3

The Socio-Demographic Distribution of Key Information-Processing Skills

This chapter analyses the results of the Survey of Adult Skills (PIAAC) to describe how proficiency in literacy, numeracy and problem solving in technology-rich environments is distributed among individuals according to various socio-demographic characteristics, including socio-economic background, educational attainment, immigrant and/or foreign-language background, age, gender and type of occupation. The perspective is also widened to report on countries' average proficiency when considering skills in the context of these variables.

This chapter examines the relationship between proficiency in literacy, numeracy and problem solving in technology-rich environments and a number of important socio-demographic characteristics – age, gender, socio-economic background, educational attainment, immigrant and language background, and type of occupation. To what extent does proficiency vary between men and women, between people of different ages and backgrounds, between adults with different educational qualifications and who work in different types of jobs? Does the strength of these relationships differ between countries? Knowing how proficiency is distributed across different groups in the population within countries, and how these distributions vary between countries, can help policy makers and others determine the strengths and weaknesses of national polices and institutional arrangements related to acquiring information-processing skills, identify groups at risk of poor outcomes and exclusion due to low levels of proficiency in these key skills, and target assistance to them. Such information is relevant not only in helping to identify possible problems but also in indicating where countries can learn from others.

The chapter describes the distribution of proficiency across the socio-demographic groups of interest within and between countries, and provides an overview of the policy interest in the relationship between proficiency in literacy, numeracy and problem solving in technology-rich environments and each of the characteristics examined. Explanations – and implications – of the observed relationships are also discussed.

Among the main findings:

- Educational attainment has a strong positive relationship to proficiency. Adults with tertiary-level qualifications have a 36 score-point advantage on the literacy scale, on average, over adults who have not attained upper secondary education, after other characteristics have been taken into account. A 36 score-point difference is estimated to be the equivalent of around five years of additional education. There are a number of countries in which adults with low levels of educational attainment have average proficiency scores at the bottom end of Level 2 on both the literacy and numeracy scales. The combination of poor initial education and lack of opportunities to improve proficiency has the potential to evolve into a vicious cycle, in which poor proficiency leads to fewer opportunities to further develop proficiency and vice versa.
- Immigrants with a foreign-language background have significantly lower proficiency in literacy, numeracy and problem solving in technology-rich environments than native-born adults, whose first or second language learned as a child was the same as that of the assessment, even after other factors are taken into account. In some countries, the time elapsed since arrival in the receiving country appears to make little difference to the proficiency of immigrants, suggesting either that the incentives to learn the language of the receiving country are not strong or that policies that encourage learning the language of the receiving country are of limited effectiveness.
- While older adults generally have lower proficiency than their younger counterparts, the extent of the gap between generations varies considerably among countries. This is likely to be related to both quality of initial education and the opportunities offered to adults to undertake further training or to engage in practices that help to maintain and develop proficiency over their lifetimes. Governments cannot change the past; however, policies designed to provide high-quality initial education and ongoing opportunities for learning can go some of the way towards ensuring that ageing adults maintain their skills.
- The low levels of proficiency observed among workers in elementary occupations are found in many countries and should be of concern to policy makers and employers. Low levels of proficiency in information-processing skills among workers may hamper the introduction of changes in technologies and organisational structures that can improve productivity. They may also place workers at considerable risk in the event that they lose their jobs or have to assume new or different duties when new technologies, processes and forms of work organisation are introduced.
- The gender gap in proficiency is small. Men have higher scores in numeracy and problem solving in technology-rich environments than women, on average, but the gap is not large and is further reduced when other characteristics are taken into account. Among younger adults, the gender gap in proficiency is negligible.

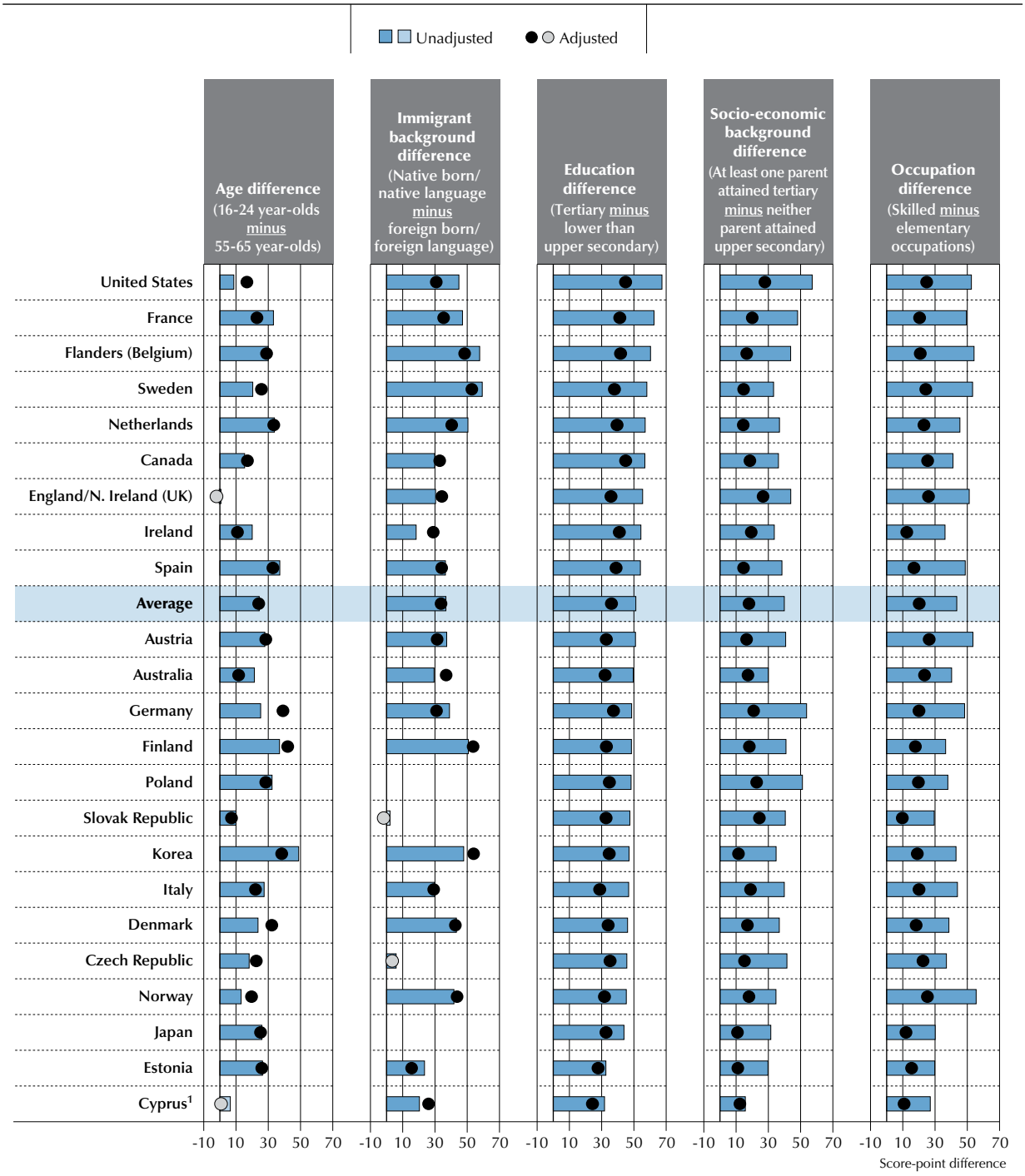
AN OVERVIEW OF SOCIO-DEMOGRAPHIC DIFFERENCES IN PROFICIENCY

The differences in proficiency associated with the socio-demographic characteristics examined are summarised in Figure 3.1(L), both before and after accounting for the impact of other characteristics. Results based on the literacy scale are used as an example, but similar results are found for numeracy, although further analysis is needed regarding results on the problem solving in technology-rich environments scale.[1] Only the proficiency differences between selected contrast groups are highlighted in Figure 3.1(L) to reveal the relative strength of each characteristic examined.

■ Figure 3.1 (L) ■

Synthesis of socio-demographic differences in literacy proficiency

Adjusted and unadjusted difference in literacy scores between contrast categories within various socio-demographic groups



1. See notes at the end of this chapter.

Notes: Statistically significant differences are marked in a darker tone. Estimates based on a sample size less than 30 are not shown (i.e. immigrant background differences in Japan and Poland). Unadjusted differences are the differences between the two means for each contrast category. Adjusted differences are based on a regression model and take account of differences associated with the following variables: age, gender, education, immigration and language background, socio-economic background, and type of occupation. Only the score-point differences between two contrast categories are shown, which is useful for showing the relative significance of each socio-demographic variable vis-a-vis observed score-point differences. For more detailed regression results, including for each category of each variable included in the model, see Table B3.17 (L) in Annex B.

Countries are ranked in ascending order of the unadjusted difference in literacy scores (tertiary minus lower than upper secondary).

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.1(L), A3.2(L), A3.6(L), A3.9(L), A3.15(L) and A3.19(L).

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Before accounting for other characteristics, educational attainment is found to have the strongest relationship to proficiency across countries, followed by occupation, socio-economic background, immigration and language background, age and gender (Figure 3.1 [L]). When other characteristics are accounted for, educational attainment continues to have the strongest relationship to literacy proficiency, followed by immigration and language background, age, occupation, socio-economic background and gender. Gender is not included in Figure 3.1(L) since the differences between men and women are insignificant in most countries (see Table A3.1 [L] in Annex A).

Given the role of formal education, particularly schooling, in developing reading, mathematical and analytical skills, it is not surprising that educational attainment stands out as the strongest socio-demographic characteristic associated with proficiency in literacy and numeracy. On average across countries, adults with some tertiary education score about 36 points higher on the literacy scale than those with lower than upper secondary education, even after accounting for other characteristics. In all countries, the variation in literacy proficiency associated with education is reduced when other socio-demographic characteristics are accounted for. Net differences between high- and low-educated adults range from about 25 to over 40 score points on the literacy scale. The difference is especially large in Canada and the United States (45 points).

Immigration and language background is also strongly associated with proficiency in literacy and numeracy. In countries with large immigrant populations, the advantage of a native-born individual (whose first or second language learned as a child was the same as that of the assessment) over an immigrant (whose first or second language learned as a child was different from the language of assessment) is between 59 score points (Sweden) and 29 score points (Australia) on the literacy scale. After accounting for other characteristics, net differences remain large in many countries.

Proficiency in literacy and numeracy is clearly associated with occupation. In all countries, the variation in literacy proficiency associated with occupation is reduced substantially when other socio-demographic characteristics are accounted for. This is primarily because adults in highly skilled jobs usually have high levels of education. Nevertheless, differences remain even after accounting for other characteristics, which suggests that the nature of work, and what people do as part of their work, may play a role in maintaining and developing information-processing skills. This is considered in greater detail in Chapter 5.

Age is strongly related to proficiency in literacy and numeracy. In most countries, differences in proficiency related to age change little and remain substantial when other socio-demographic characteristics, such as educational attainment, are taken into account. Net differences in literacy proficiency that are related to age are largest in Finland, followed by Germany and Korea.

Adults from socio-economically advantaged backgrounds have higher average proficiency in the three domains assessed in the survey, than those from disadvantaged backgrounds (socio-economic background is proxied by parents' educational attainment). Score differences on the literacy scale related to socio-economic background are largest in Germany, Poland and the United States, while they are smallest in Estonia, Japan and Korea. After accounting for other characteristics, the differences in literacy proficiency associated with socio-economic background are substantially smaller. This is because an individual's educational attainment often mirrors that of his or her parents.

The relationships between proficiency and socio-demographic characteristics are explored in more detail in the remaining sections of this chapter. Age, gender and socio-economic background are discussed first, followed by education, immigration and language background, and type of occupation. Differences in proficiency are reported both before and after accounting for other characteristics. In addition, differences related to particular combinations of characteristics are also considered. Certain combinations of characteristics have an even stronger relationship to proficiency than individual characteristics considered in isolation. In particular, the interaction of low levels of educational attainment, being an immigrant and working in low-skilled occupations with age, gender and socio-economic background is explored, providing an insight into the combinations of characteristics that increase the risk of scoring at lower levels of proficiency in information-processing skills.

