Chapter

A

THE OUTPUT OF EDUCATIONAL INSTITUTIONS AND THE IMPACT OF LEARNING

A

OVERVIEW

Chapter A examines the outcomes of education and learning, in terms of…

…the current output of educational institutions and educational attainment of the adult population,…

…the quality of learning outcomes and how this varies among schools and students,…

A

Indicator A9: Engagement in reading of 15-year-olds

Indicator A10: Fifteen-year-olds' self-regulated learning

Indicator A11: Gender differences in student performance

…and the returns to education for individuals and society.

Indicator A12: Labour force participation by level of educational attainment

Indicator A13: Expected years in education, employment and non-employment between the ages of 15 and 29

Indicator A14: Earnings and educational attainment

Indicator A15: The returns to education: Links between human capital and economic growth

INDICATOR A1: CURRENT UPPER SECONDARY GRADUATION RATES AND ATTAINMENT OF THE ADULT POPULATION

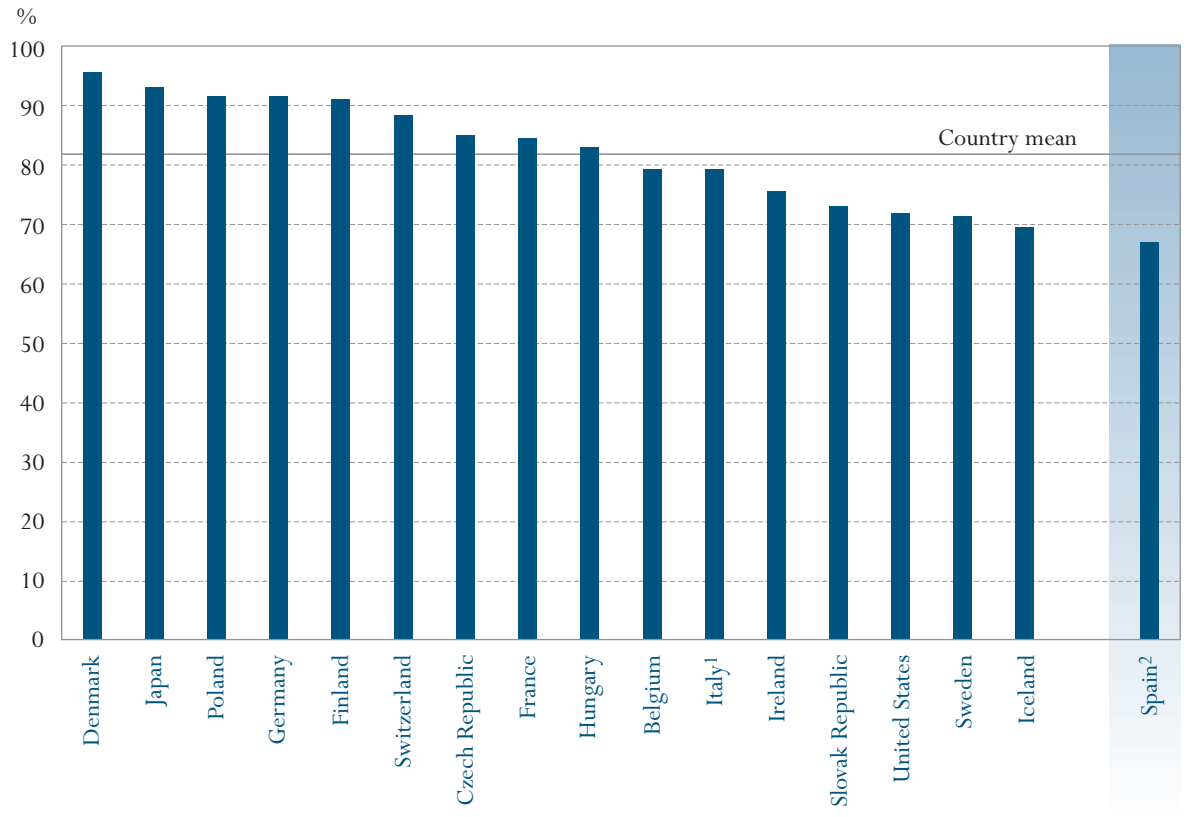
A1

- In 15 out of 17 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 per cent. In Denmark, Finland, Germany, Japan and Poland, graduation rates exceed 90 per cent. The challenge now is to ensure that the remaining fraction is not left behind, with the risk of social exclusion that this may entail.
- Comparing the 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 not completed upper secondary education has been shrinking in almost all OECD countries, and in some rapidly. Many countries with traditionally low levels of education are catching up.
- Among older age groups, females have lower levels of education than males, but for younger people the pattern has reversed and today, graduation rates for females exceed those for males in most countries.

Chart A1.1

Upper secondary graduation rates (2001)

Ratio of unduplicated count of all upper secondary graduates to population at typical age of graduation



1. Year of reference 2000.
2. A significant proportion of the youth cohort is not covered by this indicator.

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

Source: OECD. Table A1.1. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A1

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 A12 to A15).

…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 follow and successfully complete 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 between different generations one can identify the evolution of education levels within the population, reflecting both changing demands of the labour market and changing educational policies.

Evidence and explanations

In 15 out of 17 OECD countries with comparable data, upper secondary graduation rates exceed 70 per cent…

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 modal or typical graduation ages, and older students (*e.g.*, those in "second chance" programmes). In 15 OECD countries with comparable data, upper secondary graduation rates exceed 70 per cent (Chart A1.1).

…and in Denmark, Finland, Germany, Japan and Poland exceed 90 per cent.

In five of the 17 countries for which comparable numbers of graduates are available, graduation rates exceed 90 per cent (Denmark, Finland, Germany, Japan and Poland). Caution should be used in interpreting the graduation rates displayed in Chart A1.1 for Spain where the length of secondary programmes was recently extended, which leads to an underestimation of graduation rates.

Upper secondary attainment levels have increased in almost all countries…

A comparison of the levels of educational attainment between older and younger age groups indicates marked progress with regard to the percentage of the population graduating from upper secondary education (Chart A1.2). On average, only 60 per cent of 45 to 54 year-olds has attained upper secondary level of education, compared to 74 per cent of 25 to 34 year-olds.

This is especially striking in countries whose adult population generally has a lower attainment level. In younger age groups, differences among countries in the level of educational attainment are less pronounced. As a result, many countries currently showing low attainment in the adult population are expected to move closer to those with higher attainment levels. In Korea, Portugal and Spain, the proportion of individuals aged 25 to 34 with at least upper secondary attainment is around twice as high as that in the age group 45 to 54. Improvement is significant as well in Belgium, France, Greece and Ireland, while progress remains slow in Mexico and Turkey.

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

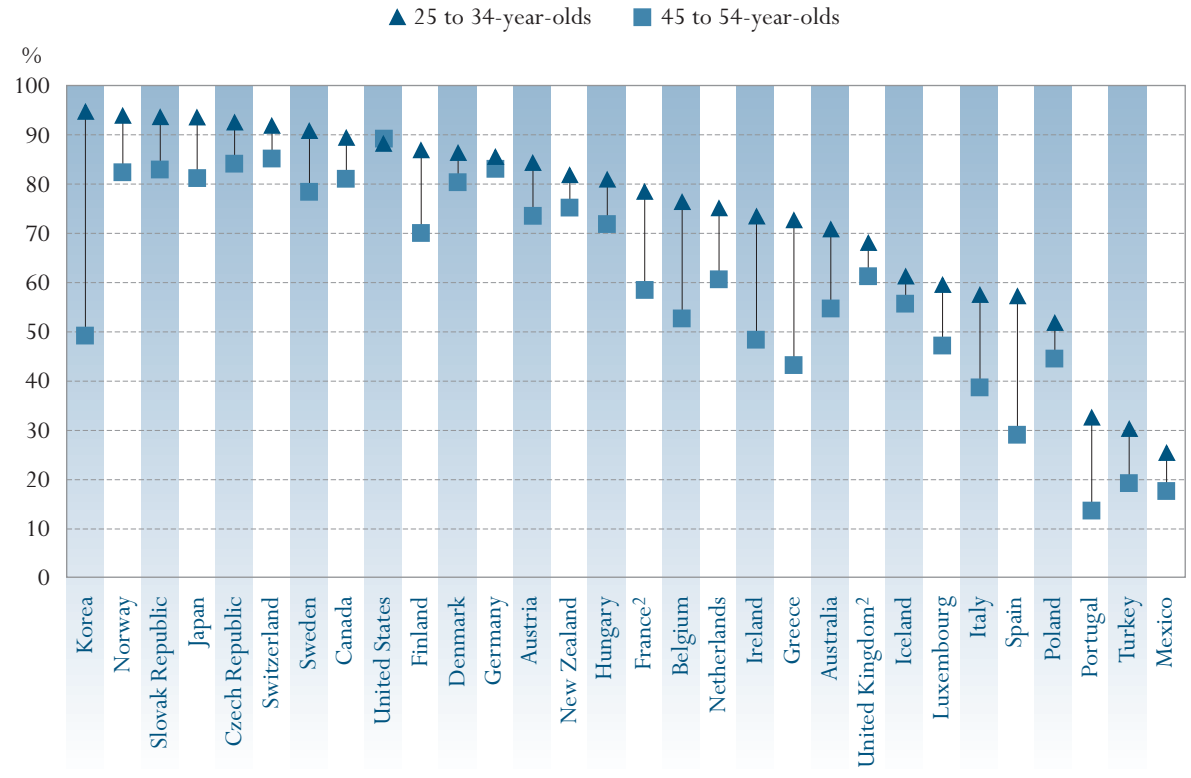
Gender differences in graduation rates

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.

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

Chart A1.2

Percentage of the population that has attained at least upper secondary education[1], by age group (2001)



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 A1.2. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A1

...but for younger people the pattern is now reversing.

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

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

Today, graduation rates no longer show significant differences between males and females in half of the countries with available data (Table A1.1). Further, in 15 out of 16 OECD countries for which total upper secondary graduation rates can be compared between the genders, graduation rates for females exceed those for males, and in Finland, Iceland, Ireland and Spain by 13 percentage points or more. In the majority of OECD countries, the gender ratio for general upper secondary programmes strongly favours females, only in Korea and Turkey do more males graduate than females, and here the difference between the genders is negligible. Conversely, in most OECD countries, more males than females graduate from pre-vocational and vocational upper secondary programmes.

Graduation from post-secondary non-tertiary programmes

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

Post-secondary non-tertiary programmes are offered in 27 of the OECD countries and 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.

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 Austria, Hungary, Ireland and New Zealand 21 per cent or more of a typical age cohort complete a post-secondary non-tertiary programme.

In 8 out of 20 OECD countries reporting comparable data, 11 per cent 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 9.5 per cent). In Austria, Hungary, Ireland and New Zealand, 21 per cent or more of a typical age cohort complete a post-secondary non-tertiary programme (Table A1.3).

In just over half of 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. However, in 9 out of 20 OECD countries, the majority of post-secondary non-tertiary graduates have completed programmes, that are designed to provide direct access to either tertiary-type A or B edu-

A1

cation. In Austria, 20 per cent graduate from ISCED 4A programmes and in Switzerland 17 per cent graduate from ISCED 4B programmes.

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.

Graduate data refer to the school year 2000-2001 and are based on the UOE data collection on education statistics that is administered annually by the OECD.

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 A1.3.

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/eag2003* 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/eag2003* for a description of ISCED-97 education programmes and attainment levels and their mappings for each country.

A1

Table A1.1

Upper secondary graduation rates (2001)

Ratio of upper secondary graduates to total population at typical age of graduation (multiplied by 100) 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[1]	m	m	m	68	74	m	m	m	m	m	m	m	m	m	m
	Austria	m	m	m	16	20	53	41	n	n	1	1	16	20	54	42
	Belgium	79	76	83	60	65	a	a	19	18	17	24	36	42	60	65
	Canada	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	Czech Republic	85	83	87	53	63	n	n	a	a	32	24	16	20	71	69
	Denmark	96	m	m	54	65	a	a	64	71	a	a	54	65	64	71
	Finland	91	85	97	91	97	a	a	a	a	a	a	54	66	73	78
	France	85	82	87	51	59	10	9	3	2	37	32	32	38	69	64
	Germany	92	89	94	32	35	59	58	a	a	a	a	32	35	59	58
	Greece	m	m	m	20	24	a	a	7	7	x(8)	x(9)	20	24	7	7
	Hungary[1]	83	80	86	57	65	x(4)	x(5)	x(10)	x(11)	24	18	m	m	m	m
	Iceland	70	61	78	48	60	1	2	24	15	15	18	49	61	38	33
	Ireland	76	69	83	72	78	a	a	5	5	a	a	55	58	22	25
	Italy[1]	79	76	83	69	74	2	3	a	a	20	18	29	38	62	56
	Japan	93	91	95	69	73	1	n	24	22	x(8)	x(9)	69	73	24	23
	Korea	m	m	m	63	62	a	a	37	38	a	a	63	62	37	38
	Luxembourg*	m	m	m	42	48	8	8	22	17	a	a	27	31	42	41
	Mexico	m	m	m	29	31	a	a	4	4	x(8)	x(9)	29	31	4	4
	Netherlands	m	m	m	62	69	a	a	16	17	18	14	34	37	61	61
	New Zealand	m	m	m	63	67	25	29	28	32	x(8)	x(9)	m	m	a	a
	Norway	m	m	m	72	89	a	a	43	37	m	m	72	89	43	37
	Poland	92	88	95	74	81	a	a	a	a	27	19	36	47	65	55
	Portugal	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	Slovak Republic	73	72	74	63	69	n	n	1	1	21	15	16	20	69	66
	Spain[2,*]	67	59	75	47	55	n	n	11	11	13	15	47	55	24	27
	Sweden	71	68	75	71	75	n	n	n	n	a	a	42	46	29	28
	Switzerland	88	91	86	25	26	50	41	15	21	n	n	28	32	62	57
	Turkey*	m	m	m	36	31	a	a	m	m	a	a	19	18	17	13
	United Kingdom	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	United States	72	70	73	m	m	m	m	m	m	m	m	m	m	m	m
	Country mean	***82***	***78***	***85***	***54***	***60***	***8***	***8***	***13***	***13***	***9***	***8***	***38***	***44***	***44***	***42***
NON-OECD COUNTRIES	Argentina[1]	m	m	m	40	47	a	a	a	a	a	a	21	28	19	19
	Brazil[1]	m	m	m	57	64	m	m	a	a	a	a	x(4)	x(5)	m	m
	Chile[1]	m	m	m	35	40	29	29	a	a	a	a	35	40	29	29
	China[1]	m	m	m	16	14	a	a	13	13	3	2	16	14	15	15
	India	m	m	m	18	16	n	n	m	m	n	n	18	16	n	n
	Indonesia	m	m	m	23	24	13	11	a	a	a	a	x(4)	x(5)	m	m
	Israel	m	m	m	60	66	25	22	3	1	a	a	60	66	28	23
	Jamaica	m	m	m	71	71	n	n	a	a	a	a	71	71	n	n
	Malaysia[1]	m	m	m	14	18	a	a	72	81	m	m	m	m	2	1
	Paraguay[1]	m	m	m	36	39	a	a	m	m	a	a	29	31	8	8
	Peru[1]	m	m	m	59	58	x(4)	x(5)	a	a	a	a	49	49	10	9
	Philippines[1]	m	m	m	65	70	a	a	a	a	a	a	65	70	a	a
	Russian Federation	m	m	m	53	x(4)	a	a	a	a	a	a	53	x(12)	a	a
	Thailand	m	m	m	29	33	20	18	a	a	a	a	29	33	19	17
	Tunisia	m	m	m	27	30	7	8	7	8	a	a	27	30	14	16
	Zimbabwe[3]	m	m	m	4	3	a	a	12	9	a	a	16	12	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.

1. Year of reference 2000.
2. Significant proportion of the youth cohort is missing.
3. Year of reference 2002.

* See Annex 3 for notes (*www.oecd.org/edu/eag2003*).

Source: OECD.

A1

Table A1.2

Population that has attained at least upper secondary education (2001)

Percentage of the population that has attained at least upper secondary education[1], by age group

		Age group				
		25-64	25-34	35-44	45-54	55-64
OECD COUNTRIES	Australia	59	71	60	55	44
	Austria	77	84	81	73	65
	Belgium	59	76	64	53	39
	Canada	82	89	85	81	67
	Czech Republic	86	92	90	84	76
	Denmark	80	86	80	80	72
	Finland	74	87	84	70	51
	France[2]	64	78	67	58	46
	Germany	83	85	86	83	76
	Greece	51	73	60	43	28
	Hungary	70	81	79	72	44
	Iceland	57	61	60	56	46
	Ireland	58	73	62	48	35
	Italy	43	57	49	39	22
	Japan	83	94	94	81	63
	Korea	68	95	77	49	30
	Luxembourg	53	59	57	47	42
	Mexico	22	25	25	17	11
	Netherlands	65	75	69	61	50
	New Zealand	76	82	80	75	60
	Norway	86	94	91	82	71
	Poland	46	52	48	44	36
	Portugal	20	32	20	14	9
	Slovak Republic	85	94	90	83	66
	Spain	40	57	45	29	17
	Sweden	81	91	86	78	65
	Switzerland	87	92	90	85	81
	Turkey	24	30	24	19	13
	United Kingdom[2]	63	68	65	61	55
	United States	88	88	89	89	83
	Country mean	***64***	***74***	***69***	***60***	***49***
NON-OECD COUNTRIES	Argentina[3]	42	51	43	38	28
	Brazil[3]	26	31	29	23	14
	Chile[3]	46	58	48	40	27
	China	15	16	22	9	7
	Indonesia	21	33	22	15	7
	Jamaica	37	61	31	12	8
	Malaysia[3]	38	52	40	22	12
	Paraguay[3]	22	30	23	16	11
	Peru[3]	44	56	47	36	22
	Philippines	36	m	m	m	m
	Thailand[3]	18	27	18	10	6
	Uruguay[3]	31	37	34	29	21

1. Excluding ISCED 3C short programmes.
2. Not all ISCED 3 programmes meet minimum requirements for ISCED 3C long programmes.
3. Year of reference 2000.

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

A1

Table A1.3

Post-secondary non-tertiary graduation rates (2001)

Ratio of post-secondary non-tertiary graduates to total population at typical age of graduation (multiplied by 100) 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)	
	M + F	Males	Females	M + F	Females	M + F	Females	M + F	Females
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OECD COUNTRIES									
Australia	m	m	m	m	m	m	m	m	m
Austria	21.8	18.3	25.4	19.7	21.8	2.4	4.2	0.1	0.2
Belgium[1]	16.5	15.1	18.0	9.8	9.8	a	a	6.8	8.2
Canada	m	m	m	m	m	m	m	m	m
Czech Republic	8.6	8.6	8.7	6.4	6.6	a	a	2.2	2.1
Denmark[1]	0.3	0.4	0.2	0.3	0.2	a	a	n	a
Finland	1.7	1.5	1.8	a	a	a	a	2.7	3.1
France[1]	1.2	0.8	1.7	0.7	0.9	a	a	0.6	0.8
Germany	15.0	16.2	13.8	9.5	8.8	5.5	5.0	a	a
Greece	m	m	m	a	a	a	a	m	m
Hungary[1, 2]	34.1	30.9	37.5	7.3	7.6	a	a	26.6	29.7
Iceland	4.1	4.7	3.4	n	n	n	n	4.1	3.4
Ireland	32.1	16.9	48.1	a	a	a	a	32.1	48.1
Italy[2]	3.7	2.9	4.4	a	a	a	a	3.7	4.4
Japan	m	m	m	m	m	m	m	m	m
Korea	a	a	a	a	a	a	a	a	a
Luxembourg[1]	3.3	4.9	1.5	a	a	a	a	3.3	1.5
Mexico	a	a	a	a	a	a	a	a	a
Netherlands[1]	1.0	1.7	0.4	a	a	a	a	1.0	0.4
New Zealand	21.3	18.0	24.8	1.3	1.7	7.5	9.0	12.4	14.1
Norway[1]	8.0	11.2	4.6	2.7	2.0	a	a	5.2	2.6
Poland[1]	11.3	7.3	15.5	a	a	a	a	11.3	15.5
Portugal	m	m	m	m	m	m	m	m	m
Slovak Republic	2.9	2.0	3.9	2.9	3.9	n	n	n	n
Spain	5.8	5.5	6.2	5.4	5.6	0.5	0.6	n	n
Sweden	m	m	m	m	m	m	m	0.4	0.2
Switzerland	19.7	22.3	17.1	2.9	1.9	17.2	15.5	n	n
Turkey	a	a	a	a	a	a	a	a	a
United Kingdom	m	m	m	m	m	m	m	m	m
United States[1]	6.9	6.3	7.6	a	a	a	a	6.9	7.6
Country mean	*9.5*	*8.5*	*10.6*	*2.9*	*3.0*	*1.4*	*1.4*	*5.0*	*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.

1. Gross graduation rate may include some double counting.

2. Year of reference 2000.

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

INDICATOR A2: CURRENT TERTIARY GRADUATION AND SURVIVAL RATES AND ATTAINMENT OF THE ADULT POPULATION

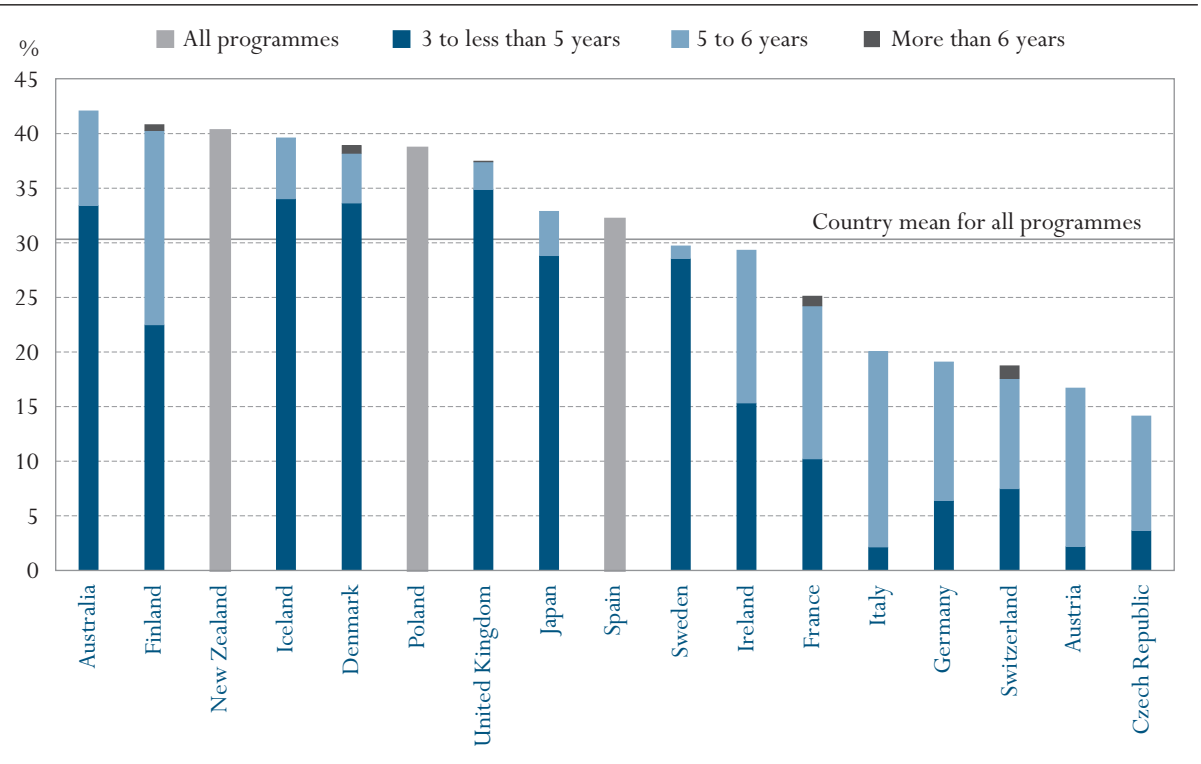
A2

- On average across OECD countries, 30 per cent of persons at the typical age of graduation currently complete the tertiary-type A level of education - a figure that ranges from around 40 per cent in Australia, Finland, Iceland and New Zealand to 20 per cent or below in Austria, the Czech Republic, Germany, Italy and Switzerland.
- On average, one third of OECD students "drop out" before they complete their first degree, regardless of whether they are following tertiary-type A or tertiary-type B programmes.
- As measured by educational attainment, there has been an increase in the stock of university-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.

Chart A2.1

Tertiary-type A graduation rates, by duration of programme (2001)

Ratio of number of graduates to the population at the typical age of graduation (multiplied by 100)



Countries are ranked in descending order of total tertiary-type A graduation rates.
Source: OECD. Table A2.1. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A2

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 the 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 but the 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 between 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 to 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 most 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 is not made 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 neces-

A2

sary to 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 and individuals who already hold a first degree are netted out of these.

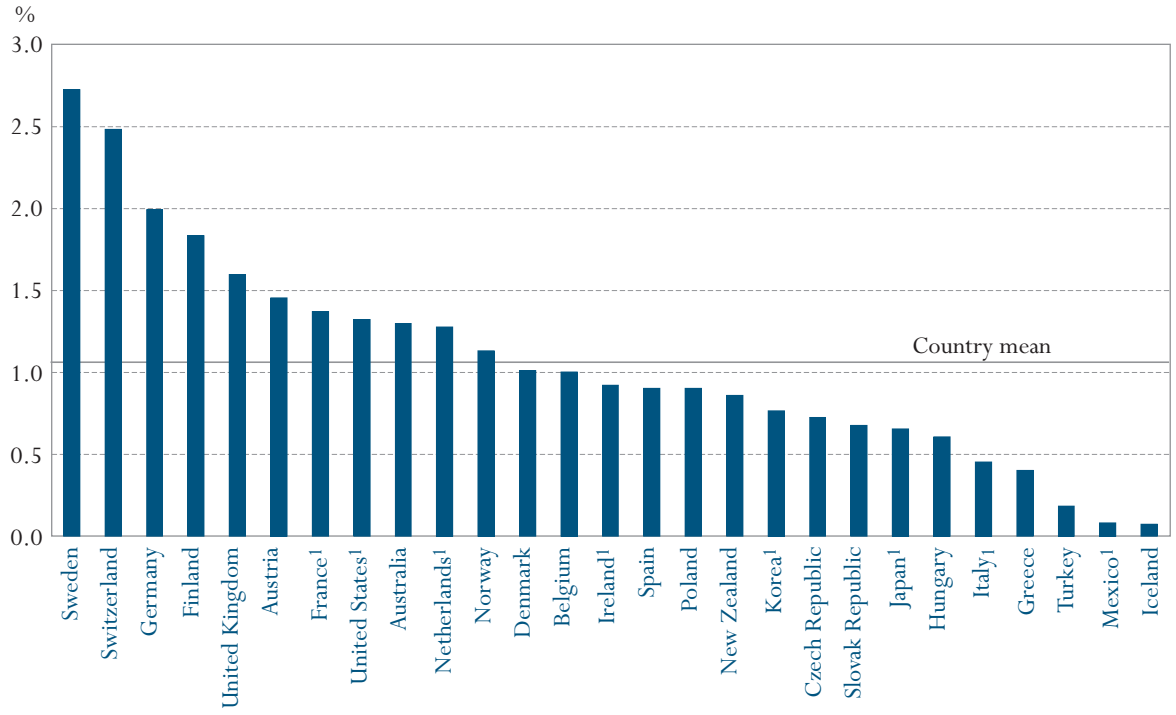
On average in OECD countries, 30 per cent of persons at the typical age of graduation complete tertiary-type A education…

On average in OECD countries, 30 per cent of persons at the typical age of graduation complete tertiary-type A education. This figure ranges from around 40 per cent in Australia, Finland, Iceland and New Zealand to 20 per cent or below in Austria, the Czech Republic, Germany, Italy and Switzerland (Chart A2.1).

Chart A2.2

Graduation rates for advanced research programmes (2001)

Sum of graduation rates over single years of age (multiplied by 100)



1. Gross graduation rates were used for these countries, which were calculated as the ratio of the number of graduates to the population at the typical age of graduation, multiplied by 100.

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

Source: OECD. Table A2.1. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A2

In general, in countries with higher graduation rates the majority of students complete medium length programmes (three to less than five years). A notable exception to this rule is Finland where 45 per cent of students complete longer programmes. The pattern for countries with lower tertiary-type A graduation rates is more obvious. In Austria, the Czech Republic, Germany, Italy and Switzerland, the majority of students complete longer programmes (of at least five years' duration), and graduation rates are 20 per cent or below.

…while the graduation rate at the tertiary-type B level is 11 per cent…

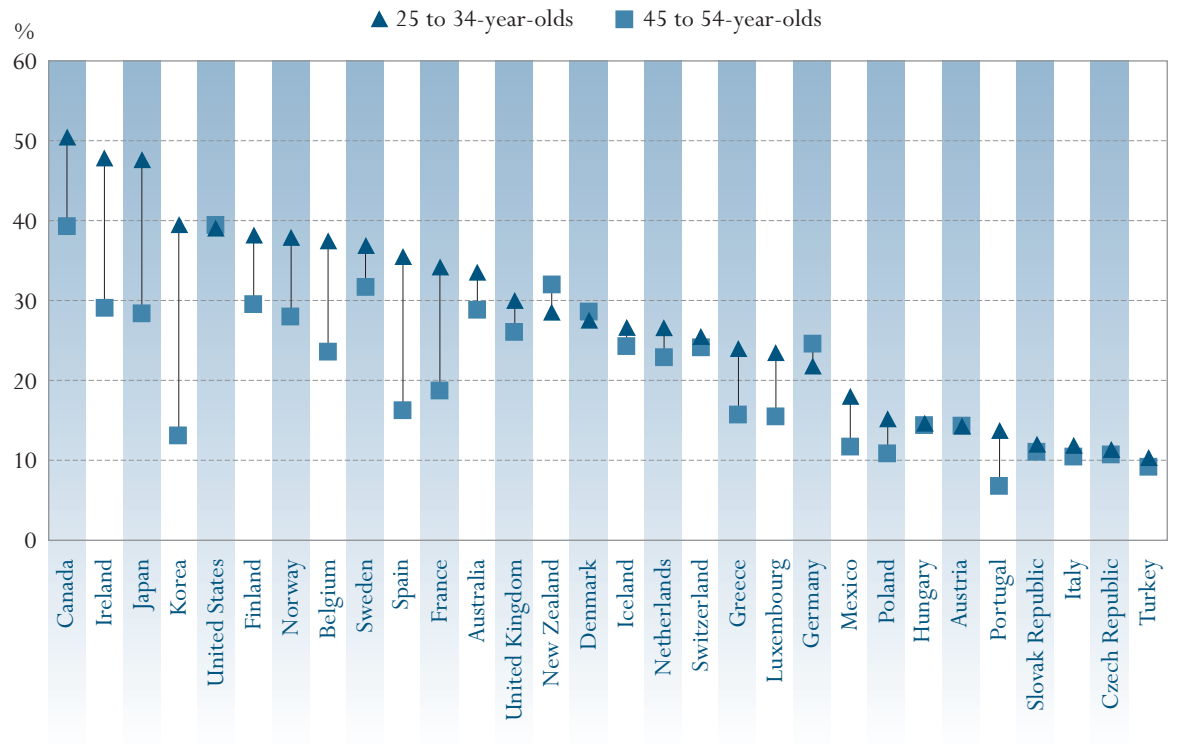
Tertiary-type B programmes are classified at the same level of competencies as tertiary-type A programmes but are more occupationally-oriented and lead to direct labour market access. The programmes are typically of shorter duration than type A programmes (typically two to three years). Generally they are not deemed to lead to university-level degrees. Graduation rates for tertiary-type B programmes account, on average in OECD countries, for 11 per cent of an age cohort (Table A2.1). In Japan, 27 per cent of the population at the typical age of graduation complete the tertiary-type B level of education, and this figure is between 16 and 19 per cent in France, Ireland, New Zealand and Switzerland.

… and 1.1 per cent obtain an advanced research qualification.

On average across OECD countries, 1.1 per cent of the population obtain an advanced research qualification, such as a Ph.D. In Sweden and Switzerland this is around 2.5 per cent and in Germany 2 per cent (Chart A2.2).

Chart A2.3

Percentage of the population that has attained tertiary education, by age group (2001)



Countries are ranked in descending order of the percentage of 25 to 34-year-olds who have attained tertiary education.
Source: OECD. Table A2.3. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A2

There has been an increase in the proportion of young people who have attained a qualification equivalent to tertiary-type A and advanced research programmes.

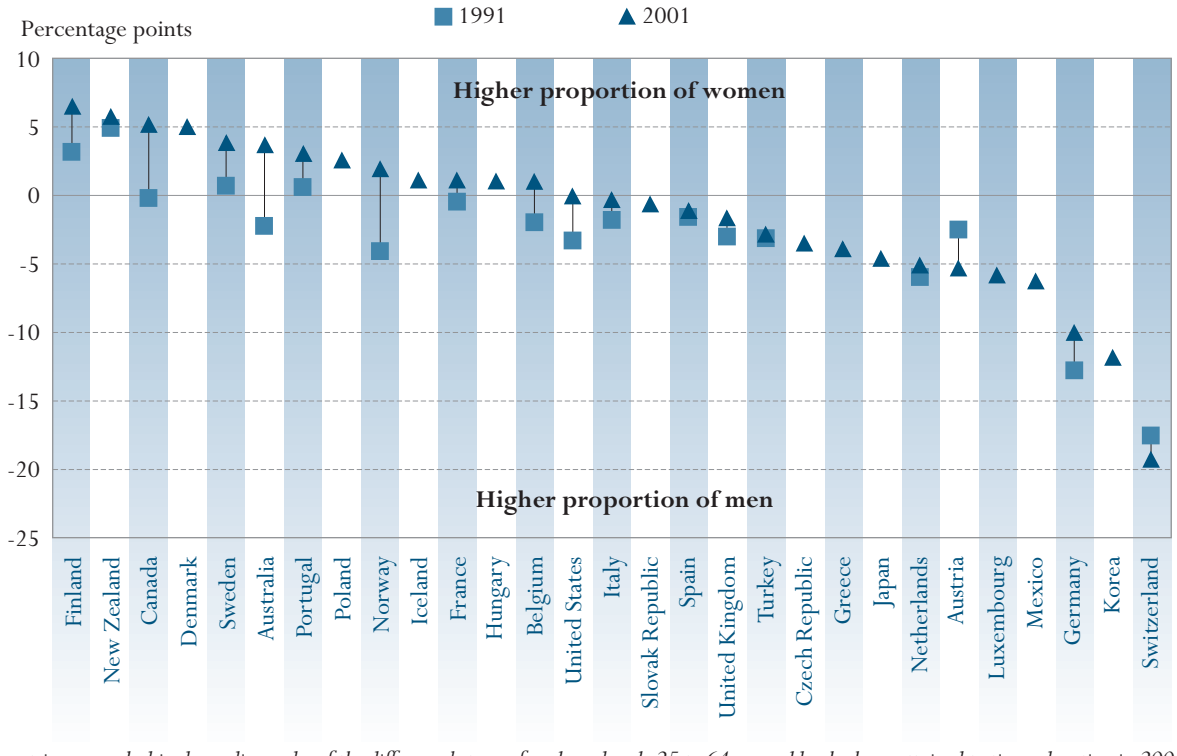
The rising skill requirements of labour markets, an increase in unemployment during recent years and higher expectations by individuals and society have influenced the proportion of young people who obtain at least a tertiary qualification. As measured by tertiary qualifications, there has been a general increase in the stock of higher-level skills in the adult population. Among OECD countries, only 14 per cent of 45 to 54 year-olds hold tertiary-type A and advanced research qualifications, whereas 18 per cent of 25 to 34 year-olds do so (Table A2.3). In some countries this increase has been marked. In Korea and Spain, for example, only 11 and 13 per cent of 45 to 54-year-olds, respectively, have obtained a tertiary qualification compared to 25 and 24 per cent among 25 to 34-year-olds. In Belgium, France, Ireland and Japan the increase is less marked but still significant (Chart A2.3).

Trends in tertiary attainment

An overview of the level of educational attainment at the tertiary level (Table A2.4) over the last ten years confirms the strong trend of increases in the proportion of the adult population attaining tertiary education. For the 19 OECD countries where data are available for both 1991 and 2001, the average increase is of 10 percentage points, with notable increases in Canada and Spain (19 percentage points) and in Ireland (28 percentage points).

Chart A2.4

Difference between females and males in levels of tertiary attainment, by year



Countries are ranked in descending order of the difference between female and male 25 to 64-year-olds who have attained tertiary education in 2001.
Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A2

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. With the exception of Canada and Ireland at the upper side of the distribution and of Austria, Italy, Portugal and Turkey at the lower side, OECD countries enjoyed an increased proportion of highly skilled people in the population, so that levels are now more similar.

...but some countries have been left behind.

However, the proportion of people holding tertiary qualifications remains rather low in Austria, Italy, Portugal and Turkey, where there seems to have been limited improvement over the last ten years. Other countries that have seen very limited increases in tertiary graduation rates include Germany, the Netherlands and Switzerland (Table A2.4).

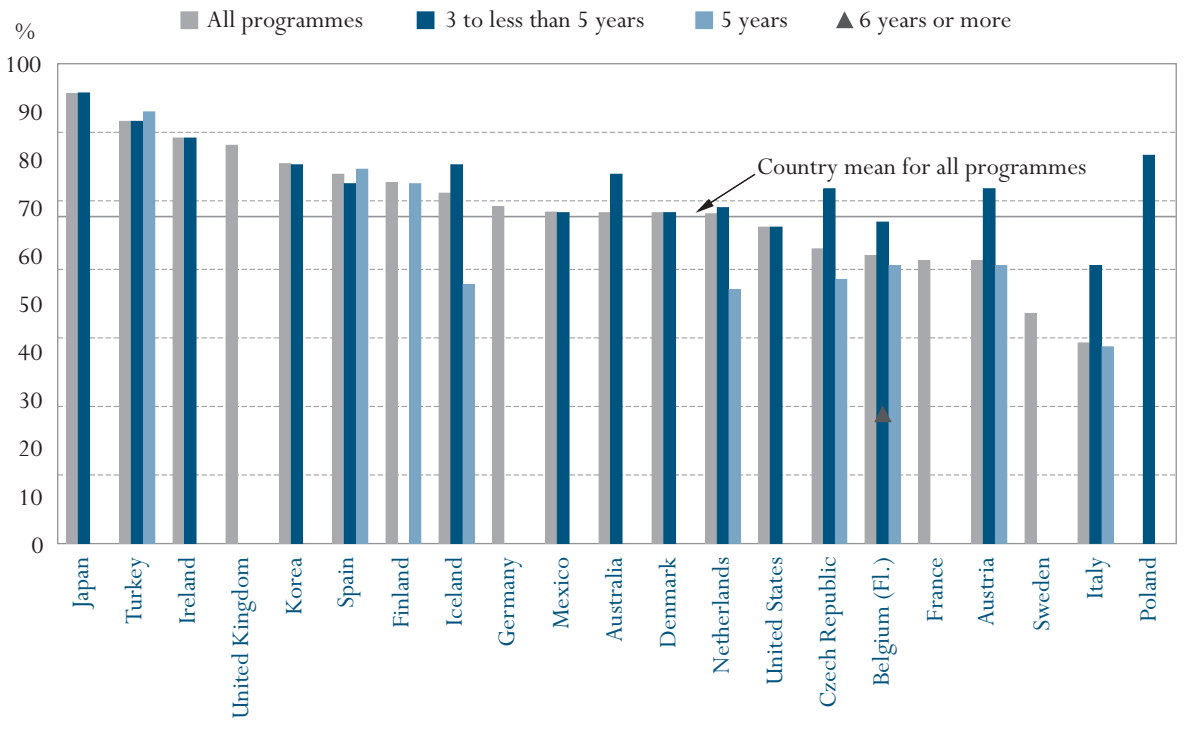
The gender gap in tertiary graduation is sometimes reversing.

The increase in the stock of tertiary graduates has not been equal for both males and females. In 1991, the levels of tertiary attainment were about the same for males and females. Ten years later, the advantage is clearly in favour of females. On average in the OECD, 29 percent of females have attained tertiary qualifications, whereas only 26 percent of males have. The relative increase of tertiary qualifications for females is especially noticeable in Canada, Ireland and Spain, showing an increase of 23, 31 and 21 percentage points respectively. By contrast, in both Germany and Switzerland where the stock of females hold-

Chart A2.5

Survival rates in tertiary-type A education, by duration of programme (2000)

Number of graduates divided by the number of new entrants in the typical year of entrance to the specified programme



Countries are ranked in descending order of tertiary-type A survival rate for all programmes.
Source: OECD. Table A2.2. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

ing tertiary qualifications is comparatively low, there has been very limited improvement over the past ten years (increases of one and four percentage points respectively).

Survival rates at the tertiary level

Tertiary-type A survival rates are generally higher in countries with more flexible qualification structures…

Tertiary-type A survival rates differ widely among OECD countries, ranging from above 80 per cent in Ireland, Japan, Turkey and the United Kingdom to below 60 per cent in Austria, France, Italy and Sweden (Chart A2.5). In both Austria and Italy the majority of students who do successfully complete a first tertiary-type A programme have followed longer programmes lasting five to six years. In contrast, the majority of students in Ireland, Japan, Korea and Turkey, where survival rates are around 80 per cent or above, have completed a medium first tertiary-type A programme (three to five years long) (see Table A2.2).

…a pattern that is not as clearly visible at the tertiary-type B level.

