A1.1b). The opposite is true, to a lesser degree, in Denmark, Hungary, Norway, Poland, Portugal, Spain and Sweden where women have higher educational attainment at this level. Tertiary-type B attainment is highly differentiated among countries:

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more than 6 percentage points in favour of women in Belgium, Canada, Finland, Japan and New Zealand, and more than 3 percentage points in favour of men in Austria, Germany and Switzerland.

Demography as an indicator for the future supply of potential educational qualifications

Differences between countries in the relative size of the youth population have diminished since 1992, but there are still notable contrasts.

The number of young people in a population influences both the rate of renewal of labour-force qualifications and the amount of resources and organisational effort that a country must invest in its education system.

While the proportion of 5 to 14-year-olds as a percentage of the total population varies between 11 and 15% in most OECD countries, the proportion of 20 to 29-year-olds is in general slightly larger (Table A1.2). Although differences among countries in the relative size of the youth population have diminished since 1992, there are still notable contrasts. In Iceland, Ireland, Korea, Mexico, Poland and the Slovak Republic more than 38% of the population is between 5 and 29 years old. In Greece, Italy, Japan, Portugal and Spain only 10% of the population is between the ages of 5 and 14. This is in contrast to Mexico where this figure is 22%.

The sharp decline in youth populations during the 1970s and 1980s has generally slowed; however, population forecasts suggest that the proportion of 5 to 14-year-olds will decline in many OECD countries.

Taking the size of the population in 2002 as the baseline (index = 100), Table A1.2 illustrates how the population in three age bands (roughly corresponding to typical ages of students in primary/lower secondary, upper secondary and tertiary education) is expected to develop over the next decade.

The sharp decline in the population of 5 to 14-year-olds that occurred in many OECD countries during the 1970s and 1980s has generally slowed; however, population forecasts suggest that over the next decade the proportion of 5 to 14-year-olds will continue to decline in many OECD countries. Poland is the only country in which the proportion of 5 to 14-year-olds will decline by more than 25% over the next decade. It is worth noting that in Austria, the Czech Republic, Hungary, the Slovak Republic and Switzerland the decline will exceed 20% (Table A1.2).

A declining youth population tends to be the rule. However, in four out of 30 OECD countries – France, Ireland, Luxembourg and the United States – the number of 5 to 14-year-olds will rise by between 2 and 8% over the period 2002 to 2012.

More variation can be observed in older age groups. In 14 countries the population of 15 to 19-year-olds will increase in the near future. In Denmark, Luxembourg, the Netherlands, New Zealand, Norway, Sweden and the United States, the number of 15 to 19-year-olds is expected to increase by between 8 and 25%, accompanied by an increase in access to upper secondary education (Indicator C1).

Among 20 to 29-year-olds, the typical age band for tertiary education, a decline of more than 20% in the Czech Republic, Greece, Hungary, Italy, Japan, Portugal and Spain will ease the pressure on tertiary spending. In Canada, Germany, New Zealand, Turkey, the United Kingdom and the United States, by contrast,

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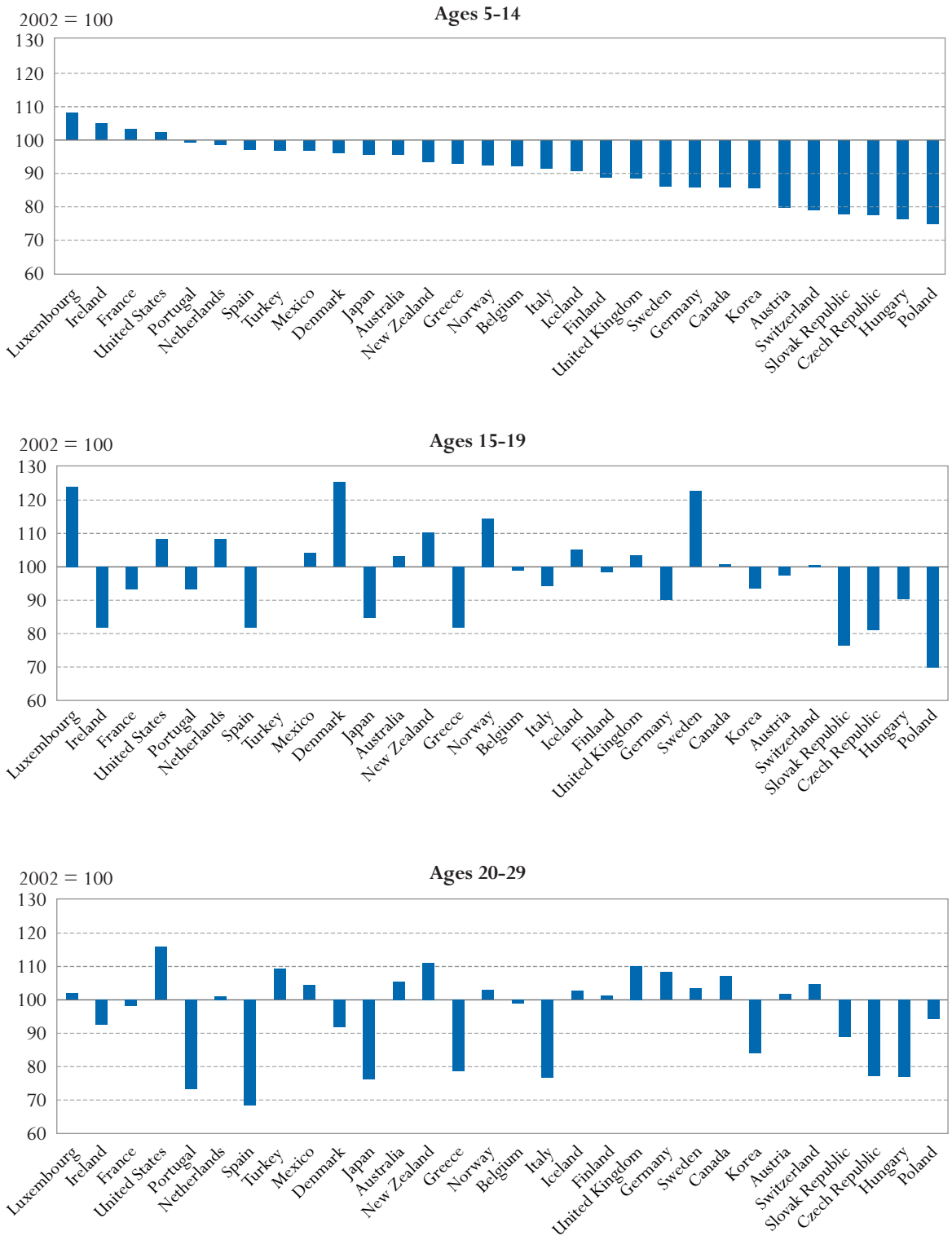
Chart A1.3. Expected demographic changes within the youth population over the next decade (2002-2012)



Countries are ranked in descending order of the change in the size of the 5 to 14-year-old population.
Source: OECD. Table A1.2. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

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the population of 20 to 29-year-olds is expected to increase by between 7 and 16% over the next decade, posing a challenge to tertiary education systems in these countries (Table A1.2).

Definitions and methodologies

Educational attainment data derive from National Labour Force Surveys, and levels are based upon the International Standard Classification of Education (ISCED-97).

Data on population and educational attainment are taken from OECD and EUROSTAT databases, which are compiled from National Labour Force Surveys. See Annex 3 at *www.oecd.org/edu/eag2004* for national sources.

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. See Annex 3 at *www.oecd.org/edu/eag2004* for a description of ISCED-97 education programmes and attainment levels and their mappings for each country.

The calculation of the average number of years 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.

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 1998/1999 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 are derived from the UN Population Database.

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Table A1.1. Educational attainment: adult population (2002)

Distribution of the 25 to 64-year-old population, by highest level of education attained

		Pre-primary and primary education	Lower secondary education	Upper secondary education			Post-secondary non-tertiary education	Tertiary education		All levels of education	Average years of schooling
				ISCED 3C Short	ISCED 3C Long/3B	ISCED 3A		Type B	Type A and advanced research programmes		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
OECD COUNTRIES	Australia	x(2)	39	a	11	19	x(5)	11	20	100	13.1
	Austria	x(2)	22	a	49	7	7	7	7	100	11.3
	Belgium	19	21	a	8	24	1	15	13	100	11.2
	Canada	6	12	a	x(5)	28	12	22	21	100	12.9
	Czech Republic	n	12	x(4)	43	33	x(5)	x(8)	12	100	12.4
	Denmark	n	20	x(2)	46	5	1	8	20	100	13.3
	Finland	x(2)	25	a	a	42	n	17	16	100	12.4
	France	17	18	27	3	10	n	12	12	100	10.9
	Germany	2	15	a	52	3	5	10	13	100	13.4
	Greece	37	10	2	2	25	5	6	13	100	10.5
	Hungary	3	26	a	29	27	2	n	14	100	11.5
	Iceland	2	32	7	a	23	10	6	20	100	13.4
	Ireland	21	18	a	a	23	12	10	16	100	12.7
	Italy	20	33	2	6	26	2	x(8)	10	100	9.4
	Japan	x(2)	16	a	x(5)	47	x(9)	16	20	100	12.6
	Korea	15	15	a	x(5)	45	a	8	18	100	11.7
	Luxembourg	23	15	5	21	14	3	7	12	100	12.9
	Mexico	73	14	a	7	a	a	3	2	100	7.4
	Netherlands	12	22	x(4)	24	13	5	3	22	100	13.5
	New Zealand	x(2)	24	a	21	18	8	15	15	100	10.6
	Norway	n	13	a	40	12	3	3	28	100	13.8
	Poland	x(2)	18	35	a	31	4	x(8)	12	100	11.9
	Portugal	67	13	x(5)	x(5)	11	x(5)	2	7	100	8.0
	Slovak Republic	1	13	x(4)	40	35	x(5)	1	10	100	12.5
	Spain	32	26	n	6	11	n	7	17	100	10.3
	Sweden	8	10	a	x(5)	49	x(7)	15	18	100	12.4
	Switzerland	3	12	2	44	6	7	9	16	100	12.8
	Turkey	65	10	a	6	10	a	x(8)	9	100	9.6
	United Kingdom	n	16	19	22	15	x(9)	8	19	100	12.7
	United States	5	8	x(5)	x(5)	49	x(5)	9	29	100	12.7
	Country mean	***14***	***18***	***3***	***16***	***22***	***3***	***8***	***15***	***100***	***11.8***
PARTNER COUNTRY	Israel	2	17	x(5)	x(5)	38	x(7)	16	26	100	m

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.
Source: OECD. See Annex 3 for a description of ISCED-97 levels and ISCED-97 country mappings *(www.oecd.org/edu/eag2004)*.

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Table A1.1a. Educational attainment: males (2002)

Distribution of the 25 to 64-year-old male population, by highest level of education attained

		Pre-primary and primary education	Lower secondary education	Upper secondary education			Post-secondary non-tertiary education	Tertiary education		All levels of education	Average years of schooling
				ISCED 3C Short	ISCED 3C Long/3B	ISCED 3A		Type B	Type A and advanced research programmes		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
OECD COUNTRIES	Australia	x(2)	33	a	19	19	x(5)	9	20	100	13.2
	Austria	x(2)	16	a	53	7	7	9	8	100	11.5
	Belgium	17	22	a	7	25	1	12	15	100	11.2
	Canada	6	12	a	x(5)	27	15	18	22	100	12.9
	Czech Republic	n	7	x(4)	51	28	x(5)	x(8)	14	100	12.6
	Denmark	n	18	x(2)	49	5	2	9	16	100	13.3
	Finland	x(2)	27	a	a	44	n	14	16	100	12.3
	France	15	18	32	3	9	n	10	13	100	11.0
	Germany	2	11	a	51	3	5	12	16	100	13.6
	Greece	34	12	4	3	23	5	6	14	100	10.7
	Hungary	2	22	a	39	22	2	n	14	100	11.7
	Iceland	1	26	6	a	25	17	5	20	100	13.8
	Ireland	23	19	a	a	21	13	8	16	100	12.6
	Italy	17	36	2	6	27	2	x(8)	10	100	9.6
	Japan	x(2)	17	a	x(5)	45	x(9)	9	30	100	12.9
	Korea	10	13	a	x(5)	46	a	8	24	100	12.2
	Luxembourg	21	13	5	22	14	4	7	14	100	13.2
	Mexico	72	15	a	7	a	a	3	3	100	7.4
	Netherlands	11	19	x(4)	25	14	5	3	24	100	13.7
	New Zealand	x(2)	23	a	27	15	8	11	16	100	10.6
	Norway	n	13	a	43	10	4	3	26	100	13.7
	Poland	x(2)	17	43	a	28	2	x(8)	11	100	11.8
	Portugal	67	14	x(5)	x(5)	12	x(5)	2	6	100	7.9
	Slovak Republic	1	9	x(4)	48	31	x(5)	0	10	100	12.6
	Spain	30	27	n	6	12	n	8	17	100	10.4
	Sweden	9	11	a	x(5)	49	x(7)	14	16	100	12.2
	Switzerland	3	10	1	42	4	7	13	21	100	13.3
	Turkey	59	12	a	8	11	a	x(8)	11	100	9.8
	United Kingdom	n	14	16	25	17	x(9)	8	20	100	12.7
	United States	5	8	x(5)	x(5)	49	x(5)	8	30	100	12.6
	Country mean	***13***	***17***	***4***	***18***	***21***	***3***	***7***	***16***	***100***	***11.9***
PARTNER COUNTRY	Israel	1	19	x(5)	x(5)	40	x(7)	15	25	100	m

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.
Source: OECD. See Annex 3 for a description of ISCED-97 levels and ISCED-97 country mappings *(www.oecd.org/edu/eag2004)*.

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Table A1.1b. Educational attainment: females (2002)

Distribution of the 25 to 64-year-old female population, by highest level of education attained

		Pre-primary and primary education	Lower secondary education	Upper secondary education			Post-secondary non-tertiary education	Tertiary education		All levels of education	Average years of schooling
				ISCED 3C Short	ISCED 3C Long/3B	ISCED 3A		Type B	Type A and advanced research programmes		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
OECD COUNTRIES	Australia	x(2)	45	a	4	19	x(5)	12	20	100	13.1
	Austria	x(2)	28	a	45	7	8	6	6	100	11.0
	Belgium	20	19	a	9	22	1	19	10	100	11.1
	Canada	6	11	a	x(5)	29	9	25	20	100	13.0
	Czech Republic	n	16	x(4)	35	38	x(5)	x(8)	10	100	12.3
	Denmark	n	21	x(2)	42	6	1	7	23	100	13.4
	Finland	x(2)	24	a	a	40	n	20	16	100	12.5
	France	19	19	23	3	11	n	13	12	100	10.7
	Germany	2	19	a	52	3	6	8	11	100	13.1
	Greece	40	9	1	1	27	6	5	12	100	10.3
	Hungary	3	30	a	19	32	1	n	15	100	11.3
	Iceland	3	39	7	a	21	3	7	20	100	13.0
	Ireland	20	17	a	a	24	12	11	16	100	12.8
	Italy	24	31	2	7	25	2	x(8)	10	100	9.2
	Japan	x(2)	16	a	x(5)	50	x(9)	24	11	100	12.4
	Korea	20	17	a	x(5)	43	a	7	13	100	11.1
	Luxembourg	26	17	5	20	15	1	7	9	100	12.5
	Mexico	74	14	a	7	a	a	3	2	100	7.3
	Netherlands	13	24	x(4)	24	12	5	2	20	100	13.3
	New Zealand	x(2)	25	a	14	21	7	19	13	100	10.6
	Norway	1	13	a	37	14	3	2	31	100	13.9
	Poland	x(2)	20	27	a	35	6	x(8)	13	100	12.1
	Portugal	67	11	x(5)	x(5)	11	x(5)	3	8	100	8.1
	Slovak Republic	1	18	x(4)	32	39	x(5)	1	10	100	12.4
	Spain	34	25	n	6	10	n	6	18	100	10.3
	Sweden	7	9	a	x(5)	49	x(7)	16	19	100	12.6
	Switzerland	3	15	4	46	8	7	5	11	100	12.4
	Turkey	73	7	a	4	8	a	x(8)	7	100	9.2
	United Kingdom	n	18	23	19	13	x(9)	9	18	100	12.6
	United States	4	7	x(5)	x(5)	50	x(5)	10	28	100	12.7
	Country mean	***15***	***19***	***3***	***14***	***23***	***3***	***9***	***14***	***100***	***11.7***
PARTNER COUNTRY	Israel	3	16	x(5)	x(5)	37	x(7)	17	27	100	m

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.
Source: OECD. See Annex 3 for a description of ISCED-97 levels and ISCED-97 country mappings *(www.oecd.org/edu/eag2004)*.

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Table A1.2. Population at the age of basic, upper secondary and tertiary education (1992, 2002, 2012)

		Percentage of the population (2002)			Change in the size of the population (2002 = 100)						Number of students enrolled as a percentage of the employed population 25 to 64 years of age
					Age group						
		Age group			5-14		15-19		20-29		
		5-14	15-19	20-29	1992	2012	1992	2012	1992	2012	
OECD COUNTRIES	Australia	14	7	14	94	96	98	103	99	105	80
	Austria	12	6	12	98	79	100	98	135	102	52
	Belgium	12	6	13	100	92	105	99	118	99	74
	Canada	m	m	m	96	85	93	101	107	107	m
	Czech Republic	12	7	17	125	77	133	81	84	77	52
	Denmark	12	5	13	85	96	126	125	120	92	56
	Finland	12	6	12	102	89	95	98	109	101	63
	France	12	7	13	104	103	104	93	109	98	65
	Germany	11	6	12	99	86	90	90	139	108	53
	Greece	10	6	15	123	93	115	82	96	79	60
	Hungary	12	6	16	119	76	134	90	85	77	66
	Iceland	16	7	15	94	91	98	105	99	103	73
	Ireland	14	8	17	121	105	101	82	75	92	70
	Italy	10	5	13	107	91	138	94	123	77	54
	Japan	10	6	14	124	96	135	85	100	76	44
	Korea	14	7	17	111	84	121	101	108	81	61
	Luxembourg	13	6	13	80	108	93	124	108	102	50
	Mexico	22	10	19	95	97	99	104	82	104	105
	Netherlands	12	6	13	91	99	107	108	129	101	54
	New Zealand	15	7	13	87	93	100	110	112	111	77
	Norway	13	6	13	87	92	109	115	118	103	59
	Poland	13	9	16	132	74	93	70	81	94	81
	Portugal	10	6	16	120	99	137	93	96	73	53
	Slovak Republic	13	8	17	125	77	105	77	83	89	67
	Spain	10	6	16	131	97	139	82	98	68	60
	Sweden	13	6	12	85	86	106	123	112	103	64
	Switzerland	12	6	12	94	78	100	101	140	104	44
	Turkey	m	m	m	97	97	91	100	83	109	101
	United Kingdom	13	6	13	93	88	94	104	116	110	74
	United States	15	7	13	88	102	86	108	102	116	64
	Country mean	*12*	*6*	*14*	*104*	*91*	*108*	*97*	*106*	*96*	*64*
PARTNER COUNTRIES	Argentina	19	9	16	97	104	92	105	77	103	m
	Brazil	20	11	17	106	99	87	91	86	106	m
	Chile	19	9	15	89	97	91	108	103	115	89
	China	m	m	m	97	86	104	91	119	106	m
	Egypt	22	12	19	94	110	76	101	72	129	m
	India	24	11	17	88	100	83	111	86	120	m
	Indonesia	19	11	18	101	98	93	98	86	105	m
	Israel	18	9	16	85	114	85	113	73	109	m
	Jamaica	22	10	16	101	95	93	98	92	107	m
	Jordan	26	12	18	78	113	76	119	64	115	m
	Malaysia	22	10	17	84	103	81	122	81	116	m
	Paraguay	25	11	17	81	113	70	117	80	136	m
	Peru	m	m	m	91	99	90	110	84	113	m
	Philippines	24	10	17	87	101	83	114	80	120	m
	Russian Federation	12	8	15	133	70	86	58	94	103	m
	Sri Lanka	17	10	17	113	92	91	86	94	100	m
	Thailand	15	8	17	109	98	106	93	96	94	m
	Tunisia	21	11	19	105	83	86	87	82	110	m
	Uruguay	16	8	16	96	101	105	108	87	98	m
	Zimbabwe	24	13	20	87	94	73	103	77	131	m

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

INDICATOR A2: CURRENT UPPER SECONDARY GRADUATION RATES AND EDUCATIONAL ATTAINMENT OF THE ADULT POPULATION

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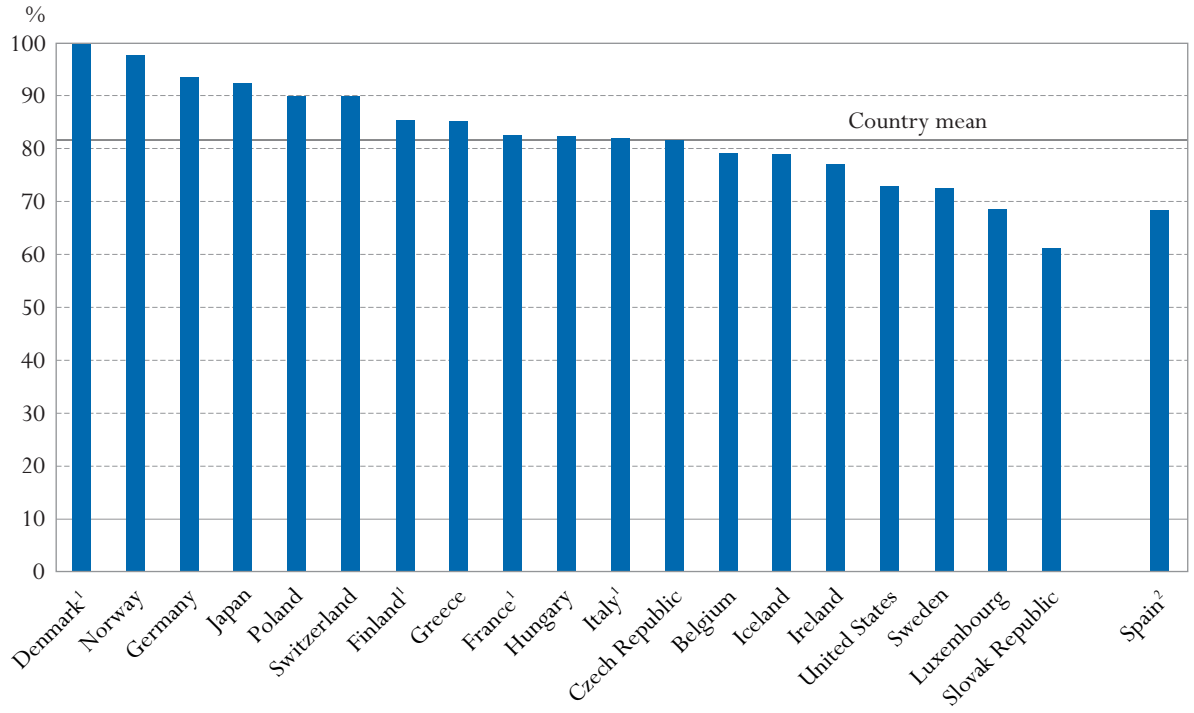
- In 17 out of 20 OECD countries for which comparable data are available, the ratio of upper secondary graduates to the population at the typical age of graduation exceeds 70%. In Denmark, Germany, Japan, Norway, Poland and Switzerland, graduation rates equal or exceed 90%. The challenge is now to ensure that the remaining fraction is not left behind, with the risk of social exclusion that this may entail.
- Comparing the educational attainment of the population aged 25 to 34 years with that of the population aged 45 to 54 shows that the proportion of individuals who have completed upper secondary education has been growing in almost all OECD countries, and in some rapidly: in two-thirds of the countries, the proportion ranges from 70 to 95% for the youngest generation. Many countries with traditionally low levels of education are catching up.
- Today, graduation rates for females exceed those for males in most OECD countries. Among older age groups, females have lower levels of education than males, but for younger people the pattern has reversed.

Chart A2.1. Upper secondary graduation rates (2002)

Percentage of upper secondary graduates to the population at the typical age of graduation (unduplicated count)



1. Year of reference 2001.
2. A significant proportion of the youth cohort is not covered by this indicator.

Countries are ranked in descending order of upper secondary graduation rates.

Source: OECD. Table A2.1. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

A2

Policy context

To gauge the share of the population that has obtained the minimum credentials for successfully entering the labour market…

Rising skill demands in OECD countries have made qualifications at the upper secondary level of education the minimum credential for successful labour market entry. Upper secondary education serves as the foundation for advanced learning and training opportunities, as well as preparation for direct entry into the labour market. Although many countries do allow students to leave the education system at the end of the lower secondary level, young people in OECD countries who leave without an upper secondary qualification tend to face severe difficulties in entering the labour market (see Indicators A10 to A12).

…this indicator shows the current upper secondary graduate output of educational institutions…

The upper secondary graduation rate reflects the current output of education systems, *i.e.*, the percentage of the typical upper secondary school-age population that follows and successfully completes upper secondary programmes. Although high upper secondary graduation rates do not guarantee that an education system has adequately equipped its graduates with the basic skills and knowledge necessary to enter the labour market – this indicator does not capture the quality of educational outcomes – it is one indication of the extent to which education systems succeed in meeting the minimum requirements of the labour market.

…as well as historical patterns of upper secondary completion.

By comparing educational attainment levels among different generations, one can identify the evolution of education attainment within the population, reflecting both changing educational policies and accession practices and potential skills and competencies.

Evidence and explanations

In 17 out of 20 OECD countries with comparable data, upper secondary graduation rates exceed 70%…

Upper secondary graduation rates are estimated as the number of persons, regardless of their age, who graduate for the first time from upper secondary programmes per 100 people at the age at which students typically graduate from upper secondary education (see Annex 1). The graduation rates take into account students graduating from upper secondary education at the typical (modal) graduation ages, and older students (*e.g.*, those in "second chance" programmes). In 17 OECD countries with comparable data, upper secondary graduation rates exceed 70% (Chart A2.1). Caution should be used in interpreting the graduation rates displayed in Chart A2.1 for Spain, where the length of secondary programmes was recently extended leading to an underestimation of graduation rates.

…and in 6 OECD countries equal or exceed 90%.

In six of the 20 countries for which comparable numbers of graduates are available, graduation rates equal or exceed 90% (Denmark, Germany, Japan, Norway, Poland and Switzerland).

Upper secondary attainment levels have increased in almost all countries…

A comparison of the levels of educational attainment in younger and older age groups indicates marked progress with regard to the percentage of the population graduating from upper secondary education (Chart A2.2). On average, 75% of 25 to 34-year-olds have attained upper secondary education compared with only 61% of 45 to 54-year-olds. In 22 OECD countries out of 30, the proportion ranges from 70 to 95% for the youngest age

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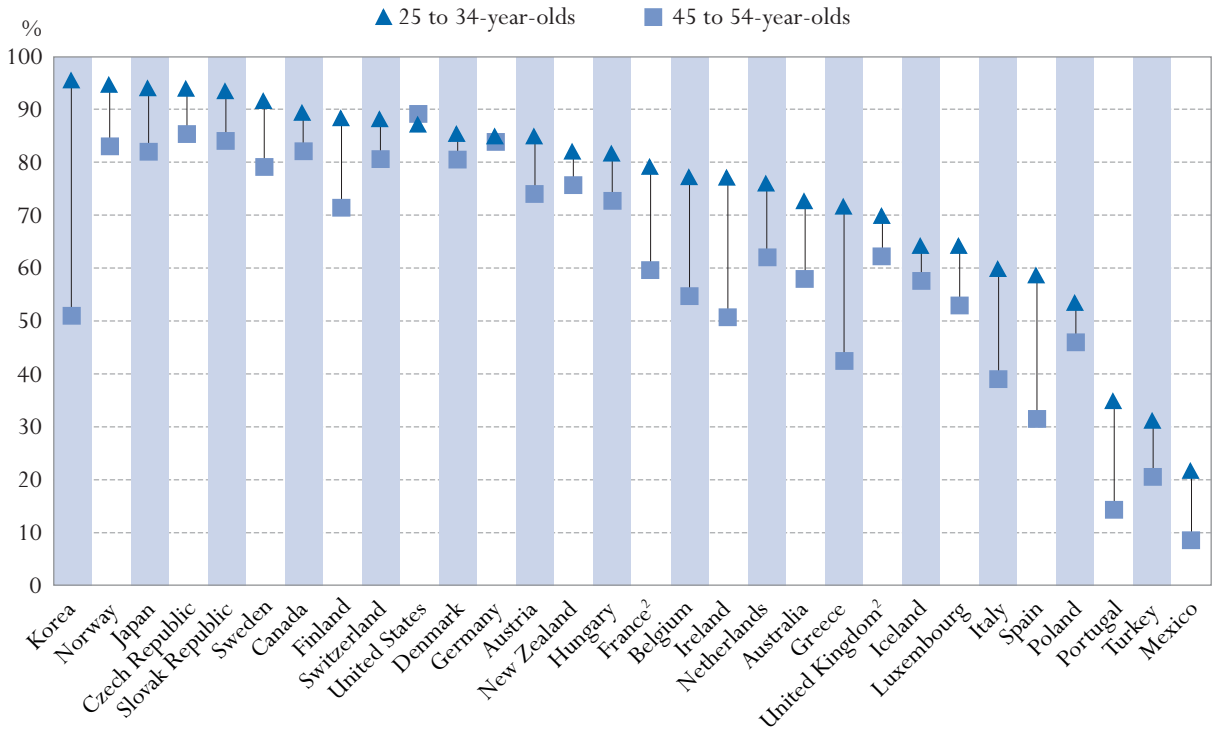
Chart A2.2. Population that has attained at least upper secondary education[1] (2002)

Percentage, by age group



1. Excluding ISCED 3C short programmes.
2. Not all ISCED 3 programmes meet minimum requirements for ISCED 3C long programmes.

Countries are ranked in descending order of the percentage of 25 to 34-year-olds who have attained at least upper secondary education.

Source: OECD. Table A2.2. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

group, setting a new standard for upper secondary graduation for OECD countries of around 80%.

…and many countries with traditionally low levels of education are catching up.

In countries whose adult population generally has a high attainment level, differences among age groups in the level of educational attainment are less pronounced (Table A2.2). Apart from the very significant exception of Korea – where the difference between those aged 25-34 and 45-54 years reaches 44 percentage points – in those countries where the younger generation (aged 25-34 years) achieves an attainment level in excess of 80%, the gain from the previous generation (aged 45-54 years) is on average only 8 percentage points. For the other countries, where there is more ground to catch up, the average gain is 17 percentage points. Only three countries, Iceland, Poland and the United Kingdom, show gains of less than 10 percentage points. The others, such as Belgium, France, Greece, Ireland, Italy, Portugal and Spain, show remarkable efforts. Proportionally, the effort is important as well in Mexico and Turkey.

Considering only the attainment at the upper secondary level – *i.e.* as a maximum and not a minimum – offers a different perspective. On average, this level remains stable at about 44% for the adult population of OECD countries (Table A3.4a)

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for the last five years. This is the result of two opposite trends: the proportion of the adult population with lower secondary attainment has decreased by 3 percentage points while, at the same time, the proportion achieving tertiary level has increased by 3 points.

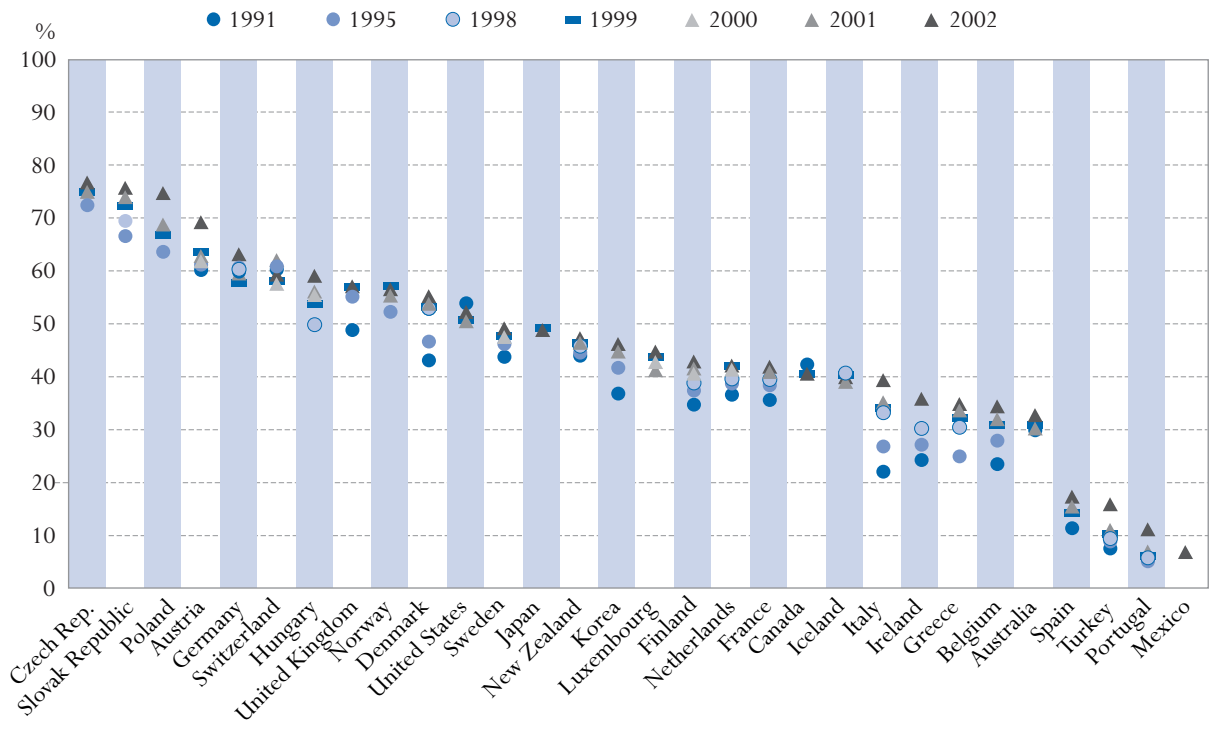
Trend data reveal different patterns across countries. Due to increased access to tertiary education, the proportion of those attaining only upper secondary level education has decreased over the last five years. This is the case in Canada, Japan and the United States. Oppositely, the progress in attaining upper secondary education by diminishing the lower level is visible in Belgium, Denmark, Greece, Hungary, Ireland, Italy, the Slovak Republic and Spain (Tables A3.4a and A3.4b).

Gender differences in graduation rates

Among older age groups, females have lower levels of education than males…

The balance of educational attainment between males and females in the adult population is unequal in most OECD countries. Historically, females did not have sufficient opportunities and/or incentives to reach the same level of education as males. Females are generally over-represented among those who did not proceed to upper secondary education and under-represented at the higher levels of education.

Chart A2.3. Trends in educational attainment of the 25 to 64-year-old population in upper secondary and post-secondary non-tertiary education (1991-2002)



Countries are ranked in descending order of the highest educational level attained in 2002.
Source: OECD. Table A3.4a. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

However, these differences are mostly attributable to the large gender differences in older age groups and have been significantly reduced or reversed among younger age groups.

…but for younger people the pattern is now reversing.

Today, graduation rates no longer show significant differences between males and females in half of the countries with available data (Table A2.1). Graduation rates for females exceed those for males in 18 out of 19 OECD countries for which total upper secondary graduation rates can be compared between the genders. The exception is Switzerland, where graduation rates are the same for both genders. The gap is relatively small, five percentage points or less, in the Czech Republic, Germany and Japan, but is 11 percentage points or more in Finland, Greece, Iceland, Ireland, Norway and Spain.

Today, graduation rates for females exceed those for males in most countries.

More males than females graduate from pre-vocational and vocational upper secondary programmes in 10 out of 23 countries with comparable data. Graduation rates for these programmes are higher for females in eight countries, and are the same for males and females in the five remaining countries.

There is no clear gender trend for pre-vocational and vocational upper secondary graduation rates.

Graduation from post-secondary non-tertiary programmes

Post-secondary non-tertiary programmes are offered in 27 of the OECD countries; they straddle the boundary between upper secondary and post-secondary education from a comparative point of view, even though they might clearly be considered upper secondary or post-secondary programmes in a national context. Although the content of post-secondary non-tertiary programmes may not be significantly more advanced than upper secondary programmes, they serve to broaden the knowledge of participants who have already gained an upper secondary qualification. The students tend to be older than those enrolled at the upper secondary level.

In some countries, a significant proportion of students broaden their knowledge at the post-secondary non-teriary level after completing a first upper secondary programme.

Typical examples of such programmes would be trade and vocational certificates in Canada and the United States, nursery teacher training in Austria and Switzerland or vocational training in the dual system for holders of general upper secondary qualifications in Germany. In most countries, post-secondary non-tertiary programmes are vocationally oriented.

In five out of 16 OECD countries reporting comparable data, 11% or more of upper secondary graduates also graduate from a post-secondary non-tertiary programme, either instead of or in addition to tertiary education (OECD average 9%). In Hungary, Ireland and Switzerland, 20% or more of a typical age cohort completes a post-secondary non-tertiary programme (Table A2.3).

In Hungary, Ireland and Switzerland, 20% or more of a typical age cohort completes a post-secondary non-tertiary programme.

In 12 out of the 20 OECD countries with available data, the majority of, if not all, post-secondary non-tertiary students graduate from ISCED 4C programmes, which are designed primarily to prepare graduates for direct entry into the labour market. Apprenticeships that are designed for students who have already graduated from an upper secondary programme are also included in this category. In the eight remaining countries, the majority of post-secondary non-tertiary graduates have completed programmes that are designed to provide direct access to tertiary-type A or B education.

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Data refer to the school year 2001-2002 and are based on the UOE data collection on education statistics that is administered annually by the OECD.

Definitions and methodologies

Upper secondary graduates are those who successfully complete the final year of upper secondary education, regardless of their age. In some countries, successful completion requires a final examination; in others it does not.

Gross graduation rates for ISCED 3A, 3B and 3C programmes cannot be added, as some individuals graduate from more than one upper secondary programme and would thus be counted twice. The same applies for graduation rates by programme orientation, *i.e.*, general or vocational. The unduplicated total count of graduates is calculated by netting out those students who graduated from another upper secondary programme in a previous year.

For some countries, an unduplicated count of post-secondary non-tertiary graduates is unavailable and graduation rates may be overestimated because graduates complete multiple programmes at the same level. These countries are marked with a footnote in Table A2.3.

Pre-vocational and vocational programmes include both school-based programmes and combined school- and work-based programmes that are recognised as part of the education system. Entirely work-based education and training that is not overseen by a formal education authority is not taken into account.

Educational attainment data derive from National Labour Force Surveys and levels are based upon the International Standard Classification of Education (ISCED-97).

Data on population and educational attainment are taken from OECD and EUROSTAT databases, which are compiled from National Labour Force Surveys. See Annex 3 at *www.oecd.org/edu/eag2004* for national sources.

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. See Annex 3 at *www.oecd.org/edu/eag2004* for a description of ISCED-97 education programmes and attainment levels for each country.

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Table A2.1. Upper secondary graduation rates (2002)

Percentage of upper secondary graduates to the population at the typical age of graduation in public and private institutions, by programme destination, programme orientation and gender

		Total (unduplicated)			ISCED 3A (designed to prepare for direct entry to tertiary-type A education)		ISCED 3B (designed to prepare for direct entry to tertiary-type B education)		ISCED 3C (long) similar to duration of typical 3A or 3B programmes		ISCED 3C (short) shorter than duration of typical 3A or 3B programmes		General programmes		Pre-vocational/ vocational programmes	
		M + F	Males	Females	M + F	Females	M + F	Females	M + F	Females	M + F	Females	M + F	Females	M + F	Females
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
OECD COUNTRIES	Australia	m	m	m	69	74	x(8)	x(9)	33	35	x(8)	x(9)	69	74	33	35
	Austria	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	Belgium	79	74	83	60	66	a	a	19	18	18	25	36	42	61	66
	Canada	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	Czech Republic	81	80	83	50	58	n	n	32	24	n	n	13	17	70	68
	Denmark[1]	100	m	m	56	67	a	a	66	73	a	a	56	67	66	73
	Finland[1]	85	78	93	85	93	a	a	a	a	a	a	51	62	69	78
	France[1]	82	79	86	51	59	10	9	3	2	36	31	32	38	67	63
	Germany	93	91	96	34	37	60	58	a	a	a	a	34	37	60	58
	Greece	85	74	97	53	61	a	a	32	36	x(8)	x(9)	53	61	34	38
	Hungary	82	79	86	58	65	x(4)	x(5)	22	18	x(8)	x(9)	30	36	49	47
	Iceland	79	68	89	52	65	n	1	32	24	20	22	54	67	49	44
	Ireland	77	70	84	72	78	a	a	5	6	a	a	53	57	23	27
	Italy[1]	82	79	85	72	76	4	5	a	a	19	17	30	40	64	58
	Japan	92	90	94	68	72	1	n	23	22	x(8)	x(9)	68	72	24	22
	Korea	m	m	m	64	64	a	a	34	35	a	a	64	64	34	35
	Luxembourg	68	64	73	39	48	8	8	20	17	a	a	27	32	42	42
	Mexico	m	m	m	30	33	a	a	4	4	x(8)	x(9)	30	33	4	4
	Netherlands	m	m	m	63	69	a	a	19	21	20	17	32	36	61	62
	New Zealand	m	m	m	60	65	25	29	43	55	x(8)	x(9)	m	m	a	a
	Norway	97	89	107	66	80	a	a	43	38	m	m	66	80	42	36
	Poland	90	86	93	76	84	a	a	a	a	23	16	38	48	63	52
	Portugal	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	Slovak Republic	61	57	66	59	64	a	a	13	10	2	2	16	19	57	57
	Spain[2]	68	62	75	48	56	n	n	16	17	7	7	48	56	24	24
	Sweden	72	69	76	72	75	n	n	n	n	a	a	41	45	31	31
	Switzerland	90	90	90	28	30	50	43	14	20	m	m	32	36	61	57
	Turkey	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	United Kingdom	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	United States	73	69	76	73	76	m	m	m	m	m	m	73	76	m	m
	Country mean	***81***	***75***	***87***	***61***	***68***	***5***	***6***	***19***	***19***	***8***	***7***	***43***	***49***	***44***	***44***
PARTNER COUNTRIES	Argentina[1]	41	38	44	41	44	a	a	a	a	a	a	22	25	19	19
	Brazil[1]	62	54	69	51	56	10	12	a	a	a	a	51	56	10	12
	Chile	63	59	67	63	67	a	a	a	a	a	a	34	39	28	28
	China	35	34	31	x(1)	x(3)	a	a	x(1)	x(3)	a	a	16	20	m	m
	India	m	m	m	19	17	m	m	m	m	m	m	m	m	m	m
	Indonesia	36	36	36	23	25	13	11	a	a	a	a	x(1)	x(3)	m	m
	Israel	90	87	92	87	91	a	a	3	1	a	a	60	66	30	26
	Jamaica	73	70	77	m	m	m	m	m	m	m	m	m	m	m	m
	Jordan[1]	65	58	73	62	72	a	a	a	a	3	n	50	61	a	a
	Paraguay[1, 3]	40	36	43	40	43	a	a	m	m	a	a	31	35	8	8
	Peru[1]	63	64	62	63	64	x(4)	x(5)	a	a	a	a	63	64	m	m
	Philippines	60	55	66	60	66	a	a	a	a	a	a	60	66	m	m
	Russian Federation	73	m	m	54	m	15	m	4	m	a	a	54	m	m	m
	Thailand	53	51	56	34	40	19	16	a	a	a	a	34	39	19	16
	Tunisia	42	40	45	36	40	3	2	3	3	a	a	36	40	m	m

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2. Mismatches between the coverage of the population data and the student/graduate data mean that the participation/graduation rates for those countries that are net exporters of students may be underestimated (for instance Luxembourg) and those that are net importers may be overestimated.

1. Year of reference 2001.
2. Significant proportion of the youth cohort is missing.
3. Excluding ISCED 3C.

Source: OECD. See Annex 3 for notes (*www.oecd.org/edu/eag2004*).

A2

Table A2.2. Population that has attained at least upper secondary education[1] (2002)

Percentage, by age group

	Age group				
	25-64	25-34	35-44	45-54	55-64
OECD COUNTRIES					
Australia	61	73	62	58	46
Austria	78	85	82	74	67
Belgium	61	77	66	55	41
Canada	83	89	86	82	69
Czech Republic	88	94	91	85	80
Denmark	80	85	81	80	72
Finland	75	88	85	71	52
France[2]	65	79	68	60	48
Germany	83	85	86	84	77
Greece	50	72	58	42	28
Hungary	71	82	79	73	48
Iceland	59	64	62	58	48
Ireland	60	77	65	51	37
Italy	44	60	50	39	24
Japan	84	94	94	82	64
Korea	71	95	79	51	31
Luxembourg	57	64	59	53	46
Mexico	13	21	7	9	13
Netherlands	66	76	71	62	53
New Zealand	76	82	80	76	62
Norway	86	95	91	83	73
Poland	47	53	48	46	37
Portugal	20	35	20	14	8
Slovak Republic	86	93	91	84	68
Spain	41	58	46	31	18
Sweden	82	91	87	79	67
Switzerland	82	88	85	80	75
Turkey	25	31	25	20	14
United Kingdom[2]	64	70	65	62	56
United States	87	87	88	89	84
Country mean	***65***	***75***	***69***	***61***	***50***
PARTNER COUNTRIES					
Argentina[3]	42	52	43	38	28
Brazil[3]	27	32	30	24	15
Chile	47	61	49	42	28
Indonesia	22	32	23	17	9
Israel	80	87	80	78	71
Jordan	39	m	m	m	m
Malaysia[3]	41	58	42	24	13
Paraguay[3]	22	30	23	16	11
Peru[3]	44	55	46	35	22
Philippines	43	54	37	m	m
Thailand	19	28	20	12	7
Uruguay[3]	33	38	36	32	23

1. Excluding ISCED 3C short programmes.
2. Not all ISCED 3 programmes meet minimum requirements for ISCED 3C long programmes.
3. Year of reference 2001.

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

A2

Table A2.3. Post-secondary non-tertiary graduation rates (2002)

Percentage of post-secondary non-tertiary graduates to the population at the typical age of graduation in public and private institutions, by programme destination and gender

	Total (unduplicated)			ISCED 4A (designed to prepare for direct entry to tertiary-type A education)		ISCED 4B (designed to prepare for direct entry to tertiary-type B education)		ISCED 4C (designed to prepare for direct entry to the labour market)	
OECD COUNTRIES	M + F	Males	Females	M + F	Females	M + F	Females	M + F	Females
Australia	m	m	m	a	a	a	a	17.8	19.7
Austria	m	m	m	m	m	m	m	m	m
Belgium[1]	16.9	15.2	18.6	10.1	10.4	a	a	7.0	8.5
Canada	m	m	m	m	m	m	m	m	m
Czech Republic	m	m	m	12.9	13.9	a	a	2.5	2.9
Denmark[1, 2]	0.8	1.3	0.4	0.8	0.4	a	a	a	a
Finland[2]	2.2	2.0	2.3	a	a	a	a	3.7	4.0
France[1, 2]	1.3	0.8	1.7	0.7	0.9	a	a	0.6	0.8
Germany	14.1	15.3	12.9	8.6	8.0	5.5	4.9	a	a
Greece	m	m	m	a	a	a	a	m	m
Hungary[1]	31.6	28.4	34.9	8.2	8.5	a	a	23.2	26.2
Iceland	4.9	6.5	3.3	n	n	n	n	5.1	3.3
Ireland	20.4	18.5	22.4	a	a	a	a	20.4	22.4
Italy[2]	4.4	3.4	5.4	a	a	a	a	4.4	5.4
Japan	m	m	m	m	m	m	m	m	m
Korea	a	a	a	a	a	a	a	a	a
Luxembourg	4.1	5.5	2.6	a	a	a	a	4.1	2.6
Mexico	a	a	a	a	a	a	a	a	a
Netherlands[1]	1.3	2.0	0.7	a	a	a	a	1.3	0.7
New Zealand	m	m	m	1.9	2.3	7.7	9.6	18.8	22.9
Norway	6.6	10.2	2.9	2.4	1.4	a	a	4.3	1.5
Poland[1]	10.7	7.4	14.1	a	a	a	a	10.7	14.1
Portugal	m	m	m	m	m	m	m	m	m
Slovak Republic	4.6	5.2	4.1	4.6	4.1	a	a	n	n
Spain	3.8	3.6	4.0	3.8	4.0	0.1	0.1	n	n
Sweden	m	m	m	m	m	m	m	0.4	0.3
Switzerland	22.4	20.7	24.0	3.3	2.4	19.5	22.2	m	m
Turkey	a	a	a	a	a	a	a	a	a
United Kingdom	m	m	m	m	m	m	m	m	m
United States[1]	m	m	m	m	m	m	m	m	m
Country mean	***9.0***	***9.1***	***8.9***	***5.2***	***5.1***	***8.2***	***9.2***	***7.6***	***8.3***

Note: Mismatches between the coverage of the population data and the student/graduate data mean that the participation/graduation rates for those countries that are net exporters of students may be underestimated (for instance Luxembourg) and those that are net importers may be overestimated.

1. Gross graduation rate may include some double counting.
2. Year of reference 2001.

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

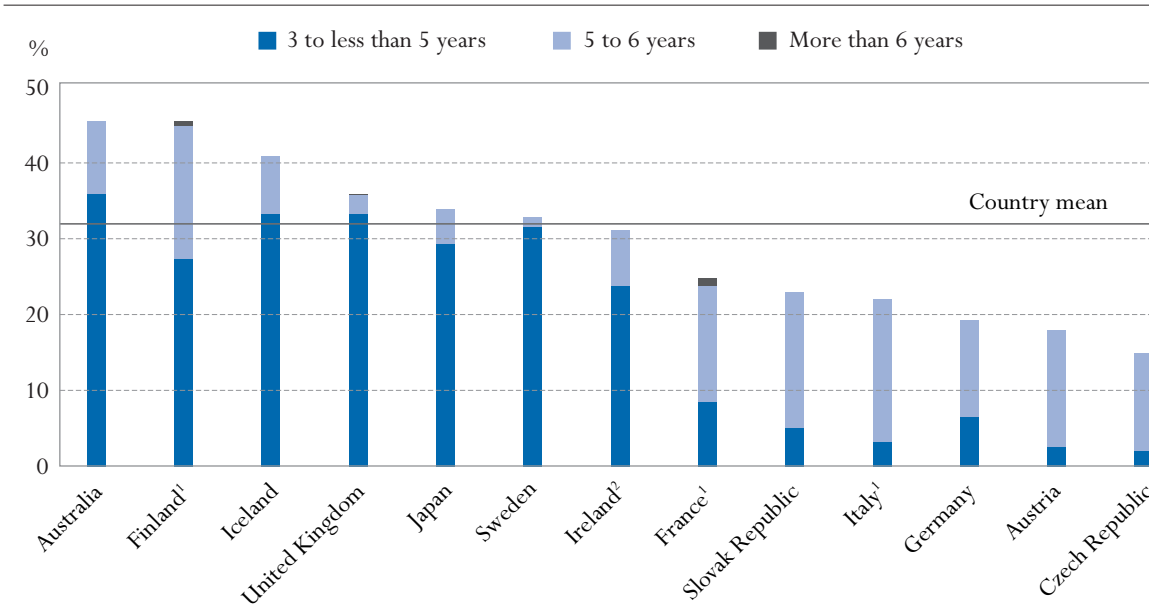
A3

INDICATOR A3: CURRENT TERTIARY GRADUATION AND SURVIVAL RATES AND EDUCATIONAL ATTAINMENT OF THE ADULT POPULATION

- On average across 17 OECD countries with comparable data, 32% of persons at the typical age of graduation currently complete the tertiary-type A level of education – a figure that ranges from less than 20% in Austria, the Czech Republic, Germany and Switzerland to more than 40% in Australia, Finland, Iceland and Poland.
- As measured by educational attainment, there has been an increase in the stock of tertiary-level skills in the adult population. However, most of that increase is due to significant increases in tertiary graduation rates in a comparatively small number of countries.
- On average, one-third of students in OECD countries "drop out" before they complete their first degree, regardless of whether they are following tertiary-type A or tertiary-type B programmes.

Chart A3.1. Tertiary-type A graduation rates, by duration of programme (2002)

Percentage of graduates to the population at the typical age of graduation



1. Year of reference 2001.
2. 5 to 6-year programmes include more than 6-year programmes.

Countries are ranked in descending order of total tertiary-type A graduation rates.

Source: OECD. Table A3.1. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

A3

Policy context

This indicator shows tertiary graduation rates, as well as historical patterns of tertiary educational attainment…

Tertiary graduation rates are an indicator of the current production rate of advanced knowledge by each country's education system. Countries with high graduation rates at the tertiary level are most likely to be developing or maintaining a highly skilled labour force. Measures of educational attainment show the evolution of advanced knowledge in the population.

…and sheds light on the internal efficiency of tertiary education systems.

Tertiary level dropout and survival rates can be useful indicators of the internal efficiency of tertiary education systems. However, students' specific reasons for leaving a tertiary programme are varied: students may realise that they have chosen the wrong subject or educational programme; they may fail to meet the standards set by their educational institution, particularly in tertiary systems that provide broader access; or they may find attractive employment before completing their programme. "Dropping out" is not necessarily an indication of failure by individual students, but high dropout rates may well indicate that the education system is not meeting the needs of its clients. Students may not find that the educational programmes offered meet their expectations or their labour market needs. It may also be that students find that programmes take longer than the number of years which they can justify being outside the labour market.

Evidence and explanations

Graduation rates at the tertiary level

Tertiary programmes vary widely in structure and scope among countries.

Tertiary graduation rates are influenced both by the degree of access to tertiary programmes and by the demand for higher skills in the labour market. They are also affected by the way in which the degree and qualification structures are organised within countries.

This indicator distinguishes among different categories of tertiary qualifications: *i)* degrees at tertiary-type B level (ISCED 5B); *ii)* degrees at tertiary-type A level (ISCED 5A); and *iii)* advanced research qualifications at the doctorate level (ISCED 6).

Tertiary-type A programmes are largely theoretically-based and designed to provide qualifications for entry into advanced research programmes and professions with high skill requirements. Countries differ in the way in which tertiary-type A studies are organised. The institutional framework may be universities, but it can also be other institutions. The duration of programmes leading to a first type-A qualification ranges from three years (*e.g.*, the Bachelor's degree in many colleges in Ireland and the United Kingdom in most fields of study and the *Licence* in France) to five years or more (*e.g.*, the *Diplom* in Germany and the *Laurea* in Italy).

Whereas, in many countries, there is a clear distinction between first and second university degrees, *i.e.,* undergraduate and graduate programmes, this distinction does not exist in other countries, where degrees that are comparable internationally at the "Master's" level are obtained through a single programme of long duration. To ensure international comparability, it is therefore necessary to

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compare degree programmes of similar cumulative duration, as well as completion rates for first-degree programmes.

Tertiary-type A programmes are subdivided in accordance with the theoretical duration of studies to allow for comparisons that are independent of differences in national degree structures.

To allow for comparisons that are independent of differences in national degree structures, tertiary-type A degrees are subdivided in accordance with the total theoretical duration of studies at the tertiary level. Specifically, the OECD classification divides degrees into those of medium (three to less than five years), long (five to less than six years) and very long duration (more than six years). Degrees obtained from short programmes of less than three years' duration are not considered equivalent to the completion of the tertiary-type A level of education and are therefore not included in this indicator. Second-degree programmes are classified according to the cumulative duration of the first and second-degree programme, netting out individuals who already hold a first degree.

On average in OECD countries, 32% of persons at the typical age of graduation complete tertiary-type A education…

On average across the 17 OECD countries with comparable data, 32% of persons at the typical age of graduation complete tertiary-type A education. This figure ranges from less than 20% in Austria, the Czech Republic, Germany and Switzerland to more than 40% in Australia, Finland, Iceland and Poland (Table A3.1). In general, the majority of students complete medium length programmes (three to less than five years) in countries with higher graduation rates (Chart A3.1). In Austria, the Czech Republic, France, Germany, Italy and the Slovak Republic, the majority of students complete longer programmes (of at least five years' duration), and graduation rates are 23% or below.

…while the graduation rate at the tertiary-type B level is 10%…

Tertiary-type B programmes are classified at the same level of competencies as tertiary-type A programmes but are more occupationally-oriented and lead to direct labour market access. The programmes are typically of shorter duration than type A programmes (typically two to three years). Generally they are not deemed to lead to university-level degrees. Graduation rates for tertiary-type B programmes account, on average in OECD countries, for 10% of an age cohort (Table A3.1). In Japan, 27% of the population at the typical age of graduation complete the tertiary-type B level of education. This figure is 19% in France and Switzerland.