DIFFERENCES IN SKILLS PROFICIENCY RELATED TO AGE

Understanding the relationships between age and proficiency in literacy, numeracy and problem solving in technology-rich environments is important for policy makers concerned with lifelong learning, and the capacity of an ageing society and workforce to adapt efficiently to changing technologies and skills demands. To this end, the Survey of Adult Skills (PIAAC) covers an age range extending from the end of compulsory schooling (16 years) to retirement (65 years) at the time they were surveyed, in other words, persons born between 1947 and 1996.

In interpreting the observed differences in proficiency across age groups, it is important to recall that the survey offers a snapshot of the proficiency of adults of different ages at a particular point in time rather than a picture of the proficiency of an age cohort at different points in time. While the observed differences in proficiency by age may reflect age-related cognitive maturation and decline, the strength of formative influences on proficiency, such as those from the education system and the world of work, will vary considerably according to age in most countries. For example, in most of the countries participating in the Survey of Adult Skills (PIAAC), the majority of people born in the 1950s (i.e. aged 53-62) left school without completing upper secondary education, whilst for those born in the 1980s and 1990s completion of upper secondary education became the norm. In addition, the content and organisation of secondary schooling has evolved considerably since the 1960s. Many of the factors that help to explain age-related differences in proficiency, including the quantity and quality of the education and training received, cannot be captured in a single study. Nonetheless, a high-quality and cross-national snapshot of age-related differences in skills proficiency provides information about the influence of important changes in society, such as the expansion of education, demographic shifts and immigration, and on the acquisition, maintenance and potential loss of skills over a lifetime.

The findings show that, in most countries, there is a close relationship between proficiency in the information-processing skills assessed and age. Literacy proficiency, for example, typically peaks among 25-34 year-olds and is lowest among those over 55 (Figure 3.2 [L]). Perhaps unsurprisingly, the gap between the old and the young is particularly marked in the domain of problem solving in technology-rich environments. The fact of having lived from an early age in a world in which information technologies were already part of the landscape is likely to have conferred a considerable advantage to young people compared to their older peers, for whom these technologies represent a novelty they have had to adapt to.

The extent of the gap in proficiency between the young and the old varies considerably among countries. The relationship of proficiency to age may reflect the influence of other characteristics that are associated with both age and proficiency. For example, the United States, which has had high rates of participation in post-secondary education over the entire post-war period, has relatively small differences in proficiency between older and younger adults. Korea, where a larger proportion of young people participated in more education than their older counterparts, has a very large generation gap in proficiency (see Box 3.1).

Box 3.1. **Korea: Age-related differences in skills proficiency**

Korea has been particularly successful in raising the educational attainment rate over a relatively short period of time. In 1970, about 67% of the labour force had a primary education, 26% had a secondary education, and about 6% had a university-level education. In three decades, Korea achieved universal primary and secondary education, and by 2010 Korea had the largest proportion of 25-34 year-olds who had attained at least an upper secondary education among all OECD countries. Some 98% of 25-34 year-olds in Korea have attained an upper secondary education – a 55 percentage-point increase over the proportion of 55-64 year-olds with that level of education. In addition, 65% of 25-34 year-olds in Korea have completed tertiary education – again, the largest proportion of adults in this age group, among all OECD countries, who have completed this level of education. Korea's 15-year-olds are also high performers in the triennial OECD Programme for International Student Assessment (PISA) surveys.

This is partly due to Korea's rapid economic growth and strong emphasis on education since 1962. The economy grew at an annual rate of 7.5% between the mid-1970s and the mid-1980s. The country's emphasis on education and training boosted productivity and further accelerated economic growth, turning the country into a high-tech and export-led economy.

In fact, the age variation in literacy proficiency is largest in Korea. It is also large in Finland and Germany, whilst lowest in England/Northern Ireland (UK), Ireland and the Slovak Republic. In addition to changes in the quantity of education received by younger and older cohorts, changes in the quality of initial education in different countries may also be a factor to consider. Differences in the quality of education received by different age cohorts would be expected to be reflected in their measured proficiency. A proficiency gap between younger and older cohorts, in favour of the young,

would indicate improvements in the quality of initial education over time. This seems to be a plausible explanation for the large gaps in proficiency between the young and old in Finland and Korea. Both countries were relatively less developed in the 1950s and 1960s than many of the other countries that participated in the Survey of Adult Skills (Korea, in particular, underwent rapid economic development during the post-war period) and both countries are high performers in PISA.

By contrast, the relatively small performance gap between the young and the old in Australia and the United States is consistent with evidence that the performance of secondary-school students on standardised tests of literacy and numeracy has changed little in these countries since the 1970s (see Rothman, 2002 for Australia and Perie, Moran and Lutkus, 2005 for the United States). The extent to which the age-related differences in proficiency can be attributed to differences in the quality of education received by different age groups should be further examined.

There are probably other factors at work that account for this gap. One may be the differences among countries in the opportunities available to adults to further develop and maintain their key information-processing skills, either through education and training or in the course of their working lives. Information-processing skills can be lost as well as maintained and enhanced. The relationship between the presence or absence of opportunities to further develop proficiency – whether they are in the education system, at work or in other contexts – and the level of proficiency is likely to be mutually reinforcing. A lack of such opportunities can create age-related inequities and a vicious cycle of exclusion from skills-related development activities, as people grow older. Thus, developing and maintaining skills over a lifetime is likely to depend not only on how well developed adult learning systems are in different countries, but also how work is stratified and organised among different socio-demographic groups. Some of these factors are examined in further detail in Chapter 5.

Accounting for other socio-demographic characteristics has little impact on observed differences in skills proficiency related to age. With few exceptions, the size of the gap in proficiency between 16-24 year-olds and 55-65 year-olds in literacy changes little when gender, educational attainment, type of occupation and socio-economic, immigrant and language background are accounted for. Other practice-related factors that are associated with both age and proficiency, such as the extent of using ICTs, are considered further in Chapter 5.

Proficiency in literacy and numeracy among older and younger age groups

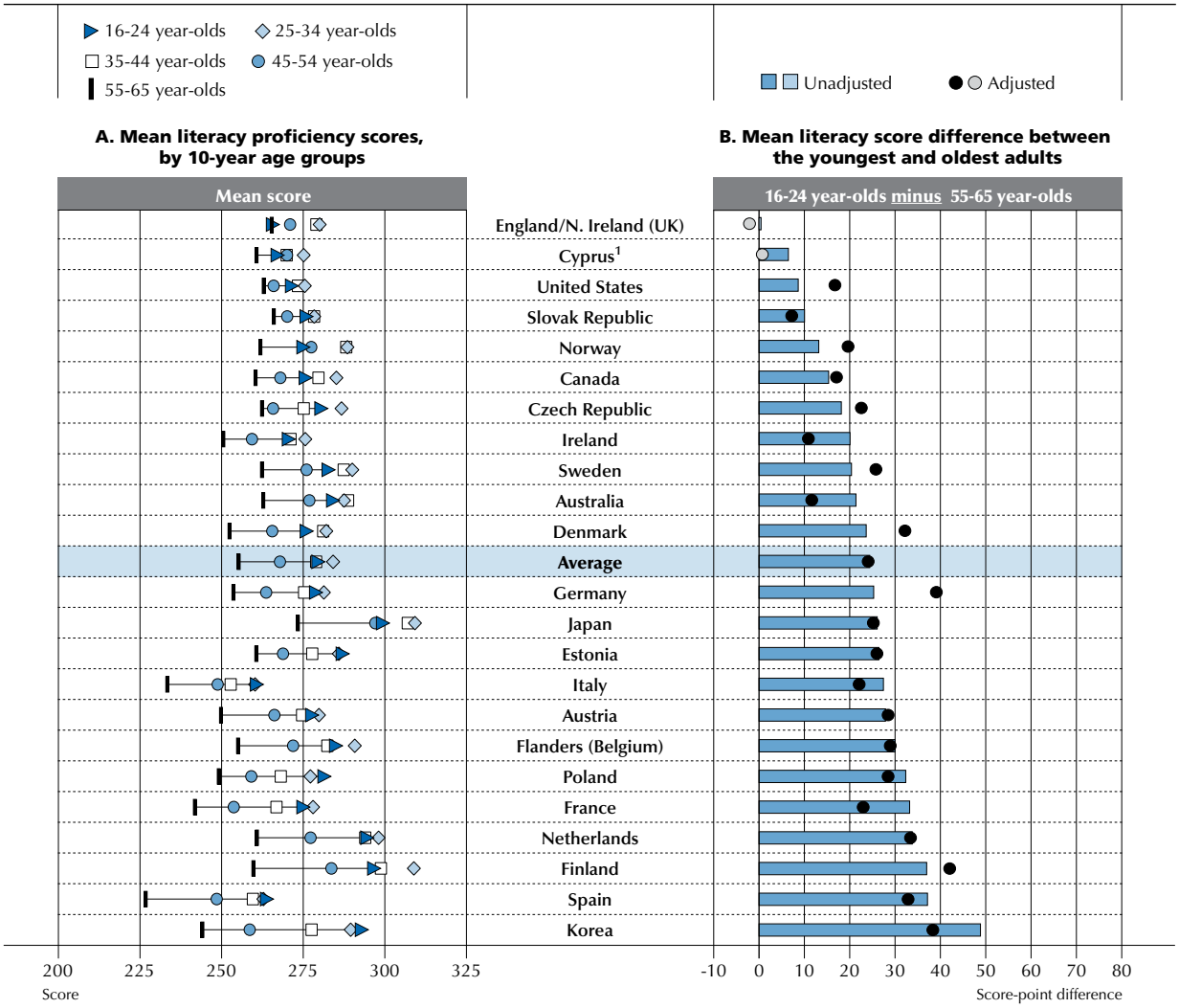
On average across countries, older adults score lower on the literacy scale than any other age group (Figure 3.2 [L]). Only in England/Northern Ireland (UK) do adults aged 55-65 score about the same as 16-24 year-olds. In nearly all cases, adults aged 45-54 follow closely behind, with a higher score, on average, than older adults, but with lower scores than all other age cohorts. The average score among 55-65 year-olds is 255 points (Level 2); among adults aged 45-54 it is 268 points (Level 2). By contrast, the average scores for adults aged 16-24 (280 points), 25-34 (284 points), and 35-44 (279 points) all correspond to Level 3.

There are wide variations in the mean proficiency among older adults across countries, suggesting that the lower average scores in this group are affected not only by the process of biological ageing, but also by differences in education and labour-market structures that can enable adults to develop and maintain their skills as they age. In literacy, older adults score lowest, on average, in Spain (227 points) and Italy (233 points). In Japan, older adults score highly (273 points), on average, in comparison to older adults in all other countries and, in fact, score higher than young people aged 16-24 in England/Northern Ireland (UK), Ireland, Italy, Spain and the United States. In Austria, Denmark, France, Germany, Ireland, Korea and Poland, and especially Italy and Spain, older adults score, on average, below the mean for older adults. Similar results are found for numeracy. However, in most countries the gap between the proficiency of 16-24 year-olds and 55-65 year-olds is smaller in numeracy than in literacy.

Young people aged 16-24 tend to score higher on the literacy scale than adults aged 45-65, but not always higher than adults aged 25-44. One explanation is that adults tend to continue to develop their key information-processing skills beyond the age of 24. Alternatively, it may reflect changes in the quality of the education and training received by the different age groups. Only in Estonia, Korea, Poland and Spain do young people aged 16-24 score higher, on average, than any other age cohort. In Korea, for example, 16-24 year-olds score as high as those aged 25-34, but this might be due to significant improvements in the quality of compulsory schooling in Korea in recent years. In both Finland and Japan, 25-34 year-olds score higher than any other age cohort from any other country. A key distinguishing feature in Japan is that adults aged 35-44 score just as high as 25-34 year-olds.

■ Figure 3.2 (L) ■

Age differences in literacy proficiency



1. See notes at the end of this chapter.

Notes: Statistically significant differences in Panel B are marked in a darker tone. Unadjusted differences are the differences between the two means for each contrast category. Adjusted differences are based on a regression model and take account of differences associated with other factors: gender, education, immigration and language background, socio-economic background, and type of occupation. Only the score-point differences between two contrast categories are shown in Panel B, which is useful for showing the relative significance of age vis-a-vis observed score-point differences. All adults aged 16-65, including the non-employed, are in the analysis. For more detailed regression results, including for each category of each variable included in the model, see Table B3.17 (L) in Annex B.

Countries are ranked in ascending order of the unadjusted difference in literacy scores (16-24 year-olds minus 55-65 year-olds).

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.1 (L) and A3.2 (L).