Tertiary-type B survival rates range from above 80 per cent in Denmark, the Flemish Community of Belgium, Japan, Mexico, Poland and Sweden, to around 50 per cent in Ireland and Italy. 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, if not all, students successfully complete short programmes (two to three years). It is however interesting to note that both Denmark and the Flemish Community of Belgium have the majority of students graduating from medium length type B programmes (in the Flemish Community the only tertiary-type B programme option) and the highest survival rates at the tertiary-type B level (see Table A2.2).

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

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

Definitions and methodologies

Data on graduates refer to the academic year 2000-2001 and are based on the UOE data collection on education statistics that is administered annually by the OECD.

Tertiary graduates are those who obtain a tertiary qualification in the specified reference year. This indicator distinguishes between different categories of tertiary qualifications: *i)* qualifications at the tertiary-type B level (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/eag2003* 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 coun-

A2

tries, 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. Dropouts 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 which 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 education attainment are taken from OECD and EUROSTAT databases, which are compiled from National Labour Force Surveys. See Annex 3 at *www.oecd.org/edu/eag2003* 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/eag2003* for a description of ISCED-97 education programmes and attainment levels and their mappings for each country.

A2

Table A2.1

Tertiary graduation rates (2001)

Ratio of tertiary graduates to the population at the typical age of graduation, multiplied by 100, by programme destination and duration of programme

	Tertiary-type B programmes (first-time graduation)	Tertiary-type A programmes (first-time graduation)				Advanced research programmes[1]
		All programmes	3 to less than 5 years (excluding students who subsequently completed a longer programme)	5 to 6 years	More than 6 years	
	(1)	(2)	(3)	(4)	(5)	(6)
OECD COUNTRIES						
Australia[2]	m	42.0	33.3	8.7	a	1.3
Austria	m	16.6	2.1	14.5	n	1.5
Belgium	m	m	m	m	m	1.0
Canada	m	m	m	m	m	m
Czech Republic*	5.0	14.1	3.6	10.5	a	0.7
Denmark	8.0	38.8	33.5	4.5	0.8	1.0
Finland*	7.3	40.7	22.4	17.7	0.5	1.8
France	17.9	25.0	10.2	14.0	0.9	1.4
Germany	10.7	19.0	6.4	12.7	a	2.0
Greece	m	m	m	m	m	0.4
Hungary	m	m	m	m	m	0.6
Iceland*	7.6	39.5	33.9	5.6	n	0.1
Ireland*	19.0	29.3	15.3	14.0	x(4)	0.9
Italy	0.3	20.0	2.1	17.8	n	0.5
Japan	27.4	32.8	28.8	4.0	a	0.7
Korea	m	m	m	m	m	0.8
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	17.6	40.2	m	m	m	0.9
Norway	m	m	m	m	m	1.1
Poland	m	38.6	m	m	m	0.9
Portugal	m	m	m	m	m	m
Slovak Republic	2.3	m	m	m	m	0.7
Spain	10.9	32.1	m	m	m	0.9
Sweden	4.0	29.6	28.5	1.2	a	2.7
Switzerland	16.1	18.7	7.4	10.1	1.1	2.5
Turkey	m	m	m	m	m	0.2
United Kingdom	11.5	37.4	34.8	2.5	0.1	1.6
United States	m	m	m	m	m	1.3
Country mean	*11.0*	*30.3*	*18.7*	*9.8*	*0.3*	*1.1*

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. 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.

2. Year of reference 2000

* See Annex 3 for notes (*www.oecd.org/edu/eag2003*).

Source: OECD.

A2

Table A2.2

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				
		Survival rate for all tertiary-type A programmes	Survival rate for programmes of duration:			Survival rate for all tertiary-type B programmes	Survival rate for programmes of duration:			Advanced research programmes
			3 to less than 5 years	5 to less than 6 years	6 years or more		2 to less than 3 years	3 to less than 5 years	5 years or more	
		(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*
NON-OECD 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.
* See Annex 3 for notes (*www.oecd.org/edu/eag2003*).
Source: OECD.

A2

Table A2.3

Population that has attained tertiary education (2001)

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	10	10	10	10	9	19	24	19	19	12
	Austria	7	7	8	8	6	7	7	8	7	5
	Belgium	15	20	16	13	10	13	18	13	11	8
	Canada	21	25	23	20	15	20	25	20	20	15
	Czech Republic	x(6)	x(7)	x(8)	x(9)	x(10)	11	11	13	11	9
	Denmark	5	6	6	5	4	22	22	23	23	17
	Finland	17	20	21	16	12	15	18	16	13	11
	France	11	17	12	9	6	12	18	11	10	8
	Germany	10	8	11	10	10	13	14	15	15	10
	Greece	5	7	7	4	3	12	17	14	12	6
	Hungary	x(6)	x(7)	x(8)	x(9)	x(10)	14	15	15	14	12
	Iceland	6	6	8	6	4	19	21	21	19	11
	Ireland	22	28	23	18	13	14	20	14	11	8
	Italy	x(6)	x(7)	x(8)	x(9)	x(10)	10	12	11	10	6
	Japan	15	23	19	11	5	19	24	25	17	10
	Korea	7	15	6	2	1	17	25	20	11	8
	Luxembourg	7	8	6	6	5	11	15	11	10	8
	Mexico	2	3	2	1	n	13	15	15	11	7
	Netherlands	2	2	3	2	2	21	24	21	21	16
	New Zealand	15	12	16	18	17	14	17	15	14	7
	Norway	3	3	3	3	2	28	35	28	25	19
	Poland	x(6)	x(7)	x(8)	x(9)	x(10)	12	15	11	11	10
	Portugal	2	3	3	2	2	7	11	7	5	3
	Slovak Republic	1	1	1	1	n	10	11	11	10	8
	Spain	7	12	7	3	2	17	24	18	13	8
	Sweden	15	17	17	14	10	17	20	16	17	15
	Switzerland	10	10	11	9	8	16	16	18	15	13
	Turkey	x(6)	x(7)	x(8)	x(9)	x(10)	9	10	8	9	6
	United Kingdom	8	9	9	8	7	18	21	18	18	12
	United States	9	9	10	10	7	28	30	28	30	24
	Country mean	***8***	***9***	***8***	***7***	***5***	***15***	***18***	***16***	***14***	***10***
NON-OECD 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]	1	2	1	1	n	9	11	9	9	6
	China	3	4	3	2	2	1	2	1	1	2
	Indonesia	2	3	3	2	1	2	4	3	2	1
	Jamaica[1]	1	1	1	1	1	3	3	4	3	2
	Malaysia[1]	x(6)	x(7)	x(8)	x(9)	x(10)	9	13	9	6	4
	Paraguay[1]	2	2	2	1	2	9	11	9	7	4
	Peru[1]	8	10	8	6	3	8	8	9	9	6
	Philippines	10	m	m	m	m	m	m	m	m	m
	Thailand[1]	2	4	2	1	1	8	9	10	6	3
	Uruguay[1]	9	9	11	9	7	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 2000.
Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

A2

OECD COUNTRIES

Table A2.4

Trends in educational attainment at tertiary level (1991 - 2001)

Percentage of the population of 25 to 34-year-olds that has attained tertiary education, by gender.

		Year										
		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Australia	Males	22	m	22	23	24	25	23	25	26	28	29
	Females	24	m	24	25	25	26	28	32	32	35	38
	M+F	23	m	23	24	25	25	26	28	29	31	34
Austria	Males	8	8	m	8	8	9	12	12	12	16	15
	Females	8	8	m	9	9	9	13	13	13	14	14
	M+F	8	8	m	9	9	9	12	13	13	15	14
Belgium	Males	25	25	26	27	28	29	29	30	30	33	34
	Females	29	29	32	33	33	36	37	38	38	39	41
	M+F	27	27	29	30	30	32	33	34	34	36	38
Canada	Males	30	31	32	35	37	38	40	41	42	43	45
	Females	33	35	37	41	44	46	48	50	52	54	56
	M+F	32	33	35	38	40	42	44	45	47	48	51
Czech Republic	Males	m	m	m	13	13	12	12	11	12	12	12
	Females	m	m	m	11	10	10	10	10	10	11	11
	M+F	m	m	m	12	12	11	11	10	11	11	11
Denmark	Males	m	m	m	m	m	m	m	27	28	26	25
	Females	m	m	m	m	m	m	m	27	29	31	34
	M+F	m	m	m	m	m	m	m	27	29	29	29
Finland	Males	28	28	m	28	29	29	30	29	30	30	30
	Females	39	39	m	40	41	41	43	43	45	46	46
	M+F	33	33	m	34	35	35	36	36	37	38	38
France	Males	19	21	22	23	23	24	26	27	29	30	32
	Females	21	22	24	26	27	28	30	32	33	35	37
	M+F	20	22	23	24	25	26	28	30	31	32	34
Germany	Males	23	22	m	22	23	22	23	23	23	24	23
	Females	19	19	m	19	19	18	19	20	20	20	20
	M+F	21	20	m	20	21	20	21	22	22	22	22
Greece	Males	m	m	m	24	25	26	21	22	22	22	21
	Females	m	m	m	26	27	30	24	27	27	26	27
	M+F	m	m	m	25	26	28	22	24	25	24	24
Hungary	Males	m	m	m	m	m	11	11	12	11	12	13
	Females	m	m	m	m	m	17	14	16	16	17	16
	M+F	m	m	m	m	m	14	12	14	14	15	15
Iceland	Males	m	m	m	m	m	19	20	21	25	24	24
	Females	m	m	m	m	m	28	26	27	30	31	29
	M+F	m	m	m	m	m	24	23	24	28	28	26
Ireland	Males	20	21	m	24	27	31	33	30	40	44	45
	Females	19	22	m	24	28	32	32	29	43	49	50
	M+F	20	21	m	24	27	31	33	29	41	47	48
Italy	Males	7	7	m	8	8	8	m	8	9	9	10
	Females	6	7	m	8	9	9	m	10	11	12	13
	M+F	7	7	m	8	8	8	m	9	10	10	12
Japan	Males	m	m	m	m	m	m	45	45	44	46	46
	Females	m	m	m	m	m	m	45	46	46	49	49
	M+F	m	m	m	m	m	m	45	45	45	47	48
Korea	Males	m	m	m	m	33	34	m	38	39	41	42
	Females	m	m	m	m	24	26	m	30	31	34	37
	M+F	m	m	m	m	29	30	m	34	35	37	40
Luxembourg	Males	m	m	m	m	m	m	m	m	22	24	25
	Females	m	m	m	m	m	m	m	m	20	22	22
	M+F	m	m	m	m	m	m	m	m	21	23	23
Mexico	Males	m	m	m	m	m	m	19	19	19	19	20
	Females	m	m	m	m	m	m	15	14	14	16	16
	M+F	m	m	m	m	m	m	17	17	16	17	18
Netherlands	Males	23	24	m	25	25	26	m	28	25	27	26
	Females	22	23	m	23	24	24	m	27	25	26	27
	M+F	22	24	m	24	25	25	m	27	25	27	27
New Zealand	Males	21	21	m	18	23	m	23	24	24	25	26
	Females	25	25	m	24	26	m	27	28	28	29	31
	M+F	23	23	m	21	24	m	25	26	26	27	29
Norway	Males	26	27	m	29	29	27	27	29	30	30	33
	Females	28	29	m	33	35	33	33	36	39	40	44
	M+F	27	28	m	31	32	30	30	33	35	35	38
Poland	Males	m	m	m	m	9	m	9	10	10	11	12
	Females	m	m	m	m	11	m	12	14	15	17	18
	M+F	m	m	m	m	10	m	10	12	12	14	15
Portugal	Males	7	m	m	10	11	11	m	8	9	10	10
	Females	10	m	m	16	16	17	m	14	14	15	17
	M+F	9	m	m	13	14	14	m	11	11	12	14
Slovak Republic	Males	m	m	m	13	12	12	10	11	11	11	11
	Females	m	m	m	12	11	13	11	11	11	12	12
	M+F	m	m	m	13	12	12	10	11	11	11	12
Spain	Males	15	22	m	24	25	26	28	29	31	31	32
	Females	18	23	m	27	28	31	33	35	36	37	39
	M+F	16	22	m	25	27	29	30	32	33	34	36
Sweden	Males	26	26	m	26	27	28	29	30	29	31	34
	Females	28	27	m	29	30	29	30	32	34	36	39
	M+F	27	27	m	27	29	28	29	31	32	34	37
Switzerland	Males	29	29	m	31	29	31	33	34	36	34	35
	Females	13	13	m	13	13	14	16	15	16	17	17
	M+F	21	21	m	22	22	23	25	25	26	26	26
Turkey	Males	7	7	m	7	8	m	9	9	10	10	11
	Females	5	4	m	6	7	m	6	7	7	8	9
	M+F	6	6	m	7	8	m	7	8	8	9	10
United Kingdom	Males	19	22	m	24	24	25	26	27	29	30	30
	Females	18	19	m	22	22	23	23	25	26	27	29
	M+F	19	21	m	23	23	24	25	26	27	29	29
United States	Males	29	29	m	31	33	34	34	34	36	36	36
	Females	31	31	m	33	35	37	37	38	39	40	42
	M+F	30	30	m	32	34	35	36	36	37	38	39
Country mean	***Males***									***25***	***26***	***26***
	Females									***27***	***28***	***29***
	M+F									***26***	***27***	***28***

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

INDICATOR A3: GRADUATES BY FIELD OF STUDY

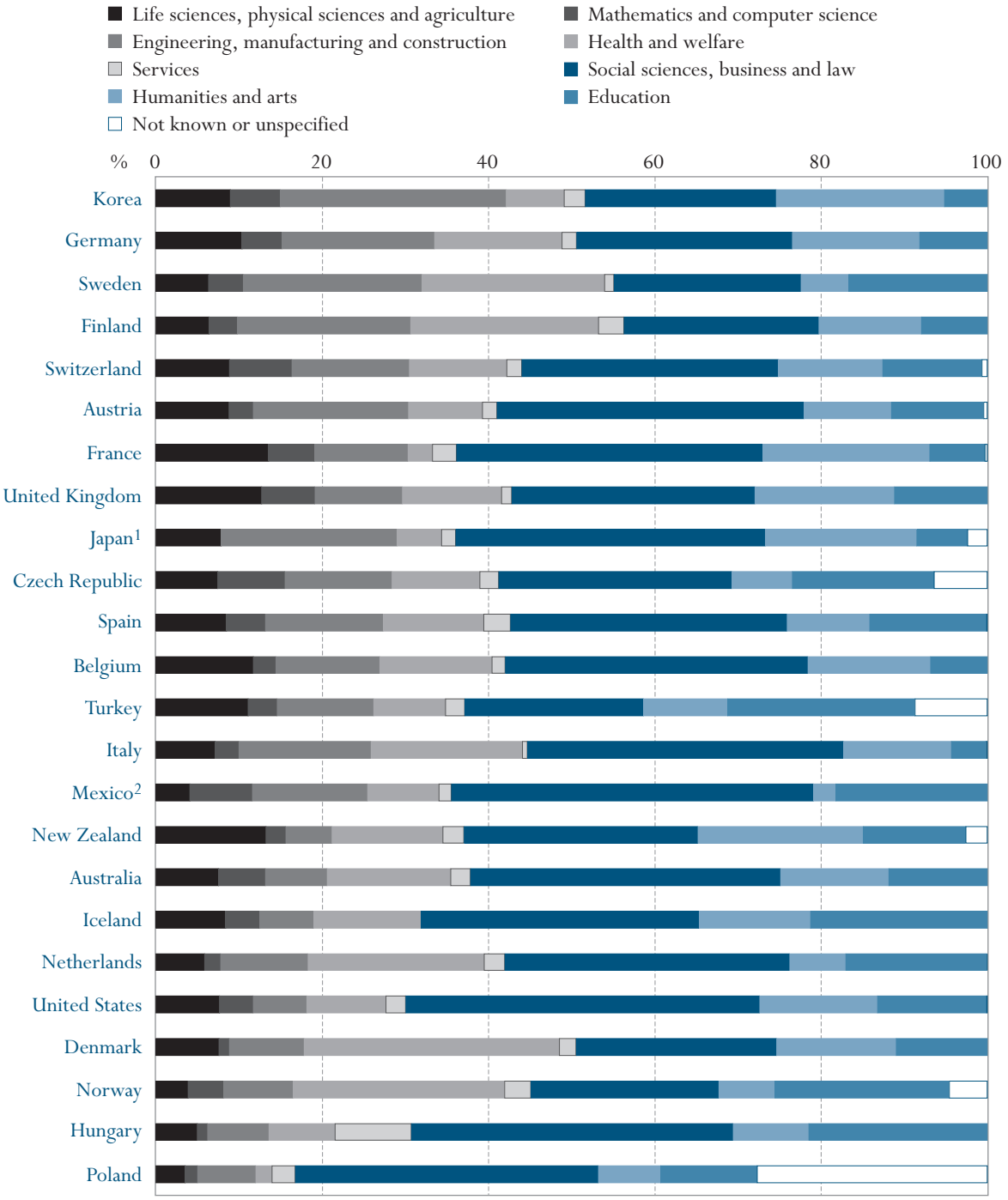
- On average across OECD countries, every third tertiary-type A graduate obtains a degree in the social sciences, business or law. The second most popular fields are science-related, from which one in four students graduate, on average.
- In the humanities, arts, education, health and welfare, on average in OECD countries more than two thirds of the tertiary-type A graduates are females, whereas female graduates are less than one-third in mathematics and computer science and less than one-quarter in engineering, manufacturing and construction.
- In OECD countries, males are still more likely than females to earn advanced research qualifications, such as doctorates.
- Science related fields, closely followed by social sciences, business and law, are the most popular fields of study at the tertiary-type B level.

A3

Chart A3.1

Graduates by field of study (2001)

Graduates with tertiary-type A and advanced research qualifications, by field of study



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.

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

Source: OECD. Table A3.1. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A3

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

Policy context

Changing opportunities in the job market, relative earnings in different occupations and sectors, and admission policies and practices among tertiary education institutions may affect the fields which 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 share of females among graduates in those fields.

Evidence and explanations

Graduates by field of study

On average in OECD countries, every third tertiary-type A graduate obtains a degree in the social sciences, business or law.

In 21 of the 25 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 A3.1). On average in OECD countries, every third tertiary-type A graduate obtains a degree in the social sciences, business or law. The percentage of tertiary-type A qualifications awarded in the social sciences, business and law ranges from under 23 per cent in Norway, Sweden and Turkey, to over 40 per cent in Mexico and the United States. In Turkey the largest concentration of tertiary-type A and advanced research qualifications awarded is in the field of education, and in Norway in the fields of health and welfare.

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

The percentage of tertiary-type A and advanced research students receiving qualifications in science-related fields (engineering, manufacturing and construction, life sciences, physical sciences and agriculture, mathematics and computing, but not including health and welfare) is 26 per cent on average in OECD countries and ranges from less than 17 per cent in Hungary, Norway and Poland, to around one-third in Germany and Sweden, and 42 per cent in Korea. Slightly less popular on average in OECD countries are the fields of humanities, arts and education from which 25 per cent of tertiary-type A and advanced research students graduate.

Individual preferences, admission policies and degree structures influence the prevalence of the 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 between countries (Table A2.1) can also be accounted for by differences in the number of tertiary-type A degrees earned in the fields of education and the 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.

A3

The majority of OECD graduates at the tertiary-type B level are from science-related fields.

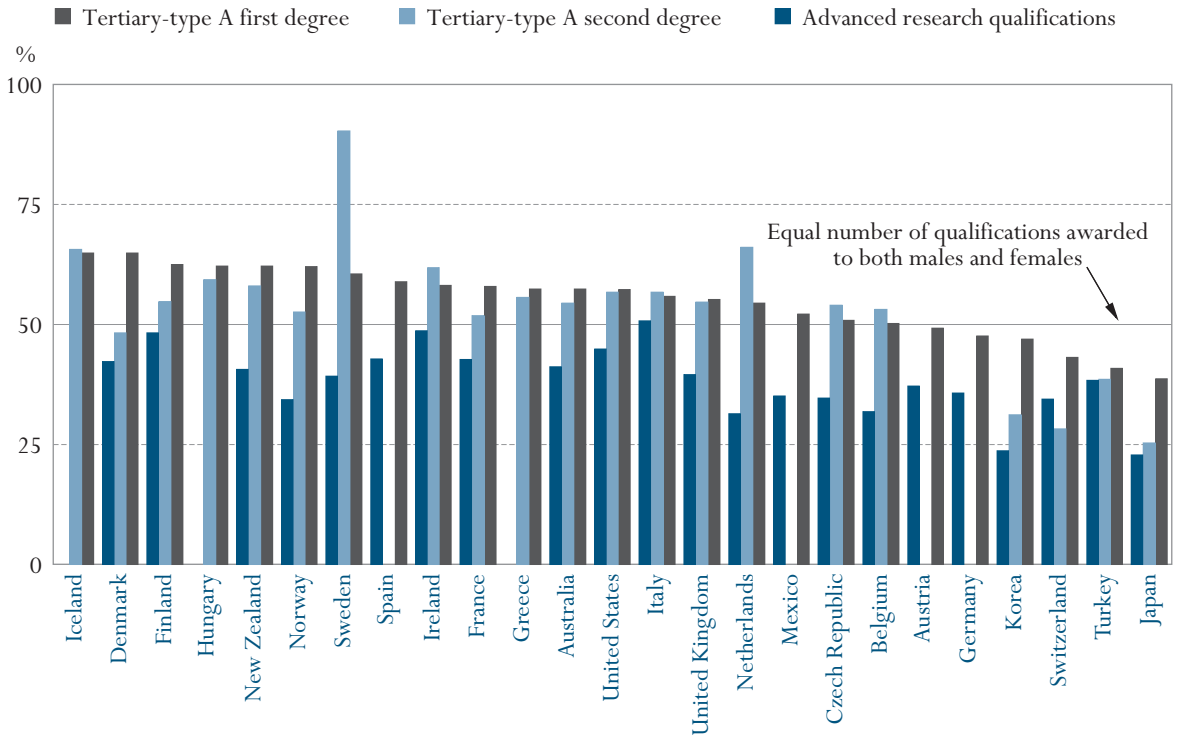
Although the same three combined fields of study yield the majority of graduates, the picture is slightly different for tertiary-type B education, where programmes are more occupationally oriented: science-related fields have the largest concentration of graduates (25 per cent), followed by the combined field of the social sciences, business and law (24 per cent), and then the combined field of the humanities, arts and education (22 per cent). However, health and welfare graduates are more common at this level than engineering, manufacturing and construction graduates (18 and 16 per cent respectively) (see Table A3.1).

The selection of a field of study at this level is heavily dependent on opportunities to study similar subject matter, 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.

Chart A3.2

Proportion of tertiary qualifications awarded to females (2001)

For all fields of study for females with tertiary-type A first and second degrees and advanced research qualifications



Countries are ranked in descending order of the percentage of tertiary-type A first degrees that are awarded to females.
Source: OECD. Table A3.2. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A3

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 20 out of 26 OECD countries. On average in OECD countries, 55 per cent of all first tertiary-type A graduates are females. However, major differences remain between fields of study. In the humanities, arts, education, health and welfare, more than two thirds of the tertiary-type A graduates are females, on average 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 A3.2).

...but are 43 per cent of below in Japan, Switzerland and Turkey.

In Denmark, Finland, Hungary, Iceland, New Zealand, Norway and Poland, the proportion of females obtaining a first tertiary-type A qualification is above 60 per cent but it is 43 per cent or below in Japan, Switzerland and Turkey (Table A3.2).

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 A3.2). 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 on graduates refer to the academic year 2000-2001 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 between different categories of tertiary qualifications: *i)* qualifications at the tertiary-type B level (ISCED 5B); and *ii)* qualifications at the tertiary-type A level (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 A3.1 and A3.2 cover graduates from all tertiary degrees reported in Table A2.1. Tertiary graduates who receive their qualification in the reference year are divided into categories based on their subject of specialisation.

Table A3.2 shows the percentage distribution of qualifications among females by subject category.

A3

Table A3.1
Tertiary graduates, by field of study and level of education (2001)

		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)	(13)
OECD COUNTRIES													
Australia[1]	A	11.9	13.0	37.3	2.4	7.5	1.3	14.8	5.3	1.0	0.4	5.2	a
	B	m	m	m	m	m	m	m	m	m	m	m	m
Austria	A	11.1	10.5	36.9	1.8	18.7	2.6	8.9	3.4	2.8	0.7	2.2	0.5
	B	42.1	3.4	3.4	6.5	24.9	4.5	13.7	n	1.1	0.1	0.4	a
Belgium[2]	A	6.9	14.7	36.4	1.6	12.5	3.5	13.5	5.8	2.4	0.8	2.0	n
	B	21.0	7.3	26.8	2.1	9.1	0.6	27.4	0.5	0.4	n	4.7	0.1
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	17.1	7.2	28.0	2.3	12.8	3.7	10.6	1.7	2.0	0.8	7.3	6.4
	B	a	7.5	36.2	8.2	6.2	3.0	34.1	a	a	a	4.8	a
Denmark	A	11.0	14.4	24.2	2.0	9.0	1.8	30.8	3.0	2.8	0.5	0.8	a
	B	n	5.2	24.0	9.3	40.0	5.2	n	n	n	n	16.3	a
Finland	A	7.9	12.4	23.4	3.1	20.8	2.6	22.6	1.6	2.2	0.9	2.5	n
	B	0.6	7.0	19.1	20.5	18.4	3.2	21.8	a	a	a	9.4	a
France	A	6.6	20.1	36.8	2.9	11.2	0.8	3.0	6.9	5.8	2.9	2.6	0.3
	B	a	1.5	39.6	5.6	25.1	n	20.3	1.8	2.4	0.4	3.2	a
Germany	A	8.2	15.3	25.9	1.8	18.4	1.9	15.3	3.2	5.2	1.7	3.1	a
	B	9.7	1.0	10.3	8.8	13.9	3.0	51.9	n	a	a	0.3	0.9
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[2]	A	21.5	9.1	38.7	9.2	7.4	3.7	7.9	0.4	0.8	0.1	1.1	a
	B	n	n	44.2	32.4	15.9	n	1.2	n	n	6.2	n	a
Iceland	A	21.3	13.3	33.5	n	6.5	1.5	12.9	4.4	2.5	0.3	3.9	a
	B	21.6	11.9	39.3	n	n	n	n	n	n	n	27.1	a
Ireland	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
Italy	A	4.2	12.9	38.0	0.6	15.9	2.0	18.2	3.4	1.6	2.1	0.8	0.2
	B	31.4	68.6	a	a	a	a	a	a	a	a	a	a
Japan[3]	A	6.1	18.3	37.2	1.7	21.2	3.3	5.3	4.6	x(9)	x(9)	x(9)	2.4
	B	8.0	15.9	7.9	25.3	16.2	0.7	20.2	n	x(9)	x(9)	x(9)	5.9
Korea	A	5.2	20.2	23.0	2.5	27.2	2.8	7.0	2.1	4.1	2.3	3.7	a
	B	9.0	15.1	17.9	5.0	38.0	1.5	9.0	4.8	0.1	n	3.4	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	18.2	2.7	43.5	1.5	13.8	2.0	8.6	0.8	1.3	0.3	7.2	a
	B	a	2.5	28.0	10.0	38.0	1.5	6.9	0.4	a	0.1	12.7	a
Netherlands	A	17.0	6.7	34.3	2.5	10.5	2.5	21.2	1.0	2.3	0.2	1.6	0.1
	B	10.0	a	38.6	8.1	2.6	a	34.6	a	a	a	6.1	a
New Zealand	A	12.4	19.8	28.1	2.5	5.5	1.5	13.4	11.7	n	0.1	2.3	2.6
	B	25.1	13.2	21.1	14.1	3.4	2.6	11.0	0.5	0.4	n	7.8	0.9
Norway	A	20.9	6.8	22.6	3.2	8.3	1.4	25.4	1.2	1.3	0.2	4.1	4.6
	B	a	5.8	60.6	4.9	3.8	a	0.9	0.1	a	a	23.1	0.8
Poland	A	11.6	7.4	36.3	2.9	7.0	1.7	1.9	1.1	0.7	0.6	0.9	27.6
	B	100.0	a	a	a	a	a	a	a	a	a	a	a
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	18.0	5.4	28.8	7.2	17.8	4.2	9.2	2.2	2.2	0.6	4.4	a
	B	2.8	9.9	5.5	7.7	7.1	1.2	64.9	n	n	n	0.9	a
Spain	A	14.1	9.9	33.3	3.2	14.2	2.7	12.1	2.6	3.2	1.3	3.4	0.1
	B	4.8	7.7	27.4	13.2	23.8	0.6	11.5	n	n	n	10.7	0.2
Sweden	A	16.7	5.7	22.5	1.1	21.5	1.1	22.0	2.8	2.5	0.6	3.5	a
	B	2.5	12.8	12.6	13.7	26.0	4.1	11.8	0.1	0.1	n	16.2	a
Switzerland	A	11.9	12.6	30.8	1.8	14.1	1.4	11.7	3.5	3.9	1.0	6.5	0.7
	B	13.9	3.5	39.2	10.8	12.1	1.7	11.9	n	n	n	6.9	n
Turkey	A	22.5	10.1	21.5	2.4	11.6	4.2	8.6	2.0	4.9	2.8	0.8	8.7
	B	a	2.3	28.3	4.7	27.5	4.8	4.0	a	0.1	a	4.3	24.2
United Kingdom	A	11.2	16.8	29.2	1.3	10.5	1.1	11.9	6.5	5.2	1.4	5.0	a
	B	7.9	9.8	15.9	1.6	10.6	1.9	39.7	1.8	2.2	0.4	8.2	a
United States	A	13.1	14.2	42.6	2.4	6.4	2.3	9.5	3.9	1.5	0.9	3.2	0.1
	B	2.7	0.2	32.8	8.8	18.3	2.2	27.0	a	a	a	7.8	0.2
Country mean	***A***	***13.1***	***12.0***	***31.7***	***2.6***	***13.2***	***2.3***	***13.0***	***3.4***	***2.6***	***1.0***	***3.3***	***2.2***
	B	***13.0***	***8.8***	***24.1***	***9.2***	***15.8***	***1.8***	***17.7***	***n***	***n***	***n***	***7.5***	***1.4***
NON-OECD COUNTRY													
Israel	A	18.0	12.9	41.8	a	9.6	0.8	5.4	3.2	1.9	6.5	x(11)	a
	B	m	m	m	m	m	m	m	m	m	m	m	m

Note: Column 1 specifies the level of education, where A equals tertiary-type A and advanced research programmes, and B equals tertiary-type B programmes.
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 2000.
2. Excludes tertiary-type B second degree programmes.
3. All sciences included in life sciences.
4. Excludes tertiary-type A second degree programmes.
* See Annex 3 for notes (*www.oecd.org/edu/eag2003*).
Source: OECD.

A3

Table A3.2

Percentage of tertiary qualifications awarded to females, by type of tertiary education and by subject category (2001)

		All fields of study					Health and welfare		Life sciences, physical sciences and agriculture		Mathematics and computer science		Humanities, arts and education		Social sciences, business, law and services		Engineering, manufacturing and construction	
		Tertiary-type B (First degree)	Tertiary-type B (Second degree)	Tertiary-type A (First degree)	Tertiary-type A (Second degree)	Advanced research degrees	Tertiary-type B education	Tertiary-type A and advanced research pro-grammes	Tertiary-type B education	Tertiary-type A and advanced research pro-grammes	Tertiary-type B education	Tertiary-type A and advanced research pro-grammes	Tertiary-type B education	Tertiary-type A and advanced research pro-grammes	Tertiary-type B education	Tertiary-type A and advanced research pro-grammes	Tertiary-type B education	Tertiary-type A and advanced research pro-grammes
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
OECD COUNTRIES	Australia[1]	m	m	57	54	41	m	76	m	51	m	26	m	71	m	52	m	22
	Austria	58	79	49	n	37	80	61	21	52	28	18	80	67	80	51	11	17
	Belgium	62	m	50	53	32	80	59	42	42	13	24	70	65	60	53	15	20
	Canada	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	Czech Republic	72	a	51	54	35	90	70	58	46	49	11	60	71	71	52	21	30
	Denmark	35	94	65	48	42	n	82	29	46	13	30	68	69	47	43	31	23
	Finland	63	a	63	55	48	89	86	53	52	50	35	74	78	68	67	26	19
	France	54	a	58	52	43	81	61	47	50	19	32	57	74	68	60	13	24
	Germany	63	a	48	a	35	81	58	14	41	19	24	88	68	51	44	7	21
	Greece	a	a	57	56	a	m	m	m	m	m	m	m	m	m	m	m	m
	Hungary	a	m	62	59	m	73	77	m	45	60	21	m	74	70	59	24	28
	Iceland	47	a	65	66	a	a	87	a	60	26	19	56	80	53	57	a	21
	Ireland	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	Italy	57	a	56	57	51	a	61	a	52	a	52	56	81	a	55	a	28
	Japan	67	a	39	25	23	78	53	51	31	x(8)	x(9)	84	67	76	31	16	10
	Korea	54	37	47	31	24	82	56	46	43	35	44	71	70	56	41	32	22
	Luxembourg	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	Mexico	42	a	52	m	35	81	62	43	48	47	43	66	65	52	56	21	24
	Netherlands	61	a	54	66	31	83	74	a	37	12	16	85	71	49	49	3	12
	New Zealand	62	68	62	58	41	84	80	44	47	27	29	70	72	63	54	25	32
	Norway	49	a	62	53	34	97	82	a	46	33	19	67	73	55	48	1	22
	Poland	84	a	63	70	42	a	67	a	64	a	45	84	77	a	65	a	24
	Portugal	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	Slovak Republic	80	a	52	a	40	92	69	96	46	a	15	64	70	64	52	39	31
	Spain	53	a	59	m	43	82	76	25	52	25	32	70	72	67	60	18	28
	Sweden	53	a	60	90	39	95	79	65	53	42	39	50	75	68	59	26	28
	Switzerland	44	40	43	28	34	79	55	7	36	15	14	68	60	38	36	7	12
	Turkey	47	a	41	39	38	57	55	52	45	31	40	76	46	55	38	26	24
	United Kingdom	61	x(1)	55	55	40	86	73	43	53	26	28	60	67	54	54	13	19
	United States	59	a	57	57	45	87	75	36	52	40	33	77	69	64	54	14	21
	Country mean	58	64	55	51	38	79	69	43	48	31	29	70	70	60	52	18	22
NON-OECD COUNTRY	Israel	m	a	61	60	47	m	71	m	56	m	34	m	81	m	58	m	23

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 2000.

* See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

Source: OECD.

A4

INDICATOR A4: READING LITERACY OF 4TH-GRADE STUDENTS

- Fourth-grade students in Sweden perform significantly higher than their counterparts in all other OECD countries. Seven other countries (the Czech Republic, England, Germany, Hungary, Italy, the Netherlands and the United States) still perform significantly above the OECD mean of 529 points, with scores ranging from 537 to 554 points.
- With England and the United States as notable exceptions, the data show that high mean scores can be achieved along with relatively small differences among students within countries.

Chart A4.1

Multiple comparisons of mean performance of 4th-grade students on the PIRLS reading literacy scale (2001)

	Mean	S.E.	Years of formal schooling	Average age	Sweden	Netherlands[1]	England[1]	Hungary	United States[1]	Italy	Germany	Czech Republic	New Zealand	Scotland[1]	France	Greece[2]	Slovak Republic	Iceland	Norway	Turkey
	561	(2.2)	4	10.8		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	561	(2.2)	4	10.8		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Netherlands[1]	554	(2.5)	4	10.3	▽		○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England[1]	553	(3.4)	5	10.2	▽	○		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	543	(2.2)	4	10.7	▽	▽	▽		○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States[1]	542	(3.8)	4	10.2	▽	▽	▽	○		○	○	○	▲	▲	▲	▲	▲	▲	▲	▲
Italy	541	(2.4)	4	9.8	▽	▽	▽	○	○		○	○	▲	▲	▲	▲	▲	▲	▲	▲
Germany	539	(1.9)	4	10.5	▽	▽	▽	○	○	○		○	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	537	(2.3)	4	10.5	▽	▽	▽	▽	○	○	○		○	▲	▲	▲	▲	▲	▲	▲
New Zealand	529	(3.6)	5	10.1	▽	▽	▽	▽	▽	▽	▽	○		○	○	○	▲	▲	▲	▲
Scotland[1]	528	(3.6)	5	9.8	▽	▽	▽	▽	▽	▽	▽	▽	○		○	○	▲	▲	▲	▲
France	525	(2.4)	4	10.1	▽	▽	▽	▽	▽	▽	▽	▽	○	○		○	○	▲	▲	▲
Greece[2]	524	(3.5)	4	9.9	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○		○	▲	▲	▲
Slovak Republic	518	(2.8)	4	10.3	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○		○	▲	▲
Iceland	512	(1.2)	4	9.7	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○		▲	▲
Norway	499	(2.9)	4	10.0	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▲
Turkey	449	(3.5)	4	10.2	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	

Instructions:
Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the mean performance of the country in the row is significantly higher than that of the comparison country, significantly lower than that of the comparison country, or if there is no statistically significant difference between the mean performance of the two countries.

▲ Mean performance statistically significantly higher than in comparison country.
○ No statistically significant difference from comparison country.
▽ Mean performance statistically significantly lower than in comparison country.

Mean performance statistically significantly above the country mean
Not statistically significantly different from the country mean
Mean performance statistically significantly below the country mean

1. Met guidelines for sample participation rates only after replacement schools were included.
2. National defined population covers less than 95 per cent of national desired population.
Countries are ranked in descending order of mean performance on the PIRLS reading literacy scale.
Source: IEA Progress in Reading Literacy Study (PIRLS) 2001. See Annex 3 for notes (*www.oecd.org/edu/eag2003*).

A4

Policy context

This indicator provides a profile of the reading literacy of 4th-grade students in terms of mean performance and variation in performance.

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 more fully in their communities and society, which is fundamental for the well being of nations. It is one of the most important abilities that students acquire and develop as they progress through their school years. Data from the International Association for the Evaluation of Educational Achievement's (IEA) Progress in Reading Literacy Study (PIRLS) provide a profile of reading literacy skills of students during the early years of schooling, at the 4th-grade level. Indicator A5 complements this profile with information on reading literacy skills among 15-year-olds.

Evidence and explanations

PIRLS and PISA define reading literacy as an interactive, constructive process and emphasise the importance of students' ability to use reading for different purposes (see also Box A4.1). This indicator profiles 4th-grade students' performance in reading literacy in several ways: by examining countries' mean performance, distribution of performance within countries, and performance differences between males and females.

Mean performance of countries

Already at the 4th grade level, countries differ significantly in the reading performance of their students…

Examining countries' mean scores in a given subject can be useful for obtaining an overall indication of how an education system is performing at a certain grade and in a certain area.

At the same time, if one country's scores are higher than those of another country, it cannot automatically be inferred that the schools in the former are more effective, since learning starts well before school and occurs in a range of institutional and out-of-school settings. Nonetheless, if a country's scores are higher, one can legitimately conclude that the cumulative impact of all learning experiences in that country, from early childhood until the point in testing, has resulted in more desirable outcomes in the subject areas assessed.

On the PIRLS reading literacy scale, 4th-grade students in Sweden perform significantly higher than their counterparts in all other OECD countries, with a mean score that is 32 points higher than the OECD average (Chart A4.1 and Table A4.1). Seven other countries (the Czech Republic, England, Germany, Hungary, Italy, the Netherlands and the United States) still perform significantly above the OECD mean of 529 points, with scores ranging from 537 to 554 points. Four countries (France, Greece, New Zealand and Scotland) have average scores that are not significantly different from the OECD mean, and another four (Iceland, Norway, the Slovak Republic and Turkey) score significantly below the OECD mean.

In interpreting these results, it needs to 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 OECD countries.

A4

Box A4.1. Reading literacy in PISA and PIRLS - Definitions

PISA and PIRLS both seek to inform about the reading literacy performance of students. However, differences in curricular demands and developmental expectations placed on 9-year-olds and 15-year-olds result in differences in the approach. As 9-year-olds commonly have just reached the end of their early reading instruction, PIRLS focuses on the acquisition of reading literacy. By contrast the focus of PISA is on the extent to which students who are approaching the end of compulsory education have acquired the capacity to access, manage, integrate, evaluate and reflect on written information, as the foundation for further learning and their active and full participation in modern societies. In short, while the focus at the beginning of schooling is on learning to read, the focus towards the end of compulsory education is on using reading for learning.

Similarities and distinctions in definitions of reading literacy

Both PISA and PIRLS view reading as an interactive, constructive process and emphasise the importance of students' ability to reflect on reading and to use reading for different purposes.

PISA defines reading literacy as *understanding, using and reflecting on written texts, in order to achieve one's goals, to develop one's knowledge and potential and to participate in society.* This implies the active and interactive role of the reader in gaining meaning from written texts. It also recognises the full scope of situations in which reading literacy plays a role for young adults, from private to public, from school to work, from active citizenship to lifelong learning. It spells out the idea that literacy enables the fulfilment of individual aspirations – from defined aspirations such as gaining an educational qualification or obtaining a job, to those less immediate goals which enrich and extend one's personal life.

In a similar way, PIRLS defines reading literacy as: *…the ability to understand and use those written language forms required by society and/or valued by the individual. Young readers can construct meaning from a variety of texts. They read to learn, to participate in a community of readers, and for enjoyment.*

Both definitions take into account the range of material students choose and are required to read. By doing so, they suggest that reading is not a unitary skill, but rather a set of processes, approaches, and skills that vary among readers, text types, and purposes or situations for reading. While social, personal, and curricular elements of reading literacy are also emphasised in both definitions, the developmental differences between the two age groups are apparent. For 9-year-olds, PIRLS emphasises the typical environment in which students read. While PISA stresses students' readiness to participate in larger society, PIRLS emphasises students' ability to participate in "communities of readers…."