…and 1.2% obtain an advanced research qualification.

On average across OECD countries, 1.2% of the population obtains an advanced research qualification, such as a Ph.D. Scores rank from Iceland and Mexico with 0.1% to Germany, Sweden and Switzerland with 2.0, 2.8 and 2.6%, respectively (Chart A3.2).

Survival rates at the tertiary level

One-third of students in OECD countries "drop out" before they complete their first degree.

On average, one-third of students in OECD countries "drop out" before they complete their first degree, regardless of whether they are following tertiary-type A or tertiary-type B programmes. The "drop out" rate is much higher for advanced research programmes, with a survival rate of less than 60%.

Tertiary-type A survival rates differ widely among OECD countries, ranging from below 60% in Austria, France, Italy and Sweden to above 80% in Ireland, Japan, Turkey and the United Kingdom (Table A3.2).

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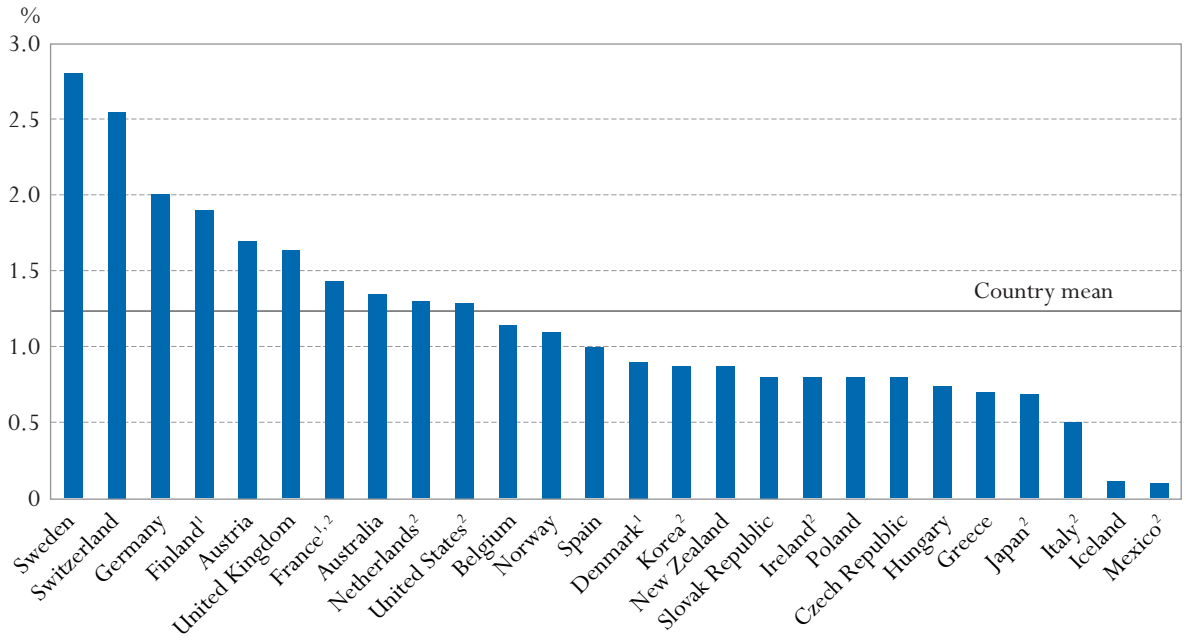
Chart A3.2. Graduation rates for advanced research programmes (2002)

Sum of graduation rates for each year of age



1. Year of reference 2001.
2. Gross graduation rates were used for these countries, which were calculated as the percentage of graduates to the population at the typical age of graduation.

Countries are ranked in descending order of graduation rates for advanced research programmes.

Source: OECD. Table A3.1. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

Tertiary-type B survival rates range from above 80% in Denmark, the Flemish Community of Belgium, Japan, Mexico, Poland and Sweden, to around 50% in Ireland and Italy (Table A3.2). In general, tertiary-type B programmes are of a shorter duration than tertiary-type A programmes. In the majority of countries with available data, most students successfully complete short programmes (two to three years). It is, however, interesting to note that a majority of students graduate from medium length type B programmes in both Denmark and the Flemish Community of Belgium (in the Flemish Community, this is the only tertiary-type B programme option).

In Italy, Japan and Korea, survival rates for students following advanced research programmes are 85% or higher. Conversely, students are far likelier to drop out of such programmes in France and Iceland (36 and 50% survival rate, respectively) (Table A3.2).

For advanced research programmes, survival rates are high in Italy, Japan and Korea.

The rising skill requirements of labour markets, an increase in unemployment during recent years and higher expectations by individuals and society have influenced the proportion of young people who obtain at least a tertiary qualification. As measured by tertiary qualifications, there has been a general increase in the stock of higher-level skills in the adult population.

The proportion of young people who have attained tertiary-type A or advanced research programmes qualifications has increased.

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The proportion of 25 to 34-year-olds that has attained tertiary education is more than 36% in 12 out of the 30 OECD countries. This improvement is the result of a dramatic effort over the last 20 years, and it is approximated by the difference between different generations of citizens. For countries ranking at the top level, the gap between older and younger learners is about 13 percentage points. Only three countries have remained stable, at a high level, for the last decades (Australia, Sweden and the United States). For all tertiary education the average level of attainment in OECD countries increased from 21% to 28%, when comparing individuals aged 50 to those aged 30.

The concern remains for the lowest performing countries, which have not made progress between the generations (demonstrating a different pattern from secondary attainment, see Indicator A2). With the noticeable exceptions of Greece, Mexico and Portugal, others nations have made little progress (Chart A3.3).

Trends in tertiary attainment

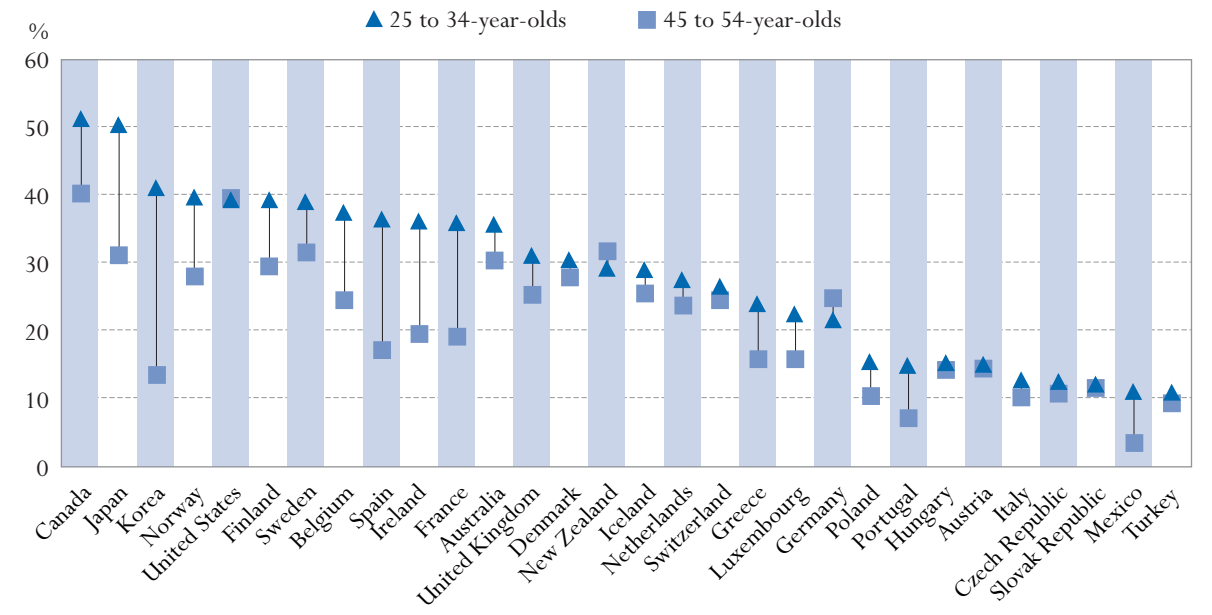
An overview of the level of educational attainment at the tertiary level (Table A3.4a) over the last years confirms the strong trend of an increasing proportion of the adult population attaining tertiary education.

Increased participation in tertiary education has moderated differences among countries…

The result of this increased participation in tertiary education has been a reduction of the differences among countries. In 2002, for the 25 to 64-year-old population, 16 out of 30 countries are closely grouped, with between 23 and 33% of the population having attained the tertiary level. Three of these

Chart A3.3. Population that has attained tertiary education (2002)

Percentage, by age group



Countries are ranked in descending order of the percentage of 25 to 34-year-olds who have attained tertiary education.
Source: OECD. Table A3.3. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

countries are performing remarkably high: Canada, Japan and the United States. Oppositely, 11 countries are significantly below 20% of tertiary attainment, some at very low levels.

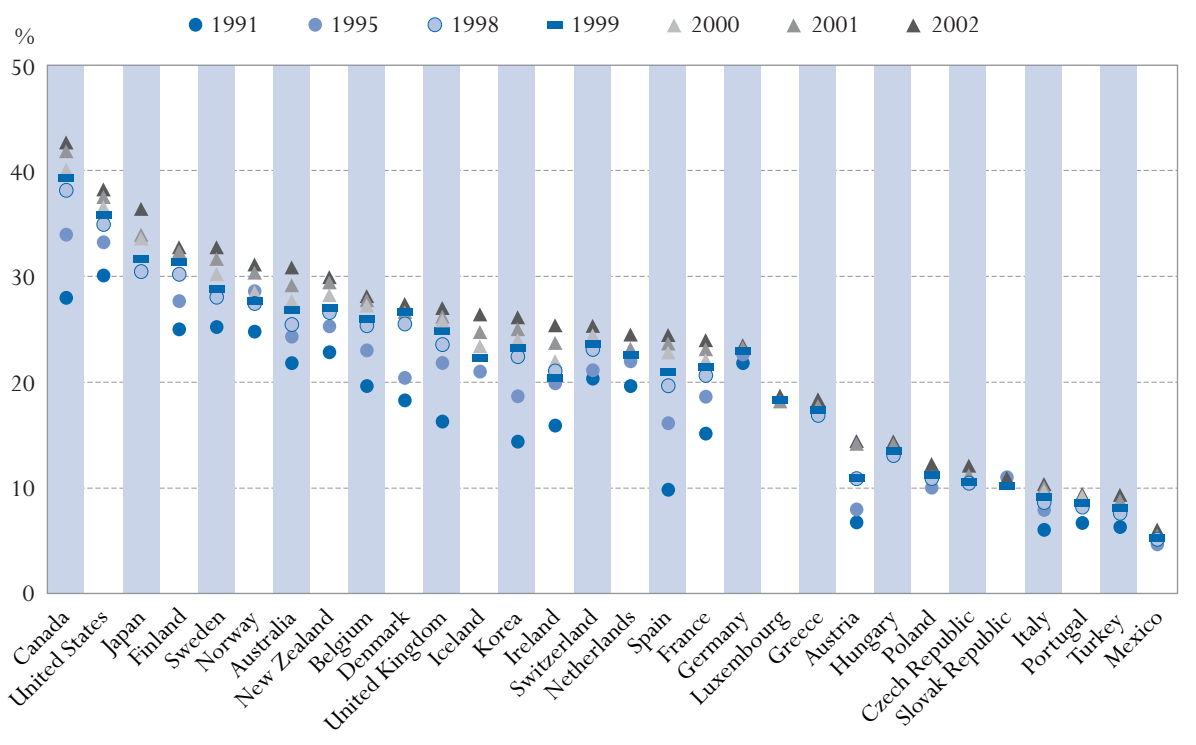
…but some countries have been left behind.

This general process is the result of constant improvements in most countries. However, the three most advanced nations continue to improve the proportion of tertiary attainment in their adult population. The other OECD countries, especially Korea and Spain, enjoyed an increased proportion of highly skilled people in the population, so levels are now more similar to the leading nations. Excepting small gains in Austria and Italy, the improvement is not perceptible at the lower side of the distribution. The proportion of people holding tertiary qualifications remains rather low in Portugal and Turkey, where there seems to have been limited improvements over the last 10 years.

Focusing on the youngest age group, from 25 to 34 years old (Tables A3.4a and A3.4b) reveals that the gain in attainment at the tertiary level between 1991 and 2002, which averages between 18 and 23% of the total population, has improved from 20 to 28% for the youngest age group. Naturally, the improvement reflects the replacement of the oldest generations by higher qualified young generations. Among the 28% of these tertiary qualified young generation, 19% have attained tertiary-type A degree or even advanced research programme qualifications. Above

Chart A3.4. Trends in educational attainment in tertiary education (1991-2002)

Percentage of 25 to 64-year-olds



Countries are ranked in descending order of educational attainment in tertiary education in 2002.
Source: OECD. Table A3.4a. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

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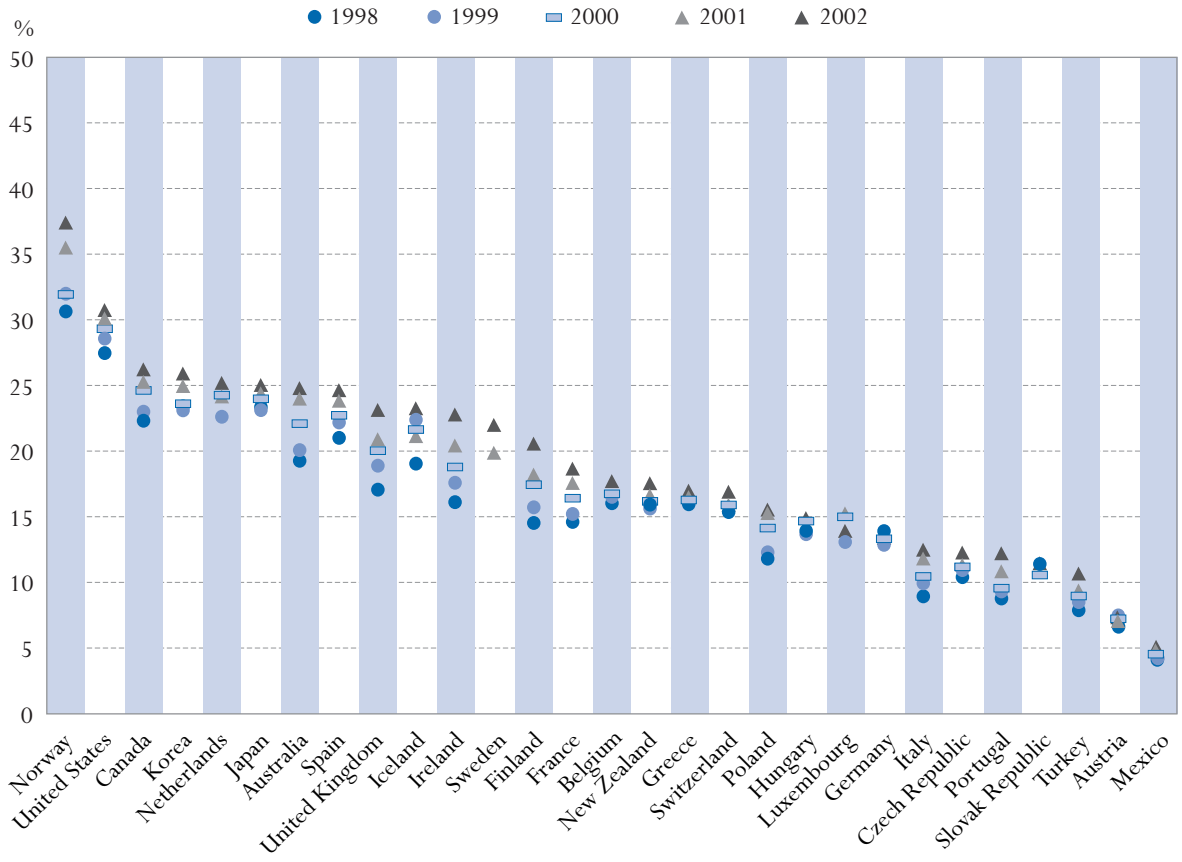
the average of 19%, there is not much difference among OECD countries. Except Norway and the United States, which rank higher than 30%, all countries range between 21% and 26%, a five-point interval. Below the average, again, positions are more scattered, particularly taking into account that some national figures include tertiary-type B programmes in the calculation (Table A3.4c).

The progression between 1998 and 2002 is particularly important for Australia, Finland, Ireland, Norway and the United Kingdom, all countries already ranking in the first half of the distribution. Canada, France and Iceland also saw more than 1 point of annual growth on average during the last four years. On the other side of the average, there has been stagnation in Austria, Germany, Switzerland and the Eastern European countries. Except Italy and Poland, the countries where the level is still low are not improving as necessary.

Higher participation and graduation for women, even at tertiary-type 5A/6 level, plays an important role in the increase of the potential qualification of the population. In 2002, for two-thirds of the countries, the proportion of young women qualified at tertiary-type A level is higher than the proportion of men. On average, the gender gap in favour of young women is around four points.

Chart A3.5. Trends in educational attainment in tertiary-type A and advanced research programmes (1998-2002)

Percentage of 25 to 34-year-olds



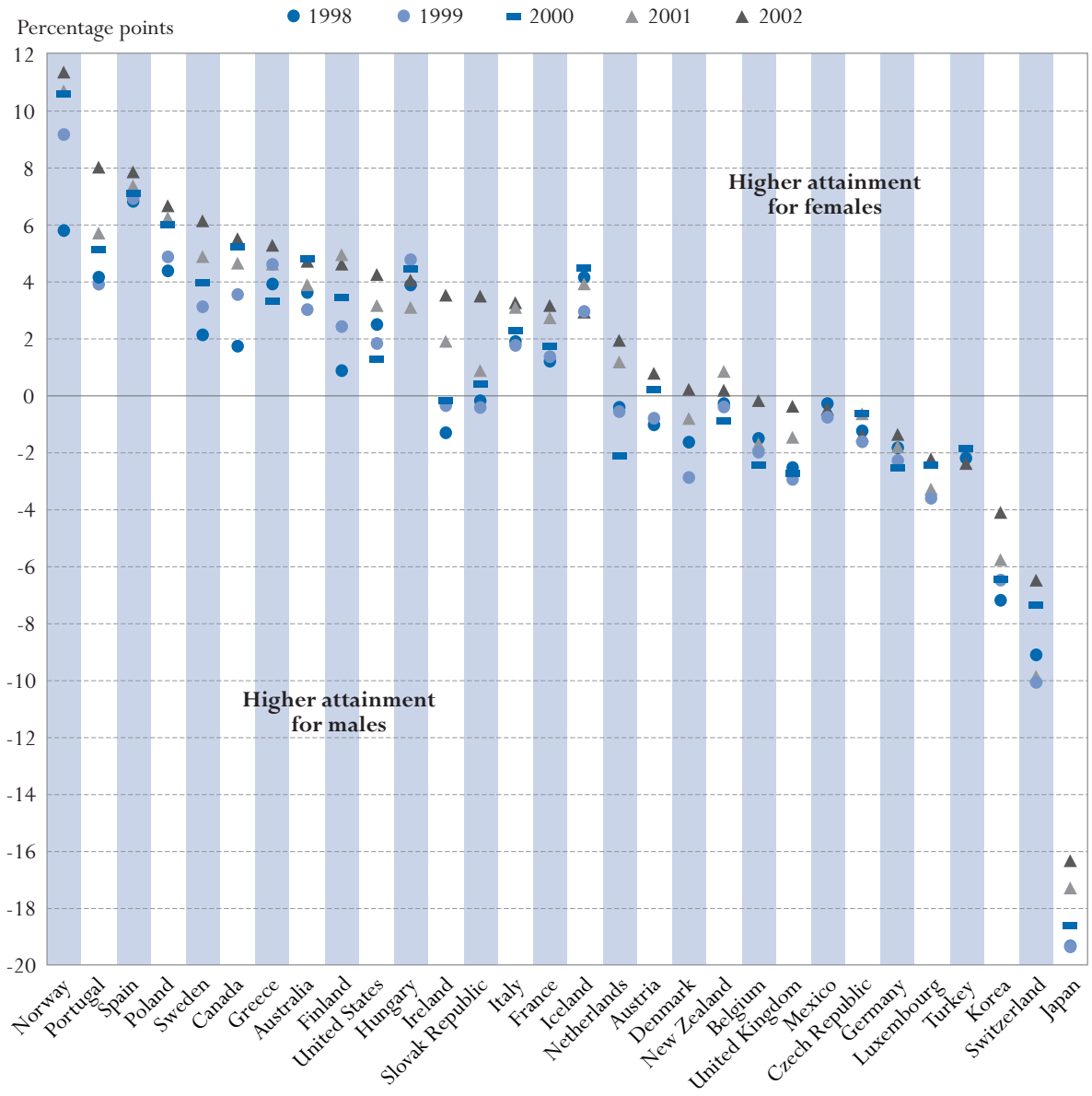
Countries are ranked in descending order of educational attainment in tertiary-type A and advanced research programmes in 2002.
Source: OECD. Table A3.4c. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

For the remaining countries the difference is not so pronounced, few above one point on average. However, it is important to note that in Korea, Japan and Switzerland, there is a gender gap for tertiary-type B level as well.

Considering trend data reveals that the gender gap is reducing even in the three countries where it is very large. However, at the same time, in countries where the advantage for women was already marked, the trend is continuing toward an even greater advantage for women.

Chart A3.6. Change in the difference between educational attainment of females and males in tertiary-type A and advanced research programmes (1998-2002)

Percentage points for 25 to 34-year-olds



Countries are ranked in descending order of the difference between educational attainment of females and males in tertiary-type A and advanced research programmes in 2002.

Source: OECD. Table A3.4c. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

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Data refer to the academic year 2001–2002 and are based on the UOE data collection on education statistics that is administered annually by the OECD.

Definitions and methodologies

Tertiary graduates are those who obtain a tertiary qualification in the specified reference year. This indicator distinguishes among different categories of tertiary qualifications: *i)* tertiary-type B qualifications (ISCED 5B); *ii)* tertiary-type A qualifications (ISCED 5A); and *iii)* advanced research degrees of doctorate standard (ISCED 6). For some countries, data are not available for the categories requested. In such cases, the OECD has assigned graduates to the most appropriate category. See Annex 3 at *www.oecd.org/edu/eag2004* for a list of programmes included for each country at the tertiary-type A and type B levels.

Tertiary-type A degrees are also subdivided in accordance with the total theoretical duration of studies at the level of ISCED 5A, to allow for comparisons that are independent of differences in national degree structures.

Graduation rates for first tertiary programmes (tertiary-type A and type B) are calculated as gross graduation rates. In order to calculate gross graduation rates, countries identify the age at which graduation typically occurs (see Annex 1). The graduates themselves, however, may be of any age. The number of graduates is then divided by the population at the typical graduation age. In many countries, defining a typical age of graduation is difficult, however, because graduates are dispersed over a wide range of ages.

A net graduation rate is calculated for advanced tertiary programmes (where duplication of certificates awarded does not pose a problem) as the sum of age-specific graduation rates. The net graduation rate can be interpreted as the percentage of persons within a virtual age cohort who obtain a tertiary qualification, and is thus unaffected by changes in population size or typical graduation age. Gross graduation rates are presented for those countries that cannot provide such detailed data.

Survival rate at the tertiary level is defined as the proportion of new entrants to the specified level of education who successfully complete a first qualification. Drop-outs are defined as those students who leave the specified level in the educational system without obtaining a first qualification. The first qualification refers to any degree, regardless of the duration of study, obtained at the end of a programme that does not have as a prerequisite a previous degree at the same level. The survival rate is calculated as the ratio of the number of students who are awarded an initial degree to the number of new entrants to the level *n* years before, *n* being the number of years of full-time study required to complete the degree.

Educational attainment data are derived from National Labour Force Surveys and levels are based upon the International Standard Classification of Education (ISCED-97).

Data on population and educational attainment are taken from OECD and EUROSTAT databases, which are compiled from National Labour Force Surveys. See Annex 3 at *www.oecd.org/edu/eag2004* for national sources.

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. See Annex 3 at *www.oecd.org/edu/eag2004* for a description of ISCED-97 education programmes and attainment levels and their mappings for each country.

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Table A3.1. Tertiary graduation rates (2002)

Percentage of tertiary graduates to the population at the typical age of graduation, by programme destination and duration

	Tertiary-type B programmes (first-time graduation)	Tertiary-type A programmes (first-time graduation)				Advanced research programmes[2]
		All programmes	3 to less than 5 years[1]	5 to 6 years[1]	More than 6 years	
	(1)	(2)	(3)	(4)	(5)	(6)
OECD COUNTRIES						
Australia	m	45.4	35.9	9.5	a	1.3
Austria	m	18.0	2.7	15.3	n	1.7
Belgium	m	m	m	m	m	1.1
Canada	m	m	m	m	m	m
Czech Republic	4.5	14.9	2.1	12.9	a	0.8
Denmark[3]	9.5	m	m	m	m	0.9
Finland[3]	3.7	45.4	27.3	17.5	0.6	1.9
France[3]	18.5	24.8	8.6	15.3	0.9	1.4
Germany	9.8	19.2	6.5	12.7	a	2.0
Greece	m	m	m	m	m	0.7
Hungary[4]	1.3	37.2	x(2)	x(2)	x(2)	0.7
Iceland	6.4	41.2	33.3	7.6	n	0.1
Ireland	12.7	31.1	23.8	7.3	x(4)	0.8
Italy[3]	0.9	22.7	2.5	20.2	n	0.5
Japan	26.7	33.8	29.3	4.5	a	0.7
Korea	m	m	m	m	m	0.9
Luxembourg	m	m	m	m	m	m
Mexico	m	m	m	m	m	0.1
Netherlands	m	m	m	m	m	1.3
New Zealand	m	m	m	m	m	0.9
Norway	4.8	m	m	m	m	1.1
Poland	n	41.5	x(2)	x(2)	x(2)	0.8
Portugal	m	m	m	m	m	m
Slovak Republic	2.7	23.0	5.0	17.9	a	0.8
Spain	13.8	33.5	x(2)	x(2)	x(2)	1.0
Sweden	3.8	32.7	31.5	1.2	a	2.8
Switzerland	18.9	17.9	x(2)	x(2)	x(2)	2.6
Turkey	m	m	m	m	m	m
United Kingdom	11.5	35.9	33.3	2.5	0.1	1.6
United States	8.8	m	m	m	m	1.3
Country mean	***9.8***	***31.8***	***21.2***	***11.4***	***1.9***	***1.2***

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2. Mismatches between the coverage of the population data and the student/graduate data mean that the participation/graduation rates for those countries that are net exporters of students may be underestimated (for instance Luxembourg) and those that are net importers may be overestimated.

1. Excluding students who subsequently completed a longer programme.
2. Net graduation rate is calculated by summing the graduation rates by single year of age, except for France, Italy, Japan, Korea, Mexico, the Netherlands and the United States.
3. Year of reference 2001.
4. Gross graduation rate may include some double counting.

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

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Table A3.2. Survival rates in tertiary education (2000)

Number of graduates divided by the number of new entrants in the typical year of entrance, by programme destination, and distribution of graduates by duration of programme

		Tertiary-type A education				Tertiary-type B education				
			Duration of programmes				Duration of programmes			
		All programmes	3 to less than 5 years	5 to less than 6 years	6 years or more	All programmes	2 to less than 3 years	3 to less than 5 years	5 years or more	Advanced research programmes
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OECD COUNTRIES	Australia	69	77	m	n	m	m	a	a	m
	Austria	59	74	58	n	m	m	m	m	m
	Belgium (Fl.)	60	67	58	27	88	a	88	a	m
	Czech Republic	61	74	55	a	77	75	78	a	m
	Denmark	69	69	a	a	84	65	90	a	m
	Finland	75	m	75	a	m	m	m	m	m
	France	59	m	m	m	72	72	n	a	36
	Germany	70	a	a	a	75	a	a	a	m
	Iceland	73	79	54	n	55	73	31	n	50
	Ireland	85	85	x(2)	x(2)	50	50	x(6)	a	m
	Italy	42	58	41	a	51	a	51	a	89
	Japan	94	94	x(2)	x(2)	86	86	x(6)	x(6)	85
	Korea	79	79	x(2)	a	74	73	78	a	95
	Mexico	69	69	x(2)	a	81	81	x(6)	a	54
	Netherlands	69	70	53	a	58	59	50	a	m
	Poland	m	81	m	a	84	84	a	a	m
	Spain	77	75	78	n	74	74	n	n	m
	Sweden	48	m	m	a	85	m	m	a	m
	Turkey	88	88	90	a	77	77	a	a	a
	United Kingdom	83	m	m	m	m	m	m	m	m
	United States	66	66	a	a	62	62	x(6)	x(6)	m
	Country mean	***70***	***76***	***62***	***2***	***73***	***72***	***67***	***n***	***58***
PARTNER COUNTRY	Israel	70	m	m	m	91	m	m	m	m

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.
Source: OECD. See Annex 3 for notes (*www.oecd.org/edu/eag2004*).

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Table A3.3. Population that has attained tertiary education (2002)

Percentage of the population that has attained tertiary-type B education or tertiary-type A and advanced research programmes, by age group

		Tertiary-type B education					Tertiary-type A and advanced research programmes				
		25-64	25-34	35-44	45-54	55-64	25-64	25-34	35-44	45-54	55-64
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
OECD COUNTRIES	Australia	11	11	11	11	10	20	25	21	19	13
	Austria	7	7	8	8	6	7	7	8	7	5
	Belgium	15	20	16	13	10	13	18	13	11	8
	Canada	22	25	23	21	16	21	26	20	20	16
	Czech Republic	x(6)	x(7)	x(8)	x(9)	x(10)	12	12	14	11	11
	Denmark	5	6	6	5	4	23	23	24	25	18
	Finland	17	19	21	16	12	16	21	17	14	11
	France	12	17	12	9	6	12	19	11	10	9
	Germany	10	8	11	11	10	13	13	15	14	11
	Greece	6	7	8	4	3	13	17	14	12	7
	Hungary	x(6)	x(7)	x(8)	x(9)	x(10)	14	15	14	14	13
	Iceland	6	6	7	7	4	20	23	22	19	12
	Ireland	10	14	10	7	5	16	23	15	12	9
	Italy	x(6)	x(7)	x(8)	x(9)	x(10)	10	12	11	10	7
	Japan	16	25	20	12	7	20	25	25	19	11
	Korea	8	15	7	2	1	18	26	21	11	8
	Luxembourg	7	9	8	6	5	12	14	12	10	10
	Mexico	3	6	2	2	3	2	5	1	1	2
	Netherlands	3	2	3	2	2	22	25	23	21	17
	New Zealand	15	12	15	17	17	15	18	16	15	9
	Norway	3	2	3	2	2	28	37	29	26	20
	Poland	x(6)	x(7)	x(8)	x(9)	x(10)	12	16	11	11	11
	Portugal	2	3	2	2	2	7	12	7	5	3
	Slovak Republic	1	1	1	1	1	10	11	10	11	8
	Spain	7	12	7	4	2	17	25	18	13	8
	Sweden	15	17	18	14	10	18	22	16	17	16
	Switzerland	9	10	10	9	7	16	17	17	16	14
	Turkey	x(6)	x(7)	x(8)	x(9)	x(10)	9	11	8	9	7
	United Kingdom	8	8	9	8	7	19	23	18	18	13
	United States	9	9	10	10	7	29	31	29	30	26
	Country mean	***8***	***9***	***8***	***7***	***5***	***16***	***19***	***16***	***14***	***11***
PARTNER COUNTRIES	Argentina[1]	5	6	5	4	2	9	9	10	10	6
	Brazil[1]	x(6)	x(7)	x(8)	x(9)	x(10)	8	7	9	9	6
	Chile	1	2	2	1	1	11	15	10	11	7
	Indonesia	2	2	2	2	1	2	3	2	2	1
	Israel	16	15	16	17	17	26	25	26	27	25
	Jordan	12	x(1)	x(1)	x(1)	x(1)	12	x(6)	x(6)	x(6)	x(6)
	Malaysia[1]	x(6)	x(7)	x(8)	x(9)	x(10)	10	14	10	6	4
	Paraguay[1]	2	2	2	1	2	9	11	9	7	4
	Peru[1]	7	10	8	6	3	8	8	9	8	6
	Philippines	12	15	10	x(3)	x(3)	8	9	8	x(8)	x(8)
	Thailand	3	4	3	1	1	9	10	10	7	4
	Uruguay[1]	9	8	11	10	8	x(1)	x(2)	x(3)	x(4)	x(5)

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.
1. Year of reference 2001.
Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A3.4a. Trends in educational attainment of the 25 to 64-year-old population (1991-2002)

Percentage that has attained upper secondary, post-secondary non-tertiary and tertiary education

OECD COUNTRIES		1991	1995	1998	1999	2000	2001	2002
Australia	Below upper secondary	48	45	44	43	41	41	39
	Upper secondary and post-secondary non-tertiary	30	31	31	31	31	30	30
	Tertiary education	22	24	25	27	27	29	31
Austria	Below upper secondary	33	31	26	25	24	23	22
	Upper secondary and post-secondary non-tertiary	61	62	63	64	62	63	63
	Tertiary education	7	8	11	11	14	14	14
Belgium	Below upper secondary	57	49	43	43	41	41	39
	Upper secondary and post-secondary non-tertiary	24	28	31	31	31	32	33
	Tertiary education	20	23	25	26	27	28	28
Canada	Below upper secondary	30	25	21	21	19	18	17
	Upper secondary and post-secondary non-tertiary	42	41	40	40	41	40	40
	Tertiary education	28	34	38	39	40	42	43
Czech Republic	Below upper secondary	m	17	15	14	14	14	12
	Upper secondary and post-secondary non-tertiary	m	73	75	75	75	75	76
	Tertiary education	m	11	10	11	11	11	12
Denmark	Below upper secondary	39	33	21	20	20	20	20
	Upper secondary and post-secondary non-tertiary	43	47	53	53	54	54	53
	Tertiary education	18	20	25	27	26	26	27
Finland	Below upper secondary	40	35	31	28	27	26	25
	Upper secondary and post-secondary non-tertiary	35	38	39	40	41	42	42
	Tertiary education	25	28	30	31	32	32	33
France	Below upper secondary	49	43	39	38	37	36	35
	Upper secondary and post-secondary non-tertiary	36	38	40	40	41	41	41
	Tertiary education	15	19	21	21	22	23	24
Germany	Below upper secondary	18	16	16	19	18	17	17
	Upper secondary and post-secondary non-tertiary	60	61	61	58	58	59	60
	Tertiary education	22	23	23	23	23	23	23
Greece	Below upper secondary	m	57	53	50	49	49	47
	Upper secondary and post-secondary non-tertiary	m	25	31	32	33	34	34
	Tertiary education	m	17	17	17	18	18	18
Hungary	Below upper secondary	m	m	37	33	31	30	29
	Upper secondary and post-secondary non-tertiary	m	m	50	54	55	56	57
	Tertiary education	m	m	13	14	14	14	14
Iceland	Below upper secondary	m	m	38	37	38	36	34
	Upper secondary and post-secondary non-tertiary	m	m	41	40	39	39	39
	Tertiary education	m	m	21	22	23	25	26
Ireland	Below upper secondary	60	53	49	45	43	41	40
	Upper secondary and post-secondary non-tertiary	24	27	30	35	36	35	35
	Tertiary education	16	20	21	20	22	24	25
Italy	Below upper secondary	72	65	58	56	56	55	54
	Upper secondary and post-secondary non-tertiary	22	27	33	34	35	35	36
	Tertiary education	6	8	9	9	9	10	10
Japan	Below upper secondary	m	m	20	19	17	17	16
	Upper secondary and post-secondary non-tertiary	m	m	50	49	49	49	47
	Tertiary education	m	m	30	32	33	34	36
Korea	Below upper secondary	49	39	34	33	32	30	29
	Upper secondary and post-secondary non-tertiary	37	42	44	44	44	45	45
	Tertiary education	14	19	22	23	24	25	26

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A3.4a. (*continued*) **Trends in educational attainment of the 25 to 64-year-old population (1991-2002)**

Percentage that has attained upper secondary, post-secondary non-tertiary and tertiary education

OECD COUNTRIES		1991	1995	1998	1999	2000	2001	2002
Luxembourg	Below upper secondary	m	m	m	38	39	41	38
	Upper secondary and post-secondary non-tertiary	m	m	m	44	43	41	43
	Tertiary education	m	m	m	18	18	18	19
Mexico	Below upper secondary	m	90	89	89	88	88	87
	Upper secondary and post-secondary non-tertiary	m	5	6	6	6	7	7
	Tertiary education	m	5	5	5	5	5	6
Netherlands	Below upper secondary	44	39	36	35	35	35	34
	Upper secondary and post-secondary non-tertiary	37	39	40	42	41	42	42
	Tertiary education	20	22	24	23	23	23	24
New Zealand	Below upper secondary	33	30	27	26	25	24	24
	Upper secondary and post-secondary non-tertiary	44	45	46	47	47	46	46
	Tertiary education	23	25	27	27	28	29	30
Norway	Below upper secondary	21	19	15	15	15	14	14
	Upper secondary and post-secondary non-tertiary	54	53	57	57	57	55	55
	Tertiary education	25	29	27	28	28	30	31
Poland	Below upper secondary	m	26	22	22	20	19	18
	Upper secondary and post-secondary non-tertiary	m	64	67	67	69	69	69
	Tertiary education	m	10	11	11	11	12	12
Portugal	Below upper secondary	86	80	82	81	81	80	80
	Upper secondary and post-secondary non-tertiary	8	9	10	10	11	11	11
	Tertiary education	7	11	8	9	9	9	9
Slovak Republic	Below upper secondary	m	22	20	18	16	15	14
	Upper secondary and post-secondary non-tertiary	m	67	70	72	73	74	75
	Tertiary education	m	11	10	10	10	11	11
Spain	Below upper secondary	78	72	67	65	61	60	58
	Upper secondary and post-secondary non-tertiary	12	12	14	14	16	17	17
	Tertiary education	10	16	20	21	23	24	24
Sweden	Below upper secondary	31	25	24	23	22	19	18
	Upper secondary and post-secondary non-tertiary	44	46	48	48	47	49	49
	Tertiary education	25	28	28	29	30	32	33
Switzerland	Below upper secondary	19	18	18	18	18	13	15
	Upper secondary and post-secondary non-tertiary	60	61	59	58	58	62	59
	Tertiary education	20	21	23	24	24	25	25
Turkey	Below upper secondary	82	77	78	78	77	76	75
	Upper secondary and post-secondary non-tertiary	11	15	14	14	15	15	16
	Tertiary education	6	8	8	8	8	9	9
United Kingdom	Below upper secondary	35	23	19	18	17	17	16
	Upper secondary and post-secondary non-tertiary	49	55	57	57	57	57	57
	Tertiary education	16	22	24	25	26	26	27
United States	Below upper secondary	16	14	14	13	13	12	13
	Upper secondary and post-secondary non-tertiary	54	53	52	51	51	50	49
	Tertiary education	30	33	35	36	36	37	38
Country mean	***Below upper secondary***	***45***	***40***	***36***	***35***	***35***	***34***	***33***
	Upper secondary and post-secondary non-tertiary	***37***	***41***	***43***	***44***	***44***	***44***	***44***
	Tertiary education	***18***	***19***	***20***	***21***	***22***	***22***	***23***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A3.4b. Trends in educational attainment of the 25 to 34-year-old population (1991-2002)

Percentage that has attained upper secondary, post-secondary non-tertiary and tertiary education

OECD COUNTRIES		1991	1995	1998	1999	2000	2001	2002
Australia	Below upper secondary	43	40	36	35	32	29	27
	Upper secondary and post-secondary non-tertiary	34	35	36	36	37	37	37
	Tertiary education	23	25	28	29	31	34	36
Austria	Below upper secondary	21	19	17	17	17	16	15
	Upper secondary and post-secondary non-tertiary	71	72	71	71	68	70	70
	Tertiary education	8	9	13	13	15	14	15
Belgium	Below upper secondary	42	33	27	27	25	24	23
	Upper secondary and post-secondary non-tertiary	31	37	39	39	39	39	39
	Tertiary education	27	30	34	34	36	38	38
Canada	Below upper secondary	20	16	13	13	12	11	11
	Upper secondary and post-secondary non-tertiary	48	43	41	40	40	39	38
	Tertiary education	32	40	45	47	48	51	51
Czech Republic	Below upper secondary	m	9	8	7	8	8	6
	Upper secondary and post-secondary non-tertiary	m	79	82	82	81	81	81
	Tertiary education	m	12	10	11	11	11	12
Denmark	Below upper secondary	25	25	15	13	13	14	15
	Upper secondary and post-secondary non-tertiary	56	55	58	59	58	57	55
	Tertiary education	19	20	27	29	29	29	31
Finland	Below upper secondary	19	17	18	14	15	13	12
	Upper secondary and post-secondary non-tertiary	48	48	46	48	48	49	49
	Tertiary education	33	35	36	37	38	38	39
France	Below upper secondary	34	29	25	24	23	22	21
	Upper secondary and post-secondary non-tertiary	46	46	46	45	45	44	43
	Tertiary education	20	25	30	31	32	34	36
Germany	Below upper secondary	11	11	12	15	15	15	15
	Upper secondary and post-secondary non-tertiary	68	68	66	64	63	64	63
	Tertiary education	21	21	22	22	22	22	22
Greece	Below upper secondary	m	36	31	29	28	27	26
	Upper secondary and post-secondary non-tertiary	m	38	45	46	48	49	50
	Tertiary education	m	26	24	25	24	24	24
Hungary	Below upper secondary	m	m	23	20	19	19	18
	Upper secondary and post-secondary non-tertiary	m	m	64	66	67	66	67
	Tertiary education	m	m	14	14	15	15	15
Iceland	Below upper secondary	m	m	36	32	35	35	32
	Upper secondary and post-secondary non-tertiary	m	m	40	40	37	39	39
	Tertiary education	m	m	24	28	28	26	29
Ireland	Below upper secondary	46	36	33	28	27	24	23
	Upper secondary and post-secondary non-tertiary	35	37	37	44	43	42	41
	Tertiary education	20	27	29	28	30	33	36
Italy	Below upper secondary	57	51	45	43	41	40	38
	Upper secondary and post-secondary non-tertiary	36	41	46	47	48	48	49
	Tertiary education	7	8	9	10	10	12	12
Japan	Below upper secondary	m	m	7	7	6	6	6
	Upper secondary and post-secondary non-tertiary	m	m	48	48	47	46	44
	Tertiary education	m	m	45	45	47	48	50
Korea	Below upper secondary	27	14	8	7	7	5	5
	Upper secondary and post-secondary non-tertiary	52	57	58	58	56	55	54
	Tertiary education	21	29	34	35	37	39	41

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A3.4b. (*continued*) **Trends in educational attainment of the 25 to 34-year-old population (1991-2002)**

Percentage that has attained upper secondary, post-secondary non-tertiary and tertiary education

OECD COUNTRIES		1991	1995	1998	1999	2000	2001	2002
Luxembourg	Below upper secondary	m	m	m	32	32	34	32
	Upper secondary and post-secondary non-tertiary	m	m	m	47	45	43	46
	Tertiary education	m	m	m	21	23	23	23
Mexico	Below upper secondary	m	84	82	81	80	79	79
	Upper secondary and post-secondary non-tertiary	m	8	9	9	10	10	10
	Tertiary education	m	8	9	10	10	10	11
Netherlands	Below upper secondary	33	30	26	26	26	25	24
	Upper secondary and post-secondary non-tertiary	45	46	46	49	48	48	48
	Tertiary education	22	25	27	25	27	27	28
New Zealand	Below upper secondary	26	23	6	6	7	6	5
	Upper secondary and post-secondary non-tertiary	51	53	61	59	59	56	55
	Tertiary education	23	24	33	35	35	38	40
Norway	Below upper secondary	12	12	6	6	7	6	5
	Upper secondary and post-secondary non-tertiary	61	56	61	59	59	56	55
	Tertiary education	27	32	33	35	35	38	40
Poland	Below upper secondary	m	12	11	11	11	10	10
	Upper secondary and post-secondary non-tertiary	m	78	77	76	75	75	75
	Tertiary education	m	10	12	12	14	15	16
Portugal	Below upper secondary	79	69	72	70	68	67	65
	Upper secondary and post-secondary non-tertiary	12	17	17	18	19	19	20
	Tertiary education	9	14	12	12	13	14	15
Slovak Republic	Below upper secondary	m	9	9	7	6	6	7
	Upper secondary and post-secondary non-tertiary	m	79	80	82	82	82	81
	Tertiary education	m	12	11	11	11	12	12
Spain	Below upper secondary	60	53	47	45	44	42	41
	Upper secondary and post-secondary non-tertiary	24	21	21	21	22	22	22
	Tertiary education	16	27	32	33	34	36	37
Sweden	Below upper secondary	16	12	13	13	13	9	9
	Upper secondary and post-secondary non-tertiary	57	59	57	55	54	54	52
	Tertiary education	27	29	31	32	34	37	39
Switzerland	Below upper secondary	12	12	12	11	12	8	11
	Upper secondary and post-secondary non-tertiary	66	67	63	63	63	66	63
	Tertiary education	21	22	25	26	26	26	26
Turkey	Below upper secondary	78	74	73	74	72	71	69
	Upper secondary and post-secondary non-tertiary	16	19	19	18	19	19	20
	Tertiary education	6	8	8	8	9	9	11
United Kingdom	Below upper secondary	21	14	11	10	10	10	10
	Upper secondary and post-secondary non-tertiary	61	63	63	63	62	61	59
	Tertiary education	19	23	26	27	29	29	31
United States	Below upper secondary	14	13	12	12	12	12	13
	Upper secondary and post-secondary non-tertiary	56	54	52	50	50	49	48
	Tertiary education	30	34	36	37	38	39	39
Country mean	***Below upper secondary***	***33***	***29***	***25***	***25***	***24***	***23***	***22***
	Upper secondary and post-secondary non-tertiary	***46***	***49***	***50***	***50***	***50***	***49***	***49***
	Tertiary education	***20***	***22***	***25***	***25***	***26***	***27***	***28***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A3.4c. Trends in educational attainment of the 25 to 34-year-old population, by gender (1998-2002)

Percentage that has attained tertiary-type A and advanced research programmes

OECD COUNTRIES		1998	1999	2000	2001	2002
Australia	Males	17	19	20	22	22
	Females	21	22	25	26	27
	M+F	19	20	22	24	25
Austria	Males	7	8	7	7	7
	Females	6	7	7	7	8
	M+F	7	7	7	7	7
Belgium	Males	17	18	18	19	18
	Females	15	16	15	17	18
	M+F	16	17	17	18	18
Canada	Males	21	21	22	23	23
	Females	23	25	27	27	29
	M+F	22	23	25	25	26
Czech Republic	Males	11	12	12	12	13
	Females	10	10	11	11	12
	M+F	10	11	11	11	12
Finland	Males	14	14	16	16	18
	Females	15	17	19	21	23
	M+F	15	16	17	18	21
France	Males	14	15	15	16	17
	Females	15	16	17	19	20
	M+F	15	15	16	18	19
Germany	Males	15	14	15	14	14
	Females	13	12	12	13	13
	M+F	14	13	13	14	13
Greece	Males	14	14	15	14	14
	Females	18	19	18	19	20
	M+F	16	17	16	17	17
Hungary	Males	12	11	12	13	13
	Females	16	16	17	16	17
	M+F	14	14	15	15	15
Iceland	Males	17	21	20	19	22
	Females	21	24	24	23	24
	M+F	19	22	22	21	23
Ireland	Males	17	18	19	19	21
	Females	15	17	19	21	25
	M+F	16	18	19	20	23
Italy	Males	8	9	9	10	11
	Females	10	11	12	13	14
	M+F	9	10	10	12	12
Japan	Males	33	33	33	33	33
	Females	14	13	14	16	17
	M+F	23	23	24	24	25
Korea	Males	27	26	27	28	28
	Females	20	20	20	22	24
	M+F	23	23	24	25	26

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A3.4c. (*continued*) **Trends in educational attainment of the 25 to 34-year-old population, by gender (1998-2002)**

Percentage that has attained tertiary-type A and advanced research programmes

			1998	1999	2000	2001	2002
OECD COUNTRIES	Luxembourg	Males	m	15	16	17	15
		Females	m	11	14	13	13
		M+F	m	13	15	15	14
	Mexico	Males	4	5	5	5	5
		Females	4	4	4	5	5
		M+F	4	4	5	5	5
	Netherlands	Males	28	23	25	24	24
		Females	27	22	23	25	26
		M+F	27	23	24	24	25
	New Zealand	Males	16	16	17	16	17
		Females	16	15	16	17	18
		M+F	16	16	16	17	18
	Norway	Males	28	27	27	30	32
		Females	34	36	37	41	43
		M+F	31	32	32	35	37
	Poland	Males	10	10	11	12	12
		Females	14	15	17	18	19
		M+F	12	12	14	15	16
	Portugal	Males	7	7	7	8	8
		Females	11	11	12	14	16
		M+F	9	9	10	11	12
	Slovak Republic	Males	11	11	10	11	10
		Females	11	11	11	12	13
		M+F	11	11	11	11	11
	Spain	Males	18	19	19	20	21
		Females	24	26	26	28	29
		M+F	21	22	23	24	25
	Sweden	Males	9	10	11	17	19
		Females	11	13	14	22	25
		M+F	10	11	12	20	22
	Switzerland	Males	20	22	20	21	20
		Females	11	12	12	11	14
		M+F	15	17	16	16	17
	Turkey	Males	9	10	10	10	12
		Females	7	7	8	8	9
		M+F	8	8	9	9	11
	United Kingdom	Males	18	20	21	22	23
		Females	16	17	19	20	23
		M+F	17	19	20	21	23
	United States	Males	26	28	29	28	28
		Females	29	30	30	31	33
		M+F	27	29	29	30	31
	Country mean	***Males***	***16***	***16***	***17***	***17***	***18***
		Females	***16***	***16***	***17***	***18***	***20***
		M+F	***16***	***16***	***17***	***18***	***19***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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INDICATOR A4: TERTIARY GRADUATES BY FIELD OF STUDY

- On average across OECD countries, close to one-third of tertiary-type A graduates obtain a degree in social sciences, business or law. The second most popular fields are science-related (engineering, manufacturing and construction, life sciences, physical sciences and agriculture, mathematics and computing, but not including health and welfare), from which one in four students graduates, on average.
- Science-related fields – closely followed by social sciences, business and law – are the most popular fields of study at the tertiary-type B level, where programmes are more occupationally oriented.
- In humanities, arts, education, health and welfare, more than two-thirds of the tertiary-type A graduates are female on average in OECD countries. Less than one-third of graduates in mathematics and computer science, and less than one-fifth of graduates in engineering, manufacturing and construction are female.
- Tertiary-type A graduation rates for females equal or exceed those for males in most OECD countries, but males are still more likely than females to earn advanced research qualifications, such as doctorates.

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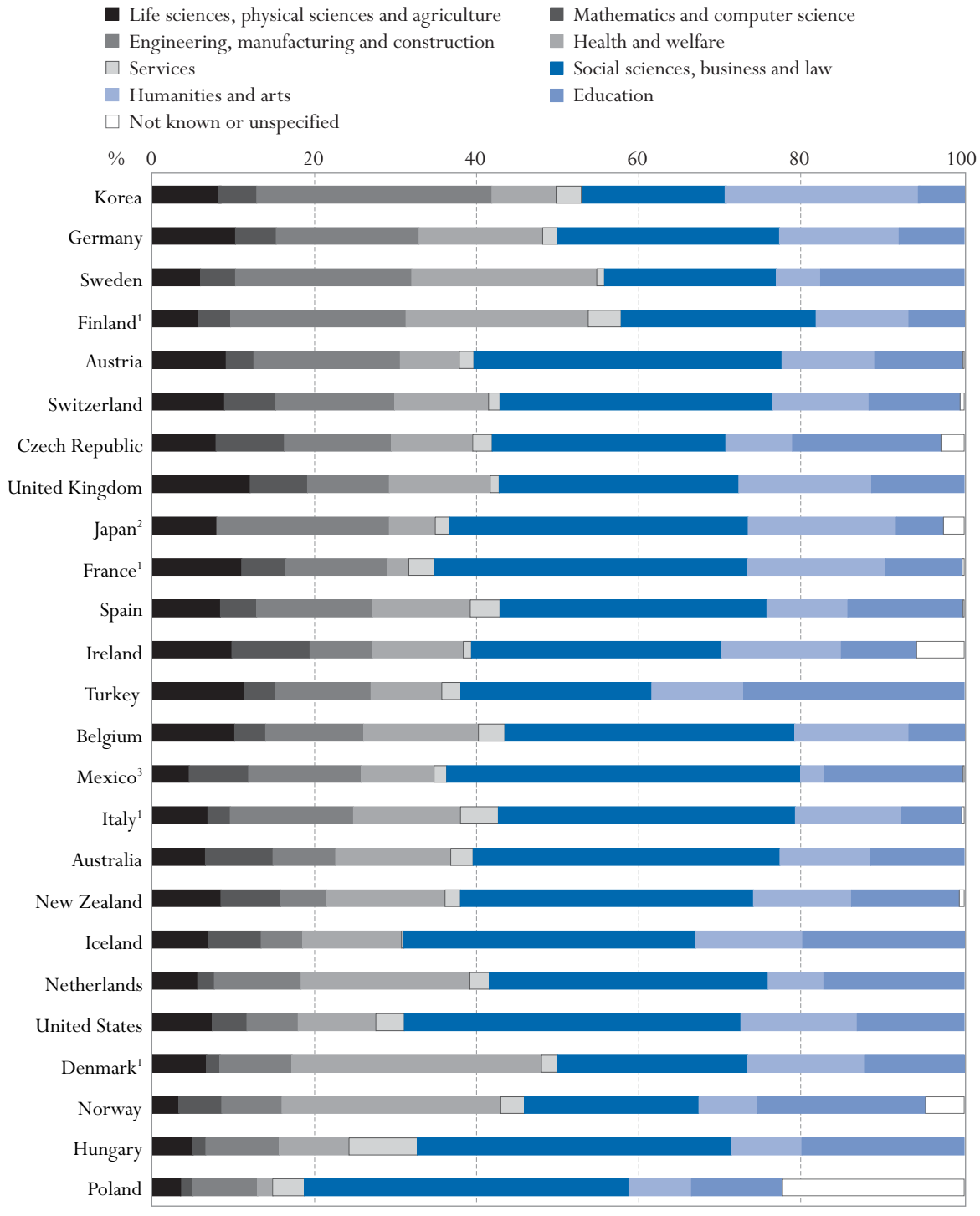
Chart A4.1. Tertiary graduates, by field of study (2002)

Graduates with tertiary-type A and advanced research qualifications



1. Year of reference 2001.
2. Mathematics and computer science are included in the category "life sciences, physical sciences and agriculture".
3. Excludes tertiary-type A second degree programmes.

Countries are ranked in descending order of the proportion of qualifications in life sciences, physical sciences and agriculture, mathematics and computer science, and engineering, manufacturing and construction.

Source: OECD. Table A4.1. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

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Policy context

This indicator shows the distribution of tertiary graduates across fields of study.

Changing opportunities in the job market, relative earnings in different occupations and sectors, and admission policies and practices of tertiary education institutions may affect which fields students choose to study. In turn, the relative popularity of the various fields of study affects the demand for courses and teaching staff, as well as the supply of new graduates. This indicator sheds light on the distribution of tertiary graduates across different fields of study, as well as on the relative proportion of female graduates in those fields.

Evidence and explanations

Graduates by field of study

On average in OECD countries, close to one-third of tertiary-type A graduates obtain a degree in social sciences, business or law.

In 21 of the 26 countries providing data, the largest concentration of tertiary-type A and advanced research qualifications awarded is in the combined fields of social sciences, business and law (Table A4.1). On average in OECD countries, close to one-third of tertiary-type A graduates obtain a degree in social sciences, business or law. The percentage of tertiary-type A qualifications awarded in social sciences, business and law ranges from less than 23% in Korea, Norway and Sweden, to more than 40% in Mexico and the United States. The largest concentration of tertiary-type A and advanced research qualifications awarded is in the field of education in Turkey; in the fields of engineering, manufacturing and construction in Korea; and in the fields of health and welfare in Denmark, Norway and Sweden.

The second largest concentration of tertiary-type A and advanced research qualifications awarded is in science-related fields.