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Korea shows the largest difference in proficiency – 49 points – between younger and older adults on both the literacy and numeracy scales. Korea is followed by Spain on both the literacy (37-point difference) and numeracy scales (35-point difference), and Finland on the literacy scale (37-point difference). England/Northern Ireland (UK) and the United States show among the smallest differences between the two groups on both the literacy and numeracy scales. This is partly due to the combination of the relatively high average scores of older adults who have comparatively high levels of educational attainment, and the relatively low average scores of younger people.

Even when educational attainment, and socio-economic and immigrant background are accounted for, age continues to have a strong relationship to proficiency. In most countries, the size of the gap in proficiency in literacy between young and old is largely unaffected when accounting for other factors. Exceptions are Australia, Ireland and Korea, where the disadvantage among older adults decreases, and Denmark, Germany and the United States, where it increases.

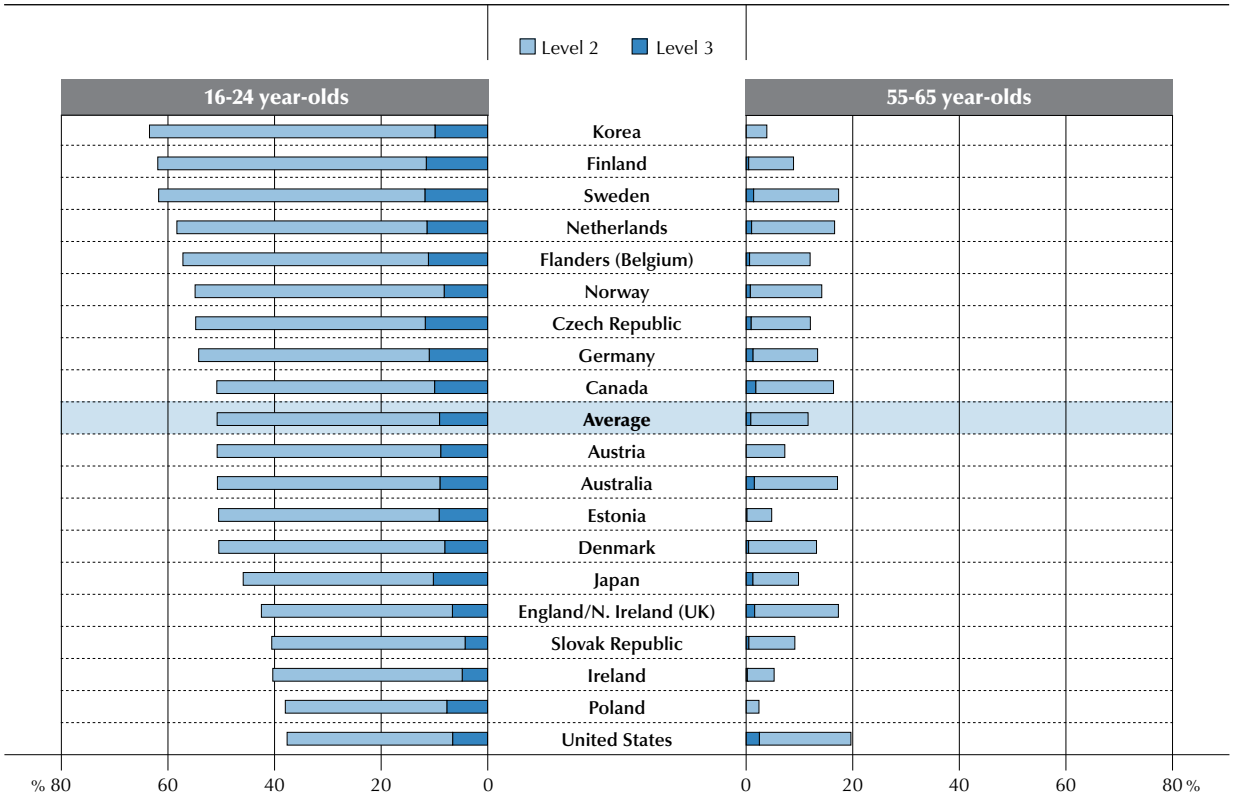
Proficiency in problem solving in technology-rich environments among older and younger age groups

On average across countries, 51% of people aged 16-24 score at Level 2 or higher on the problem solving in technology-rich environments scale (Figure 3.3 [P]). This varies from highs of 63% in Korea and 62% in Finland and Sweden to lows of 38% in Poland and the United States, and 40% in Ireland and the Slovak Republic. The proportion of young people who score at Level 3 is very small, ranging from 4% in the Slovak Republic to 12% in Sweden.

■ Figure 3.3 (P) ■

Problem-solving proficiency among younger and older adults

Percentage of adults aged 16-24 and 55-65 scoring at Level 2 or 3 in problem solving in technology-rich environments



Notes: Percentages on the problem solving in technology-rich environments scale are computed so that the sum of proportions for the following mutually exhaustive categories equals 100%: opted out of the computer-based assessment; no computer experience; failed ICT core test; below Level 1, Level 1, Level 2 and Level 3. For more detailed results for each category, see corresponding table mentioned in the source below.

Countries are ranked in descending order of the combined percentage of adults aged 16-24 scoring at Levels 2 and 3.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.3 (P).

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Very few adults aged 55-65 score at Level 2 or 3 on the problem solving in technology-rich environment scale in any country. The largest proportions of this age group with higher scores are found in the United States, followed closely by England/Northern Ireland (UK), Australia, Sweden, the Netherlands and Canada.

DIFFERENCES IN SKILLS PROFICIENCY RELATED TO GENDER

Many OECD countries have made significant progress over the past few decades in narrowing the gender gap in education and employment. Results from PISA show that 15-year-old girls outperform boys in reading and have higher career aspirations (OECD, 2012a); and more women than men are now enrolled in tertiary education (OECD, 2012b). Despite these gains, inequities persist. Women are far less likely than men to pursue careers in science or technology; and, with few exceptions, women earn less than men with similar levels of education (OECD, 2012a). Data from the Survey of Adult Skills can be analysed to determine whether there are differences in skills proficiency between men and women and, if so, how they are related to differences between the genders in educational attainment and participation in the labour force.

On average, men have higher scores on the numeracy and problem solving in technology-rich environments scales than women. While the gender gap in favour of men is narrower on the literacy scale, in half the countries surveyed, the differences are not statistically significant. The picture is different among younger adults, however. In just under half the countries surveyed, there is no difference between young men and young women in their proficiency in numeracy. Young women and young men are, on average, equally proficient in literacy; and where there are small differences, it is young women who have higher scores (see Box 3.2).

Box 3.2. Gender differences in skills proficiency between younger and older adults

Gender differences in literacy and numeracy tend to be smaller, if they exist at all, in the youngest age group than in the entire population surveyed. In the domain of numeracy, men perform better than women overall, but among young adults gender differences are not statistically significant in about half of the surveyed countries. In the remaining countries, the difference in favour of men persists among young adults, but is generally smaller than that among the entire population. In the domain of literacy, gender differences – mostly in favour of men among the entire population – virtually disappear among young adults. The differences are statistically significant in only two countries (Estonia and Poland) and in both countries they are in favour of women (see Tables B3.1 [L] and B3.1 [N] in Annex B).

Given findings from previous studies, it is not surprising to observe gender-related differences in proficiency in numeracy and problem solving in technology-rich environments. In the Adult Literacy and Life Skills Survey, men had better results in numeracy than women when the entire adult population was considered and when only younger adults were considered. Greater computer use among men (see Box 3.3) probably contributes to gender differences in proficiency in problem-solving in technology-rich environments. More surprising is the near absence of gender-related differences in literacy proficiency among young adults. While PISA results show better reading performance among 15-year-old girls than among boys (e.g. OECD, 2009), the results for 16-24 year-olds show that the gender gap in literacy is narrow, if it exists at all; a difference in favour of women is observed in only a handful of countries.

Box 3.3. Gender differences in computer use

Gender differences in computer use, skills and attitudes have been widely reported over the past decades. But in many respects the gender gap has narrowed, particularly among younger cohorts. For example, a 1989 household survey in the United States found marked gender differences in computer use at home. But in 2003 women were as likely as men to use computers at home and more likely to use computers at work (United States Census Bureau, 2013). A 2005 survey of adults in the European Union found that in a number of activities related to computer use (e.g. having used a mouse to launch programmes, having copied a file), gender differences that can be found among adults aged 16-74 no longer exist or are very small for those aged 16-24 (Eurostat, 2013). Results from the Survey of Adult Skills (PIAAC) reported in Table B3.2 in Annex B confirm that gender differences in ICT use have narrowed, with most differences among youths aged 16-24 insignificant. Yet, gender differences in ICT use persist, on average, among adults aged 16-65. Men are found to use ICT at work significantly more often than women in 15 out of 23 countries participating in the Survey of Adult Skills, and in 9 out of 23 countries when it comes to ICT use outside of work.

Closing the gender gap in educational attainment has been an important step in reducing gender differences in skills, but more can be done. For example, evidence shows that girls and boys tend to absorb, and act on, gender stereotypes about school subjects early on in their schooling (OECD, 2012a). These stereotypes may influence young people's study choices, which, in turn, will determine which skills they will be equipped with when they enter the labour market and which jobs will be suitable for them. Later on, women and men often take very different paths through life. Women are less likely to participate in the labour force; and if they do participate, they are more likely to be employed part-time and less likely to reach the highest rungs of the career ladder (OECD, 2012a).

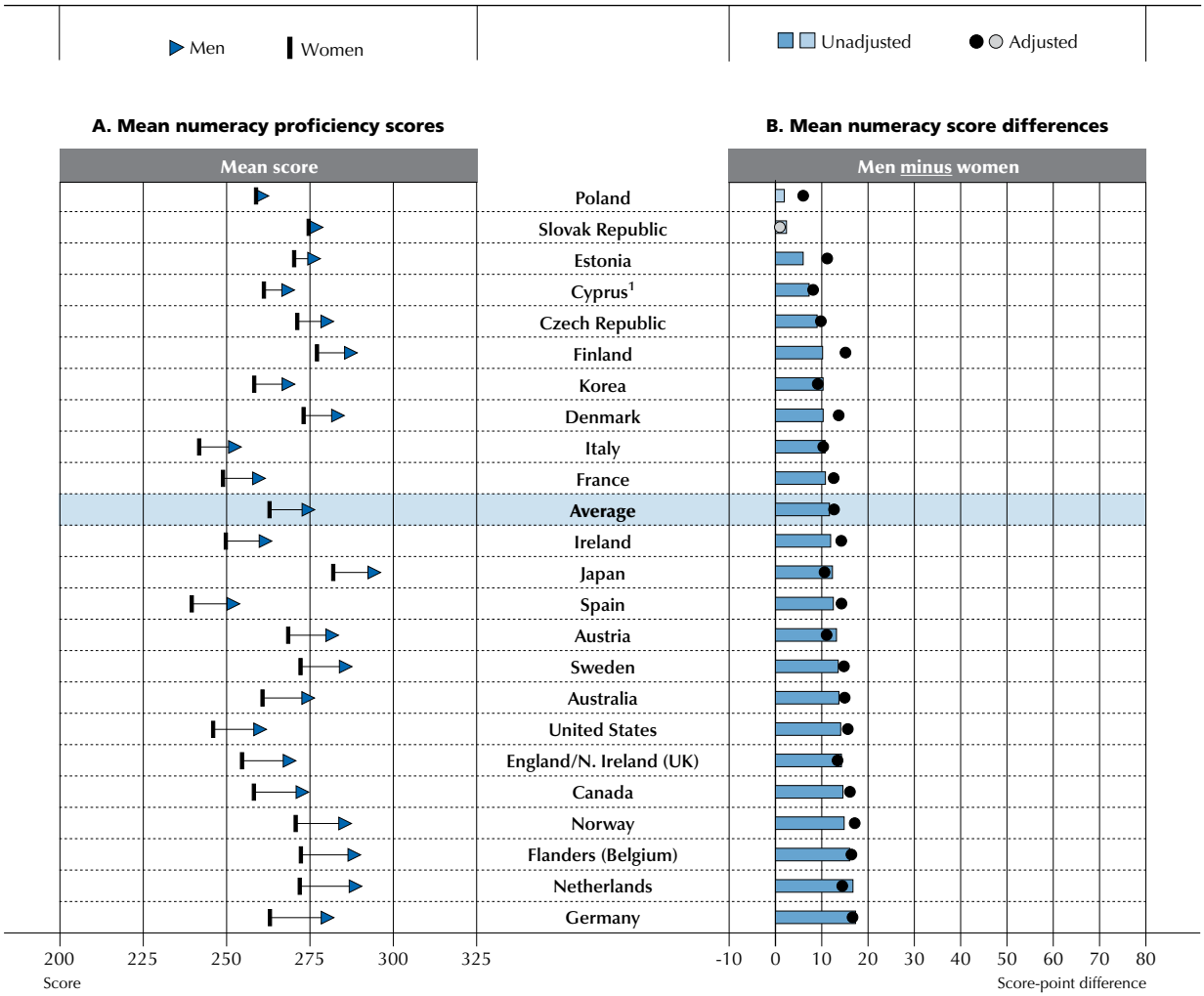
Policies to help eliminate gender differences in skills proficiency should target crucial stages of life. At the level of initial education, for example, policies can encourage the development of curricula and career guidance that are free of gender bias. For working adults, policies can be designed specifically to encourage women to participate in the labour force. These could include providing affordable and high-quality childcare, improving the work-life balance through such measures as flexible working hours, and ensuring that women have access to senior positions (OECD, 2012a).