Similarities and distinctions in the reporting of reading literacy

The reporting scales in PISA emphasise the type of reading tasks, requiring students to demonstrate their proficiency in retrieving information, understanding texts, interpreting them, reflecting on the content and form of texts in relation to their own knowledge of the world, and evaluating and arguing their own point of view. The reporting scales in PIRLS emphasise purposes for reading and identify two of the most common for this age group: reading for literary experience and reading to acquire and use information.

Source: Knowledge and Skills for Life – A New Framework For Assessment (OECD, 1999) *and Framework and Specifications for PIRLS Assessment 2001* (International Study Center at Boston College, 2nd edition, March 2001).

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 per cent of the cross-country performance differences on the PIRLS scale which is considerable and must be accounted for when comparing performance levels across countries.

…as well as in terms of performance patterns across two subscales of reading.

In addition to the overall reading literacy scale, data from PIRLS also are reported in terms of two subscales, which are based on the *purposes* dimension of the PIRLS assessment framework: reading for literary purposes and reading for informational purposes. Examining countries' mean performance on these subscales is important in that it can shed light on countries' relative strengths

Chart A4.2

Mean performance of 4th-grade students on the overall PIRLS reading literacy scale and the PIRLS reading literacy subscales (2001)

Mean performance statistically significantly above the country mean
Not statistically significantly different from the country mean
Mean performance statistically significantly below the country mean

Overall PIRLS reading literacy scale			PIRLS reading for literary purposes subscale			PIRLS reading for informational purposes subscale		
Sweden	561	(2.2)	Sweden	559	(2.4)	Sweden	559	(2.2)
Netherlands[1]	554	(2.5)	England[1]	559	(3.9)	Netherlands[1]	553	(2.6)
England[1]	553	(3.4)	Netherlands[1]	552	(2.5)	England[1]	546	(3.6)
Hungary	543	(2.2)	United States[1]	550	(3.8)	Germany	538	(1.9)
United States[1]	542	(3.8)	Hungary	548	(2.0)	Hungary	537	(2.2)
Italy	541	(2.4)	Italy	543	(2.7)	Czech Republic	536	(2.7)
Germany	539	(1.9)	Germany	537	(1.9)	Italy	536	(2.4)
Czech Republic	537	(2.3)	Czech Republic	535	(2.3)	France	533	(2.5)
New Zealand	529	(3.6)	New Zealand	531	(3.9)	United States[1]	533	(3.7)
Country mean	***529***	***(0.7)***	***Country mean***	***531***	***(0.7)***	Scotland[1]	527	(3.6)
Scotland[1]	528	(3.6)	Scotland[1]	529	(3.5)	***Country mean***	***527***	***(0.7)***
France	525	(2.4)	Greece[2]	528	(3.3)	New Zealand	525	(3.8)
Greece[2]	524	(3.5)	Iceland	520	(1.3)	Slovak Republic	522	(2.7)
Slovak Republic	518	(2.8)	France	518	(2.6)	Greece[2]	521	(3.7)
Iceland	512	(1.2)	Slovak Republic	512	(2.6)	Iceland	504	(1.5)
Norway	499	(2.9)	Norway	506	(2.7)	Norway	492	(2.8)
Turkey	449	(3.5)	Turkey	448	(3.4)	Turkey	452	(3.8)

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

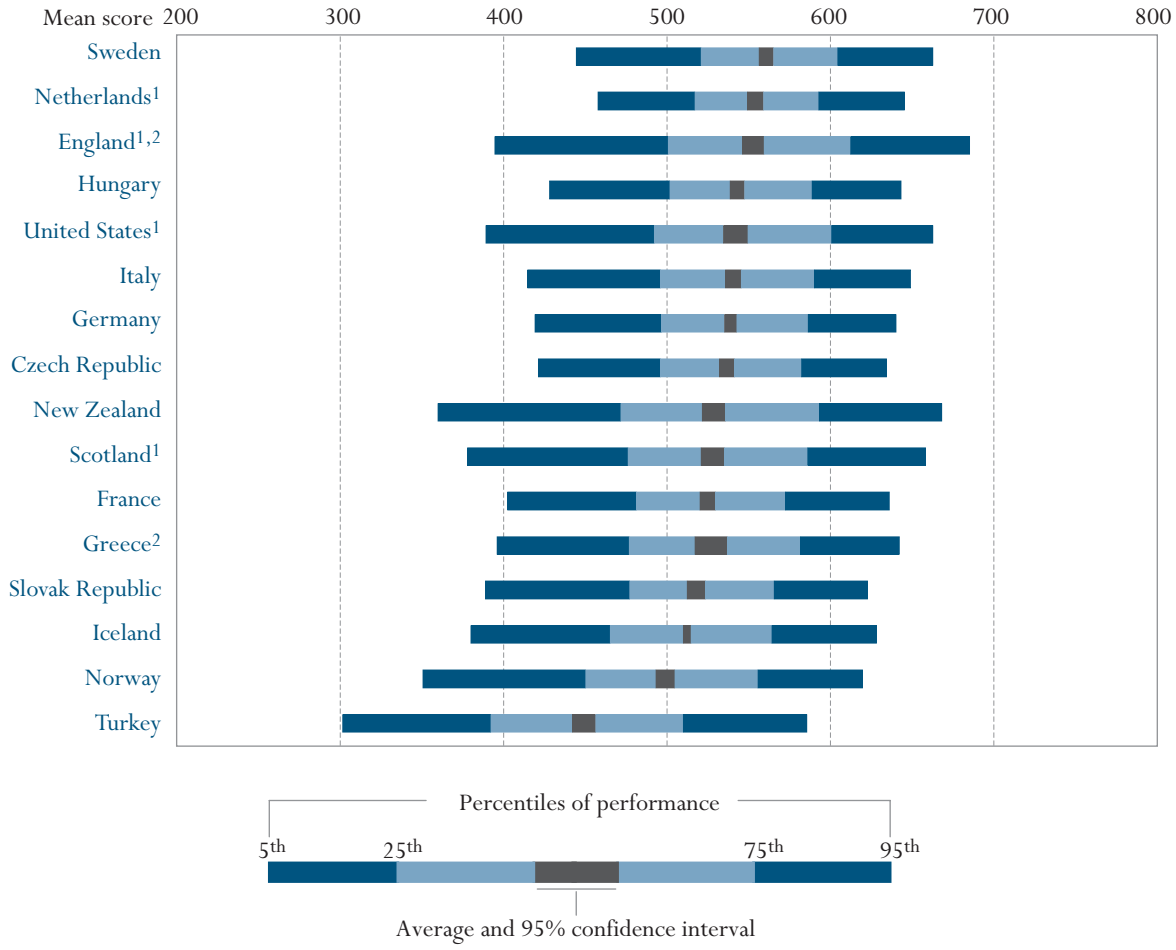
Countries are ranked in descending order of mean performance of each reading literacy scale.

Source: IEA Progress in Reading Literacy Study (PIRLS) 2001. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

and weaknesses. While most countries perform similarly relative to the OECD mean on both subscales, there are a few exceptions (Chart A4.2). In the United States, on items related to reading for literary purposes, students perform significantly above the OECD mean, whereas on items related to reading for informational purposes, their performance is not significantly different from the OECD mean. In France and the Slovak Republic, the situation is reversed. In these countries, students perform relatively better when reading for informational purposes. This is particularly pronounced in France, where students are significantly below the mean on the literary purposes subscale, but significantly above the mean on the informational purposes subscale.

Chart A4.3

Distribution of 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 per cent of national desired population.

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

Source: IEA Progress in Reading Literacy Study (PIRLS) 2001. Table A4.1. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A4

Distribution of performance

Some countries achieve high performance standards for the vast majority of students…

While mean scores are useful for obtaining a general picture of performance, they often mask significant variation in the performance of students within countries. In this indicator, within-country variation is measured by the inter-quartile range, or the difference between the mean scores of students at the 75th percentile and those of students at the 25th percentile *i.e.* the range of scores which covers the performance of the middle 50 per cent of students.

…while in other countries there are large disparities in the performance of students.

In PIRLS, the degree of within-country variation in performance in reading literacy varies among countries, with the interquartile range varying from 76 points in the Netherlands to 121 points in New Zealand (Table A4.1 and Chart A4.3). In the latter country, as well as in Turkey and England, the difference between students in the top quarter and those in the bottom quartile is greater than or equal to the difference between the averages of students in the highest- and lowest-performing countries.

It also is useful to compare a country's range of performance with its average performance, as education systems do not only seek to achieve high performance overall, but to do so for all students. With a few notable exceptions (*e.g.,* England and the United States), the data show that high mean scores can be achieved along with relatively small differences among students within countries. Three countries (Hungary, the Netherlands and Sweden) have among the highest relative means in reading literacy and lowest relative interquartile ranges. Conversely, among the countries performing significantly below the OECD mean, only the Slovak Republic has an interquartile range that is relatively small, below the OECD mean.

Definitions and methodologies

The performance scores are based on the Progress in Reading Literacy Study (PIRLS) that was undertaken by the International Association for the Evaluation of Educational Achievement (IEA) during 2001.

The PIRLS target population was students in the upper of the two adjacent grades that contained the largest proportion of nine 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.

Note that the OECD average, as presented in this indicator, is based only on the 16 OECD countries that participated in PIRLS. The Canadian provinces of Ontario and Quebec also took part in the study but as these represent less than 65 per cent of Canada as a whole, Canada is not shown in the tables and charts. The OECD mean is equal to 529 score points on the PIRLS scale. The average age of the students assessed ranges from 9.7 years in Iceland to 10.8 years in Sweden.

For additional notes on methodology, see *www.oecd.org/edu/eag2003* .

A4

Table A4.1

Mean performance and variation in performance in reading literacy of 4th-grade students (2001)

Performance of 4th-grade students on the PIRLS reading literacy scale, by percentile

		Mean		Years of formal schooling	Average age	Percentiles								Inter-quartile range[1]
						5th		25th		75th		95th		
		Mean score	S.E.			Score	S.E.	Score	S.E.	Score	S.E.	Score	S.E.	
OECD COUNTRIES														
Czech Republic	▲	537	(2.3)	4	10.5	421	(5.2)	496	(1.9)	582	(3.0)	634	(4.7)	86
England[2, 3]	▲	553	(3.4)	5	10.2	395	(6.3)	501	(4.4)	612	(4.5)	685	(5.3)	112
France		525	(2.4)	4	10.1	403	(5.2)	481	(2.8)	573	(1.8)	636	(4.5)	91
Germany	▲	539	(1.9)	4	10.5	419	(3.9)	497	(3.1)	586	(1.9)	640	(1.9)	90
Greece[3]		524	(3.5)	4	9.9	396	(4.0)	477	(5.3)	582	(3.1)	642	(4.1)	105
Hungary	▲	543	(2.2)	4	10.7	428	(4.4)	502	(2.4)	589	(2.9)	643	(3.8)	87
Iceland	▼	512	(1.2)	4	9.7	380	(3.3)	466	(2.8)	564	(2.3)	629	(5.4)	99
Italy	▲	541	(2.4)	4	9.8	415	(6.5)	496	(3.2)	590	(3.1)	649	(2.7)	94
Netherlands[2]	▲	554	(2.5)	4	10.3	458	(4.1)	517	(3.8)	593	(2.9)	645	(3.6)	76
New Zealand		529	(3.6)	5	10.1	360	(4.7)	472	(5.9)	593	(4.5)	668	(5.1)	121
Norway	▼	499	(2.9)	4	10.0	351	(5.0)	450	(4.1)	556	(6.4)	620	(4.4)	105
Scotland[2]		528	(3.6)	5	9.8	378	(5.1)	476	(6.0)	586	(2.7)	658	(6.1)	110
Slovak Republic	▼	518	(2.8)	4	10.3	389	(9.7)	477	(2.7)	566	(1.8)	623	(3.9)	88
Sweden	▲	561	(2.2)	4	10.8	445	(4.5)	521	(4.7)	605	(1.7)	663	(2.1)	84
Turkey	▼	449	(3.5)	4	10.2	302	(3.9)	392	(4.0)	510	(4.1)	586	(6.0)	118
United States[2]	▲	542	(3.8)	4	10.2	389	(8.9)	492	(4.7)	601	(4.2)	663	(2.8)	108
Country mean		***529***	***(0.7)***	***4***	***10.2***	***396***		***482***		***581***		***643***		***98***

▲ Mean performance statistically significantly above the country mean

▼ Mean performance statistically significantly below the country mean

1. Difference between the scores at the 25th and 75th percentiles.
2. Met guidelines for sample participation rates only after replacement schools were included.
3. National Defined Population covers less than 95 per cent of National Desired Population.

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

INDICATOR A5: READING LITERACY OF 15-YEAR-OLDS

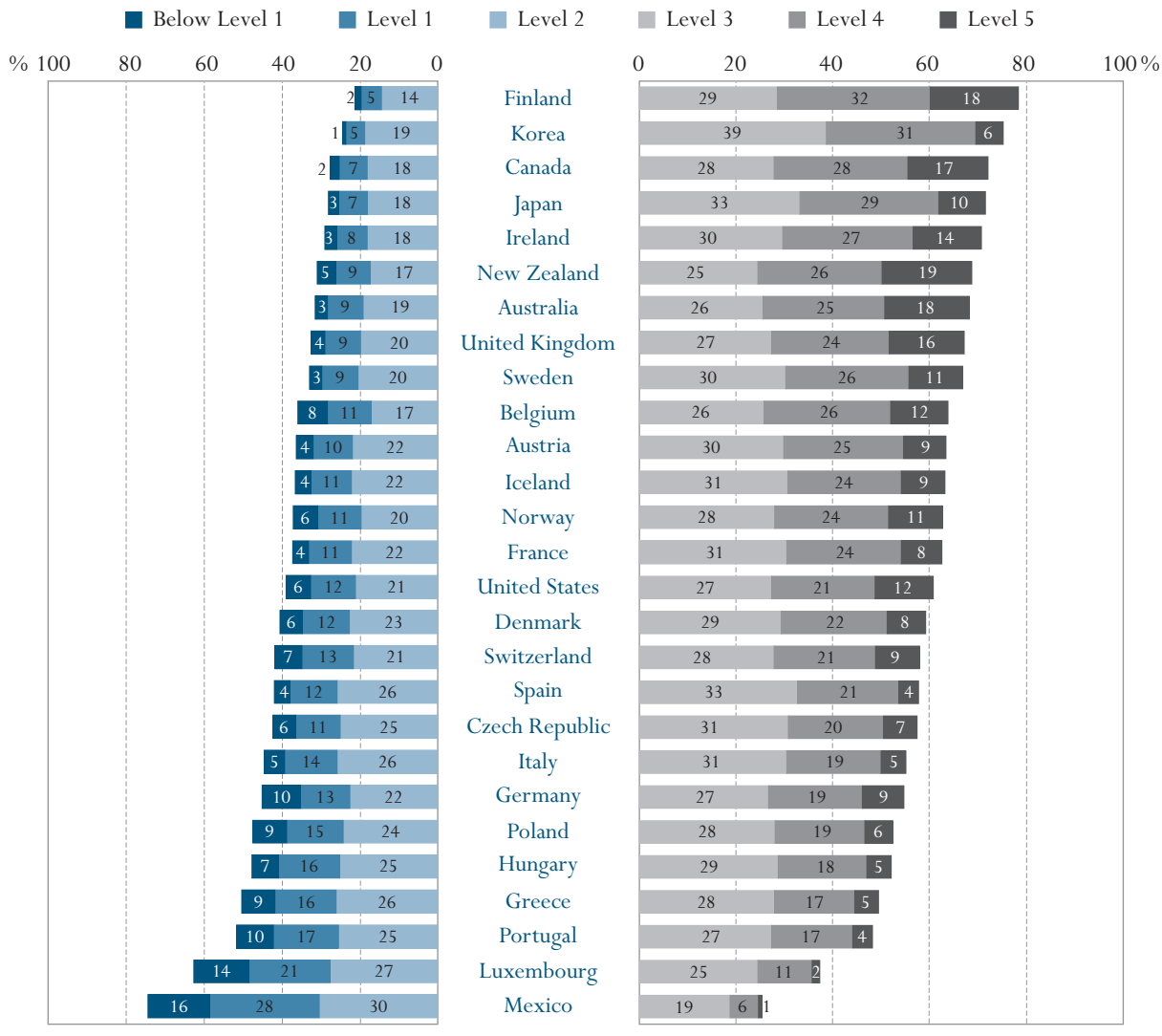
A5

- On average among OECD countries, 10 per cent of 15-year-olds have acquired 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 per cent in Finland and New Zealand to below 1 per cent in Mexico.
- Six countries (the Czech Republic, Germany, Greece, Hungary, Italy and the United States) performed relatively better in PIRLS than in PISA. In the first four cases, scores were above the OECD average in PIRLS and 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.

Chart A5.1

Proficiency of 15-year-olds on the PISA reading literacy scale (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 database, 2001. Table A5.1. See Annex 3 for notes on methodology *(www.oecd.org/edu/eag2003)* and *www.pisa.oecd.org.*

A5

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

Policy context

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 A4 and A5 are examined together, they provide a context for examining improvements 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 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 A5.1 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.

Ten per cent of 15-year-olds in OECD countries have acquired Level 5 literacy skills …

Chart A5.1 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 A5.2). As can be seen from the chart, the percentage of students reaching each level of literacy and the patterns of distribution among the levels varies from country to country. Across countries, on average, 10 per cent of students reach proficiency Level 5, 32 per cent reach at least Level 4 (*i.e.,* Levels 4 and 5), 61 per cent reach at least Level 3, 82 per cent reach at least Level 2, and 94 per cent reach at least Level 1.

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

Examining individual countries' performance by proficiency level is revealing: In five countries (Australia, Canada, Finland, New Zealand and the United Kingdom), 15 per cent or more of students reach the highest level of proficiency in reading literacy. In Belgium, Ireland and the United States, a significant percentage of students also reach proficiency level 5 (between 12 and 15 per cent). However, only five per cent or less of the students in Brazil, Greece, Latvia, Luxembourg, Mexico, Portugal, Spain and the Russian Federation reach the highest level of proficiency.

A5

Box A5.1. 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, a reading literacy scale summarises the results from the three reading scales. Indicator A5 focuses on the latter scale only 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 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.

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 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 A5.1).

Half of all 15-year-olds in Finland and at least 40 per cent of students in five other countries 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 Brazil, the country with the lowest overall performance in reading literacy, only about 4 per cent of students score at Level 4 or above.

A5

Box A5.2. 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.

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 per cent 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 per cent 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 United Kingdom, there are large numbers of students at the highest level, but over 10 per cent 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 per cent of students are at Level 1 or below, but where a below-average proportion (6 per cent) reach the highest level of proficiency (Table A5.1).

A5

In every OECD country, at least half of all students are at Level 2 or higher. Interestingly, in Spain, where only 4 per cent of students reach Level 5, an above-average 84 per cent reach at least Level 2. However, over 40 per cent of students in Spain have Level 2 as their highest proficiency level (Table A5.1).

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 therefore 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 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 future life…

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 per cent on average among OECD countries) are able to solve successfully at least 10 per cent of the non-multiple choice reading tasks in PISA 2000 (and 6 per cent correctly solve one-quarter of them). 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 a few per cent to nearly half…

In the combined OECD area, 12 per cent of students perform at Level 1, and 6 per cent below Level 1, but there are wide differences among countries. In Finland and Korea, only around 5 per cent of students perform at Level 1, and less than 2 per cent below it, but these countries are exceptions. In all other

A5

OECD countries, between 9 and 44 per cent of students perform at or below Level 1. Over 2 per cent and, in half of the OECD countries over 5 per cent, perform below Level 1 (Table A5.1).

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

The countries with 20 per cent or more of students at Level 1 or below are, respectively, Brazil, Hungary, Germany, Greece, Latvia, Liechtenstein, Luxembourg, Mexico, Poland, Portugal, the Russian Federation and Switzerland. In Brazil, Germany, Latvia, Luxembourg, Mexico and Portugal, between close to 10 and 23 per cent 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, which has the relatively high figure of 9 per cent of its students performing at Level 5 (Table A5.1).

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, reflecting 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 lies between countries and can, therefore, be captured through a comparison of country averages. The remaining variation of 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.

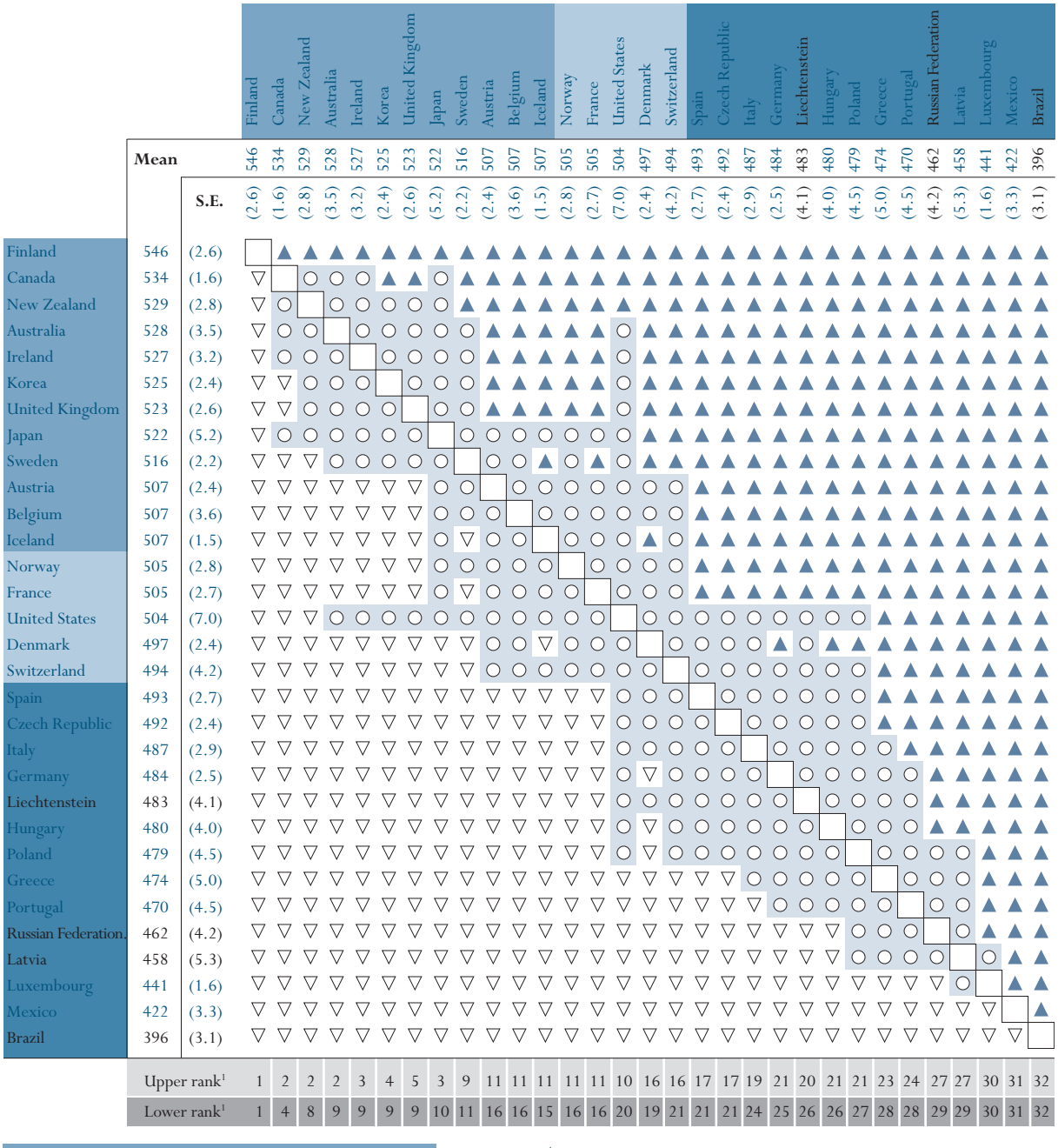
Finland shows unparalleled overall performance, almost two-thirds of a proficiency level ahead of the OECD average.

On the reading literacy scale, students from Finland perform on average higher than students from any other country participating in the study (see Chart A5.2). 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). Twelve other countries, Australia, Austria, Belgium, Canada, Iceland, Ireland, Japan, Korea, the Netherlands, New Zealand, Sweden and the United Kingdom, score significantly above the OECD mean. Five countries perform at or about the OECD mean, and 14 countries, including the four non-OECD countries, perform significantly below the OECD mean.

A5

Chart A5.2

Multiple comparisons of mean performance on the PISA reading literacy scale (2000)



Statistically significantly above the country mean
Not statistically significantly different from the country mean
Statistically significantly below the country mean

▲ Mean performance statistically significantly higher than in comparison country.
○ No statistically significant difference from comparison country.
▽ Mean performance statistically significantly lower than in comparison country.

Instructions

Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the mean performance of the country in the row is statistically significantly lower than that of the comparison country, statistically significantly higher than that of the comparison country, or if there is no statistically significant difference between the mean performance of the two countries.

Note: Countries are presented in descending order of mean performance on the PISA reading literacy scale. Due to low response rates, the Netherlands is excluded from the figure. Assuming negligible to moderate levels of bias due to non-response, the position of the Netherlands may be expected, with 95 per cent confidence, to lie between 2nd and 14th place among countries.

1. Because data are based on samples, it is not possible to report exact rank order positions for countries. However, it is possible to report the range of rank order positions within which the country mean lies with 95 per cent likelihood.

Source: OECD PISA database, 2001. See Annex 3 for notes on methodology *(www.oecd.org/edu/eag2003)* and *www.pisa.oecd.org.*

A5

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 A5.2), 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 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.

That 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 disparities 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 percentile 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 percentile 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 A5.2).

A5

Box A5.3. Reading literacy performance in PISA and PIRLS

As shown in Box A4.1, 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 between the two studies are not possible – as PIRLS and PISA are different assessments with different approaches to defining their target population – it is in 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 first four cases, scores were above the OECD average in PIRLS and 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 A5.3).

Distribution of performance

In the Czech Republic and Sweden, variation in reading literacy performance is low among both 4th graders and at age 15. However, in Sweden average performance is above OECD level in both age groups whereas in the Czech Republic, average performance among 4th graders is above the OECD level but at an age below the OECD average (Tables A4.1 and A5.2). 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 their mean reading score 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 needs to 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 per cent 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.

A5

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

For notes on standard errors, significance tests, and multiple comparisons see Annex 3 at *www.oecd.org/edu/eag2003*.

A5

Table A5.1
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)***
NON-OECD 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)

Source: OECD PISA database, 2001. See Annex 3 for notes on methodology (*www.oecd.org/edu/eag2003*) and *www.pisa.oecd.org*.

A5

Table A5.2

Variation in performance in reading literacy of 15-year-olds (2000)

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

		Mean		Standard deviation		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)*
NON-OECD 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)

Source: OECD PISA database, 2001. See Annex 3 for notes on methodology (*www.oecd.org/edu/eag2003*) and *www.pisa.oecd.org.*

A5

Table A5.3

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

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

▲ Mean performance statistically significantly above the PISA country mean

▼ Mean performance statistically significantly below the PISA country mean

Δ Mean performance statistically significantly above the PIRLS country mean

∇ Mean performance statistically significantly below the PIRLS country mean

Source: IEA Progress in Reading Literacy Study (PIRLS) 2001 and OECD PISA database, 2001.

A6

INDICATOR A6: 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.

A6

Chart A6.1

Multiple comparisons of mean performance on the PISA mathematical literacy scale (2000)

	Mean	S.E.	Japan	Korea	New Zealand	Finland	Australia	Canada	Switzerland	United Kingdom	Belgium	France	Austria	Denmark	Iceland	Liechtenstein	Sweden	Ireland	Norway	Czech Republic	United States	Germany	Hungary	Russian Federation	Spain	Poland	Latvia	Italy	Portugal	Greece	Luxembourg	Mexico	Brazil
			557	547	537	536	533	533	529	529	520	517	515	514	514	514	510	503	499	498	493	490	488	478	476	470	463	457	454	447	446	387	334
			(5.5)	(2.8)	(3.1)	(2.1)	(3.5)	(1.4)	(4.4)	(2.5)	(3.9)	(2.7)	(2.5)	(2.4)	(2.3)	(7.0)	(2.5)	(2.7)	(2.8)	(2.8)	(7.6)	(2.5)	(4.0)	(5.5)	(3.1)	(5.5)	(4.5)	(2.9)	(4.1)	(5.6)	(2.0)	(3.4)	(3.7)
Japan	557	(5.5)		○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea	547	(2.8)	○		○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
New Zealand	537	(3.1)	○	○		○	○	○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	536	(2.1)	▽	○	○		○	○	○	○	▲	▲	▲	▲	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	533	(3.5)	▽	○	○	○		○	○	○	○	▲	▲	▲	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Canada	533	(1.4)	▽	▽	○	○	○		○	○	▲	▲	▲	▲	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Switzerland	529	(4.4)	▽	▽	○	○	○	○		○	○	○	○	○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United Kingdom	529	(2.5)	▽	▽	○	○	○	○	○		○	▲	▲	▲	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Belgium	520	(3.9)	▽	▽	▽	▽	○	▽	○	○		○	○	○	○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
France	517	(2.7)	▽	▽	▽	▽	▽	▽	○	▽	○		○	○	○	○	○	▲	▲	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Austria	515	(2.5)	▽	▽	▽	▽	▽	▽	○	▽	○	○		○	○	○	○	▲	▲	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Denmark	514	(2.4)	▽	▽	▽	▽	▽	▽	○	▽	○	○	○		○	○	○	▲	▲	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Iceland	514	(2.3)	▽	▽	▽	▽	▽	▽	○	▽	○	○	○	○		○	○	▲	▲	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Liechtenstein	514	(7.0)	▽	▽	○	○	○	○	○	○	○	○	○	○	○		○	○	○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	510	(2.5)	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○	○	○		○	○	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	503	(2.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○		○	○	○	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway	499	(2.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○		○	○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	498	(2.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	▽	○	○		○	○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	493	(7.6)	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○	○	○	○	○	○	○		○	○	○	○	○	▲	▲	▲	▲	▲	▲	▲
Germany	490	(2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○		○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	488	(4.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○	○		○	○	○	▲	▲	▲	▲	▲	▲	▲
Russian Federation	478	(5.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○		○	○	▲	▲	▲	▲	▲	▲	▲
Spain	476	(3.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	▽	○	○		○	▲	▲	▲	▲	▲	▲	▲
Poland	470	(5.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	▽	○	○	○		○	○	○	○	▲	▲	▲
Latvia	463	(4.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○		○	○	○	▲	▲	▲
Italy	457	(2.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○		○	○	▲	▲	▲
Portugal	454	(4.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○		○	○	▲	▲
Greece	447	(5.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○	○		○	▲	▲
Luxembourg	446	(2.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○		▲	▲
Mexico	387	(3.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▲
Brazil	334	(3.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	
Upper rank[1]			1	2	4	4	4	5	4	6	9	10	10	10	11	9	13	16	17	17	16	20	20	21	23	23	25	26	26	27	29	31	32
Lower rank[1]			3	3	8	7	9	8	10	10	15	15	16	16	16	18	17	19	20	20	23	22	23	25	25	26	28	28	29	30	30	31	32

Statistically significantly above the country mean
Not statistically significantly different from the country mean
Statistically significantly below the country mean

▲ Mean performance statistically significantly higher than in comparison country.
○ No statistically significant difference from comparison country.
▽ Mean performance statistically significantly lower than in comparison country.

Instructions

Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the mean performance of the country in the row is statistically significantly lower than that of the comparison country, statistically significantly higher than that of the comparison country, or if there is no statistically significant difference between the mean performance of the two countries.

Note: Countries are presented in descending order of mean performance on the PISA mathematical literacy scale. Due to low response rates, the Netherlands is excluded from the figure. Assuming negligible to moderate levels of bias due to non-response, the position of the Netherlands may be expected, with 95 per cent confidence, to lie between 1st and 4th place among countries.

1. Because data are based on samples, it is not possible to report exact rank order positions for countries. However, it is possible to report the range of rank order positions within which the country mean lies with 95 per cent likelihood.

Source: OECD PISA database, 2001. See Annex 3 for notes on methodology *(www.oecd.org/edu/eag2003)* and *www.pisa.oecd.org.*

A6

Policy context

Mathematics and science today need to be used by the many, not just the few…

The need to provide the 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 on the labour market and earnings prospects of individuals but also on 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 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 A6.1).

Evidence and explanations

Charts A6.1 and A6.2 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 three other top-performing countries: Korea, the Netherlands and New Zealand. Other countries that score significantly above the OECD average include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Iceland, Liechtenstein, Sweden, Switzerland and the United Kingdom (Chart A6.1).

…and 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 A6.2).

A6

Box A6.1. 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 need to 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, reached by at least three-quarters of the students in almost all countries, 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.

A6

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 than the OECD average. Students in Denmark and Liechtenstein, 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 A6.1 and A6.2 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 less than 118 score point differences.

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 five of the countries with the smallest differences between the 75th and 25th percentiles on the mathematical literacy scale, namely Canada, Finland, Iceland, Japan and Korea, all perform significantly above the OECD average (Table A6.1). Furthermore, four of them, Canada, Finland, Japan and Korea are among the six best-performing 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 five countries (Belgium, Germany, Greece, Hungary and Poland) 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.

A6

Chart A6.2

Multiple comparisons of mean performance on the PISA scientific literacy scale (2000)

	Mean	S.E.	Korea	Japan	Finland	United Kingdom	Canada	New Zealand	Australia	Austria	Ireland	Sweden	Czech Republic	France	Norway	United States	Hungary	Iceland	Belgium	Switzerland	Spain	Germany	Poland	Denmark	Italy	Liechtenstein	Greece	Russian Federation	Latvia	Portugal	Luxembourg	Mexico	Brazil
			552	550	538	532	529	528	528	519	513	512	511	500	500	499	496	496	496	496	491	487	483	481	478	476	461	460	460	459	443	422	375
			(2.7)	(5.5)	(2.5)	(2.7)	(1.6)	(2.4)	(3.5)	(2.5)	(3.2)	(2.5)	(2.4)	(3.2)	(2.7)	(7.3)	(4.2)	(2.2)	(4.3)	(4.4)	(3.0)	(2.4)	(5.1)	(2.8)	(3.1)	(7.1)	(4.9)	(4.7)	(5.6)	(4.0)	(2.3)	(3.2)	(3.3)
Korea	552	(2.7)		○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	550	(5.5)	○		○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	538	(2.5)	▽	○		○	○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United Kingdom	532	(2.7)	▽	○	○		○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Canada	529	(1.6)	▽	▽	○	○		○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
New Zealand	528	(2.4)	▽	▽	○	○	○		○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	528	(3.5)	▽	▽	○	○	○	○		○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Austria	519	(2.5)	▽	▽	▽	▽	▽	○	○		○	○	○	▲	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	513	(3.2)	▽	▽	▽	▽	▽	▽	○	○		○	○	○	○	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	512	(2.5)	▽	▽	▽	▽	▽	▽	▽	○	○		○	○	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	511	(2.4)	▽	▽	▽	▽	▽	▽	▽	○	○	○		○	○	○	▲	▲	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
France	500	(3.2)	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○		○	○	○	○	○	○	○	▲	○	▲	▲	○	▲	▲	▲	▲	▲	▲	▲
Norway	500	(2.7)	▽	▽	▽	▽	▽	▽	▽	▽	○	▽	○	○		○	○	○	○	○	○	▲	○	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	499	(7.3)	▽	▽	▽	▽	▽	▽	▽	○	○	○	○	○	○		○	○	○	○	○	○	○	○	○	○	▲	▲	▲	▲	▲	▲	▲
Hungary	496	(4.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○		○	○	○	○	○	○	○	▲	○	▲	▲	▲	▲	▲	▲	▲
Iceland	496	(2.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○		○	○	○	○	○	▲	▲	○	▲	▲	▲	▲	▲	▲	▲
Belgium	496	(4.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○	○		○	○	○	○	▲	▲	○	▲	▲	▲	▲	▲	▲	▲
Switzerland	496	(4.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○	○	○	○		○	○	○	▲	▲	○	▲	▲	▲	▲	▲	▲	▲
Spain	491	(3.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○	○	○	○		○	○	○	○	○	▲	▲	▲	▲	▲	▲	▲
Germany	487	(2.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○	○	○		○	○	○	○	▲	▲	▲	▲	▲	▲	▲
Poland	483	(5.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○	○	○	○	○	○		○	○	○	▲	▲	○	▲	▲	▲	▲
Denmark	481	(2.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	▽	○	○	○	○	○		○	○	▲	▲	▲	▲	▲	▲	▲
Italy	478	(3.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	▽	▽	▽	▽	○	○	○	○		○	○	○	○	▲	▲	▲	▲
Liechtenstein	476	(7.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	▽	○	○	○	○	○	○	○	○	○	○		○	○	○	○	▲	▲	▲
Greece	461	(4.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○		○	○	○	▲	▲	▲
Russian Federation	460	(4.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○		○	○	▲	▲	▲
Latvia	460	(5.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	▽	○	○	○		○	○	▲	▲
Portugal	459	(4.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	○	○	○		▲	▲	▲
Luxembourg	443	(2.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	○	▽		▲	▲
Mexico	422	(3.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▲
Brazil	375	(3.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	
Upper rank[1]			1	1	3	3	4	4	4	8	9	9	10	13	13	11	13	14	13	13	16	19	19	21	22	20	25	26	25	26	30	31	32
Lower rank[1]			2	2	4	7	8	8	8	10	12	13	13	18	18	21	21	20	21	21	22	23	25	25	25	26	29	29	29	29	30	31	32

Statistically significantly above the country mean

Not statistically significantly different from the country mean

Statistically significantly below the country mean

▲ Mean performance statistically significantly higher than in comparison country.

○ No statistically significant difference from comparison country.

▽ Mean performance statistically significantly lower than in comparison country.

Instructions

Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the mean performance of the country in the row is statistically significantly lower than that of the comparison country, statistically significantly higher than that of the comparison country, or if there is no statistically significant difference between the mean performance of the two countries.

Note: Countries are presented in descending order of mean performance on the PISA scientific literacy scale. Due to low response rates, the Netherlands is excluded from the figure. Assuming negligible to moderate levels of bias due to non-response, the position of the Netherlands may be expected, with 95 per cent confidence, to lie between 3rd and 14th place among countries.

1. Because data are based on samples, it is not possible to report exact rank order positions for countries. However, it is possible to report the range of rank order positions within which the country mean lies with 95 per cent likelihood.

Source: OECD PISA database, 2001. See Annex 3 for notes on methodology *(www.oecd.org/edu/eag2003)* and *www.pisa.oecd.org.*

A6

The performance scores are based on assessments administered as part of the Programme for International Student Assessment (PISA) undertaken by the OECD during 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/eag2003*.

A6

Table A6.1

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)*
NON-OECD 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)

Source: OECD PISA database, 2001. See Annex 3 for notes on methodology (*www.oecd.org/edu/eag2003*) and *www.pisa.oecd.org*.

A6

Table A6.2

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											
		Mean		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)*
NON-OECD 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)

Source: OECD PISA database, 2001. See Annex 3 for notes on methodology (*www.oecd.org/edu/eag2003*) and *www.pisa.oecd.org*.

INDICATOR A7: HOW STUDENT PERFORMANCE VARIES BETWEEN SCHOOLS

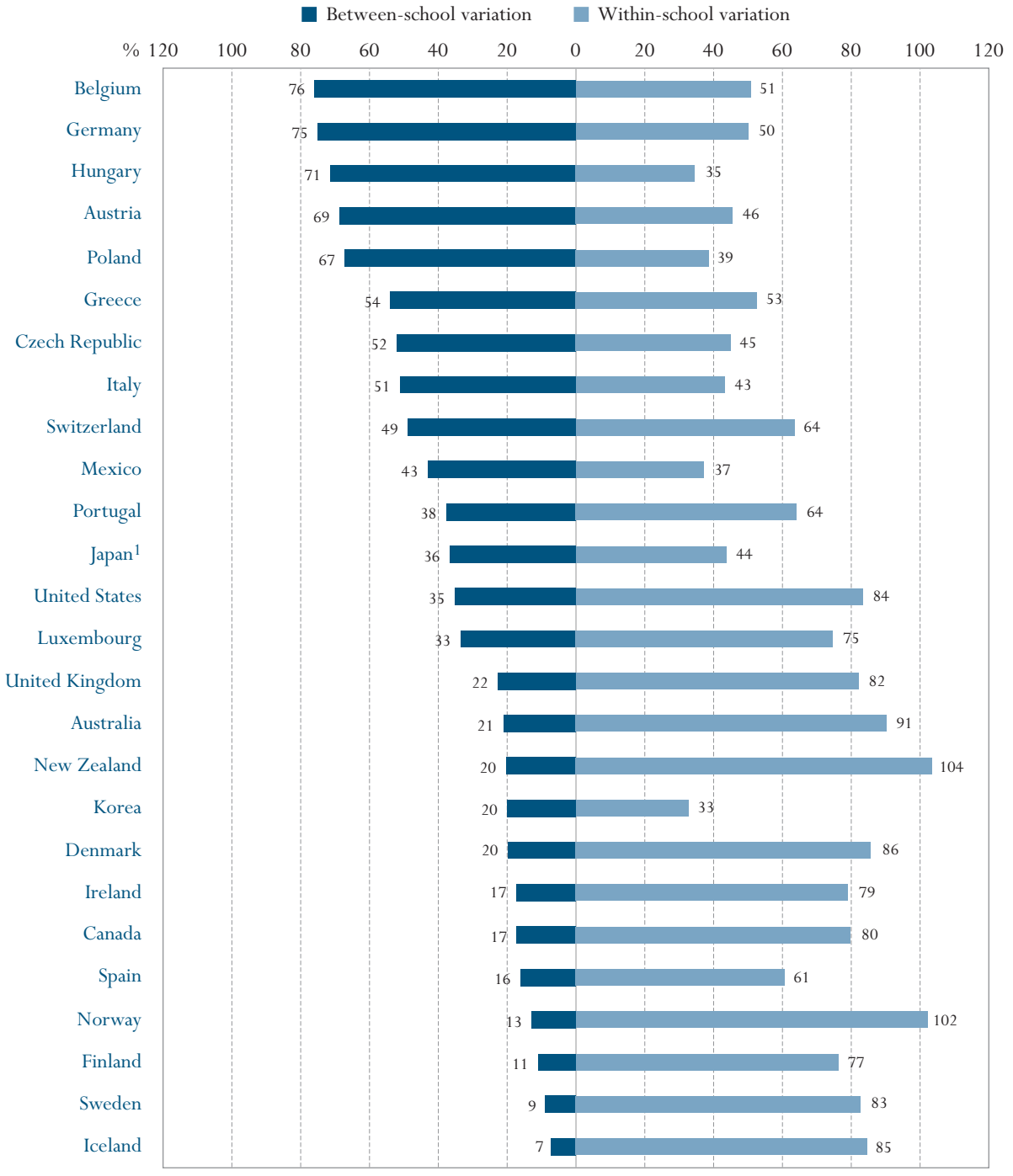
- On average, differences in the performance of 15-year-olds between schools account for 36 per cent of the OECD average variation in student performance, but this proportion varies from below 10 per cent in Iceland and Sweden to more than 50 per cent in Austria, Belgium, the Czech Republic, Germany, Greece, Hungary, Italy and Poland.
- Some of the variation between schools is attributable to geography, institutional factors or the selection of students by ability. The differences are often compounded by family background, particularly in countries with differentiated school systems, since students' results are associated not only with their own individual backgrounds but – to a greater extent – with the backgrounds of others at their school.
- High overall variation can result from high within-school differences, high between-school differences or a combination of the two.
- In school systems with differentiated school types, the clustering of students with particular socio-economic characteristics in certain schools is greater than in systems where the curriculum does not vary significantly between schools.