An average of 26% of tertiary-type A and advanced research students receive qualifications in science-related fields (engineering, manufacturing and construction, life sciences, physical sciences and agriculture, mathematics and computing, but not including health and welfare) in OECD countries; this includes percentages of less than 17% in Hungary, Norway and Poland, to around one-third in Germany and Sweden, and 41% in Korea. Slightly less popular on average in OECD countries are the fields of humanities, arts and education, from which 24% of tertiary-type A and advanced research students graduate.

Individual preferences, admission policies and degree structures influence the prevalence of different fields of study.

The distribution of qualifications awarded by field of study is driven by the relative popularity of these fields among students, the relative number of students admitted to these fields in universities and equivalent institutions, and the degree structure of the various disciplines in a particular country.

Part of the variation in graduation rates among countries (Table A3.1) can also be accounted for by differences in the number of tertiary-type A degrees earned in the fields of education and humanities. Countries with high graduation rates, on average, have a higher proportion of graduates in education and humanities and a lower proportion of graduates in science-related fields. In other words, there is less variation in graduation rates in science-related fields among countries than in overall graduation rates.

Graduates at the tertiary-type B level are mainly from science-related fields.

Although the same three combined fields of study yield the majority of graduates, the picture is slightly different for tertiary-type B education, where programmes are more occupationally oriented: science-related fields have the largest

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concentration of graduates (26%), followed by the combined field of social sciences, business and law (25%), and then the combined fields of humanities, arts and education (20%). However, health and welfare graduates are more common at this level than engineering, manufacturing and construction graduates (18 and 16%, respectively) (Table A4.1).

The selection of a field of study at this level is heavily dependent on opportunities to study similar subject matters, or to prepare for similar occupations at the post-secondary non-tertiary or tertiary-type A level. For example, if nurses in a particular country were trained primarily in tertiary-type B programmes, the proportion of students graduating with qualifications in medical sciences from that level would be higher than if nurses were primarily trained in upper secondary or tertiary-type A programmes.

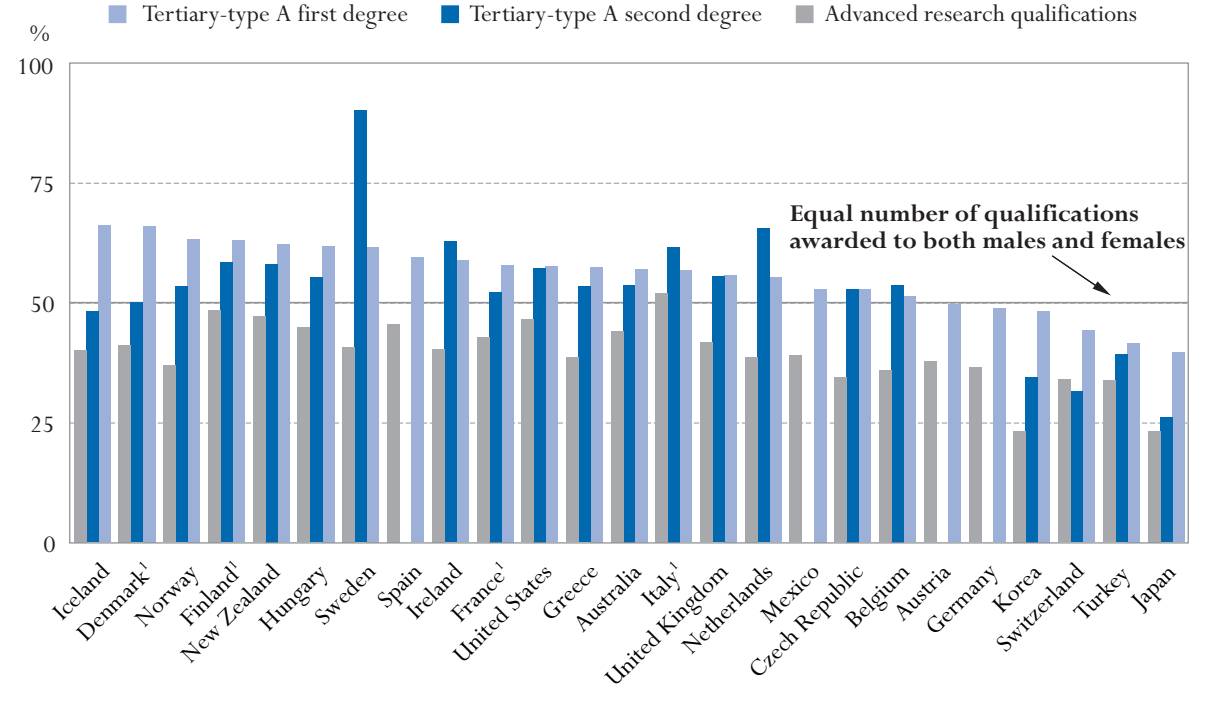
Gender differences in tertiary graduation

Tertiary-type A graduation rates for females equal or exceed those for males in most countries…

Overall, tertiary-type A graduation rates for females equal or exceed those for males in 21 out of 27 OECD countries. On average in OECD countries, 55% of all first tertiary-type A graduates are females. However, major differences remain among fields of study. In humanities, arts, education, health and welfare, more than two-thirds of the tertiary-type A graduates are females, on average

Chart A4.2. Percentage of tertiary qualifications awarded to females (2002)

Percentage of total graduates (all fields of study)



1. Year of reference 2001.

Countries are ranked in descending order of the percentage of tertiary-type A first degrees that are awarded to females.

Source: OECD. Table A4.2. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

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in OECD countries, whereas less than one-third of mathematics and computer science graduates and less than one-fifth of engineering, manufacturing and construction graduates are females (Table A4.2).

…but the proportion of female graduates is 44% or below in Japan, Switzerland and Turkey.

In Denmark, Finland, Hungary, Iceland, New Zealand, Norway, Poland and Sweden, the proportion of females obtaining a first tertiary-type A qualification is more than 60%, but it is 44% or lower in Japan, Switzerland and Turkey (Table A4.2).

In OECD countries, males are still more likely than females to earn advanced research qualifications, such as doctorates.

Males remain more likely than females to obtain advanced research qualifications in OECD countries (Table A4.2). Graduation rates from advanced research, *e.g.* Ph.D., programmes are lower for females than for males in all countries except Italy. On average in OECD countries, nearly two-thirds of all graduates at this level are males. In Japan and Korea, just over three-quarters of advanced research qualifications are awarded to males.

Definitions and methodologies

Data refer to the academic year 2001–2002 and are based on the UOE data collection on education statistics that is annually administered by the OECD.

Tertiary graduates are those who obtain a tertiary qualification in the specified reference year. This indicator distinguishes among different categories of tertiary qualifications: *i)* tertiary-type B qualifications (ISCED 5B); *ii)* tertiary-type A qualifications (ISCED 5A); and *iii)* advanced research qualifications (ISCED 6). For some countries, data are not available for the categories requested. In such cases, the country has assigned graduates to the most appropriate category.

Data in Tables A4.1 and A4.2 cover graduates from all tertiary degrees reported in Table A3.1. Tertiary graduates who receive their qualification in the reference year are divided into categories based on their subject of specialisation.

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Table A4.1. Tertiary graduates, by field of study (2002)

			Education	Humanities and arts	Social sciences, business and law	Services	Engineering, manufacturing and construction	Agriculture	Health and welfare	Life sciences	Physical sciences	Mathematics and statistics	Computing	Not known or unspecified
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OECD COUNTRIES	Australia	A	11.5	11.2	37.8	2.7	7.7	1.0	14.2	3.3	2.3	0.5	7.9	a
		B	1.5	11.3	36.0	12.2	11.3	3.8	13.1	m	m	m	m	0.1
	Austria	A	10.8	11.4	38.0	1.8	18.0	2.5	7.2	3.6	3.0	0.7	2.7	0.2
		B	m	m	m	m	m	m	m	m	m	m	m	a
	Belgium[1]	A	6.8	14.1	35.7	3.3	12.1	2.9	14.1	4.2	3.0	1.0	2.9	n
		B	23.7	6.1	26.6	1.3	9.1	0.5	27.1	0.7	0.2	n	4.8	n
	Canada	A	m	m	m	m	m	m	m	m	m	m	m	m
		B	m	m	m	m	m	m	m	m	m	m	m	m
	Czech Republic	A	18.3	8.2	28.7	2.4	13.2	3.6	10.0	2.0	2.3	1.0	7.4	2.9
		B	a	7.7	33.2	9.8	5.8	3.2	35.6	a	a	a	4.7	a
	Denmark[2]	A	12.3	14.4	23.5	1.9	8.9	1.5	30.7	3.0	2.3	0.6	1.1	a
		B	a	3.6	25.2	7.6	35.2	7.7	a	a	a	a	20.8	a
	Finland[2]	A	6.8	11.4	24.0	4.1	21.6	2.2	22.4	1.4	2.0	0.6	3.4	n
		B	4.6	10.2	10.0	23.3	30.3	4.0	12.4	a	a	a	5.3	a
	France[2]	A	9.4	17.0	38.6	3.1	12.5	0.3	2.7	5.8	4.9	2.5	3.0	0.3
		B	a	1.6	40.5	6.2	26.9	0.3	18.7	a	0.1	0.4	5.2	a
	Germany	A	8.0	14.7	27.4	1.8	17.6	1.9	15.2	3.4	5.0	1.7	3.3	a
		B	8.8	1.0	8.9	9.0	15.3	3.5	51.7	n	a	a	0.5	1.2
	Greece	A	m	m	m	m	m	m	m	m	m	m	m	m
		B	m	m	m	m	m	m	m	m	m	m	m	m
	Hungary[1]	A	20.0	8.7	38.7	8.4	9.1	3.7	8.5	0.7	0.7	0.2	1.4	a
		B	n	n	47.4	23.4	17.8	n	3.4	n	n	6.7	1.3	a
	Iceland	A	19.9	13.2	35.9	0.3	5.1	0.8	12.2	3.9	2.3	0.3	6.1	a
		B	30.9	6.3	41.8	n	n	n	n	n	n	n	21.1	a
	Ireland	A	9.3	14.7	30.8	1.0	7.7	1.2	11.2	5.8	2.8	0.9	8.7	5.8
		B	2.6	6.7	34.1	10.5	16.6	0.7	9.7	1.3	2.2	n	15.3	0.3
	Italy[2]	A	7.4	13.1	36.6	4.6	15.2	2.0	13.2	3.3	1.6	2.0	0.7	0.3
		B	60.8	39.2	a	a	a	a	a	a	a	a	a	a
	Japan[3]	A	5.8	18.2	36.8	1.8	21.2	3.3	5.7	4.7	x(8)	x(8)	x(8)	2.6
		B	8.3	13.7	7.6	25.3	16.5	0.6	21.5	n	x(8)	x(8)	x(8)	6.4
	Korea	A	5.2	21.4	22.3	2.9	27.4	2.6	7.1	2.1	3.5	1.9	3.5	a
		B	9.0	14.8	15.9	8.1	32.4	1.0	9.6	n	0.2	n	8.8	a
	Luxembourg	A	m	m	m	m	m	m	m	m	m	m	m	m
		B	m	m	m	m	m	m	m	m	m	m	m	m
	Mexico[4]	A	17.1	2.9	43.6	1.5	13.9	2.1	9.0	0.9	1.5	0.4	6.9	0.1
		B	0.2	1.2	26.3	10.2	38.0	1.1	6.8	0.6	0.1	n	15.5	a
	Netherlands	A	17.3	6.9	34.3	2.4	10.7	2.4	20.8	1.0	2.2	0.3	1.8	n
		B	12.1	a	28.6	11.8	2.9	a	37.6	a	a	a	7.1	a
	New Zealand	A	13.3	12.1	36.1	1.9	5.7	1.7	14.6	2.6	4.2	1.0	6.4	0.6
		B	18.9	19.6	23.3	9.5	3.9	2.4	9.4	0.5	1.3	0.6	9.9	0.7
	Norway	A	20.7	7.2	21.5	2.9	7.4	1.2	27.0	1.1	1.1	0.2	5.1	4.7
		B	a	8.2	65.4	4.2	6.0	a	1.5	0.1	a	a	14.2	0.4
	Poland	A	11.5	6.5	40.0	3.6	7.3	1.7	1.9	0.7	1.2	0.6	1.0	23.8
		B	13.5	7.6	42.1	3.1	2.7	1.4	2.0	0.9	1.1	0.7	0.3	24.6
	Portugal	A	m	m	m	m	m	m	m	m	m	m	m	m
		B	m	m	m	m	m	m	m	m	m	m	m	m
	Slovak Republic	A	17.2	5.5	30.1	6.6	17.9	3.9	9.4	2.4	2.4	0.5	4.0	a
		B	5.5	9.8	4.1	5.6	3.9	2.4	68.0	n	n	n	0.8	a
	Spain	A	14.2	10.0	32.9	3.6	14.3	2.9	12.0	2.5	3.1	1.2	3.2	0.1
		B	5.0	7.6	25.2	13.0	23.3	0.6	12.5	n	n	n	12.7	n
	Sweden	A	17.7	5.5	21.1	0.9	21.7	0.9	22.8	2.7	2.3	0.5	3.8	a
		B	6.6	10.2	16.1	13.3	24.3	4.5	8.0	0.2	0.2	0.2	16.4	a
	Switzerland	A	11.2	11.9	33.6	1.4	14.6	1.4	11.6	3.6	4.0	1.1	5.2	0.5
		B	13.9	4.1	39.3	9.5	11.1	1.7	12.5	n	n	n	7.8	n
	Turkey	A	27.2	11.3	23.5	2.3	11.8	4.5	8.8	2.0	4.9	2.8	1.0	a
		B	a	2.6	38.6	6.4	33.7	6.4	5.4	a	0.1	n	6.7	a
	United Kingdom	A	11.4	16.4	29.5	1.1	10.1	1.1	12.4	6.2	4.8	1.4	5.7	a
		B	8.5	9.2	16.7	1.3	9.8	1.7	40.2	1.8	1.9	0.4	8.5	a
	United States	A	13.2	14.4	41.4	3.5	6.3	2.3	9.6	3.7	1.4	0.9	3.4	n
		B	2.7	0.1	32.6	11.5	17.3	1.8	24.5	m	0.3	m	9.1	0.1
	Country mean	***A***	***12.9***	***11.6***	***32.3***	***2.9***	***13.3***	***2.2***	***12.9***	***2.9***	***2.8***	***1.0***	***3.9***	***1.7***
		B	***12.2***	***7.9***	***25.1***	***9.7***	***16.3***	***2.0***	***17.9***	***n***	***n***	***n***	***8.0***	***1.0***
PARTNER COUNTRY	Israel	A	16.3	13.1	41.8	a	10.7	0.9	5.3	3.4	1.7	6.6	x(10)	a
		B	m	m	m	m	m	m	m	m	m	m	m	a

Note: The column following country names specifies the level of education, where A equals tertiary-type A and advanced research programmes, and B equals tertiary-type B programmes. x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.

1. Excludes tertiary-type B second degree programmes.
2. Year of reference 2001.
3. All sciences included in life sciences.
4. Excludes tertiary-type A second degree programmes.

Source: OECD. See Annex 3 for notes (*www.oecd.org/edu/eag2004*).

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Table A4.2. Percentage of tertiary qualifications awarded to females, by type of tertiary education and field of study (2002)

		All fields of study					Health and welfare		Life sciences, physical sciences and agriculture	
		Tertiary-type B (First degree)	Tertiary-type B (Second degree)	Tertiary-type A (First degree)	Tertiary-type A (Second degree)	Advanced research programmes	Tertiary-type B education	Tertiary-type A and advanced research programmes	Tertiary-type B education	Tertiary-type A and advanced research programmes
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OECD COUNTRIES	Australia	52	42	57	54	44	82	77	m	53
	Austria	m	m	49	n	38	m	59	m	49
	Belgium	62	62	51	54	36	81	60	48	45
	Canada	m	m	m	m	m	m	m	m	m
	Czech Republic	72	a	53	53	34	88	71	60	50
	Denmark[1]	34	a	66	50	41	a	82	27	45
	Finland[1]	51	a	63	58	48	87	86	54	54
	France[1]	53	a	58	52	43	81	61	37	50
	Germany	63	a	49	a	36	83	60	13	43
	Greece	53	a	57	53	38	m	m	m	m
	Hungary	60	m	62	55	45	100	75	n	48
	Iceland	46	n	66	48	40	a	81	a	48
	Ireland	52	52	59	63	40	91	82	65	55
	Italy[1]	56	a	57	61	52	a	64	a	52
	Japan	66	a	39	26	23	77	53	53	39
	Korea	55	39	48	34	23	81	58	32	43
	Luxembourg	m	m	m	m	m	m	m	m	m
	Mexico	43	m	53	m	39	80	62	54	42
	Netherlands	59	a	55	65	38	81	74	a	40
	New Zealand	60	66	62	58	47	83	78	46	52
	Norway	52	a	63	53	37	84	83	a	49
	Poland	83	a	63	68	44	a	69	a	64
	Portugal	m	m	m	m	m	m	m	m	m
	Slovak Republic	81	a	55	42	41	91	69	66	49
	Spain	52	n	59	m	45	82	77	26	52
	Sweden	54	a	61	90	41	95	81	54	57
	Switzerland	47	43	44	31	34	77	59	10	36
	Turkey	45	a	41	39	34	61	56	50	44
	United Kingdom	61	x(1)	56	55	42	85	74	44	54
	United States	59	a	57	57	46	87	76	40	53
	Country mean	***57***	***44***	***55***	***51***	***40***	***84***	***70***	***41***	***49***
PARTNER COUNTRY	Israel	m	a	61	60	47	m	68	m	57

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.
1. Year of reference 2001.
Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

A4

Table A4.2. (*continued*) **Percentage of tertiary qualifications awarded to females, by type of tertiary education and field of study (2002)**

		Mathematics and computer science		Humanities, arts and education		Social sciences, business, law and services		Engineering, manufacturing and construction	
		Tertiary-type B education	Tertiary-type A and advanced research programmes	Tertiary-type B education	Tertiary-type A and advanced research programmes	Tertiary-type B education	Tertiary-type A and advanced research programmes	Tertiary-type B education	Tertiary-type A and advanced research programmes
		(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
OECD COUNTRIES	Australia	m	28	62	71	56	53	14	23
	Austria	m	19	m	68	m	51	m	17
	Belgium	12	21	71	66	58	54	17	21
	Canada	m	m	m	m	m	m	m	m
	Czech Republic	42	26	57	70	73	55	27	23
	Denmark[1]	17	28	67	70	46	45	30	23
	Finland[1]	48	39	75	79	58	68	18	21
	France[1]	21	31	57	73	68	60	16	25
	Germany	11	23	86	69	51	45	7	21
	Greece	m	m	m	m	m	m	m	m
	Hungary	56	20	n	75	68	58	19	26
	Iceland	32	20	55	80	45	59	n	27
	Ireland	40	37	69	72	59	58	10	22
	Italy[1]	a	52	56	82	a	55	a	28
	Japan	x(8)	x(9)	82	67	76	33	17	10
	Korea	40	43	72	71	55	42	34	25
	Luxembourg	m	m	m	m	m	m	m	m
	Mexico	48	42	78	64	53	57	22	25
	Netherlands	11	16	82	73	44	50	n	13
	New Zealand	27	31	71	74	62	57	25	32
	Norway	36	24	66	73	56	48	10	22
	Poland	a	41	83	76	a	67	a	24
	Portugal	m	m	m	m	m	m	m	m
	Slovak Republic	a	17	70	68	64	55	22	31
	Spain	25	32	68	73	68	60	17	29
	Sweden	42	40	55	77	69	59	31	28
	Switzerland	18	9	71	62	43	37	7	14
	Turkey	33	40	80	46	54	39	25	23
	United Kingdom	27	28	61	67	54	55	14	20
	United States	36	32	79	69	64	54	14	22
	Country mean	***31***	***30***	***67***	***70***	***59***	***53***	***18***	***23***
PARTNER COUNTRY	Israel	m	35	m	79	m	60	m	24

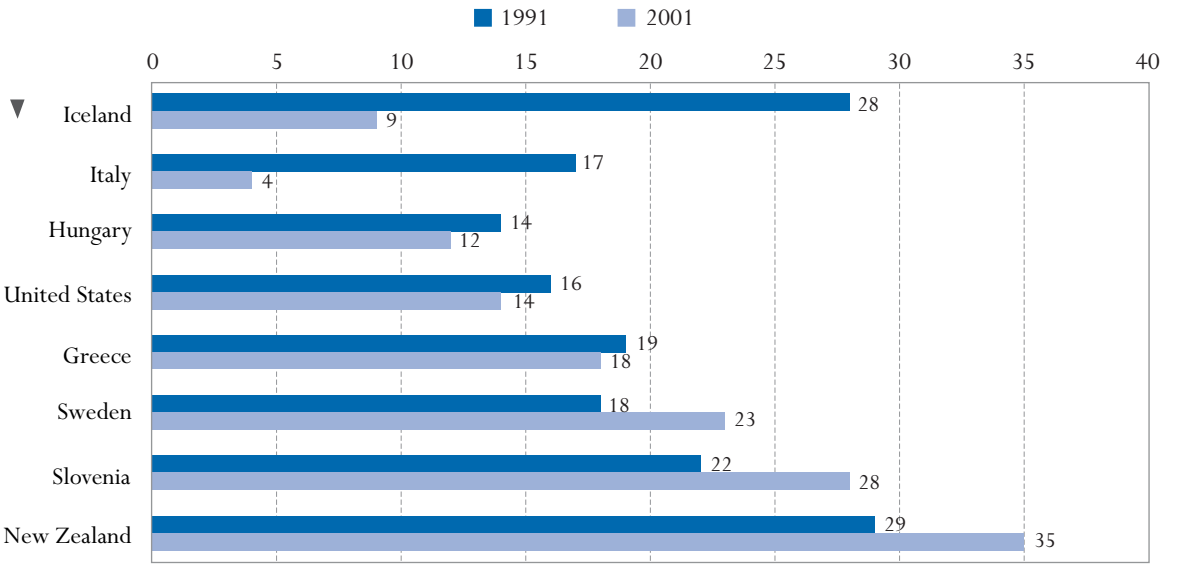
Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.
1. Year of reference 2001.
Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

A5

INDICATOR A5: TRENDS IN 4TH-GRADE STUDENTS' READING LITERACY PERFORMANCE

- In a comparison involving nine countries, four (Greece, Hungary, Iceland and Slovenia) showed statistically significant increases in the average reading literacy performance of 4th graders between 1991 and 2001, ranging from an increase of 16 points in Hungary to an increase of 41 points in Greece. By contrast Sweden decreased in performance over this period, from 513 points in 1991 to 498 points in 2001.
- In Hungary improvements among the top performing quarter of students pulled up mean performance. By contrast, in Sweden a decline in the performance of the top quarter contributed to a decrease in the average performance of Swedish 3rd graders.
- In 1991, girls outperformed boys in all nine countries. In 2001, while differences favouring girls remained in most countries, measurable differences disappeared in Iceland and Italy.

Chart A5.1. Female advantage in reading literacy performance in 1991 and 2001



▲ Female advantage in 2001 is significantly larger than in 1991.
▼ Female advantage in 2001 is significantly smaller than in 1991.

Countries are ranked in descending order of the magnitude of the performance difference between females and males between 1991 and 2001.
Source: IEA Trends in Reading Literacy Study, 2001.

A5

Policy context

This indicator examines changes in the performance of 4th-grade students in reading literacy in nine countries, overall and by gender.

The ability to read, understand and use information is at the heart of academic and personal development. Reading literacy is the foundation for learning across school subjects, and it equips individuals with the ability to participate in their communities and society. It is one of the most important abilities that students acquire and develop as they progress through their school years. Towards the end of primary education, the school curriculum tends to shift from teaching basic skills, such as reading, to teaching basic knowledge. As a result, children who have trouble reading at this level of education may find themselves at increased risk of educational failure. Since the 1970s, the International Association for the Evaluation of Educational Achievement (IEA) has studied the reading literacy performance of students at the 4th-grade level twice (see Box A5.1). Using data from the recent IEA Trends in Reading Literacy Study, this indicator examines changes in reading literacy performance for students at the end of primary school between 1991 and 2001 in nine countries.

Evidence and explanations

Means and distributions

Examining countries' mean scores can be useful for obtaining an overall indication of how education systems are performing at a certain grade and in a certain subject area, and examining trends in mean scores can provide an overall picture of how education systems are performing over time.

The most common grade levels assessed among the participating countries was the 4th grade. In the following, the shorthand "4th grade" is therefore used to denote the target population. However, in New Zealand, the assessment took place at the 5th-grade level and in Hungary, Singapore, Slovenia and Sweden it took place at the 3rd-grade level.

Between 1991 and 2001, Greece, Hungary, Iceland and Slovenia showed increases in the average reading literacy performance of 4th graders.

Table A5.1 shows the mean reading literacy scores in 1991 and in 2001, as well as the differences in scores between the two years, for 4th graders in each of the nine countries participating in the study. Four countries (Greece, Hungary, Iceland and Slovenia) showed increases from 1991 to 2001 in average student performance on the reading literacy assessment, ranging from an increase of 16 points in Hungary to an increase of 41 points in Greece. Sweden showed the only statistically significant decrease in performance over the period, from 513 points in 1991 to 498 points in 2001. Four countries (Italy, New Zealand, Singapore and the United States) showed no significant change in overall performance between 1991 and 2001. When interpreting these results it should be noted, however, that the student samples were not comparable with regard to students' ages (see below).

Overall changes in reading literacy performance were driven by different factors in different countries…

While mean scores are useful for obtaining a general picture of performance, they often mask significant variation within countries that typically far exceeds variation among countries. For example, in 2001 the range in countries' mean scores was 38 points, whereas the range of the middle 50% of students was nearly three times that (and greater than one standard deviation) in all countries. Table A5.1 also shows, in graphic form, the distribution of scores at the 5th, 25th, 75th, and 95th percentiles for each of the two assessment years.

A5

Box A5.1. PIRLS and trends in reading literacy

In 2001, the International Association for the Evaluation of Educational Achievement (IEA) launched the ***Progress in Reading Literacy Study*** (PIRLS), designed to provide an international assessment of 4th-grade students' reading literacy performance. With this study, PIRLS built on the two previous IEA Reading Literacy Studies from 1970-71 and 1990-91, and began a five-year cycle to provide data on trends in reading literacy performance. Thirty-five countries participated in the first cycle, PIRLS 2001.

Because the PIRLS 2001 reading assessment differed in a number of respects from the IEA Reading Literacy Study of 1990-91, it was not possible to link the results of the two studies directly together. However, since PIRLS 2001 was scheduled to collect data on 4th-grade students ten years after the 1991 study, PIRLS countries that participated in 1991 were given the opportunity of measuring changes in reading literacy performance over that period by re-administering the 1991 reading literacy assessment for primary school students as part of the PIRLS data collection. The resulting study is known as the ***Trends in Reading Literacy Study*** of PIRLS and is the source of data for this indicator.

The assessment on which the trend study is based was organised around three types of text (narrative, expository and document). Questions, the majority of which were multiple-choice, required students to demonstrate a variety of skills or cognitive processes, such as locating information, processing information or making inferences. However, again, because the study differs in some respects from the PIRLS 2001 assessment, countries' overall results may differ slightly between the two, with the trend study providing an indicator of change over time and the PIRLS study providing a new benchmark against a broad group of countries.

…with improvements among the top performing quarter of students in Hungary contributing to an increase in the national mean…

Looking more closely at where changes occur within the distribution of students' scores also allows reflection on changes in performance among various groups of students and how this may relate to changes in overall performance. For example, in Hungary, it appears that the increase in overall mean scores was the result of an increase in scores over the decade among students at the 75th and 95th percentiles – that is, improvements among the top performing quarter of students appeared to pull up mean performance.

…while a decline in performance among the top quarter in Sweden contributed to the decrease in the national mean.

By contrast, Sweden showed a decrease in performance among the top quarter of performers, contributing to a decrease in the average performance of Swedish 3rd graders.

Other countries with changes in performance for different groups of students include Iceland and Slovenia, where there were increases in the scores of students at all four percentiles, and Greece, where there were increases among the middle 50% of students.

Some background factors that may relate to students' reading literacy performance are summarised in a brief overview in Box A5.2.

Box A5.2. Trends in factors positively associated with reading literacy performance

Students' performance in reading can be influenced by many variables, for example, the level of support students receive at home for reading, their reading habits and their attitudes towards reading. Using information from the background questionnaires, this text box provides an overview of trends in several factors that the 1991 and/or 2001 studies found to be positively related to reading performance across most countries.

For all nine countries participating in the 2001 trend study, students who always or almost always ***speak the language of the test at home*** had higher reading performance than those speaking it only sometimes or hardly ever. These results differed somewhat from the 1991 assessment, in which the relationship between home language and performance was more variable across countries. The 2001 results show that in all countries except Italy and Singapore, at least 88% of students always or almost always speak the language of the test at home, which reflects either no change or modest decreases from 1991.

Similar to findings from 1991, in 2001 higher reading literacy performance was observed for students with more ***books in the home*** (more than 50). In 2001, the percentages of students with the most books in the home (more than 100) ranged from about one- to two-thirds (31 to 65%). For six of the countries – Hungary, Iceland, Italy, Slovenia, Sweden and the United States – this represented a decrease from 1991.

Also similar to previous results, in 2001 students who reported ***reading books for fun*** on a daily basis had higher reading performance than those reading books for fun only once a month or less. Except in Iceland, students reported either no change or less reading for fun in 2001 than a decade earlier. Iceland was the only country with an increase, and the only one where the majority of students (51%) reported reading books for fun on a daily basis.

Different from the 1991 assessment, the relationship between reading performance and the frequency of ***borrowing of books from the library*** was less pronounced among countries in 2001, perhaps related to the considerable variation and general decline in library use. In 2001, the percentages of students reporting borrowing books at least weekly ranged from moderately high (57 to 66%) in New Zealand, Singapore, Slovenia and the United States, to moderate (42%) in Iceland to relatively low (20 to 33%) in Greece, Hungary, Italy and Sweden. These levels represented a significant decline for Hungary, Singapore, Slovenia, and Sweden.

In 2001, there was considerable variation in daily ***textbook reading in classes***, ranging from 71% of the Greek students to 14% of the Swedish students; the overall trend over the decade was toward less frequent textbook reading. However, the positive relationship between textbook reading and reading performance remained, with those students reading textbooks only monthly or less showing lower reading performance, on average, than their counterparts reading more frequently. Trends in performance for various categories of textbook reading generally followed the overall trends – with Greece, Iceland, and Slovenia showing increases and Sweden showing decreases.

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In Iceland, Sweden, and the United States, students reported some increases for ***homework*** given or the amount of time they spend on it. Students in New Zealand reported essentially no change in the level of homework, and those in the remaining countries reported having less homework. Interpreting the relationship between reading performance and homework, however, is difficult, since homework can be used as a tool to challenge some students or to remediate others and the time it takes to complete also will vary among students. In 2001, the pattern appears to be towards students with the least homework having the highest performance.

Gender differences

The left half of Table A5.2 shows how girls and boys performed in the two assessment years. Generally, trends in the performance for girls and boys resembled the trends in reading overall. In Greece, Hungary, Iceland and Slovenia, both girls and boys had increased scores in reading performance over the period. Gains were similar for both groups in Greece, Hungary and Slovenia, whereas in Iceland, boys showed bigger gains than girls. In Sweden, girls' and boys' averages both decreased between 1991 and 2001. There were no statistically significant changes in scores for girls or for boys in Italy, New Zealand, Singapore and the United States.

In 1991, girls outperformed boys in all nine countries whereas in 2001, while differences favouring girls remained in most countries, measurable differences disappeared in Iceland and Italy.

The right half of Table A5.2 provides another perspective, showing the differences between girls' scores and boys' scores in each of the two years, as well as indicating if those differences have increased or decreased over time. In 1991, girls outperformed boys in all nine countries. In 2001, while differences favouring girls remained in most countries, differences in Iceland and Italy were no longer statistically significant. Moreover, in Iceland, there was a significant decrease in gender differences in reading literacy performance between girls and boys (from a 28-point difference in 1991 to 9-point difference in 2001), which was related to the increase in the performance of boys described earlier (see also Chart A5.1).

Text differences

In some countries, student performance evolved differently in different aspects of reading performance.

In addition to an overall scale, the IEA Trends in Reading Literacy Study also provides information on students' performance on three subscales related to type of texts in the assessment: narrative texts, expository texts and documents. Narrative texts are continuous texts in which the writer's aim is to tell a story, factual or fictional. These types of text normally follow a linear time sequence and are intended to entertain or involve the reader emotionally. Narrative passages included in the assessment ranged from short fables to more lengthy stories of up to 1 000 words. Expository texts also are continuous, and are designed to describe, explain, or otherwise convey factual information or opinion to the reader. Documents are non-continuous texts and consist of structured information displays presented in the form of charts, tables, maps, graphs, lists, or sets of instructions.

Greece, Hungary, Iceland and Slovenia, the four countries that showed improvements in average reading literacy between 1991 and 2001, showed increases on all three subscales (Table A5.3). These four countries were also the only ones to show statistically significant improvement on the narrative and expository scales. In contrast, Sweden and the United States showed decreases on the narrative scale, and Sweden also demonstrated decreases on the expository scale.

With respect to the document scale, all but two countries (Sweden and the United States) showed an improvement on document texts in 2001 compared to 1991.

Ages and years of schooling

In interpreting the results, limits of the comparability of the ages of students and the grades tested need to be taken into account.

In interpreting the results of the trend study, it needs to be taken into account that the samples were grade-based and resulted in considerable differences in the average age of students across participating OECD countries. For example, an analysis of the 11 OECD countries participating in both PIRLS and PISA found that the average age of students explained 49% of the cross-country differences in performance in overall reading literacy. Also, because the sample was of the grade in which there was the greatest number of 9-year-olds, the number of years of formal schooling varied across countries, related to the fact that the age at which students begin school varies from country to country.

Although the same grade was tested in 1991 and 2001 in all countries, changes also occurred in the average student age in those grades in a few countries. Overall, the average age of 4th-grade students ranged from 9.3 to 10 years in 1991, and from 9.1 to 10 years in 2001. However, in two of the countries in which there were significant overall increases in mean scores, the average age of students also increased significantly. In Greece, the average age of 4th-grade students increased from 9.3 years in 1991 to 10 years in 2001, and in Hungary the increase was from 9.3 to 9.7 years.

Definitions and methodologies

The performance scores are based on assessments administered as part of the Trends in Reading Literacy Study undertaken by the International Association for the Evaluation of Educational Achievement (IEA).

The assessments are based on the IEA Reading Literacy Study, which was first administered in 1991 (except for New Zealand and Singapore, where it was administered in 1990) and then replicated in 2001 in conjunction with the administration of the IEA Progress in Reading Literacy Study (PIRLS).

The target population for the trend study was students in the grade that contained the largest proportion of 9-year-old students at the time of testing. The most common grade levels assessed among the participating countries was the 4th grade. However, in New Zealand, the assessment took place at the 5th-grade level and in Hungary, Singapore, Slovenia and Sweden it took place at the 3rd-grade level.

The Trends in Reading Literacy Study used item response theory (IRT) methods to summarise the performance results from both 1991 and 2001 on a common scale with a mean of 500 and a standard deviation of 100. The scale mean of 500 was set to the mean of the average scale scores of the 2001 data for the nine countries being shown in this indicator. Thus, the means reported here for 1991

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will differ from the initial PIRLS report because the 1991 data were rescaled to be put on a common metric with the 2001 data.

For notes on standard errors, significance tests and multiple comparisons, see Annex 3 at *www.oecd.org/edu/eag2004*.

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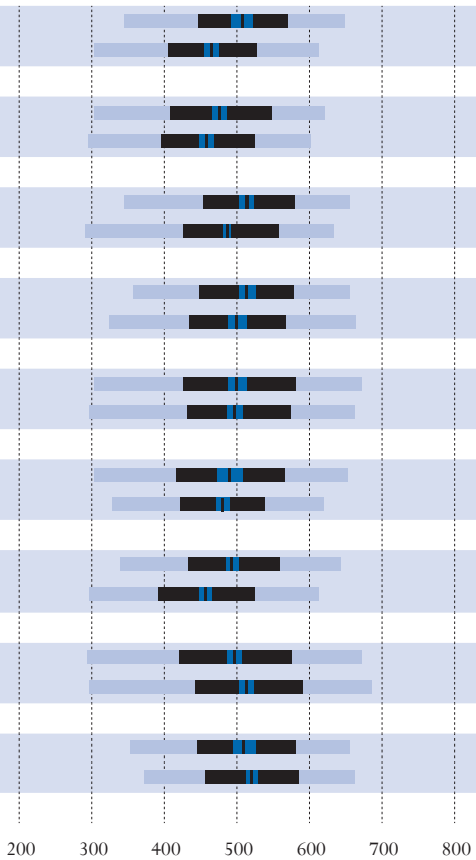
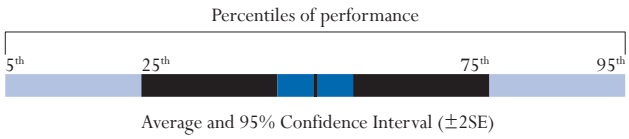
Table A5.1. Trends in reading literacy performance (1991-2001)

▲ 2001 average significantly higher than 1991 average. ▼ 2001 average significantly lower than 1991 average.

		Difference 1991 to 2001	Distribution of reading literacy performance	Average scale score	Years of formal schooling	Average age
Greece	▲	41 (7.4)				
2001				507 (5.9)	4	10.0
1991				466 (4.5)	4	9.3
Hungary	▲	16 (5.6)				
2001				475 (3.9)	3	9.7
1991				459 (4.0)	3	9.3
Iceland	▲	27 (3.7)				
2001				513 (3.5)	4	9.8
1991				486 (1.5)	4	9.8
Italy		12 (6.9)				
2001				513 (4.4)	4	9.9
1991				500 (5.4)	4	9.8
New Zealand		4 (6.8)				
2001				502 (5.3)	5	10.0
1991				498 (4.1)	5	10.0
Singapore		8 (8.7)				
2001				489 (7.9)	3	9.1
1991				481 (3.6)	3	9.3
Slovenia	▲	36 (4.9)				
2001				493 (3.7)	3	9.8
1991				458 (3.2)	3	9.7
Sweden	▼	-15 (5.7)				
2001				498 (3.9)	3	9.8
1991				513 (4.2)	3	9.8
United States		-10 (7.1)				
2001				511 (6.3)	4	10.0
1991				521 (3.2)	4	10.0





Note: Standard errors (SE) are shown in parentheses.
Source: IEA Trends in Reading Literacy Study, 2001.

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Table A5.2. Trends in gender differences in reading literacy performance (1991-2001)

▲ 2001 average is significantly higher than 1991 average.
▼ 2001 average is significantly lower than 1991 average.
F Females perform significantly higher than males.
△ Gender differences in 2001 are significantly larger than gender differences in 1991.
▽ Gender differences in 2001 are significantly smaller than gender differences in 1991.

	Average scale score		Difference 1991 to 2001		Difference between females and males				Change in difference 1991 to 2001
	2001	1991			2001		1991		
Greece									
Females	516 (7.3)	476 (5.7)	▲	40 (9.2)	**F**	18 (6.3)	**F**	19 (4.8)	
Males	499 (6.0)	457 (4.4)	▲	41 (7.4)					
Hungary									
Females	481 (4.2)	467 (4.4)	▲	14 (6.0)	**F**	12 (3.2)	**F**	14 (4.4)	
Males	469 (4.2)	453 (4.7)	▲	16 (6.3)					
Iceland									
Females	517 (3.2)	501 (2.1)	▲	17 (3.7)		9 (4.8)	**F**	28 (3.6)	▽
Males	508 (5.1)	473 (2.6)	▲	35 (5.7)					
Italy									
Females	514 (5.2)	512 (5.6)		3 (7.6)		4 (5.5)	**F**	17 (5.7)	
Males	511 (5.3)	495 (6.4)		16 (8.2)					
New Zealand									
Females	520 (7.0)	514 (5.0)		6 (8.7)	**F**	35 (8.7)	**F**	29 (6.3)	
Males	485 (6.6)	485 (5.4)		0 (8.6)					
Singapore									
Females	504 (7.9)	489 (3.9)		15 (8.8)	**F**	29 (4.8)	**F**	16 (4.3)	△
Males	475 (8.5)	473 (4.5)		2 (9.6)					
Slovenia									
Females	508 (5.2)	469 (3.5)	▲	39 (6.3)	**F**	28 (5.7)	**F**	22 (3.7)	
Males	480 (4.1)	447 (3.8)	▲	33 (5.6)					
Sweden									
Females	509 (4.3)	523 (4.9)	▼	-13 (6.5)	**F**	23 (4.1)	**F**	18 (4.6)	
Males	486 (4.4)	505 (4.8)	▼	-18 (6.4)					
United States									
Females	517 (6.7)	529 (3.3)		-12 (7.5)	**F**	14 (5.4)	**F**	16 (3.4)	
Males	504 (7.1)	513 (4.0)		-9 (8.2)					

Note: Standard errors (SE) are shown in parentheses.
Source: IEA Trends in Reading Literacy Study, 2001.

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Table A5.3. Trends in reading literacy performance, by subscale (1991-2001)

▲ 2001 average is significantly higher than 1991 average. ▼ 2001 average is significantly lower than 1991 average.

	Average score		Difference 1991 to 2001	
	2001	1991		
Narrative				
Greece	513 (4.8)	479 (3.7)	▲	34 (6.0)
Hungary	479 (3.1)	467 (3.2)	▲	12 (4.5)
Iceland	524 (3.3)	493 (1.6)	▲	31 (3.8)
Italy	517 (4.1)	507 (4.7)		10 (6.2)
New Zealand	496 (5.3)	500 (4.3)		-5 (6.9)
Singapore	487 (8.6)	486 (3.5)		1 (9.3)
Slovenia	490 (3.7)	465 (3.0)	▲	25 (4.8)
Sweden	496 (3.6)	513 (3.4)	▼	-17 (4.8)
United States	498 (6.8)	518 (3.3)	▼	-20 (7.7)
Expository				
Greece	509 (5.2)	476 (4.3)	▲	33 (6.8)
Hungary	464 (4.4)	443 (4.8)	▲	21 (6.4)
Iceland	502 (3.3)	483 (1.9)	▲	18 (3.9)
Italy	513 (4.5)	507 (5.5)		6 (7.1)
New Zealand	510 (5.3)	502 (3.9)		8 (6.5)
Singapore	495 (6.6)	489 (3.1)		6 (7.3)
Slovenia	489 (3.3)	455 (3.6)	▲	34 (4.9)
Sweden	496 (4.1)	519 (4.4)	▼	-23 (6.1)
United States	521 (5.4)	516 (3.2)		5 (6.2)
Document				
Greece	490 (5.2)	443 (4.9)	▲	48 (7.1)
Hungary	486 (3.7)	468 (4.3)	▲	18 (5.6)
Iceland	506 (3.4)	479 (1.7)	▲	28 (4.0)
Italy	499 (4.5)	482 (5.4)	▲	17 (6.9)
New Zealand	506 (5.2)	491 (4.0)	▲	16 (6.3)
Singapore	484 (6.8)	465 (3.1)	▲	18 (7.5)
Slovenia	502 (3.8)	456 (3.0)	▲	47 (4.9)
Sweden	506 (4.4)	504 (4.5)		2 (6.4)
United States	520 (6.1)	527 (3.2)		-7 (6.6)

Note: Standard errors (SE) are shown in parentheses.
Source: IEA Trends in Reading Literacy Study, 2001.

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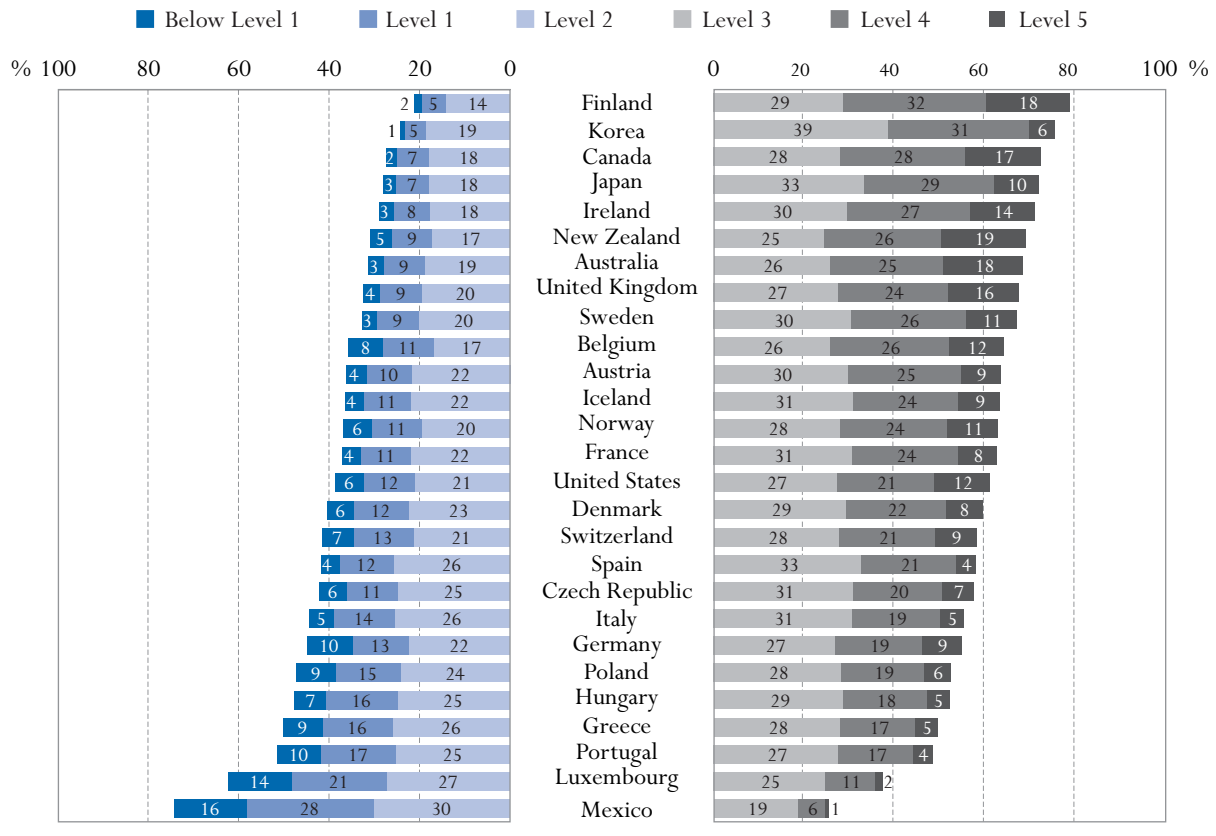
INDICATOR A6: READING LITERACY OF 15-YEAR-OLDS

- On average among OECD countries, 10% of 15-year-olds demonstrated Level 5 literacy skills, which involve evaluation of information and building of hypotheses, drawing on specialised knowledge and accommodating concepts contrary to expectations. However, this percentage varies from 19% in Finland and New Zealand to below 1% in Mexico.
- An average of 12% of 15-year-olds have only acquired the most basic literacy skills at Level 1 and a further 6% fall below even that.
- Some countries, most notably Finland, Japan and Korea, achieve both a high level of average performance and a narrow range of variation in student performance.
- Six countries (the Czech Republic, Germany, Greece, Hungary, Italy and the United States) performed relatively better in PIRLS than in PISA. In the Czech Republic, Germany, Hungary and Italy, scores were above the OECD average in PIRLS and are below the OECD average in PISA. Iceland, New Zealand and Norway performed relatively better in PISA than in PIRLS. France and Sweden performed similarly relative to other countries on both assessments.

Chart A6.1. Reading proficiency of 15-year-olds (2000)

Percentage of 15-year-olds at each level of proficiency on the PISA reading literacy scale



Countries are ranked in descending order of the percentage of students at Levels 3, 4 and 5 on the PISA reading literacy scale.
Source: OECD PISA 2000 database. Table A6.1. See Annex 3 for notes and methodology *(www.oecd.org/edu/eag2004)* and *www.pisa.oecd.org.*

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Policy context

This indicator shows the performance of 15-year-olds in reading literacy.

The capacity of students approaching the end of compulsory education to access, manage, integrate, evaluate and reflect on written information is a foundation for further learning as well as their full participation in modern societies.

This indicator shows the performance of 15-year-olds on tasks based on a concept of reading literacy that goes beyond the notion of decoding written material and literal comprehension. Reading in PISA incorporates understanding and reflecting on texts. Literacy involves the ability to use written information to fulfil goals, and the consequent ability of complex modern societies to use written information effectively.

When Indicators A5 and A6 are examined together, they provide a context for examining differences in reading literacy performance between the primary school age and the end of compulsory education, even if the PISA and PIRLS studies are somewhat different in orientation and design, and even if the measurement of performance at two age levels at a single point in time can only be a rough proxy for longitudinal progress.

Evidence and explanations

Percentage of 15-year-olds proficient at each level of reading literacy

PISA provides an interpretative framework for performance levels in reading literacy.

This indicator examines reading literacy in several ways (see Box A6.1 for an explanation of reading literacy in PISA). First, it describes proficiency in terms of the range of scores that 15-year-olds achieve in each country. Proficiency in reading is examined at five levels, each representing tasks of increasing complexity, with Level 5 being the highest. Second, this indicator describes performance in terms of the mean scores achieved by 15-year-olds and the distribution of scores among student populations.

10% of 15-year-olds in OECD countries have acquired Level 5 literacy skills…

Chart A6.1 presents an overall profile of proficiency on the reading literacy scale with the length of the coloured components of the bars showing the percentage of 15-year-olds proficient at each level (see Box A6.2). As can be seen from the chart, the percentage of students reaching each level of literacy and the patterns of distribution among the levels vary from country to country. Across countries, on average, 10% of students reach proficiency Level 5, 32% reach at least Level 4 (*i.e.,* Levels 4 and 5), 61% reach at least Level 3, 82% reach at least Level 2, and 94% reach at least Level 1.

…but this proportion ranges across countries from 19 to less than 1%.

Examining individual countries' performance by proficiency level is revealing: in five countries (Australia, Canada, Finland, New Zealand and the United Kingdom), 15% or more of students reach the highest level of proficiency in reading literacy. In Belgium, Ireland, Norway, Sweden and the United States, a significant percentage of students also reach proficiency Level 5 (between 11 and 15%). However, only 5% or less of the students in Greece, Luxembourg, Mexico, Portugal and Spain reach the highest level of proficiency.

Although there is a general tendency among countries with a high proportion of 15-year-olds scoring at Level 5 to have fewer students below the lowest level of

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Box A6.1. What is reading literacy in PISA?

Reading literacy is the ability to understand, use and reflect on written texts in order to achieve one's goals, to develop one's own knowledge and potential, and to participate effectively in society. This definition goes beyond the notion that reading means decoding written material and literal comprehension. Rather, reading also incorporates understanding and reflecting on texts, for a variety of reasons and in a variety of contexts. PISA's assessment of reading literacy reflects three dimensions: aspect of reading task; form of reading material; and the use for which the text is constructed.

What scales are reported? PISA's assessment of reading literacy is reported on three scales. A "retrieving information" scale is based on students' ability to locate information in a text. An "interpreting" scale is based on the ability to construct meaning and draw inferences from written information. A "reflection and evaluation" scale is based on students' ability to relate a text to their knowledge, ideas and experiences. In addition, an overall reading literacy scale summarises the results from the three reading scales. Indicator A6 focuses on the latter scale, which is referred to as the "reading literacy scale".

What do the scale scores mean? The scores on each scale represent degrees of proficiency in each dimension or aspect of reading literacy. For example, a low score on a scale indicates that a student has limited skills, whereas a high score indicates that a student has advanced skills in this area.

What are proficiency levels? In an attempt to capture this progression of difficulty, each of the reading literacy scales is divided into five levels based on the type of knowledge and skills students need to demonstrate at a particular level. Students at a particular level are likely to not only demonstrate the knowledge and skills associated with that level but also the proficiencies defined by lower levels. For instance, all students proficient at Level 3 are also proficient at Levels 1 and 2.

A large proportion of high performers typically means fewer low performers, but in some countries, there are large disparities.

proficiency (see Finland, for example), this is not always the case. Belgium and the United States, for example, stand out in showing an above-average share of performers at the highest proficiency level while, at the same time, showing an above-average proportion of students scoring below Level 1 (Table A6.1).

Half of all 15-year-olds in Finland and at least 40% of students in Australia, Canada, Ireland, New Zealand and the United Kingdom reach at least Level 4 on the reading literacy scale. With the exception of Luxembourg and Mexico, at least one in five students in each OECD country reaches at least Level 4.

In one-third of OECD countries, more than two-thirds of 15-year-olds reach at least Level 3.

In one-third of OECD countries, between 67 and 79% of 15-year-old students are proficient at least at Level 3 on the reading literacy scale: Australia, Canada, Finland, Ireland, Japan, Korea, New Zealand, Sweden and the United Kingdom. Using these nine countries to explore the question "is the pattern of proficiency similar across countries?", several patterns emerge. In Canada and Finland, for instance, relatively large proportions of students reach Level 5 and at least 90% of students in each country reach at least Level 2 – these countries show strong results across the reading literacy scale. In Australia, Ireland, New Zealand and the

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Box A6.2. What can students at each proficiency level do and what scores are associated with the levels?

Students proficient at ***Level 5 (over 625 points)*** are capable of completing sophisticated reading tasks, such as managing information that is difficult to find in unfamiliar texts; showing detailed understanding of such texts and inferring which information in the text is relevant to the task; and being able to evaluate critically and build hypotheses, draw on specialised knowledge and accommodate concepts that may be contrary to expectations.

Students proficient at ***Level 4 (553 to 625 points)*** are capable of difficult reading tasks, such as locating embedded information, construing meaning from nuances of language and critically evaluating a text.

Students proficient at ***Level 3 (481 to 552 points)*** are capable of reading tasks of moderate complexity, such as locating multiple pieces of information, drawing links between different parts of the text and relating it to familiar everyday knowledge.

Students proficient at ***Level 2 (408 to 480 points)*** are capable of basic reading tasks, such as locating straightforward information, making low-level inferences of various types, deciding what a well-defined part of the text means and using some outside knowledge to understand it.

Students proficient at ***Level 1 (335 to 407 points)*** are capable of completing only the least complex reading tasks developed for PISA, such as locating a single piece of information, identifying the main theme of a text or making a simple connection with everyday knowledge.

Students performing ***below Level 1 (below 335 points)*** are not able to show routinely the most basic type of knowledge and skills that PISA seeks to measure. These students may have serious difficulties in using reading literacy as an effective tool to advance and extend their knowledge and skills in other areas.

United Kingdom, there are large numbers of students at the highest level, but over 10% of students perform at or below Level 1. These countries perform well in getting students to higher levels of proficiency but succeed less well than Canada or Finland in reducing the proportion with low skills. The opposite is true in Korea, where less than 6% of students are at Level 1 or below, but where a below-average proportion (6%) reach the highest level of proficiency (Table A6.1).

In every OECD country, at least half of all students are at Level 2 or higher. Interestingly, in Spain, where only 4% of students reach Level 5, an above-average 84% reach at least Level 2. However, over 40% of students in Spain have Level 2 as their highest proficiency level (Table A6.1).

The simplest tasks in PISA require students to do more than just read words fluently.

Reading literacy, as defined in PISA, focuses on the knowledge and skills required to apply "reading to learn" rather than on the technical skills acquired in "learning to read". Since comparatively few young adults in OECD countries have not acquired technical reading skills, PISA does not seek to measure such things as the extent to which 15-year-old students are fluent readers or how well they spell or recognise words. In line with most contemporary views about reading

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literacy, PISA focuses on measuring the extent to which individuals are able to construct, expand and reflect on the meaning of what they have read in a wide range of texts both within and beyond school. The simplest reading tasks that can still be associated with this notion of reading literacy are those at Level 1. Students proficient at this level are capable of completing only the least complex reading tasks developed for PISA, such as locating a single piece of information, identifying the main theme of a text or making a simple connection with everyday knowledge.

While students below Level 1 may have the technical capacity to read, they may face serious difficulties in their future lives…

Students performing below 335 points, *i.e.,* below Level 1, are not capable of the most basic type of reading that PISA seeks to measure. This does not mean that they have no literacy skills. In fact, most of these students can probably read in a technical sense, and the majority of them (54%, on average, among OECD countries) are able to solve successfully at least 10% of the non-multiple choice reading tasks in PISA 2000 (6% correctly solve one-quarter of these tasks). Nonetheless, their pattern of answers in the assessment is such that they would be expected to solve fewer than half of the tasks in a test made up of items drawn solely from Level 1, and therefore perform below Level 1. Such students show serious difficulties in using reading literacy as an effective tool to advance and extend their knowledge and skills in other areas. Students with literacy skills below Level 1 may, therefore, be at risk not only of difficulties in their initial transition from education to work but also of failure to benefit from further education and learning opportunities throughout life.