Proficiency in literacy and numeracy among men and women

On average across countries, the mean score on the numeracy scale is higher for men than for women – by about 13 score points – for all surveyed countries (Figure 3.4 [N]). The difference is statistically significant in all but two countries, Poland and the Slovak Republic. The largest differences are found in Germany (17 points), the Netherlands (17 points) and Flanders (Belgium) (16 points).

■ Figure 3.4 (N) ■

Gender differences in numeracy proficiency



1. See notes at the end of this chapter.

Notes: Statistically significant differences in Panel B are marked in a darker tone. Unadjusted differences are the differences between the two means for each contrast category. Adjusted differences are based on a regression model and take account of differences associated with other factors: age, education, immigration and language background, socio-economic background and type of occupation. For more detailed regression results, see Table B3.17 (N) (available on line) in Annex B.

Countries are ranked in ascending order of the unadjusted difference in numeracy scores (men minus women).

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.1 (N) (available on line) and A3.4 (N).

StatLink http://dx.doi.org/10.1787/888932900878

Proficiency differences in literacy are more mixed and rather small. On average across countries, there is a 2 score-point difference in favour of men. In ten countries, men have higher mean scores on the literacy scale than women, with the largest differences observed in Korea, the Netherlands, Germany and Flanders (Belgium) (5- to 6-point difference). But in over half of the countries surveyed there is no statistically significant difference between men and women on the literacy scale. In Poland, however, women have higher mean scores than men (6-point difference).

Proficiency in problem solving in technology-rich environments among men and women

In all countries surveyed, a larger proportion of men than women are proficient at Level 2 or 3 on the problem solving in technology-rich environments scale (Figure 3.5 [P]). On average across countries, 36% of men are proficient at Level 2 or 3, compared to 32% of women. The difference in the proportion of men scoring at Level 2 or 3 compared to women is largest in Japan (11 percentage points), Austria, England/Northern Ireland (UK), Germany and the Netherlands (8 percentage points). The smallest differences are found in Australia and Canada (1 percentage point), and Estonia, Finland and the Slovak Republic (2 percentage points).

■ Figure 3.5 (P) ■

Problem-solving proficiency among women and men

Percentage of women and men scoring at Level 2 or 3 in problem solving in technology-rich environments

Notes: Percentages on the problem solving in technology-rich environments scale are computed so that the sum of proportions for the following mutually exhaustive categories equals 100%: opted out of the computer-based assessment; no computer experience; failed ICT core test; below Level 1, Level 1, Level 2 and Level 3. For more detailed results for each category, see corresponding table mentioned in the source below.

Countries are ranked in descending order of the combined percentage of men scoring at Levels 2 and 3.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.5 (P).

StatLink http://dx.doi.org/10.1787/888932900897

DIFFERENCES IN SKILLS PROFICIENCY RELATED TO SOCIO-ECONOMIC BACKGROUND

Growing up in a family with highly educated parents offers benefits that are compounded over a lifetime, from a good vocabulary to a taste for reading. Parents' educational attainment is closely linked to the socio-economic background of the parents and hence to the socio-economic background in which adults were raised. Socio-economic background is also directly and indirectly related to access to opportunities to develop information-processing skills. Adults from

disadvantaged backgrounds, for example, are at a greater risk of experiencing difficulties at school and in the labour market. Equity of opportunity, which implies fairness, can help to narrow these differences by affirming that personal and social circumstances should not be an obstacle to achieving one's potential. In turn, social mobility is also important for efficiency, as it ensures that individuals' talents do not go to waste simply because their opportunities were limited by their socio-economic circumstances (D'Addio, 2007).

The effect of socio-economic background on education trajectories and the development of literacy and numeracy skills are well-documented. Evidence from PISA reveals an association between socio-economic background and the performance of 15-year-old students in reading, mathematics and science in all participating countries (OECD, 2010). It is also clear that the impact of socio-economic background on the development of key information-processing skills can be reduced through well-designed policies, at least for school-age individuals. The PISA assessment shows that there are large variations among countries in the extent to which socio-economic background influences learning outcomes. Encouragingly, evidence also suggests that equity and excellence in education are not mutually exclusive. In other words, some countries achieve both high average performance and a weak or moderate association between socio-economic background and student performance (OECD, 2010). The Survey of Adults Skills provides the opportunity to examine the relationship between socio-economic background and proficiency in information-processing skills among a far wider age range and, therefore, to understand the extent to which different systems of post-compulsory education and training and adult learning succeed in ensuring equity of learning opportunities for all individuals, regardless of their socio-economic backgrounds.

The Survey of Adult Skills uses parents' educational attainment as a proxy for socio-economic background.[2] Three categories of background are distinguished: neither parent has attained upper secondary education; at least one parent has attained upper secondary education; and at least one parent has attained tertiary education. Measuring socio-economic background in this way offers insights into intergenerational social mobility: changes in social status across generations as opposed to changes during an individual's lifetime. The stronger the association between socio-economic background and skills proficiency, the lower is the level of intergenerational social mobility.

The pattern that emerges from the Survey of Adult Skills is clear and in line with the findings of previous surveys (e.g. the International Adult Literacy Survey and the Adult Literacy Life Skills Survey): adults from socio-economically advantaged backgrounds have higher scores on average than those from disadvantaged backgrounds. The strength of the association between skills proficiency and socio-economic background varies widely across countries and, within countries, between different age groups. In some countries, the relationship between parents' education and skills proficiency seems to have changed over time, which might reflect differences in compensatory mechanisms later in life. In Korea and the United States, for example, the relationship between socio-economic background and skills proficiency is much weaker among younger adults than among older adults, which may signal greater social mobility among young people (see Figures 3.8a [L] and 3.8b [L]). In other countries the opposite is true. This may reflect changes in educational attainment among those from different socio-economic backgrounds or changes in the quality of education. Improvements in attainment and/or the quality of education for those from disadvantaged backgrounds may weaken the relationship between socio-economic background and skills proficiency among younger adults. But such improvements may also occur when the relationship between socio-economic background and skills proficiency remains unchanged or becomes stronger. This may happen, for example, if those from advantaged backgrounds also benefit from improvements in attainment and/or in the quality of education.

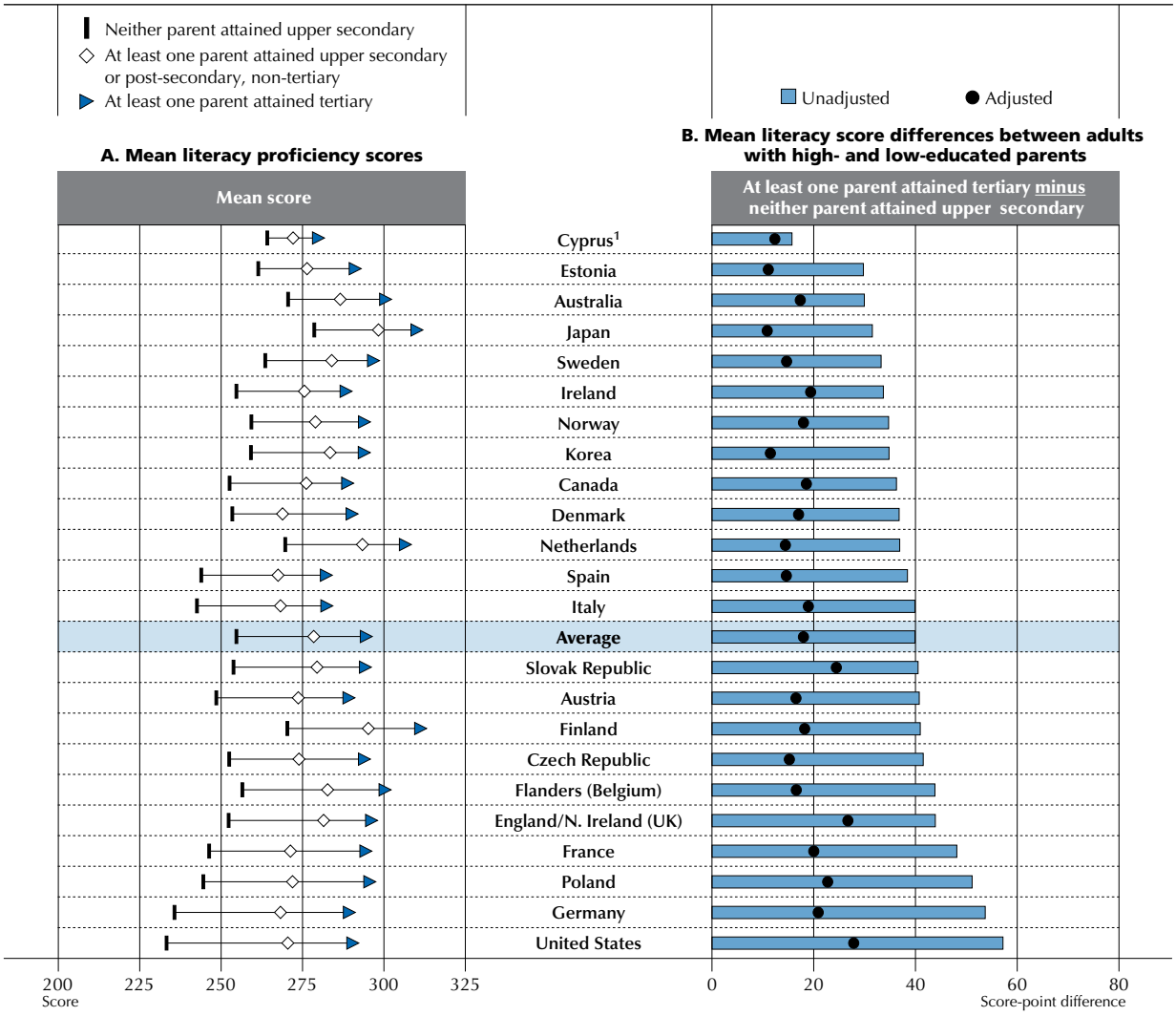
Breaking the cycle of disadvantage across generations and enhancing social mobility is a key policy challenge. Compulsory education should do as much as possible to ensure that school-leavers have the skills necessary to be successful in modern societies. At later stages, policies should ensure that there are opportunities to catch up. These may include, for example, specific adult learning courses or developmental education options as part of post-secondary education. It is essential to identify adults who require support and provide them with learning opportunities tailored to their needs.

Proficiency scores in literacy and numeracy among adults from socio-economically disadvantaged and advantaged backgrounds

On average across countries, adults with at least one parent who had attained tertiary education achieve the highest mean score (295 points) on the literacy scale, followed by those with at least one parent who had attained upper secondary education (278 points). Those with neither parent having attained upper secondary education tend, on average, to score lowest (255 points) (Figure 3.6 [L]).

■ Figure 3.6 (L) ■

Differences in literacy proficiency, by socio-economic background



1. See notes at the end of this chapter.

Notes: All differences in Panel B are statistically significant. Unadjusted differences are the differences between the two means for each contrast category. Adjusted differences are based on a regression model and take account of differences associated with other factors: age, gender, education, immigration and language background, and type of occupation. Only the score-point differences between two contrast categories are shown in Panel B, which is useful for showing the relative significance of socio-economic background vis-a-vis observed score-point differences. For more detailed regression results, including for each category of each variable included in the model, see Table B3.17 (L) in Annex B.