A7

Chart A7.1

Variation in student performance between and within schools on the PISA reading literacy scale (2000)

Expressed as a percentage of the average variation in student performance in OECD countries



Countries are ranked in descending order of the total between-school variation in student performance on the PISA reading literacy scale.

1. Due to sampling methods used, the between-school variance in Japan includes variation between classes within schools.

Source: OECD PISA database, 2001. Table A7.1. See Annex 3 for notes on methodology *(www.oecd.org/edu/eag2003)* and *www.pisa.oecd.org.*

A7

Policy context

Many factors account for the performance differences observed by PISA…

Indicators A5 and A6 have shown that, in most countries, there are considerable differences in performance within each education system. This variation may result from the background of students and schools, from the human and financial resources available to schools, from curricular differences, from selection policies and practices and from the way in which teaching is organised and delivered.

…and the organisation of the education system can play a significant part in this equation.

Some countries have non-selective school systems that seek to provide all students with the same opportunities for learning and that allow each school to cater to the full range of student performance. Other countries respond to diversity explicitly by forming groups of students of similar performance levels through selection either within or between schools, with the aim of serving students according to their specific needs. And in yet other countries, combinations of the two approaches occur. Even in comprehensive school systems, there may be significant variation between schools due to the socio-economic and cultural characteristics of the communities that the schools serve or due to geographical differences (such as differences between regions, provinces or states in federal systems, or differences between rural and urban areas). Finally, there may be significant variation between individual schools that cannot be easily quantified or otherwise described, part of which could result from differences in the quality or effectiveness of the teaching that those schools provide.

To shed light on this, this indicator examines performance differences between schools.

To examine the impact of such policies and practices, this indicator examines differences between schools in reading literacy performance. The results for mathematical and scientific literacy are broadly similar and therefore not shown in this indicator.

Evidence and explanations

Chart A7.1 compares the extent of variation in student performance within countries…

Chart A7.1 and Table A7.1 show the extent of variation attributable to different factors in each country. The length of the bars indicates the total observed variation in student performance on the reading literacy scale. Note that the values are expressed as percentages of the average variation between OECD countries in student performance on the reading literacy scale. If the sum of the two bars for each country is larger than 100, this indicates that variation in student performance is greater in the corresponding country than in a typical OECD country. Similarly, a combined value smaller than 100 indicates below-average variation in student performance.

…and breaks it down into between-school and within-school differences.

The bar for each country is aligned so that variation between schools is represented by the length to the left of the vertical line down the centre of the chart, and variation within schools is represented by the length to the right of that vertical line. Longer segments to the left of the vertical line indicate greater variation in the mean performance of schools. Longer segments to the right of the vertical line indicate greater variation among students within schools.

A7

On average, differences between schools account for 36 per cent of the OECD average between-student variation, but this proportion varies widely across countries.

As shown in Chart A7.1, in most countries a considerable portion of the variation in student performance lies between schools. On average, among the 26 OECD countries included in this comparison, differences between schools account for 36 per cent of the OECD average between-student variation. In Austria, Belgium, the Czech Republic, Germany, Greece, Hungary, Italy and Poland, more than 50 per cent of the OECD average between-student variation is between schools (see Column 3 in Table A7.1). Where there is substantial variation between schools and less variation between students within schools, students will generally be in schools in which other students perform at levels similar to their own. This selectivity may reflect family choice of school or residential location, or policies on school enrolment, allocation of students or the curriculum.

Some countries have low variation between schools and within schools…

In Korea, overall variation in student performance on the reading literacy scale is about half the OECD average variation in that category, and Korea's variation between schools is only about 20 per cent of the OECD average variation between schools. Korea thus not only achieves high average performance in reading and low overall disparity between students, but does so with relatively little variation in mean performance between schools. Spain also shows low overall variation (around three-quarters of the OECD average) and low between-school variation (16 per cent of the OECD average variation in student performance) but, unlike Korea, has a mean score significantly below the OECD average.

…particularly those with the lowest overall variation.

The smallest variation in reading performance between schools occurs in Finland, Iceland and Sweden, where the differences account for only between 7 and 11 per cent of the average between-student variation in OECD countries. In these countries performance is largely unrelated to the schools in which students are enrolled. They are thus likely to encounter a similar learning environment in terms of the ability distribution of students. It is noteworthy that overall variation in student performance in these countries is below the OECD average. These education systems succeed both in minimising differences between schools and in containing the overall variation in student performance in reading literacy.

High overall variation can result from high within-school differences,…

Australia, New Zealand and Norway (with 112, 126 and 116 per cent of the OECD average between-student variation, respectively) are among the countries with the highest overall variation in reading performance, but only a comparatively small proportion (21, 20 and 13 per cent of the OECD average of student performance) results from differences between schools. In these countries, most variation occurs within schools, suggesting that individual schools need to cater to a more diverse client base.

…high between-school differences…

Belgium, Germany and Switzerland (124, 133 and 112 per cent of the average between-student variation in OECD countries) are also countries with comparatively high overall variation in student performance, but a large proportion (76, 75 and 49 per cent of the OECD average variation in student performance) results from differences in performance between schools.

The United States, another country with comparatively large overall variation in student performance (118 per cent of the average variation between students in OECD countries), is somewhere in the middle, with 35 per cent of the average OECD variation in student performance between schools.

…or a combination of the two.

The fuller analysis in the report *Knowledge and Skills for Life* (OECD, 2001) suggests that, in school systems with differentiated school types, the clustering of students with particular socio-economic characteristics in certain schools is greater than in systems where the curriculum does not vary significantly between schools. In Austria, Belgium, the Czech Republic, Germany, Italy and the Netherlands, for example, the between-school variation associated with the fact that students attend different types of school is considerably compounded by differences in social and family background. This may be a consequence of selection or self-selection: when the school market provides some differentiation, students from lower social backgrounds may tend to be directed to, or choose for themselves, less demanding study programmes, or may opt not to participate in the selection procedures of the education system.

Some of the variation between schools is attributable to geography, institutional factors or selection of students by ability.

The fuller analysis also suggests that the effect of the overall social background of a school's intake on student performance tends to be greater than the impact of the individual student's social background. Students from a lower socio-economic background attending schools in which the average socio-economic background is high tend to perform much better than when they are enrolled in a school with a below-average socio-economic intake – and the reverse is true for more advantaged students in less advantaged schools. This suggests that institutional differentiation in education systems, often compounded by the social background of a school's intake, self-selection by students and/or their parents as well as judgements on prior performance, can have a major impact on an individual student's success at school.

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 during 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, 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 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.

Variation in Table A7.1 is expressed by statistical variance. This is obtained by squaring the standard deviation referred to earlier in this chapter. The statistical variance rather than the standard deviation is used for this comparison to allow for the decomposition of the components of variation in student performance.

A7

The average is calculated over the OECD countries included in the table. Owing to the sampling methods used in Japan, the between-school variation in Japan includes variation between classes within schools.

For notes on standard errors, significance tests, and multiple comparisons see Annex 3 at *www.oecd.org/edu/eag2003*.

A7

Table A7.1

Sources of variation in performance in reading literacy of 15-year-old students (2000)

Between-school and within-school variation in student performance on the PISA reading literacy scale

		Variation expressed as a percentage of the average variation in student performance (SP) across the OECD countries							
					Variation explained by the international socio-economic index of occupational status of students		Variation explained by the international socio-economic index of occupational status of students and schools		
		Total variation in SP[1]	Total variation in SP expressed as a percentage of the average variation in student performance across OECD countries	Total variation in SP between schools	Total variation in SP within schools	Between-school variation explained	Within-school variation explained	Between-school variation explained	Within-school variation explained	Total variation between schools expressed as a percentage of the total variation within the country[2]
OECD COUNTRIES	Australia	10 357	111.6	20.9	90.6	8.3	6.7	14.2	6.9	18.8
	Austria	8 649	93.2	68.6	45.7	10.4	0.4	42.6	0.3	60.0
	Belgium	11 455	123.5	76.0	50.9	11.0	1.8	44.2	1.9	59.9
	Canada	8 955	96.5	17.1	80.1	4.6	5.0	7.8	5.1	17.6
	Czech Republic	9 278	100.0	51.9	45.3	8.8	1.8	34.4	1.8	53.4
	Denmark	9 614	103.6	19.6	85.9	10.2	8.0	11.6	8.1	18.6
	Finland	7 994	86.2	10.7	76.5	1.5	4.6	1.7	4.6	12.3
	France	m	m	m	m	m	m	m	m	m
	Germany	12 368	133.3	74.8	50.2	11.7	2.3	51.5	2.3	59.8
	Greece	9 436	101.7	53.8	52.9	7.0	1.1	25.0	1.1	50.4
	Hungary	8 810	95.0	71.2	34.8	8.3	0.3	49.4	0.2	67.2
	Iceland	8 529	91.9	7.0	85.0	1.6	5.0	1.7	5.0	7.6
	Ireland	8 755	94.4	17.1	79.2	5.5	5.7	10.1	5.7	17.8
	Italy	8 356	90.1	50.9	43.4	3.4	0.5	23.8	0.5	54.0
	Japan[3]	7 358	79.3	36.5	43.9	m	m	m	m	45.4
	Korea	4 833	52.1	19.7	33.0	1.0	0.2	7.1	0.2	37.4
	Luxembourg	10 088	108.7	33.4	74.9	11.1	8.3	26.7	8.2	30.8
	Mexico	7 370	79.4	42.9	37.4	5.2	0.1	25.7	0.1	53.4
	New Zealand	11 701	126.1	20.1	103.9	7.3	10.9	11.6	11.0	16.2
	Norway	10 743	115.8	12.6	102.4	3.7	8.7	4.9	8.7	10.9
	Poland	9 958	107.3	67.0	38.9	6.3	1.1	42.4	1.1	63.2
	Portugal	9 436	101.7	37.5	64.3	10.6	4.6	23.8	4.6	36.8
	Spain	7 181	77.4	15.9	60.9	5.4	3.0	9.1	3.1	20.7
	Sweden	8 495	91.6	8.9	83.0	4.5	6.9	5.8	6.9	9.7
	Switzerland	10 408	112.2	48.7	63.7	12.7	4.0	24.3	3.9	43.4
	United Kingdom	10 098	108.9	22.4	82.3	9.6	8.4	16.0	8.7	21.4
	United States	10 979	118.3	35.1	83.6	12.0	5.6	25.5	5.8	29.6
NON-OECD COUNTRIES	Brazil	7 427	80.1	35.8	47.1	6.5	1.9	19.7	2.1	43.1
	Latvia	10 435	112.5	35.1	77.5	4.9	4.4	16.7	4.5	31.2
	Liechtenstein	m	m	m	m	m	m	m	m	43.9
	Russian Federation	8 466	91.3	33.6	57.1	4.8	2.4	15.4	2.3	37.1

1. The total variation in student performance is obtained as the square of the standard deviation shown in Table A5.2. The statistical variance and not the standard deviation is used for this comparison to allow for the decomposition of the components of variation in student performance. For reasons explained in the *PISA 2000 Technical Report*, the sum of the between and within-school variance components may, for some countries, differ slightly from the square of the standard deviation shown in Table A5.2.
2. This index is often referred to as the intra-class correlation (rho).
3. Due to the sampling methods used in Japan, the between-school variance in Japan includes variation between classes within schools.

Source: OECD PISA database, 2001. See Annex 3 for notes on methodology (*www.oecd.org/edu/eag2003*) and *www.pisa.oecd.org.*

A8

INDICATOR A8: PROFILES OF 15-YEAR-OLD READERS

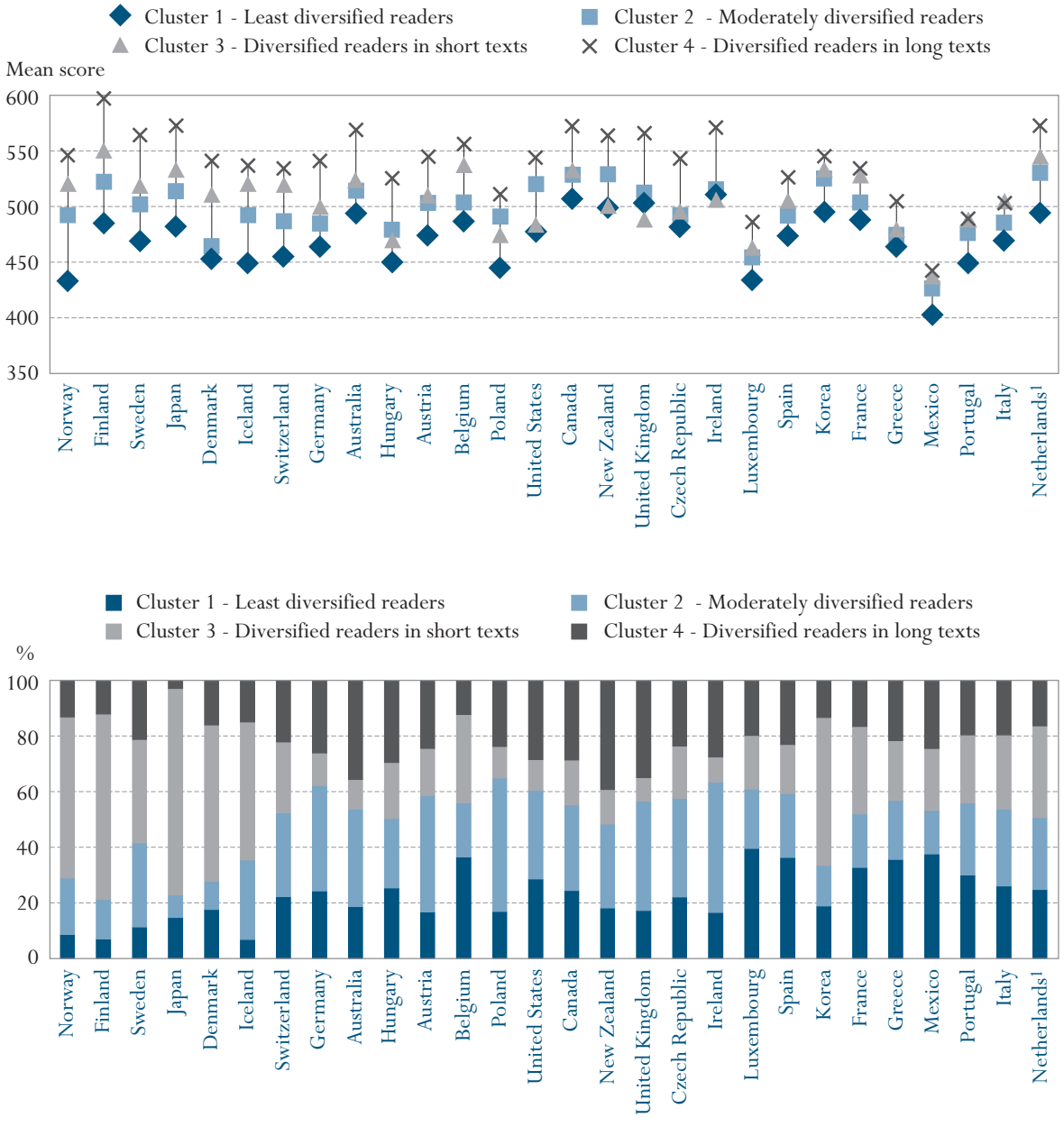
- PISA identifies several profiles of readers. Some 15-year-olds focus their reading on a limited set of print material; magazines only, or magazines and newspapers. Others, more diversified in their reading interests, choose a broader range of print content. Some choose to read comics in addition to magazines and newspapers while others prefer books, either fiction or non-fiction, to comics.
- Profiles of readers differ perceptibly from one country to another. In some countries, such as Finland and Japan, a high proportion of the students who read a variety of print content mainly read newspapers, magazines and comics. In other countries, such as Australia, New Zealand and the United Kingdom, students who read a diverse range of materials tend to choose newspapers, magazines and books (fiction and non-fiction).
- Females and males show clearly different profiles of reading. Among the two profiles of students poorly diversified in reading, mainly readers of newspapers and magazines, males and females are more or less equally distributed. The third profile, of readers more oriented towards comics, comprises a majority of males, while the profile oriented towards reading books, especially fiction, comprises a majority of females.
- Not surprisingly, 15-year-olds reading a diversity of print material are more proficient in reading than those reading a limited set of print material. But the gap in reading proficiency between those reading comics and those reading fiction is not huge. Daily engagement in reading magazines, newspapers and comics – a kind of reading that is perhaps less valued by school than fiction books – seems, at least in some cultural contexts, to be a fruitful way of becoming a proficient reader.

A8

Chart A8.1

Performance and profiles of 15-year-old readers (2000)

Performance of 15-year-olds on the PISA combined reading literacy scale and percentage of students by reading profile cluster



1. Response rate is too low to ensure comparability.

Countries are ranked in descending order of the difference between mean scores on the PISA combined reading literacy scale in Cluster 1- Least diversified readers and Cluster 4 - Diversified readers in long texts.

Source: OECD PISA database, 2001. Table A8.2. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A8

This indicator examines the reading literacy skills of 15-year-old students in relation to the frequency and diversity of print materials that they read.

Policy context

Students' reading practices outside of the classroom are associated with their reading literacy performance. It is well established that students who choose to spend a lot of time reading tend to be better readers than those who do not. In examining students' reading practices, it is important to consider not just the amount of time that students spend reading, but also how they invest this time. While some students may choose to read only one type of material (*e.g.*, magazines) frequently, others read a diversity of materials. Understanding what students read frequently and how these choices are related to reading performance can prompt educators and policymakers to devise early-intervention strategies to foster certain reading behaviours in order to promote literacy.

This indicator, drawn from PISA, profiles students' reading practices according to the materials they read frequently and demonstrates the relationship between these profiles and their performance in reading literacy. Indicator A9 builds on these findings to explore a broader concept of "engagement" in reading, which encompasses both reading practices and attitudes toward reading.

Evidence and explanations

Students can be grouped according to their reading patterns of different material.

In PISA, students were asked to rate how frequently they chose to read different kinds of print materials, including magazines, newspapers, comics, and fiction and non-fiction books. Based on their responses, students were grouped into four distinct reading profiles, or *clusters*. The distribution of these clusters is based on two dimensions: the frequency of reading, and the diversity of reading. These two dimensions are reflected in such expressions as "involved in diversified reading" or "diversified reader". This indicator concentrates on the frequency with which students read *for enjoyment* and does therefore not represent the totality of students' reading practices, which would also include reading at school and for homework.

Reading profiles

Cluster 1 comprises the least diversified readers…

Students in Cluster 1 were identified as the readers who are the least involved in diversified reading (least diversified readers). The only materials that students in Cluster 1 report reading frequently are magazines; 38 per cent read magazines frequently. Much smaller percentages of students in Cluster 1 report frequently reading other materials (Table A8.1).

…Cluster 2 moderately diversified readers…

Students in Cluster 2 can be considered modestly diversified readers. While a vast majority of the students in Cluster 2 report frequently reading newspapers (89 per cent) as well as magazines (70 per cent), very small percentages of students report reading other print materials.

…Cluster 3 readers that are diversified in short texts …

In Cluster 3, the overwhelming majority of students frequently read magazines (85 per cent) and newspapers (81 per cent) – as in Cluster 2 – but they also frequently read comics (89 per cent). By comparison with Clusters 1 and 2, these students are more involved in diversified reading, but their focus is on relatively short and undemanding texts.

A8

Likewise, Cluster 4 includes students who are diversified readers, but the focus of these students is on more demanding and longer texts, namely books. A majority of these students report frequently reading magazines (71 per cent), newspapers (76 per cent), and fiction (72 per cent), while almost half (48 per cent) report frequently reading non-fiction books (Table A8.1).

…and Cluster 4 readers that are diversified in long and complex texts…

Reading profiles and performance

Reading patterns are closely associated with performance…

Grouping students by their involvement in diversified reading can provide insight into the relationship between reading practices and reading literacy. Performance on the combined reading literacy scale is related among OECD countries to the frequency with which students report reading a diversity of materials. Students in Cluster 1, the least diversified readers, had the lowest mean score (468 points) on the combined reading literacy scale compared to students in other clusters, and score significantly below the OECD average. The modestly diversified readers in Cluster 2 had a mean score of 498 points, which is statistically similar to the OECD average and significantly higher than the mean score for students in Cluster 1. By contrast, the diversified readers of shorter texts (Cluster 3) scored higher than the OECD average (514 points versus 500 points), while the diversified readers of longer texts in Cluster 4 scored significantly higher, with 539 points, than both the OECD average and the average of students in Cluster 3. The average difference between scores of the least diversified readers (Cluster 1) and the diversified readers of longer texts (Cluster 4) was 71 points, almost an entire proficiency level (Table A8.2).

…both overall as well as within each country.

The relationship between diversified reading of longer texts and reading literacy scores is evident *within* most countries as well. In all countries except Italy, students who are diversified readers of longer texts (Cluster 4) obtain the highest average reading literacy scores. At the other extreme, in all countries except Ireland and the United Kingdom, students who are among the least diversified readers (Cluster 1) have the lowest mean scores within their respective countries compared to the other clusters. The difference between scores of the least diversified readers (Cluster 1) and the diversified readers of longer texts (Cluster 4) ranged from 34 points in Italy to 112 and 113 points in Finland and Norway, respectively (Chart A8.1).

The relationship between reading profiles and performance among students in Clusters 2 and 3 is somewhat less consistent among countries. For example, in several English-speaking countries (Ireland, New Zealand, the United Kingdom, and the United States) and in certain Eastern European countries (Hungary and Poland), students in Cluster 2 obtain higher reading literacy scores than students in Cluster 3. This result is interesting in that it suggests that, in these countries, students who report reading a more diverse array of reading materials, especially comics and to a lesser extent books, perform less well than students who report reading only newspapers and magazines (Table A8.2).

Another way of exploring the relationship between reading practices and reading literacy is to examine the distribution of readers across the PISA reading proficiency levels (for the definition of the proficiency levels, see Indicator A5).

A8

As would be expected, among countries, Cluster 1 has the largest share of students reading at or below Level 1 relative to the other clusters (27 per cent versus 16, 13, and 10 per cent respectively for Clusters 2, 3, and 4). By contrast, Cluster 4 has the largest share of students reading at the two highest levels of proficiency (Levels 4 or 5) – 47 per cent compared with 35, 28, and 21 for Clusters 3, 2, and 1, respectively (Chart A8.2 and Table A8.3).

Reading profiles among countries

Reading patterns differ widely among countries…

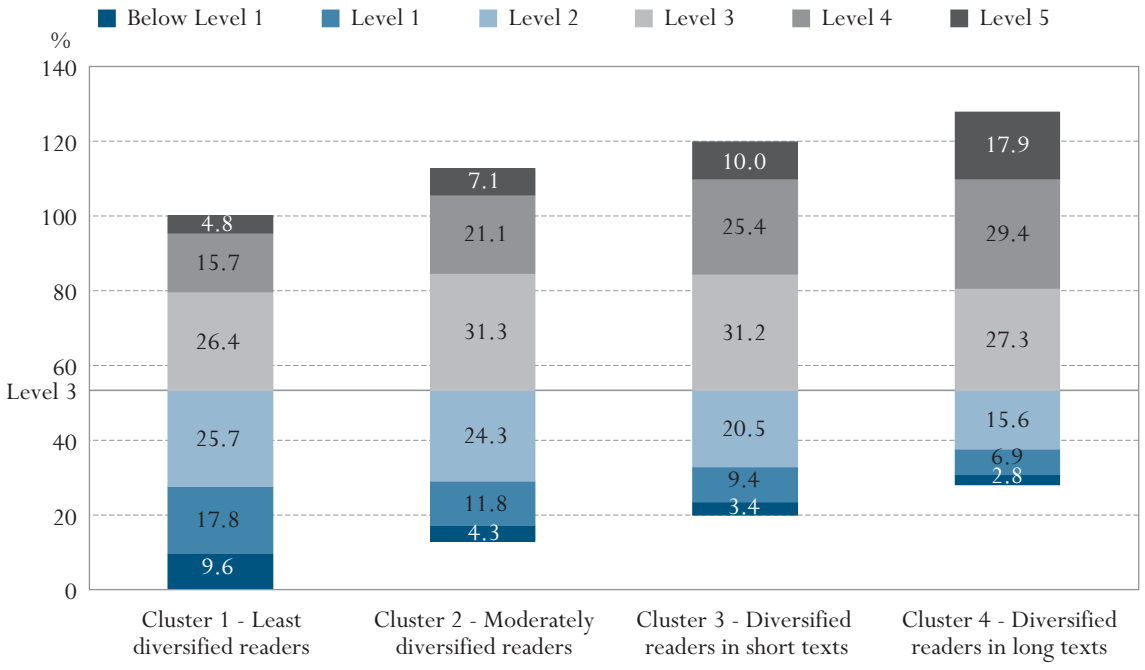
Although the relationship between diversified reading and reading literacy appears to be somewhat similar among countries, the actual patterns of reading practices are not. The countries that have the lowest proportion of students in Cluster 1 are Finland (7 per cent), Iceland (7 per cent), Norway (8 per cent), and Sweden (11 per cent). By contrast, more than 30 per cent of students in six countries are in Cluster 1: Belgium, France, Greece, Luxembourg, Mexico and Spain.

…and some of these differences are reflected in performance patterns.

Four of these countries with high proportions of the least diversified readers (Greece, Luxembourg, Mexico and Spain) have overall mean reading scores that are significantly below the OECD average of 500, while one (France) scores similar to the OECD average and another (Belgium) scores significantly above the OECD average (Table A8.2 and Chart A8.1).

Chart A8.2

Percentage of 15-year-olds in each PISA reading profile cluster (2000)
by level of proficiency on the PISA combined reading literacy scale



Source: OECD PISA database, 2001. Table A8.3. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

Not surprisingly, there is also a large range among countries in the proportions of students who are diversified readers of longer texts (Cluster 4). The proportions of students in Cluster 4 ranged from 3 per cent in Japan and 12 per cent in Belgium and Finland to more than one-third of the students in Australia, New Zealand, and the United Kingdom. As one would expect, countries that have a high proportion of students who are diversified readers of longer texts have mean scores that are significantly above the OECD average. The converse, however, is not necessarily true. For instance, although Finland and Japan have low proportions of students in Cluster 4, these two countries also have mean reading scores that are well above the OECD mean. This may in part be explained by the fact that, in both of these countries, two-thirds to three quarters of the students are diversified readers of shorter texts (Cluster 3).

Reading profiles and gender

Females tend to be not just better performers but also more diversified readers.

Patterns of diversity of reading practices also vary by gender. Numerous studies in various countries have demonstrated that females, on average, spend more time reading and also tend to read different types of materials than do males. Indeed, the concentration of males in certain clusters shows this to be the case. On average, 34 per cent of males, compared to 23 per cent of females, are grouped in Cluster 3. The majority of students in Cluster 3 report frequently reading shorter texts such as newspapers, magazines, and comics, but not books. Conversely, in Cluster 4, females outnumber males (29 per cent versus 16 per cent on average). Students in Cluster 4 tend to frequently read newspapers, magazines, and books (especially fiction), but not comics. Thus, the more involved readers of fiction are clearly females, a trend that is observed in every OECD country. The distinction between males and females is more balanced among the less diversified readers (Clusters 1 and 2), and varies more by country (Table A8.4).

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 during 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 and or whether they participated in school full-time or part-time.

In PISA, students were asked to rate how frequently they read different kinds of materials. For the cluster analysis in this indicator, reading one kind of material 'several times a month' or 'several times a week' is considered as frequent reading, 'a few times a year' and 'once a month' as moderate reading, and 'never or hardly ever' as no reading.

For notes on standard errors, significance tests, and multiple comparisons see Annex 3 at *www.oecd.org/edu/eag2003*.

A8

Table A8.1

Profiles of 15-year-old readers (2000)

Cross-country mean percentage of 15-year-olds reading each kind of print material, by PISA reading profile cluster

	No reading	Moderate reading	Frequent reading
Cluster 1 - Least diversified readers (22.4 per cent of students)			
Magazines	15.6	46.0	38.4
Newspapers	47.6	52.2	0.2
Comics	49.6	37.4	12.9
Fiction	40.6	47.1	12.3
Non-fiction	53.7	40.7	5.7
Cluster 2 - Moderately diversified readers (27.1 per cent of students)			
Magazines	4.6	25.4	69.9
Newspapers	-	11.4	88.6
Comics	60.7	38.9	0.4
Fiction	45.3	51.9	2.7
Non-fiction	51.7	45.3	3.1
Cluster 3 - Diversified readers in short texts (28.3 per cent of students)			
Magazines	1.8	13.5	84.7
Newspapers	2.4	16.1	81.4
Comics	-	10.6	89.4
Fiction	18.2	51.3	30.5
Non-fiction	24.5	54.4	21.0
Cluster 4 - Diversified readers in long texts (22.2 per cent of students)			
Magazines	3.2	26.3	70.5
Newspapers	2.2	21.7	76.1
Comics	46.0	48.4	5.6
Fiction	0.7	27.4	71.9
Non-fiction	4.3	47.5	48.3

Source: OECD PISA database, 2001.

A8

Table A8.2

Performance and profiles of 15-year-old readers (2000)

Performance of 15-year-olds on the PISA combined reading literacy scale and percentage of students, by PISA reading profile cluster

		All students		Cluster 1 - Least diversified readers				Cluster 2 - Moderately diversified readers				Cluster 3 - Diversified readers in short texts				Cluster 4 - Diversified readers in long texts			
		Mean score	S.E.	Mean score	S.E.	%	S.E.	Mean score	S.E.	%	S.E.	Mean score	S.E.	%	S.E.	Mean score	S.E.	%	S.E.
OECD COUNTRIES	Australia	528	(3.5)	494	(4.9)	18.5	(0.9)	514	(3.7)	35.0	(1.1)	522	(6.3)	10.8	(0.6)	569	(4.4)	35.7	(1.2)
	Austria	507	(2.4)	474	(4.6)	16.6	(0.7)	503	(2.4)	41.9	(0.9)	509	(3.5)	17.0	(0.5)	545	(3.6)	24.6	(0.8)
	Belgium	507	(3.6)	487	(4.4)	36.3	(0.6)	503	(5.4)	19.6	(0.6)	537	(3.4)	31.8	(0.7)	556	(5.5)	12.3	(0.5)
	Canada	534	(1.6)	507	(2.3)	24.3	(0.4)	528	(1.7)	30.8	(0.5)	531	(2.5)	16.2	(0.3)	572	(1.9)	28.7	(0.5)
	Czech Republic	492	(2.4)	482	(3.5)	22.0	(0.7)	492	(2.8)	35.6	(0.9)	494	(3.4)	18.7	(0.6)	543	(2.9)	23.8	(0.7)
	Denmark	497	(2.4)	453	(5.0)	17.5	(0.8)	464	(6.0)	10.1	(0.6)	511	(2.3)	56.2	(1.0)	541	(5.2)	16.2	(0.6)
	Finland	546	(2.6)	485	(14.6)	6.9	(0.5)	522	(4.4)	14.2	(0.6)	550	(2.2)	66.6	(0.9)	597	(3.5)	12.3	(0.5)
	France	505	(2.7)	488	(4.1)	32.6	(0.9)	503	(3.4)	19.2	(0.7)	528	(2.9)	31.3	(0.9)	534	(4.1)	16.8	(0.7)
	Germany	484	(2.5)	464	(4.2)	24.1	(0.8)	485	(2.8)	38.0	(0.8)	499	(5.9)	11.6	(0.6)	541	(3.1)	26.3	(0.7)
	Greece	474	(5.0)	464	(5.3)	35.4	(0.9)	474	(6.6)	21.3	(0.8)	478	(5.8)	21.5	(0.7)	505	(5.2)	21.8	(0.9)
	Hungary	480	(4.0)	450	(4.8)	25.1	(1.0)	479	(4.3)	25.1	(0.8)	470	(4.7)	20.1	(0.7)	525	(4.7)	29.6	(1.0)
	Iceland	507	(1.5)	449	(6.5)	6.6	(0.5)	492	(2.6)	28.6	(0.7)	520	(2.1)	49.7	(0.8)	537	(4.3)	15.1	(0.6)
	Ireland	527	(3.2)	510	(5.9)	16.3	(0.7)	515	(3.3)	47.0	(0.8)	507	(5.9)	8.9	(0.6)	571	(3.6)	27.8	(1.0)
	Italy	487	(2.9)	469	(4.7)	25.8	(0.9)	485	(3.3)	27.9	(0.7)	505	(3.3)	26.5	(0.8)	503	(4.1)	19.8	(0.7)
	Japan	522	(5.2)	482	(8.2)	14.5	(0.9)	514	(7.2)	8.1	(0.5)	532	(4.6)	74.4	(0.9)	573	(7.7)	3.0	(0.3)
	Korea	525	(2.4)	495	(3.9)	18.8	(0.6)	525	(3.7)	14.6	(0.6)	531	(2.4)	53.1	(1.1)	545	(3.8)	13.6	(0.7)
	Luxembourg	441	(1.6)	434	(2.5)	39.4	(0.8)	454	(4.3)	21.3	(0.6)	461	(4.0)	19.2	(0.7)	486	(3.8)	20.0	(0.6)
	Mexico	422	(3.3)	403	(3.6)	37.5	(1.3)	426	(5.9)	15.6	(0.8)	438	(4.3)	22.3	(5.9)	443	(4.9)	24.7	(0.7)
	New Zealand	529	(2.8)	499	(4.8)	18.0	(0.7)	529	(3.1)	30.1	(0.9)	500	(6.4)	12.4	(0.6)	564	(3.7)	39.4	(1.0)
	Norway	505	(2.8)	433	(7.1)	8.5	(0.6)	492	(4.2)	20.2	(0.7)	520	(2.7)	58.0	(0.9)	546	(4.3)	13.3	(0.5)
	Poland	479	(4.5)	445	(7.0)	16.7	(0.9)	491	(4.2)	48.0	(1.1)	474	(6.6)	11.4	(0.7)	511	(6.3)	24.0	(1.1)
	Portugal	470	(4.5)	449	(5.8)	29.8	(0.9)	477	(4.1)	25.9	(0.7)	487	(5.8)	24.4	(0.6)	489	(5.9)	19.8	(0.6)
	Spain	493	(2.7)	474	(3.4)	36.2	(1.1)	492	(3.6)	23.0	(0.7)	503	(3.4)	17.5	(0.7)	526	(2.9)	23.3	(0.7)
	Sweden	516	(2.2)	469	(4.8)	11.1	(0.5)	502	(2.8)	30.3	(0.8)	518	(2.8)	37.3	(0.8)	564	(3.6)	21.3	(0.7)
	Switzerland	494	(4.3)	455	(4.6)	22.1	(0.9)	487	(4.3)	30.3	(0.8)	519	(5.1)	25.4	(0.8)	534	(5.2)	22.2	(0.8)
	United Kingdom	523	(2.6)	503	(4.3)	17.1	(0.6)	512	(2.7)	39.4	(0.9)	488	(5.3)	8.4	(0.5)	566	(3.7)	35.1	(1.0)
	United States	504	(7.1)	478	(7.6)	28.4	(1.3)	520	(5.8)	32.1	(1.5)	482	(10.9)	10.8	(1.1)	544	(6.0)	28.7	(1.5)
	Country mean	*500*	*(0.6)*	*468*	*(1.0)*	*22.4*	*(0.2)*	*498*	*(0.7)*	*27.1*	*(0.1)*	*514*	*(0.9)*	*28.3*	*(0.2)*	*539*	*(0.9)*	*22.2*	*(0.2)*
NON-OECD COUNTRIES	Brazil	396	(3.1)	370	(4.4)	29.5	(1.1)	407	(5.1)	15.1	(0.8)	413	(4.3)	27.5	(1.0)	418	(3.6)	27.9	(1.1)
	Latvia	458	(5.3)	412	(8.2)	13.8	(0.8)	464	(5.3)	39.9	(1.3)	433	(8.7)	15.2	(0.9)	499	(5.7)	31.1	(1.4)
	Liechtenstein	483	(4.1)	442	(11.0)	21.9	(2.1)	478	(8.0)	40.7	(2.5)	524	(12.6)	14.3	(2.1)	526	(11.7)	23.2	(2.5)
	Russian Federation	462	(4.2)	426	(6.3)	11.5	(0.5)	451	(5.1)	17.1	(0.6)	432	(4.8)	21.6	(1.2)	495	(3.9)	49.7	(1.1)
	Netherlands[1]	-	-	494	(5.4)	24.7	(1.3)	530	(4.5)	25.8	(1.0)	544	(4.0)	33.1	(1.2)	573	(4.9)	16.5	(0.9)

1. Response rate is too low to ensure comparability.

Source: OECD PISA database, 2001.

A8

Table A8.3
Cross-country mean percentage of 15-year-olds in each PISA reading profile cluster (2000)
by level of proficiency on the PISA combined reading literacy scale

	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)*
Cluster 1 - Least diversified readers	9.6	17.8	25.7	26.4	15.7	4.8
Cluster 2 - Moderately diversified readers	4.3	11.8	24.3	31.3	21.1	7.1
Cluster 3 - Diversified readers in short texts	3.4	9.4	20.5	31.2	25.4	10
Cluster 4 - Diversified readers in long texts	2.8	6.9	15.6	27.3	29.4	17.9

Source: OECD PISA database, 2001.