…and, along with those at Level 1, may not acquire the necessary literacy skills to sufficiently benefit from educational opportunities.

Education systems with large proportions of students performing below, or even at, Level 1 should be concerned that significant numbers of their students may not be acquiring the necessary literacy knowledge and skills to benefit sufficiently from their educational opportunities. This situation is even more troublesome in light of the extensive evidence suggesting that it is difficult in later life to compensate for learning gaps in initial education. Adult literacy skills and participation in continuing education and training are strongly related, even after controlling for other characteristics affecting participation in training.

The percentage of students at or below Level 1 varies widely, from less than 10% to nearly half…

In the combined OECD area, 12% of students perform at Level 1, and 6% below Level 1, but there are wide differences among countries. In Finland and Korea, only around 5% of students perform at Level 1, and less than 2% below it, but these countries are exceptions. In all other OECD countries, between 9 and 44% of students perform at or below Level 1 (Table A6.1).

…and, in some countries, a considerable minority do not reach Level 1.

The countries with 20% or more of students at Level 1 or below are Germany, Greece, Hungary, Luxembourg, Mexico, Poland, Portugal and Switzerland. In Germany, Luxembourg, Mexico and Portugal, between 10 and 23% of students do not reach Level 1, *i.e.,* are unable routinely to show the most basic skills that PISA seeks to measure. This is most remarkable in the case of Germany, where 9% of students perform at Level 5, a relatively high figure (Table A6.1).

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National means and distribution of performance in reading literacy

Average scores can usefully summarise country performances…

Another way to summarise student performance and to compare the relative standing of countries in terms of student performance in PISA 2000 is to display the mean scores for students in each country. To the extent that high average performance at age 15 can be considered predictive of a highly skilled future workforce, countries with high average performance will have an important economic and social advantage. It should be noted, however, that average performance charts often mask significant variation in performance within countries, failing to reflect different performance among many different groups of students.

…but mask wide differences in student performance within countries.

As in previous international studies of student performance, such as the Third International Mathematics and Science Study (TIMSS), only around one-tenth of PISA's total variation in student performance in reading literacy lies between countries and can, therefore, be captured through a comparison of country averages. The remaining variation in student performance occurs within countries, *i.e.,* between educational programmes, between schools, and between students within schools. Thus, this indicator also presents information on the distribution of reading literacy scores, examining the range of performance between the top and bottom quarter of students in each country.

Finland shows unparalleled overall performance, the mean score being almost two-thirds of a proficiency level above the OECD average.

On the reading literacy scale, students from Finland perform on average higher than students from any other country participating in the study (see Chart A6.2). Their mean score, 546 points, is almost two-thirds of a proficiency level above the OECD average of 500 points (or in statistical terms, almost half the international standard deviation above the mean). Eleven other OECD countries, Australia, Austria, Belgium, Canada, Iceland, Ireland, Japan, Korea, New Zealand, Sweden and the United Kingdom, score significantly above the OECD mean. Five countries perform at or about the OECD mean, and the remaining countries perform significantly below the OECD mean.

High average scores are not enough; countries also look to raise the level of performance of poor performers.

Looking at the distribution in student performance (Table A6.2) shows that the variation in student performance on the reading literacy scale within countries is large. The variation within every country far exceeds the range of country mean scores. The difference between the 75th and 25th percentiles, which covers the middle half of the national performance distribution, exceeds the magnitude of one proficiency level (72 score points) in all countries, and measures about two times the magnitude of one proficiency level in Australia, Belgium, Germany and New Zealand (the OECD average on this measure is 1.8 times the magnitude of one proficiency level).

Are these observed disparities inevitable?

Together, these findings suggest that educational systems in many countries face significant challenges in addressing the needs of all students, including those most in need as well as those performing exceptionally well.

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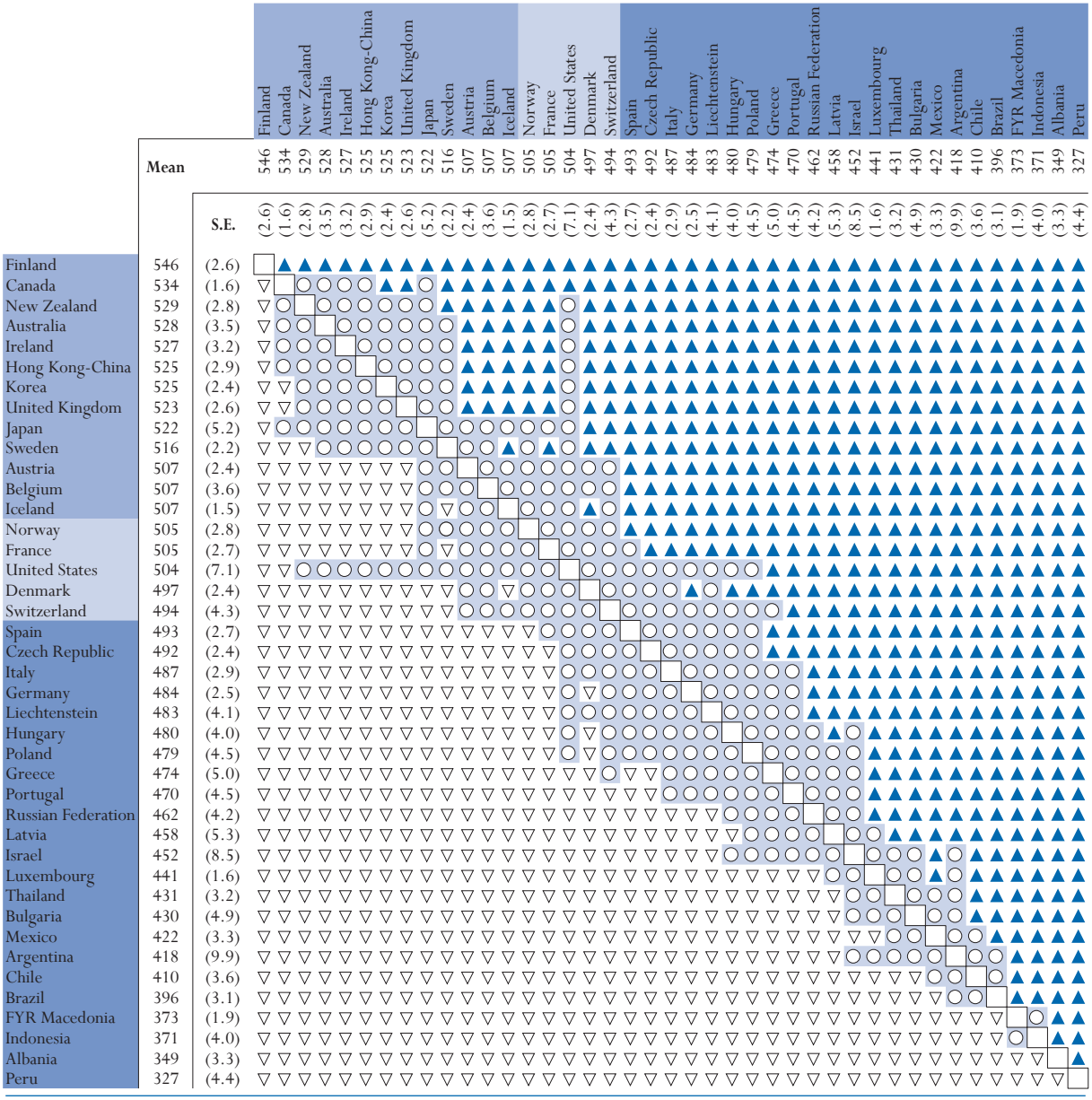
Chart A6.2. Multiple comparisons of mean performance on the PISA reading literacy scale (2000)



Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart.

Statistical significance of mean performance:

▲ Higher than for the country listed along the top of the chart.

○ No difference from the country listed along the top of the chart.

▽ Lower than for the country listed along the top of the chart.

Statistical significance of difference from OECD country mean:

Above country mean.

No difference from country mean.

Below country mean.

Note: Due to low response rates, the Netherlands is excluded from the chart.

Countries are ranked in descending order of mean performance on the PISA reading literacy scale.

Source: OECD PISA 2000 database. See Annex 3 for notes and methodology (*www.oecd.org/edu/eag2004*) and *www.pisa.oecd.org.*

Box A6.3. Reading literacy performance in PISA and PIRLS

There are significant similarities in the way that reading literacy is defined and measured in the PISA and PIRLS assessments. While direct comparisons of the results of the two studies are not possible – as PIRLS and PISA are different assessments with different approaches to defining their target populations – it is interesting to make some comparisons at a general level for the 11 countries for which there are country-wide data for both assessments.

Standing relative to OECD mean

Six countries (the Czech Republic, Germany, Greece, Hungary, Italy and the United States) performed relatively better in PIRLS than in PISA. In the Czech Republic, Germany, Hungary and Italy, scores were above the OECD average in PIRLS but are below the OECD average in PISA. Three countries performed relatively better in PISA than in PIRLS: Iceland, New Zealand and Norway. France and Sweden performed similarly relative to other countries on both assessments (Table A6.3).

Distribution of performance

In the Czech Republic and Sweden, variation in reading literacy performance is low among both 4th graders and students at age 15. In Sweden average performance is above the OECD average level in both age groups, whereas in the Czech Republic, average performance among 4th graders is above the OECD average level but performance at age 15 is below the OECD average (Table A6.2). German 4th graders perform well on average and with low disparities. By contrast, 15-year-olds perform below average and show some of the largest disparities in student performance. Students in New Zealand show some of the largest disparities in both age groups.

The comparison is based on the Czech Republic, France, Germany, Greece, Hungary, Iceland, Italy, New Zealand, Norway, Sweden and the United States. Canada and the United Kingdom are not considered in this comparison because only certain jurisdictions participated in PIRLS. The Netherlands is not considered because its mean reading score in PISA is not published due to low response rates. The Slovak Republic and Turkey, which participated in PIRLS, did not participate in PISA 2000.

In interpreting these results, it must be taken into account that, unlike in PISA, the samples for PIRLS were grade-based and resulted in considerable differences in the average age of students across participating countries. For example, students in the best performing country, Sweden, were a year older than students in Iceland and Italy and almost a year older than students in France, Greece, New Zealand and Norway. Among the 11 countries that participated in both PISA and PIRLS, the average age of students explains 49% of the cross-country performance differences, which is considerable. These differences need to be taken into account not only when interpreting average performance in PIRLS, but also when comparing performance differences in countries between PISA and PIRLS. This being said, it is noteworthy that the performance of Swedish 3rd graders remains strongest, even when an adjustment for differences in students' ages is made.

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It is hard to say, but some countries contain them within a far narrower range than others…

One can also observe that countries with similar levels of average performance show considerable variation in the range of student performance. For example, Korea and the United Kingdom both show above-average mean performance on the reading literacy scale at around 525 score points. The difference between the 75th and 25th percentiles in Korea is 92 points, significantly below the OECD average, but in the United Kingdom it is 137 score points, similar to the OECD average. A similar result can be observed for countries scoring below average. Italy and Germany each perform at around 485 score points, significantly below the OECD average. In Italy the difference between the 75th and 25th percentiles is 124 points, but in Germany, it is 146 points. Bringing the bottom quarter of students closer to the mean is one way for countries with wide internal disparities to raise overall performance.

…and some countries succeed in combining high average performance with low disparities.

Finally, comparing the range of performance within a country with its average performance shows that some countries attain both relatively low differences between top and bottom performing students and relatively high levels of overall performance. There is a tendency for high performing countries to show relatively small disparities. For example, the three countries with the smallest differences between the 75th and 25th percentiles – Finland, Japan and Korea – are also among the best performing countries in reading literacy. By contrast, one of the three countries with the highest performance differences, Germany, scores significantly below the OECD average (Table A6.2).

Definitions and methodologies

The performance scores are based on assessments administered as part of the Programme for International Student Assessment (PISA) undertaken by the OECD in 2000.

The target population studied for this indicator was 15-year-old students. Operationally, this refers to students aged between 15 years and 3 (completed) months and 16 years and 2 (completed) months at the beginning of the testing period, and enrolled in an educational institution, regardless of the grade level or type of institution and of whether they participated in school full-time or part-time.

To facilitate the interpretation of the scores assigned to students in PISA, the mean score for reading literacy performance among OECD countries was set at 500 and the standard deviation at 100, with the data weighted so that each OECD country contributed equally. These reference points anchor PISA's measurement of student proficiency.

Different from PISA, the PIRLS data are reported on a scale for which the mean of all countries, including partner countries, was set to a mean of 500 and a standard deviation of 100. The international mean is thus different from the Trends in Reading Literacy Study reported in Indicator A5.

For notes on standard errors, significance tests and multiple comparisons see Annex 3 at *www.oecd.org/edu/eag2004*.

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Table A6.1. Reading proficiency of 15-year-olds (2000)

Percentage of 15-year-olds at each level of proficiency on the PISA reading literacy scale

		Proficiency levels											
		Below Level 1 (less than 335 score points)		Level 1 (from 335 to 407 score points)		Level 2 (from 408 to 480 score points)		Level 3 (from 481 to 552 score points)		Level 4 (from 553 to 625 score points)		Level 5 (above 625 score points)	
		%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.	%	S.E.
OECD COUNTRIES	Australia	3.3	(0.5)	9.1	(0.8)	19.0	(1.1)	25.7	(1.1)	25.3	(0.9)	17.6	(1.2)
	Austria	4.4	(0.4)	10.2	(0.6)	21.7	(0.9)	29.9	(1.2)	24.9	(1.0)	8.8	(0.8)
	Belgium	7.7	(1.0)	11.3	(0.7)	16.8	(0.7)	25.8	(0.9)	26.3	(0.9)	12.0	(0.7)
	Canada	2.4	(0.3)	7.2	(0.3)	18.0	(0.4)	28.0	(0.5)	27.7	(0.6)	16.8	(0.5)
	Czech Republic	6.1	(0.6)	11.4	(0.7)	24.8	(1.2)	30.9	(1.1)	19.8	(0.8)	7.0	(0.6)
	Denmark	5.9	(0.6)	12.0	(0.7)	22.5	(0.9)	29.5	(1.0)	22.0	(0.9)	8.1	(0.5)
	Finland	1.7	(0.5)	5.2	(0.4)	14.3	(0.7)	28.7	(0.8)	31.6	(0.9)	18.5	(0.9)
	France	4.2	(0.6)	11.0	(0.8)	22.0	(0.8)	30.6	(1.0)	23.7	(0.9)	8.5	(0.6)
	Germany	9.9	(0.7)	12.7	(0.6)	22.3	(0.8)	26.8	(1.0)	19.4	(1.0)	8.8	(0.5)
	Greece	8.7	(1.2)	15.7	(1.4)	25.9	(1.4)	28.1	(1.7)	16.7	(1.4)	5.0	(0.7)
	Hungary	6.9	(0.7)	15.8	(1.2)	25.0	(1.1)	28.8	(1.3)	18.5	(1.1)	5.1	(0.8)
	Iceland	4.0	(0.3)	10.5	(0.6)	22.0	(0.8)	30.8	(0.9)	23.6	(1.1)	9.1	(0.7)
	Ireland	3.1	(0.5)	7.9	(0.8)	17.9	(0.9)	29.7	(1.1)	27.1	(1.1)	14.2	(0.8)
	Italy	5.4	(0.9)	13.5	(0.9)	25.6	(1.0)	30.6	(1.0)	19.5	(1.1)	5.3	(0.5)
	Japan	2.7	(0.6)	7.3	(1.1)	18.0	(1.3)	33.3	(1.3)	28.8	(1.7)	9.9	(1.1)
	Korea	0.9	(0.2)	4.8	(0.6)	18.6	(0.9)	38.8	(1.1)	31.1	(1.2)	5.7	(0.6)
	Luxembourg	14.2	(0.7)	20.9	(0.8)	27.5	(1.3)	24.6	(1.1)	11.2	(0.5)	1.7	(0.3)
	Mexico	16.1	(1.2)	28.1	(1.4)	30.3	(1.1)	18.8	(1.2)	6.0	(0.7)	0.9	(0.2)
	New Zealand	4.8	(0.5)	8.9	(0.5)	17.2	(0.9)	24.6	(1.1)	25.8	(1.1)	18.7	(1.0)
	Norway	6.3	(0.6)	11.2	(0.8)	19.5	(0.8)	28.1	(0.8)	23.7	(0.9)	11.2	(0.7)
	Poland	8.7	(1.0)	14.6	(1.0)	24.1	(1.4)	28.2	(1.3)	18.6	(1.3)	5.9	(1.0)
	Portugal	9.6	(1.0)	16.7	(1.2)	25.3	(1.0)	27.5	(1.2)	16.8	(1.1)	4.2	(0.5)
	Spain	4.1	(0.5)	12.2	(0.9)	25.7	(0.7)	32.8	(1.0)	21.1	(0.9)	4.2	(0.5)
	Sweden	3.3	(0.4)	9.3	(0.6)	20.3	(0.7)	30.4	(1.0)	25.6	(1.0)	11.2	(0.7)
	Switzerland	7.0	(0.7)	13.3	(0.9)	21.4	(1.0)	28.0	(1.0)	21.0	(1.0)	9.2	(1.0)
	United Kingdom	3.6	(0.4)	9.2	(0.5)	19.6	(0.7)	27.5	(0.9)	24.4	(0.9)	15.6	(1.0)
	United States	6.4	(1.2)	11.5	(1.2)	21.0	(1.2)	27.4	(1.3)	21.5	(1.4)	12.2	(1.4)
	OECD total	***6.2***	***(0.4)***	***12.1***	***(0.4)***	***21.8***	***(0.4)***	***28.6***	***(0.4)***	***21.8***	***(0.4)***	***9.4***	***(0.4)***
	Country mean	***6.0***	***(0.1)***	***11.9***	***(0.2)***	***21.7***	***(0.2)***	***28.7***	***(0.2)***	***22.3***	***(0.2)***	***9.5***	***(0.1)***
PARTNER COUNTRIES	Brazil	23.3	(1.4)	32.5	(1.2)	27.7	(1.3)	12.9	(1.1)	3.1	(0.5)	0.6	(0.2)
	Latvia	12.7	(1.3)	17.9	(1.3)	26.3	(1.1)	25.2	(1.3)	13.8	(1.1)	4.1	(0.6)
	Liechtenstein	7.6	(1.5)	14.5	(2.1)	23.2	(2.9)	30.1	(3.4)	19.5	(2.2)	5.1	(1.6)
	Russian Federation	9.0	(1.0)	18.5	(1.1)	29.2	(0.8)	26.9	(1.1)	13.3	(1.0)	3.2	(0.5)

Note: Standard errors (SE) are shown in parentheses.

Source: OECD PISA 2000 database. See Annex 3 for notes and methodology (*www.oecd.org/edu/eag2004*) and *www.pisa.oecd.org*.

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Table A6.2. Variation in performance in reading literacy of 15-year-olds (2000)

Performance of 15-year-olds on the PISA reading literacy scale, by percentile

						Percentiles											
						5th		10th		25th		75th		90th		95th	
		Mean score	S.E.	S.D.	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.
OECD COUNTRIES	Australia	528	(3.5)	102	(1.6)	354	(4.8)	394	(4.4)	458	(4.4)	602	(4.6)	656	(4.2)	685	(4.5)
	Austria	507	(2.4)	93	(1.6)	341	(5.4)	383	(4.2)	447	(2.8)	573	(3.0)	621	(3.2)	648	(3.7)
	Belgium	507	(3.6)	107	(2.4)	308	(10.3)	354	(8.9)	437	(6.6)	587	(2.3)	634	(2.5)	659	(2.4)
	Canada	534	(1.6)	95	(1.1)	371	(3.8)	410	(2.4)	472	(2.0)	600	(1.5)	652	(1.9)	681	(2.7)
	Czech Republic	492	(2.4)	96	(1.9)	320	(7.9)	368	(4.9)	433	(2.8)	557	(2.9)	610	(3.2)	638	(3.6)
	Denmark	497	(2.4)	98	(1.8)	326	(6.2)	367	(5.0)	434	(3.3)	566	(2.7)	617	(2.9)	645	(3.6)
	Finland	546	(2.6)	89	(2.6)	390	(5.8)	429	(5.1)	492	(2.9)	608	(2.6)	654	(2.8)	681	(3.4)
	France	505	(2.7)	92	(1.7)	344	(6.2)	381	(5.2)	444	(4.5)	570	(2.4)	619	(2.9)	645	(3.7)
	Germany	484	(2.5)	111	(1.9)	284	(9.4)	335	(6.3)	417	(4.6)	563	(3.1)	619	(2.8)	650	(3.2)
	Greece	474	(5.0)	97	(2.7)	305	(8.2)	342	(8.4)	409	(7.4)	543	(4.5)	595	(5.1)	625	(6.0)
	Hungary	480	(4.0)	94	(2.1)	320	(5.6)	354	(5.5)	414	(5.3)	549	(4.5)	598	(4.4)	626	(5.5)
	Iceland	507	(1.5)	92	(1.4)	345	(5.0)	383	(3.6)	447	(3.1)	573	(2.2)	621	(3.5)	647	(3.7)
	Ireland	527	(3.2)	94	(1.7)	360	(6.3)	401	(6.4)	468	(4.3)	593	(3.6)	641	(4.0)	669	(3.4)
	Italy	487	(2.9)	91	(2.7)	331	(8.5)	368	(5.8)	429	(4.1)	552	(3.2)	601	(2.7)	627	(3.1)
	Japan	522	(5.2)	86	(3.0)	366	(11.4)	407	(9.8)	471	(7.0)	582	(4.4)	625	(4.6)	650	(4.3)
	Korea	525	(2.4)	70	(1.6)	402	(5.2)	433	(4.4)	481	(2.9)	574	(2.6)	608	(2.9)	629	(3.2)
	Luxembourg	441	(1.6)	100	(1.5)	267	(5.1)	311	(4.4)	378	(2.8)	513	(2.0)	564	(2.8)	592	(3.5)
	Mexico	422	(3.3)	86	(2.1)	284	(4.4)	311	(3.4)	360	(3.6)	482	(4.8)	535	(5.5)	565	(6.3)
	New Zealand	529	(2.8)	108	(2.0)	337	(7.4)	382	(5.2)	459	(4.1)	606	(3.0)	661	(4.4)	693	(6.1)
	Norway	505	(2.8)	104	(1.7)	320	(5.9)	364	(5.5)	440	(4.5)	579	(2.7)	631	(3.1)	660	(4.6)
	Poland	479	(4.5)	100	(3.1)	304	(8.7)	343	(6.8)	414	(5.8)	551	(6.0)	603	(6.6)	631	(6.0)
	Portugal	470	(4.5)	97	(1.8)	300	(6.2)	337	(6.2)	403	(6.4)	541	(4.5)	592	(4.2)	620	(3.9)
	Spain	493	(2.7)	85	(1.2)	344	(5.8)	379	(5.0)	436	(4.6)	553	(2.6)	597	(2.6)	620	(2.9)
	Sweden	516	(2.2)	92	(1.2)	354	(4.5)	392	(4.0)	456	(3.1)	581	(3.1)	630	(2.9)	658	(3.1)
	Switzerland	494	(4.2)	102	(2.0)	316	(5.5)	355	(5.8)	426	(5.5)	567	(4.7)	621	(5.5)	651	(5.3)
	United Kingdom	523	(2.6)	100	(1.5)	352	(4.9)	391	(4.1)	458	(2.8)	595	(3.5)	651	(4.3)	682	(4.9)
	United States	504	(7.1)	105	(2.7)	320	(11.7)	363	(11.4)	436	(8.8)	577	(6.8)	636	(6.5)	669	(6.8)
	OECD total	***499***	***(2.0)***	***100***	***(0.8)***	***322***	***(3.4)***	***363***	***(3.3)***	***433***	***(2.5)***	***569***	***(1.6)***	***622***	***(2.0)***	***653***	***(2.1)***
	Country mean	***500***	***(0.6)***	***100***	***(0.4)***	***324***	***(1.3)***	***366***	***(1.1)***	***435***	***(1.0)***	***571***	***(0.7)***	***623***	***(0.8)***	***652***	***(0.8)***
PARTNER COUNTRIES	Brazil	396	(3.1)	86	(1.9)	255	(5.0)	288	(4.5)	339	(3.4)	452	(3.4)	507	(4.2)	539	(5.5)
	Latvia	458	(5.3)	102	(2.3)	283	(9.7)	322	(8.2)	390	(6.9)	530	(5.3)	586	(5.8)	617	(6.6)
	Liechtenstein	483	(4.1)	96	(3.9)	310	(15.9)	350	(11.8)	419	(9.4)	551	(5.8)	601	(7.1)	626	(8.2)
	Russian Federation	462	(4.2)	92	(1.8)	306	(6.9)	340	(5.4)	400	(5.1)	526	(4.5)	579	(4.4)	608	(5.3)

Note: Standard errors (SE) are shown in parentheses.

Source: OECD PISA 2000 database. See Annex 3 for notes and methodology (*www.oecd.org/edu/eag2004*) and *www.pisa.oecd.org.*

A6

Table A6.3. Mean performance in reading literacy of 4th-grade students and 15-year-olds (2000, 2001)

Performance of 4th-grade students on the PIRLS reading literacy scale and of 15-year-olds on the PISA reading literacy scale

▲ Mean performance statistically significantly above the PISA OECD country mean (= 500)
▼ Mean performance statistically significantly below the PISA OECD country mean (= 500)
△ Mean performance statistically significantly above the PIRLS OECD country mean (= 529)
▽ Mean performance statistically significantly below the PIRLS OECD country mean (= 529)

	Performance of 15-year-olds on the PISA reading literacy scale			Performance of 4th-grade students on the PIRLS reading literacy scale		
Czech Republic	▼	492	(2.4)	△	537	(2.3)
France		505	(2.7)		525	(2.4)
Germany	▼	484	(2.5)	△	539	(1.9)
Greece	▼	474	(5.0)		524	(3.5)
Hungary	▼	480	(4.0)	△	543	(2.2)
Iceland	▲	507	(1.5)	▽	512	(1.2)
Italy	▼	487	(2.9)	△	541	(2.4)
New Zealand	▲	529	(2.8)		529	(3.6)
Norway		505	(2.8)	▽	499	(2.9)
Sweden	▲	516	(2.2)	△	561	(2.2)
United States		504	(7.1)	△	542	(3.8)

Note: Standard errors (SE) are shown in parentheses.
Source: IEA Progress in Reading Literacy Study (PIRLS) 2001 and OECD PISA 2000 database.

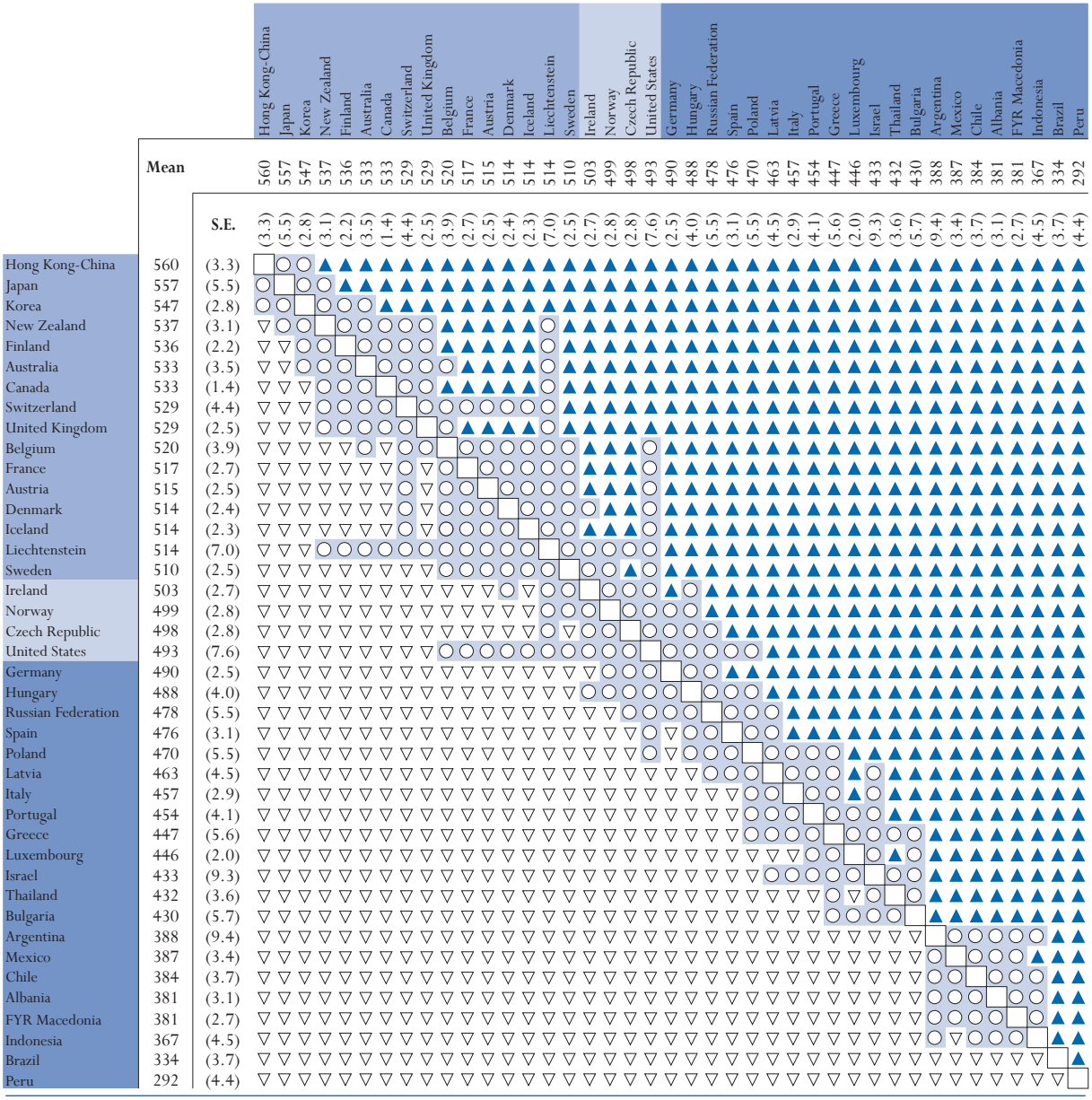
A7

INDICATOR A7: MATHEMATICAL AND SCIENTIFIC LITERACY OF 15-YEAR-OLDS

- 15-year-olds in Japan display the highest mean scores in mathematical literacy, although their scores cannot be distinguished statistically from students in two other top-performing countries, Korea and New Zealand. On the scientific literacy scale, students in Japan and Korea demonstrate the highest average performance.
- While there are large differences in mean performance among countries, the variation of performance among 15-year-olds within each country is many times larger. However, wide disparities in performance are not a necessary condition for a country to attain a high level of overall performance. On the contrary, five of the countries with the smallest variation in performance on the mathematical literacy scale, namely Canada, Finland, Iceland, Japan and Korea, all perform significantly above the OECD average, and four of them, Canada, Finland, Japan and Korea, are among the six best-performing countries in mathematical literacy.

A7

Chart A7.1. Multiple comparisons of mean performance on the PISA mathematical literacy scale (2000)



Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart.

Statistical significance of mean performance:

▲ Higher than for the country listed along the top of the chart.

○ No difference from the country listed along the top of the chart.

▽ Lower than for the country listed along the top of the chart.

Statistical significance of difference from OECD country mean:

Above country mean.

No difference from country mean.

Below country mean.

Note: Due to low response rates, the Netherlands is excluded from the chart.

Countries are ranked in descending order of mean performance on the PISA mathematical literacy scale.

Source: OECD PISA 2000 database. See Annex 3 for notes and methodology (*www.oecd.org/edu/eag2004*) and *www.pisa.oecd.org.*

A7

Policy context

Mathematics and science skills are necessary for the many, not just the few…

The need to provide foundations for the professional training of a small number of mathematicians, scientists and engineers dominated the content of school mathematics and science curricula for much of the past century. With the growing role of science, mathematics and technology in modern life, however, the objectives of personal fulfilment, employment and full participation in society increasingly require all adults to be mathematically, scientifically and technologically literate.

…if people are to understand and participate in the modern world.

Deficiencies in mathematical and scientific literacy can have grave consequences, not only for the labour market and earnings prospects of individuals, but also for the competitiveness of nations. Conversely, the performance of a country's best students in mathematics and science-related subjects can have implications for the part that country will play in tomorrow's advanced technology sector. Aside from meeting workplace requirements, mathematical and scientific literacy also are important for understanding the environmental, medical, economic and other issues that confront modern societies and that rely heavily on technological and scientific advances.

This indicator shows the performance of 15-year-olds in mathematical and scientific literacy.

Consequently, policy makers and educators alike attach great importance to mathematics and science education. Addressing the increasing demand for mathematical and scientific skills requires excellence throughout educational systems, and it is important to monitor how well nations provide young adults with fundamental skills in these areas. The Programme for International Student Assessment (PISA) provides information about how well 15-year-olds perform in these areas with a focus on assessing the knowledge and skills that prepare students for life and lifelong learning (Box A7.1).

Evidence and explanations

Charts A7.1 and A7.2 order countries by the mean performance of their students on the mathematical and scientific literacy scales. The charts also show which countries perform above, below, or about the same as the OECD average and how their students perform in comparison with students in every other country.

Japan shows the highest mean score in mathematical literacy…

Students in Japan display the highest mean scores in mathematical literacy, although their scores cannot be distinguished statistically from students in Korea and New Zealand. Other OECD countries that score significantly above the OECD average include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Iceland, Sweden, Switzerland and the United Kingdom (Chart A7.1).

…and together with Korea in scientific literacy.

On the scientific literacy scale, students in Korea and Japan demonstrate the highest average performance compared to students in other OECD countries. Australia, Austria, Canada, the Czech Republic, Finland, Ireland, New Zealand, Sweden and the United Kingdom are among other countries that score significantly above the OECD average (Chart A7.2).

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Box A7.1. What are mathematical and scientific literacy in PISA?

What is *mathematical* literacy? Mathematical literacy in PISA concerns students' ability to recognise and interpret mathematical problems encountered in their world, to translate these problems into a mathematical context, to use mathematical knowledge and procedures to solve the problems within their mathematical context, to interpret the results in terms of the original problem, to reflect upon the methods applied, and to formulate and communicate the outcomes.

What do different points along the mathematical literacy scale mean? The scale can be described in terms of the knowledge and skills students must demonstrate at various points along the mathematical literacy scale:

- Towards the top end of the mathematical literacy scale, around 750 score points, students typically take a creative and active role in their approach to mathematical problems.
- Around 570 score points on the scale, students are typically able to interpret, link and integrate different representations of a problem or different pieces of information; and/or use and manipulate a given model, often involving algebra or other symbolic representations; and/or verify or check given propositions or models.
- At the lower end of the scale, around 380 score points, students are usually able to complete only a single processing step consisting of reproducing basic mathematical facts or processes or applying simple computational skills.

What is *scientific* literacy? Scientific literacy reflects students' ability to use scientific knowledge, to recognise scientific questions and to identify what is involved in scientific investigations, to relate scientific data to claims and conclusions, and to communicate these aspects of science.

What do different points along the scientific literacy scale mean? The scale can be described in terms of increasingly difficult tasks required for students:

- Towards the top end of the scientific literacy scale, around 690 score points, students generally are able to create or use simple conceptual models to make predictions or give explanations; analyse scientific investigations in relation to, for example, experimental design or the identification of an idea being tested; relate data as evidence to evaluate alternative viewpoints or different perspectives; and communicate scientific arguments and/or descriptions in detail and with precision.
- Around 550 score points, students typically are able to use scientific concepts to make predictions or provide explanations; recognise questions that can be answered by scientific investigation and/or identify details of what is involved in a scientific investigation; and select relevant information from competing data or chains of reasoning in drawing or evaluating conclusions.
- Towards the lower end of the scale, around 400 score points, students are able to recall simple scientific factual knowledge (*e.g.,* names, facts, terminology, simple rules) and use common science knowledge in drawing or evaluating conclusions.

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As can be inferred by reading the lists of above-average performers in the previous paragraphs, in general, countries that perform well in one subject area also perform well in the other subject area (*i.e.*, mean mathematics and science scores are highly correlated). However, there are some exceptions. For example, the scores for mathematical literacy of the Czech Republic and Ireland are not significantly different from the OECD average, but their students perform significantly above the OECD average on the scientific literacy scale. Conversely, students in Belgium, France, Iceland and Switzerland perform significantly above the OECD average on the mathematical literacy scale, but their score in scientific literacy is not statistically different from the OECD average. Students in Denmark, while above the OECD mean in mathematical literacy, are below the OECD mean in scientific literacy.

While there are large differences in mean performance among countries, the variation of performance among students within each country is many times larger.

While there are large differences in mean performance among countries, the variation of performance among students within each country is many times larger. Tables A7.1 and A7.2 show how students perform at the 5th, 25th, 75th and 95th percentiles in each county. The distributions of student performance on the mathematical literacy scale in Belgium, Germany, Greece, Hungary, New Zealand, Poland, Switzerland and the United States, show a relatively large gap between the 75th and 25th percentiles – between 135 and 149 score points. Finland, Iceland, Ireland, Japan and Korea show comparatively smaller disparities, with 113 score points or less separating the 75th and 25th percentiles.

In scientific literacy, Belgium, Denmark, France, Germany, Hungary, New Zealand, Switzerland and the United States exhibit relatively large gaps between students at the 75th and 25th percentiles – between 140 and 154 score points each – while Finland, Japan, Korea and Mexico exhibit relatively small differences between these groups of students, with differences all less than 118 score points.

Disparities in performance are not a necessary condition for a country to attain a high level of overall performance.

It is useful to relate the range of performance to average performance. This comparison shows that wide disparities in student performance are not a necessary condition for a country to attain a high level of overall performance. On the contrary, it is striking to see that six of the countries with the smallest differences between the 75th and 25th percentiles on the mathematical literacy scale, namely Canada, Finland, Iceland, Ireland, Japan and Korea, all perform significantly above the OECD average (Table A7.1). Furthermore, four of them, Canada, Finland, Japan and Korea are among the six best-performing OECD countries in mathematical literacy. A similar pattern is observed for scientific literacy. Again, Canada, Finland, Japan and Korea are among the six countries with the smallest differences between 75th and 25th percentiles, as well as among the six best-performing countries.

Conversely, the countries with the largest internal disparities tend to perform below the OECD mean. In mathematical literacy, for example, among the six countries (Belgium, Germany, Greece, Hungary, Poland and the United States) with the largest differences between the students at the 75th and 25th percentiles, only two (Belgium and the United States) do not perform significantly below the OECD average.

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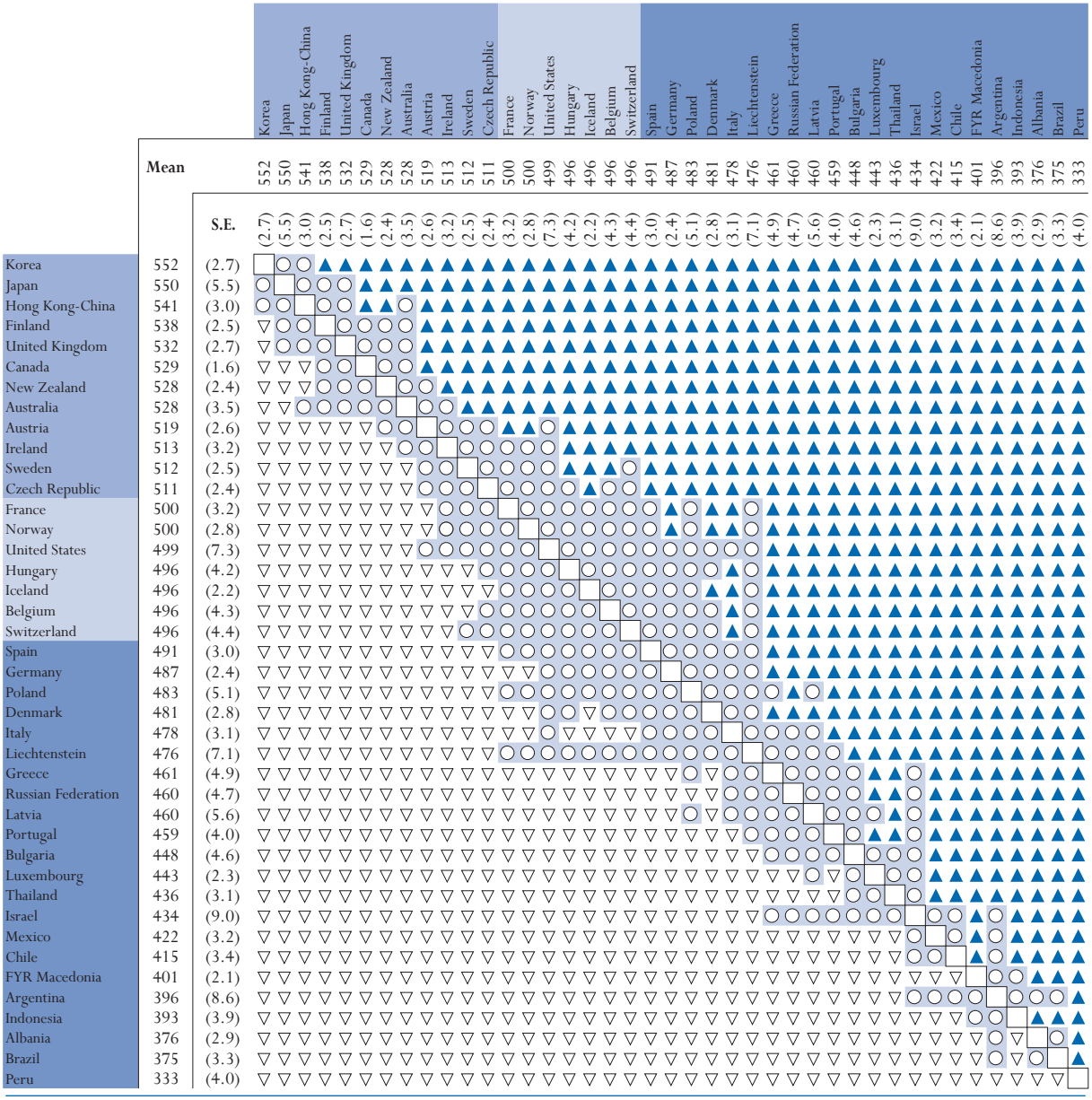
Chart A7.2. Multiple comparisons of mean performance on the PISA scientific literacy scale (2000)



Instructions: Read across the row for a country to compare performance with the countries listed along the top of the chart.

Statistical significance of mean performance:

▲ Higher than for the country listed along the top of the chart.

○ No difference from the country listed along the top of the chart.

▽ Lower than for the country listed along the top of the chart.

Statistical significance of difference from OECD country mean:

Above country mean.

No difference from country mean.

Below country mean.

Note: Due to low response rates, the Netherlands is excluded from the chart.

Countries are ranked in descending order of mean performance on the PISA scientific literacy scale.

Source: OECD PISA 2000 database. See Annex 3 for notes and methodology (*www.oecd.org/edu/eag2004*) and *www.pisa.oecd.org.*

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The performance scores are based on assessments administered as part of the Programme for International Student Assessment (PISA) undertaken by the OECD in 2000.

Definitions and methodologies

The target population studied for this indicator was 15-year-old students. Operationally, this refers to students aged between 15 years and 3 (completed) months and 16 years and 2 (completed) months at the beginning of the testing period and enrolled in an educational institution, irrespective of the grade level or type of institution and of whether they participated in school full-time or part-time.

To facilitate the interpretation of the scores assigned to students in PISA, the mean score for mathematical and scientific literacy performance among OECD countries was set at 500 and the standard deviation at 100, with the data weighted so that each OECD country contributed equally.

For notes on standard errors, significance tests and multiple comparisons see Annex 3 at *www.oecd.org/edu/eag2004*.

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Table A7.1. Variation in performance in mathematical literacy of 15-year-olds (2000)

Performance of 15-year-olds on the PISA mathematical literacy scale, by percentile

		Mean		Percentiles									
				5th		10th		25th		75th		90th		95th	
		Mean score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.
OECD COUNTRIES	Australia	533	(3.5)	380	(6.4)	418	(6.4)	474	(4.4)	594	(4.5)	647	(5.7)	679	(5.8)
	Austria	515	(2.5)	355	(5.3)	392	(4.6)	455	(3.5)	581	(3.8)	631	(3.6)	661	(5.2)
	Belgium	520	(3.9)	322	(11.0)	367	(8.6)	453	(6.5)	597	(3.0)	646	(3.9)	672	(3.5)
	Canada	533	(1.4)	390	(3.2)	423	(2.5)	477	(2.0)	592	(1.7)	640	(1.9)	668	(2.6)
	Czech Republic	498	(2.8)	335	(5.4)	372	(4.2)	433	(4.1)	564	(3.9)	623	(4.8)	655	(5.6)
	Denmark	514	(2.4)	366	(6.1)	401	(5.1)	458	(3.1)	575	(3.1)	621	(3.7)	649	(4.6)
	Finland	536	(2.2)	400	(6.5)	433	(3.6)	484	(4.1)	592	(2.5)	637	(3.2)	664	(3.5)
	France	517	(2.7)	364	(6.4)	399	(5.4)	457	(4.7)	581	(3.1)	629	(3.2)	656	(4.6)
	Germany	490	(2.5)	311	(7.9)	349	(6.9)	423	(3.9)	563	(2.7)	619	(3.6)	649	(3.9)
	Greece	447	(5.6)	260	(9.0)	303	(8.1)	375	(8.1)	524	(6.7)	586	(7.8)	617	(8.6)
	Hungary	488	(4.0)	327	(7.1)	360	(5.7)	419	(4.8)	558	(5.2)	615	(6.4)	648	(6.9)
	Iceland	514	(2.3)	372	(5.7)	407	(4.7)	459	(3.5)	572	(3.0)	622	(3.1)	649	(5.5)
	Ireland	503	(2.7)	357	(6.4)	394	(4.7)	449	(4.1)	561	(3.6)	606	(4.3)	630	(5.0)
	Italy	457	(2.9)	301	(8.4)	338	(5.5)	398	(3.5)	520	(3.5)	570	(4.4)	600	(6.1)
	Japan	557	(5.5)	402	(11.2)	440	(9.1)	504	(7.4)	617	(5.2)	662	(4.9)	688	(6.1)
	Korea	547	(2.8)	400	(6.1)	438	(5.0)	493	(4.2)	606	(3.4)	650	(4.3)	676	(5.3)
	Luxembourg	446	(2.0)	281	(7.4)	328	(4.2)	390	(3.8)	509	(3.4)	559	(3.2)	588	(3.9)
	Mexico	387	(3.4)	254	(5.5)	281	(3.6)	329	(4.1)	445	(5.2)	496	(5.6)	527	(6.6)
	New Zealand	537	(3.1)	364	(6.1)	405	(5.4)	472	(3.9)	607	(4.0)	659	(4.2)	689	(5.2)
	Norway	499	(2.8)	340	(7.0)	379	(5.2)	439	(4.0)	565	(3.9)	613	(4.5)	643	(4.5)
	Poland	470	(5.5)	296	(12.2)	335	(9.2)	402	(7.0)	542	(6.8)	599	(7.7)	632	(8.5)
	Portugal	454	(4.1)	297	(7.3)	332	(6.1)	392	(5.7)	520	(4.3)	570	(4.3)	596	(5.0)
	Spain	476	(3.1)	323	(5.8)	358	(4.3)	416	(5.3)	540	(4.0)	592	(3.9)	621	(3.1)
	Sweden	510	(2.5)	347	(5.8)	386	(4.0)	450	(3.3)	574	(2.6)	626	(3.3)	656	(5.5)
	Switzerland	529	(4.4)	353	(9.1)	398	(6.0)	466	(4.8)	601	(5.2)	653	(5.8)	682	(4.8)
	United Kingdom	529	(2.5)	374	(5.9)	412	(3.6)	470	(3.2)	592	(3.2)	646	(4.3)	676	(5.9)
	United States	493	(7.6)	327	(11.7)	361	(9.6)	427	(9.7)	562	(7.5)	620	(7.7)	652	(7.9)
	OECD total	***498***	***(2.1)***	***318***	***(3.1)***	***358***	***(3.4)***	***429***	***(3.0)***	***572***	***(2.1)***	***628***	***(1.9)***	***658***	***(2.1)***
	Country mean	***500***	***(0.7)***	***326***	***(1.5)***	***367***	***(1.4)***	***435***	***(1.1)***	***571***	***(0.8)***	***625***	***(0.9)***	***655***	***(1.1)***
PARTNER COUNTRIES	Brazil	334	(3.7)	179	(5.5)	212	(5.2)	266	(4.2)	399	(5.5)	464	(7.5)	499	(8.9)
	Latvia	463	(4.5)	288	(9.0)	328	(8.9)	393	(5.7)	536	(6.2)	593	(5.6)	625	(6.6)
	Liechtenstein	514	(7.0)	343	(19.7)	380	(18.9)	454	(15.5)	579	(7.5)	635	(16.9)	665	(15.0)
	Russian Federation	478	(5.5)	305	(9.0)	343	(7.4)	407	(6.6)	552	(6.6)	613	(6.8)	648	(7.8)

Note: Standard errors (SE) are shown in parentheses.

Source: OECD PISA 2000 database. See Annex 3 for notes and methodology (*www.oecd.org/edu/eag2004*) and *www.pisa.oecd.org.*

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Table A7.2. Variation in performance in scientific literacy of 15-year-olds (2000)

Performance of 15-year-olds on the PISA scientific literacy scale, by percentile

		Mean		Percentiles									
				5th		10th		25th		75th		90th		95th	
		Mean score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.
OECD COUNTRIES	Australia	528	(3.5)	368	(5.1)	402	(4.7)	463	(4.6)	596	(4.8)	646	(5.1)	675	(4.8)
	Austria	519	(2.6)	363	(5.7)	398	(4.0)	456	(3.8)	584	(3.5)	633	(4.1)	659	(4.3)
	Belgium	496	(4.3)	292	(13.5)	346	(10.2)	424	(6.6)	577	(3.5)	630	(2.6)	656	(3.0)
	Canada	529	(1.6)	380	(3.7)	412	(3.4)	469	(2.2)	592	(1.8)	641	(2.2)	670	(3.0)
	Czech Republic	511	(2.4)	355	(5.6)	389	(4.0)	449	(3.6)	577	(3.8)	632	(4.1)	663	(4.9)
	Denmark	481	(2.8)	310	(6.0)	347	(5.3)	410	(4.8)	554	(3.5)	613	(4.4)	645	(4.7)
	Finland	538	(2.5)	391	(5.2)	425	(4.2)	481	(3.5)	598	(3.0)	645	(4.3)	674	(4.3)
	France	500	(3.2)	329	(6.1)	363	(5.4)	429	(5.3)	575	(4.0)	631	(4.2)	663	(4.9)
	Germany	487	(2.4)	314	(9.5)	350	(6.0)	417	(4.9)	560	(3.3)	618	(3.5)	649	(4.7)
	Greece	461	(4.9)	300	(9.3)	334	(8.3)	393	(7.0)	530	(5.3)	585	(5.3)	616	(5.8)
	Hungary	496	(4.2)	328	(7.5)	361	(4.9)	423	(5.5)	570	(4.8)	629	(5.1)	659	(8.5)
	Iceland	496	(2.2)	351	(7.0)	381	(4.3)	436	(3.7)	558	(3.1)	607	(4.1)	635	(4.8)
	Ireland	513	(3.2)	361	(6.5)	394	(5.7)	450	(4.4)	578	(3.4)	630	(4.6)	661	(5.4)
	Italy	478	(3.1)	315	(7.1)	349	(6.2)	411	(4.4)	547	(3.5)	602	(4.0)	633	(4.4)
	Japan	550	(5.5)	391	(11.3)	430	(9.9)	495	(7.2)	612	(5.0)	659	(4.7)	688	(5.7)
	Korea	552	(2.7)	411	(5.3)	442	(5.3)	499	(4.0)	610	(3.4)	652	(3.9)	674	(5.7)
	Luxembourg	443	(2.3)	278	(7.2)	320	(6.8)	382	(3.4)	510	(2.8)	563	(4.4)	593	(4.0)
	Mexico	422	(3.2)	303	(4.8)	325	(4.6)	368	(3.1)	472	(4.7)	525	(5.5)	554	(7.0)
	New Zealand	528	(2.4)	357	(5.6)	392	(5.2)	459	(3.8)	600	(3.4)	653	(5.0)	683	(5.1)
	Norway	500	(2.8)	338	(7.3)	377	(6.6)	437	(4.0)	569	(3.5)	619	(3.9)	649	(6.2)
	Poland	483	(5.1)	326	(9.2)	359	(5.8)	415	(5.5)	553	(7.3)	610	(7.6)	639	(7.5)
	Portugal	459	(4.0)	317	(5.0)	343	(5.1)	397	(5.2)	521	(4.7)	575	(5.0)	604	(5.3)
	Spain	491	(3.0)	333	(5.1)	367	(4.3)	425	(4.4)	558	(3.5)	613	(3.9)	643	(5.5)
	Sweden	512	(2.5)	357	(5.7)	390	(4.6)	446	(4.1)	578	(3.0)	630	(3.4)	660	(4.5)
	Switzerland	496	(4.4)	332	(5.8)	366	(5.4)	427	(5.1)	567	(6.4)	626	(6.4)	656	(9.0)
	United Kingdom	532	(2.7)	366	(6.8)	401	(6.0)	466	(3.8)	602	(3.9)	656	(4.7)	687	(5.0)
	United States	499	(7.3)	330	(11.7)	368	(10.0)	430	(9.6)	571	(8.0)	628	(7.0)	658	(8.4)
	OECD total	***502***	***(2.0)***	***332***	***(3.3)***	***368***	***(3.1)***	***431***	***(2.8)***	***576***	***(2.1)***	***631***	***(1.9)***	***662***	***(2.3)***
	Country mean	***500***	***(0.7)***	***332***	***(1.5)***	***368***	***(1.0)***	***431***	***(1.0)***	***572***	***(0.8)***	***627***	***(0.8)***	***657***	***(1.2)***
PARTNER COUNTRIES	Brazil	375	(3.3)	230	(5.5)	262	(5.9)	315	(3.7)	432	(4.9)	492	(7.8)	531	(8.2)
	Latvia	460	(5.6)	299	(10.1)	334	(8.8)	393	(7.7)	528	(5.7)	585	(7.2)	620	(8.0)
	Liechtenstein	476	(7.1)	314	(23.5)	357	(20.0)	409	(12.3)	543	(12.7)	595	(12.4)	629	(24.0)
	Russian Federation	460	(4.7)	298	(6.5)	333	(5.4)	392	(6.2)	529	(5.8)	591	(5.9)	625	(5.7)

Note: Standard errors (SE) are shown in parentheses.

Source: OECD PISA 2000 database. See Annex 3 for notes and methodology (*www.oecd.org/edu/eag2004*) and *www.pisa.oecd.org*.

INDICATOR A8: 15-YEAR-OLDS' ENGAGEMENT IN SCHOOL – A SENSE OF BELONGING AND PARTICIPATION

- On average, nearly a quarter of 15-year-olds express negative views about their sense of belonging at school, and an average of one in five reported recently missing school, arriving late or skipping classes.
- Students in Austria, Sweden and Switzerland reported a particularly high sense of belonging, while students in Belgium, the Czech Republic, Japan, Korea and Poland reported a below-average sense of belonging.
- In most countries, the prevalence of students with a low sense of belonging varied significantly among schools and the between-school variation was even greater for student participation.
- At the level of individual students, the relationship between student participation and sense of belonging is weak, suggesting that there are many students who lack a sense of belonging but still attend school regularly, and vice versa.
- By contrast, at the school level students' sense of belonging and their participation tend to go hand in hand and are closely related to school performance, suggesting that schools with high levels of engagement also tend to have high levels of academic performance.
- The analysis reveals, in particular, that a considerable portion of students with comparatively high academic performance still report a low sense of belonging.