Countries are ranked in ascending order of the unadjusted difference in literacy scores (at least one parent attained tertiary minus neither parent attained upper secondary).

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.1 (L) and A3.6 (L).

StatLink http://dx.doi.org/10.1787/888932900916

The largest difference in both literacy and numeracy proficiency between adults with at least one parent who had high levels of educational attainment (i.e. from socio-economically advantaged backgrounds) and those with both parents who had low levels of educational attainment (i.e. from socio-economically disadvantaged backgrounds) is observed in the United States and Germany (57 and 54 points, respectively). These are also the countries with the lowest average literacy score among adults with neither parent having attained upper secondary education. In contrast, Australia, Estonia, Japan and Sweden show the smallest difference (28-33 points) between these two groups of adults. These countries also feature relatively higher scores among adults with neither parent having completed upper secondary education.

After accounting for the influence of other socio-demographic characteristics (age, gender, educational attainment, immigrant and language background and type of occupation), the size of the difference in proficiency scores between adults with a parent who had completed tertiary education and those with parents who had not completed

upper secondary education is reduced by around half. Among OECD countries that participated in the survey, the gap in favour of adults with a tertiary-educated parent falls from around 40 to 18 score points.

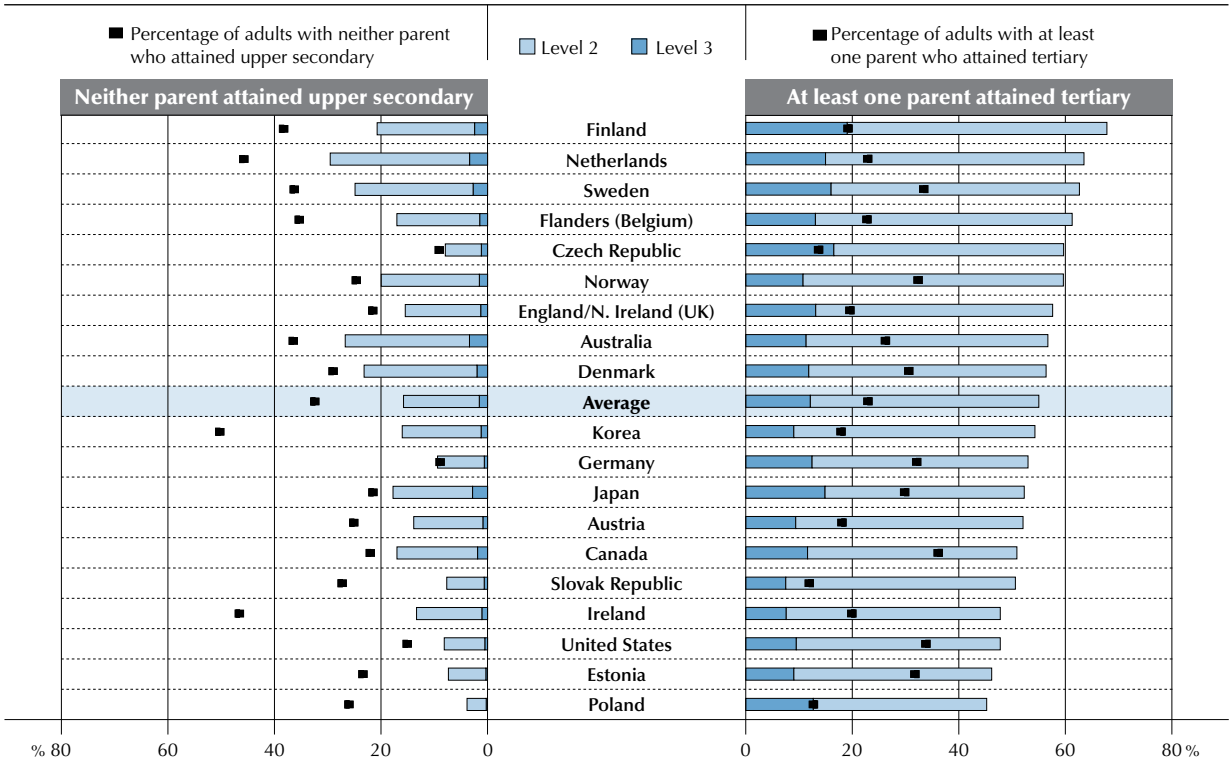
Proficiency levels in problem solving in technology-rich environments among adults from socio-economically disadvantaged and advantaged backgrounds

A small proportion of adults from disadvantaged backgrounds are proficient at Level 2 or 3 on the problem solving in technology-rich environments scale (Figure 3.7 [P]). The average is 16%, with proportions ranging from lows of about 3% to 8% in Estonia, the Czech Republic, Poland, the Slovak Republic and the United States, and, to highs of about 25% to 30% in Australia, the Netherlands and Sweden. On average across countries, 55% of adults from advantaged backgrounds score at Level 2 or 3. The lowest proportions (around 45% to 48%) are found in Estonia, Ireland, Poland and the United States. The highest proportions are found in the Netherlands, Sweden (both 63%) and Finland (68%).

■ Figure 3.7 (P) ■

Problem-solving proficiency among adults with low- and high-educated parents

Percentage of adults with low- and high-educated parents who score at Level 2 or 3 in problem solving in technology-rich environments



Notes: Percentages on the problem solving in technology-rich environments scale are computed so that the sum of proportions for the following mutually exhaustive categories equals 100%: opted out of the computer-based assessment; no computer experience; failed ICT core test; below Level 1, Level 1, Level 2 and Level 3. For more detailed results for each category, see corresponding tables mentioned in the source below.

Countries are ranked in descending order of the combined percentage of adults who score at Level 2 or 3 and at least one of whose parents attained tertiary education.

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.7 (P) and B3.5 in Annex B.

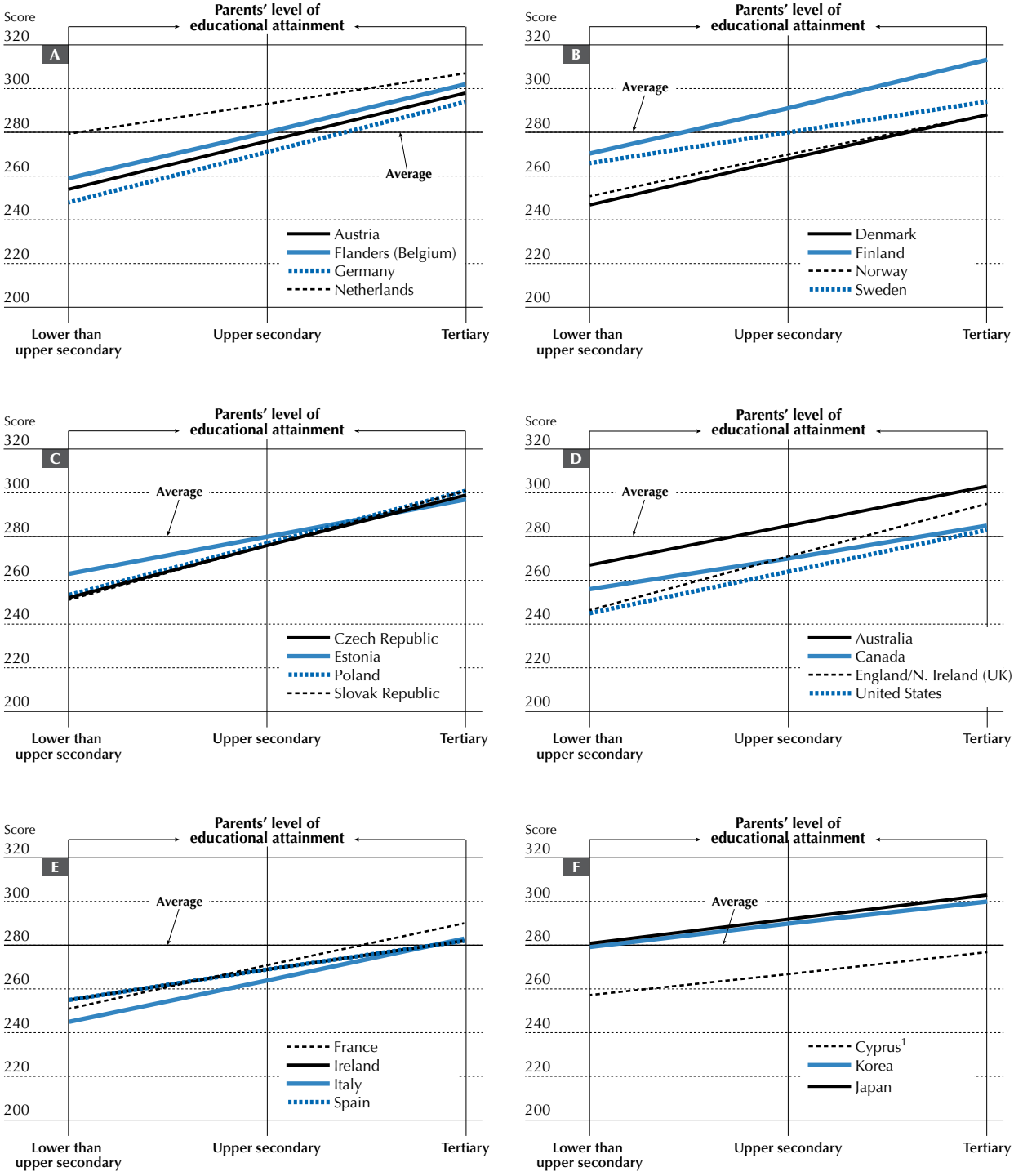
StatLink http://dx.doi.org/10.1787/888932900935

On average across countries, about 12% of adults from socio-economically advantaged backgrounds are proficient at Level 3 on the problem-solving in technology-rich environments scale. The Czech Republic, Finland and Sweden feature the highest proportions (over 15%), followed by Japan, the Netherlands, England/Northern Ireland (UK) and Flanders (Belgium). In contrast, in Austria, Estonia, Ireland, Korea, the Slovak Republic and the United States, about 7% to 9% of adults from advantaged backgrounds are proficient at Level 3. Among adults from disadvantaged backgrounds the proportions are even smaller. On average, less than 2% of this group attains proficiency Level 3; only in Australia, Finland, Japan, the Netherlands and Sweden is the proportion higher than 2% but still below 4%.

■ Figure 3.8a (L) ■

Relationship between literacy proficiency and socio-economic background among young adults

Socio-economic gradient, 16-24 year-olds



1. See notes at the end of this chapter.

Notes: The average represents the average score of 16-24 year-olds in the OECD countries participating in the survey. The socio-economic gradient is based on the trend line connecting mean scores for each level of parents' educational attainment.

Countries in Panel A-D are grouped according to regional or language considerations with the remainder grouped in Panel E-F.