Table A8.4
Profiles of 15-year-old readers and gender (2000)
Percentage of 15-year-olds in each PISA reading profile cluster, by gender

		Cluster 1 - Least diversified readers		Cluster 2 - Moderately diversified readers		Cluster 3 - Diversified readers in short texts		Cluster 4 - Diversified readers in long texts	
		Males	Females	Males	Females	Males	Females	Males	Females
OECD COUNTRIES	Australia	17.4	19.7	39.0	30.7	15.5	5.7	28.2	43.9
	Austria	16.9	16.0	42.1	42.0	23.6	10.9	17.4	31.2
	Belgium	34.2	38.5	22.1	16.9	36.3	26.9	7.4	17.6
	Canada	24.7	23.9	34.3	27.2	19.4	13.1	21.6	35.8
	Czech Republic	19.4	24.3	44.8	27.3	22.9	14.9	12.9	33.5
	Denmark	18.2	16.8	11.7	8.4	60.3	52.1	9.7	22.8
	Finland	8.1	5.8	12.2	15.9	74.1	59.7	5.6	18.6
	France	31.7	33.5	16.7	21.6	41.2	22.2	10.4	22.8
	Germany	23.3	24.8	42.6	33.3	16.7	6.7	17.4	35.2
	Greece	24.7	46.0	29.6	12.9	27.4	15.7	18.3	25.3
	Hungary	25.8	24.3	28.3	22.0	21.6	18.7	24.3	35.0
	Iceland	6.5	6.8	29.0	28.2	55.2	44.3	9.4	20.7
	Ireland	15.7	16.9	53.7	40.6	11.2	6.7	19.5	35.8
	Italy	23.4	28.0	30.0	25.9	31.0	21.9	15.5	24.3
	Japan	12.2	16.7	6.4	9.7	79.5	69.5	1.9	4.0
	Korea	16.6	21.5	13.1	16.4	60.3	44.1	10.0	18.1
	Luxembourg	36.2	42.5	23.6	19.1	27.4	11.3	12.8	27.1
	Mexico	36.9	38.0	15.4	15.8	26.8	17.7	20.9	28.5
	New Zealand	18.2	17.9	33.9	26.5	17.6	7.2	30.4	48.4
	Norway	8.6	8.3	19.6	20.7	66.0	49.9	5.8	21.0
	Poland	21.0	12.3	48.1	48.0	14.6	8.2	16.3	31.6
	Portugal	22.9	36.0	37.2	15.7	27.8	21.4	12.1	26.9
	Spain	30.7	41.5	27.9	18.4	25.1	10.4	16.4	29.8
	Sweden	11.9	10.2	29.5	31.1	45.0	29.5	13.6	29.2
	Switzerland	20.2	23.9	34.2	26.5	32.7	18.2	13.0	31.3
	United Kingdom	13.9	20.2	46.0	33.1	12.5	4.4	27.6	42.3
	United States	30.4	26.5	33.2	31.1	15.0	7.0	21.4	35.4
	Country mean	***20.9***	***23.6***	***29.8***	***24.7***	***33.8***	***22.9***	***15.5***	***28.8***
NON-OECD COUNTRIES	Brazil	33.4	26.2	19.5	11.4	29.4	25.9	17.7	36.5
	Latvia	17.0	10.8	42.3	37.5	16.7	13.8	23.9	37.8
	Liechtenstein	17.3	24.8	51.1	31.1	17.9	10.9	13.7	33.2
	Russian Federation	15.4	7.7	21.4	13.0	22.1	21.3	41.0	58.1
	Netherlands[1]	24.5	25.0	27.2	24.3	41.4	24.3	6.9	26.3

1. Response rate is too low to ensure comparability.
Source: OECD PISA database, 2001.

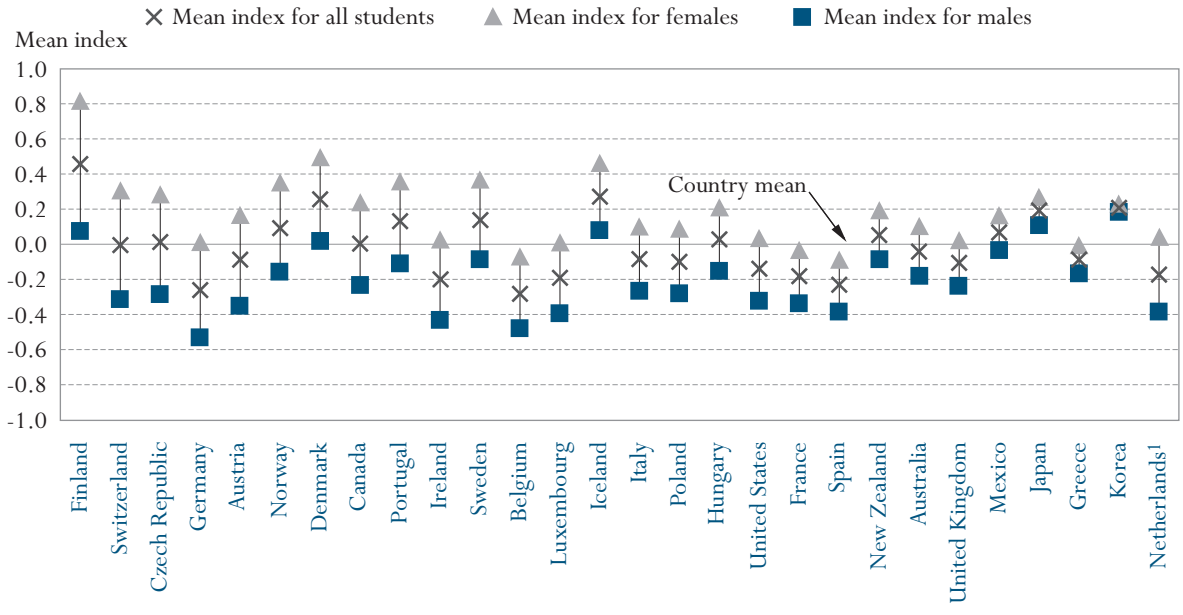
INDICATOR A9: ENGAGEMENT IN READING OF 15-YEAR-OLDS

- Engagement in reading, as defined in this chapter (time spent reading for pleasure, time spent reading a diversity of material, high motivation and interest in reading), varies widely from country to country with Finland, at the high end, and Spain, at the low end, the extremes.
- On average, females tend to be far more strongly engaged in reading than males.
- Fifteen-year-olds whose parents have the lowest occupational status but who are highly engaged in reading achieve better reading scores than students whose parents have high or medium occupational status but who are poorly engaged in reading. All students who are highly engaged in reading achieve reading literacy scores that, on average, are significantly above the OECD mean, whatever their parents' occupational background. This suggests that student engagement with reading may be an important policy lever to counter social disadvantage.

Chart A9.1

Engagement in reading (2000)

Performance of 15-year-olds on the PISA index of engagement in reading, by gender



1. Response rate is too low to ensure comparability.

Countries are ranked in descending order of the difference between females and males on the PISA index of engagement in reading.

Source: OECD PISA database, 2001. Table A9.1. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A9

Policy context

This indicator examines 15-year-old students' engagement in reading, as measured by their reading practices and their attitudes towards reading…

Most current models of reading acquisition consider both reading practices and reading attitudes to be key factors related to reading performance. While reading practices encompass behavioural attributes related to reading (the amount of time students spend reading and, as described in Indicator A8, the diversity of materials they read), reading attitudes encompass students' interest in reading and their motivation to read. When considered together, these two factors – practices and attitudes – provide a composite of overall engagement in reading.

In societies that increasingly depend on the capacity and motivation of their citizens to continue learning throughout life, engagement is an important outcome of education in itself. In addition, it is also an important predictor of student performance as students who are highly engaged in reading tend to perform better on assessments of reading literacy than those who are less engaged.

…as well as the impact of engagement and socio-economic status on performance in reading literacy.

Indicator A9 examines the level of reading engagement for 15-year-olds, using data from PISA. Importantly, this indicator explores the potential role of engagement in moderating the impact of social background on student performance in reading literacy.

Evidence and explanations

In addition to assessing their performance, PISA also asked students about their reading practices and attitudes.

In PISA 2000, students were asked questions about both their reading practices (see also Indicator A8) and their attitudes toward reading (interest in reading and motivation to read). Based on these questions, an index of reading engagement was created. The index scale ranges from –1 to 1, with 0 as the mean value for the combined OECD student population. Negative values do not necessarily mean that students responded negatively to questions, but instead that students in this particular country as a whole responded less positively than students among the OECD countries. Conversely, a positive value indicates that students in a particular country responded more favourably, on average, than did students among the OECD countries.

How engaged in reading are 15-year-old students?

Overall levels of student engagement in reading vary widely between the two extremes – Finland and Belgium.

Levels of engagement in reading vary by country. The country that has the highest average level of engagement is Finland, at 0.46 on the PISA index of reading engagement. Other countries where levels of engagement in reading are relatively high are Denmark (0.26), Iceland (0.27), Japan (0.20) and Korea (0.21). By comparison, countries where the levels of engagement are relatively low are Belgium (-0.28), Germany (-0.26), Ireland (-0.20), Luxembourg (-0.19) and Spain (-0.23) (Table A9.1).

Females tend to be substantially more engaged in reading than males.

Among countries, levels of engagement in reading also vary by gender. In fact, females are substantially more engaged in reading than males, with an average gap of 0.38 on the reading engagement index. The reasons why males are less engaged in reading and the solutions to improve their engagement are much debated issues. Discrimination at school, gender stereotyped reading material, and social norms of masculinity that may discourage commitment to school-

work are all potential explanations that have been offered for the lower levels of engagement among males. Whatever the reasons may be for this pattern, it is clear that fostering engagement in reading will necessitate actions targeted at males.

In every OECD country, females have a higher average engagement in reading than males. In some countries, such as Switzerland and Finland, the gap between females and males is more pronounced (0.62 and 0.74, respectively), while in other countries it is relatively low, such as in Greece (0.17), Japan (0.17), Korea (0.04) and Mexico (0.20). However, there are some interesting differences when males and females are compared between different countries. Males from some countries are more engaged in reading than females from other countries. For instance, males from Denmark, Finland, Iceland, Japan, and Korea report being either as engaged or more engaged in reading than females from Belgium, France and Spain (Table A9.1 and Chart A9.1).

Can engagement in reading moderate the effects of social background on reading literacy?

PISA assesses the extent to which both engagement in reading and social background relate to performance.

Previous studies have shown that engagement in reading can "compensate" for low family income and educational background. In order to explore this, PISA students were distributed into groups based on two variables: their level of engagement in reading and their parents' occupational status. For each of these two indices, three separate groups were created: the low group (below the 25th percentile), the middle group (from the 25th percentile to the 75th percentile) and the high group (above the 75th percentile). These two variables were then combined and nine categories of students were identified (Table A9.2).

Students who are less engaged readers are somewhat more numerous than expected among the group of students whose parents have the lowest occupational status. (The "expected percentage" refers to the percentage of students that one would expect to see in any of the nine categories if they were evenly distributed according to the parameters of the categories). Likewise, highly engaged students are more numerous than expected among the group of students whose parents have the highest occupational status. Approximately 8 per cent of all students are in the low group on both indices, while another 8 per cent are in the high group on both indices. However, engagement is not completely predicted by parents' occupational status. There are students from less privileged social backgrounds who are highly engaged in reading as well as students from more privileged backgrounds who are the least engaged readers.

Not surprisingly, students from more advantaged social backgrounds tend to be more engaged in reading…

Not surprisingly, students who have parents with the highest occupational status and who are highly engaged in reading obtain the highest average scores (583 points) on the combined reading literacy scale. Conversely, students who have parents with the lowest occupational status and who are the least engaged in reading had the lowest average scores (423 points) among the 9 groups.

A9

…but highly engaged students from disadvantaged backgrounds tend to perform as well as students in the middle engagement groups of students from advantaged backgrounds…

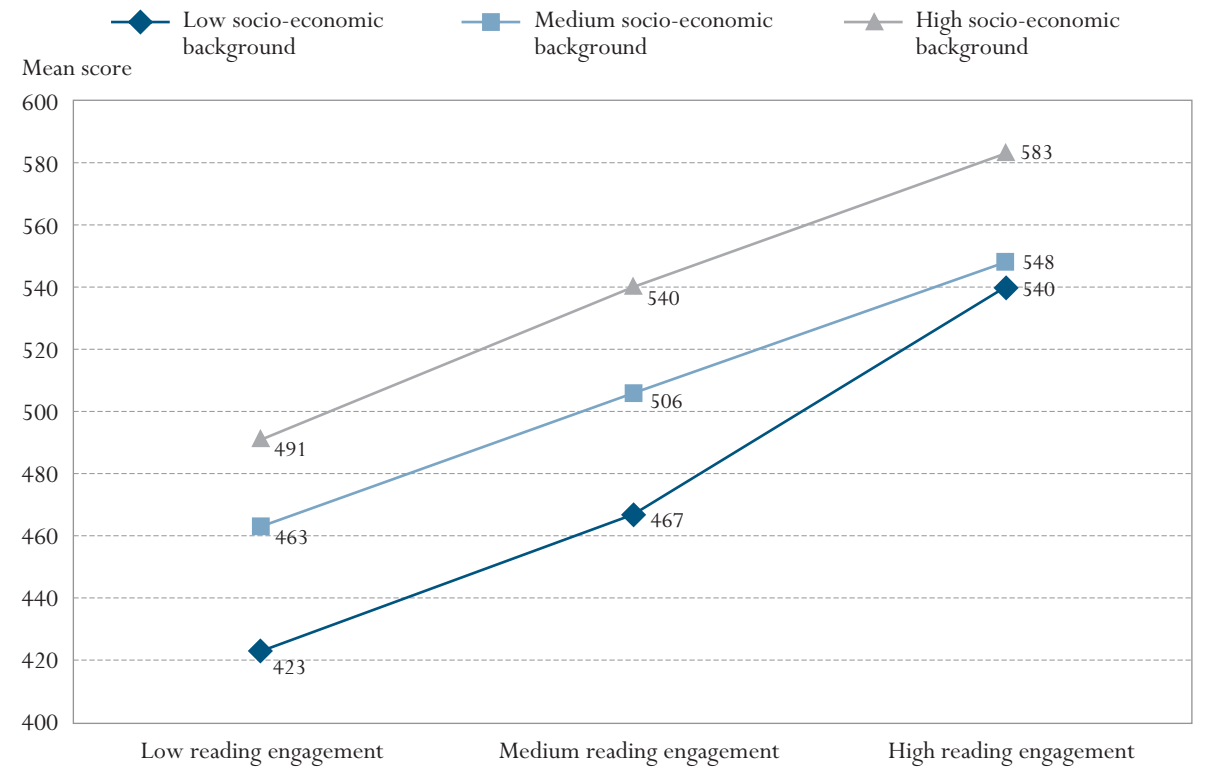
Perhaps more importantly, however, 15-year-old students who are highly engaged readers and whose parents have the lowest occupational status achieved a significantly higher average reading score (540 points) than students whose parents have the highest occupational status but who are poorly engaged in reading (491 points). In fact, the highly engaged students whose parents have low occupational status performed as well on average as those students who are in the middle engagement group but whose parents have high status occupations (Table A9.2 and Chart A9.2).

…which suggests that student engagement with reading may be an important policy lever to counter social disadvantage.

All students who are highly engaged in reading achieve reading literacy scores that, on average, are significantly above the OECD mean (500 points), whatever their parents' occupational background. Conversely, students who are poorly engaged in reading score below the OECD mean, regardless of their parents' occupational background. Within each grouping of occupational status, students who are in the group of least engaged readers register average scores that range from 85 to 117 points lower than those who are in the highly engaged reading group, with the largest difference seen among students whose parents have the lowest occupational status (Table A9.2).

Chart A9.2

Reading literacy performance and socio-economic background of 15-year-olds, by level of reading engagement (2000)



Source: OECD PISA database, 2001. Table A9.2. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A9

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

Definitions and methodologies

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 and of whether they participated in school full-time or part-time.

The concept of engagement in reading, as presented in this indicator, is built on three components: frequency of reading, diversity and content of reading, and interest in reading. The first two components address students' reading practices, while the final component addresses their attitudes. To assess the first component, students were asked about how much time they usually spent on reading for enjoyment each day. They were asked to respond by indicating which one of five descriptions best represented the time they spent reading, ranging from 'I do not read for enjoyment' to 'more than two hours a day'. To assess the second component, students were asked to indicate the kinds of materials they choose to read from a list that included newspapers, magazines, fiction, non-fiction, comics, e-mails and web pages. They were also asked to indicate the frequency with which they read each type of material – from 'never' to 'several times a week'. To assess the third component, a reading attitude scale comprising nine statements about reading, either positive or negative, was included in the questionnaire. Students were asked to indicate their degree of agreement with each statement on a four-point scale ranging from 'strongly disagree' to 'strongly agree'.

The information on occupational status in this indicator is based on the PISA International Socio-Economic Index of Occupational Status (ISEI). Students were asked to report their mothers' and fathers' occupation, and to state whether each parent was in full-time paid work; part-time paid work; not working but looking for a paid job; or 'other'. The open-ended responses were then coded in accordance with the International Standard Classification of Occupations (ISCO 1988). The index captures the attributes of occupations that convert parents' education into income. The index was derived by the optimal scaling of occupation groups to maximise the indirect effect of education on income through occupation, and to minimise the direct effect of education on income, net of occupation (both effects being net of age). The index is based on either the father's or mother's occupations, whichever is the higher. Values on the index range from 0 to 90; low values represent low socio-economic status and high values represent high socio-economic status.

For notes on standard errors, significance tests, and multiple comparisons see Annex 3 at *www.oecd.org/edu/eag2003*.

A9

Table A9.1

Engagement in reading (2000)

Mean scores of 15-year-olds on the index of engagement in reading, overall and by gender

		All students		Females	Males	Difference between females and males
		Mean index	S.E.	Mean index	Mean index	
OECD COUNTRIES	Australia	-0.04	(0.03)	0.11	-0.18	0.28
	Austria	-0.08	(0.03)	0.17	-0.35	0.52
	Belgium	-0.28	(0.02)	-0.07	-0.48	0.41
	Canada	0.01	(0.01)	0.24	-0.23	0.47
	Czech Republic	0.02	(0.02)	0.29	-0.29	0.57
	Denmark	0.26	(0.02)	0.50	0.02	0.48
	Finland	0.46	(0.02)	0.82	0.08	0.74
	France	-0.18	(0.02)	-0.03	-0.33	0.30
	Germany	-0.26	(0.02)	0.01	-0.53	0.55
	Greece	-0.09	(0.02)	0.00	-0.17	0.17
	Hungary	0.03	(0.02)	0.21	-0.15	0.36
	Iceland	0.27	(0.01)	0.46	0.08	0.39
	Ireland	-0.20	(0.02)	0.03	-0.43	0.46
	Italy	-0.08	(0.02)	0.10	-0.27	0.37
	Japan	0.20	(0.03)	0.28	0.11	0.17
	Korea	0.21	(0.02)	0.23	0.19	0.04
	Luxembourg	-0.19	(0.02)	0.01	-0.39	0.40
	Mexico	0.07	(0.01)	0.17	-0.03	0.20
	New Zealand	0.05	(0.02)	0.20	-0.09	0.29
	Norway	0.09	(0.02)	0.35	-0.16	0.51
	Poland	-0.10	(0.02)	0.09	-0.28	0.36
	Portugal	0.13	(0.02)	0.36	-0.11	0.47
	Spain	-0.23	(0.02)	-0.09	-0.38	0.29
	Sweden	0.14	(0.02)	0.37	-0.08	0.45
	Switzerland	0.00	(0.01)	0.31	-0.31	0.62
	United Kingdom	-0.10	(0.02)	0.03	-0.24	0.26
	United States	-0.14	(0.03)	0.04	-0.32	0.36
	Country mean	***0.00***	***(0.00)***	***0.19***	***-0.19***	***0.38***
NON-OECD COUNTRIES	Brazil	0.11	(0.02)	0.36	-0.17	0.53
	Latvia	-0.04	(0.02)	0.17	-0.27	0.44
	Liechtenstein	-0.13	(0.05)	0.13	-0.36	0.49
	Russian Federation	0.17	(0.02)	0.37	-0.02	0.39
	Netherlands[1]	-0.17	(0.04)	0.04	-0.38	0.42

1. Response rate is too low to ensure comparability.

Source: OECD PISA database, 2001.

Table A9.2

Expected and observed percentages of 15-year-olds and performance on the PISA index of reading engagement (2000)

by level of reading engagement and socio-economic background (Cross-country means)

	Low reading engagement			Medium reading engagement			High reading engagement		
	Expected (%)	Observed (%)	Mean score	Expected (%)	Observed (%)	Mean score	Expected (%)	Observed (%)	Mean score
Low socio-economic background	6.3	7.6	423	12.5	12.6	467	6.3	4.9	540
Medium socio-economic background	12.3	12.9	463	25.0	25.1	506	12.3	12.0	548
High socio-economic background	6.3	4.5	491	12.5	12.3	540	6.3	8.2	583

Source: OECD PISA database, 2001.

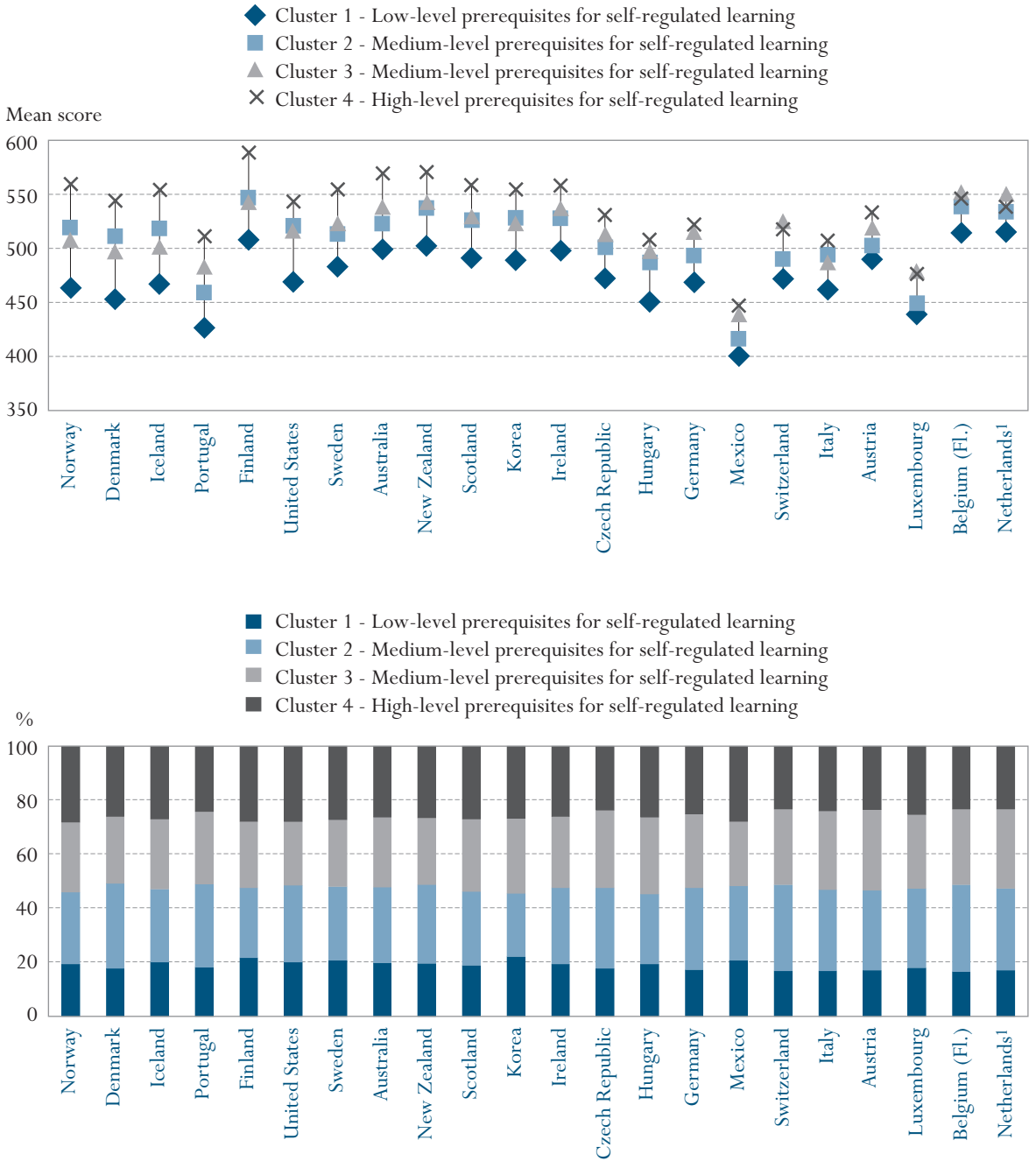
INDICATOR A10: FIFTEEN YEAR-OLDS' SELF-REGULATED LEARNING

- The indicator reveals four clusters of student approaches to learning which are associated with student performance in reading literacy.
- A closer look also shows that the extent to which students monitor their own learning is closely related to performance in reading literacy. Furthermore, it shows that students' beliefs that a goal is feasible, that the resources necessary to achieve it are accessible and that it is worth expending energy to achieve the goal are strong predictors of student performance in reading literacy.

A10

Chart A10.1

Mean performance of 15-year-olds on the PISA combined reading literacy scale and percentage of students by PISA self-regulated learning cluster (2000)



1. Response rate is too low to ensure comparability.

Countries are ranked in descending order of the difference between mean scores on the PISA combined reading literacy scale in Cluster 4 - High-level prerequisites for self-regulated learning and Cluster 1 - Low-level prerequisites for self-regulated learning.

Source: OECD PISA database, 2001. Table A10.2. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A10

Policy context

This indicator examines patterns of results between and within countries on measures of 15 – year-old students' self-regulated learning…

Although many scholastic competencies are learned in subject areas (such as reading, mathematics and science), other relevant competencies are developed "between the lines" of the curriculum. Often, these cross-curricular competencies are neither precisely defined nor firmly embedded in a specific area of the curriculum. Nevertheless, they are important outcomes of education systems because they contribute to the development of personal skills needed for full and active participation in societies and economies. PISA places great importance on such competencies, and devotes time in each PISA assessment to cross-curricular competencies that participating countries have identified as important.

…as well as the relationship of selected self-regulated learning scales to performance in reading literacy.

PISA 2000 collected self-report data on students' learning strategies, motivational preferences, self-related competencies, and learning preferences. This indicator examines 13 measures that underlie these broad categories in order to gain a picture of students' abilities to regulate their own learning. In societies that increasingly depend on the capacity and motivation of their citizens to continue learning throughout life, these abilities are an important outcome of education in themselves and may have an impact on students' success both in school and in their future lives.

Evidence and explanations

Self-regulated learning includes many aspects, including…

In PISA 2000, students were asked a series of questions related to self-regulated learning, including on their:

…uses of cognitive and meta-cognitive learning strategies…

- uses of cognitive and metacognitive learning strategies (*e.g.*, memorisation, elaboration, and control strategies);

…motivational preferences and volition…

- motivational preferences and volition (*e.g.*, instrumental motivation, verbal interest, math interest, and effort and persistence in learning);

…self-related cognitions…

- self-related cognitions (*e.g.*, self-efficacy, verbal self-concept, math self-concept, and academic self-concept); and

…and preferences for learning situations.

- preferences for learning situations (*e.g.*, preference for cooperative learning and preference for competitive learning).

For each of the 13 scales on self-regulated learning (listed in parentheses above), indices were created based on students' self-reports to related questions. The index scales range from –1 to 1, with 0 as the mean value for the combined OECD student population. Negative values do not necessarily mean that students responded negatively to questions, but instead that students in this particular country as a whole responded less positively than students among the OECD countries. Conversely, a positive value indicates that students in a particular country responded more favourably, on average, than students among the OECD countries as a whole (Table A10.1).

This indicator first considers the patterns of responses on the 13 self-regulated learning scales in combination, by means of a cluster analysis. Then it examines

A10

select self-regulated learning scales, students' use of control strategies and self-efficacy, and their relationship to reading literacy.

Profiles of self-regulated learning

Through cluster analysis, students were grouped in accordance with their approaches to learning.

In general, cluster analysis groups individuals based on how similar they are with respect to a number of defining characteristics. Students belonging to one cluster have relatively similar characteristics and students belonging to different clusters have relatively dissimilar characteristics. In the present cluster analysis, the 13 scales of self-regulated learning were used as defining characteristics. Each student was allocated to one cluster in accordance with the specific combination of scores he or she displayed on the scales of self-regulated learning.

Students in Cluster 4 are characterised by high scores on all aspects of self-regulated learning…

Table A10.1 illustrates the mean index scores on each of the 13 self-regulated learning scales for the four clusters, or profiles, identified in the analysis. Students in Cluster 4 are characterised by the highest scores in all aspects of self-regulated learning, while their peers in Cluster 1 have the lowest scores on almost all of the scales.

…while students in Cluster 1 show the lowest scores, particularly as concerning comprehension-oriented learning strategies and self-evaluation.

Students in these two extreme clusters display particularly marked differences in their use of comprehension-oriented learning strategies (*e.g.*, elaboration). Similarly, the self-evaluative perspective on learning characterised by control of one's own learning processes (*i.e.*, control strategies) is particularly strong among students in Cluster 4, but weak among students in Cluster 1. Large gaps between these two clusters are also found for effort and persistence put into learning and confidence in being able to achieve even difficult goals (self-efficacy). Indeed, it is on these two scales that students in Cluster 4 report the highest scores.

Students in Clusters 2 and 3 report moderate use of self-regulated learning behaviours and attitudes.

By contrast, students in Clusters 3 and 2 report more moderate use of self-regulated learning behaviours and attitudes, with students in Cluster 3 generally scoring slightly above the mean and students in Cluster 2 generally scoring slightly below the mean on the individual scales. The main exceptions are the mathematics-specific scales (interest in mathematics and mathematical self-concept), on which students in Cluster 2 significantly outscore their generally higher-scoring counterparts in Cluster 3. This domain-specific aspect distinguishes students in Clusters 3 and 2 from one another, as well as from students in other clusters, who display relatively more uniform results across the scales (Table A10.1).

Among countries, students are distributed fairly equally among the four clusters. Between 25 and 28 percent of students are in each of the top three clusters (*e.g.*, 2 through 4). Only Cluster 1 is somewhat smaller, with 19.6 percent of the students (Table A10.2).

Grouping students by how they score on the self-regulated learning scales can provide insight into the relationship between these behaviours and attitudes and students' performance in school. Focusing on performance on the reading literacy scale reveals a clear hierarchy. Overall, students in each cluster score significantly higher than their counterparts in the respective lower clusters.

Such differences are also found within countries (Chart A10.1 and Table A10.2). In general, the pattern within a country is the same as the pattern among countries. Students in Cluster 4 outperform their peers in all other clusters on the combined reading literacy scale, and as a rule, the higher the number of the cluster, the higher the performance on the reading literacy scale.

Students in Cluster 4 tend to outperform their peers in all other clusters in reading literacy...

However, there are some exceptions. In the Flemish Community of Belgium, Luxembourg, the Netherlands and Switzerland, students in Cluster 3 tend to outperform their peers in Cluster 4. In these countries, the reading-specific pattern of Cluster 3 seems to foster reading performance just as well as the generally high values across the self-regulated learning scales displayed by Cluster 4 students. Additionally, in Denmark, Finland, Iceland, Italy, Korea, Norway, and the United States, the performance of students in Cluster 2 is as good as – or better than – the performance of students in Cluster 3.

...but there are exceptions to this pattern.

The performance of students in Cluster 1 on the combined reading literacy scale is generally comparatively low within countries. The difference in performance of students in Cluster 1 and those in Cluster 4 ranges from a low of 23 points on the combined reading literacy scale in the Netherlands to a high of 91 points in Denmark and Norway. The mean difference between students in these two clusters is 62 points, nearly a full proficiency level.

When interpreting these results, it is important to bear in mind that students' cluster membership cannot be seen as a competence indicator *per se*. The moderate use of learning strategies as in Cluster 2, for example, might also be seen as an indicator for adaptive learning. In other words, if the tasks at hand are of minor difficulty for the students, there is less need to use strategies to monitor learning. Still, the general consistency of results among and within countries indicates that specific configurations of the behaviours and attitudes related to self-regulated learning are associated with high performance in reading literacy.

Chart A10.1 shows the percentage of students in each cluster in each country. In some countries (Finland, Mexico, Norway and the United States), 28 per cent of the 15 year-olds in PISA belong to the cluster with the highest scores on the self-regulated learning scales (Cluster 4).

In Finland, Mexico, Norway and the United States 28 per cent of students belong to Cluster 4...

The percentage of students in this Cluster, however, is smaller in the Flemish Community of Belgium and Switzerland, where only 23 per cent of fall into this category.

...while it is just 23 per cent in the Flemish Community of Belgium and Switzerland.

Within each country, there is a significant percentage of students in Cluster 1. The size of this cluster ranges from 17 per cent in Austria, the Flemish Community of Belgium, Germany, Italy, the Netherlands and Switzerland to 22 per cent in Korea. This group of students may require particular attention, as they may not yet have succeeded in acquiring the prerequisites for lifelong learning and, in the absence of additional support, they may be unlikely to succeed either in school or in their future undertakings (Chart A10.1 and Table A10.2).

A10

Self-regulated learning and performance in reading literacy

A closer look shows that…

As this indicator has shown, self-regulated learning can contribute to performance in school, specifically with respect to reading literacy. Students with the necessary disposition and attitudes for self-regulated learning (*e.g.*, metacognitive learning strategies, sufficient interest in learning, and a positive self-regard) are more likely to outperform their peers who lack these attributes. In the following, the indicator examines the relationship of two of the self-regulated learning scales to performance in reading literacy.

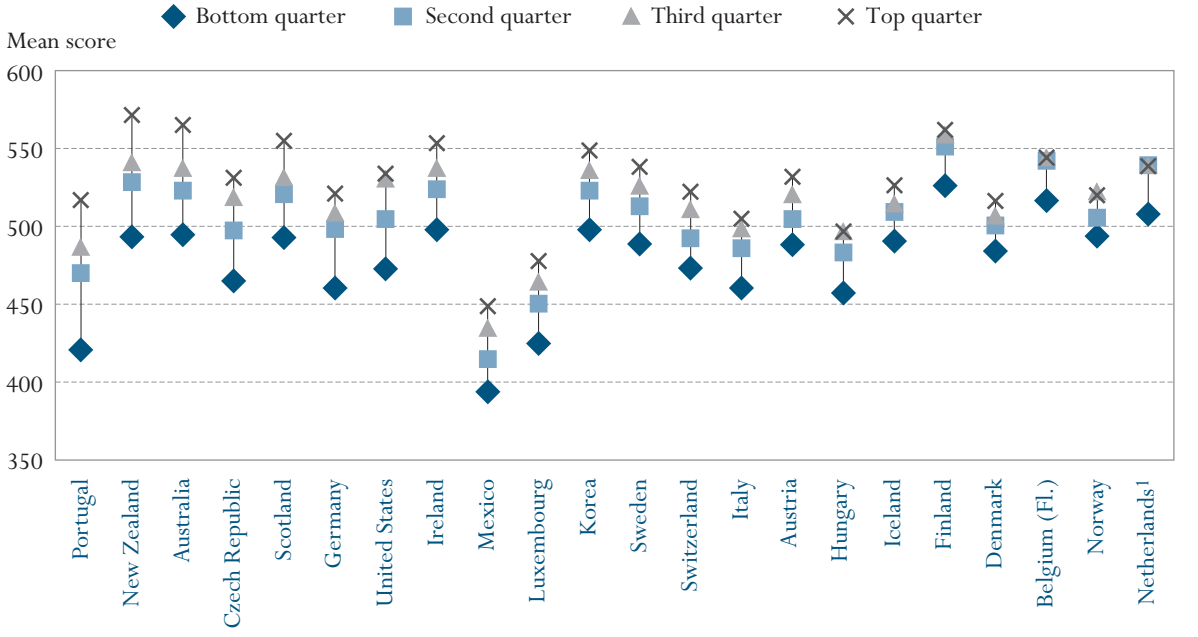
Control strategies

…the extent to which students monitor their own learning is closely related to performance in reading literacy.

Students may apply a variety of cognitive (e.g., memorisation, elaboration, transformation) and metacognitive strategies (e.g., planning, monitoring) during the learning process. One metacognitive strategy measured in PISA 2000 is students' use of control strategies, the extent to which they attempt to monitor their own learning. The index of control strategies was derived from responses to questions about the frequency with which students chart out exactly what they need to learn, work out as they go what concepts they have not really understood, look for additional information when they do not understand, force themselves to check whether they remember what they have learned, and make sure they have remembered the most important things.

Chart A10.2

Performance of 15-year-olds on the PISA combined reading literacy scale, by quarters of the PISA index of control strategies (2000)



1. Response rate is too low to ensure comparability.

Countries are ranked in descending order of the difference between performance on the PISA combined reading literacy scale of students in the top quarter of the PISA index of control strategies and those at the bottom quarter of the index.

Source: OECD PISA database, 2001. Table A10.3. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

The use of control strategies is closely related to performance in the reading literacy assessment.

The use of control strategies is closely related to performance in the reading literacy assessment in almost all of the participating countries (Chart A10.2 and Table A10.3). The connection is particularly strong in Portugal, where students who report frequent use of control strategies (top quarter of the control strategy scale) outperform those who rarely use control strategies (bottom quarter) by almost one standard deviation (96 points). Australia, the Czech Republic, Germany, New Zealand, Scotland and the United States also display large differences in performance (60 points or more) between students in the two extreme quarters on this index. In the Flemish Community of Belgium and Norway, the gap between the reading literacy scores of students who report frequent use of control strategies and those who report using them only rarely is only half that magnitude, at just under 30 points.

For many countries the mean reading scores of students in the second and third quarters of the control strategy scale are close together…

An additional finding is that, in many countries, the mean reading scores of students in the second and third quarters of the control strategy scale – and, in some countries, students in the top quarter – are close together. On average, the gap between the two middle groups is of 13 points on the performance scale. With the exception of the Czech Republic, Mexico and the United States, where there is 20-point gap or more between the middle two quarters, it is not possible to distinguish notable performance differences in any of the countries. Rather, there are considerable differences in the performance of students reporting frequent (top quarter), medium (second and third quarters), and infrequent (bottom quarter) use of control strategies.

… and in six countries, only students who rarely use control strategies clearly lag behind in reading proficiency.

In six countries, the mean performance of students who report using control strategies about half the time (second and third quarters) is similar to those of students who report regular use of control strategies (top quarter). Thus, in Finland, the Flemish Community of Belgium, Germany, Hungary, Italy and the Netherlands, it is only students who rarely use control strategies (bottom quarter) who clearly lag behind their peers in reading proficiency. In these six countries, use of control strategies seems to be a minimum requirement, and how often the students use (or perceive they use) these strategies makes little difference in terms of reading proficiency (Chart A10.2 and Table A10.3).

The use of control strategies does not guarantee high performance in comparison to other countries, but gives students a considerable relative advantage within their countries.

In interpreting these differences, it is important to bear in mind that the reading performance of students from the top quarter of the control strategies scale varies considerably among the participating countries. Comparison of Mexico and New Zealand, for example, shows that students who use control strategies frequently in Mexico (top quarter) achieve far lower scores on the reading literacy scale than New Zealand students who use control strategies only rarely (bottom quarter). Even if there are strong correlations within a country, it does not follow that the frequent use of control strategies (top quarter) leads to an equally high performance and gives students the same relative advantage in all countries. The countries differ in a number of features that impact student performance, and the frequency of use of control strategies is just one of these. Within countries, however, the use of control strategies gives students a considerable relative advantage.

A10

Self-efficacy

Furthermore, students' beliefs that a goal is feasible …

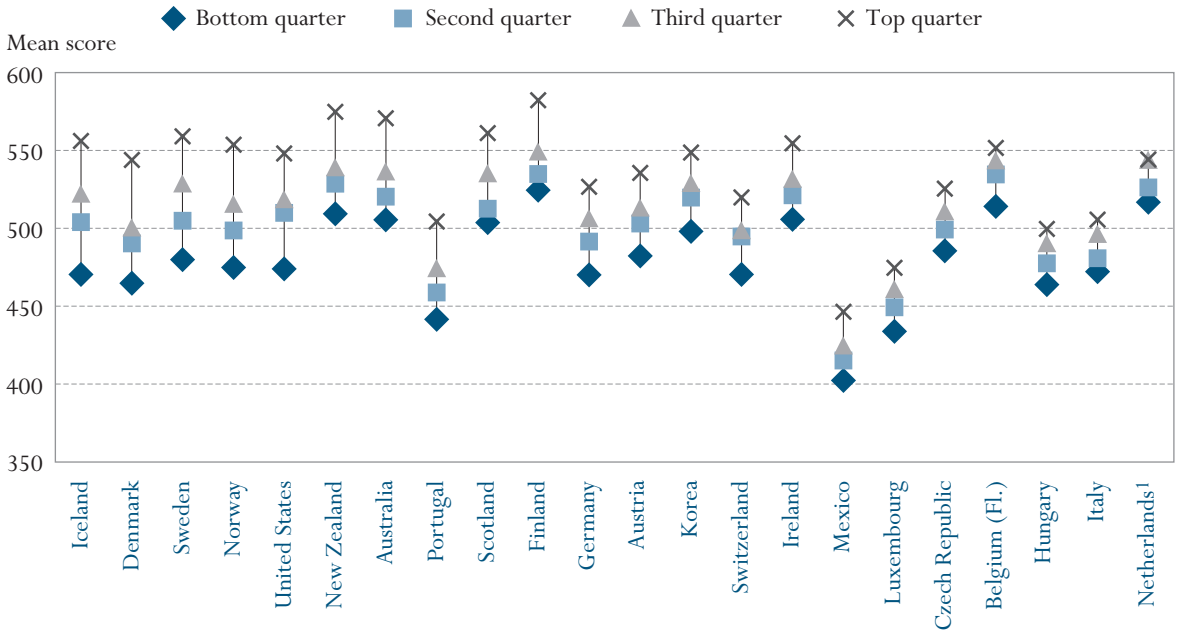
Self-efficacy beliefs are characterised by the confidence of being able to successfully orchestrate an action, even in the face of difficulties. The belief that a goal is essentially feasible, that the resources necessary to achieve it are accessible, and in turn, that it is worth expending a great deal of energy to pursue, are important for successful learning.

…is important for successful learning and closely related to student performance in reading literacy.

PISA shows a relationship between students' self-efficacy beliefs and performance in reading literacy (Chart A10.3 and Table A10.4). In all the OECD countries, the largest performance gaps are found between students who are very confident in being able to meet learning challenges in the face of difficulties (top quarter) and students who express very little confidence in this respect (bottom quarter). This corresponds to an average difference of 56 points on the proficiency scale, or just over half a standard deviation on the international reading literacy scale. The relative advantage of positive self-efficacy beliefs is particularly strong in Denmark, Iceland and Sweden where the students in the top quarter of the self-efficacy scale outperform their peers in the bottom quarter by at least 79 points. By contrast, in the Flemish Community of Belgium, Hungary, Italy, and the Netherlands, the difference in performance between students in the top and bottom quarter of the self-efficacy scale is relatively small, at less than 40 points.

Chart A10.3

Performance of 15-year-olds on the PISA combined reading literacy scale, by quarters of the PISA index of self-efficacy (2000)



1. Response rate is too low to ensure comparability.

Countries are ranked in descending order of the difference between performance on the PISA combined reading literacy scale of students in the top quarter of the PISA index of self-efficacy and those at the bottom quarter of the index.

Source: OECD PISA database, 2001. Table A10.4. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

A10

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

Definitions and methodologies

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 and of whether they participated in school full-time or part-time.