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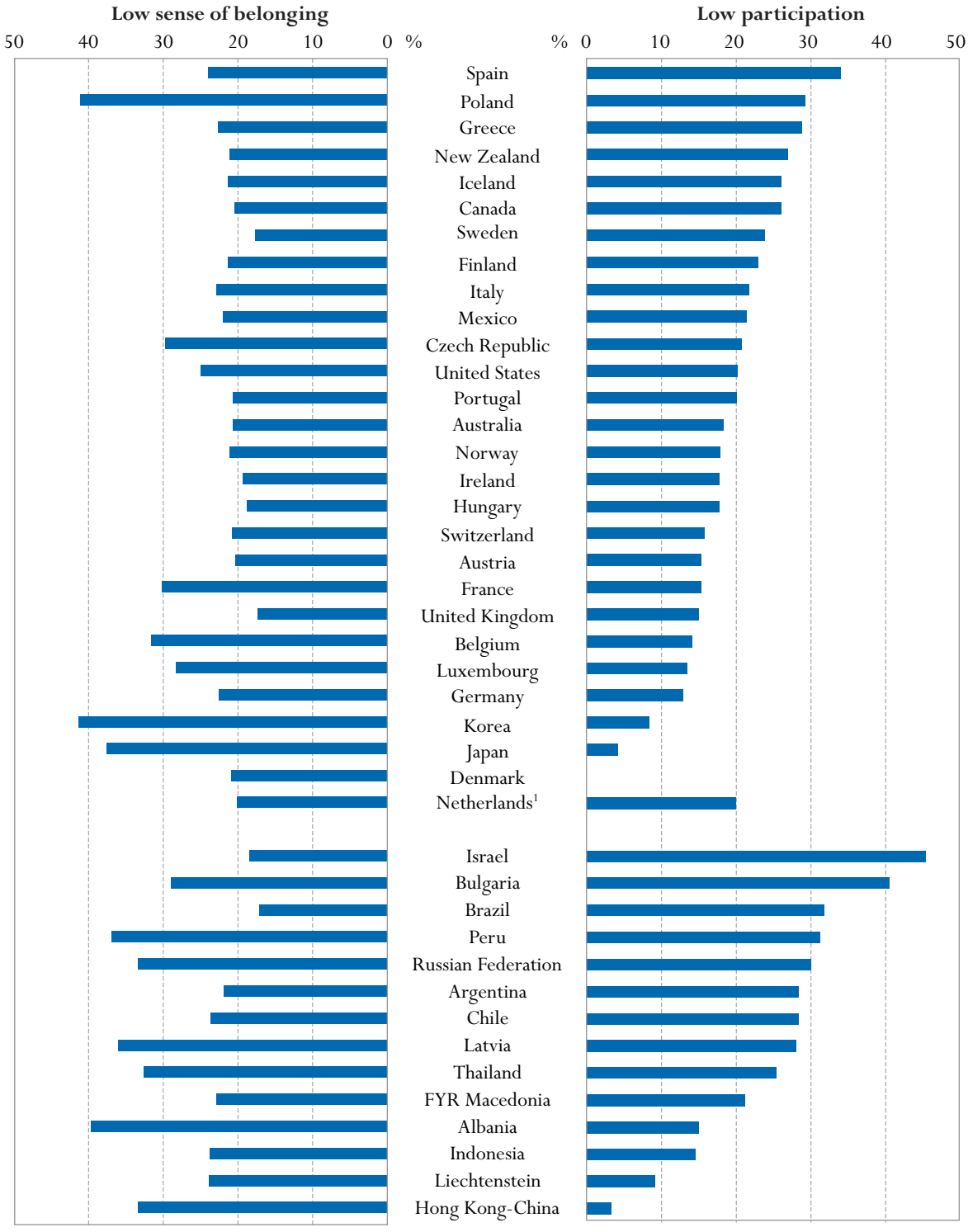
Chart A8.1. Prevalence of students with low sense of belonging and low participation (2000)



1. Response rate is too low to ensure comparability.

Countries are ranked in descending order of prevalence of students with low participation.

Source: OECD PISA 2000 database. Table A8.2.

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Policy context

School is a major aspect of the daily lives of young people, and their perception of schooling is reflected in their participation in academic, as well as non-academic, pursuits. Most students participate in academic and non-academic life at school, and develop a sense of belonging – their friends are there, they have good relations with teachers and other students, and they identify with and value schooling outcomes. However, other students do not share this sense of belonging, and do not believe that academic success will have a strong bearing on their future, potentially resulting in their withdrawal from school life. Meeting the needs of this group of students is one of the biggest challenges facing teachers and school administrators.

This indicator examines the extent to which average scores on two measures of school engagement, and the prevalence of youths with very low scores on these two measures, vary across countries…

In the research literature, engagement has both a psychological component pertaining to students' sense of belonging and acceptance of school values, and a behavioural component pertaining to their participation in school activities. In 2000, the Programme for International Student Assessment (PISA) measured student engagement with respect to both components. The indicator first examines the extent to which average scores on the two measures of school engagement, as well as the prevalence of youths with very low scores on these two measures, vary across countries. It also estimates the range of prevalence of disaffected students across schools within countries, which has important implications for how to target policies aimed at reducing student disaffection.

…estimates the variation of student engagement across schools…

A common approach to the study of engagement is to presume that engagement precedes academic outcomes, and that when students become disengaged from school, their academic performance begins to suffer. This may be the case for some students. However, another plausible model is that failure to succeed in academic work results in student disaffection and the withdrawal from school activities. It also could be that a range of other factors, including individual, family and school factors, jointly influence both engagement and academic outcomes. Moreover, it may be that causal relationships differ depending on students' temperament, academic ability, and family and school contexts. Although PISA cannot determine the causal relationships among engagement and achievement outcomes, it can provide an indication of how strong the relationships are among these outcomes, both affective and academic, for students at age 15. To shed light on this, the second part of the indicator looks at the inter-relationships between student engagement in school and performance. It first examines the strength of the relationships among measures of engagement and measures of students' reading, mathematical and scientific literacy and then identifies profiles of students with regard to engagement and literacy outcomes.

…and examines the inter-relationship between student engagement and reading literacy performance.

Evidence and explanations

The term student engagement is used in this indicator to refer to students' attitudes towards schooling and their participation in school activities. This measure of engagement differs from "reading engagement", described in the PISA reports, which refers specifically to students' motivation and interest in reading and the time they spend reading for pleasure and reading diverse mate-

The indicator examines two aspects of student engagement in school, namely…

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rials. The construct of student engagement at school derived from PISA 2000 has two dimensions: sense of belonging and participation.

…students' sense of belonging,…

Sense of belonging was based on students' responses to questions describing their personal feelings about being accepted by their peers and whether or not they felt lonely, "like an outsider" or "out of place". Like literacy performance or virtually any schooling outcome, sense of belonging is affected by students' experiences at home and in their community, as well as by their school experiences.

…and their attendance and participation in school.

The second component, participation, was measured by the frequency of absence, class-skipping and late arrival at school during the two weeks before the PISA 2000 survey. (For more information on issues relating to how the two constructs – particularly participation – were measured see *Student Engagement at School – A Sense of Belonging and Participation*, OECD 2003.)

Variation among countries in student engagement

On average, students in Austria, Sweden and Switzerland reported a particularly high sense of belonging,…

The OECD mean for both measures of student engagement was fixed at 500, and therefore countries with scores significantly above 500 have more favourable engagement scores than at the OECD average level, while those with scores below 500 have less favourable scores. Table A8.1 shows that OECD countries varied in their levels of sense of belonging, ranging from 461 score points in Korea and Poland to 520 score points or more in Austria, Sweden and Switzerland.

…while students in Belgium, the Czech Republic, Japan, Korea and Poland reported a below-average sense of belonging.

The countries that scored significantly below the OECD average are: Belgium, the Czech Republic, Japan, Korea and Poland. Among the partner countries, two countries, Brazil and Israel, had scores that were significantly above the OECD average, while eight of the other partner countries had relatively low scores, at least 19 points below the OECD average.

More variation was observed in levels of participation, with scores ranging from 472 in Spain to 555 in Japan. Three OECD countries had scores significantly above the OECD average: Japan, Korea and Germany. Five countries scored below the OECD average: Canada, Greece, New Zealand, Poland and Spain. Among the partner countries, four were above the OECD mean, and eight were significantly below it.

In some countries, students' sense of belonging is high but their participation is low, while in others the reverse is true.

Looking at the two measures together (Chart A8.2), it is interesting to note that, among OECD countries, Sweden had relatively high scores on the sense of belonging measure, but relatively low scores on the participation measure. By contrast, Japan and Korea had relatively high scores on the participation measure, but relatively low scores on the sense of belonging measure. Other geographic clustering was also observed on these measures, such as in Austria, Germany and Switzerland in which both participation and sense of belonging are relatively high. Another cluster is among the South American partner countries, Argentina, Chile and Brazil, where students tend to have a relatively higher sense of belonging than participation in school.

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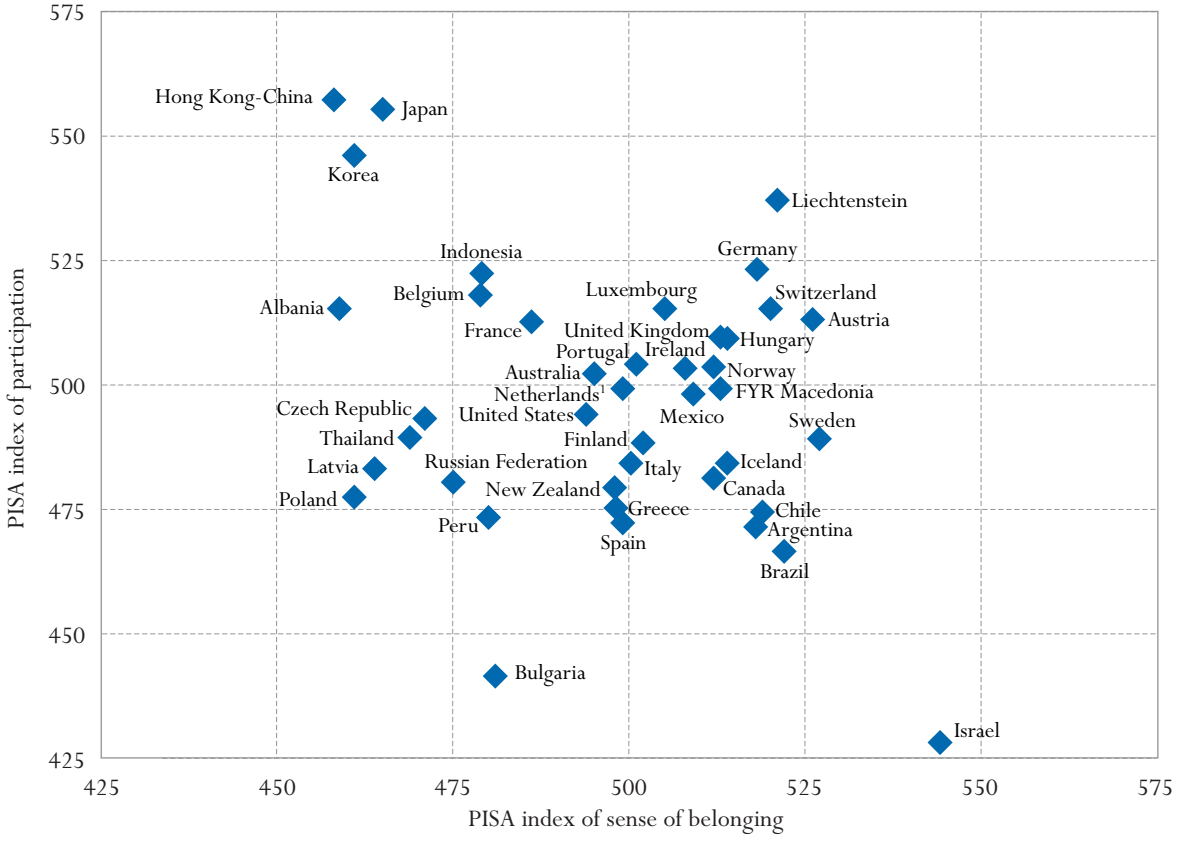
Chart A8.2. Mean scores on two indices of students' engagement in school (2000)



1. Response rate is too low to ensure comparability.
Source: OECD PISA 2000 database. Table A8.1.

Variation among countries in low sense of belonging and low participation

Another way to examine this topic is to examine the prevalence of students who are *disengaged* from school, who feel they do not belong and have withdrawn from school activities in a significant way. These students may be considered "disaffected." Analyses of PISA 2000 data identified students with a low sense of belonging and low participation relative to their peers overall. Students were considered to have a low sense of belonging or low participation if they scored below specified cut-off points based on substantive and empirical considerations. Although the choices of cut-off points do not materially affect international comparisons, they do affect the estimates of prevalence. Thus, when making substantive interpretations of "low sense of belonging" and "low participation", the reader should be aware of the more detailed definitions described in the technical notes below.

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On average, nearly a quarter of 15-year-olds express negative views about how well they fit in at school…

…and an average of one in five reported recently missing school, arriving late or skipping classes.

In most countries the share of youth with a low sense of belonging was around 25% (Chart A8.1). However, there were five countries with averages above 30%, namely Belgium, France, Japan, Korea and Poland. The prevalence of students with a low sense of belonging was below 20% in four countries, Hungary, Ireland, Sweden and the United Kingdom.

As with the mean scores on these measures, the prevalence of students with low participation varied more among countries than did the prevalence of students with a low sense of belonging. Although the average percentage of students with low participation was 20% (and lower than its counterpart measure on low sense of belonging), there were more countries with relatively high percentages and more with relatively low percentages of students with low participation.

Six countries in which the prevalence of low participation was above 25% are Canada, Greece, Iceland, New Zealand, Poland and Spain. Five countries in which the prevalence was below 15% are Belgium, Germany, Japan, Korea and Luxembourg – with particularly low prevalence of low participation in Japan, at only 4%.

Variation among schools in low sense of belonging and low participation

The prevalence of students with a low sense of belonging may also vary considerably among schools within each country. Determining the extent of this variation is important for at least two reasons. First, if there is considerable variation among schools, then it may be more efficient to target certain schools for intervention, whereas if the prevalence is fairly uniform across most schools in a country, then a more universal intervention is likely to be preferable. Second, if there is considerable variation among schools in the prevalence of disaffected students, it may be possible to discern whether particular school factors are related to either sense of belonging or participation, thereby providing some direction for what kinds of intervention might be most effective.

For each country, the prevalence of students with a low sense of belonging and low participation was calculated for each school using multilevel analysis techniques. The variation in the estimates of the prevalence of disaffected students across schools in each country can be shown as distributions, which identify the median prevalence for all schools in the country, and the 5th, 25th, 75th, and 95th percentiles for the distribution of prevalence estimates for all schools in the country.

In most countries, the prevalence of students with a low sense of belonging varied significantly among schools…

The results show that, within every country except Iceland, New Zealand and Sweden, the prevalence of students with a low sense of belonging varied significantly among schools. The average interquartile range was 5% and the average range from the 5th to the 95th percentiles was 13%. In three countries, Korea, Luxembourg and Poland, the range exceeded 20%, indicating relatively large variation among schools.

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The prevalence of low participation students varied significantly among schools in every OECD country. The average interquartile range was 7%, and the average range between the 5th and 95th percentiles was 20%. These figures indicate that there was considerably more variation among schools in the prevalence of students with low participation than for low sense of belonging. In Belgium, Hungary, Italy, Poland, Spain, Switzerland and the United States, the range in the prevalence of low participation students exceeded 25%.

…and the between-school variation was even greater for student participation.

Student engagement and performance

Although PISA cannot determine the causal relationships among engagement and achievement outcomes, it can provide an indication of how strong the relationships are among these outcomes, both affective and academic. This analysis discerns whether students who are more engaged in schooling tend to have better literacy skills and vice versa. The correlations between two outcome variables can also be partitioned into within- and between-school components. The within-school component indicates how closely two variables are related among students within the same school. The school-level component indicates whether schools that have higher average scores on one outcome measure also tend to have higher average scores on the other outcome measure, and vice versa.

Chart A8.3 shows the average relationships among these variables for all participating OECD countries. Student-level correlations are shown below the diagonal, while school-level correlations are shown above the diagonal. At the student level, the average correlation between sense of belonging and participation is only 0.07, a very weak correlation, suggesting that the two variables are markedly different outcome measures.

At the level of individual students, the relationship between student participation and sense of belonging is weak …

There may thus be many students who lack a sense of belonging, but despite these feelings, still attend school regularly. Similarly, there may be many students who have a strong sense of belonging, but miss school often, and regularly skip classes and arrive late for school. The relationships between sense of belonging and the three measures of literacy performance also are very weak, ranging from 0.04 to 0.06. The relationships between participation and academic performance are somewhat stronger, ranging from 0.13 to 0.14. In contrast, the correlations among the three measures of literacy are fairly high, ranging from 0.68 to 0.79 at the student level.

…suggesting that there are many students who lack a sense of belonging but still attend school regularly, and vice versa.

By contrast, the correlation between sense of belonging and participation at the school level is 0.37, indicating a much stronger relationship. Thus, schools with high average levels of sense of belonging also tend to have high average levels of participation.

By contrast, at the school level, students' sense of belonging and their participation tend to go hand in hand…

The school-level correlations between each of the two engagement outcomes and each of the three measures of literacy performance also are moderately strong, ranging from 0.48 to 0.51. In contrast, the school-level correlations among the three measures of literacy performance are very strong, ranging from 0.97 to 0.99. These findings have a number of implications for policy and practice. The weak correlations at the student level suggest that teachers and

…and are closely related to school performance…

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Chart A8.3. Correlations among measures of students' engagement in school and performance on the PISA reading, mathematical and scientific literacy scales[1] (2000)

Student-level correlations School-level correlations

	Sense of belonging	Participation	Reading literacy performance	Mathematical literacy performance	Scientific literacy performance
Sense of belonging		0.37	0.51	0.48	0.50
Participation	0.07		0.48	0.50	0.49
Reading literacy performance	0.06	0.14		0.97	0.99
Mathematical literacy performance	0.04	0.13	0.71		0.99
Scientific literacy performance	0.04	0.14	0.79	0.68	

1. Only OECD countries are included.
Source: OECD PISA 2000 database.

guidance counsellors are likely to encounter students who have a very low sense of belonging, even though they participate in school activities and their literacy skills are fairly strong. Students with low participation are likely to have somewhat poorer literacy than those who have attended most classes; however, there are many students who miss school, skip classes, and arrive late for school who also show reasonably strong literacy skills.

…suggesting that schools with high levels of engagement also tend to have high levels of academic performance.

The moderately strong school-level correlations among the engagement measures and literacy performance suggest that schools that have high levels of engagement also tend to have high levels of academic performance. However, it cannot be inferred from these findings that efforts to increase student engagement, even at the school level, are likely to lead to better academic performance.

Cluster analysis allows further examination of these relationships and partitions students into:…

An approach to further examine the inter-relationships is the formation of clusters of individuals based on how similar they are with respect to the engagement and performance outcomes. Chart A8.4 displays the results for the cluster analysis of OECD countries. The figure shows the percentages of students in each of five clusters, as well as the average scores on each of four outcome variables (belonging, participation, reading literacy, mathematical literacy) for each cluster of students.

…students with strong academic performance as well as above-average sense of belonging and participation…

The first cluster, which comprises about one-quarter of all students, is labelled *top students*. These students are engaged in schooling and have relatively high scores on reading and mathematical literacy. On average, students in this cluster scored 610 points on the reading literacy scale, 609 points on the mathematical literacy scale, 530 points on the participation scale and 531 points on the sense of belonging scale.

Chart A8.4. Percentage of students and mean scores on four outcome measures, by cluster of students' engagement[1] (2000)

Student category	Percentage of students	Mean score on index			
		Sense of belonging	Participation	Reading literacy	Mathematical literacy
Top students	25.6	531	530	610	609
Engaged students	27.3	575	529	491	488
Students feeling isolated	20.4	387	526	521	522
Absentee students	9.6	490	271	449	454
Non-academic students	17.1	472	509	366	369
All clusters	100.0	500	500	500	500

1. Only OECD countries are included.
Source: OECD PISA 2000 database.

…students with a high sense of belonging, above average participation and average academic performance…

The second group, *engaged students*, have above average scores on the two engagement measures, but on average have reading and mathematical literacy scores that are about 10 points below the OECD average of 500. Although these students do not tend to be among those with high literacy skills, they feel they belong at school and they are not absent from school on a regular basis. They also comprise about one-quarter of all students.

…students with a low sense of belonging but at least average participation and performance…

The third group of students, labelled *students feeling isolated*, comprise about one-fifth of all students. These students on average have low scores on the sense of belonging scale, but above average levels of participation. Their achievement scores tend to be fairly strong – on average about 20 points above the OECD average.

…frequently absent students…

The fourth group of students, labelled *absentee students*, has very low participation scores. Their literacy skills also tend to be below average – by about 50 points on average – but their sense of belonging is close to the OECD average. These students comprise about 10% of the sample.

…and non-academic students.

The last group, labelled *non-academic students*, comprises students who have low literacy skills, on average about 130 to 135 points below the OECD average. These students on average have low scores on the sense of belonging scale, but are not absent from school on a regular basis. They comprise about 17% of 15-year-old students across the OECD area.

A considerable portion of students with comparatively high academic performance still report a low sense of belonging.

An important finding revealed by this analysis is that students who have a low sense of belonging are found in two separate groups. There are students who feel lonely and isolated from their classmates, even though they have relatively high academic performance. There are other students who have these feelings and have very poor academic performance. This split to some extent explains

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the relatively low correlations between sense of belonging and academic performance (see Chart A8.3). An important further question concerning these results is whether or not students in the cluster with high literacy skills but low sense of belonging tend to pursue additional education beyond the period of compulsory schooling.

The cluster analysis also shows that students with very low literacy skills are not generally those with particularly low scores on both measures of engagement. The analysis did not yield a cluster of students who had low scores on all four outcome measures.

Definitions and methodologies

The engagement and performance measures are based on assessments administered as part of the Programme for International Student Assessment (PISA) undertaken by the OECD in 2000.

The index scores and percentages are based on background questionnaires administered as part of the Programme for International Student Assessment (PISA) in 2000. The target population studied for this indicator was 15-year-old students. Operationally, this referred to students who were from 15 years and 3 (completed) months to 16 years and 2 (completed) months at the beginning of the testing period and who were enrolled in an educational institution, regardless of the grade level or type of institution in which they were enrolled or whether they participated in school full-time or part-time.

Students were considered to have a low sense of belonging if they scored below 3.0 on the sense of belonging scale (before standardisation). These students, on average for the six items, responded "disagree" or "strongly disagree" more frequently than "agree" or "strongly agree". Students who feel that they "belong" can be expected on average at least to "agree" with the positive statements and "disagree" with the negative ones. Those with a lower average score are classified as having a "low sense of belonging". This does not mean that they express negative attitudes overall, but they do in at least one respect. Also, analyses of the distribution of the scaled scores suggested that 3.0 was an appropriate cut-off point. The sense of belonging scale was negatively skewed (-0.70 for participating OECD countries), which indicates that there were a number of students with exceedingly low scores. One-quarter of all students scored below 3.0 on the unstandardised scale, which corresponded to scores at or below 426 on the standardised scale. There is a marked break in the distribution at this point. Students with scores of 3.0 or higher had scaled scores of 460 or higher. Thus, the criterion used for classifying students as having a low sense of belonging has a simple substantive interpretation and is based on a significant break in the observed distribution of scores.

Students were considered to have low participation if they scored less than or equal to 10 on the unstandardised participation scale. Note that the scale does not distinguish between justified and unjustified absences. This also has an appealing substantive interpretation. For example, all students were considered to have low participation if they responded "1 or 2 times" to all three items, or "3 or 4 times" to "miss school", or "3 or 4 times" to both "skip classes" and "arrive late for school". The participation variable was also strongly negatively skewed (-1.82 for OECD countries). As with the sense of belonging scores, this

indicates that there are a number of students with exceedingly low scores. With these criteria set at 10 or lower on the participation scale, 20% of students in participating OECD countries were classified as having low participation.

For notes on standard errors, significance tests and multiple comparisons see Annex 3 at *www.oecd.org/edu/eag2004*.

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Table A8.1. Mean scores on two indices of students' engagement in school (2000)

		Sense of belonging			Participation		
		Mean index	S.E.	S.D.	Mean index	S.E.	S.D.
OECD COUNTRIES	Australia	495	(2.0)	97	502	(2.1)	89
	Austria	526	(2.3)	109	513	(2.2)	85
	Belgium	479	(1.3)	90	518	(1.7)	94
	Canada	512	(1.1)	110	481	(1.1)	104
	Czech Republic	471	(1.6)	78	493	(2.2)	99
	Denmark	513	(2.2)	104	m	m	m
	Finland	502	(1.4)	96	488	(2.1)	103
	France	486	(1.6)	94	512	(2.1)	93
	Germany	518	(1.8)	107	523	(1.9)	85
	Greece	498	(2.0)	95	475	(2.7)	112
	Hungary	514	(1.6)	97	509	(1.9)	96
	Iceland	514	(1.8)	109	484	(1.8)	110
	Ireland	508	(1.7)	101	503	(2.1)	89
	Italy	500	(1.6)	92	484	(2.6)	98
	Japan	465	(1.9)	89	555	(1.9)	57
	Korea	461	(1.6)	81	546	(1.5)	71
	Luxembourg	505	(1.8)	110	515	(1.4)	96
	Mexico	509	(2.2)	98	498	(2.1)	89
	New Zealand	498	(1.9)	98	479	(2.1)	110
	Norway	512	(2.2)	104	503	(2.0)	102
	Poland	461	(1.9)	85	477	(3.7)	119
	Portugal	501	(1.9)	88	504	(1.8)	91
	Spain	499	(1.6)	91	472	(2.5)	118
	Sweden	527	(1.8)	103	489	(1.5)	99
	Switzerland	520	(2.0)	105	515	(1.9)	90
	United Kingdom	513	(1.4)	101	509	(1.5)	86
	United States	494	(3.1)	111	494	(3.9)	100
	Country mean	*500*	*(0.4)*	*100*	*500*	*(0.4)*	*100*
PARTNER COUNTRIES	Albania	459	(1.6)	80	515	(2.1)	89
	Argentina	518	(3.7)	107	471	(6.2)	124
	Brazil	522	(2.4)	102	466	(2.9)	109
	Bulgaria	481	(1.9)	85	441	(3.4)	133
	Chile	519	(2.3)	110	474	(2.9)	111
	Hong Kong-China	458	(1.3)	73	557	(1.2)	51
	Indonesia	479	(1.7)	72	522	(1.7)	79
	Israel	544	(2.9)	115	428	(5.3)	129
	Latvia	464	(2.1)	79	483	(2.7)	103
	Liechtenstein	521	(5.5)	113	537	(4.1)	79
	FYR Macedonia	513	(1.7)	98	499	(1.6)	109
	Peru	480	(2.5)	99	473	(2.5)	113
	Russian Federation	475	(1.6)	85	480	(2.5)	114
	Thailand	469	(1.5)	77	489	(2.1)	97
	Netherlands[1]	499	(2.8)	84	499	(2.8)	92

Note: Standard errors (SE) are shown in parentheses. SD: Standard deviation.
1. Response rate is too low to ensure comparability.
Source: OECD PISA 2000 database.

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Table A8.2. Prevalance of students with low sense of belonging and low participation (2000)

		Low sense of belonging		Low participation	
		Percentage	S.E.	Percentage	S.E.
OECD COUNTRIES	Australia	20.7	(0.8)	18.3	(0.8)
	Austria	20.3	(0.7)	15.3	(0.8)
	Belgium	31.6	(0.6)	14.1	(0.6)
	Canada	20.5	(0.4)	26.0	(0.5)
	Czech Republic	29.8	(0.7)	20.7	(0.8)
	Denmark	20.9	(0.7)	m	m
	Finland	21.3	(0.7)	22.9	(0.9)
	France	30.2	(0.7)	15.3	(0.7)
	Germany	22.6	(0.6)	12.9	(0.7)
	Greece	22.7	(0.9)	28.8	(1.0)
	Hungary	18.8	(0.6)	17.7	(0.7)
	Iceland	22.4	(0.7)	26.0	(0.8)
	Ireland	19.4	(0.7)	17.8	(0.7)
	Italy	22.9	(0.8)	21.7	(0.9)
	Japan	37.6	(1.0)	4.2	(0.6)
	Korea	41.4	(1.1)	8.4	(0.6)
	Luxembourg	28.3	(0.8)	13.4	(0.5)
	Mexico	22.0	(0.9)	21.4	(0.8)
	New Zealand	21.1	(0.8)	26.9	(0.9)
	Norway	21.1	(0.8)	17.9	(0.8)
	Poland	41.2	(1.2)	29.2	(1.3)
	Portugal	20.7	(0.9)	20.1	(0.7)
	Spain	24.0	(0.7)	34.0	(1.0)
	Sweden	17.7	(0.5)	23.8	(0.6)
	Switzerland	20.8	(0.7)	15.7	(0.7)
	United Kingdom	17.4	(0.6)	15.0	(0.6)
	United States	25.0	(1.0)	20.2	(1.1)
	Country mean	***24.5***	***(0.2)***	***20.0***	***(0.2)***
PARTNER COUNTRIES	Albania	39.7	(0.9)	15.0	(0.8)
	Argentina	21.9	(1.7)	28.4	(2.6)
	Brazil	17.1	(0.7)	31.8	(1.2)
	Bulgaria	29.0	(1.2)	40.5	(1.1)
	Chile	23.6	(0.9)	28.4	(1.2)
	Hong Kong-China	33.4	(0.8)	3.3	(0.3)
	Indonesia	23.8	(1.1)	14.5	(0.6)
	Israel	18.5	(0.9)	45.4	(1.9)
	Latvia	36.0	(1.1)	28.0	(1.3)
	Liechtenstein	23.9	(2.1)	9.1	(1.7)
	FYR Macedonia	22.9	(0.7)	21.2	(0.6)
	Peru	36.9	(1.2)	31.2	(1.0)
	Russian Federation	33.4	(1.0)	30.0	(0.9)
	Thailand	32.7	(0.9)	25.4	(0.9)
	Netherlands[1]	20.1	(1.2)	20.0	(1.2)

Note: Standard errors (SE) are shown in parentheses.
1. Response rate is too low to ensure comparability.
Source: OECD PISA 2000 database.

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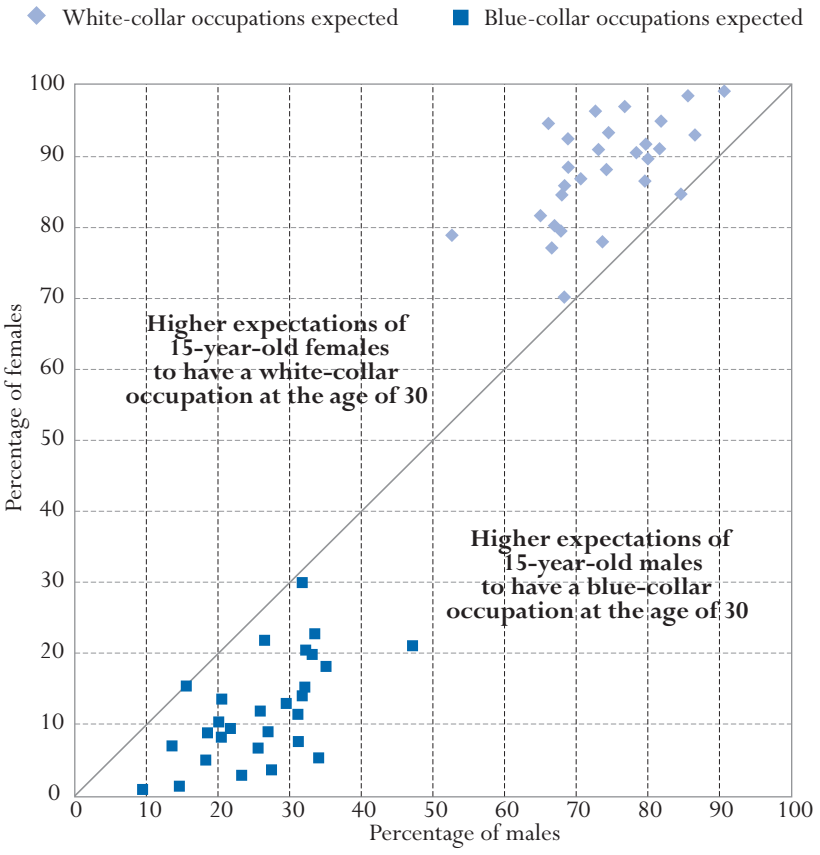
INDICATOR A9: GENDER DIFFERENCES IN STUDENT PERFORMANCE

- At the 4th-grade level, females significantly outperform males in reading literacy, on average, and at age 15 the gender gap in reading tends to be large.
- In mathematics, 15-year-old males tend to be at a slight advantage in most countries; in science, gender patterns are less pronounced and uneven.
- In civic knowledge, few gender differences emerge among 14-year-olds.
- Notwithstanding these overall patterns, countries differ widely in the magnitude of gender differences in the different subject areas.
- Females seem to have higher expectation towards future occupations than males, but there is considerable variation in expectations for both genders among countries.
- In about half the countries, females preferred co-operative learning more than males did, whereas males in most countries tended to prefer competitive learning more than females did.

Chart A9.1. Expectations of 15-year-olds to have a white- or blue-collar occupation at the age of 30, by gender (2000)



Source: OECD PISA 2000 database. Table A9.1. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Policy context

This indicator examines gender differences in students' performance in various subject areas, as well as on various other attitudinal scales.

Recognising the impact that education has on participation in labour markets, occupational mobility and the quality of life, policy makers and educators emphasise the importance of reducing educational differences between males and females. Significant progress has been achieved in reducing the gender gap in educational attainment (see Indicators A1 and A2), although in certain fields of study, such as mathematics and computer science, gender differences favouring males still exist (see Indicator A4).

As females have closed the gap and then surpassed males in many aspects of education in OECD countries, there is now concern about the underachievement of males in certain areas, such as reading. Gender differences in student performance, as well as in attitudes toward and strategies for learning, therefore need close attention from policy makers if greater gender equity in educational outcomes is to be achieved. Furthermore, students' perceptions of what occupations lie ahead for them can affect their academic decisions and performance. An important policy objective should therefore be to strengthen the role that the education system can play in moderating gender differences in performance in different subject areas. This indicator begins by examining data from OECD's PISA study on gender differences in the occupations which 15-year old students expect to practice by the age of 30 and then goes on to analyse gender differences in performance, attitudes and learning strategies by drawing upon findings from PISA as well as the International Association for the Evaluation of Educational Achievement's (IEA) PIRLS and Civic Education Studies.

Evidence and explanations

Students' aspirations and expectations for the future can affect their academic performance and choices.

PISA explored students' expected occupations at the age of 30 in order to understand their future aspirations and expectations. These expectations are likely to affect their academic performance as well as the courses and educational pathways that they pursue. Students with higher academic aspirations are also more likely to be engaged with school and related activities (see *www.pisa.oecd.org*).

Perhaps not surprisingly, PISA suggests that students' expected occupations are associated with their parents' professions, although the correlations are only weak to moderate. On average across countries the correlation of students' expected occupations with fathers' occupations is 0.19 and that of mothers' occupations is 0.15.

The occupations they expect to have by age 30 seem to be predictive of their future career choices.

More importantly, the occupations that students expect to have at the age of 30 seem to be predictive for the career choices that they make later on. For example, female students in the participating countries are far more likely than males to report expected occupations related to life sciences and health, including biology, pharmacy, medicine and medical assistance, dentistry, nutrition and nursing, as well as professions related to teaching: 20% of females expect to be in life sciences or health related professions compared to only 7% of males; 9% of females compared to 3% of males expect to be in occupations associated with teaching. Male students, on the other hand, more often expect careers associated with physics, mathematics or engineering (18% of males versus 5% of females) or occupations related to metal, machinery and related trades (6% of males versus less than 1% of females).

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Females seem to have higher expectations towards future occupations than males....

PISA classified students' expected professions at the age of 30 into four socio-economic categories, namely white-collar high-skilled, white-collar low-skilled, blue-collar high-skilled and blue-collar low-skilled. A comparison based on a taxonomy in which professions were ordered by their predictive power on future earnings shows that in 39 out of the 42 countries females seem to have higher expectation towards their future occupations than males. Chart A9.1 indicates this relationship. Each symbol represents one country, with diamonds representing the percentage of students expecting a white-collar occupation at the age of 30 and the squares representing the percentage of students expecting to have a blue-collar occupation at the age of 30. In Belgium, the Czech Republic and Denmark, 25% more females than males expect to have a white-collar occupation at the age of 30. Mexico and Korea are countries where large percentages of males and females seem to have high expectations for a white-collar occupation (more than 80%), with small differences found in males' and females' expectations (less than 10%) (see Table A9.1).

.....but there is considerable variation in expectations among countries for both genders.

Chart A9.2 provides further detail by showing the percentage of male and female students who expect to have a white-collar profession, either high- or low-skilled. The left side of the chart shows the percentage of males and the right side the percentage for females. The percentages of females expecting to hold a white-collar position at the age of 30 range from around 95% in Belgium, Poland and the United States to 66% in Japan. Similar patterns are found for males ranging from more than 80% in Korea, Mexico and the United States to 51% in Japan (see Table A9.1).

These results are of significance for policy development. Combining the PISA data on the occupations that 15-year-old males and females expect to have at age 30 with data on today's gender patterns in choices relating to educational pathways and occupations suggests that gender differences in occupational expectations at age 15 are likely to persist and to have a significant influence on the future of students. An important policy objective should be to strengthen the role that education systems play in moderating gender differences in occupational expectations and – to the extent that these are related to gender patterns in student performance and student interest – to reduce performance gaps in different subject areas.

By the 4th-grade level, females tend to outperform males in reading literacy...

On average, and in all countries, 4th-grade females outperform 4th-grade males on the reading literacy scale (Chart A9.3). The difference between females' scores and males' scores ranges from 8 points in Italy to more than 20 points (one-fifth of an international standard deviation) in England, Greece, New Zealand, Norway and Sweden, and in all countries, the differences are statistically significant.

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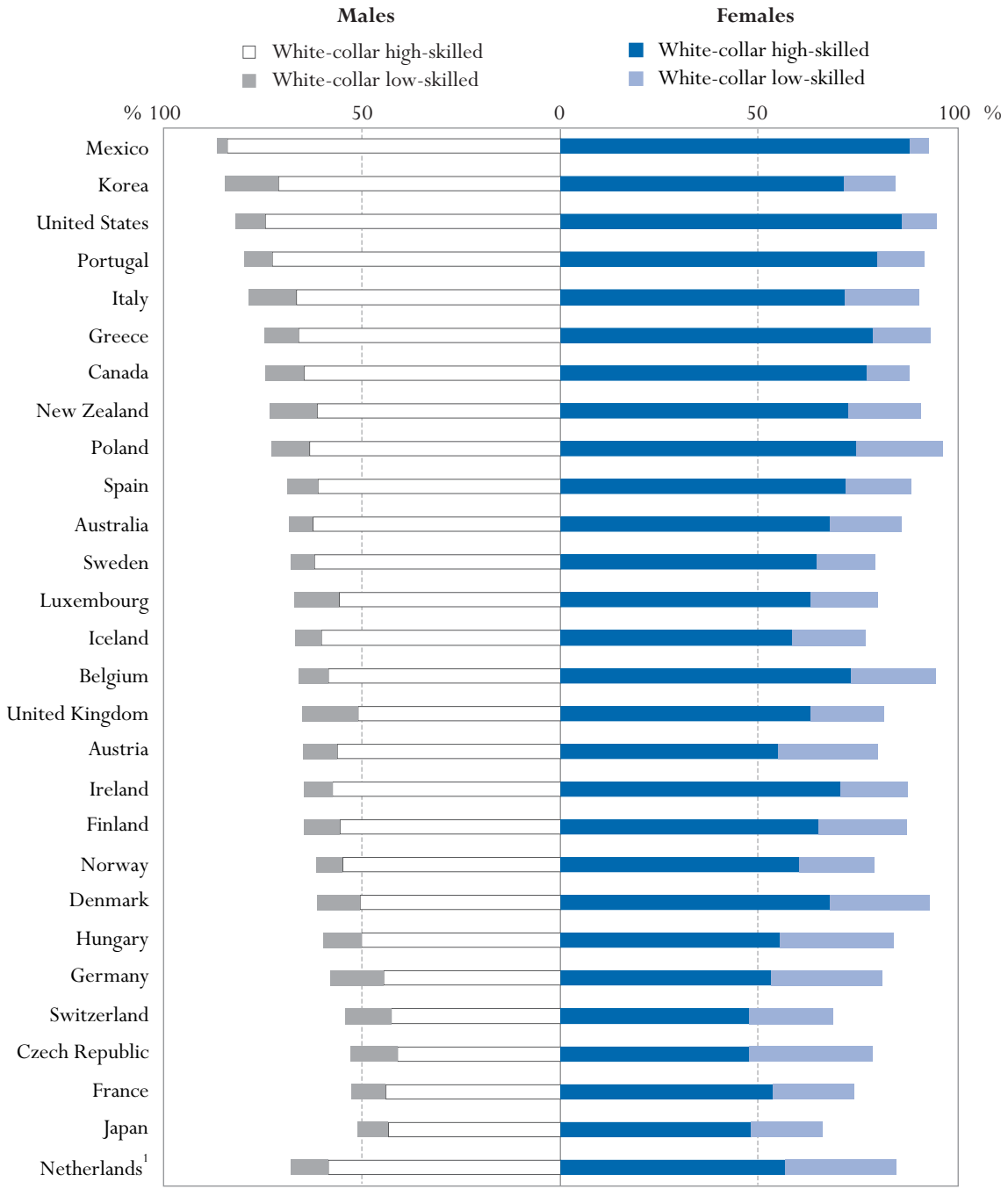
Chart A9.2. Expectations of 15-year-olds to have a low or high-skilled white-collar occupation at age 30, by gender (2000)



1. Response rate is too low to ensure comparability.
Countries are ranked in descending order of male white-collar occupation expectations.
Source: OECD PISA 2000 database. Table A9.1. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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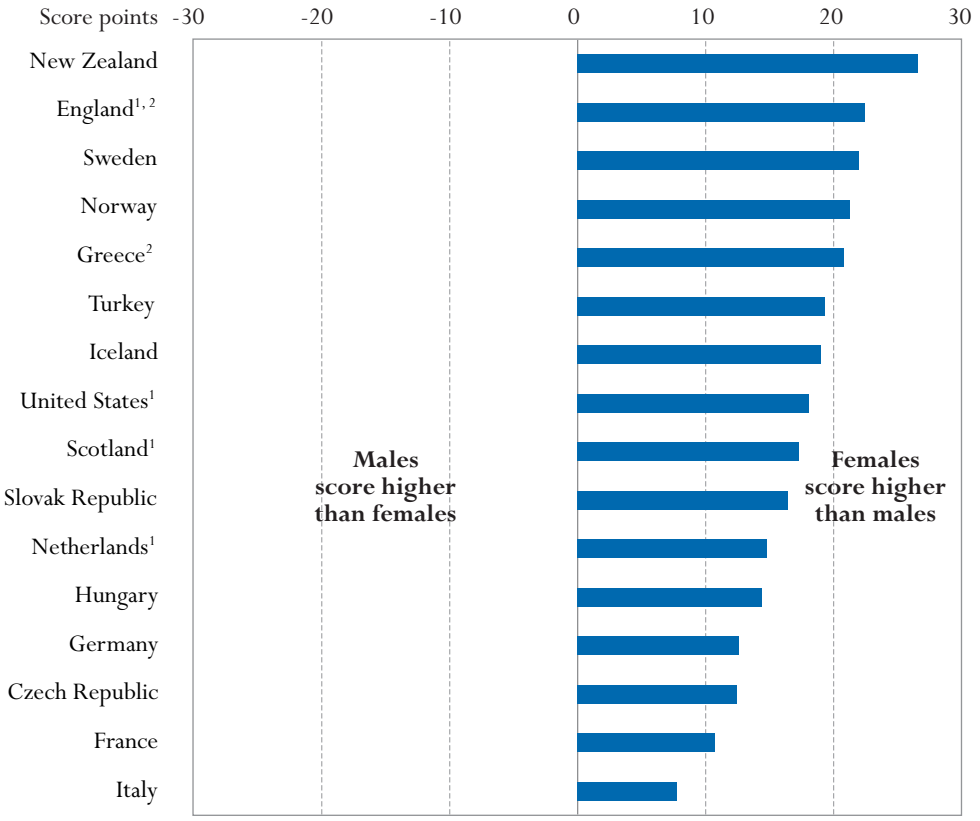
Chart A9.3. Gender differences in performance of 4th-grade students on the PIRLS reading literacy scale (2001)



1. Met guidelines for sample participation rates only after replacement schools were included.
2. National defined population covers less than 95% of national desired population.

Countries are ranked in descending order of magnitude of the difference between mean scores of females and males on the PIRLS reading literacy scale.

Source: IEA Progress in Reading Literacy Study (PIRLS), 2001. Table A9.2. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

…and at age 15, the gender gap in reading tends to be large.

Among 15-year-olds, PISA shows even larger differences in reading literacy performance. In every country and on average, females reach higher levels of performance in reading literacy than do males. This difference is not only universal but also large: 32 points (or one-third of an international standard deviation) on average (Table A9.3 and Chart A9.4).

Although gender differences appear to be more pronounced among 15-year-olds, the measures from the PISA and PIRLS assessments are highly correlated among countries ($r = 0.81$).

In mathematics, 15-year-old males tend to be at a slight advantage…

In mathematical literacy, there are statistically significant differences in about half the countries, in all of which males perform better. The average gap between males and females in mathematical literacy is 11 points (one-tenth of an international standard deviation) (Table A9.3 and Chart A9.4).

Measures of scientific literacy from PISA 2000 show fewer disparities between males and females than measures of reading and mathematical literacy, and the pattern of the differences is not as consistent among countries. Twenty-five OECD countries show no statistically significant gender differences in science performance (Table A9.3 and Chart A9.4).

…whereas in science, gender patterns are less pronounced and more uneven…

Gender differences in civic knowledge, as measured by the IEA Civic Education Study, are relatively small (Table A9.4). The civic knowledge test, which was administered to 14-year-olds in 28 countries in 1999, was designed to test students' knowledge of fundamental democratic principles and their skills in interpreting material with civic or political content. The study found that, without controlling for other variables, both civic content knowledge and skills in interpreting political communication are unrelated to gender among 14-year-olds in most countries. When other factors related to civic knowledge (such as students' predicted level of educational attainment and home literacy resources) are held constant, slight differences arise favouring males, but only in about one-third of the 28 countries surveyed.

…and the IEA Civic Education Study shows few gender differences in civic knowledge.

The fact that the direction of gender differences in reading and mathematics tends to be somewhat consistent among countries suggests that there are underlying features of education systems or societies and cultures that may foster such gender gaps. However, the wide variation among countries in the magnitude of gender differences suggests that current differences may be the result of variations in students' learning experiences and are thus amenable to changes in policy.

Countries differ widely, however, in the magnitude of gender differences in the different subject areas.

Box A9.1. Gender differences among low performers

Fostering high performance and gender parity in education will require that attention be paid to students who are among the lowest performers. In all OECD countries, 15-year-old males are more likely to be among the lowest-performing students in reading literacy (*i.e.* to perform at or below Level 1 on the combined reading literacy scale); the average ratio of males to females at this level is 1.7 among OECD countries, ranging from 1.3 in Mexico to 3.5 in Finland.

Because 15-year-old males tend to perform better than females on the mathematical literacy scale, one might expect that females would be more represented among the lowest performing students in mathematics. However, much of the gender difference in mathematical literacy scores is attributable to larger differences in favour of males among the better students, not a relative absence of males among the poorer performers. In 15 of the OECD countries in PISA, 15-year-old males are more likely to be among the best-performing students; the same is not true for females in any country. However, among students who perform at least 100 points below the OECD mean on the mathematical literacy scale, the proportion of females and males is roughly equal. These findings suggest that the underachievement of young males across subject domains is a significant challenge for education policy that will need particular attention if the proportion of students at the lowest levels of proficiency is to be reduced.

For more information and data on low performers, see *Knowledge and Skills for Life – First Results from PISA 2000* (OECD, 2001).

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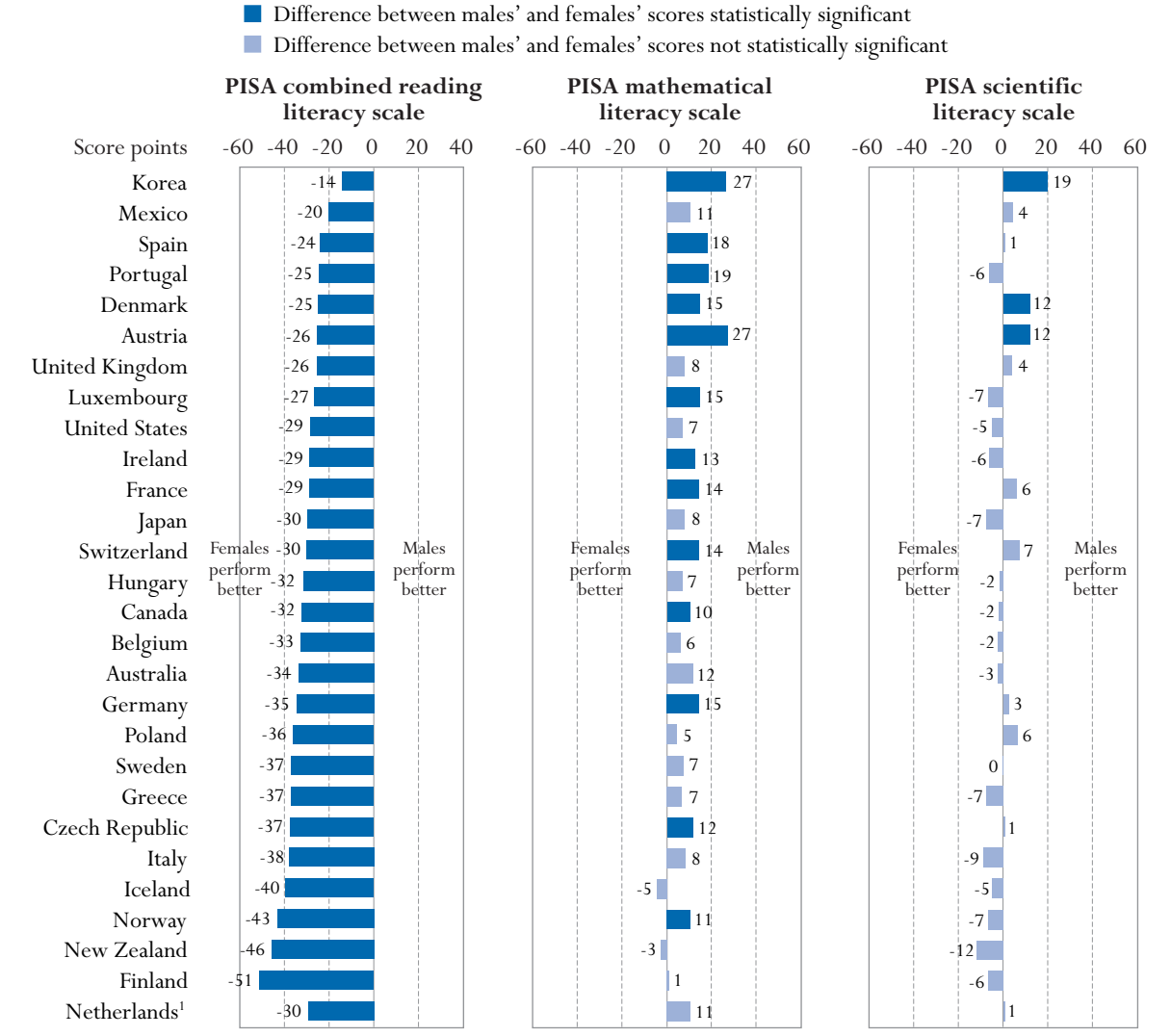
Chart A9.4. Gender differences in performance of 15-year-olds on the PISA combined reading, mathematical and scientific literacy scales (2000)



1. Response rate is too low to ensure comparability.
Countries are ranked in ascending order of the difference between the mean performance of females and males on the PISA combined reading literacy scale.
Source: OECD PISA 2000 database. Table A9.3. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

The gap between scores of 15-year-old males and females in reading literacy in PISA ranged from 25 points or less in Denmark, Korea, Mexico, Portugal, and Spain to about twice that amount in Finland. The gap in mathematical literacy ranged from statistically insignificant differences in 14 OECD countries to 27 points in Austria and Korea. Thus, some countries do appear to provide a learning environment that benefits both genders equally, either as a direct result of educational efforts or because of a more favourable social context. In reading literacy, Korea, and to a lesser extent Japan and the United Kingdom, achieve both high mean scores and below average gender differences. In mathemati-

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cal literacy, Belgium, Finland, Japan, New Zealand and the United Kingdom similarly achieve both high mean performance and relatively small gender differences (Table A9.3 and Indicators A6 and A7).

Self-regulated learning scales

Gender differences exist not only in student performance, but also in attitudes, habits and approaches to learning.

Gender differences exist not only on measures of proficiency in different subjects, but in attitudinal and other measures related to learning habits. PISA 2000 collected data on a variety of skills and attitudes that are considered prerequisites for students' abilities to manage the learning process, or their self-regulated learning. These 13 self-regulated learning scales address students' uses of learning strategies, motivation, self-related cognitions, and learning preferences (see *Learners for Life: Student Approaches to Learning*, OECD, 2003). By identifying differences between males and females in the self-regulated learning scales (Table A9.5), this indicator points to their relative strengths and weaknesses. Targeting interventions to account for differences in students' learning strategies or attitudes could have important impacts on pedagogy. However, some of these measures are difficult to compare across countries.

Learning strategies

In the majority of countries, 15-year-old females tend to emphasise memorisation strategies…

Differences in the learning strategies that males and females use may provide information on possible strategies to reduce gender differences in performance. In the majority of countries, 15-year-old females report emphasising memorisation strategies (*e.g.*, reading material aloud several times and learning key facts) more than males do (Table A9.5).

…while males tend to be stronger on elaboration strategies.

Conversely, males report using elaboration strategies (*e.g.*, exploring how material relates to things one has learned in other contexts) more than females. However, in almost all countries with statistically significant gender differences on the control strategies scale, females report using control strategies (*i.e.*, strategies that allow them to control the learning process) more often than do males. Norway and Sweden are exceptions. This suggests that females are more likely to adopt a self-evaluating perspective during the learning process. Males, on the other hand, perhaps could benefit from more general assistance in planning, organising and structuring learning activities (Table A9.5).

Motivation

In all countries, females express much more interest in reading…

In all countries, females express much more interest in reading than males. They also tend to be more involved readers of books, particularly fiction, and to be more engaged in reading than males.

…while males tend to express more interest in mathematics…

By contrast, males express more interest in mathematics than do females in almost every country in the study, even though these differences are much smaller than in the case of reading. In fact, Portugal and Mexico are the only countries where females and males report similar levels of interest in mathematics.

…and both differences are closely mirrored in performance patterns.

Gender differences in performance in reading and mathematical literacy are closely mirrored in student interest in their respective subjects. These gender differences in attitudes may reveal inequalities in the effective-

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ness with which schools and societies promote motivation and interest in different subject areas.

Self-related cognitions

Gender differences are also observed with regard to students' confidence in their abilities and whether they believe in the benefits of learning…

Students' confidence in their abilities and their beliefs about the benefits of learning are also factors that have a close relationship to performance and also vary by gender. In all countries except Korea, females express a stronger self-concept than do males in reading. These differences are especially pronounced in Finland, the Czech Republic, Germany, Italy, Norway and the United States. In mathematical literacy, males tend to express a higher self-concept than females, particularly in Germany, Norway and Switzerland. In terms of their general self-efficacy, or belief that one's goals can be achieved, males score significantly higher than females, overall and in most countries. The differences between males and females are particularly pronounced in Denmark, Finland, Norway and Sweden (Table A9.5).

Learning styles

…as well as in student attitudes to co-operative and competitive learning.

In about half the countries, females preferred co-operative learning more than males did, whereas males in most countries tended to prefer competitive learning more than females did. On the co-operative learning scale, these gender differences are most pronounced in Ireland, Italy and the United States. On the competitive learning scale, they are most evident in Ireland, Portugal and Scotland (Table A9.5).

Definitions and methodologies

The reading performance scores of 4th graders are based on the IEA Progress in Reading Literacy Study of 2001.

The PIRLS target population was students in the upper of the two adjacent grades that contained the largest proportion of 9-year-old students at the time of testing. Beyond the age criterion embedded in the definition, the target population should represent that point in the curriculum where students have essentially finished learning the basic reading skills and will focus more on "reading to learn" in the subsequent grades. Thus the PIRLS target grade was expected to be the 4th grade (Table A9.2).

The civic knowledge scores are based on the Civic Education Study undertaken by the IEA in 1999.