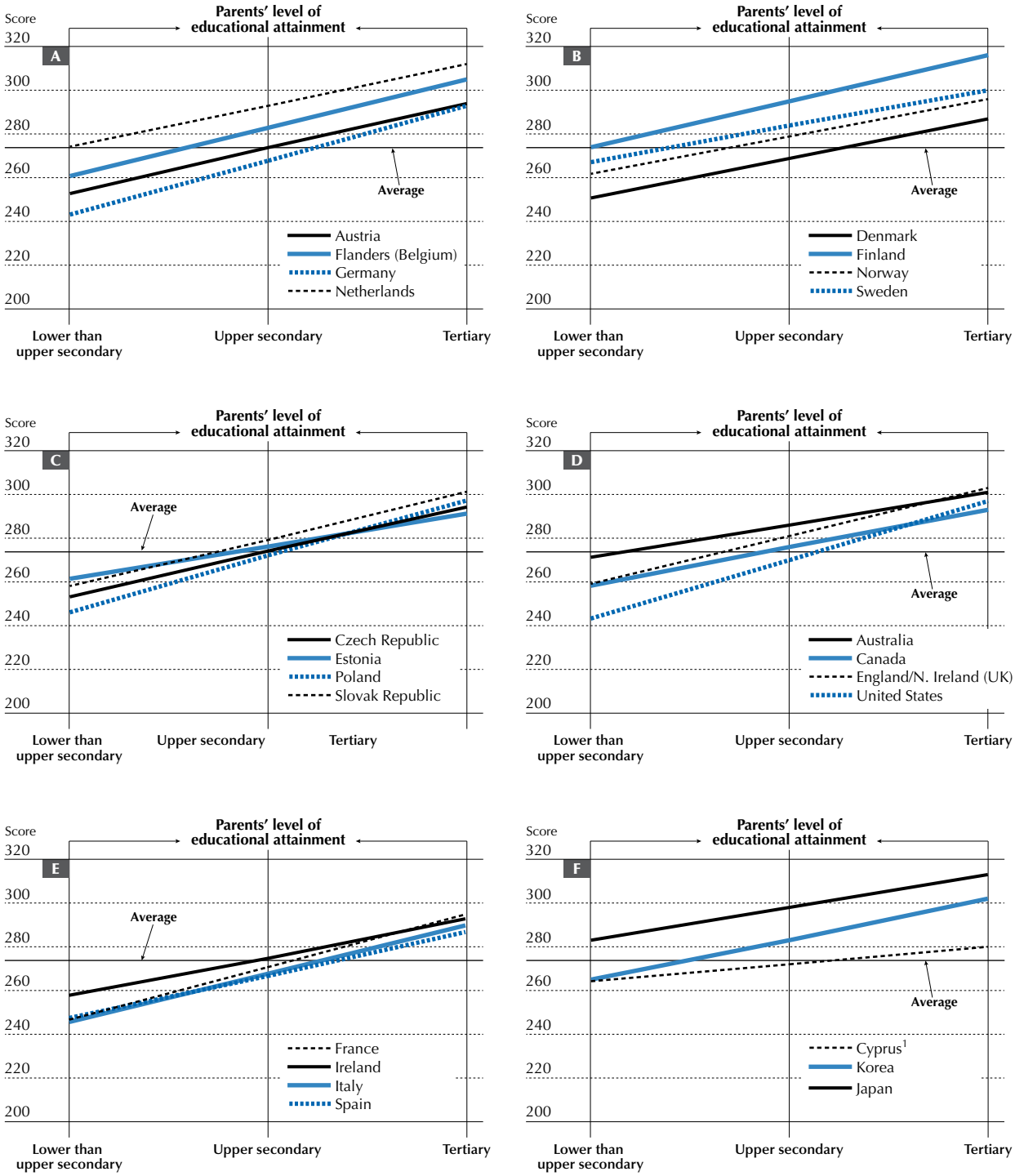
Source: Survey of Adult Skills (PIAAC) (2012), Table A3.8 (L).

StatLink http://dx.doi.org/10.1787/888932900954

■ Figure 3.8b (L) ■

Relationship between literacy proficiency and socio-economic background among adults

Socio-economic gradient, 16-65 year-olds



1. See notes at the end of this chapter.

Notes: The average represents the average score of OECD countries participating in the survey. The socio-economic gradient is based on the trend line connecting mean scores for each level of parents' educational attainment.

Countries in Panel A-D are grouped according to regional or language considerations with the remainder grouped in Panel E-F.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.8 (L).

StatLink http://dx.doi.org/10.1787/888932900973

The relationship between socio-economic background and skills proficiency, by age

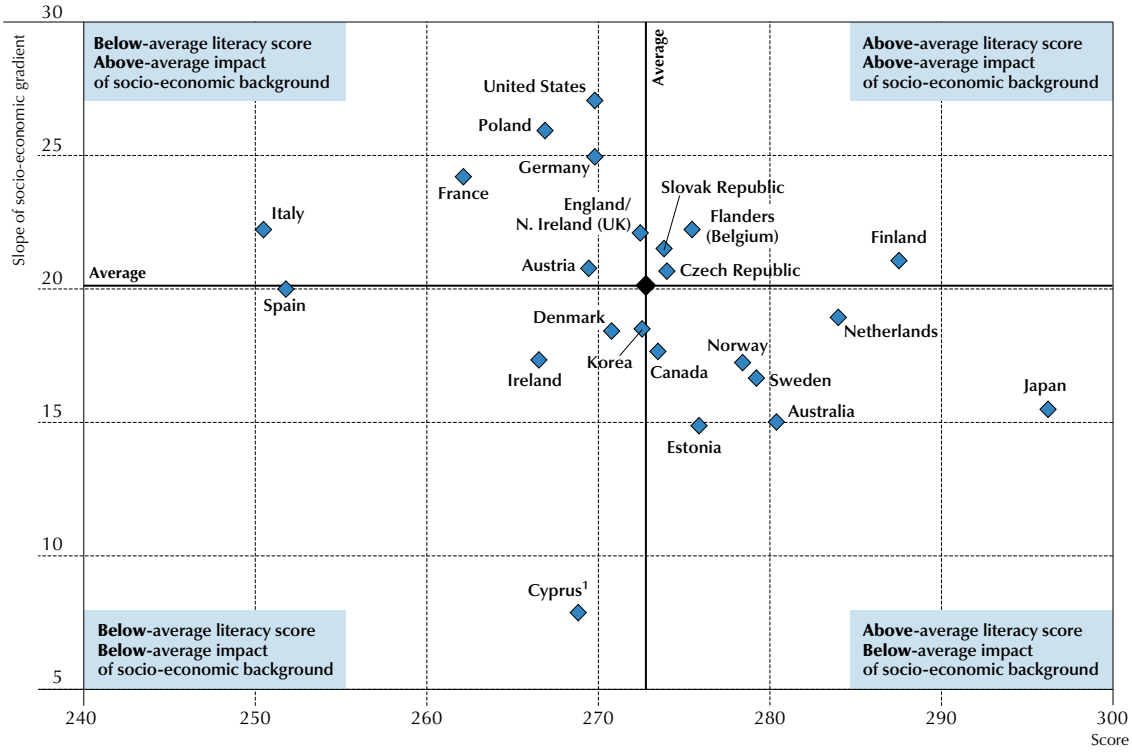
Countries with the weakest association between socio-economic background and literacy proficiency (also known as the socio-economic gradient) among young people include Ireland, Japan, Korea, the Netherlands, Spain and Sweden. The association is strongest in the Czech Republic, England/Northern Ireland (UK), Germany, Poland and the Slovak Republic (Figure 3.8a [L]). Among the broader population of 16-65 year-olds, this relationship is the weakest in Australia, Estonia, Ireland, Japan, Norway and Sweden; it is strongest in England/Northern Ireland (UK), Flanders (Belgium), Germany, Italy, Poland and the United States (Figure 3.8b [L]).

On average across countries, the slope of the socio-economic gradient is steeper (i.e. the relationship between socio-economic background and proficiency is stronger) for the adult population as a whole than for young people. The United States, for example, has the steepest gradient among 16-65 year-olds, but is close to the average among 16-24 year-olds. Korea also has a much weaker association between socio-economic background and skills proficiency among young people than among all adults. While among 16-65 year-olds in Korea the slope of the socio-economic gradient is close to the average, among young people, Korea has the second flattest gradient of all countries surveyed. In contrast, in the Czech Republic, Denmark, England/Northern Ireland (UK), Estonia and the Slovak Republic, the socio-economic gradient is steeper among young people than among the overall adult population.

■ Figure 3.8c (L) ■

Relationship between literacy proficiency and impact of socio-economic background on proficiency

Mean literacy score and slope of the socio-economic gradient, 16-65 year-olds



1. See notes at the end of this chapter.

Notes: The averages represent the average scores of OECD countries participating in the survey. The slope of socio-economic gradient represents the score-point difference associated with one unit increase in parents' level of educational attainment.

Source: Survey of Adult Skills (PIAAC) (2012), Tables A2.4 and A3.8 (L).

StatLink http://dx.doi.org/10.1787/888932900992

Social mobility and literacy proficiency

Is there a link between the strength of the relationship between socio-economic background and skills proficiency and the skills proficiency of the adult population? (Figure 3.8c [L]). Seven countries, including Australia, Japan and the Netherlands, combine above-average literacy scores with a socio-economic gradient that is flatter than the average,

and six countries, including Germany, Poland and the United States, show below-average literacy scores and a steeper-than-average socio-economic gradient. In contrast, in another group of countries, the relationship appears to be reversed. The Czech Republic, Finland, Flanders (Belgium) and the Slovak Republic have above-average literacy scores while also having a steeper-than-average socio-economic gradient, while some countries, including Denmark, Ireland and Korea, combine below-average literacy scores with a flatter-than-average socio-economic gradient.

DIFFERENCES IN SKILLS PROFICIENCY RELATED TO EDUCATIONAL QUALIFICATIONS

Formal education and training is one of the main mechanisms through which proficiency in literacy, numeracy and problem solving is developed and maintained. One of the explicit goals of the school systems in the countries that participated in the Survey of Adult Skills is to ensure that students leave compulsory education with adequate literacy and numeracy skills and with the ability to use information and communication technologies; and this continues to be a goal at higher levels of education too. Most countries have national testing programmes in place to assess progress towards this goal (OECD, 2013). The OECD Programme for International Student Assessment (PISA) underscores the importance of these skills as it includes reading and mathematical literacy among the domains in which it tests 15-year-olds every three years.

In addition to having a direct relationship with skills, the level and type of formal learning completed, and the qualifications earned, are indirectly related to individuals' proficiency in information-processing skills: they determine access to the jobs and further education and training that could help individuals maintain and develop their skills. The education system is also a place where characteristics, attitudes and practices that facilitate lifelong learning, such as an interest in reading or positive attitudes towards learning, are developed.

The formal education system is not the only setting in which the skills assessed in the Survey of Adult Skills are developed. Learning occurs in a range of other settings, including the family, the workplace and through self-directed individual activity. Moreover, the skills developed in formal education can depreciate if they are not used. The longer the period during which a person has been out of education, the weaker the direct relationship between his or her formal education and proficiency, and the greater the role of other factors that may affect proficiency, such as the work or social environment. In other words, a 55-year-old's experience in formal education is likely to have less of a direct influence on his or her proficiency than that of a 26-year-old. In addition, the quality of education may have changed over time. Even within the same country, individuals with apparently the same qualifications or level of education may have had very different experiences in school. The content and quality of the secondary education delivered in the 1960s may be quite different than that delivered in the early 2000s.

The relationship between educational attainment and proficiency in information-processing skills is complex. Individuals with greater proficiency are more likely to participate in higher levels of education, for example, and to get better jobs with possibly more opportunities to develop these skills. The role of education in fostering information-processing skills either directly or indirectly is discussed in more detail in Chapter 5. In this section, the focus is on observed differences among adults who have not attained upper secondary education, those who have attained upper secondary education, and adults who have attained tertiary education.

As expected, there is a close positive relationship between educational attainment and proficiency in information-processing skills. Beyond that, two other findings stand out. First, differences in skills proficiency related to educational attainment vary considerably among countries. The gap in average proficiency between adults with tertiary education and those who have not attained upper secondary education is considerably larger in some countries than in others. The United States stands out as having a particularly large gap between these two groups in both literacy and numeracy proficiency. Among possible reasons for the differences in the size of the proficiency gaps between adults with high and low levels of educational attainment are differences in the quality of schooling, the nature of adult-learning systems, and differences in patterns of participation in education. Other things being equal, the average proficiency of adults who have not attained secondary education would be expected to decline as the size of this group shrinks relative to the total population.