Twenty-six of the 32 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, Brazil, the Czech Republic, Denmark, Finland, Germany, Hungary, Ireland, Iceland, Italy, Korea, Latvia, Liechtenstein, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Portugal, the Russian Federation, 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 of Belgium and Scotland, respectively. Canada, France, Greece, Ireland, Japan, and Spain, as well as the French Community of Belgium and England, did not participate in this option.

The PISA index on *memorisation* was derived from the frequency with which students used the following strategies when studying: I memorise everything that might be covered; I memorise as much as possible; I memorise all new material so I that I can recite it; and I practice saying the material to myself over and over. A four-point scale with the response categories 'almost never', 'sometimes', 'often' and 'almost always' was used.

The PISA index on *elaboration* was derived from the frequency with which students used the following strategies when studying: I try to relate new material to things I have learned in other subjects; I chart out how the information might be useful in the real world; I try to understand the material better by relating it to things I already know; and, I chart out how the material fits in with what I have already learned. A four-point scale with the response categories 'almost never', 'sometimes', 'often' and 'almost always' was used.

The PISA index on *control strategies* was derived from the frequency with which students used the following strategies when studying: I start by figuring out exactly what I need to learn; I force myself to check to see if I remember the most important things; and, when I study and don't understand something, I look for additional information to clarify this. A four-point scale with the response categories 'almost never', 'sometimes', 'often' and 'almost always' was used.

The PISA index on *interest in reading* was derived from students' level of agreement with the following statements: because reading is fun, I wouldn't want to give it up; I read in my spare time; and, when I read, I sometimes get totally absorbed.

A10

A four-point scale with the response categories 'disagree', 'disagree somewhat', 'agree somewhat' and 'agree' was used.

The PISA index on *interest in mathematics* was derived from students' level of agreement with the following statements: when I do mathematics, I sometimes get totally absorbed; mathematics is important to me personally; and because doing mathematics is fun, I wouldn't want to give it up. A four-point scale with the response categories 'disagree', 'disagree somewhat', 'agree somewhat' and 'agree' was used.

The PISA index on *student self-concept in reading* was derived from students' level of agreement with the following statements: I'm hopeless in <classes of the language of assessment>; I learn things quickly in the <classes of the language of assessment>; and, I get good marks in the <language of assessment>. A four-point scale with the response categories 'disagree', 'disagree somewhat', 'agree somewhat' and 'agree' was used. Similarly, the PISA index on *self-concept in mathematics* was derived from students' level of agreement with the following statements: I get good marks in mathematics; mathematics is one of my best subjects; and, I have always done well in mathematics. A four-point scale with the response categories 'disagree', 'disagree somewhat', 'agree somewhat' and 'agree' was used.

The PISA index on *co-operative learning* was derived from students' level of agreement with the following statements: I like to work with other students; I like to help other people do well in a group; and, it is helpful to put together everyone's ideas when working on a project. A four-point scale with the response categories 'disagree', 'disagree somewhat', 'agree somewhat' and 'agree' was used. Similarly, the PISA index on *competitive learning* was derived from students' level of agreement with the following statements: I like to try to be better than other students; trying to be better than others makes me work well; I would like to be the best at something; and, I learn faster if I'm trying to do better than the others. A four-point scale with the response categories 'disagree', 'disagree somewhat', 'agree somewhat' and 'agree' was used.

The cluster analysis for this indicator is based on scale scores that are standardised within countries. The aim of standardisation is to reduce or eliminate unwanted between-group differences such as those due to response sets.

For more information of the theoretical underpinnings of this model of self-regulated learning, see *Approaches to Learning: Strategies and Motivation* (OECD, 2003).

For notes on standard errors, significance tests, and multiple comparisons see Annex 3 at *www.oecd.org/edu/eag2003*.

A10

Table A10.1

Cross-country mean index of 15-year-olds on the PISA indices of self-regulated learning (2000)

by PISA self-regulated learning cluster

	Cluster 1 - Low-level prerequisites for self-regulated learning (19.6 per cent of students)	Cluster 2 - Medium-level prerequisites for self-regulated learning (27.2 per cent of students)	Cluster 3 - Medium-level prerequisites for self-regulated learning (25.4 per cent of students)	Cluster 4 - High-level prerequisites for self-regulated learning (27.8 per cent of students)
Use of cognitive and meta-cognitive learning strategies				
Memorisation strategies	-0.87	-0.34	0.29	0.70
Elaboration strategies	-1.02	-0.30	0.16	0.89
Control strategies	-1.14	-0.34	0.26	0.94
Motivation and interest				
Instrumental motivation	-0.92	-0.25	0.26	0.70
Interest in reading	-0.62	-0.15	0.13	0.48
Interest in mathematics	-0.81	0.43	-0.63	0.75
Effort and perseverance	-1.13	-0.30	0.17	0.97
Self-concept				
Perceived self-efficacy	-1.08	-0.19	-0.01	0.99
Self concept in reading	-0.61	-0.23	0.23	0.48
Self-concept in mathematics	-0.77	0.53	-0.76	0.74
Academic self concept	-1.03	0.11	-0.19	0.83
Preference for learning situations				
Co-operative learning	-0.37	0.01	0.03	0.21
Competitive learning	-0.78	0.08	-0.15	0.63

Source: OECD PISA database, 2001.

A10

Table A10.2

Performance of 15-year-olds on the PISA combined reading literacy scale and percentage of students (2000)

by PISA self-regulated learning cluster

		Cluster 1 - Low-level prerequisites for self-regulated learning		Cluster 2 - Medium-level prerequisites for self-regulated learning		Cluster 3 - Medium-level prerequisites for self-regulated learning		Cluster 4 - High-level prerequisites for self-regulated learning	
		Mean score	%	Mean score	%	Mean score	%	Mean score	%
OECD COUNTRIES	Australia	499	19.8	522	28.0	538	25.8	569	26.4
	Austria	490	16.9	502	29.6	519	29.8	533	23.7
	Belgium (Fl.)	514	16.5	539	32.2	550	28.0	545	23.3
	Czech Republic	472	17.5	501	30.0	511	28.5	531	23.9
	Denmark	453	17.6	511	31.5	497	24.7	544	26.2
	Finland	508	21.4	547	26.0	544	24.5	588	28.0
	Germany	469	17.1	493	30.3	516	27.4	522	25.2
	Hungary	450	19.2	487	25.9	495	28.5	508	26.4
	Iceland	467	19.9	518	27.1	501	25.8	554	27.2
	Ireland	498	19.1	527	28.4	533	26.3	558	26.2
	Italy	462	16.6	494	30.0	488	29.2	507	24.1
	Korea	489	21.9	528	23.4	525	27.9	554	26.8
	Luxembourg	439	17.8	448	29.4	479	27.3	476	25.6
	Mexico	400	20.6	416	27.7	440	23.9	447	27.9
	New Zealand	502	19.4	536	29.3	541	24.7	570	26.6
	Norway	463	19.3	519	26.5	509	25.9	559	28.3
	Portugal	427	18.1	459	30.8	483	26.8	511	24.3
	Scotland	491	18.7	525	27.3	528	26.9	558	27.1
	Sweden	483	20.5	513	27.4	522	24.8	554	27.2
	Switzerland	472	16.7	490	31.9	525	27.9	517	23.4
	United States	469	19.8	520	28.6	518	23.6	543	28.0
	Country mean	***465***	***19.6***	***496***	***27.2***	***506***	***25.4***	***527***	***27.8***
NON-OECD COUNTRIES	Brazil	374	18.7	397	25.6	415	26.3	430	29.4
	Latvia	421	18.3	457	30.9	473	23.9	495	26.8
	Liechtenstein	469	20.8	470	28.3	503	25.4	516	25.5
	Russian Federation	426	21.9	468	25.4	472	23.4	496	29.3
	Netherlands[1]	515	16.9	533	30.3	551	29.5	538	23.3

1. Response rate is too low to ensure comparability.

Source: OECD PISA database, 2001.

A10

Table A10.3

Performance of 15-year-olds on the PISA combined reading literacy scale (2000)

by quarters of the PISA index of control strategies

		Bottom quarter		Second quarter		Third quarter		Top quarter	
		Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.
OECD COUNTRIES	Australia	494	(4.5)	525	(4.6)	540	(4.3)	564	(5.8)
	Austria	485	(4.3)	502	(3.1)	517	(3.9)	531	(3.5)
	Belgium (Fl.)	512	(7.2)	543	(4.2)	542	(5.3)	545	(5.0)
	Czech Republic	464	(3.1)	497	(3.0)	518	(3.3)	532	(2.9)
	Denmark	481	(3.8)	497	(3.6)	507	(3.3)	514	(3.3)
	Finland	527	(3.8)	546	(2.9)	556	(3.6)	562	(3.6)
	Germany	459	(4.3)	495	(4.0)	508	(3.6)	519	(3.3)
	Hungary	456	(5.8)	483	(4.4)	495	(4.3)	496	(5.6)
	Iceland	490	(3.2)	509	(3.2)	513	(3.1)	526	(3.6)
	Ireland	499	(4.3)	525	(5.1)	537	(4.0)	553	(3.8)
	Italy	461	(5.1)	485	(3.8)	499	(3.4)	505	(3.2)
	Korea	496	(3.4)	521	(2.9)	534	(3.1)	548	(3.0)
	Luxembourg	424	(3.3)	453	(3.0)	456	(3.3)	475	(3.3)
	Mexico	394	(3.4)	415	(3.9)	432	(4.3)	449	(4.7)
	New Zealand	494	(4.2)	531	(3.7)	540	(3.6)	572	(5.0)
	Norway	494	(5.2)	505	(3.5)	521	(4.4)	518	(4.1)
	Portugal	419	(5.6)	464	(5.0)	483	(4.4)	515	(4.4)
	Scotland	493	(5.4)	521	(5.2)	531	(5.7)	555	(4.6)
	Sweden	491	(3.2)	515	(3.2)	527	(3.9)	539	(3.0)
	Switzerland	469	(4.9)	492	(4.9)	503	(4.8)	522	(6.1)
	United States	477	(7.4)	505	(8.3)	528	(5.7)	534	(8.3)
	Country mean	***474***	***(1.0)***	***500***	***(1.0)***	***512***	***(0.8)***	***526***	***(1.0)***
NON-OECD COUNTRIES	Brazil	368	(4.4)	395	(4.0)	414	(4.0)	425	(4.3)
	Latvia	430	(6.4)	465	(6.3)	463	(6.7)	482	(5.6)
	Liechtenstein	462	(9.9)	479	(10.9)	477	(9.7)	520	(9.7)
	Russian Federation	431	(5.0)	462	(4.9)	476	(4.7)	485	(4.7)
	Netherlands[1]	511	(5.6)	542	(4.2)	541	(3.7)	536	(4.9)

1. Response rate is too low to ensure comparability.

Source: OECD PISA database, 2001.

A10

Table A10.4

Performance of 15-year-olds on the PISA combined reading literacy scale (2000)

by quarters of the PISA index of self-efficacy

		Bottom quarter		Second quarter		Third quarter		Top quarter	
		Mean score	S.E.	Mean score	S.E.	Mean score	S.E.	Mean score	S.E.
OECD COUNTRIES	Australia	506	(4.5)	520	(5.2)	536	(4.1)	571	(4.7)
	Austria	483	(4.0)	503	(4.0)	513	(3.1)	536	(3.7)
	Belgium (Fl.)	514	(8.4)	535	(4.4)	543	(4.6)	552	(6.5)
	Czech Republic	486	(2.7)	499	(3.5)	510	(3.2)	526	(3.8)
	Denmark	465	(3.6)	490	(4.0)	500	(3.2)	544	(2.6)
	Finland	525	(3.1)	535	(3.7)	549	(3.0)	583	(4.1)
	Germany	470	(4.2)	492	(3.5)	506	(3.8)	527	(4.9)
	Hungary	464	(5.5)	477	(4.5)	490	(6.1)	500	(5.1)
	Iceland	471	(3.0)	504	(3.3)	522	(3.7)	556	(3.5)
	Ireland	506	(4.3)	521	(4.6)	531	(4.0)	555	(4.3)
	Italy	472	(4.9)	481	(3.4)	496	(3.3)	506	(4.4)
	Korea	498	(3.4)	520	(3.3)	528	(2.8)	549	(3.0)
	Luxembourg	434	(2.9)	449	(3.9)	461	(3.1)	475	(3.3)
	Mexico	402	(3.3)	415	(4.1)	425	(4.3)	447	(5.4)
	New Zealand	509	(4.8)	529	(3.9)	538	(4.1)	575	(5.3)
	Norway	475	(4.2)	499	(3.8)	515	(5.7)	554	(3.6)
	Portugal	442	(5.3)	459	(5.5)	473	(5.3)	505	(4.9)
	Scotland	504	(5.6)	513	(5.8)	535	(4.4)	562	(5.6)
	Sweden	480	(3.1)	505	(3.3)	528	(3.3)	560	(3.4)
	Switzerland	471	(4.4)	495	(5.2)	499	(5.5)	520	(5.1)
	United States	474	(7.4)	510	(7.1)	518	(6.9)	548	(8.3)
	Country mean	***478***	***(21.5)***	***500***	***(7.1)***	***510***	***(13.9)***	***534***	***(14.8)***
NON-OECD COUNTRIES	Brazil	376	(3.8)	395	(3.8)	411	(4.3)	432	(4.7)
	Latvia	434	(5.7)	457	(6.2)	467	(6.2)	494	(6.6)
	Liechtenstein	446	(11.0)	475	(7.4)	514	(8.8)	507	(11.8)
	Russian Federation	435	(4.9)	458	(4.9)	470	(3.5)	492	(5.0)
	Netherlands[1]	517	(5.4)	526	(3.9)	543	(5.4)	545	(4.5)

1. Response rate is too low to ensure comparability.

Source: OECD PISA database, 2001.

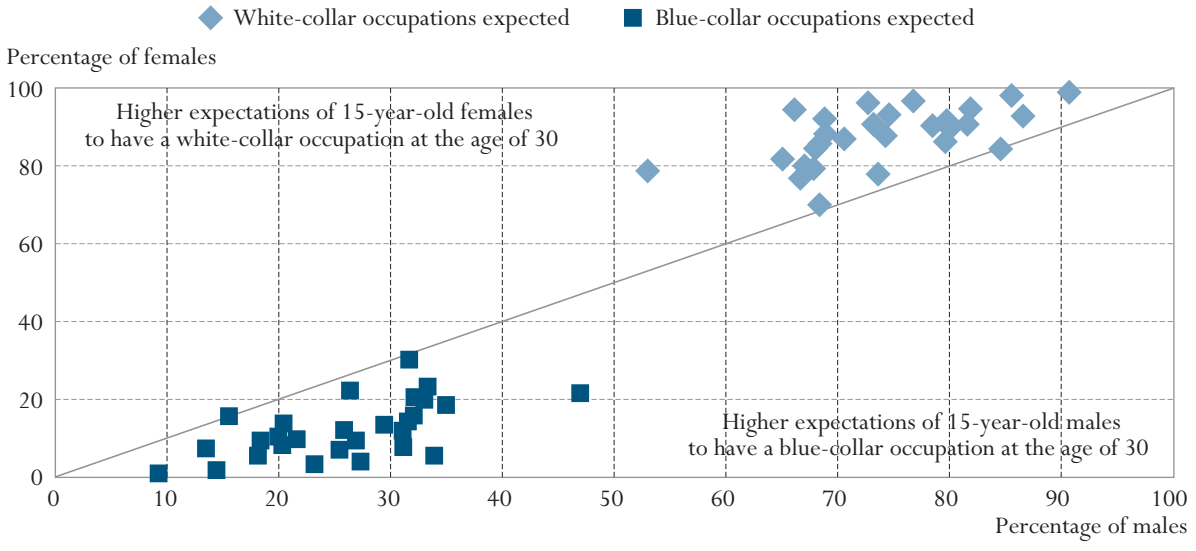
INDICATOR A11: GENDER DIFFERENCES IN STUDENT PERFORMANCE

A11

- Already at the 4th-grade level, females tend to 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 whereas in science, gender patterns are less pronounced and uneven.
- In civics knowledge, few gender differences emerge among 14-year-olds.
- Despite these overall patterns, countries differ, however, widely in the magnitude of gender differences in the different subject areas.
- 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 A11.1

Expectations of 15-year-old students to have a white-collar or blue-collar occupation at the age of 30, by gender (2000)



Source: OECD PISA database, 2001. Table A11.1. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

A11

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

Policy context

Recognising the impact that education has on participation in labour markets, occupational mobility and the quality of life, policymakers 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 A3).

As females have closed the gap and then surpassed males in many aspects of education, there are now many instances in which there is 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 to receive close attention from policymakers 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 have 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 the future aspirations and expectations for their own future. 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.

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: Twenty per cent of females expect to be in life sciences or health related professions compared to only 7 per cent of males; 9 per cent of females compared to 3 per cent 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 per cent of males versus 5 per cent of females) or occupations related to metal, machinery and related trades (6 per cent of males versus less than 1 per cent of females).

Females seem to have higher expectation 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 . This taxonomy shows that in 40 out of the 42 countries females seem to have higher expectation towards their future occupations than males. Chart A11.1 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 per cent 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 per cent), with small differences found in this expectation between males and females (less than 10 per cent) (see Table A11.1).

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

Chart A11.2 provides further detail on this 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 per cent in Belgium, Poland and the United States to 66 per cent in Japan. Similar patterns are found for males ranging from more than 80 per cent Korea, Mexico and the United States to 51 per cent in Japan (see Table A11.1).

These results are of significance for policy development. Combining the PISA data on the occupations that 15-year-olds 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.

Already at 4th-grade level, females tend to outperform males in reading literacy…

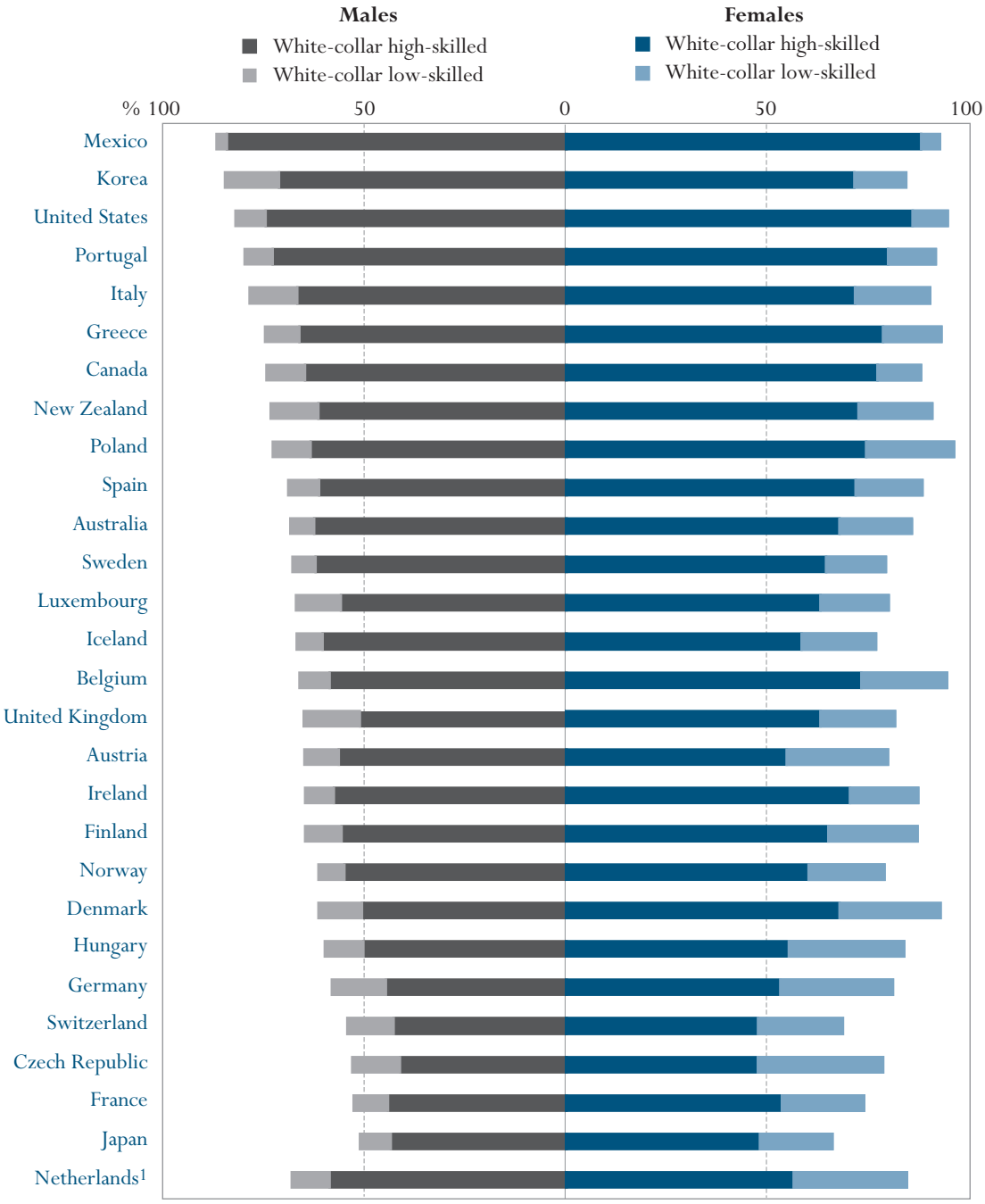
On average, and in all countries, 4th-grade females outperform 4th-grade males on the reading literacy scale (Chart A11.3). The difference between females' scores and males' scores ranges from 8 points in Italy to over 20 points in England, Greece, New Zealand, Norway and Sweden, and in all countries, the differences are statistically significant.

A11

Chart A11.2

15-year-olds' expectation of having a white-collar occupation at age 30

Percentage of 15-year-olds expecting to have a white-collar low-skilled or white-collar high skilled occupation, by gender



1. Response rate is too low to ensure comparability.

Source: OECD PISA database, 2001. Table A11.1. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

A11

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 on average (Table A11.3 and Chart A11.4).

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

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 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 (Table A11.3 and Chart A11.4).

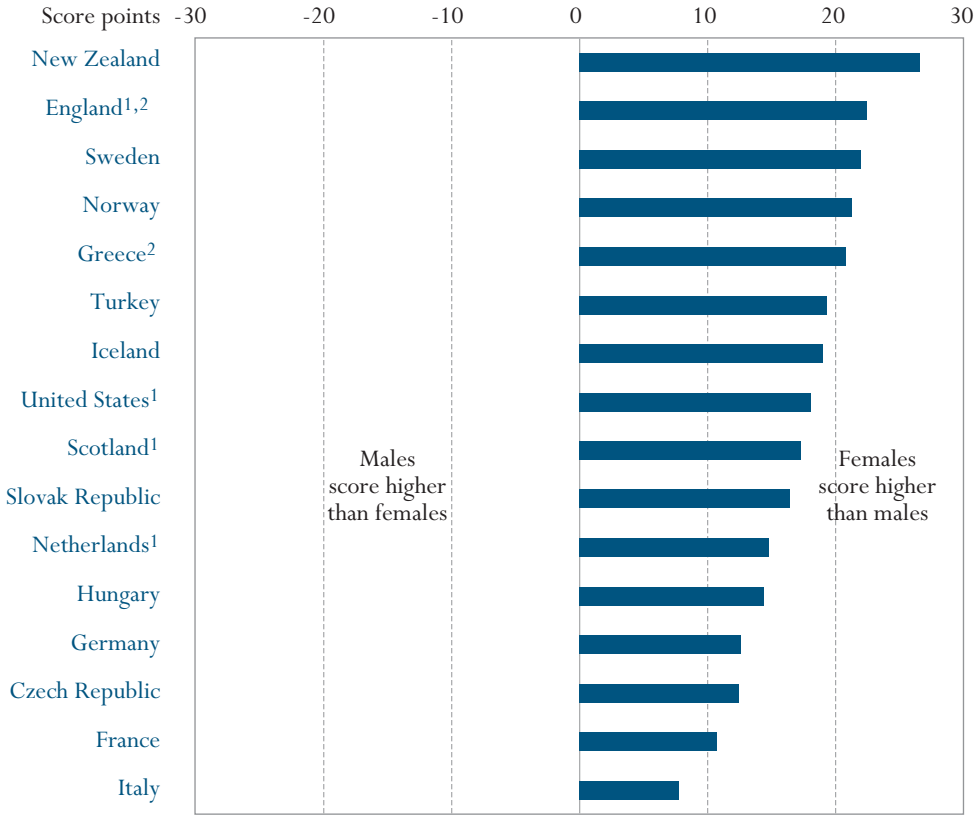
In mathematics, 15-year-old males tend to be at a slight advantage…

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 A11.3 and Chart A11.4).

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

Chart A11.3

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 per cent of national desired population.

Countries are presented in descending order of magnitude of difference betweeen females' and males' mean scores on the reading literacy scale.
Source: IEA Progress in Reading Literacy Study (PIRLS) 2001. Table A11.2. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

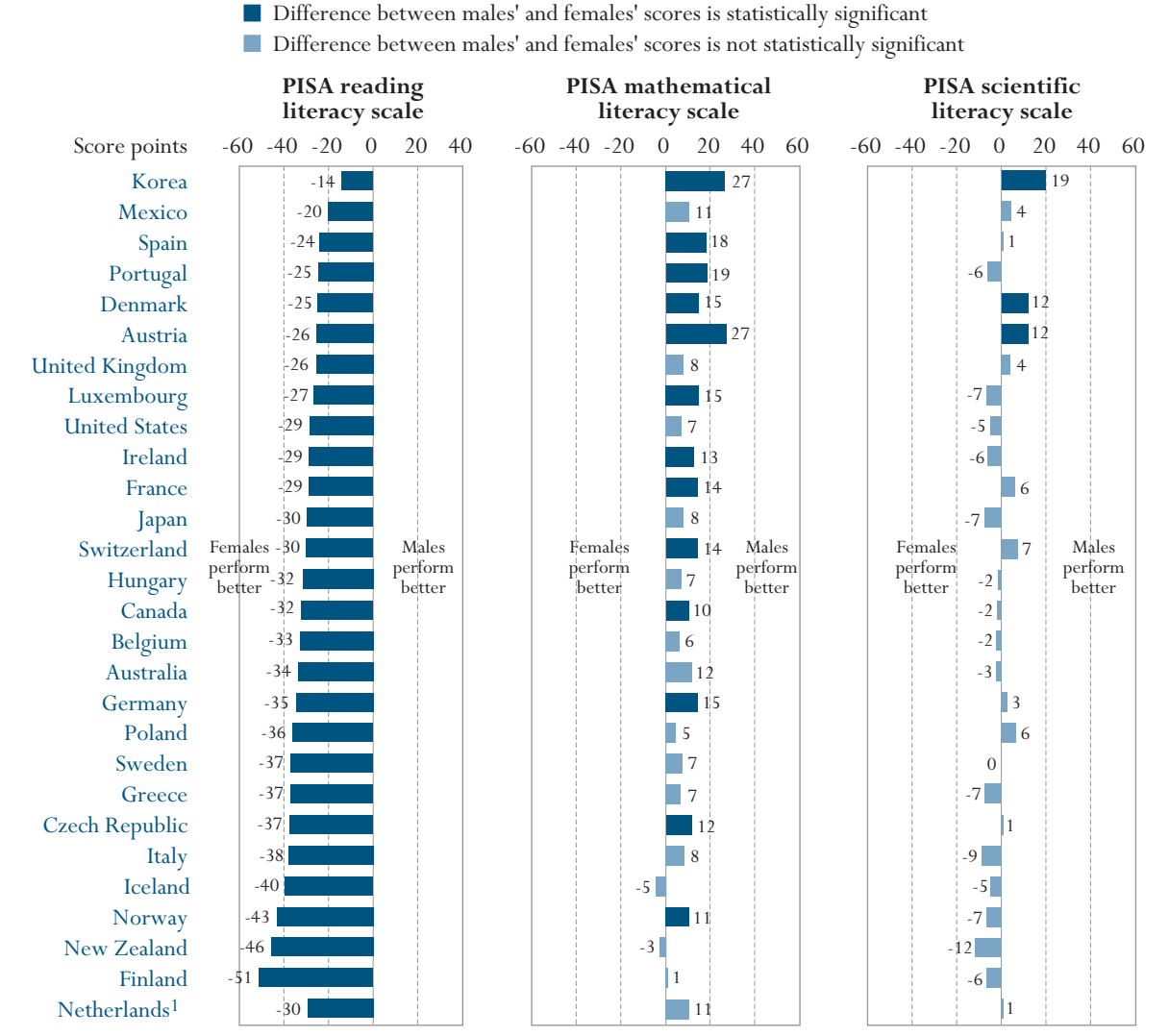
A11

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

Also gender differences in civic knowledge, as measured by the IEA Civic Education Study, are relatively small (Table A11.4). 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

Chart A11.4

Gender differences in performance of 15-year-olds on the PISA 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 reading literacy scale.

Source: OECD PISA database, 2001. Table A11.3. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

(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.

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

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 between 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.

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 Ireland, Japan, and the United Kingdom, achieve both high mean scores and below average gender differences. In mathematical literacy, Belgium, Finland, Japan, New Zealand and the United Kingdom similarly achieve both high mean performance and relatively small gender differences (Table A11.3 and Indicators A5 and A6).

Box A11.1 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, while in no country is the same true for females. 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 the *Knowledge and Skills for Life – First Results from PISA 2000* (OECD, 2001).

A11

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. As described in Indicator A9, 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 *Approaches to Learning: Strategies and Motivation*, OECD, 2003). By identifying differences between males and females in the self-regulated learning scales (Tables A11.5a and A11.5b), this indicator pinpoints their relative strengths and weaknesses. Targeting interventions to account for differences in students' learning strategies or attitudes could have important impacts on pedagogy.

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 A11.5a).

…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, females report using control strategies (*i.e.*, strategies that allow them to control the learning process) more often than do males. This suggests that females are more likely to adopt a self-evaluating perspective during the learning process (see OECD, 2001). Males, on the other hand, perhaps could benefit from more general assistance in planning, organizing, and structuring learning activities (Table A11.5a).

Motivation.

In all countries, females express greater interest in reading…

In all countries, females express greater interest in reading than males. And as shown in Indicators A8 and A9, 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. 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 effectiveness with which schools and societies promote motivation and interest in different subject areas.

Self-related cognitions

The confidence that students have 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

higher self-concept than do males in reading. These differences are especially pronounced in Finland, Germany, Italy 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, Sweden and Norway (Table A11.5b).

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

Learning styles

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 A11.5b).

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

Definitions and methodologies

The reading performance scores of 4th graders are based on the Progress in Reading Literacy Study (PIRLS) that was undertaken by the International Association for the Evaluation of Educational Achievement (IEA) during 2001. The PIRLS target population was students in the upper of the two adjacent grades that contained the largest proportion of nine 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 A11.2).

The reading performance scores of 4th graders are based on the Progress in Reading Literacy Study (PIRLS).

The scores on the civics knowledge test are based on assessments of students during the second phase of the International Association for the Evaluation of Educational Achievement's (IEA) 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 A11.4).

The civics knowledge scores are based on the Civics Education Study that was undertaken by the IEA during 1999.

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.

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 during 2000.

Twenty-six of the 32 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, Brazil, the Czech Republic, Denmark, Finland, Germany, Hungary, Ireland, Iceland, Italy, Korea, Latvia, Liechtenstein, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Portugal, the Russian Federation, Scotland, Sweden, Switzerland and the United States. Note that Belgium and the United Kingdom, countries that did participate in the main

A11

PISA assessments, are represented in the self-regulated learning option only by participating jurisdictions: the Flemish Community and Scotland, respectively. Canada, France, Greece, Ireland, Japan, and Spain, as well as the French Community of Belgium and England did not participate in this option.

For the definition of the indices referred to in this indicator, see Indicator A10.

For notes on standard errors, significance tests, and multiple comparisons see Annex 3 at *www.oecd.org/edu/eag2003*.

A11

Table A11.1

15 year-olds' occupational expectations by age 30, by gender

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

		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***
NON-OECD 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 database, 2001.

A11

Table A11.2

Performance of 4th-grade students and gender (2001)

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

	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)***

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 per cent of National Desired Population.

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

A11

Table A11.3

Performance of 15-year-old students and gender (2000)

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

		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)*
NON-OECD 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)

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 database, 2001.

A11

Table A11.4

Civic knowledge of 14-year-old students and gender (1999)

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

	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)

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 per cent.
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).

A11

Table A11.5a

Gender differences among 15-year-olds on the PISA self-regulated learning scales (2000)

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

		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 perseverance	
		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	0.01	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	0.04	0.04	0.04	-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	0.05	-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	0.07	-0.34	0.47	0.26	0.35	-0.01	0.01
	Switzerland	-0.16	0.17	0.02	0.03	-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*
NON-OECD COUNTRIES	Brazil	-0.10	0.10	-0.11	0.11	-0.18	0.17	-0.10	0.13	-0.34	0.42	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	0.02	-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 database, 2001.

A11

Table A11.5b

Gender differences among 15-year-olds on the PISA self-regulated learning scales (2000) (continued)

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

		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	0.12	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*
NON-OECD COUNTRIES	Brazil	-0.24	0.11	0.21	0.21	0.06	0.08	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 database, 2001.

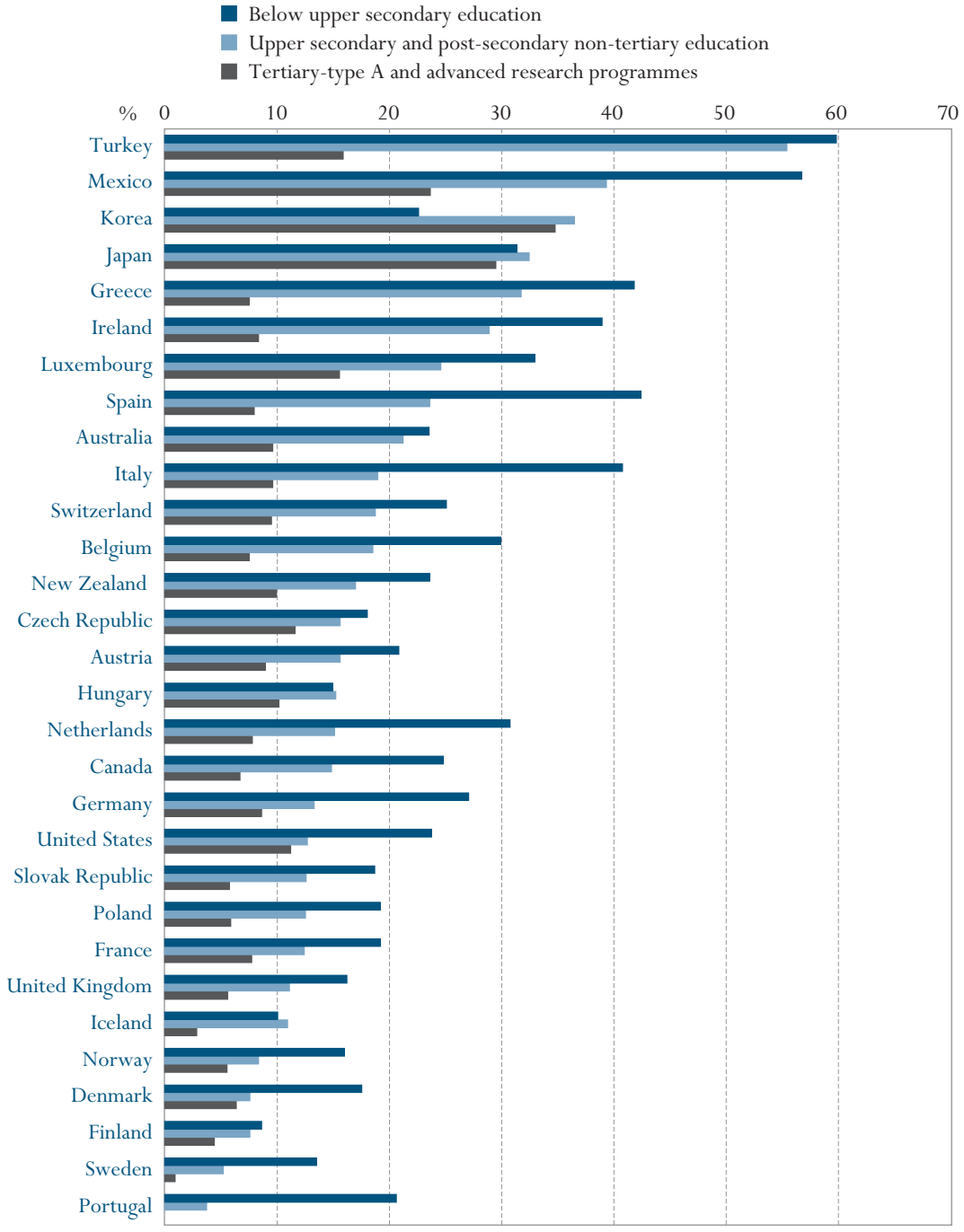
INDICATOR A12: LABOUR FORCE PARTICIPATION BY LEVEL OF EDUCATIONAL ATTAINMENT

- Labour force participation rates rise with educational attainment in most OECD countries. With very few exceptions, the participation rate for graduates of tertiary education is markedly higher than that for upper secondary graduates. The gap in male participation rates is particularly wide between upper secondary graduates and those without an upper secondary qualification.
- The labour force participation rate for females with less than upper secondary attainment is particularly low. Rates for females with tertiary attainment approach or exceed 80 per cent in all but four countries, but remain below those of males in all countries except one.
- The gender gap in labour force participation decreases with increasing educational attainment. Although a gender gap in labour force participation remains among those with the highest educational attainment, it is much narrower than among those with lower qualifications.

A12

Chart A12.1

Differences between labour force participation rates of males and females, by level of educational attainment for 25 to 64-year-olds (2001)



Countries are ranked in descending order of the difference in participation rates of males and females who have completed upper secondary and post-secondary non-tertiary education.
Source: OECD. Table A12.1. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A12

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 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 rates of participation in the labour force first, and then rates of unemployment. 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

Labour force participation

Labour force participation rates for males vary less between countries than those for females.

Variation between countries in labour force participation by females is a primary factor in the differences in overall participation rates between OECD countries. The overall labour force participation rates for males aged 25 to 64 range from 81 per cent or less in Belgium, Hungary, Italy and Poland to 94 per cent and above in Iceland, Japan, Mexico and Switzerland (Table A12.1). By contrast, reflecting very different cultural and social patterns, labour force participation among females ranges from 55 per cent or less in Greece, Italy, Mexico, Spain and Turkey, to over 77 per cent in the Nordic countries. Prolonged education and non-employment are two factors which contribute to these disparities, generally increasing the number of people not in the labour force.

Labour force participation rates for males rise with educational attainment in most OECD countries.

Labour force participation rates for males are generally higher among those with higher educational qualifications. With the exception of Ireland, Mexico, Spain and Turkey, where the trend is less pronounced, the participation rate for graduates of tertiary education is markedly higher than that for upper secondary graduates. The difference ranges from a few percentage points to between 8 and 9 percentage points in Austria, Denmark, Germany and Poland. It is very small between the ages of 35 and 44, when most people are in employment, and may stem mainly from the fact that the less skilled leave the labour market earlier. After 55, those with higher educational attainment tend to remain in employment longer than others (Table A12.1).

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

The gap in participation rates 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 18 out of 30 OECD countries, the difference in the rate of participation between upper secondary graduates and those without such a qualification exceeds ten percentage points. The most extreme case is Hungary, where only half of the male population without upper secondary education, but over 80 per cent with such attainment, participate in the labour force. The gap in participation rates between males with low and males with

A12

high educational attainment is less than five percentage points in Iceland, Korea, Mexico, Portugal and Turkey (Table A12.1).

Among females, the difference in labour force participation by level of educational attainment is even wider.

Labour force participation rates for females aged 25 to 64 years show yet more marked differences, not only between those with below upper secondary and those with upper secondary attainment (20 percentage points or more in 15 out of the 30 OECD countries) but also between those with upper secondary and those with tertiary-type A attainment (around 10 percentage points or more in 23 countries). Particular exceptions are Japan, Korea and Sweden where participation rates for females with upper secondary qualifications approach those for females with a tertiary qualification (a difference of around 3 to 7 percentage points) (Table A12.1).

Labour force participation among females with qualifications below upper secondary is particularly low…

Participation rates for females with less than upper secondary attainment are particularly low, averaging 50 per cent over all OECD countries and around 40 per cent or below in Belgium, Greece, Hungary, Ireland, Italy and Turkey. Rates for females with tertiary attainment exceed 80 per cent everywhere except Hungary, Japan, Korea, Luxembourg, Mexico and Turkey, but remain below those of males in all countries (Table A12.1).

…but the gender gap in labour force participation decreases with increasing educational attainment.

Although the gender gap in labour force participation 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 participation of males and females decreases significantly: from 26 percentage points at below upper secondary level, to 19 percentage points at upper secondary and 10 percentage points at tertiary level (Table A12.1).

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

Much of the overall gap between the labour force participation rates of males with differing educational attainment is explained by larger differences in the older populations, particularly among males between the ages of 55 and 64 (Table A12.1). At least 70 per cent of males aged 55 to 64 with a tertiary-level qualification are active in the labour force in 18 out of 30 countries. Only Greece, Korea, Mexico and Turkey have participation rates as high among those who have not completed upper secondary education. By contrast, the education gap in female labour force participation is relatively wide in all age groups.

The patterns observed here 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. A sizeable number 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

rates in the labour market have been lower historically than those of males, and in spite of considerable advances over the last few decades, current participation rates continue to show the impact of these historical factors.

Unemployment rates 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 rate is a measure of a particular 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 of varying educational attainment will depend both on the requirements of labour markets and on the supply of workers with differing 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 rates fall with higher educational attainment.