The scores on the civic knowledge test are based on assessments of students during the second phase of the International Association for the Evaluation of Educational Achievement's Civic Education Study. The internationally desired population includes all students enrolled on a full-time basis in that grade in which most students aged 14 years to 14 years and 11 months are found at the time of testing. Time of testing for most countries was the first week of the 8th month of the school year (Table A9.4).

The PISA target population studied for this indicator was 15-year-old students. Operationally, this referred to students who were from 15 years and 3 (completed) months to 16 years and 2 (completed) months at the beginning of the testing period and who were enrolled in an educational institution, regardless of the grade level or type of institution and of whether they participated in school full-time or part-time.

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The reading, mathematics and science performance scores for 15-year-olds are based on assessments administered as part of the Programme for International Student Assessment (PISA) undertaken by the OECD in 2000.

Twenty-two of the 28 OECD countries that participated in PISA 2000 administered the self-regulated learning component on which this indicator is based: Australia, Austria, the Flemish Community of Belgium, the Czech Republic, Denmark, Finland, Germany, Hungary, Ireland, Iceland, Italy, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Portugal, Scotland, Sweden, Switzerland and the United States. Note that Belgium and the United Kingdom, countries that did participate in the main PISA assessments, are represented in the self-regulated learning option only by participating jurisdictions: the Flemish Community and Scotland, respectively. Canada, France, Greece, Japan and Spain, as well as the French Community of Belgium and England did not participate in this option.

For notes on standard errors, significance tests and multiple comparisons, see Annex 3 at *www.oecd.org/edu/eag2004*.

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Table A9.1. 15-year-olds' occupational expectations by age 30, by gender (2000)

Percentage of 15-year-olds expecting to have a white or blue-collar occupation

		All students				Males				Females			
		White-collar high-skilled	White-collar low-skilled	Blue-collar high-skilled	Blue-collar low-skilled	White-collar high-skilled	White-collar low-skilled	Blue-collar high-skilled	Blue-collar low-skilled	White-collar high-skilled	White-collar low-skilled	Blue-collar high-skilled	Blue-collar low-skilled
OECD COUNTRIES	Australia	65.0	11.7	10.4	12.9	62.4	6.0	19.0	12.7	67.8	17.9	1.2	13.1
	Austria	55.3	17.2	11.7	15.8	56.3	8.6	21.9	13.3	54.8	25.1	2.2	17.9
	Belgium	65.6	14.2	15.4	4.9	58.5	7.6	27.9	6.0	73.1	21.3	1.8	3.7
	Canada	70.9	10.2	7.1	11.8	64.6	9.7	13.0	12.8	77.1	10.8	1.2	10.8
	Czech Republic	44.5	22.0	16.2	17.3	41.1	11.9	28.3	18.7	47.6	31.1	5.3	16.0
	Denmark	58.5	17.5	19.6	4.3	50.5	10.9	34.1	4.5	67.7	25.1	2.9	4.2
	Finland	60.4	15.8	12.2	11.5	55.5	9.1	21.4	14.0	65.0	22.0	3.7	9.2
	France	48.9	14.7	9.9	26.5	44.1	8.5	18.7	28.7	53.4	20.5	1.7	24.4
	Germany	48.8	20.9	17.2	13.2	44.7	13.3	30.1	11.9	53.1	28.0	4.6	14.3
	Greece	72.3	11.7	9.4	6.6	66.0	8.6	17.9	7.6	78.5	14.6	1.3	5.6
	Hungary	52.7	19.0	16.6	11.7	50.3	9.5	28.0	12.2	55.3	28.5	5.1	11.1
	Iceland	59.2	12.6	7.9	20.3	60.3	6.4	13.5	19.8	58.4	18.5	2.4	20.7
	Ireland	64.1	12.2	11.7	12.1	57.5	7.2	22.6	12.7	70.3	16.9	1.3	11.5
	Italy	69.1	15.2	5.8	9.9	66.6	11.9	10.6	10.9	71.6	18.7	0.9	8.8
	Japan	45.8	12.9	4.0	37.4	43.3	7.7	7.3	41.7	48.2	17.9	0.7	33.2
	Korea	71.2	13.2	1.6	13.9	71.1	13.4	2.4	13.0	71.4	13.0	0.6	15.0
	Luxembourg	59.6	14.3	8.7	17.4	55.7	11.3	15.4	17.6	63.0	16.9	2.8	17.2
	Mexico	86.0	3.6	2.1	8.2	84.0	2.5	3.4	10.1	88.0	4.7	0.8	6.4
	New Zealand	67.0	15.1	8.5	9.4	61.3	11.8	16.5	10.4	72.4	18.3	0.8	8.4
	Norway	57.4	12.7	12.9	17.1	55.0	6.4	23.2	15.4	60.1	18.9	2.3	18.7
	Poland	68.8	15.4	14.2	1.7	63.3	9.4	24.4	2.9	74.5	21.7	3.5	0.4
	Portugal	76.5	9.5	5.1	9.0	72.7	7.0	9.8	10.5	79.8	11.7	0.8	7.7
	Spain	66.6	12.2	8.2	13.1	61.2	7.7	16.1	15.0	71.7	16.6	0.7	11.0
	Sweden	63.2	10.3	8.1	18.5	62.0	5.8	13.6	18.6	64.5	14.8	2.4	18.3
	Switzerland	45.3	16.4	15.0	23.3	42.7	11.5	26.9	18.8	47.6	21.0	3.9	27.4
	United Kingdom	57.1	16.3	7.6	19.0	51.0	14.0	14.5	20.5	63.0	18.6	0.8	17.6
	United States	80.5	8.2	5.1	6.2	74.4	7.5	9.8	8.4	85.8	8.8	1.0	4.3
	Country mean	***62.2***	***13.9***	***10.1***	***13.8***	***58.4***	***9.1***	***18.2***	***14.4***	***66.1***	***18.6***	***2.1***	***13.2***
PARTNER COUNTRIES	Argentina	79.7	7.2	1.9	11.2	74.3	7.3	4.4	14.1	83.6	7.1	0.1	9.1
	Brazil	87.4	7.8	2.4	2.3	86.0	4.7	4.5	4.8	88.6	10.4	0.7	0.2
	Chile	68.9	10.2	7.6	13.3	64.8	5.7	14.5	15.0	72.6	14.2	1.5	11.8
	Hong Kong-China	58.6	17.2	0.6	23.7	54.1	19.5	0.6	25.8	63.1	14.9	0.5	21.5
	Indonesia	76.2	6.8	3.8	13.2	78.2	1.3	6.0	14.5	74.2	12.1	1.7	12.0
	Israel	63.7	5.6	1.1	29.7	64.8	3.5	2.2	29.5	62.9	7.0	0.3	29.8
	Latvia	63.1	18.0	13.4	5.5	55.0	13.8	22.7	8.5	70.5	21.8	5.0	2.7
	Liechtenstein	36.3	17.1	14.2	32.4	40.6	13.9	24.4	21.1	32.2	20.4	3.1	44.2
	Peru	84.1	7.9	6.2	1.8	82.9	2.6	11.0	3.4	85.2	13.1	1.4	0.2
	Russian Federation	58.6	6.9	11.0	23.5	47.6	4.8	15.9	31.7	69.1	9.0	6.2	15.7
	Thailand	43.3	17.4	10.9	28.4	33.5	12.5	22.0	32.0	49.8	20.8	3.4	26.0
	Netherlands[1]	57.6	18.6	8.4	15.5	58.6	9.4	15.7	16.3	56.4	28.1	0.8	14.7

1. Response rate is too low to ensure comparability.

Source: OECD PISA 2000 database.

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Table A9.2. Performance of 4th-grade students and gender (2001)

Mean performance of 4th-grade students on the PIRLS reading literacy scale

	Females		Males		Difference[1]	
	Mean score	S.E.	Mean score	S.E.	Score difference	S.E.
OECD COUNTRIES						
Czech Republic	543	(2.8)	531	(2.6)	**12**	(2.8)
England[2, 3]	564	(3.9)	541	(3.7)	**22**	(3.3)
France	531	(2.7)	520	(3.0)	**11**	(3.3)
Germany	545	(2.2)	533	(2.5)	**13**	(2.7)
Greece[3]	535	(3.8)	514	(4.0)	**21**	(3.9)
Hungary	550	(2.4)	536	(2.5)	**14**	(3.8)
Iceland	522	(1.9)	503	(1.5)	**19**	(2.4)
Italy	545	(2.6)	537	(2.7)	**8**	(2.5)
Netherlands[2]	562	(2.7)	547	(2.8)	**15**	(2.2)
New Zealand	542	(4.7)	516	(4.2)	**27**	(5.4)
Norway	510	(3.5)	489	(3.4)	**21**	(3.9)
Scotland[2]	537	(3.9)	519	(4.2)	**17**	(4.0)
Slovak Republic	526	(3.0)	510	(3.3)	**16**	(3.0)
Sweden	572	(2.6)	550	(2.5)	**22**	(2.6)
Turkey	459	(4.0)	440	(3.7)	**19**	(3.1)
United States[2]	551	(3.8)	533	(4.9)	**18**	(4.1)
Country mean	***538***	***(0.8)***	***521***	***(0.8)***	***17***	***(0.8)***

Note: Standard errors (SE) are shown in parentheses.

1. Positive differences indicate that females perform better than males while negative differences indicate that males perform better than females. Differences that are statistically significant are indicated in bold.
2. Met guidelines for sample participation rates only after replacement schools were included.
3. National defined population covers less than 95% of national desired population.

Source: IEA Progress in Reading Literacy Study (PIRLS), 2001.

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Table A9.3. Performance of 15-year-olds by gender (2000)

Mean performance of 15-year-olds on the PISA reading, mathematical and scientific literacy scales

		Reading literacy						Mathematical literacy						Scientific literacy					
		Males		Females		Difference[1]		Males		Females		Difference[1]		Males		Females		Difference[1]	
		Mean score	S.E.	Mean score	S.E.	Score dif.	S.E.	Mean score	S.E.	Mean score	S.E.	Score dif.	S.E.	Mean score	S.E.	Mean score	S.E.	Score dif.	S.E.
OECD COUNTRIES	Australia	513	(4.0)	546	(4.7)	**-34**	(5.4)	539	(4.1)	527	(5.1)	12	(6.2)	526	(3.9)	529	(4.8)	-3	(5.3)
	Austria	495	(3.2)	520	(3.6)	**-26**	(5.2)	530	(4.0)	503	(3.7)	**27**	(5.9)	526	(3.8)	514	(4.3)	**12**	(6.3)
	Belgium	492	(4.2)	525	(4.9)	**-33**	(6.0)	524	(4.6)	518	(5.2)	6	(6.1)	496	(5.2)	498	(5.6)	-2	(6.7)
	Canada	519	(1.8)	551	(1.7)	**-32**	(1.6)	539	(1.8)	529	(1.6)	**10**	(1.9)	529	(1.9)	531	(1.7)	-2	(1.9)
	Czech Republic	473	(4.1)	510	(2.5)	**-37**	(4.7)	504	(4.4)	492	(3.0)	**12**	(5.2)	512	(3.8)	511	(3.2)	1	(5.1)
	Denmark	485	(3.0)	510	(2.9)	**-25**	(3.3)	522	(3.1)	507	(3.0)	**15**	(3.7)	488	(3.9)	476	(3.5)	**12**	(4.8)
	Finland	520	(3.0)	571	(2.8)	**-51**	(2.6)	537	(2.8)	536	(2.6)	1	(3.3)	534	(3.5)	541	(2.7)	-6	(3.8)
	France	490	(3.5)	519	(2.7)	**-29**	(3.4)	525	(4.1)	511	(2.8)	**14**	(4.2)	504	(4.2)	498	(3.8)	6	(4.8)
	Germany	468	(3.2)	502	(3.9)	**-35**	(5.2)	498	(3.1)	483	(4.0)	**15**	(5.1)	489	(3.4)	487	(3.4)	3	(4.7)
	Greece	456	(6.1)	493	(4.6)	**-37**	(5.0)	451	(7.7)	444	(5.4)	7	(7.4)	457	(6.1)	464	(5.2)	-7	(5.7)
	Hungary	465	(5.3)	496	(4.3)	**-32**	(5.7)	492	(5.2)	485	(4.9)	7	(6.2)	496	(5.8)	497	(5.0)	-2	(6.9)
	Iceland	488	(2.1)	528	(2.1)	**-40**	(3.1)	513	(3.1)	518	(2.9)	-5	(4.0)	495	(3.4)	499	(3.0)	-5	(4.7)
	Ireland	513	(4.2)	542	(3.6)	**-29**	(4.6)	510	(4.0)	497	(3.4)	**13**	(5.1)	511	(4.2)	517	(4.2)	-6	(5.5)
	Italy	469	(5.1)	507	(3.6)	**-38**	(7.0)	462	(5.3)	454	(3.8)	8	(7.3)	474	(5.6)	483	(3.9)	-9	(7.7)
	Japan	507	(6.7)	537	(5.4)	**-30**	(6.4)	561	(7.3)	553	(5.9)	8	(7.4)	547	(7.2)	554	(5.9)	-7	(7.2)
	Korea	519	(3.8)	533	(3.7)	**-14**	(6.0)	559	(4.6)	532	(5.1)	**27**	(7.8)	561	(4.3)	541	(5.1)	**19**	(7.6)
	Luxembourg	429	(2.6)	456	(2.3)	**-27**	(3.8)	454	(3.0)	439	(3.2)	**15**	(4.7)	441	(3.6)	448	(3.2)	-7	(5.0)
	Mexico	411	(4.2)	432	(3.8)	**-20**	(4.3)	393	(4.5)	382	(3.8)	11	(4.9)	423	(4.2)	419	(3.9)	4	(4.8)
	New Zealand	507	(4.2)	553	(3.8)	**-46**	(6.3)	536	(5.0)	539	(4.1)	-3	(6.7)	523	(4.6)	535	(3.8)	-12	(7.0)
	Norway	486	(3.8)	529	(2.9)	**-43**	(4.0)	506	(3.8)	495	(2.9)	**11**	(4.0)	499	(4.1)	505	(3.3)	-7	(5.0)
	Poland	461	(6.0)	498	(5.5)	**-36**	(7.0)	472	(7.5)	468	(6.3)	5	(8.5)	486	(6.1)	480	(6.5)	6	(7.4)
	Portugal	458	(5.0)	482	(4.6)	**-25**	(3.8)	464	(4.7)	446	(4.7)	**19**	(4.9)	456	(4.8)	462	(4.2)	-6	(4.3)
	Spain	481	(3.4)	505	(2.8)	**-24**	(3.2)	487	(4.3)	469	(3.3)	**18**	(4.5)	492	(3.5)	491	(3.6)	1	(4.0)
	Sweden	499	(2.6)	536	(2.5)	**-37**	(2.7)	514	(3.2)	507	(3.0)	7	(4.0)	512	(3.5)	513	(2.9)	0	(3.9)
	Switzerland	480	(4.9)	510	(4.5)	**-30**	(4.2)	537	(5.3)	523	(4.8)	**14**	(5.0)	500	(5.7)	493	(4.7)	7	(5.4)
	United Kingdom	512	(3.0)	537	(3.4)	**-26**	(4.3)	534	(3.5)	526	(3.7)	8	(5.0)	535	(3.4)	531	(4.0)	4	(5.2)
	United States	490	(8.4)	518	(6.2)	**-29**	(4.1)	497	(8.9)	490	(7.3)	7	(5.4)	497	(8.9)	502	(6.5)	-5	(5.3)
	Country mean	***485***	***(0.8)***	***517***	***(0.7)***	***-32***	***(0.9)***	***506***	***(1.0)***	***495***	***(0.9)***	***11***	***(1.2)***	***501***	***(0.9)***	***501***	***(0.8)***	***0***	***(1.0)***
PARTNER COUNTRIES	Brazil	388	(3.9)	404	(3.4)	**-17**	(4.0)	349	(4.7)	322	(4.7)	**27**	(5.6)	376	(4.8)	376	(3.8)	0	(5.6)
	Latvia	432	(5.5)	485	(5.4)	**-53**	(4.2)	467	(5.3)	460	(5.6)	6	(5.8)	449	(6.4)	472	(5.8)	**-23**	(5.4)
	Liechtenstein	468	(7.3)	500	(6.8)	**-31**	(11.5)	521	(11.5)	510	(11.1)	**12**	(17.7)	484	(10.9)	468	(9.3)	16	(14.7)
	Russian Federation	443	(4.5)	481	(4.1)	**-38**	(2.9)	478	(5.7)	479	(6.2)	-2	(4.8)	453	(5.4)	467	(5.2)	**-14**	(4.5)
	Netherlands[2]	517	(4.8)	547	(3.8)	**-30**	(5.7)	569	(4.9)	558	(4.6)	11	(6.2)	529	(6.3)	529	(5.1)	1	(8.1)

Note: Standard errors (SE) are shown in parentheses.

1. Positive differences indicate that males perform better than females while negative differences indicate that females perform better than males. Differences that are statistically significant are indicated in bold.

2. Response rate is too low to ensure comparability.

Source: OECD PISA 2000 database.

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Table A9.4. Civic knowledge of 14-year-olds by gender (1999)

Mean performance of 14-year-olds on the civic knowledge scale

	Males		Females		Difference[1]	
	Mean score	S.E.	Mean score	S.E.	Score difference	S.E.
OECD COUNTRIES						
Australia	101	(1.1)	103	(0.9)	-2	(1.4)
Belgium (Fr.)[2]	93	(1.3)	97	(1.1)	-5	(1.7)
Czech Republic	104	(1.0)	102	(0.8)	2	(1.3)
Denmark[2]	102	(0.7)	99	(0.7)	3	(1.0)
England[3]	100	(1.0)	99	(0.8)	0	(1.3)
Finland	108	(0.8)	110	(0.9)	-2	(1.2)
Germany[4]	101	(0.7)	99	(0.6)	1	(0.9)
Greece	107	(0.9)	109	(0.8)	-2	(1.2)
Hungary	101	(0.8)	102	(0.7)	-1	(1.0)
Italy	104	(1.1)	106	(0.9)	-2	(1.4)
Norway[2]	103	(0.7)	103	(0.6)	1	(0.9)
Poland	109	(1.5)	112	(2.2)	-3	(2.6)
Portugal[5]	97	(0.9)	96	(0.8)	1	(1.2)
Slovak Republic	105	(0.9)	105	(0.8)	0	(1.1)
Sweden[3]	99	(1.1)	100	(0.8)	-1	(1.3)
Switzerland	100	(0.9)	97	(0.8)	2	(1.2)
United States[3]	106	(1.3)	107	(1.2)	-2	(1.8)

Note: Standard errors (SE) are shown in parentheses.

1. Positive differences indicate that males perform better than females while negative differences indicate that females perform better than males. Differences that are statistically significant are indicated in bold.
2. Countries' overall participation rate after replacement less than 85%.
3. Countries with testing date at beginning of school year.
4. Does not cover all of the national population.
5. Grade 8 selected instead of Grade 9 due to average age.

Source: IEA Civic Education Study (2001).

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Table A9.5. Gender differences among 15-year-olds in self-regulated learning (2000)

Difference between male and female 15-year-old students' scores on PISA self-regulated learning indices

		Index of memorisation strategies		Index of elaboration strategies		Index of control strategies		Index of instrumental motivation		Index of interest in reading		Index of interest in mathematics		Index of effort and persistence	
		Difference[1]	Effect size	Difference[1]	Effect size	Difference[1]	Effect size	Difference[1]	Effect size	Difference[1]	Effect size	Difference[1]	Effect size	Difference[1]	Effect size
OECD COUNTRIES	Australia	-0.07	0.07	0.10	-0.12	-0.15	0.14	0.10	-0.12	-0.29	0.36	0.22	-0.28	-0.05	0.08
	Austria	-0.29	0.28	0.14	-0.14	-0.17	0.19	-0.35	-0.05	-0.61	0.62	0.39	-0.38	-0.05	0.08
	Belgium (Fl.)	-0.15	0.14	0.19	-0.19	-0.14	0.16	0.04	-0.05	-0.47	0.54	0.10	-0.16	-0.13	0.21
	Czech Republic	-0.31	0.31	0.04	-0.05	-0.31	0.34	-0.09	0.12	-0.79	0.79	0.22	-0.26	-0.12	0.20
	Denmark	0.07	-0.09	0.12	-0.13	-0.02	0.04	0.19	-0.25	-0.52	0.53	0.31	-0.28	-0.07	0.12
	Finland	-0.08	0.09	0.12	-0.14	-0.10	0.12	-0.01	0.02	-0.87	0.96	0.25	-0.28	-0.15	0.25
	Germany	-0.28	0.28	0.08	-0.08	-0.19	0.21	0.00	0.00	-0.63	0.60	0.34	-0.38	-0.10	0.16
	Hungary	-0.28	0.33	0.10	-0.11	-0.24	0.27	-0.03	0.05	-0.52	0.49	0.03	-0.05	-0.10	0.17
	Iceland	0.00	-0.02	0.10	-0.11	-0.02	0.01	-0.01	0.01	-0.40	0.45	-0.03	-0.02	-0.14	0.21
	Ireland	-0.26	0.26	-0.05	0.05	-0.33	0.31	0.08	-0.08	-0.56	0.53	0.14	-0.13	-0.17	0.23
	Italy	0.00	-0.02	0.04	-0.04	-0.36	0.38	0.20	-0.22	-0.57	0.58	0.06	-0.09	-0.17	0.26
	Korea	-0.07	0.07	0.02	-0.01	-0.06	0.05	0.04	-0.05	-0.03	0.02	0.04	-0.07	0.02	-0.03
	Luxembourg	-0.40	0.36	-0.06	0.06	-0.29	0.29	-0.21	0.15	-0.42	0.43	0.25	-0.27	-0.16	0.24
	Mexico	0.04	-0.03	-0.07	0.08	-0.19	0.20	0.00	0.01	-0.21	0.32	-0.02	0.02	-0.13	0.20
	New Zealand	-0.12	0.12	0.02	-0.01	-0.20	0.19	0.05	-0.06	-0.35	0.37	0.21	-0.24	-0.06	0.09
	Norway	0.26	-0.29	0.20	-0.21	0.16	-0.18	0.07	-0.09	-0.63	0.60	0.47	-0.38	-0.02	0.03
	Portugal	-0.03	0.02	-0.03	0.03	-0.31	0.34	-0.08	0.11	-0.71	0.80	-0.11	0.02	-0.18	0.29
	Scotland	-0.09	0.14	0.07	-0.11	-0.13	0.22	0.01	-0.02	-0.43	0.43	0.14	-0.17	-0.08	0.14
	Sweden	0.09	-0.11	0.28	-0.29	0.02	-0.02	0.06	-0.08	-0.34	0.47	0.26	-0.35	-0.01	0.02
	Switzerland	-0.16	0.17	0.02	-0.04	-0.22	0.24	-0.03	0.04	-0.65	0.68	0.46	-0.51	-0.10	0.16
	United States	-0.21	0.17	-0.10	0.08	-0.35	0.31	-0.04	0.05	-0.35	0.36	0.05	-0.08	-0.22	0.31
	Country mean	***-0.11***	***0.10***	***0.06***	***-0.06***	***-0.18***	***0.18***	***0.02***	***-0.02***	***-0.50***	***0.53***	***0.18***	***-0.20***	***-0.11***	***0.16***
PARTNER COUNTRIES	Brazil	-0.10	0.10	-0.11	0.11	-0.18	0.17	-0.10	0.13	-0.34	0.43	0.10	-0.08	-0.12	0.19
	Latvia	-0.13	0.18	0.03	-0.03	-0.19	0.25	-0.10	0.14	-0.54	0.61	0.03	-0.03	-0.09	0.15
	Liechtenstein	-0.15	0.18	0.21	-0.21	-0.11	0.12	0.06	-0.08	-0.43	0.42	0.48	-0.71	-0.07	0.11
	Russian Federation	-0.15	0.20	0.09	-0.09	-0.17	0.19	-0.11	0.16	-0.42	0.41	-0.03	0.03	-0.12	0.18
	Netherlands[2]	-0.03	0.03	0.17	-0.19	-0.04	0.05	0.25	-0.17	-0.70	0.70	0.58	-0.48	-0.05	0.08

1. Positive differences indicate that males perform better than females while negative differences indicate that females perform better than males.
2. Response rate is too low to ensure comparability.

Source: OECD PISA 2000 database.

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Table A9.5. (*continued*) **Gender differences among 15-year-olds in self-regulated learning (2000)**

Difference between male and female 15-year-old students' scores on PISA self-regulated learning indices

		Index of co-operative learning		Index of competitive learning		Index of self-efficacy		Index of self-concept in reading		Index of self-concept in mathematics		Index of academic self-concept	
		Difference[1]	Effect size	Difference[1]	Effect size	Difference[1]	Effect size	Difference[1]	Effect size	Difference[1]	Effect size	Difference[1]	Effect size
OECD COUNTRIES	Australia	-0.14	0.03	0.20	-0.32	0.13	-0.22	-0.17	0.21	0.23	-0.29	0.03	-0.05
	Austria	-0.30	0.17	0.12	-0.15	0.20	-0.32	-0.35	0.34	0.29	-0.30	-0.06	0.10
	Belgium (Fl.)	-0.22	0.14	0.19	-0.23	0.14	-0.24	-0.13	0.18	0.18	-0.27	0.04	-0.08
	Czech Republic	-0.33	0.15	0.00	-0.01	0.17	-0.30	-0.36	0.37	0.26	-0.31	-0.04	0.05
	Denmark	-0.11	-0.02	0.29	-0.25	0.28	-0.45	-0.32	0.31	0.39	-0.40	0.10	-0.16
	Finland	-0.29	0.11	0.22	-0.30	0.21	-0.34	-0.42	0.45	0.35	-0.36	-0.03	0.04
	Germany	-0.24	0.10	0.13	-0.16	0.13	-0.21	-0.45	0.43	0.42	-0.42	0.00	0.00
	Hungary	-0.23	0.01	-0.06	0.02	0.11	-0.19	-0.32	0.33	0.12	-0.13	-0.06	0.08
	Iceland	-0.18	0.08	0.22	-0.28	0.18	-0.26	-0.20	0.20	0.20	-0.19	-0.04	0.05
	Ireland	-0.42	-0.23	0.41	-0.39	0.12	-0.17	-0.15	0.13	0.09	-0.13	-0.02	0.03
	Italy	-0.49	-0.27	0.13	-0.14	0.12	-0.19	-0.44	0.40	0.18	-0.11	-0.15	0.21
	Korea	0.09	-0.14	0.09	-0.12	0.10	-0.15	0.02	-0.03	0.15	-0.16	0.09	-0.12
	Luxembourg	-0.36	0.19	0.04	-0.13	0.12	-0.18	-0.21	0.18	0.28	-0.28	-0.04	0.06
	Mexico	-0.20	0.11	0.10	-0.13	0.00	-0.01	-0.21	0.25	0.05	-0.09	-0.04	0.06
	New Zealand	-0.23	0.08	0.23	-0.28	0.12	-0.19	-0.29	0.27	0.26	-0.26	0.04	-0.05
	Norway	-0.34	0.15	0.31	-0.34	0.22	-0.33	-0.38	0.37	0.50	-0.44	0.04	-0.05
	Portugal	-0.35	0.14	0.35	-0.38	0.08	-0.14	-0.31	0.32	0.14	-0.16	0.01	-0.02
	Scotland	-0.03	-0.05	0.35	-0.42	0.19	-0.32	-0.10	0.14	0.22	-0.24	0.02	-0.03
	Sweden	-0.05	0.05	0.21	-0.27	0.24	-0.37	-0.30	0.37	0.36	-0.41	0.05	-0.08
	Switzerland	-0.28	0.14	0.24	-0.30	0.13	-0.22	-0.31	0.35	0.50	-0.55	0.03	-0.05
	United States	-0.42	0.21	0.05	-0.13	0.04	-0.06	-0.39	0.36	0.09	-0.13	-0.08	0.11
	Country mean	***-0.27***	***0.10***	***0.18***	***-0.21***	***0.14***	***-0.22***	***-0.29***	***0.29***	***0.25***	***-0.25***	***-0.02***	***0.02***
PARTNER COUNTRIES	Brazil	-0.24	0.12	0.21	-0.21	0.06	-0.09	0.28	0.30	0.25	-0.21	0.03	-0.05
	Latvia	-0.31	0.15	-0.11	0.11	0.03	-0.05	0.51	0.51	0.18	-0.18	-0.07	0.11
	Liechtenstein	-0.17	0.09	0.27	-0.36	0.07	-0.12	0.37	0.37	0.39	-0.58	0.00	-0.01
	Russian Federation	-0.20	0.05	-0.15	0.10	0.07	-0.11	0.52	0.48	0.02	0.00	-0.08	0.11
	Netherlands[2]	-0.33	0.20	0.36	-0.34	0.24	-0.44	0.25	0.26	0.65	-0.57	0.12	-0.20

1. Positive differences indicate that males perform better than females while negative differences indicate that females perform better than males.
2. Response rate is too low to ensure comparability.

Source: OECD PISA 2000 database.

A10

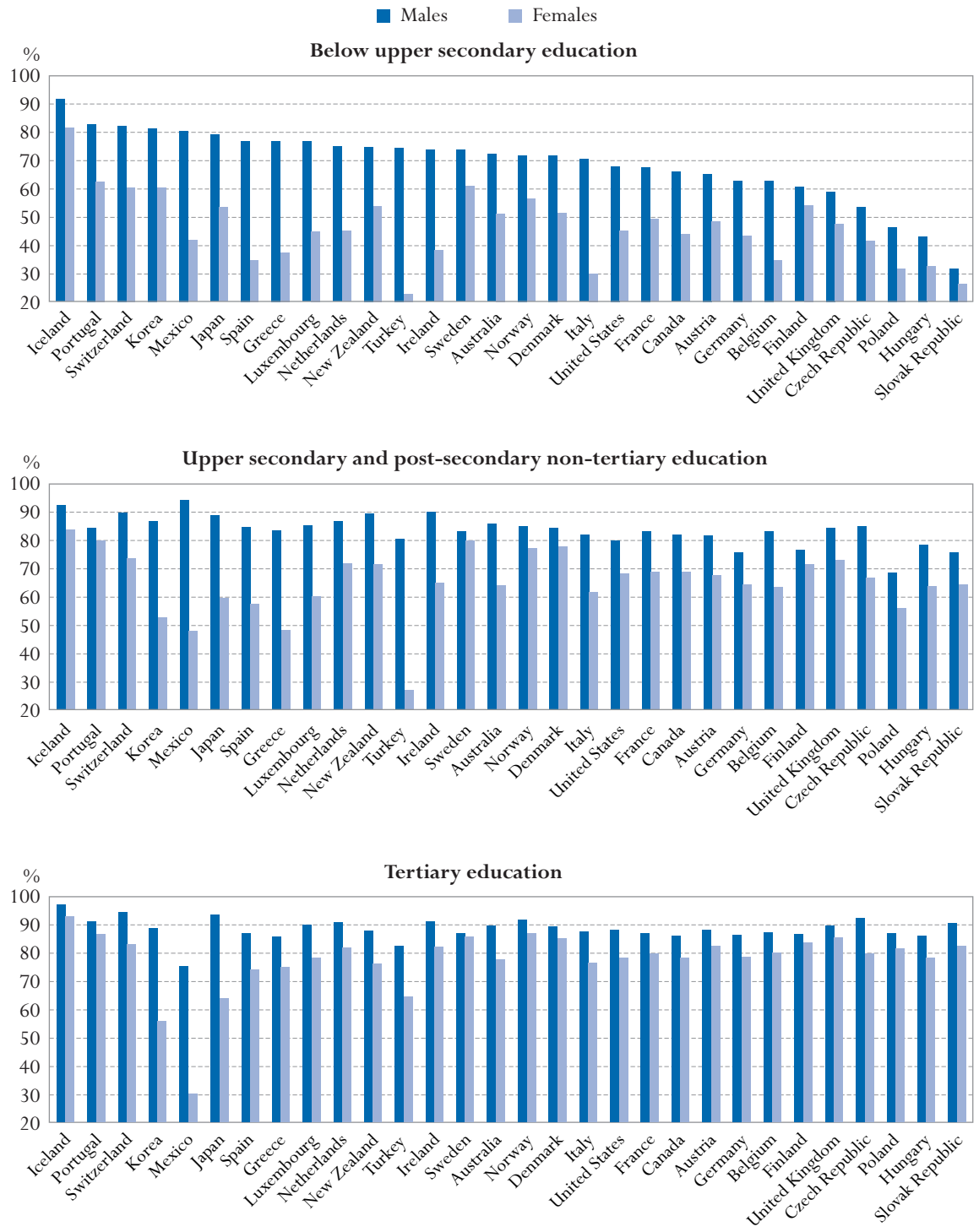
INDICATOR A10: LABOUR FORCE PARTICIPATION BY LEVEL OF EDUCATIONAL ATTAINMENT

- Employment ratios rise with educational attainment in most OECD countries. With very few exceptions, the employment ratio for graduates of tertiary education is markedly higher than the ratio for upper secondary graduates. For males, the gap is particularly wide between upper secondary graduates and those without an upper secondary qualification.
- The employment ratio for females with less than upper secondary attainment is particularly low. Ratios for females with tertiary type-A attainment exceed 75% in all but four countries, but remain below those of males in all countries.
- The gender gap in employment ratios decreases with increasing educational attainment. The gap is 23 percentage points among persons without upper secondary education and 11 points among those with the highest educational attainment.

A10

Chart A10.1. Employment ratios by educational attainment (2002)

Percentage of 25 to 64-year-olds who are employed



Countries are ranked in descending order of the employment rates of males having attained below upper secondary education.
Source: OECD. Table A10.1a. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

A10

Policy context

This indicator examines the relationship between educational attainment and labour-market status.

OECD economies and labour markets are becoming increasingly dependent on a stable supply of well-educated workers to further their economic development and to maintain their competitiveness. As levels of skill tend to rise with educational attainment, the costs incurred when those with higher levels of education do not work also rise; and as populations in OECD countries age, higher and longer participation in the employed labour force can lower dependency ratios and help to alleviate the burden of financing public pensions.

This indicator examines the relationship between educational attainment and labour force activity, comparing employment ratios first, and then ratios of unemployment, their prevalence by gender and changes over time. The adequacy of workers' skills and the capacity of the labour market to supply jobs that match those skills are important issues for policy makers.

Evidence and explanations

Employment participation

Employment ratios for males vary less between countries than those for females.

Variation among countries in employment participation by females is a primary factor in the differences in overall employment ratios. The overall employment ratios for males aged 25 to 64 range from 76% or less in Finland, Hungary, Poland and the Slovak Republic to 86% and above in Iceland, Japan, Korea, New Zealand and Switzerland (Table A10.1a). By contrast, reflecting very different cultural and social patterns, employment participation among females ranges from 48% or less in Greece, Italy, Mexico, Spain and Turkey, to over 78% in Iceland, Norway and Sweden. Prolonged education and unemployment are two factors that contribute to these disparities.

Employment ratios for males rise with educational attainment in most OECD countries.

Employment ratios for males are generally higher among those with higher educational qualifications. With the exception of Mexico and New Zealand where the pattern is different, the employment ratio for graduates of tertiary education is markedly higher – around 5 percentage points on average for OECD countries – than that for upper secondary graduates. The difference ranges from a few percentage points to 10 percentage points and more in Finland, Germany, Poland and the Slovak Republic. It may stem mainly from the fact that the less skilled leave the labour market earlier. Those with higher educational attainment tend to remain in employment longer (Chart A10.1).

The gap in male employment ratios is particularly wide between those with and those without an upper secondary qualification.

The gap in employment ratios of males aged 25 to 64 years is particularly wide between upper secondary graduates and those who have not completed an upper secondary qualification. In 22 out of 30 OECD countries, the difference in the ratio of participation between upper secondary graduates and those without such a qualification is 10 percentage points or more. The extreme cases are the Czech and Slovak Republics and Hungary, where between one-third and around half of the male population without upper secondary education, but more than 80% with such attainment, participate in employment. The gap in employment ratios between males with and without upper secondary attainment is less than 6 percentage points in Iceland, Korea, Portugal and Turkey (Chart A10.1 and Table A10.1a).

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Employment ratios for females aged 25 to 64 years show more marked differences, not only between those with below upper secondary and those with upper secondary attainment (15 percentage points or more in 22 out of the 30 OECD countries) but also between those with upper secondary and those with tertiary-type A or advanced research programmes attainment (9 percentage points or more in 23 countries). Particular exceptions are Japan, Korea, New Zealand, Sweden and Portugal where employment ratios for females with upper secondary qualifications approach those for females with a tertiary qualification (a difference of around 3 to 7 percentage points) (Chart A10.1 and Table A10.1a).

Among females, the difference in employment ratios by level of educational attainment is even wider.

Employment ratios for females with lower secondary attainment are particularly low, averaging 49% over all OECD countries and standing at around 35% or below in Hungary, Poland, the Slovak Republic and Turkey. Employment ratios for females with tertiary type-A attainment exceed 75% everywhere except in Japan, Korea, Mexico and Turkey, but remain below those of males in all countries (Table A10.1a).

Employment ratios among females with qualifications below upper secondary is particularly low…

Although the gender gap in employment remains among those with the highest educational attainment, it is much narrower than among those with lower qualifications. On average among OECD countries, with each additional level attained, the difference between the employment ratio of males and females decreases significantly: from 23 percentage points at below upper secondary level, to 19 percentage points at upper secondary and 11 percentage points at tertiary level (Chart A10.1).

…but the gender gap in employment decreases with increasing educational attainment.

The gap is unevenly distributed among countries at all levels of attainment. Below upper secondary, it is lower than 10 percentages points in the Slovak Republic and Finland but higher than 40 percentage points in Greece, Italy, Spain and Turkey. At the upper secondary level, again, the gap is below 10 percentage points in Nordic countries and Portugal and remains higher than 34 points in Korea, Greece, Mexico and Turkey. At the tertiary level, the gap tends to be reduced significantly except for Japan, Korea and Mexico.

Much of the overall gap between the employment ratios of males with differing levels of educational attainment is explained by the large differences within older populations. The patterns reflect a number of underlying causes. Since earnings tend to increase with educational attainment, the monetary incentive to participate is greater for individuals with higher qualifications. In addition, those individuals often work on more interesting and stimulating tasks, and hold functions of higher responsibility, which increase their motivation to remain in the labour force. Conversely, hard physical work, generally associated with rather low levels of education, can lead to a need for early retirement. Moreover, industrial restructuring in many countries has reduced job opportunities for unskilled workers, or for workers with skills that have been made obsolete by new technologies. In countries with well-developed and long-standing pension systems, individuals with low education entered the labour market earlier than those with higher levels and, hence, could draw on pension income often years earlier, even in the absence of any other provisions. A sizeable number

The education gap in male participation in employment is strongly influenced by differences among the older population.

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of these people have left the labour market either through early retirement schemes or because there are only limited job opportunities. The educational attainment of females and their participation in the labour market have historically been lower than those of males, and in spite of considerable advances over the last few decades, current employment ratios continue to show the impact of these historical factors.

Unemployment ratios by level of educational attainment

Those with low educational attainment are both less likely to be labour force participants and more likely to be unemployed.

The unemployment ratio is a measure of an economy's ability to supply a job to everyone who wants one. To the extent that educational attainment is assumed to be an indicator of skill, it can signal to employers the potential knowledge, capacities and workplace performance of candidates for employment. The employment prospects of individuals with varying levels of educational attainment depend both on the requirements of labour markets and on the supply of workers with different skills. Those with low educational qualifications are at particular risk of economic marginalisation since they are both less likely to be labour force participants and more likely to be without a job if they are actively seeking one.

Unemployment ratios fall with higher educational attainment.

On average among OECD countries, male labour force participants aged 25 to 64 with a qualification below upper secondary education are around 1.5 times as likely to be unemployed as their counterparts who have completed upper secondary education. Similarly, on average across the OECD countries, the unemployment ratio for male upper secondary graduates is around 1.5 times the unemployment ratio among tertiary Type A graduates. The association between unemployment ratios and educational attainment is similar among females, although the gap between upper secondary and tertiary attainment is even wider in many countries.

Higher unemployment ratios for females across the levels of educational attainment are generally the rule in Greece, Italy and Spain. On the other hand, unemployment ratios are generally higher for men across all levels of educational attainment in Canada, Ireland, Japan, Korea, Mexico, New Zealand, Norway, Sweden, the United Kingdom and the United States. Differences in unemployment ratios among males and females according to educational attainment are not strongly pronounced in Finland, Iceland and the Netherlands. In Germany, Hungary, Poland and Turkey, males with lower qualifications tend to have higher unemployment ratios than females, whilst the reverse is true for the more highly qualified. The pattern is more mixed across the levels for the remaining countries (Table A10.1b).

The changes in the added value of education with regard to unemployment

The differences in unemployment ratios of those with low educational attainment are changing with the characteristics of the supply of jobs.

The difference between the unemployment ratios of 25 to 64-year-olds without upper secondary education and those with upper secondary education is a measure of the benefit of pursuing education up to the upper secondary level; this is considered to be the minimum level allowing a satisfactory position in the labour market. On the other hand, the different ratios may denote the exclusion or discrimination in accessing employment, which affects those who have

not attained the minimum education level. Depending on the structure of the supply of jobs, the gap is widely variable among countries, generally in disfavour of the less qualified.

In Greece and Korea, and to a lesser extent in Italy, Norway, Portugal, Spain and Turkey, completing upper secondary education does not offer a reduced risk of being unemployed; this has changed over the last decade (Table A10.2b). The supply of jobs, probably in the agricultural (primary) sector that do not require secondary qualifications remains sufficient in relation to the structure of educational attainment of the adult population. This has been continuously verified over the last decade in these countries, but is a relatively recent phenomenon in Norway. It is also notable that in 1991, unemployment ratios of individuals in Switzerland with below upper secondary education were lower than those of individuals with upper secondary attainment.

In all other countries, the benefit of upper secondary education compared to below upper secondary level represents a lower unemployment ratio, by an average of 1.1 percentage points; however, the trends differ significantly among countries.

In a number of countries such as Canada, Germany, Japan, Sweden, Switzerland, the United Kingdom and the United States the relative benefit to employment prospects of upper secondary education has remained pretty stable over the last few years. However, there has been evidence since 1991 of increased employment prospects for those with upper secondary education compared with those without, in a number of countries such as Australia, Austria, Finland, Hungary and Turkey and more recently in the Slovak Republic. The reverse trend has been evident in Belgium, Ireland and Norway. Overall, however, the threshold of upper secondary education makes less of a difference in the labour market than tertiary education does (Table A10.2b).

Lower unemployment ratios associated with higher educational attainment are not always guaranteed.

The benefit of tertiary education compared to upper secondary level generally confirms the expected trend, but there are important nuances for some countries. For seven OECD countries in 2002 – Denmark, Korea, Luxembourg, Netherlands, New Zealand, Switzerland and Turkey – the unemployment ratio of the adult population with tertiary education is higher than that for those who attained upper secondary education. This is a recent phenomenon.

Considering all OECD countries since 1995, on average the benefit of tertiary education expressed in terms of lower unemployment ratios has decreased slightly. Unemployment ratios for those with tertiary education were on average 1.4 percentage points lower than those with upper secondary education in 2002 compared with a difference of 1.9 percentage points in 1995. Countries where this trend has been most evident are Denmark, Portugal, Switzerland and Turkey. On the other hand, the reverse trend with, greater labour market advantage accruing to tertiary graduates, is also evident, for example in Austria and Germany (Table A10.2b).

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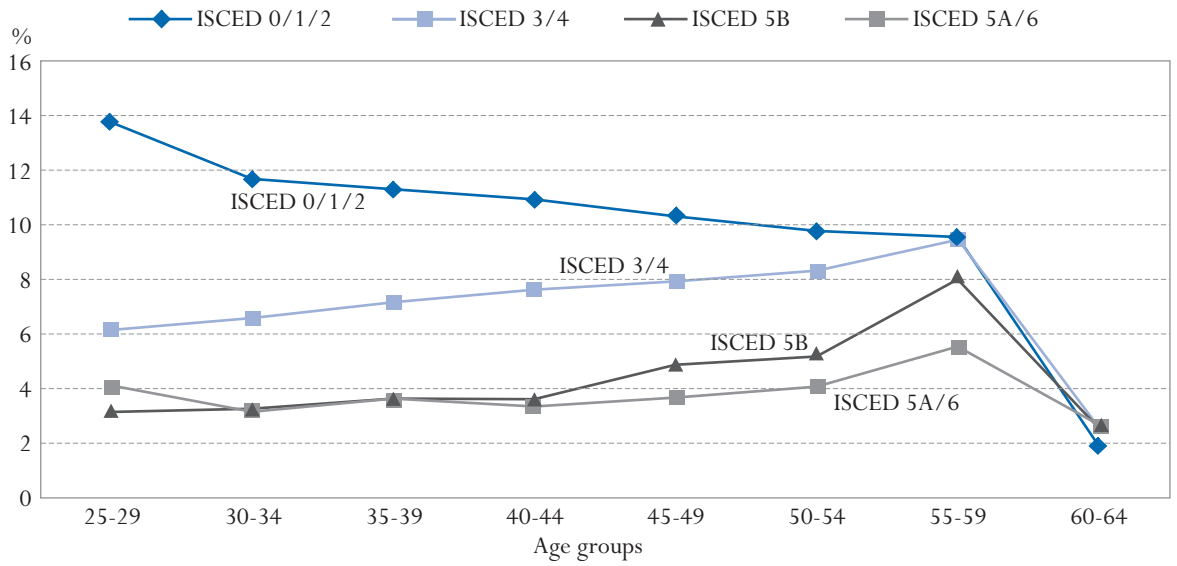
Box A10.1. Germany: labour market risk for dual system graduates in many occupations

In Germany, as in other countries, different levels of educational attainment often correspond with different ratios of employment, unemployment and non-participation in the labour market (data source: "European Labour Force Survey" and the national "Mikrozensus").

Unemployment to population ratios by level of educational attainment and age groups (2002)



In the light of the high number of persons with an upper secondary qualification, a more detailed analysis of vocational programmes is of particular interest, especially in countries such as Germany, Austria or Switzerland where dual system programmes (apprenticeship opportunities comprising education and training both at a vocational school and in an enterprise) are of special importance. Dual system programmes generally ensure a favourable combination of practical and theoretical elements that facilitates the establishment of graduates in the labour market.

In Germany, the vast majority (21.5 million) of the 22.8 million persons aged 25 to 64 with a vocational upper secondary qualification as their highest level of education or training in 2002 completed a dual system programme. Previously, degrees from specialised vocational schools (*Berufsfachschulen*) have been of lesser importance (1.2 million persons). However, specialised vocational schools have continuously gained in attractiveness over the last 10 years. In 1993 about every ninth student in vocational upper secondary programmes attended a specialised vocational school; in school year 2003/2004, every fifth student is enrolled in such a programme.

An analysis of the labour market status of persons with a dual system qualification, as opposed to those with a degree from specialised vocational schools, shows that the employment ratio of persons aged 25 to 64 trained in the dual system (70%) is lower than the ratio for persons with a degree from specialised vocational schools (73%). A difference also exists for persons not participating in the labour force. Their proportion amounts to 23% for dual system graduates and to 21% for graduates from specialised vocational schools. Similar results can also be seen in earlier years than in 2002.

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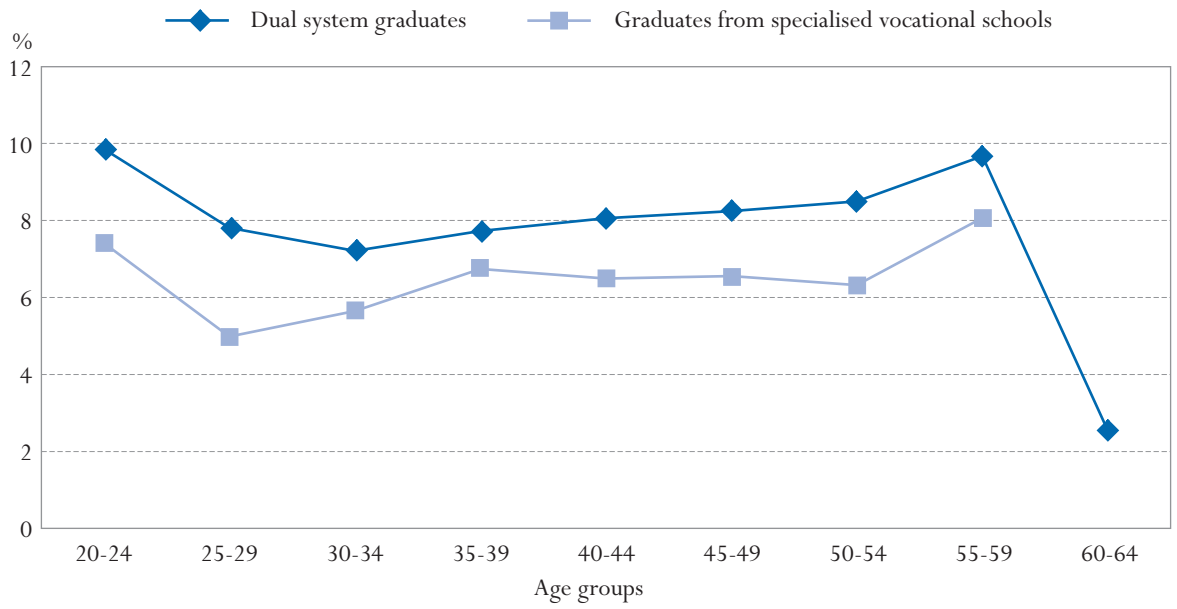
The unemployment to population ratios also differ significantly by age. For all age groups, the ratio is higher for dual system graduates than for graduates of specialised vocational schools. The difference for persons aged 20 to 24 is particularly obvious. In this age group, the ratio for dual system graduates is 10% as opposed to 7% for graduates of specialised vocational schools. Similar results are found for the age group 25 to 29, where the ratios are 8% and 5% respectively. The reason for this might be different occupational fields for graduates of the dual system and of the specialised vocational schools.

Unemployment to population ratios for persons with an upper secondary qualification, by age group (2002)



More than half (54%) of 20 to 24-year-old dual system graduates are employed in the 10 most common occupational fields (according to the National Classification of Occupations: clerks, health associate professionals, protective service workers, salespersons, wholesales and retail sales clerks-sales associate professionals, electrical and electronic mechanics, vehicle engineering and maintenance workers, social work professionals, building finishers and related trades workers and mechanical engineering and maintenance workers). An analysis of the unemployment ratio shows considerable differences among occupations. Security services workers and clerks (both 6%) seem to have relatively good employment opportunities. By contrast, among building finishers (18%), a markedly high number of young persons are unemployed. Moreover, the unemployment ratios for 20 to 24-year-olds in the majority of these 10 fields are higher than the ratios for 25 to 64-year-olds in the same occupational fields. A more detailed analysis is necessary to find out whether the young unemployed transit to working life in occupations that match their training or whether they choose other occupations. The high number of dual system graduates as motor-vehicle drivers and messengers might point to the latter aspect.

A corresponding analysis of graduates from specialised vocational schools broken down by occupation is not possible due to the considerably smaller overall number of these graduates, which leads to sampling results that are not sufficiently reliable.

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Data are derived from National Labour Force Surveys.

Definitions and methodologies

The unemployment ratio is the number of unemployed persons as a percentage of the total number of persons in the population.

The employment ratio is the number of employed persons as a percentage of the total number of persons in the population.

The ratio of the population not in the labour force is the number of people not in the labour force as a percentage of the total number of persons in the population.

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. Those not in the labour force are those who are neither employed or unemployed.

For Tables A10.1 (a, b, c) and A10.2 (a, b, c) the population by level of educational attainment is allocated to the three groups: employed, unemployed, not in the labour force.

The level of educational attainment is based on the definitions of ISCED-97.

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Table A10.1a. Employment ratio and educational attainment (2002)

Number of 25 to 64-year-olds in employment as a percentage of the population aged 25 to 64, by level of education attained and gender

			Pre-primary and primary education	Lower secondary education	Upper secondary education			Post-secondary non-tertiary education	Tertiary education		All levels of education
					ISCED 3C Short	ISCED 3C Long/3B	ISCED 3A		Type B	Type A and advanced research programmes	
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OECD COUNTRIES	Australia	Males	x(2)	72	a	87	85	x(5)	87	91	83
		Females	x(2)	51	a	65	64	x(5)	73	81	63
	Austria	Males	x(2)	65	a	82	77	85	86	91	80
		Females	x(2)	48	a	65	66	84	81	85	64
	Belgium	Males	49	74	a	83	83	87	87	88	77
		Females	25	45	a	59	65	68	79	82	57
	Canada	Males	55	72	a	x(5)	82	83	86	86	81
		Females	31	51	a	x(5)	68	71	78	79	69
	Czech Republic	Males	a	55	x(4)	83	88	x(5)	x(8)	92	84
		Females	a	42	x(4)	62	71	x(5)	x(8)	80	64
	Denmark	Males	a	73	x(2)	85	84	79	88	92	83
		Females	a	52	x(2)	78	71	92	86	84	74
	Finland	Males	x(2)	61	a	a	77	a	84	89	76
		Females	x(2)	54	a	a	72	a	83	85	72
	France	Males	57	77	83	85	83	a	88	86	79
		Females	43	56	67	74	71	a	80	80	64
	Germany	Males	54	65	a	76	63	84	84	88	77
		Females	33	45	a	64	54	75	78	80	62
	Greece	Males	75	84	86	85	83	86	81	88	81
		Females	36	42	51	51	45	61	73	76	47
	Hungary	Males	18	46	a	78	79	80	a	86	71
		Females	8	35	a	61	66	69	a	78	56
	Iceland	Males	92	92	93	a	91	95	95	98	93
		Females	81	82	85	a	84	85	92	94	86
	Ireland	Males	64	86	a	a	89	91	91	91	84
		Females	30	47	a	a	63	70	80	84	60
	Italy	Males	52	79	80	85	82	85	x(8)	88	77
		Females	18	39	56	62	61	73	x(8)	77	46
	Japan	Males	x(2)	79	a	x(5)	89	x(9)	94	94	89
		Females	x(2)	53	a	x(5)	60	x(9)	62	68	60
	Korea	Males	79	84	a	x(5)	87	a	90	88	86
		Females	60	60	a	x(5)	53	a	56	56	56
	Luxembourg	Males	73	83	87	85	88	81	87	92	84
		Females	46	44	42	60	68	49	80	77	57
	Mexico	Males	78	95	a	94	a	a	82	67	81
		Females	41	48	a	48	a	a	36	23	42
	Netherlands	Males	63	82	x(4)	86	91	82	91	91	84
		Females	35	50	x(4)	71	74	76	80	82	64
	New Zealand	Males	x(2)	75	a	91	87	90	86	90	86
		Females	x(2)	54	a	73	71	73	75	79	69
	Norway	Males	a	73	a	85	86	88	94	92	85
		Females	a	57	a	77	77	80	89	87	78
	Poland	Males	x(2)	46	65	a	74	80	x(8)	87	67
		Females	x(2)	32	47	a	61	69	x(8)	82	55
	Portugal	Males	82	88	x(5)	x(5)	85	x(5)	84	93	84
		Females	60	77	x(5)	x(5)	80	x(5)	78	90	67
	Slovak Republic	Males	5	33	x(4)	71	83	x(5)	83	91	73
		Females	3	27	x(4)	58	70	x(5)	78	83	60
	Spain	Males	69	86	a	89	83	a	88	87	81
		Females	28	44	a	57	58	a	68	76	48
	Sweden	Males	67	80	a	x(5)	83	x(7)	85	89	83
		Females	51	69	a	x(5)	80	x(7)	83	88	79
	Switzerland	Males	73	85	96	91	83	89	95	94	91
		Females	56	62	66	73	74	81	85	82	73
	Turkey	Males	74	78	a	80	81	a	x(8)	83	77
		Females	23	17	a	30	26	a	x(8)	65	26
	United Kingdom	Males	a	59	83	83	88	x(9)	88	90	82
		Females	a	48	70	74	77	x(9)	84	86	72
	United States	Males	67	69	x(5)	x(5)	80	x(5)	86	89	82
		Females	39	49	x(5)	x(5)	68	x(5)	77	79	69
	Country mean	***Males***	***62***	***73***	***84***	***84***	***83***	***85***	***88***	***89***	***81***
		Females	***37***	***49***	***61***	***63***	***66***	***73***	***76***	***78***	***62***
PARTNER COUNTRY	Israel	Males	28	63	x(5)	x(5)	73	x(7)	80	84	74
		Females	10	29	x(5)	x(5)	60	x(7)	70	80	60

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.
Source: OECD. See Annex 3 for a description of ISCED-97 levels, ISCED-97 country mappings and national data sources (*www.oecd.org/edu/eag2004*).