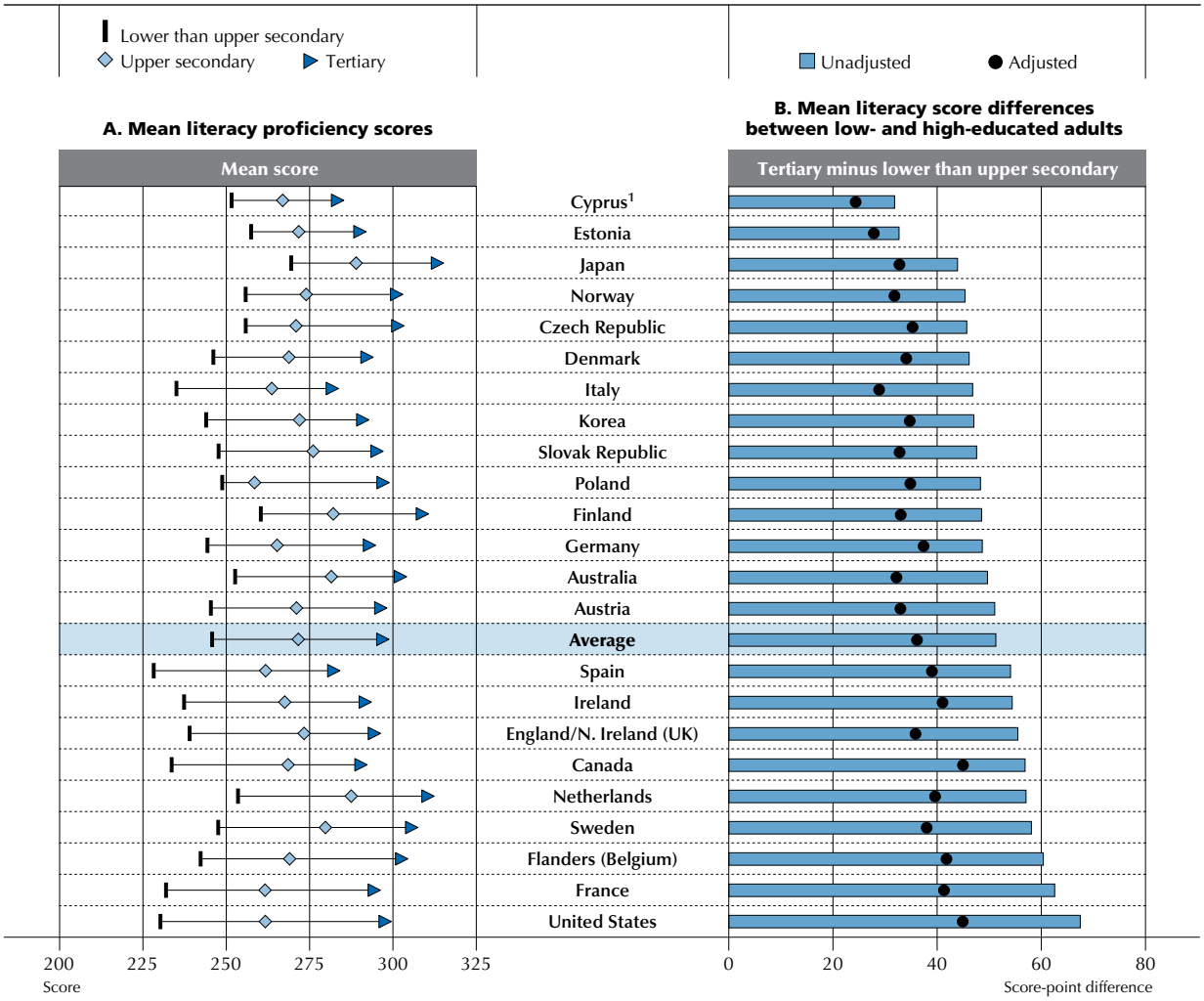
Second, the proficiency of adults who have the same level of educational attainment varies substantially among countries. In fact, in a few countries, the average proficiency of adults who have completed secondary education exceeds that of tertiary graduates. However, caution is advised in attributing these differences to variations in the quality of education among countries; they may also reflect differences in the abilities of the adults at a given level of education. It would be expected that the graduates of a highly selective higher-education system would have greater proficiency, in general, than

those who graduated from a comprehensive system offering wide access. Similarly, differences among countries may reflect variations in the opportunities for, and the effectiveness of, ongoing skills development and use after "initial" education is completed, as the skills assessed can be acquired outside of formal education and can also be lost over time.

Accounting for the effects of other socio-demographic characteristics, such as age, reduces the strength of the relationship between educational attainment and proficiency in all countries. However, the relationship remains strong, with between 25 and 45 score points separating the average literacy scores of adults with tertiary-level attainment and those with lower than upper secondary attainment, depending on the country. Interestingly, the adjusted differences in literacy proficiency between low- and high-educated adults do not vary greatly among countries. In other words, the gain in proficiency associated with having a tertiary qualification compared to having lower than upper secondary attainment is of similar magnitude irrespective of the differences in the structure and development of the different education and training systems.

■ Figure 3.9 (L) ■

Differences in literacy proficiency, by educational attainment



1. See notes at the end of this chapter.

Notes: All differences in Panel B are statistically significant. Unadjusted differences are the differences between the two means for each contrast category. Adjusted differences are based on a regression model and take account of differences associated with other factors: age, gender, immigration and language background, socio-economic background, and type of occupation. Only the score-point differences between two contrast categories are shown in Panel B, which is useful for showing the relative significance of educational attainment vis-a-vis observed score-point differences. For more detailed regression results, including for each category of each variable included in the model, see Table B3.17 (L) in Annex B. Lower than upper seconday includes ISCED 1, 2 and 3C short. Upper secondary education includes ISCED 3A, 3B, 3C long and 4. Tertiary includes ISCED 5A, 5B and 6. Where possible, foreign qualifications are included as per their closest correspondance to the respective national education systems.

Countries are ranked in ascending order of the unadjusted differences in literacy scores (tertiary minus lower than upper secondary).

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.1 (L) and A3.9 (L).

StatLink http://dx.doi.org/10.1787/888932901011

Proficiency in literacy and numeracy among low- and high-educated adults

As expected, adults who have not attained upper secondary education (hereafter, "low-educated" adults) score lower, on average, on the literacy scale than adults who have; and the latter group, in turn, scores lower, on average, than adults who have attained tertiary education (hereafter "high-educated" adults) (Figure 3.9 [L]). The mean score for adults who have not attained upper secondary education is 246 points (Level 2), whereas it is 272 points (near Level 3) for upper secondary graduates and 297 points (Level 3) for adults who have attained a tertiary level of education. On average across countries, about 24% of adults have not attained upper secondary education; but this proportion ranges from a low of about 14% in the United States to a high of about 53% in Italy (see Table B3.6 in Annex B).

Countries differ widely in average literacy proficiency by level of educational attainment. Low-educated adults score lowest, on average, on the literacy scale in Canada, France, Italy, Spain and the United States. In Japan, low-educated adults score very high (269 points), on average, in comparison with all other countries – higher, on average, in fact, than upper secondary graduates in France, Poland and the United States. Otherwise, low-educated adults in the Czech Republic, Estonia, Finland, the Netherlands and Norway score comparatively high, on average, and well above the mean for low-educated adults.

The largest differences in skills proficiency between adults with low levels of education and those with high levels of education are found in the United States: in literacy, 67 score points separate the two groups; in numeracy, the difference is 83 score points. The United States is followed by France on both the literacy (63-point difference) and numeracy (79-point difference) scales. Estonia shows among the smallest differences on both the literacy (33-point difference) and numeracy (42-point difference) scales. This is partly due to the comparatively high average score among adults with less than upper secondary education in Estonia and the comparatively low average score among adults with tertiary education.

In addition to the observed relationship between proficiency in literacy and numeracy and educational attainment, Figure 3.9 (L) shows the difference in proficiency between adults with tertiary attainment and those with lower than upper secondary attainment after accounting for other socio-demographic characteristics. While net differences are smaller in all countries compared to unadjusted differences, they remain large – between 25 and 45 score points, depending on the country.

Proficiency in problem solving in technology-rich environments among low- and high-educated adults

On average across countries, 52% of tertiary-educated adults score at Level 2 or higher on the problem solving in technology-rich environments scale (Figure 3.10 [P]). This varies from highs of 64% in the Netherlands and 62% in Sweden to lows of 36% in Estonia and 38% in Poland. Sweden, the Netherlands and the Czech Republic have the largest proportion of tertiary graduates who score at Level 3 on this scale.

Only 19% of low-educated adults score at Level 2 or higher, on average, across countries. This varies from lows of 7% to 10% in England/Northern Ireland (UK) and Ireland to highs of 26% to 28% in the Czech Republic, Finland and Germany. Overall, only about 2% of adults who have not attained upper secondary education score at Level 3 on the problem solving in technology-rich environments scale.

Cumulative disadvantage in key information-processing skills for low-educated adults

Adults who have not attained upper secondary education have a very high risk of scoring at Level 2 or below on the literacy and numeracy scales. The following section examines whether educational attainment interacts with age, gender and socio-economic background in its relationship with skills proficiency.

Low-educated and inactive youth

While younger adults generally score better than older adults on measures of key information-processing skills, there are certain groups of youth who fare particularly poorly.

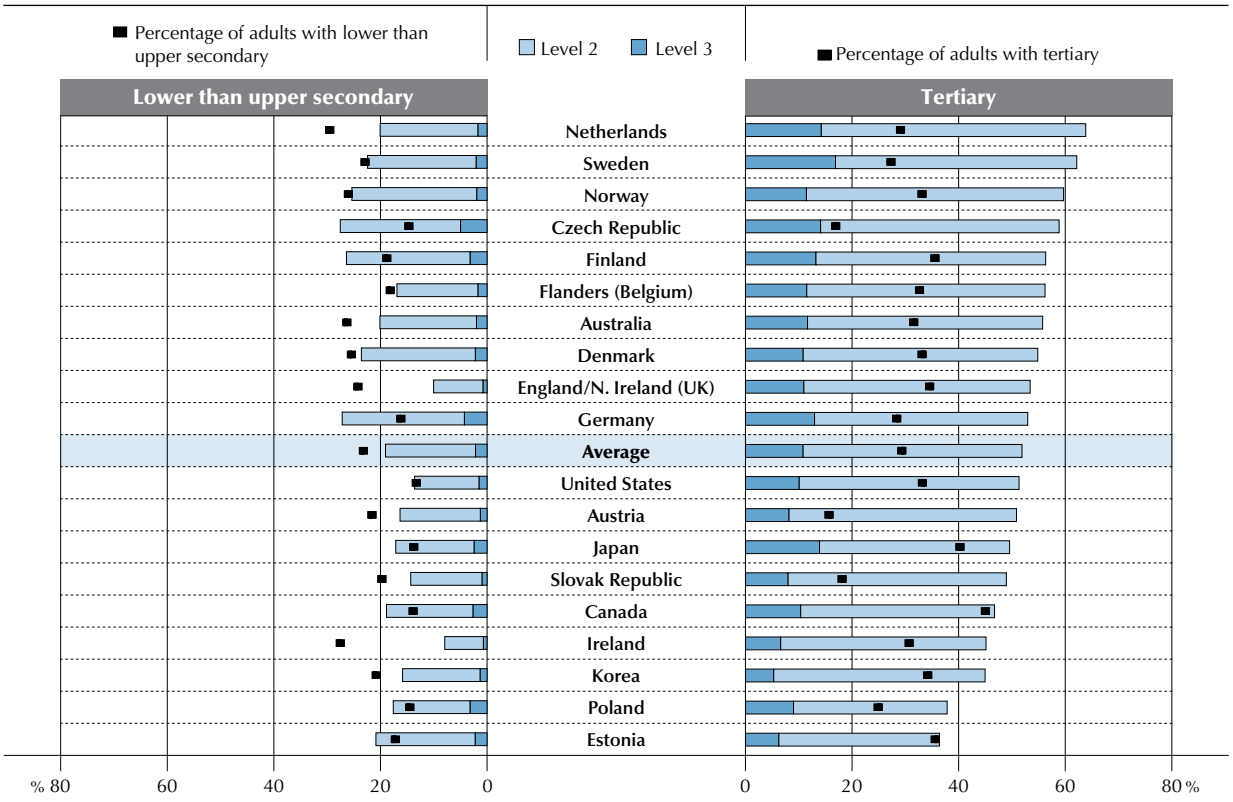
Being neither in employment nor in education and training may have a negative effect on skills development. The results show that this group of young people has, on average across countries, nearly three times the odds of scoring at Level 2 or below on the literacy scale compared to young people who remain in education (Figure 3.11 [L]; and see Box 3.4 for an explanation of odds ratio analysis). The increased odds that inactive young people will score at Level 2 or below ranges from six times higher in Canada to two times higher in Estonia. In a number of countries, however, young people are not found to have higher odds of scoring at lower levels of proficiency, although this may be due to small sample sizes.

The average proportion of inactive youths, across countries, is about 5% but ranges from as high as 12% in the Slovak Republic to as low as 1% in the Netherlands (see Table B3.7 in Annex B).

■ Figure 3.10 (P) ■

Problem-solving proficiency, by educational attainment

Percentage of low- and high-educated adults scoring at Level 2 or 3 in problem solving in technology-rich environments



Notes: Percentages on the problem solving in technology-rich environments scale are computed so that the sum of proportions for the following mutually exhaustive categories equals 100%: opted out of the computer-based assessment; no computer experience; failed ICT core test; below Level 1, Level 1, Level 2 and Level 3. For more detailed results for each category, see corresponding tables mentioned in the source below. Lower than upper seconday includes ISCED 1, 2 and 3C short. Upper secondary education includes ISCED 3A, 3B, 3C long and 4. Tertiary includes ISCED 5A, 5B and 6. Where possible, foreign qualifications are included as per their closest correspondance to the respective national education systems.