In 18 out of the 30 OECD countries, male labour force participants aged 25 to 64 with a qualification below upper secondary education are more than 1.5 times as likely to be unemployed as their counterparts who have completed upper secondary education. In 17 countries, the unemployment rate for male upper secondary graduates is at least 1.5 times the unemployment rate among tertiary-type A graduates. At the tertiary level, completion of shorter vocationally-oriented programmes (ISCED 5B) is associated with higher unemployment rates than those for graduates of more theoretical, longer programmes at ISCED level 5A in about two thirds of the countries (Table A12.2).

In most countries, the disparities in unemployment rates between levels of educational attainment are particularly strong among males between 30 and 44 years of age. The association between unemployment rates and educational attainment is similar among females, although the gap between upper secondary and tertiary attainment is even wider in many countries. The disadvantage for females is visible for one-third of countries, but the unemployment rates are similar in the others, independently of the levels of attainment. At the tertiary level, the gap is much less obvious, even in the countries where a large gender disparity is a general phenomenon (Chart A12.2).

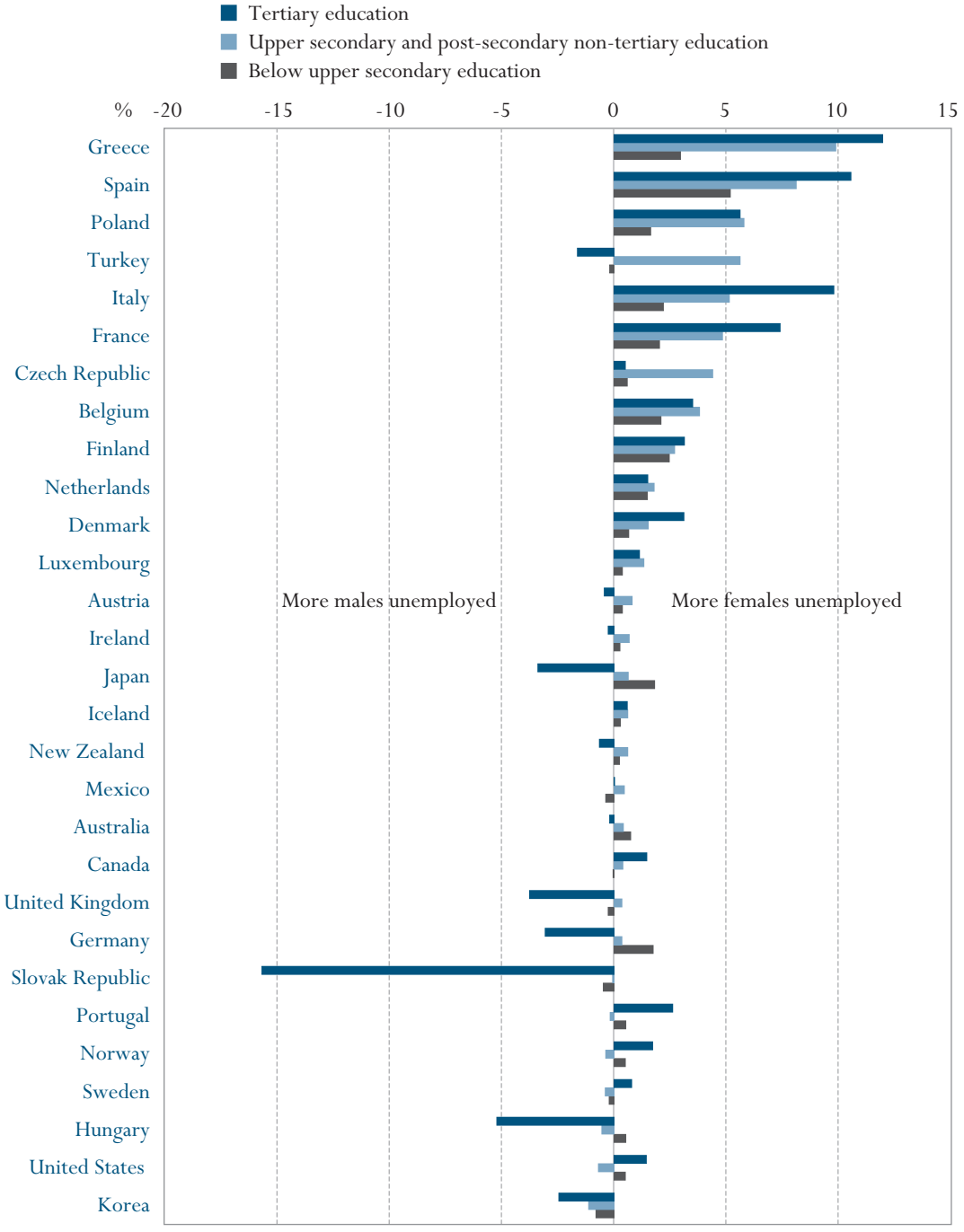
A number of factors contribute to the variation between countries in the association between unemployment rates and educational attainment.

The wide variation between countries in unemployment rates observed among those with low educational attainment is attributable to a number of factors. In some countries (especially those facing a transition process: the Czech Republic, Hungary, Poland and the Slovak Republic), the high unemployment rates of the poorly educated reflect generally difficult labour market conditions, which affect these individuals in particular. To a lesser extent, this is also the case in Finland, France and Germany. Unemployment rates among those without an upper secondary qualification are also relatively high in some countries where labour markets are less regulated (Canada, the United Kingdom and the United States). On the other hand, in countries where agriculture is still an important sector of employment (Mexico and Portugal), unemployment rates of persons without upper secondary education tend to be low. Finally, where overall

A12

Chart A12.2

Differences between unemployment rates of females and males, by level of educational attainment, for 30 to 44-year-olds (2001)



Countries are ranked in descending order of the difference in unemployment rates of females to males who have completed upper secondary education or post-secondary non-tertiary education.

Source: OECD. Table A12.2. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A12

labour market conditions are particularly favourable in 2000/2001 (Austria, Iceland, Luxembourg, the Netherlands and Norway), jobs appear to be available for workers with low as well as high educational attainment (Table A12.2). Generally the lower skilled are among the first victims of negative changes in the economic climate.

Definitions and methodologies

Data are derived from national labour force surveys.

The labour force participation rate for a particular age group is equal to the percentage of individuals in the population of the same age group who are either employed or unemployed, as defined according to the guidelines of the International Labour Office (ILO).

The 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.

The unemployment rate is the number of unemployed persons divided by the number of labour force participants (expressed as a percentage). The level of educational attainment is based on the definitions of ISCED-97.

A12

Table A12.1

Labour force participation rates (2001)

by level of educational attainment and gender for 25 to 64-year-olds and 55 to 64-year-olds

OECD COUNTRIES

		25 to 64-year-olds					55 to 64-year-olds			
		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	Below upper secondary education	Upper secondary and post-secondary non-tertiary education	Tertiary education	All levels of education
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Australia	Males	79	89	89	92	86	54	67	74	62
	Females	55	68	77	83	66	30	42	61	38
Austria	Males	70	84	88	94	83	30	40	64	41
	Females	49	69	83	85	65	15	19	40	18
Belgium	Males	69	87	91	92	81	25	44	58	36
	Females	39	69	81	84	60	11	21	31	16
Canada	Males	73	88	91	90	86	52	64	66	61
	Females	48	73	81	83	72	28	46	51	41
Czech Republic	Males	70	88	x(4)	94	87	35	55	79	55
	Females	52	73	x(4)	83	70	13	27	61	25
Denmark	Males	75	87	91	96	86	55	65	81	66
	Females	57	79	88	90	77	31	60	67	52
Finland	Males	70	86	90	93	83	43	54	65	51
	Females	61	79	86	88	77	40	53	67	49
France	Males	76	88	92	92	85	36	44	66	44
	Females	57	76	85	84	70	29	36	51	34
Germany	Males	77	84	88	92	84	44	49	67	53
	Females	50	70	81	83	67	26	35	53	34
Greece	Males	82	88	85	90	85	60	48	57	57
	Females	40	57	79	83	52	25	16	30	24
Hungary	Males	50	83	x(4)	89	75	22	46	64	36
	Females	35	67	x(4)	79	58	8	21	43	16
Iceland	Males	95	95	97	98	96	91	92	99	93
	Females	85	84	91	95	87	81	83	82	82
Ireland	Males	79	93	95	94	87	61	72	80	66
	Females	40	64	74	85	60	21	35	50	29
Italy	Males	74	86	x(4)	91	80	36	49	71	41
	Females	34	67	x(4)	81	50	12	29	41	16
Japan	Males	87	95	98	97	95	80	86	86	84
	Females	56	63	66	68	63	48	49	47	49
Korea	Males	84	89	94	91	88	74	67	70	71
	Females	61	53	58	56	57	51	25	42	48
Luxembourg	Males	78	86	92	92	84	22	34	73	36
	Females	45	62	80	77	56	7	20	48	14
Mexico	Males	94	96	97	94	94	81	78	79	80
	Females	37	56	61	70	43	27	37	37	28
Netherlands	Males	77	89	89	91	86	44	54	61	52
	Females	47	73	82	83	65	20	33	46	27
New Zealand	Males	80	91	89	93	89	66	79	80	75
	Females	56	74	77	83	71	41	58	65	52
Norway	Males	74	89	92	94	88	59	74	88	74
	Females	58	81	90	88	80	47	66	84	63
Poland	Males	64	83	x(4)	92	81	35	41	68	41
	Females	45	71	x(4)	86	67	20	24	45	24
Portugal	Males	87	87	94	94	87	63	57	78	64
	Females	66	84	88	95	71	41	32	60	42
Slovak Republic	Males	62	88	89	93	86	25	46	64	43
	Females	43	76	90	88	71	3	12	52	11
Spain	Males	83	90	93	91	86	59	62	73	61
	Females	41	66	77	83	54	20	38	58	24
Sweden	Males	79	88	89	91	87	68	74	82	74
	Females	66	83	86	90	82	56	69	82	68
Switzerland	Males	87	93	96	96	94	78	82	85	83
	Females	62	74	85	86	74	41	58	68	54
Turkey	Males	82	87	x(4)	87	84	52	25	43	49
	Females	22	32	x(4)	71	27	14	5	15	14
United Kingdom	Males	67	88	93	93	86	51	67	73	64
	Females	51	77	85	87	74	44	65	69	58
United States	Males	75	86	90	92	87	55	66	77	68
	Females	52	73	80	81	73	33	54	66	54
Country mean	***Males***	***77***	***88***	***92***	***93***	***86***	***52***	***59***	***72***	***59***
	Females	***50***	***70***	***81***	***83***	***65***	***29***	***39***	***54***	***37***

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/eag2003)*.

A12

Table A12.2

Unemployment rates (2001)

by level of educational attainment and gender of 25 to 64-year-olds and 30 to 44-year-olds

		25 to 64-year-olds					30 to 44-year-olds			
		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	Below upper secondary education	Upper secondary and post-secondary non-tertiary education	Tertiary education	All levels of education
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OECD COUNTRIES										
Australia	Males	8.1	4.5	4.5	2.5	5.2	8.6	4.6	2.8	5.3
	Females	7.0	5.2	3.9	2.6	5.1	8.4	5.0	3.5	5.7
Austria	Males	7.2	2.9	1.4	1.3	3.2	6.5	2.4	1.2	2.7
	Females	5.7	3.3	2.0	1.5	3.6	6.0	3.2	1.6	3.5
Belgium	Males	7.4	4.4	2.5	2.5	4.8	8.8	3.7	2.1	4.9
	Females	10.4	6.9	2.5	3.8	6.3	12.3	7.5	2.6	6.8
Canada	Males	10.2	6.2	4.8	4.4	6.2	10.8	6.3	4.8	6.3
	Females	10.2	6.2	4.5	4.4	5.8	12.3	6.7	4.8	6.2
Czech Republic	Males	19.3	4.7	x(4)	1.9	5.4	23.4	4.5	1.8	5.3
	Females	19.1	8.0	x(4)	2.2	8.9	24.0	8.9	2.4	9.7
Denmark	Males	4.0	2.7	3.3	3.5	3.1	4.0	2.3	3.2	2.8
	Females	6.2	4.0	3.1	3.1	4.1	7.2	3.9	3.9	4.3
Finland	Males	10.5	7.9	4.7	3.0	7.2	11.9	7.1	2.8	6.5
	Females	12.7	9.2	5.9	3.6	8.1	15.0	9.8	5.3	8.2
France	Males	9.7	5.1	4.3	4.1	6.2	10.7	4.7	3.5	6.1
	Females	14.4	9.3	5.0	5.6	9.8	18.1	9.5	5.5	10.6
Germany	Males	15.6	8.1	4.4	3.4	7.7	14.2	7.0	2.6	6.5
	Females	11.5	8.4	5.8	4.4	8.1	11.2	7.4	4.4	7.2
Greece	Males	4.9	6.2	4.9	4.5	5.3	4.7	5.1	4.2	4.7
	Females	12.3	15.1	8.3	9.6	12.5	16.7	14.9	7.1	13.2
Hungary	Males	12.5	4.8	x(4)	1.1	5.5	15.1	4.6	0.7	5.6
	Females	7.6	4.2	x(4)	1.3	4.3	9.9	4.1	1.2	4.5
Iceland	Males	2.3	1.2	0.8	1.0	1.5	1.7	1.4	0.6	1.3
	Females	2.4	2.8	2.4	0.2	2.1	2.3	2.0	0.9	1.8
Ireland	Males	5.5	2.3	1.9	1.1	3.3	6.3	2.0	1.6	3.4
	Females	5.1	2.8	2.3	1.0	2.9	6.1	2.7	1.9	3.1
Italy	Males	6.9	4.9	x(4)	3.8	5.8	7.1	3.8	3.9	5.4
	Females	14.0	9.3	x(4)	7.2	10.7	16.8	8.9	6.1	11.1
Japan	Males	6.9	4.8	3.2	2.8	4.4	7.5	3.6	2.0	3.1
	Females	4.3	4.7	3.8	3.1	4.2	4.2	4.2	3.8	4.0
Korea	Males	4.3	3.7	5.0	3.2	3.8	4.9	3.5	2.7	3.4
	Females	1.8	2.7	3.3	2.0	2.3	2.5	2.4	1.9	2.3
Luxembourg	Males	1.6	0.8	0.9	1.1	1.1	1.0	0.6	1.2	0.9
	Females	2.4	1.5	0.4	2.6	1.8	2.2	2.0	1.6	1.9
Mexico	Males	1.4	1.9	2.1	2.2	1.6	1.3	1.2	2.0	1.5
	Females	1.4	1.6	1.8	2.2	1.6	1.3	1.7	1.7	1.5
Netherlands	Males	2.5	1.1	0.0	0.7	1.6	2.6	0.8	0.6	1.2
	Females	3.5	2.3	1.2	2.1	2.7	4.1	2.6	2.1	2.8
New Zealand	Males	7.4	3.0	4.4	2.8	4.0	8.1	3.2	3.4	4.1
	Females	5.9	3.6	2.9	3.2	3.9	7.5	3.8	3.6	4.4
Norway	Males	3.4	2.9	0.7	1.7	2.6	4.2	3.2	1.5	2.8
	Females	3.3	2.5	1.9	1.8	2.4	5.9	2.9	2.0	2.7
Poland	Males	21.7	14.0	x(4)	4.0	13.9	26.3	13.5	1.8	13.7
	Females	23.7	18.3	x(4)	5.9	17.0	31.9	19.3	3.4	18.1
Portugal	Males	2.7	3.1	2.6	2.0	2.7	2.4	3.0	1.4	2.4
	Females	4.6	3.3	2.9	3.3	4.3	5.0	2.8	1.9	4.2
Slovak Republic	Males	44.3	14.8	5.3	4.5	15.7	55.1	14.8	3.9	16.1
	Females	34.6	14.8	11.0	3.4	15.7	39.5	14.8	3.4	15.8
Spain	Males	7.3	5.4	4.1	4.7	6.2	7.6	4.6	3.4	5.8
	Females	16.1	12.8	13.0	8.8	13.3	18.1	12.7	8.6	13.5
Sweden	Males	5.6	5.0	3.4	2.6	4.5	6.3	4.7	2.9	4.3
	Females	6.4	4.2	2.5	2.2	3.8	7.0	4.3	2.7	3.9
Switzerland	Males	m	1.1	m	m	1.1	m	m	m	m
	Females	m	2.9	m	m	3.1	m	3.4	m	3.4
Turkey	Males	9.2	8.0	x(4)	5.6	8.6	9.3	5.5	3.4	7.9
	Females	6.9	13.5	x(4)	6.1	7.7	7.7	11.2	3.2	7.3
United Kingdom	Males	9.4	4.1	2.7	2.0	4.1	11.9	3.9	2.2	4.2
	Females	5.7	3.7	1.7	1.9	3.4	8.2	4.3	2.0	4.0
United States	Males	7.5	4.2	2.5	1.9	3.7	7.4	4.4	1.8	3.7
	Females	8.9	3.4	2.3	2.0	3.3	8.9	3.7	2.3	3.6
Country mean	*Males*	*8.9*	*4.8*	*3.3*	*2.8*	*5.0*	*9.9*	*4.5*	*2.4*	*4.9*
	Females	*9.4*	*6.4*	*4.0*	*3.5*	*6.1*	*11.1*	*6.3*	*3.3*	*6.3*

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/eag2003)*.

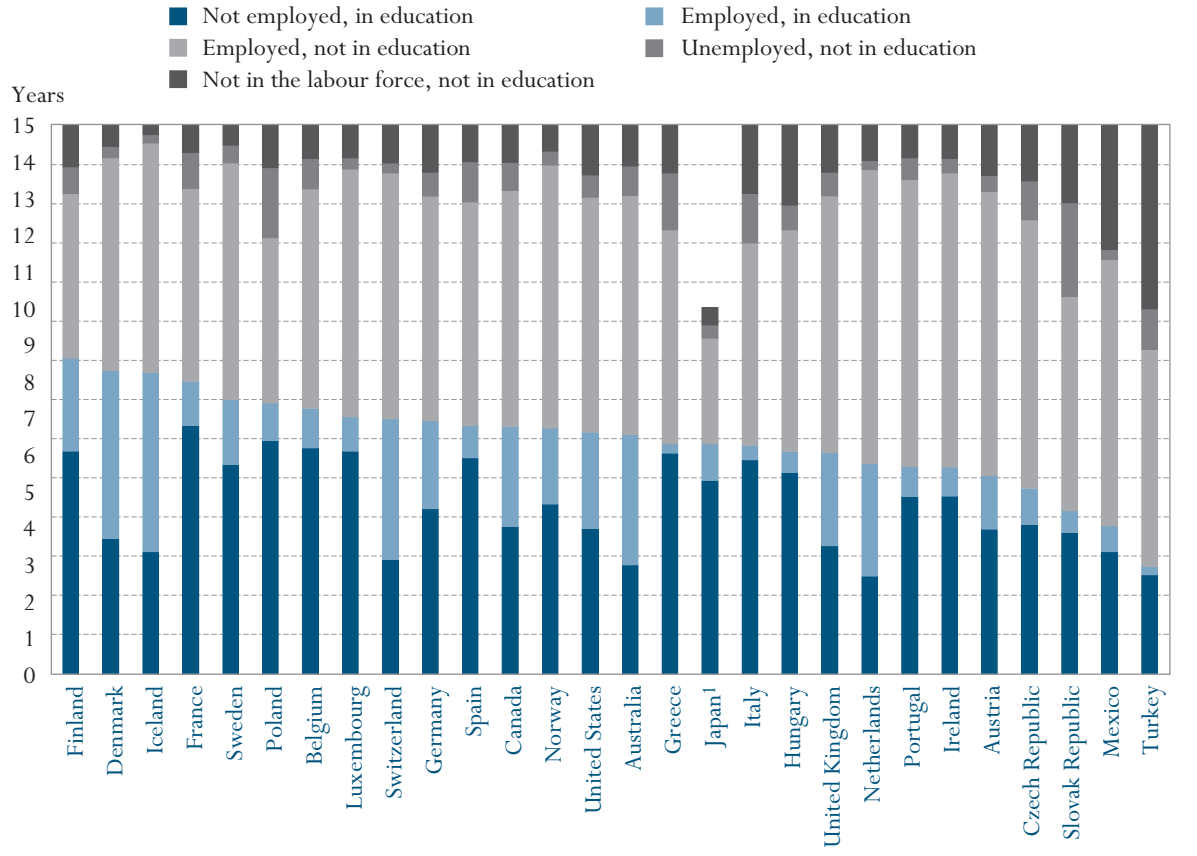
A13

INDICATOR A13: EXPECTED YEARS IN EDUCATION, EMPLOYMENT AND NON-EMPLOYMENT BETWEEN THE AGES OF 15 AND 29

- On average among countries, a young person aged 15 in 2001 can expect to be in formal education for a little under six and a half years. In 16 of the 28 countries studied, this period ranges from six to seven and a half years.
- In addition to the expected number of years spent in education, a young person aged 15 can expect to hold a job for 6.4 of the 15 years to come, to be unemployed for a total of 0.8 years and to be out of the labour market for 1.4 years. It is in the average duration of spells of unemployment that countries vary most, which primarily reflects differences in youth employment rates.
- In absolute terms, young people today can expect to spend less time in unemployment after completing their initial education than they did ten years ago.

Chart A13.1

Expected years in education and not in education, by work status of 15 to 29-year-olds (2001)



1. Data refer to 15 to 24-year-olds.

Countries are ranked in descending order of the expected years in education of the youth population.

Source: OECD. Table A13.1. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A13

Policy context

This indicator shows the expected years young people spend in education, employment and non-employment.

During the past decade, young people have spent longer in initial education, with the result that they delay their entry into the world of work (see *Education at a Glance,* OECD, 1998). Some of this additional time is spent combining work and education, a practice that is widespread in some countries. Once young people have completed their education, access to the labour market is often impeded by spells of unemployment or non-employment, although this situation affects males and females differently. In absolute terms, however, young people today can expect to spend less time in unemployment after completing initial education than they did ten years ago.

Evidence and explanations

On the basis of the current situation of persons between the ages of 15 and 29, this indicator gives a picture of the major trends affecting the transition from school to work.

On average, a 15-year-old can expect to be in the education system for about another six and a half years.

On average, a young person aged 15 in 2001 can expect to be in education for around six and a half years (Table A13.1). Between 1985 and 1996, this value rose by almost 1.5 years. Since 1996, the overall increase has been slower. Countries where young people used to spend relatively little time in education have made up some ground, whereas those in which they stayed in education longest are now recording little increase.

In 16 of the 28 countries studied, a 15-year-old can expect to spend from six to seven and a half years in education. There is, however, a gap of around four years separating the two extreme groups: Denmark, Finland, France and Iceland (eight years or more) on the one hand and Mexico, the Slovak Republic and Turkey (four years on average) on the other.

The average overall number of expected years in education is marginally higher for females (6.5 compared with 6.3 years). In many countries, the figures are about the same, but Turkey stands out as an exception, with only 2.4 years of expected education for young females aged 15 years. At the other end of the scale, a longer average period of education often goes hand in hand with a relatively higher average for females (Table A13.1).

The figure for expected years of education covers some very different combinations of education and work.

The figure for expected years of education covers some very different combinations of education and work. Employment combined with education includes both work-study programmes and part-time jobs. While such combinations are rare in half of the countries studied, in the other half they account for between one and four of the additional years that young people expect to spend in education.

Today, a 15-year-old can expect to hold a job for 6.4 years, to be unemployed for almost one year and to be out of the labour force for 1.4 years until the age of 29.

In addition to the average six and a half years spent in education, a young person aged 15 can expect to hold a job for 6.4 of the 15 years to come, to be unemployed for a total of 0.8 years and to be out of the labour market for 1.4 years, neither in education nor seeking work (Table A13.1). It is worth noting that, in absolute terms, young people can expect to spend less time in unemployment after completion of initial education than they could ten years ago.

A13

It is in the average duration of spells of unemployment that countries vary most, which mainly reflects differences in youth employment rates. The cumulative average duration of unemployment is four months or below in Denmark, Iceland, Luxembourg, Mexico, the Netherlands and Switzerland, but more than 18 months in Greece, Poland, and the Slovak Republic.

By and large, males and females differ very little in terms of the expected number of years in unemployment. However, while the situation is similar for both genders in many countries, females appear to be at a disadvantage in Greece, Portugal and Spain and at an advantage in Australia, Canada, Germany, Hungary, the Slovak Republic, Turkey and the United Kingdom (Table A13.1). In some of the latter countries, however, notably in Australia, the United Kingdom, and in particular Turkey, the lower expectancy for females is largely influenced by the fact that many females leave the labour market, thereby reducing pressure on jobs.

Whereas young males can expect to spend little more than eight months neither in education nor in the labour force between the ages of 15 and 29, the average figure for females is more than two years. In Austria, Finland and Sweden, young males and young females do not differ much in this measure. Conversely, in the Czech Republic, Hungary, Mexico and Turkey there is a much stronger tendency for young females to leave the labour market. In all of the other countries, females between the ages of 15 and 29 spend an average of about one year more than males outside the labour market.

Definitions and methodologies

Data are derived from national labour force surveys.

The statistics presented here are calculated from labour force survey data on age-specific proportions of young people in each of the specified categories. These proportions are then totalled over the 15 to 29 age group to yield the expected number of years spent in various situations. For countries providing data from the age of 16 only, it is assumed that the 15 year-olds are all in education and out of the labour force. This improvement in the calculation tends to increase the average number of expected years in education compared to the last edition of *Education at a Glance*. The calculation thus assumes that young persons currently aged 15 years will show the same pattern of education and work between the ages of 15 and 29 as the population between those age limits in the given data year.

Persons in education include those attending part-time as well as full-time. The definitions of the various labour force statuses are based on the guidelines of the International Labour Office (ILO), except for the category 'youth in education and employed', which includes all work-study programmes whatever their classification according to the ILO guidelines. The data for this indicator were obtained from a special collection with a reference period in the early part of the calendar year, usually the first quarter or the average of the first three months.

A13

Table A13.1

Expected years in education and not in education for 15 to 29-year-olds (2001)

by gender and work status

		Expected years in education			Expected years not in education			
		Not employed	Employed (including work study programmes)	Sub-total	Employed	Unemployed	Not in the labour force	Sub-total
OECD COUNTRIES								
Australia	Males	3.0	3.6	6.6	6.9	0.9	0.5	8.4
	Females	2.9	3.5	6.4	6.1	0.7	1.8	8.6
	M+F	3.0	3.5	6.5	6.5	0.8	1.2	8.5
Austria	Males	3.6	1.8	5.4	7.9	0.5	1.3	9.6
	Females	4.3	1.1	5.4	7.6	0.4	1.6	9.6
	M+F	3.9	1.5	5.4	7.7	0.4	1.4	9.6
Belgium	Males	5.9	1.3	7.3	6.4	0.8	0.5	7.7
	Females	6.4	0.8	7.2	5.6	0.8	1.4	7.8
	M+F	6.2	1.1	7.2	6.0	0.8	0.9	7.8
Canada	Males	4.0	2.5	6.5	6.8	1.0	0.7	8.5
	Females	4.0	3.0	7.0	6.0	0.5	1.4	8.0
	M+F	4.0	2.8	6.8	6.4	0.8	1.0	8.2
Czech Republic	Males	3.7	1.2	5.0	8.6	1.1	0.3	10.0
	Females	4.4	0.7	5.1	6.0	1.1	2.8	9.9
	M+F	4.1	1.0	5.1	7.3	1.1	1.6	9.9
Denmark	Males	3.4	4.7	8.1	6.2	0.3	0.3	6.9
	Females	4.0	4.5	8.4	5.3	0.3	0.9	6.6
	M+F	3.7	4.6	8.3	5.8	0.3	0.6	6.7
Finland	Males	5.8	2.3	8.1	5.0	0.7	1.1	6.9
	Females	6.3	2.8	9.1	3.9	0.7	1.2	5.9
	M+F	6.1	2.6	8.6	4.5	0.7	1.2	6.4
France	Males	6.6	1.3	7.8	5.9	0.9	0.3	7.2
	Females	7.0	1.2	8.1	4.6	1.0	1.2	6.9
	M+F	6.8	1.2	8.0	5.3	1.0	0.8	7.0
Germany	Males	4.4	2.5	6.9	6.6	0.8	0.8	8.1
	Females	4.6	2.3	6.9	5.7	0.5	1.9	8.1
	M+F	4.5	2.4	6.9	6.1	0.6	1.3	8.1
Greece	Males	6.0	0.3	6.2	6.9	1.3	0.6	8.8
	Females	6.1	0.2	6.3	4.8	1.8	2.1	8.7
	M+F	6.0	0.2	6.3	5.8	1.6	1.3	8.7
Hungary	Males	5.4	0.6	5.9	7.0	0.9	1.2	9.1
	Females	5.6	0.6	6.2	5.1	0.5	3.2	8.8
	M+F	5.5	0.6	6.1	6.0	0.7	2.2	8.9
Iceland	Males	3.2	4.4	7.6	7.0	0.2	0.1	7.4
	Females	3.5	5.4	8.8	5.5	0.2	0.5	6.2
	M+F	3.3	4.9	8.2	6.3	0.2	0.3	6.8
Ireland	Males	4.5	0.7	5.2	8.8	0.5	0.5	9.8
	Females	5.2	0.9	6.0	7.2	0.3	1.4	9.0
	M+F	4.8	0.8	5.6	8.0	0.4	0.9	9.4
Italy	Males	5.6	0.4	6.0	6.4	1.3	1.3	9.0
	Females	6.1	0.4	6.5	4.6	1.4	2.5	8.5
	M+F	5.8	0.4	6.2	5.5	1.4	1.9	8.8
Japan[1]	Males	5.6	1.0	6.6	2.8	0.4	0.3	3.4
	Females	5.0	0.9	5.9	3.0	0.4	0.7	4.1
	M+F	5.3	1.0	6.3	2.9	0.4	0.5	3.7
Luxembourg	Males	6.1	1.1	7.2	7.1	0.4	0.4	7.8
	Females	6.1	0.8	6.8	6.4	0.2	1.5	8.2
	M+F	6.1	0.9	7.0	6.8	0.3	0.9	8.0
Mexico	Males	3.3	0.9	4.2	9.9	0.3	0.6	10.8
	Females	3.3	0.5	3.9	4.9	0.2	6.1	11.1
	M+F	3.3	0.7	4.0	7.3	0.3	3.4	11.0
Netherlands	Males	2.8	3.0	5.8	8.4	0.2	0.5	9.2
	Females	2.5	3.1	5.7	7.6	0.3	1.5	9.3
	M+F	2.7	3.1	5.7	8.0	0.2	1.0	9.3
Norway	Males	4.4	1.8	6.2	7.8	0.5	0.5	8.8
	Females	4.8	2.4	7.2	6.5	0.3	1.0	7.8
	M+F	4.6	2.1	6.7	7.2	0.4	0.7	8.3
Poland	Males	6.2	1.0	7.2	5.2	2.0	0.6	7.8
	Females	6.5	1.0	7.5	3.8	1.9	1.8	7.5
	M+F	6.4	1.0	7.4	4.5	1.9	1.2	7.6
Portugal	Males	4.5	0.8	5.3	8.7	0.4	0.6	9.7
	Females	5.2	0.8	6.0	7.0	0.7	1.3	9.0
	M+F	4.8	0.8	5.6	7.8	0.6	0.9	9.4
Slovak Republic	Males	3.6	0.8	4.3	6.2	3.0	1.5	10.7
	Females	4.1	0.4	4.5	5.5	2.1	2.9	10.5
	M+F	3.8	0.6	4.4	5.9	2.6	2.2	10.6
Spain	Males	5.5	0.8	6.3	7.2	1.0	0.5	8.7
	Females	6.3	0.9	7.2	5.0	1.2	1.5	7.8
	M+F	5.9	0.9	6.8	6.1	1.1	1.0	8.2
Sweden	Males	5.6	1.6	7.1	6.8	0.5	0.5	7.9
	Females	5.8	2.0	7.8	6.1	0.4	0.7	7.2
	M+F	5.7	1.8	7.5	6.5	0.5	0.6	7.5
Switzerland	Males	3.0	4.3	7.3	6.7	0.2	0.8	7.7
	Females	3.2	3.4	6.6	6.7	0.3	1.4	8.4
	M+F	3.1	3.9	7.0	6.7	0.3	1.1	8.0
Turkey	Males	3.1	0.3	3.4	8.2	1.5	1.9	11.6
	Females	2.3	0.2	2.4	3.4	0.6	8.6	12.6
	M+F	2.7	0.2	2.9	5.9	1.1	5.0	12.1
United Kingdom	Males	3.4	2.4	5.8	7.7	0.8	0.6	9.2
	Females	3.5	2.7	6.2	6.2	0.5	2.0	8.8
	M+F	3.5	2.6	6.0	7.0	0.6	1.3	9.0
United States	Males	4.1	2.4	6.5	7.1	0.7	0.8	8.5
	Females	3.8	2.9	6.7	5.8	0.5	2.0	8.3
	M+F	3.9	2.6	6.6	6.4	0.6	1.4	8.4
Country mean	***Males***	***4.5***	***1.8***	***6.3***	***7.2***	***0.8***	***0.7***	***8.7***
	Females	***4.7***	***1.8***	***6.5***	***5.7***	***0.7***	***2.1***	***8.5***
	M+F	***4.6***	***1.8***	***6.4***	***6.4***	***0.8***	***1.4***	***8.6***

1. Data refer to 15 to 24-year-olds.

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2003).*

A14

INDICATOR A14: THE RETURNS TO EDUCATION: EDUCATION AND EARNINGS

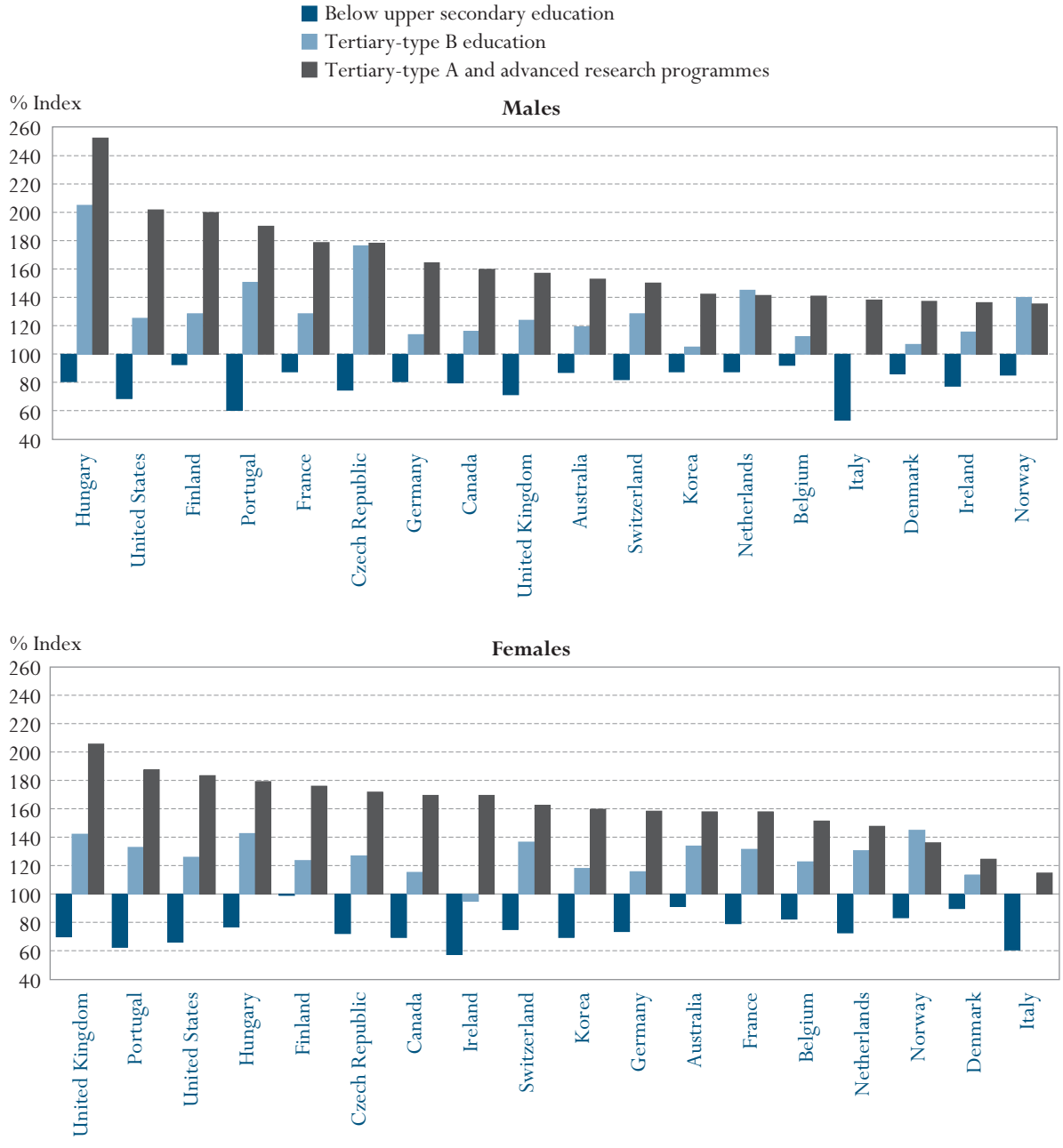
- Education and earnings are positively linked. Upper secondary and post-secondary non-tertiary education form a break point in many countries beyond which additional education attracts a particularly high premium. In all countries, graduates of tertiary-level education earn substantially more than upper secondary and than 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 be 60 to 90 per cent of those of upper secondary and post-secondary non-tertiary graduates.
- Females still earn less than males with similar levels of educational attainment.

A14

Chart A14.1

Relative earnings with income from employment (2001)

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 for the population having attained the level of tertiary-type A and advanced research programmes.

Source: OECD. Table A14.1. See Annex 3 for national data sources *(www.oecd.org/edu/eag2003)*.

A14

Policy context

This indicator examines the earnings of workers with differing 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 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 need to be considered when examining the returns to investment in education. This indicator examines the returns and the various costs and benefits that influence them.

Evidence and explanations

Education and earnings

Earnings differentials are a 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 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 in 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 is apparent from a similar comparison. Variations in relative earnings (before taxes) between countries reflect a number of factors, including skill demands in the labour force, 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 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, whatever the type of socio-economic system or the degree of economic development.

Chart A14.1 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 upper secondary and post-secondary non-tertiary education form a break-point in many countries, beyond which additional education attracts a particularly high premium. Among those countries which report gross earnings, the earnings premium for males aged 25 to 64 years with tertiary-level education ranges from 32 per cent or less in Belgium, Denmark, Ireland, Korea and New Zealand, to 78 per cent or more in the Czech Republic, Hungary, Portugal and United States.

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 for countries reporting weekly or monthly earnings (see definitions below).

Education and gender disparity in earnings

Tertiary education enhances earnings relative to upper secondary and post-secondary non-tertiary education more for females than for males in Australia, Belgium, Canada, Ireland, Korea, the Netherlands, New Zealand, Norway, Switzerland and the United Kingdom, whereas the reverse is true in the remaining countries (Table A14.1).

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, reinforced by the frequency of part-time work for females.

When all levels of education are taken together, the earnings of females between 30 and 44 range from less than 55 per cent of those of males in Switzerland and the United Kingdom to over 75 per cent of those of males in Hungary and Spain (Table A14.2).

…with some of the differences explained by career and occupational choices, the amount of time that males and females spend in the labour force, and the relatively high incidence of part-time work among females.

Some of the gap in earnings between males and females may be explained 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. Furthermore, earnings data by age suggest that there may be a movement towards more equality of average earnings between males and females across all levels of education, a result which might also be influenced by the increased proportion of females among younger tertiary graduates. In four out of 18 countries with available data, the ratio of female to male earnings at the tertiary-type A and advanced research programmes levels is at least 10 percentage points higher among 30 to 44-year-olds than among 55 to 64-year-olds (Table A14.2).

Private internal rates of return to investment in education

The overall incentives to invest in human capital that are embedded in labour market benefits can be summarised in the private rate of return.