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Table A10.1b. Unemployment ratio and educational attainment (2002)

Number of 25 to 64-year-olds who are unemployed as a percentage of the population aged 25 to 64, by level of education attained and gender

			Pre-primary and primary education	Lower secondary education	Upper secondary education			Post-secondary non-tertiary education	Tertiary education		All levels of education
					ISCED 3C Short	ISCED 3C Long/3B	ISCED 3A		Type B	Type A and advanced research programmes	
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OECD COUNTRIES	Australia	Males	x(2)	6.8	a	2.9	4.3	x(5)	4.1	2.6	4.5
		Females	x(2)	3.4	a	3.6	3.2	x(5)	3.7	2.0	3.1
	Austria	Males	x(2)	5.9	a	3.2	1.5	2.6	1.0	2.2	3.2
		Females	x(2)	2.9	a	2.5	2.7	1.5	1.0	2.4	2.5
	Belgium	Males	6.7	5.3	a	6.5	3.6	5.9	2.6	3.1	4.5
		Females	4.5	6.0	a	6.4	4.8	4.6	2.8	3.9	4.6
	Canada	Males	7.8	8.6	a	x(5)	5.8	5.9	5.4	4.5	5.9
		Females	4.5	5.7	a	x(5)	5.0	5.1	3.9	3.9	4.6
	Czech Republic	Males	a	14.8	x(4)	4.4	2.2	x(5)	x(8)	1.6	4.2
		Females	a	8.6	x(4)	7.2	3.9	x(5)	x(8)	1.6	5.6
	Denmark	Males	a	3.5	x(2)	2.9	1.4	7.2	3.5	3.2	3.1
		Females	a	4.6	x(2)	2.7	2.9	4.7	2.5	4.8	3.2
	Finland	Males	x(2)	8.0	a	a	7.4	a	4.8	3.1	6.5
		Females	x(2)	8.1	a	a	7.0	a	4.8	3.1	6.2
	France	Males	6.0	9.8	4.4	3.8	6.0	a	5.0	4.8	5.8
		Females	5.4	9.4	7.0	6.7	6.0	a	3.9	4.8	6.4
	Germany	Males	17.7	12.8	a	8.1	5.4	5.2	3.9	3.6	7.4
		Females	7.7	6.4	a	6.5	3.7	3.9	4.7	3.8	5.9
	Greece	Males	3.4	5.6	5.4	7.2	4.4	5.9	4.6	3.6	4.3
		Females	3.9	8.8	9.7	16.1	7.8	12.6	8.4	7.0	6.6
	Hungary	Males	7.1	6.2	a	4.4	2.7	1.9	a	1.0	4.0
		Females	2.5	3.1	a	3.7	2.3	4.7	a	1.5	2.7
	Iceland	Males	a	3.0	1.8	a	2.7	1.8	2.8	1.2	2.3
		Females	a	2.7	3.3	a	2.5	1.5	1.0	1.7	2.3
	Ireland	Males	5.6	4.0	a	a	2.8	1.7	2.3	1.9	3.3
		Females	1.7	2.5	a	a	2.0	2.3	1.4	1.1	1.9
	Italy	Males	4.8	5.2	3.6	3.0	4.1	6.6	x(8)	3.3	4.5
		Females	3.2	6.1	9.3	5.5	5.6	10.5	x(8)	5.9	5.4
	Japan	Males	x(2)	6.8	a	x(5)	5.1	x(9)	4.3	3.1	4.8
		Females	x(2)	2.6	a	x(5)	3.2	x(9)	3.1	2.7	3.0
	Korea	Males	2.2	2.7	a	x(5)	2.8	a	4.2	2.6	2.8
		Females	0.7	1.0	a	x(5)	1.1	a	1.9	1.1	1.1
	Luxembourg	Males	2.5	1.1	n	0.7	1.0	1.6	3.6	0.8	1.4
		Females	2.3	3.4	1.1	1.5	0.4	n	n	2.3	1.8
	Mexico	Males	2.5	1.5	a	1.7	a	a	2.1	1.1	2.2
		Females	1.5	0.5	a	0.5	a	a	0.2	0.1	1.2
	Netherlands	Males	2.8	2.4	x(4)	1.4	1.6	1.7	1.1	1.9	1.9
		Females	2.1	2.2	x(4)	1.9	2.1	2.7	1.7	2.0	2.1
	New Zealand	Males	x(2)	4.7	a	2.1	3.2	3.0	3.3	3.0	3.2
		Females	x(2)	3.0	a	3.9	2.1	3.9	2.7	2.4	2.9
	Norway	Males	a	2.4	a	2.8	3.0	1.4	1.5	2.2	2.5
		Females	a	2.1	a	2.2	2.0	2.9	2.1	1.7	2.0
	Poland	Males	x(2)	17.1	16.4	a	10.2	9.6	x(8)	5.1	13.5
		Females	x(2)	11.2	16.9	a	12.0	9.8	x(8)	6.1	12.3
	Portugal	Males	3.0	3.6	x(5)	x(5)	3.5	x(5)	4.5	1.8	3.1
		Females	3.4	5.0	x(5)	x(5)	4.0	x(5)	2.8	4.8	3.8
	Slovak Republic	Males	35.8	28.8	x(4)	14.8	8.2	x(5)	6.3	3.1	12.9
		Females	19.8	16.0	x(4)	14.4	8.5	x(5)	5.3	3.1	11.2
	Spain	Males	6.5	6.5	a	5.2	5.0	a	4.7	4.7	5.8
		Females	5.8	10.1	a	12.1	8.6	a	10.4	8.4	8.3
	Sweden	Males	3.8	4.5	a	x(5)	4.5	x(7)	3.3	3.2	4.0
		Females	4.4	3.9	a	x(5)	3.3	x(7)	2.4	2.1	3.1
	Switzerland	Males	2.0	4.6	n	1.7	1.5	1.7	1.0	2.3	2.0
		Females	4.8	2.7	1.3	2.1	2.1	2.1	0.9	2.9	2.3
	Turkey	Males	7.9	7.4	a	6.3	6.1	a	x(8)	5.7	7.3
		Females	1.3	3.1	a	5.2	5.2	a	x(8)	6.5	2.3
	United Kingdom	Males	a	6.8	4.5	3.5	3.1	x(9)	2.6	2.5	3.8
		Females	a	3.2	3.4	2.9	2.4	x(9)	1.5	1.8	2.7
	United States	Males	6.9	7.9	x(5)	x(5)	5.3	x(5)	3.8	2.8	4.7
		Females	5.1	5.5	x(5)	x(5)	3.7	x(5)	2.5	2.1	3.3
	Country mean	***Males***	***6.7***	***6.9***	***4.5***	***4.3***	***4.1***	***4.0***	***3.5***	***2.9***	***4.6***
		Females	***4.2***	***5.1***	***6.5***	***5.4***	***4.1***	***4.6***	***3.0***	***3.3***	***4.1***
PARTNER COUNTRY	Israel	Males	6.1	10.2	x(5)	x(5)	6.9	x(7)	6.4	5.2	7.0
		Females	2.0	4.7	x(5)	x(5)	7.7	x(7)	5.4	5.1	5.9

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.
Source: OECD. See Annex 3 for a description of ISCED-97 levels, ISCED-97 country mappings and national data sources (*www.oecd.org/edu/eag2004*).

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Table A10.1c. Ratio of the population not in the labour force and educational attainment (2002)

Number of 25 to 64-year-olds not in the labour force as a percentage of the population aged 25 to 64, by level of education attained and gender

				Upper secondary education				Tertiary education		
		Pre-primary and primary education	Lower secondary education	ISCED 3C Short	ISCED 3C Long/3B	ISCED 3A	Post-secondary non-tertiary education	Type B	Type A and advanced research programmes	All levels of education
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OECD COUNTRIES										
Australia	Males	x(2)	21	a	10	11	x(5)	8	7	13
	Females	x(2)	45	a	32	33	x(5)	23	17	34
Austria	Males	x(2)	29	a	15	21	13	13	7	17
	Females	x(2)	49	a	32	31	15	18	13	33
Belgium	Males	44	21	a	11	13	7	11	9	19
	Females	71	49	a	34	30	27	18	15	38
Canada	Males	38	20	a	x(5)	12	11	8	10	13
	Females	64	44	a	x(5)	27	24	18	17	26
Czech Republic	Males	a	30	x(4)	12	10	x(5)	x(8)	6	12
	Females	a	49	x(4)	31	25	x(5)	x(8)	19	30
Denmark	Males	a	24	x(2)	12	15	14	9	5	14
	Females	a	44	x(2)	19	26	3	12	12	22
Finland	Males	x(2)	31	a	a	16	a	11	8	18
	Females	x(2)	38	a	a	22	a	13	12	22
France	Males	37	13	12	11	11	a	7	9	15
	Females	52	35	26	19	23	a	16	16	29
Germany	Males	29	23	a	16	32	11	12	8	16
	Females	59	49	a	29	42	21	18	17	32
Greece	Males	22	10	9	8	13	9	14	8	15
	Females	60	49	40	33	47	26	19	17	46
Hungary	Males	75	48	a	17	18	18	a	13	25
	Females	89	62	a	35	32	27	a	20	42
Iceland	Males	8	5	5	a	6	3	2	1	4
	Females	19	16	12	a	14	13	7	4	12
Ireland	Males	30	10	a	a	8	7	7	7	13
	Females	68	50	a	a	35	27	19	15	39
Italy	Males	43	16	16	12	14	9	x(8)	9	19
	Females	79	55	35	32	33	16	x(8)	17	49
Japan	Males	x(2)	14	a	x(5)	6	x(9)	2	3	6
	Females	x(2)	44	a	x(5)	37	x(9)	35	30	37
Korea	Males	19	14	a	x(5)	10	a	5	9	11
	Females	39	39	a	x(5)	46	a	42	43	43
Luxembourg	Males	25	15	13	15	11	17	9	8	15
	Females	52	53	57	38	31	51	20	21	42
Mexico	Males	20	4	a	4	a	a	16	32	16
	Females	58	52	a	52	a	a	64	77	57
Netherlands	Males	34	16	x(4)	13	8	16	8	7	14
	Females	63	47	x(4)	27	24	22	19	16	34
New Zealand	Males	x(2)	20	a	7	10	7	11	7	11
	Females	x(2)	43	a	23	27	23	23	18	28
Norway	Males	a	25	a	12	11	11	5	6	12
	Females	a	41	a	21	21	17	9	11	20
Poland	Males	x(2)	37	19	a	15	10	x(8)	8	20
	Females	x(2)	57	36	a	27	21	x(8)	12	33
Portugal	Males	15	9	x(5)	x(5)	12	x(5)	11	5	13
	Females	36	18	x(5)	x(5)	16	x(5)	19	5	29
Slovak Republic	Males	59	38	x(4)	14	9	x(5)	11	6	14
	Females	77	57	x(4)	28	22	x(5)	17	14	29
Spain	Males	24	8	a	6	12	a	7	9	13
	Females	66	46	a	30	34	a	21	15	44
Sweden	Males	29	16	a	x(5)	12	x(7)	11	8	13
	Females	45	27	a	x(5)	17	x(7)	15	10	18
Switzerland	Males	25	10	4	8	16	9	4	4	7
	Females	39	36	33	25	24	17	14	15	25
Turkey	Males	18	15	a	13	13	a	x(8)	12	16
	Females	75	80	a	65	69	a	x(8)	29	71
United Kingdom	Males	a	34	12	13	9	x(9)	9	7	14
	Females	a	49	26	23	20	x(9)	14	12	25
United States	Males	27	23	x(5)	x(5)	15	x(5)	10	8	14
	Females	56	46	x(5)	x(5)	28	x(5)	21	19	27
	Country mean	***Males***	***31***	***20***	***11***	***11***	***13***	***11***	***9***	***8***	***14***
		Females	***58***	***46***	***33***	***31***	***30***	***22***	***21***	***19***	***34***
PARTNER COUNTRY										
Israel	Males	66	27	x(5)	x(5)	20	x(7)	13	11	19
	Females	88	66	x(5)	x(5)	33	x(7)	24	15	34

Note: x indicates that data are included in another column. The column reference is shown in brackets after "x", *e.g.* x(2) means that data are included in column 2.
Source: OECD. See Annex 3 for a description of ISCED-97 levels, ISCED-97 country mappings and national data sources (*www.oecd.org/edu/eag2004*).

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Table A10.2a. Trends in employment ratio by educational attainment (1991-2002)

Number of 25 to 64-year-olds in employment as a percentage of the population aged 25 to 64, by level of education attained

OECD COUNTRIES

		1991	1995	1998	1999	2000	2001	2002
Australia	Below upper secondary	54	60	59	59	61	60	60
	Upper secondary and post-secondary non-tertiary	71	75	76	76	77	78	78
	Tertiary education	81	83	84	82	83	83	83
Austria	Below upper secondary	52	56	53	53	54	54	55
	Upper secondary and post-secondary non-tertiary	73	77	75	76	75	75	75
	Tertiary education	88	88	86	87	87	86	86
Belgium	Below upper secondary	49	47	47	49	51	49	49
	Upper secondary and post-secondary non-tertiary	75	72	72	75	75	74	74
	Tertiary education	85	84	84	85	85	84	84
Canada	Below upper secondary	55	53	54	55	55	55	55
	Upper secondary and post-secondary non-tertiary	75	74	74	75	76	76	76
	Tertiary education	82	81	82	82	83	82	82
Czech Republic	Below upper secondary	m	56	50	47	47	47	45
	Upper secondary and post-secondary non-tertiary	m	82	78	76	76	76	76
	Tertiary education	m	92	89	87	87	88	87
Denmark	Below upper secondary	62	61	61	62	62	62	61
	Upper secondary and post-secondary non-tertiary	81	76	79	81	81	81	81
	Tertiary education	89	89	87	88	88	87	87
Finland	Below upper secondary	64	54	56	59	57	58	58
	Upper secondary and post-secondary non-tertiary	78	70	73	74	75	75	74
	Tertiary education	88	81	83	85	84	85	85
France	Below upper secondary	58	57	56	56	57	58	58
	Upper secondary and post-secondary non-tertiary	78	76	75	75	76	77	77
	Tertiary education	85	82	82	82	83	84	83
Germany	Below upper secondary	51	49	48	49	51	52	51
	Upper secondary and post-secondary non-tertiary	74	71	69	70	70	71	70
	Tertiary education	86	84	83	83	84	83	84
Greece	Below upper secondary	m	56	56	55	55	55	56
	Upper secondary and post-secondary non-tertiary	m	62	65	65	65	65	66
	Tertiary education	m	79	80	81	81	80	81
Hungary	Below upper secondary	m	m	36	36	36	37	37
	Upper secondary and post-secondary non-tertiary	m	m	71	72	72	72	72
	Tertiary education	m	m	81	82	82	83	82
Iceland	Below upper secondary	m	m	85	86	87	87	86
	Upper secondary and post-secondary non-tertiary	m	m	89	91	89	89	89
	Tertiary education	m	m	95	95	95	95	95
Ireland	Below upper secondary	46	49	53	54	56	57	57
	Upper secondary and post-secondary non-tertiary	63	67	72	75	77	77	77
	Tertiary education	81	83	85	87	88	87	87
Italy	Below upper secondary	54	49	47	48	48	49	50
	Upper secondary and post-secondary non-tertiary	74	70	70	70	71	72	72
	Tertiary education	87	81	81	81	81	82	82
Japan	Below upper secondary	m	m	69	68	67	68	67
	Upper secondary and post-secondary non-tertiary	m	m	76	74	74	74	74
	Tertiary education	m	m	80	80	79	80	80
Korea	Below upper secondary	70	71	66	67	68	68	68
	Upper secondary and post-secondary non-tertiary	70	71	66	66	69	69	70
	Tertiary education	80	80	76	75	75	76	76

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A10.2a. (*continued*) **Trends in employment ratio by educational attainment (1991-2002)**

Number of 25 to 64-year-olds in employment as a percentage of the population aged 25 to 64, by level of education attained

OECD COUNTRIES		1991	1995	1998	1999	2000	2001	2002
Luxembourg	Below upper secondary	m	m	m	55	58	58	59
	Upper secondary and post-secondary non-tertiary	m	m	m	73	73	74	74
	Tertiary education	m	m	m	85	84	86	85
Mexico	Below upper secondary	m	59	62	62	62	61	60
	Upper secondary and post-secondary non-tertiary	m	68	72	71	70	70	71
	Tertiary education	m	49	53	55	54	53	53
Netherlands	Below upper secondary	50	52	55	57	58	59	59
	Upper secondary and post-secondary non-tertiary	73	74	77	78	79	80	80
	Tertiary education	85	83	85	87	86	86	87
New Zealand	Below upper secondary	57	58	59	60	61	62	64
	Upper secondary and post-secondary non-tertiary	73	80	79	80	80	81	81
	Tertiary education	80	82	80	81	81	82	82
Norway	Below upper secondary	62	61	68	67	65	63	64
	Upper secondary and post-secondary non-tertiary	80	80	84	83	83	83	81
	Tertiary education	90	89	90	90	90	90	89
Poland	Below upper secondary	m	50	49	47	43	41	38
	Upper secondary and post-secondary non-tertiary	m	70	71	70	67	65	62
	Tertiary education	m	85	87	87	85	84	84
Portugal	Below upper secondary	62	67	72	72	73	73	73
	Upper secondary and post-secondary non-tertiary	84	77	80	82	83	83	82
	Tertiary education	92	89	89	90	91	91	88
Slovak Republic	Below upper secondary	m	39	37	33	31	30	28
	Upper secondary and post-secondary non-tertiary	m	75	75	72	71	70	70
	Tertiary education	m	88	89	87	86	87	87
Spain	Below upper secondary	49	46	49	51	54	55	56
	Upper secondary and post-secondary non-tertiary	72	65	67	70	72	72	72
	Tertiary education	79	75	76	78	80	81	81
Sweden	Below upper secondary	83	78	66	66	68	69	68
	Upper secondary and post-secondary non-tertiary	91	84	79	80	82	82	82
	Tertiary education	94	89	85	86	87	87	86
Switzerland	Below upper secondary	78	67	69	69	66	69	70
	Upper secondary and post-secondary non-tertiary	80	80	81	81	82	81	81
	Tertiary education	92	90	90	91	91	92	91
Turkey	Below upper secondary	60	64	57	57	53	51	50
	Upper secondary and post-secondary non-tertiary	67	63	66	64	62	63	62
	Tertiary education	87	74	81	79	78	78	76
United Kingdom	Below upper secondary	61	55	53	53	54	54	53
	Upper secondary and post-secondary non-tertiary	78	77	79	79	79	79	79
	Tertiary education	86	86	87	88	88	88	88
United States	Below upper secondary	52	54	58	58	58	58	57
	Upper secondary and post-secondary non-tertiary	74	75	76	76	77	76	74
	Tertiary education	85	86	85	85	85	84	83
Country mean	***Below upper secondary***	***59***	***56***	***57***	***57***	***57***	***57***	***57***
	Upper secondary and post-secondary non-tertiary	***76***	***74***	***75***	***75***	***75***	***75***	***75***
	Tertiary education	***86***	***83***	***83***	***84***	***84***	***84***	***83***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A10.2b. Trends in unemployment ratio by educational attainment (1991-2002)

Number of 25 to 64-year-olds who are unemployed as a percentage of the population aged 25 to 64, by level of education attained

OECD COUNTRIES		1991	1995	1998	1999	2000	2001	2002
Australia	Below upper secondary	5.5	5.7	5.9	5.4	4.9	4.9	4.8
	Upper secondary and post-secondary non-tertiary	5.2	5.0	4.7	4.1	3.6	3.8	3.5
	Tertiary education	3.3	3.5	2.9	2.9	3.1	2.6	2.8
Austria	Below upper secondary	2.6	3.4	3.9	3.5	3.6	3.7	4.0
	Upper secondary and post-secondary non-tertiary	2.4	2.3	2.8	2.5	2.3	2.3	2.7
	Tertiary education	1.3	1.8	1.8	1.7	1.4	1.3	1.6
Belgium	Below upper secondary	6.5	7.3	7.2	6.7	5.5	4.5	5.6
	Upper secondary and post-secondary non-tertiary	3.3	5.8	5.8	5.3	4.2	4.3	4.7
	Tertiary education	1.7	3.1	2.8	2.7	2.4	2.4	3.0
Canada	Below upper secondary	8.8	8.0	7.2	6.6	6.2	6.4	6.9
	Upper secondary and post-secondary non-tertiary	7.2	6.7	6.0	5.4	4.7	5.0	5.5
	Tertiary education	5.5	5.3	4.1	3.9	3.5	4.1	4.4
Czech Republic	Below upper secondary	m	4.7	8.4	10.9	11.2	11.1	10.5
	Upper secondary and post-secondary non-tertiary	m	1.8	3.7	5.3	5.4	5.0	4.5
	Tertiary education	m	0.7	1.7	2.4	2.2	1.8	1.6
Denmark	Below upper secondary	10.2	10.5	4.6	4.6	4.2	3.3	4.0
	Upper secondary and post-secondary non-tertiary	8.1	8.4	3.8	3.4	3.3	2.7	2.8
	Tertiary education	4.6	4.2	3.0	2.8	2.4	2.9	3.2
Finland	Below upper secondary	6.1	14.9	9.0	8.8	7.9	7.5	8.0
	Upper secondary and post-secondary non-tertiary	6.1	14.0	8.7	7.8	7.3	7.0	7.2
	Tertiary education	3.1	8.1	5.1	4.2	4.2	3.9	4.0
France	Below upper secondary	6.8	9.0	9.8	10.2	9.2	7.8	7.7
	Upper secondary and post-secondary non-tertiary	5.5	7.5	7.9	7.6	6.5	5.7	5.6
	Tertiary education	3.3	5.7	5.7	5.4	4.4	4.2	4.6
Germany	Below upper secondary	4.1	7.6	9.2	9.2	8.1	8.1	9.2
	Upper secondary and post-secondary non-tertiary	3.6	6.1	7.9	6.8	6.2	6.3	6.9
	Tertiary education	2.9	4.3	4.8	4.4	3.6	3.7	3.9
Greece	Below upper secondary	m	3.8	4.5	5.1	4.8	4.5	4.4
	Upper secondary and post-secondary non-tertiary	m	6.2	7.6	7.9	7.9	7.1	7.0
	Tertiary education	m	7.0	5.3	6.6	6.3	5.6	5.5
Hungary	Below upper secondary	m	m	4.6	4.5	4.0	4.1	4.3
	Upper secondary and post-secondary non-tertiary	m	m	4.7	4.5	4.1	3.4	3.3
	Tertiary education	m	m	1.4	1.1	1.1	1.0	1.3
Iceland	Below upper secondary	m	m	3.0	2.0	2.2	2.1	2.7
	Upper secondary and post-secondary non-tertiary	m	m	1.2	0.9	1.4	1.6	2.4
	Tertiary education	m	m	0.8	0.6	0.8	0.9	1.5
Ireland	Below upper secondary	11.7	9.5	7.0	5.5	4.2	3.4	3.6
	Upper secondary and post-secondary non-tertiary	5.0	5.5	3.4	2.8	1.9	1.9	2.2
	Tertiary education	3.5	3.6	2.6	1.5	1.4	1.2	1.6
Italy	Below upper secondary	3.3	4.9	5.7	5.6	5.3	4.9	4.9
	Upper secondary and post-secondary non-tertiary	5.7	6.1	6.3	6.1	5.6	5.2	5.0
	Tertiary education	4.6	6.4	6.0	6.0	5.1	4.6	4.6
Japan	Below upper secondary	m	m	3.1	4.0	4.3	4.3	4.7
	Upper secondary and post-secondary non-tertiary	m	m	2.6	3.4	3.6	3.7	4.1
	Tertiary education	m	m	2.2	2.7	2.9	2.6	3.2
Korea	Below upper secondary	0.7	0.7	4.2	3.8	2.4	2.1	1.5
	Upper secondary and post-secondary non-tertiary	1.4	1.2	4.8	4.5	2.7	2.4	2.0
	Tertiary education	2.2	1.6	3.9	3.7	2.7	2.6	2.4

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

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Table A10.2b. (*continued*) **Trends in unemployment ratio by educational attainment (1991-2002)**

Number of 25 to 64-year-olds who are unemployed as a percentage of the population aged 25 to 64, by level of education attained

OECD COUNTRIES		1991	1995	1998	1999	2000	2001	2002
Luxembourg	Below upper secondary	m	m	m	2.1	1.9	1.1	2.4
	Upper secondary and post-secondary non-tertiary	m	m	m	0.8	1.2	0.8	0.9
	Tertiary education	m	m	m	0.9	0.8	1.1	1.5
Mexico	Below upper secondary	m	4.2	2.3	1.6	1.7	1.6	1.8
	Upper secondary and post-secondary non-tertiary	m	2.7	1.1	0.9	1.0	1.0	1.1
	Tertiary education	m	1.8	0.5	0.6	0.8	0.6	0.9
Netherlands	Below upper secondary	4.7	4.4	0.5	2.9	2.3	1.8	2.3
	Upper secondary and post-secondary non-tertiary	3.5	3.7	1.3	1.9	1.8	1.3	1.8
	Tertiary education	1.3	3.5	n	1.5	1.7	1.1	1.9
New Zealand	Below upper secondary	8.1	5.3	6.9	5.8	5.1	4.5	3.8
	Upper secondary and post-secondary non-tertiary	5.7	2.7	3.9	3.8	2.9	2.7	2.8
	Tertiary education	4.0	2.7	3.7	3.4	3.0	2.7	2.8
Norway	Below upper secondary	4.5	4.2	2.0	1.7	1.5	2.2	2.2
	Upper secondary and post-secondary non-tertiary	3.7	3.4	2.0	2.2	2.2	2.3	2.5
	Tertiary education	1.8	2.2	1.4	1.2	1.7	1.5	1.9
Poland	Below upper secondary	m	8.1	7.9	9.2	11.1	12.1	13.9
	Upper secondary and post-secondary non-tertiary	m	8.8	7.1	8.3	10.7	12.3	13.8
	Tertiary education	m	2.5	2.2	2.8	3.8	4.5	5.7
Portugal	Below upper secondary	3.5	4.5	3.3	3.0	2.7	2.7	3.4
	Upper secondary and post-secondary non-tertiary	4.0	5.3	4.3	3.8	3.0	2.8	3.7
	Tertiary education	1.7	3.0	2.6	2.8	2.5	2.6	3.6
Slovak Republic	Below upper secondary	m	12.2	12.0	14.4	17.6	19.2	20.7
	Upper secondary and post-secondary non-tertiary	m	8.0	7.3	9.7	11.8	12.2	11.7
	Tertiary education	m	2.4	3.0	3.6	4.1	3.8	3.2
Spain	Below upper secondary	7.9	12.0	10.2	8.8	8.5	6.3	7.0
	Upper secondary and post-secondary non-tertiary	10.1	14.8	12.1	10.3	8.9	6.6	7.5
	Tertiary education	8.1	12.7	11.5	9.6	8.3	6.0	6.8
Sweden	Below upper secondary	2.2	8.7	7.7	6.6	5.9	4.3	4.2
	Upper secondary and post-secondary non-tertiary	2.1	7.9	6.7	5.5	4.6	4.0	3.9
	Tertiary education	1.1	4.2	3.9	3.4	2.7	2.4	2.7
Switzerland	Below upper secondary	0.9	4.1	4.1	3.6	3.5	2.6	3.5
	Upper secondary and post-secondary non-tertiary	1.2	2.3	2.4	1.9	1.7	1.7	1.9
	Tertiary education	1.2	1.8	2.6	1.6	1.2	1.2	2.0
Turkey	Below upper secondary	3.6	3.2	2.7	3.2	2.6	3.8	4.8
	Upper secondary and post-secondary non-tertiary	5.2	4.7	4.6	5.6	3.6	4.9	5.8
	Tertiary education	2.8	2.5	4.0	4.1	3.0	3.7	6.0
United Kingdom	Below upper secondary	7.1	8.1	6.2	5.8	5.2	4.5	4.9
	Upper secondary and post-secondary non-tertiary	5.5	6.2	4.1	4.1	3.8	3.2	3.4
	Tertiary education	3.0	3.4	2.3	2.4	1.9	1.8	2.2
United States	Below upper secondary	7.3	6.0	5.4	4.8	4.9	5.1	6.5
	Upper secondary and post-secondary non-tertiary	5.2	4.0	3.5	3.0	2.9	3.0	4.5
	Tertiary education	2.6	2.4	1.8	1.8	1.5	1.8	2.6
Country mean	***Below upper secondary***	***5.5***	***6.7***	***5.8***	***5.7***	***5.4***	***5.1***	***5.6***
	Upper secondary and post-secondary non-tertiary	***4.7***	***5.8***	***4.9***	***4.7***	***4.4***	***4.2***	***4.5***
	Tertiary education	***3.0***	***3.9***	***3.2***	***3.1***	***2.8***	***2.7***	***3.1***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A10.2c. Trends in the ratio of the population not in the labour force by educational attainment (1991-2002)

Number of 25 to 64-year-olds not in the labour force as a percentage of the population aged 25 to 64, by level of education attained

OECD COUNTRIES		1991	1995	1998	1999	2000	2001	2002
Australia	Below upper secondary	40	34	35	36	34	35	35
	Upper secondary and post-secondary non-tertiary	24	20	19	20	20	18	19
	Tertiary education	16	13	13	15	14	14	14
Austria	Below upper secondary	46	41	43	43	43	43	41
	Upper secondary and post-secondary non-tertiary	24	21	22	22	23	23	22
	Tertiary education	10	10	12	11	12	12	12
Belgium	Below upper secondary	45	45	45	44	44	46	46
	Upper secondary and post-secondary non-tertiary	21	22	22	20	21	22	21
	Tertiary education	13	13	13	12	12	13	13
Canada	Below upper secondary	36	39	39	39	39	39	38
	Upper secondary and post-secondary non-tertiary	18	19	19	19	19	19	19
	Tertiary education	12	13	14	14	14	14	14
Czech Republic	Below upper secondary	m	40	42	42	42	42	44
	Upper secondary and post-secondary non-tertiary	m	16	18	18	19	19	19
	Tertiary education	m	7	10	10	11	10	11
Denmark	Below upper secondary	28	28	35	34	33	35	35
	Upper secondary and post-secondary non-tertiary	11	15	17	16	16	17	16
	Tertiary education	6	7	10	9	9	10	10
Finland	Below upper secondary	30	31	35	33	35	34	34
	Upper secondary and post-secondary non-tertiary	16	16	18	18	18	18	18
	Tertiary education	9	11	12	11	11	11	11
France	Below upper secondary	36	34	34	33	34	34	34
	Upper secondary and post-secondary non-tertiary	16	17	17	17	18	18	18
	Tertiary education	12	12	13	13	12	12	12
Germany	Below upper secondary	45	43	43	42	41	40	40
	Upper secondary and post-secondary non-tertiary	23	23	23	23	23	23	23
	Tertiary education	11	12	12	13	13	13	13
Greece	Below upper secondary	m	40	40	40	40	40	40
	Upper secondary and post-secondary non-tertiary	m	32	27	27	27	28	27
	Tertiary education	m	14	14	13	13	15	14
Hungary	Below upper secondary	m	m	59	60	60	59	59
	Upper secondary and post-secondary non-tertiary	m	m	24	23	24	25	25
	Tertiary education	m	m	18	17	17	16	17
Iceland	Below upper secondary	m	m	12	12	11	11	12
	Upper secondary and post-secondary non-tertiary	m	m	10	8	9	9	8
	Tertiary education	m	m	4	4	4	4	3
Ireland	Below upper secondary	42	42	40	40	40	40	39
	Upper secondary and post-secondary non-tertiary	32	28	25	22	21	21	21
	Tertiary education	16	13	12	11	11	12	12
Italy	Below upper secondary	43	46	47	47	47	46	45
	Upper secondary and post-secondary non-tertiary	21	24	24	24	23	23	23
	Tertiary education	9	13	13	13	13	14	13
Japan	Below upper secondary	m	m	28	28	29	28	29
	Upper secondary and post-secondary non-tertiary	m	m	22	22	23	22	22
	Tertiary education	m	m	18	18	18	17	17
Korea	Below upper secondary	29	28	30	29	30	30	30
	Upper secondary and post-secondary non-tertiary	28	28	29	29	29	28	27
	Tertiary education	18	19	20	22	22	22	22

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A10.2c. (*continued*) **Trends in the ratio of the population not in the labour force by educational attainment (1991-2002)**

Number of 25 to 64-year-olds not in the labour force as a percentage of the population aged 25 to 64, by level of education attained

OECD COUNTRIES		1991	1995	1998	1999	2000	2001	2002
Luxembourg	Below upper secondary	m	m	m	43	40	41	38
	Upper secondary and post-secondary non-tertiary	m	m	m	26	26	25	26
	Tertiary education	m	m	m	14	15	13	13
Mexico	Below upper secondary	m	37	36	37	37	38	38
	Upper secondary and post-secondary non-tertiary	m	29	27	29	29	29	28
	Tertiary education	m	49	47	45	46	47	46
Netherlands	Below upper secondary	45	43	44	40	40	39	39
	Upper secondary and post-secondary non-tertiary	23	22	22	20	19	19	19
	Tertiary education	14	14	15	11	12	13	11
New Zealand	Below upper secondary	35	36	35	35	34	33	33
	Upper secondary and post-secondary non-tertiary	22	17	17	16	17	17	16
	Tertiary education	16	16	16	16	16	16	16
Norway	Below upper secondary	33	35	30	31	33	35	34
	Upper secondary and post-secondary non-tertiary	17	16	14	15	15	15	16
	Tertiary education	8	9	8	9	8	9	9
Poland	Below upper secondary	m	42	43	44	46	46	48
	Upper secondary and post-secondary non-tertiary	m	21	22	22	23	23	24
	Tertiary education	m	13	11	11	12	11	10
Portugal	Below upper secondary	35	28	25	25	25	24	24
	Upper secondary and post-secondary non-tertiary	12	18	16	14	14	15	14
	Tertiary education	6	8	8	7	7	7	8
Slovak Republic	Below upper secondary	m	49	51	52	52	50	51
	Upper secondary and post-secondary non-tertiary	m	17	18	18	18	18	18
	Tertiary education	m	9	8	9	10	9	10
Spain	Below upper secondary	43	42	40	40	38	39	37
	Upper secondary and post-secondary non-tertiary	17	20	21	20	19	22	21
	Tertiary education	13	13	12	13	12	13	12
Sweden	Below upper secondary	15	14	26	27	26	27	28
	Upper secondary and post-secondary non-tertiary	7	9	14	15	14	14	14
	Tertiary education	5	7	11	11	11	11	11
Switzerland	Below upper secondary	21	29	27	27	31	28	27
	Upper secondary and post-secondary non-tertiary	19	18	16	17	16	17	17
	Tertiary education	7	8	7	7	8	7	7
Turkey	Below upper secondary	36	33	40	40	45	45	45
	Upper secondary and post-secondary non-tertiary	28	32	29	31	35	33	33
	Tertiary education	10	23	15	17	18	18	18
United Kingdom	Below upper secondary	32	37	41	42	41	42	42
	Upper secondary and post-secondary non-tertiary	16	17	17	17	17	17	17
	Tertiary education	11	10	10	10	10	10	10
United States	Below upper secondary	41	40	37	37	37	36	37
	Upper secondary and post-secondary non-tertiary	21	21	21	21	20	21	22
	Tertiary education	12	12	13	14	13	14	14
Country mean	***Below upper secondary***	***36***	***37***	***37***	***37***	***38***	***38***	***37***
	Upper secondary and post-secondary non-tertiary	***20***	***21***	***20***	***20***	***20***	***21***	***20***
	Tertiary education	***11***	***13***	***13***	***13***	***13***	***14***	***13***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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INDICATOR A11: THE RETURNS TO EDUCATION: EDUCATION AND EARNINGS

- Education and earnings are positively linked. In many countries, upper secondary and post-secondary non-tertiary education form a break point beyond which additional education attracts a particularly high premium. In all countries, graduates of tertiary level education earn substantially more than upper secondary and post-secondary non-tertiary graduates. Earnings differentials between tertiary and upper secondary education are generally more pronounced than those between upper secondary and lower secondary or below.
- Earnings of people with below upper secondary education tend to range from 60 to 90% of those of upper secondary and post-secondary non-tertiary graduates.
- Females still earn less than males with similar levels of educational attainment.

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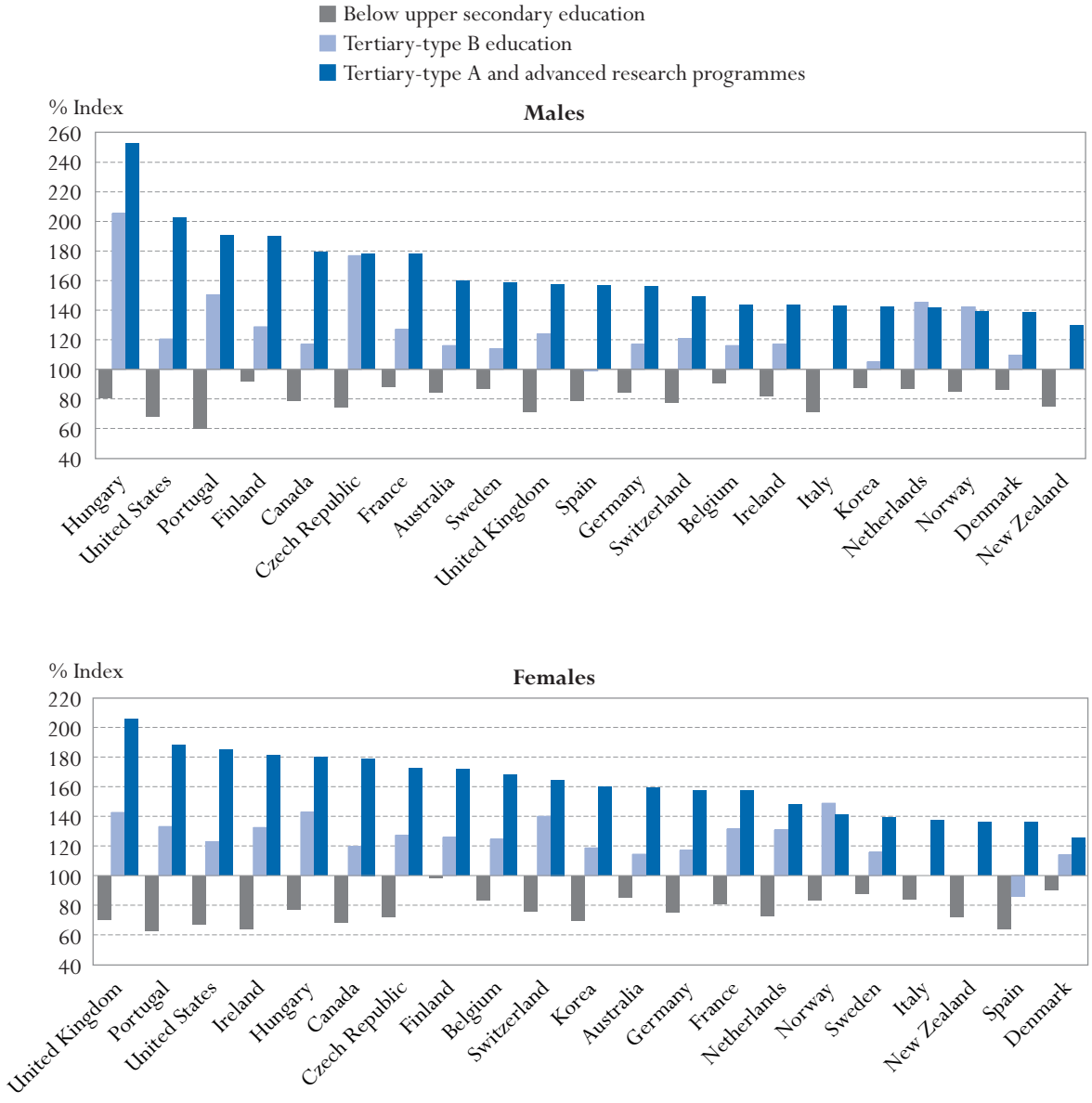
Chart A11.1. Relative earnings from employment (2002)

By level of educational attainment and gender for 25 to 64-year-olds (upper secondary education = 100)



Countries are ranked in descending order of relative earnings of the population having attained tertiary-type A and advanced research programmes.

Source: OECD. Table A11.1a. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

Policy context

This indicator examines the earnings of workers with differing levels of educational attainment…

One way in which markets provide incentives for individuals to develop and maintain appropriate levels of skills is through wage differentials, in particular through the enhanced earnings accorded to persons completing additional education. The pursuit of higher levels of education can also be viewed as an investment in human capital. Human capital includes the stock of skills that

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individuals maintain or develop, usually through education or training, and then offer in return for earnings in the labour market. The higher the earnings that result from increases in human capital, the higher the returns on that investment and the premium paid for enhanced skills and/or for higher productivity.

…as well as the returns to educational investment.

At the same time, education involves costs, which must be considered when examining the returns to investment in education. This indicator examines these returns and the various costs and benefits that influence them.

Evidence and explanations

Education and earnings

Earnings differentials are a key measure of the current financial incentives in a particular country for an individual to invest in further education.

Earnings differentials according to educational attainment are a key measure of the current financial incentives in a particular country for an individual to invest in further education. Earnings differentials may also reflect differences in the supply of educational programmes at different levels or the barriers to access to those programmes. The earnings benefit of completing tertiary education can be seen by comparing the ratio of the mean annual earnings of those who graduated from tertiary education with the mean annual earnings of upper secondary or post-secondary non-tertiary graduates. The earnings disadvantage from not completing upper secondary education is apparent from a similar comparison. Variations in relative earnings (before taxes) among countries reflect a number of factors, including the demand for skills in the labour market, minimum wage legislation, the strength of unions, the coverage of collective bargaining agreements, the supply of workers at the various levels of educational attainment, the range of work experience of workers with high and low levels of educational attainment, the distribution of employment among occupations and the relative incidence of part-time and part-year work among workers with varying levels of educational attainment.

Education and earnings are positively linked, in all socio-economic systems and at all levels of economic development.

Chart A11.1 shows a strong positive relationship between educational attainment and earnings. In all countries, graduates of tertiary-level education earn substantially more than upper secondary and post-secondary non-tertiary graduates. Earnings differentials between tertiary and upper secondary education are generally more pronounced than those between upper secondary and lower secondary or below, suggesting that in many countries upper secondary (and with a small number of exceptions, post-secondary non-tertiary) education forms a break-point beyond which additional education attracts a particularly high premium. Table A11.1a shows that, among those countries which report gross earnings, the earnings premium for males aged 25 to 64 years with tertiary-level education, relative to upper secondary education, ranges from 30% in New Zealand to 152% in Hungary.

The earnings data shown in this indicator differ among countries in a number of ways. Caution should therefore be exercised in interpreting the results. In particular, in countries reporting annual earnings, differences in the incidence of part-year work among individuals with different levels of educational attainment will have an effect on relative earnings that is not reflected in the data

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for countries reporting weekly or monthly earnings (see the "Definitions and methodologies" section below).

Education and gender disparity in earnings

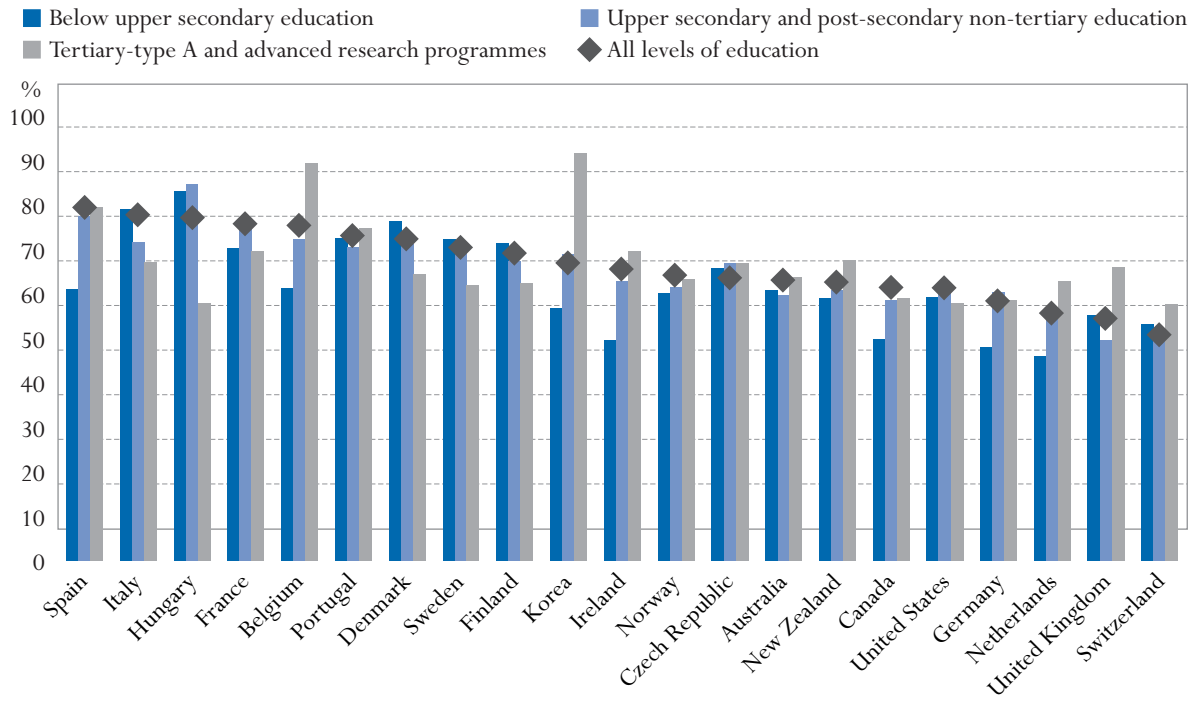
Tertiary education enhances earnings relative to upper secondary education more for females than for males in Belgium, Ireland, Korea, the Netherlands, New Zealand, Norway, Switzerland and the United Kingdom. The reverse is true in the remaining countries, with the exception of Germany where, relative to upper secondary education, the earnings of males and females are equally enhanced by tertiary education (Table A11.1a).

Earnings differentials between males and females with the same educational attainment remain substantial…

Although both males and females with upper secondary, post-secondary non-tertiary or tertiary attainment have substantial earnings advantages compared with those of the same gender who do not complete upper secondary education, earnings differentials between males and females with the same educational attainment remain substantial (Chart A11.2 and Table A11.1b).

When all levels of education are taken together, the earnings of females between the ages of 30 and 44 range from 50% of those of males in Switzerland to 79% of those of males in Spain (Chart A11.2 and Table A11.1b).

Chart A11.2. Differences in earnings between females and males (2002)
Average annual earnings of females as a percentage of average annual earnings of males (30-44 age group), by level of educational attainment



Countries are ranked in descending order of the average annual earnings of females as a percentage of the average annual earnings of 30 to 44-year-old males, for all levels of education.
Source: OECD. Table A11.1b. See Annex 3 for notes *(www.oecd.org/edu/eag2004).*

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…with some of the differences explained by career choices, the time spent in the labour force, and the incidence of part-time work among females.

The gap in earnings between males and females may be explained in part by different choices of career and occupation, differences in the amount of time that males and females spend in the labour force, and the relatively high incidence of part-time work among females (in Table A11.1b, part-time employment is excluded in Hungary, Portugal and the United States).

Private internal rates of return to investment in education

The overall incentives for individuals to invest in human capital can be summarised in the private internal rate of return.

The incentives to invest in human capital reflect the associated labour market benefits and terms of educational financing, and can be summarised in estimates of private internal rates of return. The rate of return represents a measure of the benefits obtained, over time, relative to the costs of the investment in education. It is expressed as a percentage and is analogous to percentage returns from investing in a savings account (see Annex 3 at *www.oecd.org/edu/eag2004* for an explanation of the methodology).

This indicator estimates the incentives for investment in education faced by working-age adults under a range of study scenarios.

Rates of return to investments in education have commonly been estimated across the lifetime of individuals who have completed different stages of education during youth and early adulthood. By contrast, this indicator refers to investments in education made by working-age adults. Specifically, the estimates of private rates of return presented in Tables A11.4 and A11.5 apply to the case of a hypothetical individual, aged 40, who returns to formal education to attain the next highest level of qualification. As such, these calculations are relevant to current policy concerns regarding the encouragement of lifelong learning in many OECD member countries.

Transitions from two different levels of education are examined. The first, in Table A11.4, presents private rates of return for an individual who has invested in obtaining upper secondary or post-secondary non-tertiary education (ISCED level 3/4), from an original lower secondary level of education (ISCED level 0/1/2). The second transition, presented in Table A11.5, concerns an individual who has invested in obtaining a tertiary-level education, up to the attainment of an advanced research qualification (ISCED level 5(A,B)/6), starting from an upper secondary level of education (ISCED level 3/4). Estimates were calculated for the following scenarios:

- The individual studies on a full-time basis.
- The student has no work activity and hence no earnings while studying. Rates of return are here calculated for two cases. In the first, the individual bears the direct costs of tuition (as reported by national education authorities), as well as foregone earnings net of taxes (only taxes levied by central government are considered) adjusted for the probability of being employed. In the second case, the individual bears no direct tuition costs, but again bears the costs of foregone earnings.
- In youth, the individual has continued directly to the next highest level of education before entering the labour market.

Results are presented separately for males and females. In all of the above scenarios, the benefits that result from investing in education are comprised of the gains in post-tax earnings (based on average differences in post-tax earnings between individuals with the original and acquired levels of education) adjusted for higher employment probability. Assumptions have been made regarding the earnings of a hypothetical 40-year-old who returns to the labour force with the next highest level of education. It is assumed that s/he immediately experiences a 10% increase in wages relative to the wages associated with the original level of qualification. The individual's wage then converges in a linear fashion with the average wage of individuals who already hold the higher level of qualification. The convergence period lasts for three years, when wage parity is achieved (see "Definitions and methodologies" and "The interpretation of the internal rates of return" for a discussion of these assumptions and a consideration of how an alternative convergence period affects the results).

The calculated rates of return are likely to be biased upwards on account of the fact that social transfers, such as unemployment benefits, are not taken into account. However, the non-inclusion of other sources of non-wage income (such as private pensions, real estate, other assets, etc.) will bias the calculated rates of return downwards, particularly for better-educated groups. The rate of return calculations reported in this indicator do not take into account possible non-monetary benefits of education (such as the enjoyment of learning, enhanced social status and improved health).

High rates of return exist for individuals who obtain education early and reap the benefits of education across the life cycle.

Notable in Tables A11.4 and A11.5 are the high rates of return that result for both males and females who proceed directly to the next highest level of education before entering the labour market. The rates of return are strikingly high for the attainment of upper secondary education (Table A11.4), reaching up to 98% for females in the United States. These high returns are driven by the significant differential in wages and salaries that follow the achievement of upper secondary education. They underline the poor earnings prospects of those who fail to complete upper secondary education. In every country (except for Spain, in the case of males), private rates of return are higher when the individual proceeds directly from upper secondary to tertiary education, in comparison to returns achieved when entering full-time education at age 40 (Table A11.5). The fact that private rates of return are generally higher when the next level of education is attained at an earlier age, regardless of the level of qualification achieved, is explained by the longer time horizon over which education-enhanced earnings accrue, as well as the lower level of foregone earnings in youth and early adulthood.

The impact on incentives of eliminating tuition costs tends to be modest, but is higher at the tertiary level of education.

As expected, in both Tables A11.4 and A11.5, the rates of return rise when direct tuition costs are eliminated. However, overall, the additional incentive created by eliminating tuition costs is not remarkable, at 0.6 of a percentage point on average for the achievement of an upper secondary qualification, and 1.8 percentage points on average for the achievement of a tertiary level qualification (and 1.3 percentage points if one omits the very high figures for the United

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States). Overall, the increase to the rate of return that results from not having to pay tuition costs is notably higher for the attainment of tertiary education, reflecting the higher tuition costs to individuals at the tertiary level. However, in countries such as Denmark and Finland the impact on private rates of return of not incurring tuition costs is rather small, reflecting the low costs of tuition to the individual in those countries (indeed, in Denmark, there is no tuition fee for initial tertiary education, although fees do apply to non-regular education for adults). Conversely, in countries such as Australia, Hungary, Spain, the United Kingdom and the United States, eliminating tuition costs leads to a significant increase in the private rate of return.

For attainment of the upper secondary level, in Table A11.4, countries fall into four groups based on the estimated values of the rate of return:

- First, with particularly high rewards from the attainment of upper secondary education – ranging from 9.9 to 17.5% – Hungary, Spain and the United States form a separate group.
- Second, Switzerland and the United Kingdom both have high rates of return, although somewhat below those of the previous group.
- Third, Denmark forms a group by itself, with very low positive rates of return.
- Fourth, Australia and Sweden have negative rates of return, as does Finland. In the cases of Australia and Finland the negative rates of return are due in large measure to the effects of taxation, as post-tax earnings for those with an upper secondary qualification are below post-tax earnings for those with lower secondary education (although not for all age groups). Tax effects have a similar impact in Sweden.

Table A11.5 presents a number of salient features regarding achievement of a tertiary-level qualification:

- Hungary constitutes a group by itself, with exceedingly high rates of return.
- Finland and Spain stand out with rates of return of between 8.1 and 12.1%.
- The United Kingdom and the United States also register high rates of return, although slightly below those of the preceding group.
- The remaining countries have moderate, but in most cases positive, rates of return.

In attaining the upper secondary level, the gender differential in the rates of return is limited in most countries. However, rates of return are considerably higher for women than men in Hungary, Spain and Switzerland. In these three countries, under both cost scenarios, the rate of return for females is an average of 3.8 percentage points higher than for males. This divergence is largely due to the lower level of foregone earnings for women in these countries. It is noteworthy that, in attaining the tertiary level of education, the private rate of return for females lags behind that for males in all countries except Switzerland and the United Kingdom.

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Social internal rates of return to investment in education

The benefits to society of additional education can be assessed on the basis of a social internal rate of return…

The benefits to society of additional education can be assessed on the basis of social rates of return. The social rate of return reflects the costs and benefits to society of investment in education, which can differ in magnitude from private costs and benefits. The social cost includes foregone production of output during study periods as well as the full cost of providing education, rather than only the cost borne by the individual. The social benefit includes the increased productivity associated with the investment in education as well as a range of possible indirect benefits, which also have economic repercussions (such as lower crime, better health, more social cohesion and more informed and effective citizens).

While data on social costs are available for most OECD countries, information on the full range of social benefits is less readily available. To the extent that productivity gains are reflected in labour cost differentials, the latter can be used as a measure of the economic gains of education for society. However, the possibility of externalities associated with education suggests that the observed earnings differentials might not fully account for the economy-wide efficiency gains. On the other hand, studies suggest that a (small) part of the wage premiums received by better educated individuals is due to the signals of inherent ability that educational attainments provide to employers, rather than productivity differentials due to increases in human capital. Furthermore, while the indirect benefits of education are important, it is often difficult to translate these into monetary values for inclusion in rate of return calculations.

Tables A11.6 and A11.7 present estimates of the social internal rates of return for three scenarios:

- The individual proceeds directly to the next highest level of education prior to entering the labour market.
- The individual, at age 40, enters full-time studies in order to obtain the next highest level of education.
- The individual studies on a part-time basis while continuing to work. The duration of tuition is here assumed to be twice that of the scenario in which the student enters full-time studies.

…which can, however, currently only be estimated in a narrow sense excluding non-economic benefits.

Given the difficulties of constructing comprehensive social rates of return, these calculations present estimates of a "narrow" definition that abstracts from any externality effects. To the extent that there are significant positive externalities related to human capital investment by the average student these estimates will thus be biased downwards. Arithmetically, social costs and benefits are simply the addition of individual and public costs and benefits. Hence, the social rate of return is unchanged whether the individual bears the costs of tuition or not. This is because costs eliminated for the individual become public costs. Hence, Tables A11.6 and A11.7 do not report separate social rates of return for the cases in which the individual does or does not bear tuition costs, as the social rates of return (but not the public rate of return) are identical in both instances.

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The estimates presented in Table A11.6 suggest that the social internal rate of return is particularly high at the upper secondary level in Hungary, Spain and the United States, while it is lowest, and indeed significantly negative, in Finland. At the tertiary level (Table A11.7), the social internal rate of return is particularly high in Finland, Hungary, Spain, the United Kingdom and the United States, while it is lowest in Denmark.

Social internal rates of return are generally lower than private rates of return, due to the significant social costs of education.