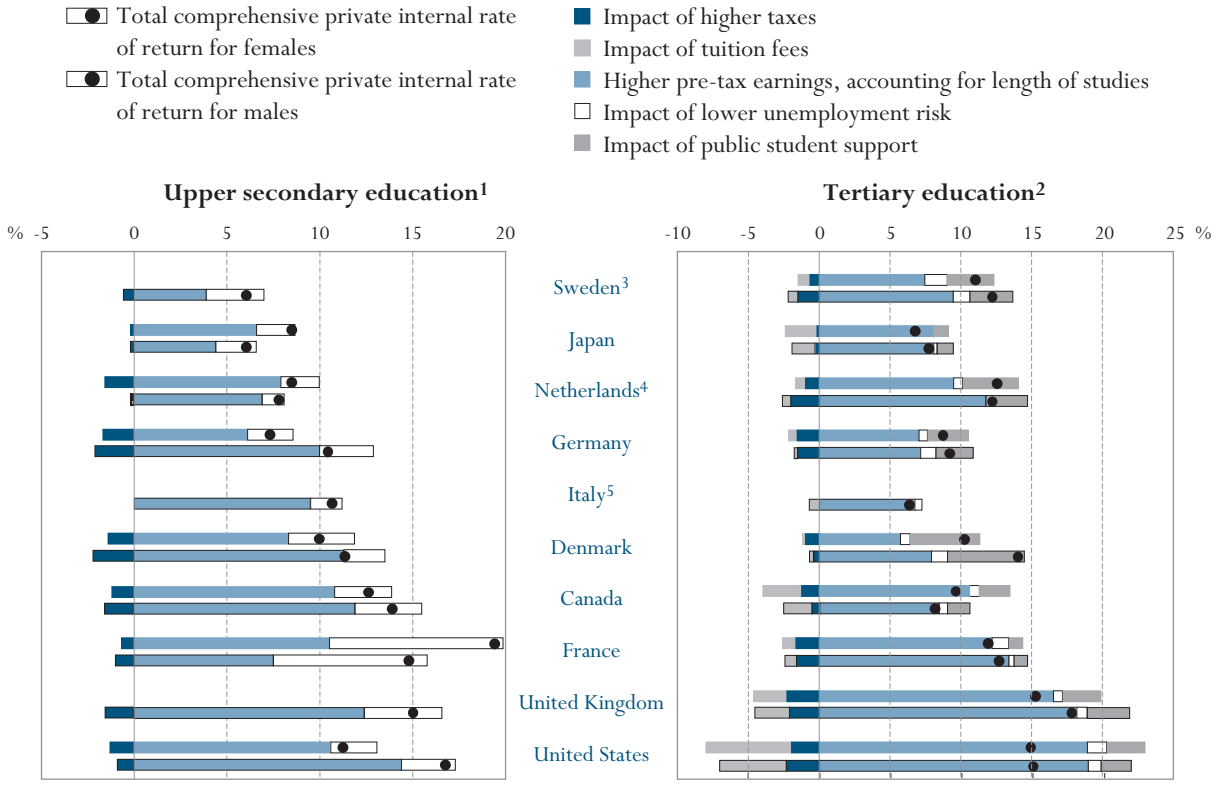
The overall incentives to invest in human capital that are embedded in labour market benefits and financing arrangements can be summarised in estimates of the private internal rates of return (Chart A14.2 and Table A14.3). The rate of return represents a measure of the returns obtained, over time, relative to the cost of the initial 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/eag2003* for an explanation of the methodology). In its most comprehensive form, the costs equal tuition fees, foregone earnings net of taxes adjusted for the probability of being in employment less the resources

made available to students in the form of grants and loans. The benefits are the gains in posttax earnings adjusted for higher employment probability less the repayment, if any, of public support during the period of study. The calculations assume that the student is fulltime in education and has no work activity, hence no earnings while studying. The calculated rates of return are, however, likely to be biased upwards as unemployment, retirement and early retirement benefits are not taken into account. The rate of return calculations reported in this indicator do not take into account the nonmonetary benefits of education.

Chart A14.2

Comprehensive private internal rates of return to education (1999-2000)

Impact of pretax earnings, taxes, unemployment risk, tuition fees and public student support in upper secondary and tertiary education, by gender (in percentage points)



1. The rate of return to upper secondary education is calculated by comparing the benefits and costs with those of lower secondary education.
2. The rate of return to tertiary education is calculated by comparing the benefits and costs with those of upper secondary education.
3. In tertiary education, the theoretical length of standard tertiary courses is used in the calculations rather than the average theoretical length of different programmes for males and females. For females, earnings differential between upper and lower secondary levels are not large enough to permit a positive rate of return calculation.
4. Year of reference 1997.
5. Data for males derive from 1998 post-tax earnings data.

Countries are ranked in descending order of the total comprehensive rates of return to education of males in upper secondary education.
Source: OECD. Table A14.3.

In all countries, the private rate of return is higher than real interest rates, and often significantly so.

The estimated private internal rates of return to upper secondary and university education differ significantly across the countries listed in Table A14.3 but are higher in all cases than the real interest rate, and often significantly so, suggesting that human capital investment is an attractive way for the average person to build up wealth. For tertiary studies, three groups of countries can be identified depending on the estimated values of the internal rate of return, which includes the combined effect of earnings, length of studies, taxation, unemployment risk, tuition fees and public student support.

- First, with its very high rewards from tertiary education, the United Kingdom is in a group of its own.
- Second, Denmark, France, the Netherlands, Sweden and the United States have relatively high internal rates of return, ranging from 10 to 15 per cent.
- Third, in the remaining countries, rates are below 10 per cent, with the lowest rates recorded for Italy and Japan.

In upper secondary education, the internal rate is calculated to exceed 10 per cent in countries listed in Table A14.3 with the exceptions of Germany (females), Japan, the Netherlands and Sweden.

At the tertiary level, the gender differential in rates of return calculations is limited in most countries. However, at the upper secondary level, gender differences are more marked in Germany and in the United States with returns cut by one-quarter to one-third for females, due to relatively narrow earnings differentials.

Earnings differentials and the length of education tend to be the prime determinants of the returns…

As can be seen from Table A13.3, earnings differentials and the length of education are generally the prime determinants of the private internal rates of return. Thus, countries with strong overall incentives to invest in human capital are typically characterised by high educationearnings differentials and/or relatively short education programmes, and *vice versa*. The calculated high rates of return to tertiary education in the United Kingdom, for example, are to an important extent due to relatively short standard university studies, whereas the low rates of return in Germany are strongly influenced by comparatively long study periods. Indeed, if the average length of tertiary studies were to be shortened by one year without compromising quality, the internal rate of return for males in the countries under review would increase by 1 to 5 percentage points, if all other factors were held constant. To put such a hypothetical shortening of tertiary studies into perspective, it should be noted that to achieve the same increase via wider wage differentiation would require an increase in the tertiary wage premium by 5 to 14 percentage points.

There are, however, notable exceptions to this general pattern. Despite narrow wage differentials and long study periods, Denmark and, to a lesser extent, Sweden offer comparatively strong incentives to acquire university education. And France has strong incentives for young people to invest in upper secondary education despite relatively small wage gains compared to the length of such education.

A14

…but there are other factors, including…

The contribution of the various factors to the difference between the narrow internal rate of return, comprising only earnings differentials and the length of education, and the comprehensive rate can be evaluated by adding them successively to the rate of return formula:

…taxes, which reduce the returns,…

Taxes reduce the internal rate of return derived from pretax earnings and study periods by 1.3 percentage points on average for tertiary education and 1.1 percentage point for upper secondary education in the countries under review. At the tertiary level, the impact of taxes is particularly strong in the United Kingdom and in the United States, mainly reflecting large education earnings differentials combined with progressive tax systems, but also in the Netherlands and France. At the upper secondary level, the depressing effect of the tax system is most notable in Germany, due to the strong degree of progressivity of the tax system over the relevant earnings range, and in Denmark, while it is the smallest in Japan.

…lower risks of unemployment, which increase the returns,…

Unemployment risk differentials increase the internal rate of return compared with rates based only on pretax earnings and the length of study. Reflecting the large differential in unemployment rates between people with lower and upper secondary education, the increase in the internal rate is particularly large for upper secondary education, averaging 3.6 percentage points for males and females for the countries under review. The relatively high unemployment differential in France adds as much as 8.3 to 9.4 percentage points to the internal rate of return. For tertiary education, the differential employment prospects have much less effect on the rates of return, adding on average 0.7 to 0.9 percentage points for males and females, respectively, in the countries included in Table A14.3.

…tuition fees, which reduce the returns…

Tuition fees have a particularly important negative impact on rates of return to tertiary education in the United States, and, to a lesser extent, in Canada and the United Kingdom. In the continental European countries, the impact is significantly smaller due to the much lower level of tuition fees.

…and public grant or loan arrangements, which boost returns.

Public student grant and loan arrangements at the tertiary level give a significant boost to incentives, averaging 2.5 to 3 percentage points in the countries under review, compared with rates of returns excluding such support. The impact is particularly strong in Denmark, the Netherlands and Sweden, while it is weak in France, and absent in Italy.

Social rates of return of investment in education

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

The benefits to society of additional education can be assessed on the basis of social rates of return. The social internal rate of return needs to reflect the costs and benefits to society of investment in education, which can differ significantly from private costs and benefits. The social cost includes the opportunity cost of having people not participating in the production of output and the full cost of the provision of education rather than only the cost borne by the individual. The social benefit includes the increased productivity associated with the investment in education and a host of possible noneconomic benefits, 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 about 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 for society of education activity. 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 premia received by better educated individuals is due to educational attainments, signalling inherent abilities to employers rather than productivity differentials due to investment in human capital. And while the non-economic benefits of education are found to be important, it is often difficult to translate them into monetary values for inclusion in rateofreturn calculations.

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

In view of the difficulty of constructing comprehensive social rates of return, Table A14.4 presents estimates of a "narrow" definition that abstracts from any externality effects and noneconomic benefits. To the extent that there are sizeable positive externalities related to human capital investment by the average student, these estimates will thus be biased downwards.

The estimates suggest that the social internal rate of return is particularly high at both the upper secondary and tertiary levels in the United Kingdom and the United States, while it is the lowest in Denmark at both of these education levels. In France, it is moderate for upper secondary education but comparatively high at the tertiary level.

Social returns are still well above risk-free real interest rates, but tend to be lower than private returns, due to the significant social costs of education.

Primarily reflecting that the social cost of education is typically much higher than the private cost, the "narrow" social internal rates of return are significantly lower than the private internal rates of return. At the tertiary level, the differences are particularly large in Denmark and Sweden, with gaps ranging from 4 to almost 7.5 percentage points. At the upper secondary level, differentials between the private and social rates of return are notably wide in France, but comparatively small in Germany and the Netherlands.

The interpretation of the internal rates of return

The high rates of return can be interpreted as indicating…

The private and social internal rates of return reported above are generally well above the riskfree real interest rate. Given that the return on human capital accumulation is subject to considerable uncertainty (as indicated by the wide dispersion of earnings among the better educated), investors are likely to require a compensating risk premium. However, 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. The high internal rates of return can be interpreted in two different ways.

…a dis-equilibrium in the market for educated workers, which calls for increasing educational capacity…

One interpretation is that the high rates indicate a serious shortage of better educated workers driving up their earnings. This might imply a transitory situation, where high returns to education would subsequently generate enough supply response to push the rates into line with returns available on other

A14

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 also be accelerated by better availability of information to students about the returns to different courses of study, thereby helping them to make more informed choices.

…or significantly lower marginal returns than average returns…

Part of the high returns may also be compatible with a market equilibrium. This would be the case if the marginal rates are significantly lower than the average rates. The marginal rate would indeed 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.

…which would lessen the case for public intervention.

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 noncognitive skills of young people, education policy could make a significant contribution to efficiency and equity in the longer run.

Definitions and methodologies

Data are derived from national labour force surveys and other surveys.

Relative earnings from employment are defined as the mean earnings (income from work before taxes) of persons at a given level of educational attainment divided by the mean earnings of persons with upper secondary education. This ratio is then multiplied by 100. The estimates are restricted to individuals with income from employment during the reference period.

Earnings data in Table A14.1 are annual for most countries but for France, Spain and Switzerland they are monthly. In Belgium and France, data cover the earnings of employees only. The Spanish data exclude people who work fewer than fifteen hours a week. The 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 charts 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.

For the methods employed for the calculation of the rates of return in Tables A14.3 and A14.4, see Annex 3 at *www.oecd.org/edu/eag2003*.

A14

Table A14.1

Relative earnings of the population with income from employment

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

OECD COUNTRIES

			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
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Australia	1999	Males	87	85	111	116	120	122	153	152	141	142
		Females	91	89	116	113	134	132	158	158	150	148
		M+F	81	79	112	118	118	118	146	146	136	136
Belgium	2000	Males	93	x(1)	99	x(3)	113	x(5)	141	x(7)	128	x(9)
		Females	83	x(1)	112	x(3)	123	x(5)	152	x(7)	133	x(9)
		M+F	92	x(1)	102	x(3)	112	x(5)	147	x(7)	128	x(9)
Canada	1999	Males	80	78	102	101	116	117	160	159	138	137
		Females	70	67	98	89	115	115	170	184	139	144
		M+F	80	79	102	100	113	113	163	167	136	137
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	2000	Males	86	83	91	94	107	107	137	134	131	128
		Females	90	89	92	109	114	112	125	122	123	121
		M+F	87	85	100	106	110	111	127	123	124	121
Finland	1999	Males	93	90	m	m	129	125	200	188	167	159
		Females	99	96	m	m	124	123	176	172	145	141
		M+F	96	94	m	m	120	115	190	179	153	144
France	1999	Males	88	86	130	118	129	137	179	182	159	163
		Females	80	81	133	108	132	139	158	165	145	152
		M+F	84	84	130	112	125	133	169	174	150	155
Germany	2000	Males	81	88	114	117	114	112	164	163	143	141
		Females	74	73	128	127	116	118	159	158	141	142
		M+F	76	80	115	114	117	116	165	163	145	143
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	1998	Males	78	83	80	55	116	125	136	142	130	135
		Females	58	59	80	82	95	81	170	166	140	133
		M+F	77	79	69	68	108	114	153	153	138	137
Italy	1998	Males	54	55	m	m	x(7)	x(8)	138	142	138	142
		Females	61	56	m	m	x(7)	x(8)	115	114	115	114
		M+F	58	57	m	m	x(7)	x(8)	127	126	127	126
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	x(9)	x(10)	x(9)	x(10)	130	122
		Females	72	72	m	m	x(9)	x(10)	x(9)	x(10)	136	135
		M+F	74	75	m	m	x(9)	x(10)	x(9)	x(10)	133	128
Norway	1999	Males	85	89	118	116	140	143	136	138	136	138
		Females	84	88	121	118	145	151	136	138	137	139
		M+F	85	90	124	120	155	155	132	133	135	135
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
Sweden	1999	Males	87	86	m	m	x(9)	x(10)	x(9)	x(10)	138	140
		Females	88	87	m	m	x(9)	x(10)	x(9)	x(10)	126	122
		M+F	89	88	m	m	x(9)	x(10)	x(9)	x(10)	131	131
Switzerland	2001	Males	82	82	113	109	129	130	150	146	141	139
		Females	75	76	122	124	137	146	163	171	154	162
		M+F	79	79	114	116	147	150	167	165	159	159
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	2001	Males	69	69	123	125	125	125	202	199	193	190
		Females	67	66	120	123	126	129	183	189	176	180
		M+F	70	69	121	122	123	122	195	192	186	183

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 national data sources (*www.oecd.org/edu/eag2003*).

A14

Table A14.2

Differences in earnings between females and males

Average annual earnings of females as a percentage of males by level of educational attainment of 30 to 44-year-olds and 55 to 64-year-olds

		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
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
OECD COUNTRIES											
Australia	1999	66	67	63	75	68	66	65	58	65	66
Canada	1999	51	61	58	66	59	57	69	65	63	62
Czech Republic	1999	66	58	67	64	45	62	67	63	63	61
Denmark	2000	76	67	71	69	74	75	65	63	72	66
Finland	1999	74	78	69	77	68	73	63	65	70	70
France	1999	70	62	75	69	76	72	68	64	74	60
Germany	2000	51	49	62	59	64	65	59	62	60	53
Hungary	2001	83	81	84	94	59	48	58	69	77	78
Ireland	1998	50	36	70	55	46	43	83	60	66	43
Italy	1998	71	70	69	43	x(7)	x(8)	56	45	73	57
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	x(7)	x(8)	68	54	62	62
Norway	1999	60	61	61	63	64	65	61	61	62	61
Portugal	1999	72	70	70	67	63	57	75	68	73	66
Spain	1998	61	x(1)	81	x(3)	70	x(5)	73	x(7)	79	x(9)
Sweden	1999	74	73	74	69	x(9)	x(10)	x(9)	x(10)	71	70
Switzerland	2001	50	50	55	52	61	42	63	66	54	47
United Kingdom	2001	55	43	50	53	53	81	66	66	54	54
United States	2001	58	65	60	54	62	57	57	50	60	51

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 national data sources (*www.oecd.org/edu/eag2003*).

A14

Table A14.3

Private internal rates of return to education (1999-2000)

The impact of higher pre-tax earnings (accounting for length of studies), taxes, unemployment risk, tuition fees and public student support) in upper secondary and tertiary education, by gender (in percentage points)

OECD COUNTRIES

	Return to upper secondary education (in percentage points)[1]								Return to tertiary education (in percentage points)[2]											
	Comprehensive private internal rate of return		Impact of						Comprehensive private internal rate of return		Impact of									
			Higher pre-tax earnings		Higher taxes		Lower unemployment risk				Higher pre-tax earnings		Higher taxes		Lower unemployment risk		Tuition fees		Public student support	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Canada	13.6	12.7	11.9	10.8	-1.6	-1.2	3.6	3.1	8.1	9.4	8.4	10.6	-0.5	-1.3	0.6	0.6	-2.0	-2.7	1.6	2.2
Denmark	11.3	10.5	11.3	8.3	-2.2	-1.4	2.2	3.6	13.9	10.1	7.9	5.7	-0.4	-1.0	1.1	0.7	-0.1	-0.2	5.4	4.9
France	14.8	19.2	7.5	10.5	-1.0	-0.7	8.3	9.4	12.2	11.7	13.3	12.1	-1.6	-1.7	0.4	1.2	-0.8	-0.9	0.9	1.0
Germany	10.8	6.9	10.0	6.1	-2.1	-1.7	2.9	2.5	9.0	8.3	7.1	7.0	-1.5	-1.6	1.1	0.6	-0.3	-0.6	2.6	2.9
Italy[3]	11.2	m	9.5	m	m	m	1.7	m	6.5	m	6.7	m	m	m	0.5	m	-0.7	m	n	m
Japan	6.4	8.5	4.4	6.6	-0.2	-0.2	2.2	2.1	7.5	6.7	8.0	8.0	-0.3	-0.2	0.3	0.0	-1.6	-2.2	1.1	1.1
Netherlands[4]	7.9	8.4	6.9	7.9	-0.2	-1.6	1.2	2.1	12.0	12.3	11.7	9.4	-2.0	-1.0	n	0.7	-0.6	-0.7	2.9	3.9
Sweden[5]	6.4	m	3.9	m	-0.6	m	3.1	m	11.4	10.8	9.4	7.4	-1.5	-0.7	1.2	1.6	-0.7	-0.8	3.0	3.3
United Kingdom	15.1	m	12.4	m	-1.5	m	4.2	m	17.3	15.2	18.1	16.4	-2.1	-2.3	0.7	0.7	-2.4	-2.3	3.0	2.7
United States	16.4	11.8	14.4	10.6	-0.9	-1.3	2.9	2.5	14.9	14.7	18.9	18.8	-2.3	-2.0	0.9	1.4	-4.7	-6.0	2.1	2.7
Country mean[6]	*11.4*	*11.1*	*9.2*	*8.7*	*-1.1*	*-1.1*	*3.6*	*3.6*	*11.8*	*11.3*	*11.4*	*10.6*	*-1.3*	*-1.3*	*0.7*	*0.9*	*-1.5*	*-1.8*	*2.5*	*2.9*

1. The rate of return to upper secondary education is calculated by comparing the benefits and costs with those of lower secondary education.
2. The rate of return to tertiary education is calculated by comparing the benefits and costs with those of upper secondary education.
3. Data for males derive from 1998 post-tax earnings data.
4. Year of reference 1997.
5. In tertiary education, the theoretical length of standard tertiary courses is used in the calculations rather than the average theoretical length of different programmes for males and females. For females, earnings differential between upper and lower secondary levels are not large enough to permit a positive rate of return calculation.
6. Data for males exclude Italy; data for females in upper secondary education exclude Sweden and the United Kingdom.

Source: OECD.

Table A14.4

Social rates of return to education (1999-2000)

Rates of return to upper secondary and tertiary education, by gender (in percentage points)

OECD COUNTRIES

	Social return to upper secondary education[1]		Social return to tertiary education[2]	
	Males	Females	Males	Females
Canada[3]	m	m	6.8	7.9
Denmark	9.3	8.7	6.3	4.2
France	9.6	10.6	13.2	13.1
Germany	10.2	6.0	6.5	6.9
Italy[4]	8.4	m	7.0	m
Japan	5.0	6.4	6.7	5.7
Netherlands	6.2	7.8	10.0	6.3
Sweden	5.2	m	7.5	5.7
United Kingdom	12.9	m	15.2	13.6
United States	13.2	9.6	13.7	12.3

1. The rate of return to upper secondary education is calculated by comparing the benefits and costs with those of lower secondary education.
2. The rate of return to tertiary education is calculated by comparing the benefits and costs with those of upper secondary education.
3. In Canada, no data were available on expenditure per student in upper secondary education.
4. In Italy, the sample size of earnings for females was not large enough to allow for the calculation of rates of return.

Source: OECD.

A15

INDICATOR A15: THE RETURNS TO EDUCATION: LINKS BETWEEN HUMAN CAPITAL AND ECONOMIC GROWTH

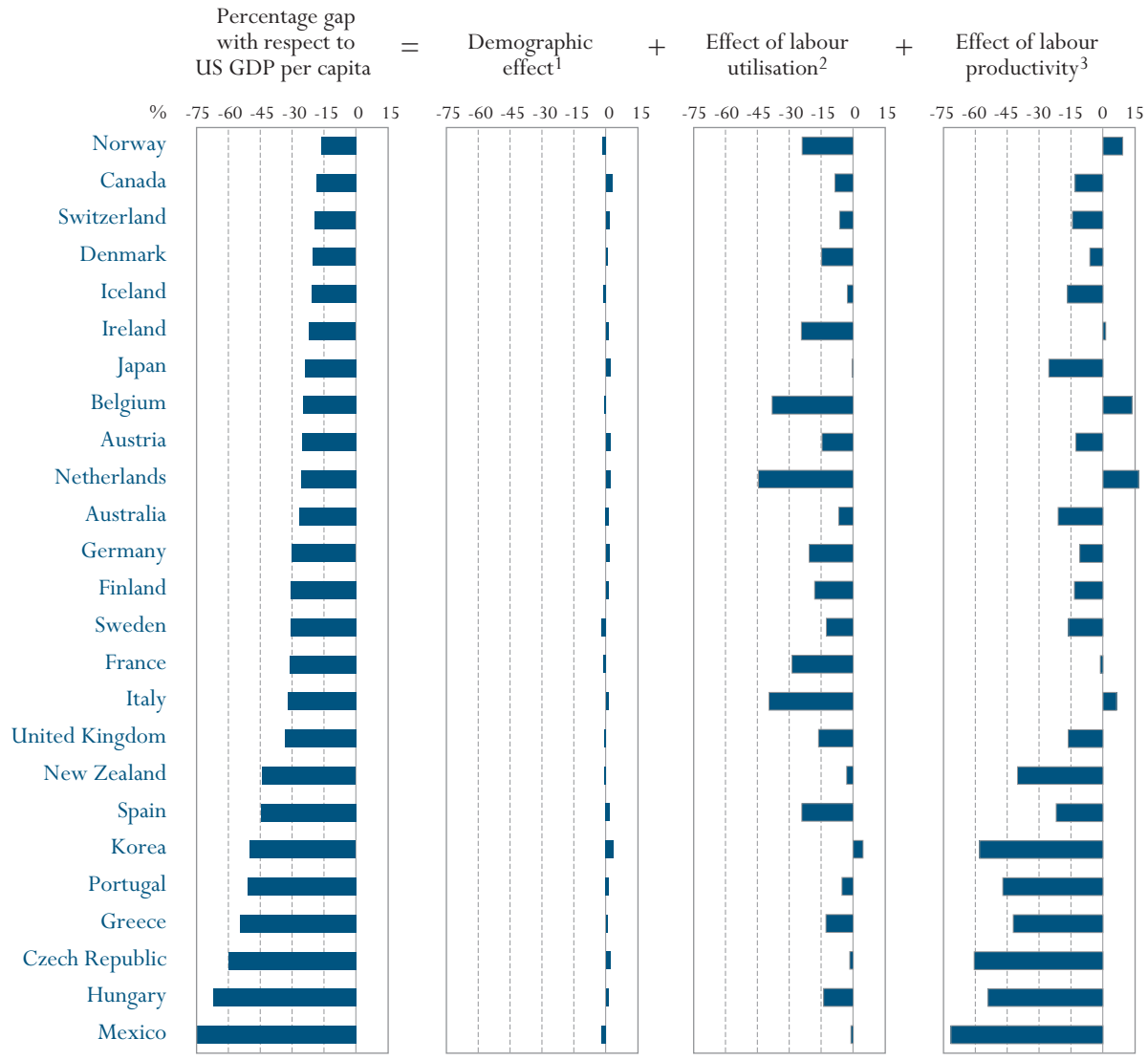
- An analysis of the driving factors of economic growth shows that rising labour productivity accounted for at least half of GDP per capita growth in most OECD countries.
- Labour productivity can be increased in several ways and human capital plays a pivotal role in this equation, not just as an input linking aggregate output to the stocks of productive inputs, but also as a determinant of the rate of technological progress.
- The estimated long-run effect on economic output of one additional year of education in the OECD area is in the order of 6 per cent.

A15

Chart A15.1

Large differentials in GDP per capita (2000)

Percentage point differences in trend, PPP-based, GDP per capita with respect to the United States



1. Based on the ratio of working age population (15-64 years) to total population.
2. Based on employment rates and average hours worked.
3. GDP per hour worked.

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

A15

Policy context

This indicator estimates the effect of changes in explanatory variables, including human capital, on changes in output per capita growth rates.

What makes some countries seemingly able to thrive on new technological opportunities while others are held back? One of the most important lessons that emerges from the "OECD growth project" is that policies that ensure stable macroeconomic conditions are important for growth, as high and variable inflation depresses investment and excessive tax burdens distort proper resource allocation. Also, the importance of capital – in the broadest sense – is reaffirmed; there are high returns not only to physical capital accumulation but also to investment in education and R&D. In addition, institutional structures and policy settings that favour competition and flexibility in capital and labour markets, the development of new technologies and the dissemination of innovations and technological change also make a key difference to growth prospects.

A central element in all of this is "human capital" the knowledge and skills embodied in workers. This indicator focuses on the role that human capital plays in fostering output per capita growth rates. The indicator complements Indicator A14 which examines the relationship between human capital and economic returns at the level of individuals. While Indicator A14 examines what happens to the earnings of an individual as his or her schooling rises, holding constant factor prices and the economy-wide average level of education, Indicator A15 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.

It should be interpreted in connection with the individual returns to education as examined in Indicator A14.

Comparisons of micro-level estimates of returns to education (such as those portrayed in IndicatorA14) and macro-econometric estimates as reflected in this indicator, are potentially of great policy relevance because discrepancies between them can point to the existence of externalities that drive a wedge between the private and public returns to schooling and may call for corrective policy action. For instance, if the productivity of each worker increases with average education at the aggregate level of the economy as it does with his own school attainment, the first of these effects will constitute an externality and 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 will only pick up the own-education effects of schooling (because the indirect aggregate effect does not vary across individuals within a given country), whereas macro-econometric estimates with cross-country data should also capture the social externality.

Evidence and explanations

In the last decade, productivity has accelerated in some countries but slowed down in others.

In the last decade, per capita growth rates in OECD countries have ceased to converge. Productivity has accelerated in some of the most affluent economies, most notably the United States, and slowed down substantially in others, such as continental Europe and Japan, while signs of what has been named a "New Economy", driven by the upsurge of new technologies, have emerged.

Data for 2000 show the United States well at the top of the OECD income distribution, followed by Norway, Canada and Switzerland with GDP per capita about 15-20 percentage points below the United States' figure. The bulk of the OECD countries, including all other major economies lagged behind per capita GDP in the United States by 25-35 percentage points (Chart A15.1).

Employment rates combined with hours worked explain significant differences in levels of GDP per capita.

Labour-force participation rates tended to remain stable over the last decade, with rising prime-age female participation rates largely compensated by falling participation rates among older workers and youngsters. However, participation rates only provide a partial proxy for the actual labour input in production, and the utilisation of supplied labour needs to be taken into account as well. A number of countries (*e.g.* the United States or Japan) have high employment rates and higher than average hours worked. While most of the Nordic countries have even higher employment rates, but this is offset by lower hours worked. By contrast, low employment rates in some countries (*e.g.* Belgium, France, Italy, the Netherlands and Spain) combined with relatively low hours, explain more than 20 percentage points of the gap between their per capita GDP and that of the United States. Chart A15.1 suggests that labour utilisation (employment rates combined with hours worked) is an important factor in accounting for differences in the GDP per capita levels between countries.

An analysis of the driving factors of economic growth shows that…

These differences in levels have caused renewed interest in the main factors driving economic growth and the policies that might influence it. The "OECD growth project", from which this indicator presents selected findings, shows that the observed growth patterns are a reflection of structural shifts in the factors and policies that drive economic growth. Understanding them better provides valuable lessons for policymaking, even if some OECD economies may be slowing down

A first approach to reviewing growth in GDP per capita over the past decade is to break it down into three major components, comprising growth rates of: *i)* the ratio of persons of working-age (15-64 years) to the total population; *ii)* the ratio of employed persons to the working age population (the "employment rate"); and *iii)* labour productivity (Chart A15.2).

…changes in demography have not yet become a major drag on growth…

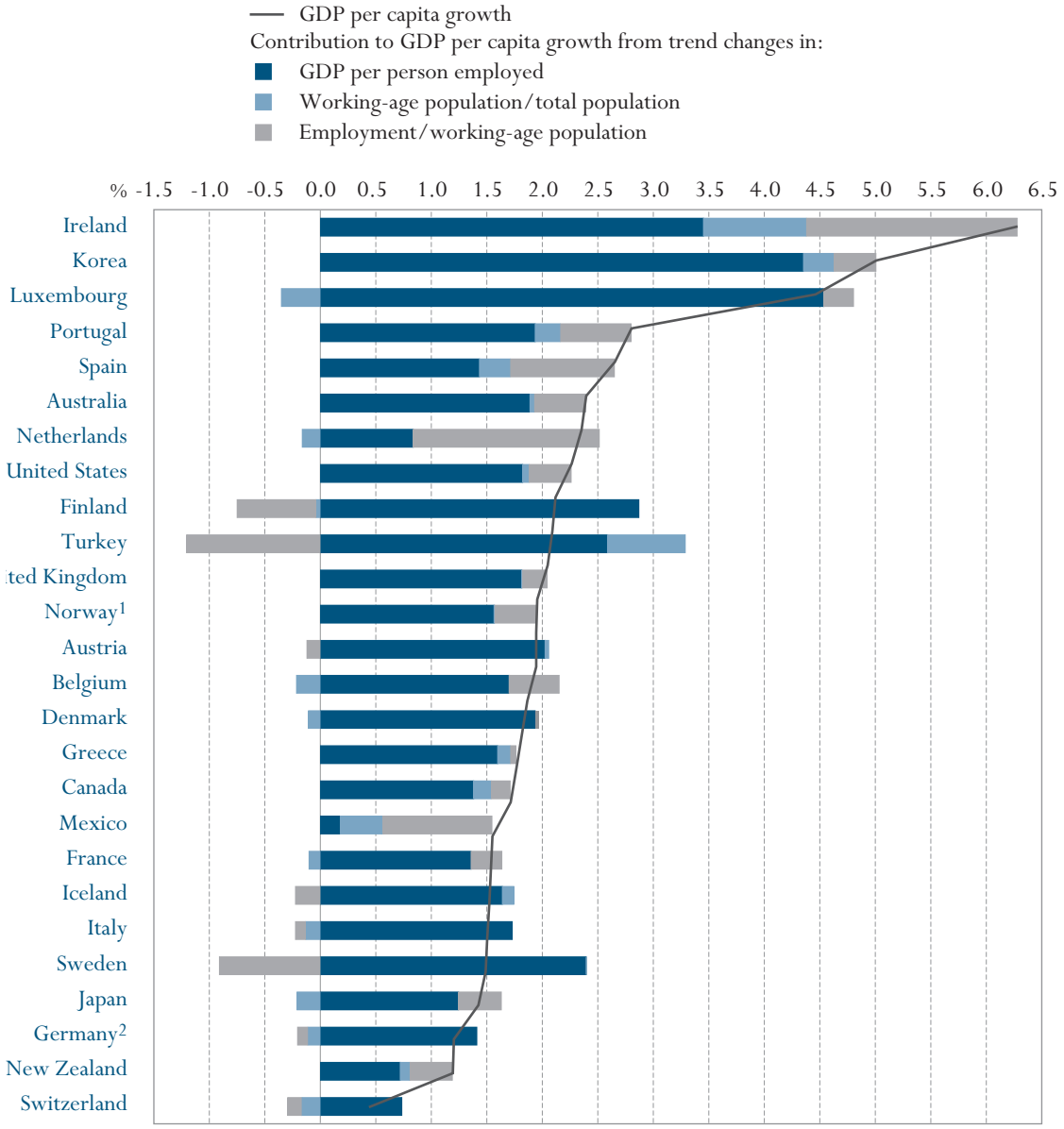
Chart A15.2 shows that, for the vast majority of OECD countries, demographic trends were a relatively minor component of growth in GDP per capita over the 1990s. The only countries where demographic change made a positive and significant contribution to growth in GDP per capita were Ireland, Korea, Mexico and Turkey, the former having experienced a reversal in traditional migration flows in the 1990s. However, in some OECD countries, 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 due to more rapid increase in the share of older persons in total population.

A15

Chart A15.2

The driving forces of GDP per capita growth (1990-2000)

Trend series, average annual percentage change



land only.
-2000.
OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

A15

…and rising labour productivity accounted for at least half of GDP per capita growth in most OECD countries.

Rising labour productivity, defined as GDP per person employed, accounted for at least half of GDP per capita growth in most OECD countries over the 1990s. 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 reflect 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.

Compared with the previous decade, hourly labour productivity picked up in a number of countries, including Australia, Finland, Germany, Norway, Portugal, Sweden and the United States, while it declined in the other countries. However, these changes in productivity trends were accompanied by different employment patterns across countries. Among the G-7 economies, significant employment increase in the United States (as well as in Canada and Japan with no acceleration in productivity) contrasted sharply with declines in Germany and Italy. Even stronger contrasts in employment patterns were found amongst some smaller countries, where strong upward trends in employment rates in Ireland, the Netherlands and Spain compare with declines in Finland, Sweden and Turkey.

Labour productivity can be increased in several 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 efficiency improvements, such as improved managerial practices, organisational changes and innovative ways of producing goods and services. Multi-factor productivity can rise because better skills and better technology may cause the blend of labour and capital to produce more efficiently, organisational and managerial changes may help to improve operations, and innovation may lead to more valuable output being produced with a given combination of capital and labour.

…and human capital plays a pivotal role in this equation…

The skills and competencies embodied in workers - in short the quality of labour or "human capital" - plays a fundamental role in labour productivity growth. The rise in the 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 empirical studies have found, human capital is a significant determinant of economic growth.

…not just as an input linking aggregate output to the stocks of productive inputs and technical efficiency...

Chart A15.3 shows that growth in output per employed person is partly attributable to increases in "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 the components that are due to: *i)* changes in the average hours worked, *ii)* changes in the average years of formal education (used here as a proxy for changes in the quality of labour), and *iii)* changes in

A15

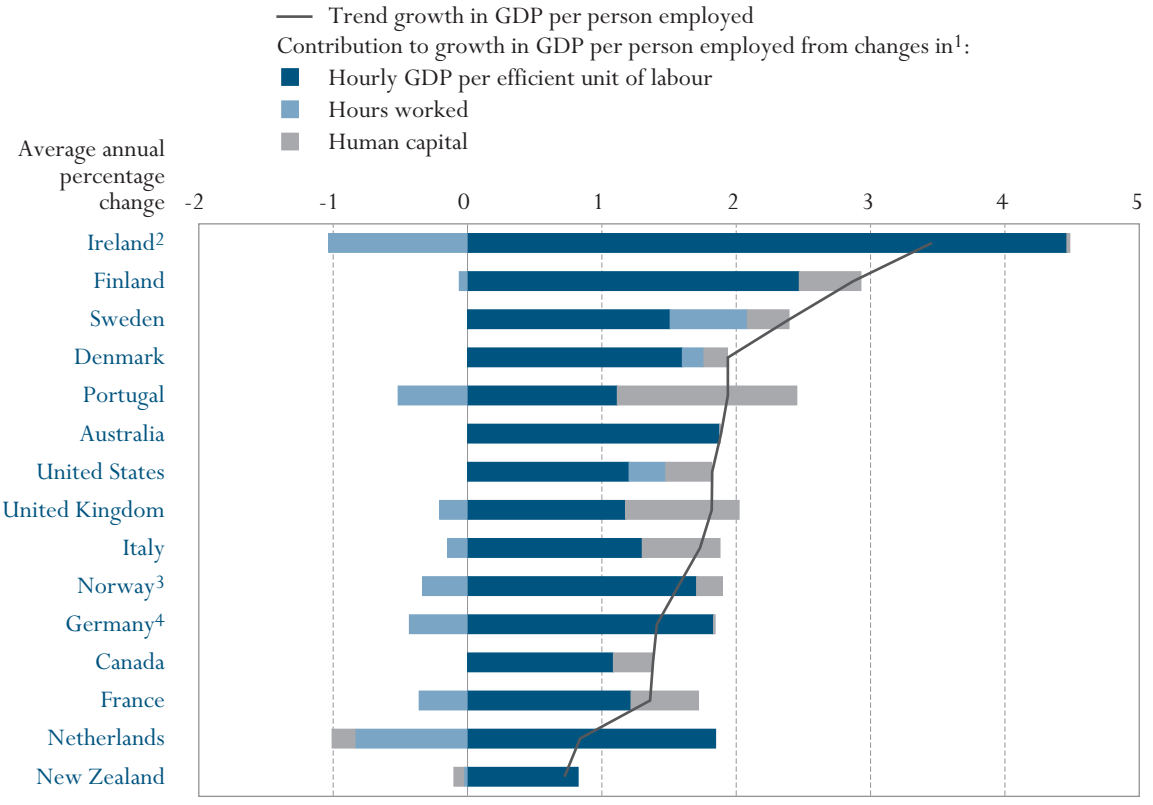
the hourly GDP per efficient unit of labour, which is equivalent to changes in GDP per worker once changes in working hours and changes in the average quality of labour are accounted for. The latter is based on a measure of labour input that sums up shares of workers with different levels of formal education, each weighted by their relative wage. The rationale behind this measure is first, that educational attainment accounts for a good proportion of human capital embodied in workers; and second, that relative wages between different levels of education provide a reasonable quantitative proxy for the relative productivity of workers with different levels of education (see Box A15.1).

OECD countries have invested heavily in education over past decades and this has resulted in a positive contribution of human capital enhancement in growth rates of GDP per person employed, or labour productivity. Over the past decade, skill upgrading amongst workers was particularly marked in Europe,

Chart A15.3

Enhancements in human capital contribute to labour productivity growth (1990-2000)

Average annual percentage change



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. 1990-1999 for Ireland.
3. Mainland only.
4. 1991-2000 for Germany.

Source: OECD. See Annex 3 for notes *(www.oecd.org/edu/eag2003)*.

although it was accompanied by sluggish employment growth because productivity gains were achieved in part by dismissals or not employing workers with low skills. By contrast, in the United States, Australia, Canada, the Netherlands and New Zealand, skill upgrading has played, at best, a modest role in GDP growth per employed person. Improving labour-market conditions in these countries has widened the employment base, especially in the 1990s, allowing low-skilled workers to get a foothold in employment.

…but also as a determinant of the rate of technological progress.

However, education plays an important role in this equation, not only as an input linking aggregate output to the stocks of productive inputs and technical efficiency, but as a key determinant of the rate of technological progress that affects the output per worker. In fact, one reason for the renewed interest in the productivity-enhancing role of human capital is that human capital complements new technologies. For technologies to be developed and used effectively, and network externalities of new technology to materialise, the right skills and competencies must be in place. One of the factors behind the good growth record of some countries has been the availability of a large pool of qualified personnel, and skilled labour shortages are rightly considered as a constraint on the growth process.

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 per cent of the net employment gains recorded during this period. Wages have followed a similar pattern. For example in the United States, the wage of knowledge workers has risen much faster than wages of other occupations. Between 1985 and 1998, real earnings of knowledge-intensive workers grew by almost 17 per cent, cumulatively, compared with 5.3 per cent 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 per cent.

As a result, an additional year of education has, on average, a long-term impact on economic output of 6 per cent.

Summing up the different influences of education on economic growth, the "OECD growth project" concludes that the estimated long-run effect on output of one additional year of education in the adult population is in the order of 6 per cent in the OECD area.

A15

Box 14.1. Estimating changes in the quality of factor inputs: the example of the labour input

In order to assess the impact of labour and capital inputs on output and productivity growth rates, proper account should be taken of the role that each factor plays as input in the production process. In the case of labour input, the simple count of hours worked is only a crude approximation, insofar as workers show great differences in education, experience, sector of activity and other attributes that greatly affect their marginal productivity. In particular, a measure of labour input in efficiency units can be obtained by weighting different types of labour by their marginal contribution to the production activity in which they are employed. Since these productivity measures are generally not observable, information on relative wages by characteristics is used to derive the required weights to aggregate different types of labour.

The difference between the weighted and unweighted series yields an index for the compositional change of labour input, or its quality. To take into account the effect of changes in the composition of labour input, six different types of workers were considered, based on gender and three different educational levels: below upper-secondary; upper secondary and tertiary education. It is assumed that: *i)* workers with different levels of education work the same (average) number of hours; and *ii)* relative wage rates are constant over the sample period. Compared with other proxies available in the literature (largely for the United States) this decomposition is rather crude, but it does shed light on the role of compositional changes in labour input consistently for a range of OECD countries, thereby permitting cross-country comparisons. (For more details on this procedure, see OECD, 2003).

Definitions and methodologies

Human capital is estimated on the basis of completed levels of education and average years of schooling at each level in the working-age population. It should be borne in mind that educational attainment is a crude and somewhat narrow proxy for skills and competencies, taking little account of the quality of formal education or of other important dimensions of human capital. It is derived from OECD data combined with data from de la Fuente and Doménech (2000).

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) from which the material for this indicator has been derived. 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.

TABLE OF CONTENTS