At both the upper secondary and tertiary levels the "narrow" social internal rates of return are lower than the private internal rates of return in most countries. This finding primarily reflects the fact that the social cost of education is typically much higher than the private cost. The principal exceptions are Sweden, at the upper secondary level, and Australia and the United Kingdom, at the tertiary level. The differences (private returns higher than social returns) are particularly significant at the tertiary level in Denmark, Finland, Hungary and Switzerland, ranging from 2 to 5.4 percentage points. At the upper secondary level, differentials between private and social rates of return (private returns higher than social returns) are notably wide in Denmark and Switzerland.

Examining the scenario in which the individual stays in work, but studies part-time, it is notable that the rates of return for attaining the upper secondary level are systematically higher than when the individual studies full-time at age 40. However, the picture is more mixed for tertiary-level qualification. Higher rates of return for both males and females are seen in Sweden and the United Kingdom in the part-time studies scenario. However, in some countries higher rates exist for males only, as occurs in Australia, Denmark, Finland, Spain and Switzerland.

The interpretation of the internal rates of return

Few adults currently leave work in mid-career to pursue full-time studies. The scenario considered in Tables A11.6 and A11.7, in which a working-age adult undertakes part-time studies in order to attain the next highest level of qualification, is more common. The results presented are somewhat sensitive to assumptions regarding the earnings of working-age individuals who return to the labour force after attaining the next highest level of education. When the earnings convergence period is doubled, from three to six years, the private rate of return decreases by an average of 1 percentage point. However, as described above, the empirical basis for the earnings assumptions is weak. These data also report accounting rates of return only. The results would no doubt differ from econometric estimates that control for the inherent ability, and other features, of those who decide to invest in education.

With some exceptions, policies that reduce the direct costs of education have only a modest impact on individuals' decisions to invest in mid-career learning.

For persons acquiring upper secondary education, as well as individuals attaining a tertiary level qualification, private internal rates of return in a number of countries are higher than the real interest rate, often significantly. In these countries, human capital investment appears to be an attractive way for the average person to build wealth. In other countries there are weak incentives for investment in education. Furthermore, and with some exceptions, policies that eliminate (or reduce) the direct costs of education have only a modest impact on individuals' decisions to invest in mid-career learning.

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In many countries, private and social rates of return to investments in education are above the risk-free real interest rate.

In the majority of cases, the reported private and social internal rates of return are above – and in a number of countries significantly above – the risk-free real interest rate. However, returns on human capital accumulation are not risk-free, as indicated by the wide dispersion of earnings among the better educated. Therefore, individuals contemplating an investment in education are likely to require a compensating risk premium. However, in a number of countries, the size of the premium of the internal rates of return over the real interest rate is higher than would seem to be warranted by considerations of risk alone. A policy implication is that if returns to this form of investment are high relative to investments of similar risk there is some obstacle to individuals making the investment. High risk-adjusted private rates of return provide *prima facie* grounds for policy intervention to alleviate the relevant constraints.

High rates of return have more than one possible interpretation.

One interpretation of high rates of return is that they indicate a shortage of better-educated workers, driving up earnings for better-qualified workers. Such a situation might be temporary, with high returns to education eventually generating sufficient supply response to push the rates into line with returns to other productive assets. However, the adjustment period could be protracted and the speed of adjustment would depend largely on the capacity of the education system to respond to the derived increase in demand and the capacity of the labour market to absorb the changing relative supplies of labour. The rebalancing mechanism could be accelerated by making better information about the returns to different courses of study available to students, helping them to make more informed choices.

Part of the high returns may also be compatible with market equilibrium. This would be the case if the marginal rates are significantly lower than the average rates. The marginal rate would be lower than the average rate if the students at the margin are of lower ability and motivation than the average students, and thus unlikely to be able to command the average wage premium. According to this interpretation, the high internal rates of return would partly reflect economic rents on a scarce resource, namely ability and motivation. If the returns to education at the margin are lower, the case for public intervention to stimulate human capital accumulation is lessened if the quality of the marginal student cannot be improved. On the other hand, to the extent that the education system can improve cognitive and non-cognitive skills of young people, education policy could make a significant contribution to efficiency and equity in the longer run.

Definitions and methodologies

Earnings data in Table A11.1 are annual in Canada, the Czech Republic, Finland, Italy, the Netherlands, Norway, Spain, Sweden and the United States. Earnings are reported weekly in Australia, Ireland, New Zealand and the United Kingdom, and monthly in the remaining countries (although the reporting period for Denmark has not been indicated to the OECD Secretariat). In Hungary, Portugal and the United States, data cover the earnings of full-time employees only. Part-year and seasonal employment is also excluded in

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Hungary, Korea and Portugal. The French data exclude the self-employed, while earnings of business owners are omitted in France, Hungary, Ireland, Korea, the Netherlands, Portugal and Spain. Observed differences in relative earnings between countries therefore reflect variations not only in wage rates but also in coverage, in the number of weeks worked per year and in hours worked per week. Since lower educational attainment is associated with fewer hours of work (in particular with part-time work) and with less stable employment (more likelihood of temporary employment or more susceptibility to unemployment over the course of a year), the relative earnings shown for higher educational attainment in the tables and charts will be greater than what would be evident from an examination of relative rates of pay. The observed differences in relative earnings of males and females within a country can likewise be affected by some of these factors.

Earnings assumptions were made in calculating rates of return for an individual who recommences work, in mid-career, after having attained the next highest level of education. The assumptions concerned the immediate earnings increase (10%) and the time required for convergence with the average wage of individuals already holding the next highest level of educational qualification (3 years). These assumptions are somewhat *ad hoc*. Empirical evidence on the earnings of adults who return to work following part-time or full-time studies is scarce, especially for individuals attaining an upper secondary qualification. However, Canadian data indicate a convergence period of just two years for 30 to 49-year-olds who obtain a university degree, with a still shorter catch-up time for those who obtain a college certificate (OECD [2003], *Education Policy Analysis*, Paris). It should be noted, nevertheless, that the Canadian data are derived from a small sample of individuals and do not control for the fact that those who invested in education may differ in important ways – such as motivation and inherent ability – by comparison with those who did not.

For the methods employed for the calculation of the rates of return in Tables A11.4 to A11.7, see Annex 3 at *www.oecd.org/edu/eag2004*.

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Table A11.1a. Relative earnings of the population with income from employment (2002)

By level of educational attainment and gender for 25 to 64-year-olds and 30 to 44-year-olds (upper secondary education = 100)

			Below upper secondary education		Post-secondary non-tertiary education		Tertiary-type B education		Tertiary-type A and advanced research programmes		All tertiary education	
			25-64	30-44	25-64	30-44	25-64	30-44	25-64	30-44	25-64	30-44
OECD COUNTRIES												
Australia	2001	Males	85	83	m	m	116	108	160	157	145	141
		Females	85	84	m	m	114	119	159	168	142	151
		M+F	77	75	m	m	106	102	148	148	133	132
Belgium	2002	Males	91	97	c	c	116	120	144	149	132	136
		Females	84	83	c	c	124	124	168	185	140	146
		M+F	91	95	c	c	114	115	152	162	132	136
Canada	2001	Males	79	78	104	106	117	115	179	183	147	147
		Females	68	65	101	96	119	120	179	179	145	145
		M+F	79	78	105	105	115	113	177	178	143	142
Czech Republic	1999	Males	75	77	a	a	177	182	178	176	178	177
		Females	72	75	a	a	127	124	172	176	170	174
		M+F	68	70	a	a	151	151	180	182	179	181
Denmark	2001	Males	87	83	106	108	110	109	139	135	132	128
		Females	90	89	124	128	114	112	125	122	124	121
		M+F	87	85	118	120	114	113	127	123	125	121
Finland	2001	Males	92	89	m	m	129	125	190	180	163	155
		Females	98	94	m	m	126	124	172	167	146	141
		M+F	95	92	m	m	121	115	181	171	150	141
France	2002	Males	88	86	m	m	127	132	178	173	159	157
		Females	81	80	m	m	131	135	157	159	146	148
		M+F	84	84	m	m	125	129	167	165	150	150
Germany	2002	Males	85	87	110	110	117	113	156	152	142	137
		Females	75	72	132	136	117	112	157	153	142	138
		M+F	78	80	116	116	120	115	161	154	146	139
Hungary	2001	Males	81	81	140	137	205	182	252	253	252	253
		Females	77	80	128	124	143	128	180	174	179	174
		M+F	77	78	131	126	164	144	210	203	210	202
Ireland	2000	Males	82	77	79	60	117	123	143	140	135	133
		Females	64	61	94	78	132	126	181	155	161	144
		M+F	87	83	82	67	124	130	163	152	149	143
Italy	2000	Males	71	72	m	m	m	m	143	140	143	140
		Females	84	80	m	m	m	m	137	132	137	132
		M+F	78	77	m	m	m	m	138	133	138	133
Korea	1998	Males	88	90	m	m	105	109	143	136	132	129
		Females	69	75	m	m	118	138	160	181	141	164
		M+F	78	80	m	m	106	113	147	142	135	134
Netherlands	1997	Males	88	86	126	121	145	130	141	133	142	132
		Females	73	73	120	124	131	136	148	154	146	152
		M+F	85	84	121	119	139	131	144	139	144	138
New Zealand	2001	Males	76	74	m	m	m	m	130	122	130	122
		Females	72	72	m	m	m	m	136	135	136	135
		M+F	74	75	m	m	m	m	133	128	133	128
Norway	2002	Males	86	90	118	114	142	145	139	139	139	139
		Females	83	88	121	116	149	152	141	142	141	143
		M+F	85	91	125	121	155	152	135	135	137	136
Portugal	1999	Males	60	57	m	m	150	155	190	194	180	185
		Females	63	58	m	m	133	139	188	206	170	185
		M+F	62	58	m	m	141	146	192	202	178	187
Spain	2001	Males	79	82	m	m	99	97	157	135	138	122
		Females	64	65	m	m	86	88	136	138	125	126
		M+F	78	80	m	m	95	95	141	133	129	122
Sweden	2001	Males	87	86	128	134	114	114	158	162	146	149
		Females	88	85	108	111	116	109	139	137	130	126
		M+F	89	87	127	132	110	105	148	148	135	133
Switzerland	2003	Males	77	79	110	106	121	122	149	149	138	138
		Females	76	85	118	120	140	150	164	174	156	166
		M+F	76	81	112	111	141	146	168	170	158	161
United Kingdom	2001	Males	72	67	m	m	124	126	157	162	147	151
		Females	70	74	m	m	142	133	206	216	183	183
		M+F	67	68	m	m	128	124	174	181	159	161
United States	2002	Males	68	70	122	125	120	122	202	205	193	195
		Females	67	67	118	117	122	122	185	191	176	182
		M+F	71	71	120	121	118	118	195	196	186	187

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A11.1b. Differences in earnings between females and males (2002)

Average annual earnings of females as a percentage of average annual earnings of males, by level of educational attainment, 30 to 44 and 55 to 64 age groups

		Below upper secondary education		Upper secondary and post-secondary non-tertiary education		Tertiary-type B education		Tertiary-type A and advanced research programmes		All levels of education	
		30-44	55-64	30-44	55-64	30-44	55-64	30-44	55-64	30-44	55-64
OECD COUNTRIES											
Australia	2001	61	59	60	70	65	58	64	58	63	60
Belgium	2002	61	65	72	66	74	81	89	82	75	67
Canada	2001	50	60	59	70	63	57	59	55	61	62
Czech Republic	1999	66	58	67	64	45	62	67	63	63	61
Denmark	2001	76	68	71	70	73	74	64	64	72	67
Finland	2001	71	77	67	76	67	73	62	68	69	71
France	2002	70	65	76	72	78	68	69	66	76	62
Germany	2002	48	66	60	55	57	56	59	65	58	54
Hungary	2001	83	81	84	94	59	48	58	69	77	78
Ireland	2000	50	48	63	39	64	47	69	80	65	56
Italy	2000	79	78	72	53	m	m	67	83	77	69
Korea	1998	57	62	69	70	87	96	92	99	67	50
Netherlands	1997	46	43	55	50	57	39	63	50	55	45
New Zealand	2001	59	57	61	70	m	m	68	54	62	61
Norway	2002	60	62	61	63	65	66	63	62	64	61
Portugal	1999	72	70	70	67	63	57	75	68	73	66
Spain	2001	61	48	78	74	70	57	79	42	79	47
Sweden	2001	72	73	71	69	70	73	62	66	70	71
Switzerland	2003	53	47	50	51	61	51	58	59	50	46
United Kingdom	2001	55	43	50	53	53	81	66	66	54	54
United States	2001	59	65	61	61	62	69	58	59	61	58

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A11.2. Trends in relative earnings: adult population (1997-2002)

By educational attainment, for 25 to 64-year-old population (upper secondary and post-secondary non-tertiary education = 100)

OECD COUNTRIES		1997	1998	1999	2000	2001	2002
Australia	Below upper secondary	79	m	80	m	77	m
	Tertiary education	124	m	134	m	133	m
Belgium	Below upper secondary	m	m	m	92	m	91
	Tertiary education	m	m	m	128	m	132
Canada	Below upper secondary	84	78	80	80	78	m
	Tertiary education	127	138	136	140	141	m
Czech Republic	Below upper secondary	68	68	68	m	m	m
	Tertiary education	179	179	179	m	m	m
Denmark	Below upper secondary	85	86	86	m	87	m
	Tertiary education	123	124	124	m	124	m
Finland	Below upper secondary	97	96	96	m	95	m
	Tertiary education	148	148	153	m	150	m
France	Below upper secondary	84	84	84	m	m	84
	Tertiary education	149	150	150	m	m	150
Germany	Below upper secondary	81	78	79	75	m	77
	Tertiary education	134	130	135	143	m	143
Hungary	Below upper secondary	68	68	70	71	71	m
	Tertiary education	179	184	200	194	194	m
Ireland	Below upper secondary	75	79	m	89	m	m
	Tertiary education	146	142	m	153	m	m
Italy	Below upper secondary	m	58	m	78	m	m
	Tertiary education	m	127	m	138	m	m
Korea	Below upper secondary	m	78	m	m	m	m
	Tertiary education	m	135	m	m	m	m
Netherlands	Below upper secondary	83	m	m	m	m	m
	Tertiary education	141	m	m	m	m	m
New Zealand	Below upper secondary	77	76	76	74	74	m
	Tertiary education	148	136	139	133	133	m
Norway	Below upper secondary	85	84	84	m	m	84
	Tertiary education	138	132	133	m	m	135
Portugal	Below upper secondary	62	62	62	m	m	m
	Tertiary education	176	177	178	m	m	m
Spain	Below upper secondary	76	80	m	m	78	m
	Tertiary education	149	144	m	m	129	m
Sweden	Below upper secondary	90	89	89	m	86	m
	Tertiary education	129	130	131	m	131	m
Switzerland	Below upper secondary	74	75	76	78	m	77
	Tertiary education	152	153	151	157	m	156
United Kingdom	Below upper secondary	64	65	65	67	67	m
	Tertiary education	153	157	159	159	159	m
United States	Below upper secondary	70	67	65	65	m	66
	Tertiary education	168	173	166	172	m	172
Country mean	***Below upper secondary***	***78***	***76***	***77***	***77***	***79***	***80***
	Tertiary education	***148***	***148***	***151***	***152***	***144***	***148***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A11.2a. Trends in relative earnings: male population (1997-2002)

By educational attainment, for 25 to 64-year-old males (upper secondary and post-secondary non-tertiary education = 100)

		1997	1998	1999	2000	2001	2002
OECD COUNTRIES							
Australia	Below upper secondary	87	m	86	m	85	m
	Tertiary education	136	m	139	m	145	m
Belgium	Below upper secondary	m	m	m	93	m	92
	Tertiary education	m	m	m	128	m	132
Canada	Below upper secondary	85	78	80	81	78	m
	Tertiary education	127	140	138	144	145	m
Czech Republic	Below upper secondary	75	75	75	m	m	m
	Tertiary education	178	178	178	m	m	m
Denmark	Below upper secondary	86	87	87	m	87	m
	Tertiary education	130	132	133	m	132	m
Finland	Below upper secondary	94	93	93	m	92	m
	Tertiary education	159	159	167	m	163	m
France	Below upper secondary	88	88	88	m	m	88
	Tertiary education	158	159	159	m	m	159
Germany	Below upper secondary	88	77	80	80	m	84
	Tertiary education	130	126	138	141	m	140
Hungary	Below upper secondary	74	72	73	75	75	m
	Tertiary education	213	218	238	232	232	m
Ireland	Below upper secondary	72	78	m	84	m	m
	Tertiary education	131	131	m	138	m	m
Italy	Below upper secondary	m	54	m	71	m	m
	Tertiary education	m	138	m	143	m	m
Korea	Below upper secondary	m	88	m	m	m	m
	Tertiary education	m	132	m	m	m	m
Netherlands	Below upper secondary	86	m	m	m	m	m
	Tertiary education	139	m	m	m	m	m
New Zealand	Below upper secondary	82	76	76	76	76	m
	Tertiary education	148	137	140	130	130	m
Norway	Below upper secondary	85	85	85	m	m	84
	Tertiary education	138	133	135	m	m	138
Portugal	Below upper secondary	60	61	60	m	m	m
	Tertiary education	178	178	180	m	m	m
Spain	Below upper secondary	78	82	m	m	79	m
	Tertiary education	154	152	m	m	138	m
Sweden	Below upper secondary	88	87	87	m	84	m
	Tertiary education	135	136	138	m	141	m
Switzerland	Below upper secondary	81	81	80	81	m	78
	Tertiary education	134	135	134	139	m	136
United Kingdom	Below upper secondary	73	73	72	72	72	m
	Tertiary education	147	149	150	147	147	m
United States	Below upper secondary	69	65	63	64	m	63
	Tertiary education	168	176	167	178	m	178
Country mean	***Below upper secondary***	***81***	***78***	***79***	***78***	***81***	***82***
	Tertiary education	***150***	***151***	***156***	***152***	***153***	***147***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A11.2b. Trends in relative earnings: female population (1997-2002)

By educational attainment, for 25 to 64-year-old females (upper secondary and post-secondary non-tertiary education = 100)

OECD COUNTRIES		1997	1998	1999	2000	2001	2002
Australia	Below upper secondary	85	m	89	m	85	m
	Tertiary education	137	m	146	m	142	m
Belgium	Below upper secondary	m	m	m	82	m	83
	Tertiary education	m	m	m	132	m	140
Canada	Below upper secondary	75	68	70	70	68	m
	Tertiary education	132	144	140	140	145	m
Czech Republic	Below upper secondary	72	72	72	m	m	m
	Tertiary education	170	170	170	m	m	m
Denmark	Below upper secondary	88	89	90	m	90	m
	Tertiary education	122	124	123	m	124	m
Finland	Below upper secondary	100	99	99	m	98	m
	Tertiary education	143	143	145	m	146	m
France	Below upper secondary	80	79	79	m	m	81
	Tertiary education	146	145	145	m	m	146
Germany	Below upper secondary	88	86	83	72	m	73
	Tertiary education	131	130	123	137	m	137
Hungary	Below upper secondary	66	67	68	71	71	m
	Tertiary education	154	159	167	164	164	m
Ireland	Below upper secondary	57	59	m	65	m	m
	Tertiary education	156	145	m	163	m	m
Italy	Below upper secondary	m	61	m	84	m	m
	Tertiary education	m	115	m	137	m	m
Korea	Below upper secondary	m	69	m	m	m	m
	Tertiary education	m	141	m	m	m	m
Netherlands	Below upper secondary	71	m	m	m	m	m
	Tertiary education	143	m	m	m	m	m
New Zealand	Below upper secondary	69	74	75	72	72	m
	Tertiary education	143	129	129	136	136	m
Norway	Below upper secondary	84	84	83	m	m	83
	Tertiary education	140	136	135	m	m	140
Portugal	Below upper secondary	62	62	63	m	m	m
	Tertiary education	168	171	170	m	m	m
Spain	Below upper secondary	64	66	m	m	64	m
	Tertiary education	145	137	m	m	125	m
Sweden	Below upper secondary	89	89	88	m	87	m
	Tertiary education	125	125	126	m	129	m
Switzerland	Below upper secondary	74	73	72	73	m	74
	Tertiary education	146	145	142	150	m	151
United Kingdom	Below upper secondary	64	68	69	70	70	m
	Tertiary education	167	173	178	183	183	m
United States	Below upper secondary	62	63	61	62	m	63
	Tertiary education	166	163	163	164	m	165
Country mean	***Below upper secondary***	***75***	***74***	***77***	***72***	***78***	***76***
	Tertiary education	***146***	***144***	***147***	***151***	***144***	***146***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A11.3. Trends in differences in earnings between females and males (1997-2002)

Average annual earnings of females as a percentage of average annual earnings of males, by level of educational attainment of 25 to 64-year-olds

		1997	1998	1999	2000	2001	2002
OECD COUNTRIES							
Australia	Below upper secondary	60	m	66	m	62	m
	Upper secondary and post-secondary non-tertiary	62	m	64	m	62	m
	Tertiary education	62	m	67	m	61	m
Belgium	Below upper secondary	m	m	m	64	m	65
	Upper secondary and post-secondary non-tertiary	m	m	m	72	m	72
	Tertiary education	m	m	m	74	m	76
Canada	Below upper secondary	54	53	53	53	53	m
	Upper secondary and post-secondary non-tertiary	61	61	61	62	61	m
	Tertiary education	64	62	62	60	61	m
Czech Republic	Below upper secondary	66	66	66	m	m	m
	Upper secondary and post-secondary non-tertiary	69	69	69	m	m	m
	Tertiary education	66	65	65	m	m	m
Denmark	Below upper secondary	73	73	73	m	74	m
	Upper secondary and post-secondary non-tertiary	72	71	71	m	71	m
	Tertiary education	68	66	66	m	67	m
Finland	Below upper secondary	78	77	77	m	76	m
	Upper secondary and post-secondary non-tertiary	74	72	72	m	71	m
	Tertiary education	66	65	62	m	63	m
France	Below upper secondary	68	68	68	m	m	70
	Upper secondary and post-secondary non-tertiary	75	75	75	m	m	77
	Tertiary education	69	69	69	m	m	70
Germany	Below upper secondary	63	74	70	56	m	53
	Upper secondary and post-secondary non-tertiary	64	67	68	63	m	61
	Tertiary education	63	68	60	61	m	60
Hungary	Below upper secondary	79	80	84	83	83	m
	Upper secondary and post-secondary non-tertiary	88	86	89	88	88	m
	Tertiary education	64	63	62	62	62	m
Ireland	Below upper secondary	46	48	m	46	m	m
	Upper secondary and post-secondary non-tertiary	59	63	m	60	m	m
	Tertiary education	70	70	m	71	m	m
Italy	Below upper secondary	m	70	m	76	m	m
	Upper secondary and post-secondary non-tertiary	m	62	m	65	m	m
	Tertiary education	m	52	m	62	m	m
Korea	Below upper secondary	m	56	m	m	m	m
	Upper secondary and post-secondary non-tertiary	m	70	m	m	m	m
	Tertiary education	m	75	m	m	m	m
Netherlands	Below upper secondary	46	m	m	m	m	m
	Upper secondary and post-secondary non-tertiary	56	m	m	m	m	m
	Tertiary education	57	m	m	m	m	m
New Zealand	Below upper secondary	52	61	65	61	61	m
	Upper secondary and post-secondary non-tertiary	62	63	67	64	64	m
	Tertiary education	60	59	61	67	67	m
Norway	Below upper secondary	60	60	61	m	m	61
	Upper secondary and post-secondary non-tertiary	61	61	62	m	m	63
	Tertiary education	63	62	62	m	m	64
Portugal	Below upper secondary	72	71	71	m	m	m
	Upper secondary and post-secondary non-tertiary	69	69	69	m	m	m
	Tertiary education	66	66	65	m	m	m
Spain	Below upper secondary	60	61	m	m	58	m
	Upper secondary and post-secondary non-tertiary	72	76	m	m	71	m
	Tertiary education	68	69	m	m	64	m
Sweden	Below upper secondary	73	74	74	m	74	m
	Upper secondary and post-secondary non-tertiary	72	72	73	m	71	m
	Tertiary education	67	66	67	m	65	m
Switzerland	Below upper secondary	51	51	53	51	m	51
	Upper secondary and post-secondary non-tertiary	55	57	58	57	m	53
	Tertiary education	60	61	62	62	m	59
United Kingdom	Below upper secondary	47	50	51	50	50	m
	Upper secondary and post-secondary non-tertiary	53	53	53	52	52	m
	Tertiary education	60	62	63	64	64	m
United States	Below upper secondary	53	60	59	59	m	63
	Upper secondary and post-secondary non-tertiary	59	62	61	60	m	63
	Tertiary education	59	58	59	56	m	58
Country mean	***Below upper secondary***	***61***	***64***	***66***	***60***	***66***	***60***
	Upper secondary and post-secondary non-tertiary	***66***	***67***	***67***	***64***	***68***	***65***
	Tertiary education	***64***	***64***	***64***	***64***	***64***	***65***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2004)*.

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Table A11.4. Private internal rates of return (RoR) for individuals obtaining an upper secondary or post-secondary non-tertiary education (ISCED 3/4) from a lower secondary level of education (ISCED 0/1/2) (2001)

	RoR when the individual immediately acquires the next higher level of education		RoR when the individual, at age 40, begins the next higher level of education in full-time studies, and the individual bears…			
			direct costs and foregone earnings		no direct costs, but foregone earnings	
	Males	Females	Males	Females	Males	Females
Australia	40.0	40.0	(2)	-17.7	(2)	-17.5
Denmark	(1)	(1)	1.7	1.4	1.8	1.4
Finland	(1)	(1)	(2)	(2)	(2)	(2)
Hungary	97.2	74.9	9.9	12.9	10.3	13.3
Spain	11.5	20.6	11.6	16.8	11.9	17.5
Sweden	(1)	(1)	-1.3	-4.7	-1.3	-4.7
Switzerland	47.5	50.7	4.4	6.5	5.6	9.2
United Kingdom	60.5	73.0	6.7	6.4	7.5	7.5
United States	92.7	98.1	14.3	13.7	14.8	14.6

(1) Negligible or zero costs cause excessively high estimates.
(2) Negative benefits owing to tax effects cause excessively low estimates.
Source: OECD. See Annex 3 for notes (*www.oecd.org/edu/eag2004*).

Table A11.5. Private internal rates of return (RoR) for individuals obtaining a tertiary-level degree or an advanced research qualification (ISCED 5 (A, B)/6) from an upper secondary or post-secondary non-tertiary level of education (ISCED 3/4) (2001)

	RoR when the individual immediately acquires the next higher level of education		RoR when the individual, at age 40, begins the next higher level of education in full-time studies, and the individual bears…			
			direct costs and foregone earnings		no direct costs, but foregone earnings	
	Males	Females	Males	Females	Males	Females
Australia	6.6	6.5	3.3	-0.8	5.4	2.7
Denmark	6.7	6.1	4.9	3.0	5.0	3.1
Finland	14.2	15.2	10.6	8.1	10.8	8.4
Hungary	19.8	11.3	16.4	8.7	18.7	10.8
Spain	9.2	8.5	11.2	8.2	12.1	9.7
Sweden	8.8	7.3	6.9	4.5	7.6	5.4
Switzerland	9.8	7.8	a	a	6.3	9.1
United Kingdom	11.2	13.7	4.0	9.9	4.9	12.1
United States	11.0	7.9	7.4	2.7	11.9	8.6

Source: OECD. See Annex 3 for notes (*www.oecd.org/edu/eag2004*).

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Table A11.6. Social internal rates of return (RoR) for individuals obtaining an upper secondary or post-secondary non-tertiary education (ISCED 3/4) from a lower secondary level of education (ISCED 0/1/2) (2001)

	RoR when the individual immediately acquires the next higher level of education		RoR when the individual, at age 40, begins the next higher level of education in full-time studies		RoR when the individual returns, at age 40, to acquire the next higher level of education in part-time studies (duration is doubled)	
	Males	Females	Males	Females	Males	Females
Australia	20.8	17.4	-0.5	-1.1	10.8	5.4
Denmark	18.8	14.6	-1.3	-1.9	2.2	0.0
Finland	22.9	16.1	-5.5	-3.9	-1.5	-1.7
Hungary	21.5	17.4	8.6	10.7	11.2	12.4
Spain	10.4	12.6	11.7	14.2	17.4	15.2
Sweden	40.4	33.3	3.8	1.7	12.7	7.6
Switzerland	20.3	21.1	3.6	4.0	6.1	2.9
United Kingdom	21.6	22.0	6.5	4.9	9.7	5.0
United States	22.3	21.9	13.6	10.9	16.3	9.5

Source: OECD. See Annex 3 for notes (*www.oecd.org/edu/eag2004*).

Table A11.7. Social internal rates of return (RoR) for individuals obtaining a tertiary-level degree or an advanced research qualification (ISCED 5 (A, B)/6) from an upper secondary or post-secondary non-tertiary level of education (ISCED 3/4) (2001)

	RoR when the individual immediately acquires the next higher level of education		RoR when the individual, at age 40, begins the next higher level of education in full-time studies		RoR when the individual returns, at age 40, to acquire the next higher level of education in part-time studies (duration is doubled)	
	Males	Females	Males	Females	Males	Females
Australia	8.3	7.6	5.5	1.7	6.9	-0.1
Denmark	4.9	3.5	2.7	0.2	3.6	-0.5
Finland	10.5	8.7	8.6	5.4	8.9	4.3
Hungary	16.1	9.1	13.4	6.6	11.6	5.1
Spain	8.1	6.7	10.2	6.2	12.3	4.9
Sweden	8.2	6.5	6.5	3.9	12.7	7.6
Switzerland	6.7	4.9	a	a	4.6	1.8
United Kingdom	12.6	13.7	6.2	10.3	11.8	10.9
United States	11.1	7.9	8.0	3.2	7.3	0.8

Source: OECD. See Annex 3 for notes (*www.oecd.org/edu/eag2004*).

INDICATOR A12: THE RETURNS TO EDUCATION: LINKS BETWEEN HUMAN CAPITAL AND ECONOMIC GROWTH

- Recent analyses of human capital across 14 OECD economies – based on literacy scores – suggest significant positive effects on growth.
- An analysis by the OECD Secretariat of the causes of economic growth shows that rising labour productivity accounted for at least half of GDP per capita growth in most OECD countries over the period 1990-2000.
- Increases in the stock of human capital raise labour productivity, and also serve as a driver of technological progress.
- The estimated long-run effect on economic output of one additional year of education in the OECD area generally falls between 3 and 6%.

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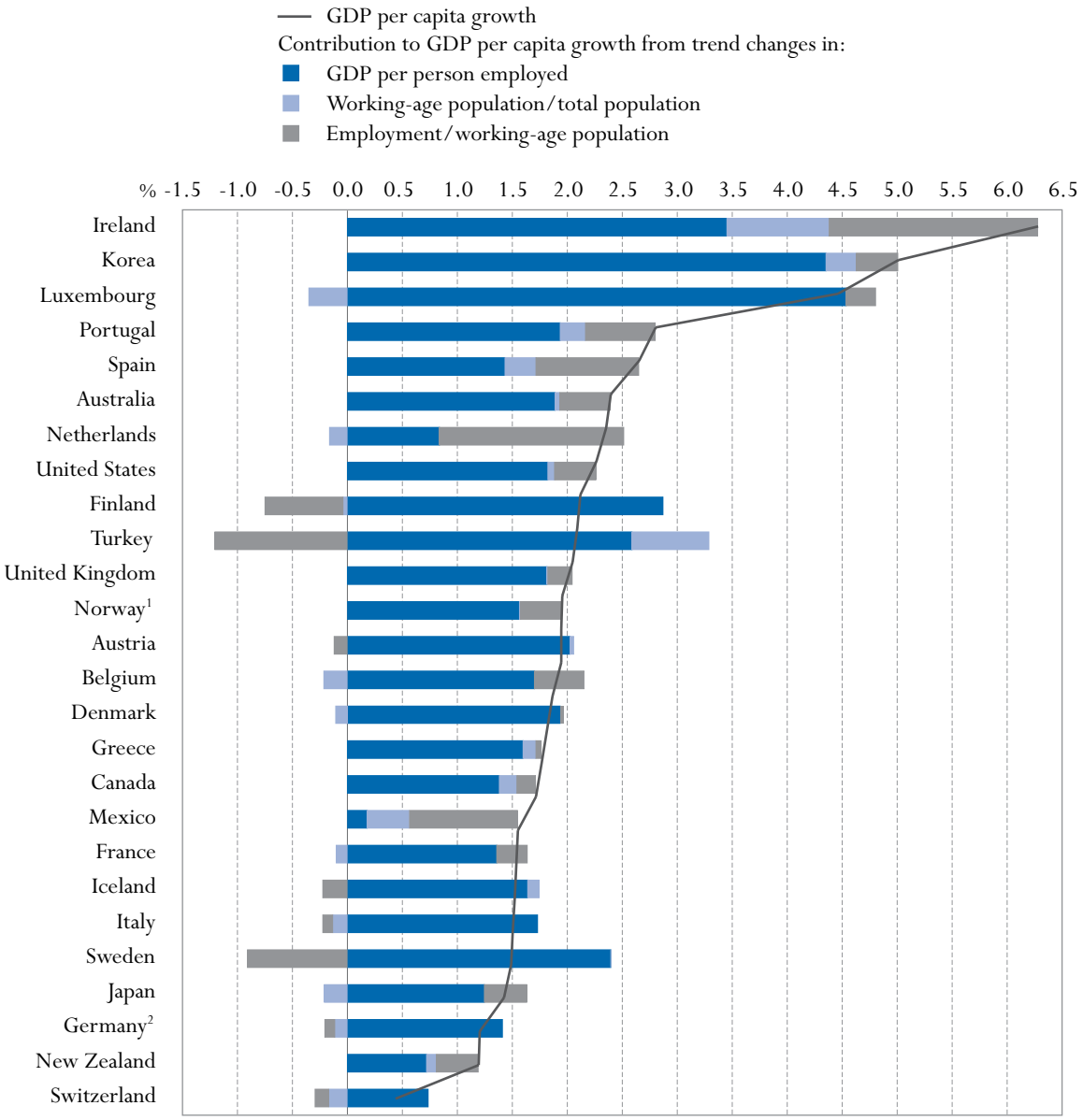
Chart A12.1. The driving forces of GDP per capita growth (1990-2000)

Trend series, average annual percentage change



1. Mainland only.
2. Years of reference 1991-2000.

Countries are ranked in descending order of GDP per capita growth.

Source: OECD.

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Policy context

This indicator estimates the effect of changes in explanatory variables, including human capital, on changes in output per capita.

Since the mid-1980s, economic growth has occupied centre-stage in macroeconomic research (see Box A12.1). Research has gained impetus from new theoretical insights – in particular new-growth theory – and new approaches to the empirics of growth. "Human capital" – the knowledge and skills embodied in workers – has been critical to renewed thinking about growth. Significant differences among OECD member countries in their recent macroeconomic performance have also spurred interest in the causes of growth. Such differences were a principal motivation for the development of the "OECD Growth Project". *Education at a Glance 2003* reported key findings from the OECD Growth Project. This work drew attention to the importance for growth of stable and conducive macroeconomic conditions, as well as institutional structures and policy settings that favour competition and flexibility in capital and labour markets. Growth prospects were also shown to be strongly affected by the development of new technologies and the dissemination of innovations and technological change. A central element in all of this is human capital. This indicator focuses on the role of human capital as a determinant of the level and rate of growth of output per capita. The indicator complements Indicator A11, which examines the relationship between human capital and economic returns at the individual level. While Indicator A11 examines what happens to the earnings of an individual as his or her level of schooling rises, Indicator A12 seeks to capture the effects of changes in a country's overall stock of human capital on labour productivity, holding the aggregate stock of physical capital constant.

This indicator should be interpreted in conjunction with the individual returns to education examined in Indicator A11.

Comparisons of micro-level estimates of returns to education (such as those portrayed in Indicator A11) and macro-econometric estimates as reflected in this indicator, are potentially of great policy relevance because discrepancies between them can point to differences in the private and public returns to schooling that may call for corrective policy action. For instance, following a rise in school attainment, if productivity at the aggregate level of the economy is raised in ways additional to the increases in productivity of each worker, then the first of these effects will constitute an externality. This externality will generate a tendency for underinvestment in education because individuals will fail to take into account the indirect social benefits that can arise from their schooling choices. In this context, micro-econometric estimates of wage equations with individual cross-section data for a given country only pick up the effects on individuals of schooling, whereas macro-econometric estimates with cross-country data should also capture the social externality.

Evidence and explanations

During the 1990s, productivity accelerated in some countries but slowed in others.

Reporting on the Growth Project findings, *Education at a Glance 2003* noted that in 2000 most OECD countries lagged behind per capita GDP in the United States by 25-35 percentage points. For each country, productivity differences were broken down into three components: demographic effect, labour utilisation and labour productivity. The demographic effect refers to the ratio of the working age population to total population, and in most countries accounted

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for only a minor part of productivity differences relative to the United States. Analysis of the utilisation of available labour (employment rates combined with hours worked) showed a number of countries (*e.g.* the United States and Japan) with high employment rates and higher than average hours worked. While most of the Nordic countries had higher employment rates, this was offset by fewer hours worked. In some countries that combined low employment rates with relatively low hours (*e.g.* Belgium, France, Italy, the Netherlands), almost all of the gap between their per capita GDP and that of the United States was attributable to lower labour utilisation. Labour utilisation is therefore an important factor in accounting for differences in GDP per capita across countries. Of the 25 countries for which data were available, only five (Belgium, Ireland, Italy, the Netherlands and Norway) surpassed the United States in terms of labour productivity (GDP per hour worked). For a number of countries in which labour utilisation was relatively high (such as the Czech Republic, Iceland, Japan, Korea, Mexico and New Zealand), differences in GDP per capita as compared to the United States were attributable principally to a significantly lower level of labour productivity.

Demography had a significant impact on growth in only a few countries during the 1990s…

Illustrating the relative importance of the key drivers of growth in GDP per capita over the years 1990 to 2000, Chart A12.1 shows that, for most OECD countries, demographic change had a relatively minor impact. The only countries where demographic change made a positive and significant contribution to growth in GDP per capita were Ireland, Korea, Mexico and Turkey. However, in some OECD countries (such as Belgium, Denmark, France, Italy, Japan, Germany, Luxembourg, the Netherlands and Switzerland) demographic trends have begun (in this accounting sense) to act as a slight drag on growth in GDP per capita. This tendency is set to strengthen in the future as the total population ages more rapidly.

…while rising labour productivity accounted for at least half of growth in per capita GDP in most OECD economies.

Chart A12.1 shows that rising labour productivity accounted for at least half of GDP per capita growth in most OECD countries over the 1990s. Indeed, in a number of countries, growth in labour productivity produced almost all of the increase in GDP per capita (this includes Austria, Denmark, Finland, Germany, Greece, Italy, Korea, Luxembourg, Sweden and the United Kingdom). Since hours worked fell in most countries during the 1990s, especially in continental Europe, labour productivity growth was higher on an hourly basis than when measured on a head-count basis. Declines in hours worked were a reflection of both shorter statutory (or collectively agreed) working weeks as well as, especially in a number of European countries, a substantial increase in part-time work. Changes in productivity trends were accompanied by different employment patterns across countries. For instance, among the G-7 economies, significant employment increases in the United States (as well as in Canada and Japan, with no acceleration in productivity) contrasted sharply with employment declines in Germany and Italy.

Box A12.1. Estimating the macroeconomic returns to education

A large body of empirical research has confirmed a positive link between education and productivity. Better educated employees are generally more productive, and may raise the productivity of co-workers. Higher stocks of human capital facilitate investments in physical capital and enhance the development and diffusion of new technologies. A range of indirect benefits from education are also likely to have positive economic consequences. For instance, greater education is associated with superior health status, lower risks of unemployment, reduced crime, more social cohesion and higher levels of political participation. Knowing the macroeconomic returns to education is important for policy making. Accurate assessment of macroeconomic returns can identify externalities associated with education. Such externalities provide a necessary rationale for public action. Knowledge of the macroeconomic returns to education can also indicate whether investment in human capital represents a better use of public resources than investment in alternative assets. Furthermore, the education-growth nexus is of increasing importance in the contemporary context of rapid technological change.

Studies of the macroeconomic returns to education are methodologically diverse and based on two broad theoretical approaches. The first, a neo-classical approach, models the relationship between the stock of education and the long-run level of GDP. Most studies follow this tradition. A second approach derives from "new-growth" theory and models the relationship between the stock of education and the rate of growth of GDP. Whether increases in the stock of education primarily affect the level of output, or its growth rate, is still unclear. Concerning the magnitude of the returns, the available studies indicate that in the neo-classical models a one-year increase in average education raises the level of output per capita by between 3 and 6%. Studies of the "new-growth" variety find that the same increase in average education raises the rate of growth of output by around 1%. The two theoretical approaches yield results that differ significantly in magnitude over the medium- to long-term, because the absolute effect on output of a cumulative 1% increase in the rate of growth soon exceeds a once-only increment to the level of output of even 6% (the upper bound). However, over a period of a few years the absolute size of the predicted effects on output is comparable in both theoretical frameworks.

Various conceptual and methodological hurdles have hindered the estimation of education's impact on growth. A central issue relates to the direction of causality in the growth relationship: does education spur growth, or does growth cause individuals to consume more education? In practice, it is likely that causality operates in both directions. In a related manner, efficiency in producing educational outputs may simply be associated with efficiency in other areas of the economy as well. The results of many studies have also been weakened by data deficiencies. For instance, low correlations have been observed between measures of education from some key sources of educational data. Furthermore, growth studies have relied on a variety of proxies for human capital, such as average years of education, adult literacy rates and school enrolment ratios (and different studies have used a variety of dependent variables). Such proxies pose a number of difficulties. For instance, they include formal education only, omitting the skills and competencies acquired through on-the-job training, experience and other channels, as well as the loss of skills caused, for instance, by disuse. Similarly, adult literacy rates capture only one dimension of human capital,

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omitting such competencies as numeracy and technical knowledge. And variations in the quality of education systems mean that indicators of educational attainment are often not fully comparable across countries.* Indeed, different specifications of human capital lead to major divergences in estimates of the stock of human capital across countries. Different types of education can also be expected to have varied impacts on growth: a cohort of graduates in engineering disciplines is likely to affect productivity in different ways than a similar-sized cohort of graduates in the arts. But this differential effect is not captured in the usual aggregated proxies of human capital. And there is confusion in some studies as to whether school enrolment rates are intended to serve as a stock or flow measure of investment in human capital.

Cross-country growth regressions also usually assume that the impact of education is linear, and constant across countries. However, research suggests that the assumption of constant growth effects of education across countries is unfounded. There is also evidence of diminishing effects on growth above an average of 7.5 years of education (see "Definitions and methodologies"). This is well below the average years of education across the OECD as a whole (in 1998, this was 11.3 years, across 20 OECD member countries for which data were available).

Much remains uncertain in education-growth research. As noted above, it is still unclear whether education and increases in the stock of human capital affect the level of GDP or its growth rate. Policy-relevant issues that could be addressed by further research include:

- how is growth affected by investment in different stages of education (from pre-school to advanced tertiary education and work-related training)?
- after how many years, and at which levels of education, do diminishing growth returns become important?
- how is growth affected by investment in different types of education, such as engineering disciplines or the arts?
- how is growth affected by the quality of education?
- how, if at all, are growth effects from the expansion of one stage of education affected by the level of attainment achieved at an earlier stage?

* International surveys, such as the Adult Literacy and Life Skills survey, and the OECD's Programme for the International Assessment of Adult Competencies, now under development, can provide internationally comparable multidimensional indicators of skills.

Source: Sianesi, B. and J. Van Reenan (2003), "The Returns to Education: Macroeconomics", *The Journal of Economic Surveys*, Vol. 17, No. 2, pp. 157-200, and De la Fuente, A. and A. Ciccone (2003), *Human Capital in a Global and Knowledge-based Economy*, European Commission, DG for Employment and Social Affairs, Office for official publications of the European Communities, Luxembourg.

Labour productivity can be increased in a number of ways…

Labour productivity can be increased in several ways: by improving the quality of labour used in the production process, by increasing the use of capital per worker and improving its quality, or by attaining greater overall efficiency in how these factors of production are used together, which economists call multi-factor productivity. Multi-factor productivity reflects many types of effi-

ciency improvements, such as improved managerial practices and organisational changes, and innovations leading to more valuable output being produced with a given combination of capital and labour. The skills and competencies embodied in workers – or human capital – play a fundamental role in raising labour productivity. Rising levels of educational attainment among workers over the 1990s is only one sign of this role. Increases in the level of post-educational skills may be even more important, although few hard measures are available. Consequently, as a variety of empirical studies have found (see Boxes A12.1 and A12.2), human capital is a significant determinant of economic growth. The OECD Growth Project estimated that in the OECD area, the long-run effect on output of one additional year of education in the adult population generally falls between 3 and 6%.

…and human capital plays a key role in raising output per worker…

Chart A12.2 shows that growth in output per employed person is partly attributable to increases in the human capital of those in employment. The chart displays the impact of changes in the average human capital of workers on growth in cyclically adjusted GDP per hour worked. Essentially, the chart decomposes average annual percentage changes in GDP per capita over the period 1990 to 2000 into three components: *i)* changes in average hours worked, *ii)* changes in average years of formal education (used here as a proxy for changes in the quality of labour), and *iii)* changes in the hourly GDP per efficient unit of labour, which is equivalent to changes in GDP per worker once changes in working hours and changes in the average quality of labour are accounted for. The latter is based on a measure of labour input that sums up shares of workers with different levels of formal education, each weighted by their relative wage. Two assumptions underlie this

Box A12.2. Literacy and growth in 14 OECD member countries

Recent research has sought to estimate the relationship between human-capital and economic growth using a direct measure of human capital based on internationally comparable literacy scores. This approach goes some way to avoiding the problem of the imperfect comparability of measures of educational attainment across different national education systems. The literacy measures were obtained from the 1994 International Adult Literacy Survey (IALS). IALS tested the skills of individuals aged between 16 and 64 in prose, quantitative and document literacy. The data cover 14 countries, all members of the OECD. Using these survey findings, a synthetic time series was constructed for the period 1960-1995. The literacy results of individuals aged 17 to 25 in a given period were then used as proxies for investment in human capital during the previous period (the authors note that the imputation of literacy skills early in life, based on data collected in adulthood, requires adjustment for the changes in human capital that occur over the life-cycle. This adjustment was not made, and represents a disadvantage of this synthetic indicator in comparison to indicators of schooling. However, the procedure used to remove mean values from the cross-sectional data would afford the required adjustment, if the process of adjustment in human capital over the life-cycle is homogeneous across countries). Time series and cross-country information was pooled in a panel data set. The authors note that the non-inclusion of information on immigration flows in this indicator is a weakness.

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The research indicates that literacy scores, as a direct measure of human capital, perform better in growth regressions than indicators of schooling. A country able to attain literacy scores 1% higher than the international average will achieve levels of labour productivity and GDP per capita that are 2.5% and 1.5% higher, respectively, than other countries. The authors offer two explanations as to why literacy data should contain more information on the relative well-being of nations than data on years of schooling. One is that literacy might be a superior measure of some key driver of growth, such as social infrastructure. Another is that data on literacy skills might be more comparable across countries than data on years of schooling. To assess these interpretations, the authors propose future research using both indicators of human capital to compare growth effects across regions within a given country. This could help to surmount problems of imperfect international comparability. The relative performance of the two indicators would reveal which performed best as a measure of human capital and which was most closely associated with economic growth.

Measures based on average literacy scores across all individuals were shown to serve as much better indicators of aggregate human capital than measures based on the share of individuals attaining high levels of literacy. This finding is in line with the idea that the principal impact of education on growth is to raise the productivity of the workforce as a whole, rather than to increase the number of individuals able to bring about radical innovations. A striking finding was that increases in literacy skills among women have a much larger effect on growth than increases in literacy among men. Various possible explanations for this finding were advanced: investment in the education of women may have been provided to particularly high-ability individuals who were previously held back by social barriers; the rate of return to education among women may have been high owing to low initial levels of literacy; increased education might allow a reallocation of male and female labour across occupations, allowing more men and women to subsequently work in occupations for which they have a comparative advantage; if male and female labour is not perfectly substitutable, increased education of women might be associated with a period of fast-growth rebalancing of the stock of human and physical capital prior to achieving a new steady state level; possible statistical effects stemming from greater variation in women's literacy scores across countries; and the fact that women's literacy could be associated with omitted variables that affect growth, such as a country's level of social development.

Source: Coulombe, S., J-F. Tremblay and S. Marchand (2004), *Literacy Scores, Human Capital and Growth Across 14 OECD Countries*, Statistics Canada and Human Resources and Skills Development Canada, Ottawa.

measure: educational attainment accounts for a good proportion of human capital embodied in workers, and relative wages provide a reasonable quantitative proxy for the relative productivity of workers with different levels of education.

During the decade 1990-2000, skill upgrading amongst workers was particularly marked in Europe, although it was accompanied by sluggish employment growth. Productivity gains were achieved in part by dismissals or by not employing workers with low skills. By contrast, in Australia, Canada, Denmark, the Netherlands, New Zealand, Norway, Sweden and the United States, skill upgrading played a modest role in GDP growth per employed person.

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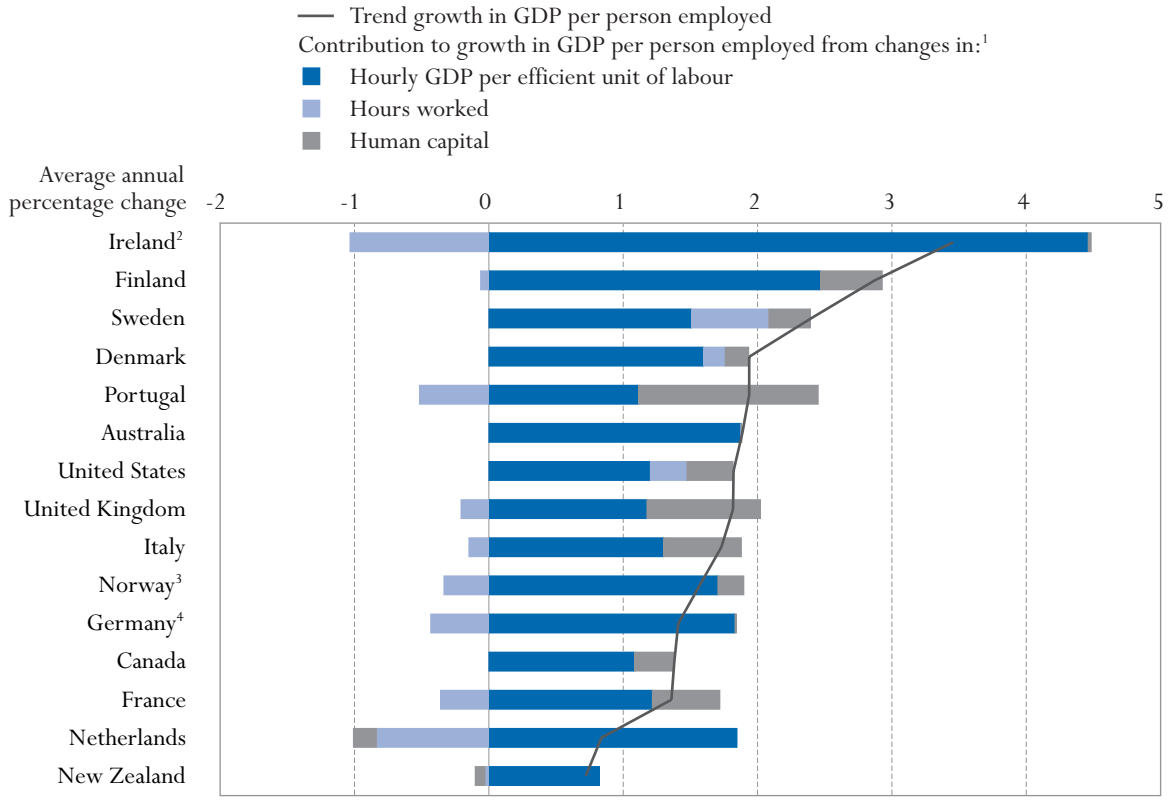
Chart A12.2. Enhancements in human capital contributing to labour productivity growth (1990-2000)



1. Based on the following decomposition: growth in GDP per person employed = (changes in hourly GDP per efficient unit of labour) + (changes in average hours worked) + (changes in human capital).
2. Years of reference 1990-1999.
3. Mainland only.
4. Years of reference 1991-2000.

Countries are ranked in descending order of trend growth in GDP per person employed.
Source: OECD.

…as well as being a determinant of the rate of technological progress.

One of the key economic roles of education is its impact on technological progress, which in turn affects output per worker. A key reason for the renewed interest in the productivity-enhancing role of human capital is that human capital complements new technologies. Skills and competencies are critical to the development, diffusion and effective adoption of new technologies. During the 1990s, in the OECD countries for which data are available, the rise in the number of knowledge workers (scientists, engineers and others, such as ICT specialists and technicians who generate knowledge) accounted for nearly 30% of recorded net employment growth. Wages have followed a similar pattern. For example, in the United States, wages among knowledge workers have risen much faster than wages of other occupations. Between 1985 and 1998, real earnings of knowledge-intensive workers grew by almost 17%, cumulatively, compared with 5.3% for the average employee in the United States. During the same period "goods-producing" occupations suffered a cut in their real earnings of nearly 2.5%.

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Box A12.3. Human capital and converging incomes across Canada's provinces

Many OECD economies exhibit marked geographic concentrations in economic well-being, labour market performance and key social desiderata. Reducing regional economic and social disparities is a policy priority for a number of OECD governments. In Canada, since the early 1950s, incomes and productivity have tended to converge, albeit gradually, across the country's provinces. Recent research has examined this process of convergence using a growth model that incorporates human capital. It was found that for the period 1951 to 1996, across Canada's provinces, roughly 50% of the differences in the growth of per capita income, and more than 80% of the relative income levels, can be explained in terms of convergence in the stocks of human capital. In this open-economy model, with perfect capital mobility, changes in the stock of human capital are seen to drive the accumulation of physical capital across provinces. The measure of human capital used is an index, based on census data, of the share of the population that has achieved given benchmark levels of education (growth and income effects were seen to be particularly sensitive to an indicator of advanced education). Some of the difficulties of using proxies for human capital are avoided in this work by taking relative measures of the human capital stock in a context of more or less homogeneous educational systems operating across subnational regions.

As noted by the authors, the explanatory power of the study might have been increased with the use of data on immigration and inter-regional redistribution. Nevertheless, this research provides insights into why economic convergence can be slow, even within a national economy possessing integrated financial markets and no formal barriers to capital mobility. Because physical and human capital complement each other, regions lacking physical capital might face difficulties in attracting additional physical capital if their human-capital base is relatively underdeveloped. As older individuals have less of an incentive to invest in education than young people, regional convergence is slowed on account of the large numbers of less-educated older individuals who remain in poorer provinces. The authors estimate that convergence would have been up to two to three times faster had all persons invested in education at the same rate at which the young are making these investments. This work also affords an analytical framework for assessing the effects of redistributing public resources – from wealthy to less wealthy provinces – for the purpose of financing education.

Source: Coulombe, S. and J-F. Tremblay (2001), "Human Capital and Regional Convergence in Canada", *Journal of Economic Studies*, Vol. 28, No. 3, pp. 154-180.

Definitions and methodologies

Human capital was estimated on the basis of completed levels of education and average years of schooling at each level in the working-age population. This measure of human capital was derived from OECD data combined with data from De la Fuente, A. and Doménech, R. (2000), *Human Capital in Growth Regressions: How Much Difference does Data Quality Make?*, Economics Department Working Papers, No. 262., OECD, Paris. For further information on definitions, methods and sources see *The Sources of Economic Growth in OECD Countries* (OECD, 2003) and *The New Economy: Beyond the Hype* (OECD, 2001). The figures shown are as published in these reports and do not take account of the subsequent revisions that have been made to some countries' GDP data. These revisions do not, however, affect the general messages from the analysis.

In connection with Box A12.1, an assessment of how different specifications of human capital affect international comparative estimates of stocks of human capital is provided in Wösmann, L. (2003), "Specifying Human Capital", *Journal of Economic Surveys*, Vol. 17, No. 3, pp. 239-270. Evidence that the growth effects of education are not constant across countries, and diminish above an average of 7.5 years of education, is provided in Krueger, A.B. and Lindhal, M. (2001), "Education and Growth: Why and for Whom?", *Journal of Economic Literature*, Vol. XXXIX, pp. 1101-1136.

CONTRIBUTORS TO THIS PUBLICATION

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