Countries are ranked in descending order of the combined percentage of adults with tertiary attainment scoring at Levels 2 and 3.

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.10 (P) and B3.6 in Annex B.

StatLink http://dx.doi.org/10.1787/888932901030

Box 3.4. **Using odds ratios**

Odds ratios reflect the relative likelihood of an event occurring for a particular group relative to a reference group. An odds ratio of 1 represents equal chances of an event occurring for a particular group vis-à-vis the reference group. Coefficients with a value below 1 indicate that there is less chance of an event occurring for a particular group compared to the reference group, and coefficients greater than 1 represent greater chances.

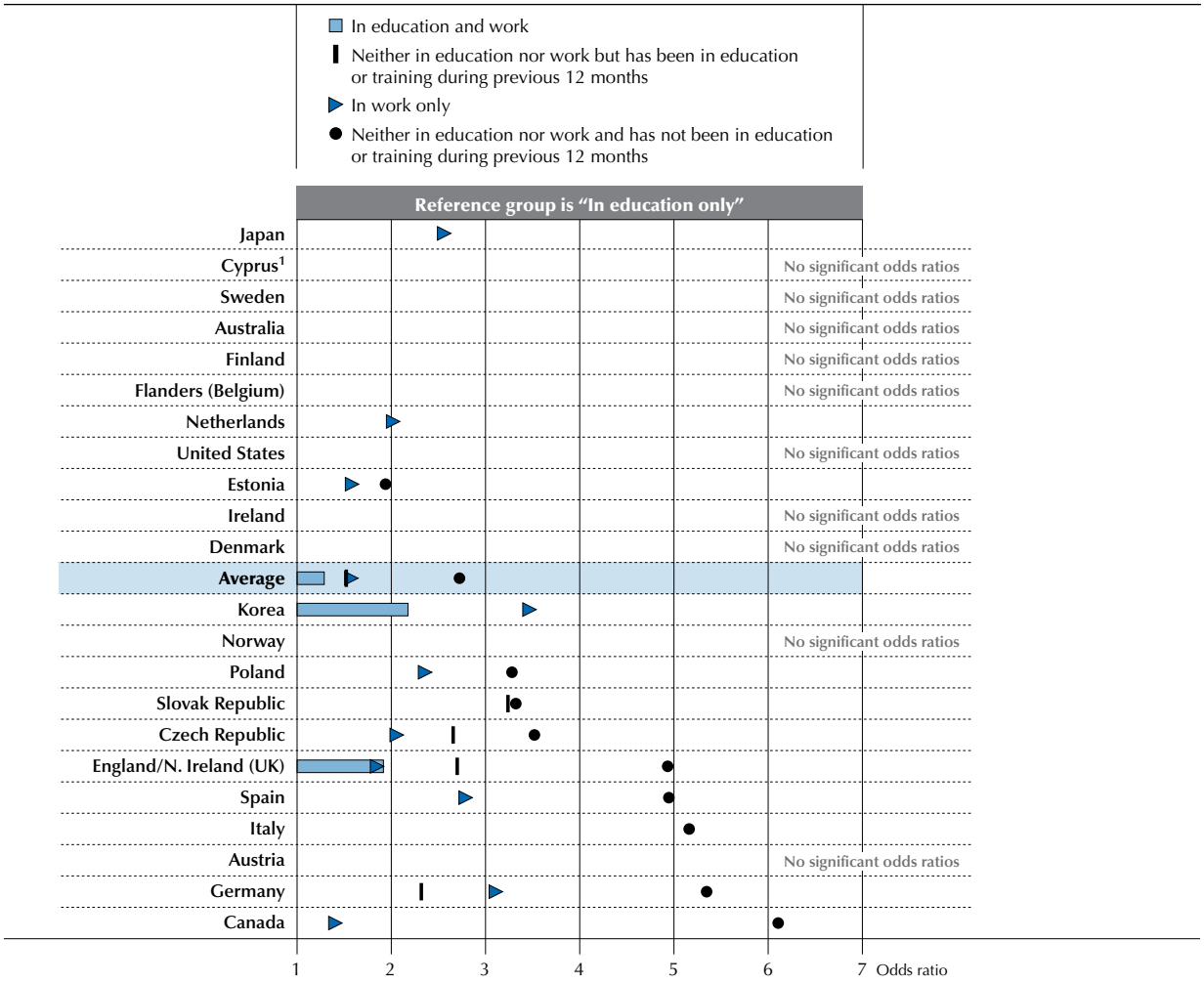
Remaining active in work but not in education does not necessarily translate into a greater likelihood of attaining higher proficiency. Young people aged 16-24 who are in work and not in education in the Czech Republic, Germany, Japan, Korea, the Netherlands, Poland and Spain show a marked likelihood of displaying lower proficiency compared to those who remain in education. The results suggest that for some of these countries, gaining access to jobs at an early age, especially low-skilled jobs, might translate into very limited opportunities for young people to develop their information-processing skills beyond very low levels of functionality. Youth who mix education with work also show an increased likelihood, on average, of scoring at lower levels of proficiency. This is particularly the case in

England/Northern Ireland (UK) and Korea. By contrast, in some countries, young people who remain active in work but who are not in education do not necessarily show a greater likelihood of having lower scores on the literacy scale compared to those who remain in education, although this may be due to small sample sizes, per country, for these groups since the average odds across countries is significant.

■ Figure 3.11 (L) ■

Likelihood of lower literacy proficiency among young adults

Adjusted odds ratios of 16-24 year-olds scoring at or below proficiency Level 2 on the literacy scale, by education and work status



1. See notes at the end of this chapter.

Notes: Estimates based on a sample size less than 30 or are not statistically different from the reference group are not shown. For more detailed results, see corresponding table mentioned in the source below. Odds ratios are adjusted for age, gender, type of occupation, immigrant status, language and socio-economic background.

Countries are ranked in ascending order of the odds ratios of youths scoring at or below proficiency Level 2 when they are neither in education nor work, and not recently in education/training.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.11 (L).

StatLink http://dx.doi.org/10.1787/888932901049

Low-educated adults from socio-economically disadvantaged backgrounds

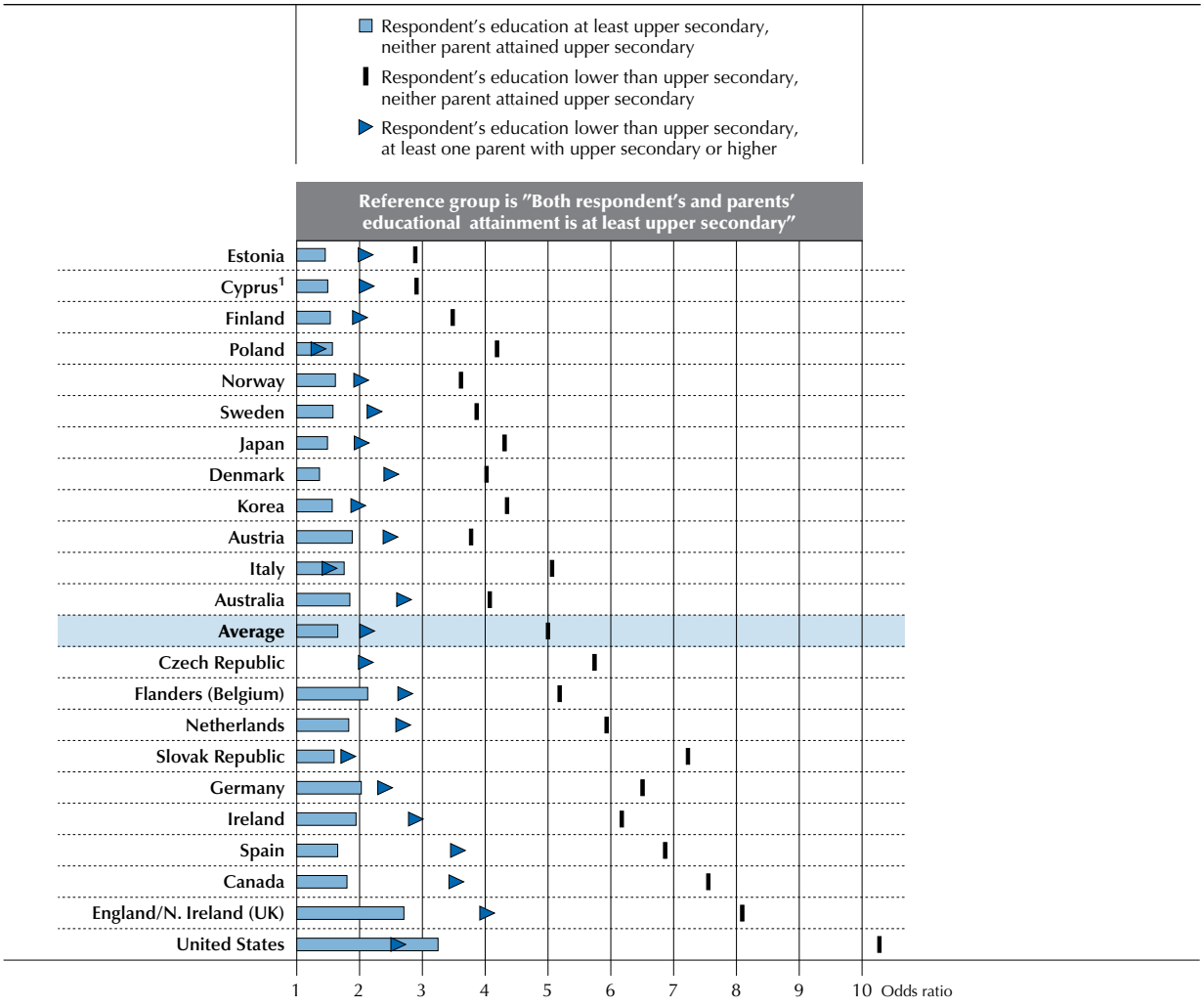
Adults who have low levels of education and whose parents also had low levels of education have, on average across countries, nearly five times the odds of scoring at lower levels of proficiency on the literacy scale than adults whose parents had higher levels of education (Figure 3.12 [L]). These increased odds vary from highs of over ten times higher in the United States and at or near eight times higher in Canada and England/Northern Ireland (UK), to lows of about three times in Estonia and Finland. These are the adults who are the least likely to participate in any

form of adult education and training, or to engage in practices conducive to productive learning (see Desjardins, Rubenson and Milana, 2006). On average across countries, there are about 13% of adults who have low levels of education and whose parents also had low levels of education; but this proportion ranges from a low of about 3% in the Czech Republic to a high of about 45% in Italy (see Table B3.8 in Annex B).

■ Figure 3.12 (L) ■

Likelihood of lower literacy proficiency among low-educated adults

Adjusted odds ratio of scoring at or below Level 2 in literacy, by respondent's and parents' level of education



1. See notes at the end of this chapter.

Notes: Estimates based on a sample size less than 30 or are not statistically different from the reference group are not shown. For more detailed results, see corresponding table mentioned in the source below. Odds ratios are adjusted for age, gender, type of occupation, and immigrant and language background.
Countries are ranked in ascending order of the odds ratios of respondents scoring at or below proficiency Level 2 when their and their parents' educational attainment is lower than upper secondary.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.12 (L).

StatLink http://dx.doi.org/10.1787/888932901068

Coming from a more advantaged socio-economic background significantly mitigates the consequences of not attaining upper secondary education, even if these individuals still have more than twice the odds of scoring at lower levels of proficiency on the literacy scale than adults from the same background that completed upper secondary. These increased odds range from a high of four times higher in England/Northern Ireland (UK) and over three times higher in Canada and Spain, but remain well below the odds ratio associated with having both low levels of education and a disadvantaged background found in nearly all countries.

Even if they have completed at least upper secondary education, adults from a disadvantaged background still have about two times the odds of scoring at lower levels of proficiency on the literacy scale compared to adults who both completed at least upper secondary education and who come from a more advantaged background. This is particularly the case in the United States and England/Northern Ireland (UK), where the former group has about three times the odds of having lower scores on the literacy scale as the latter group.

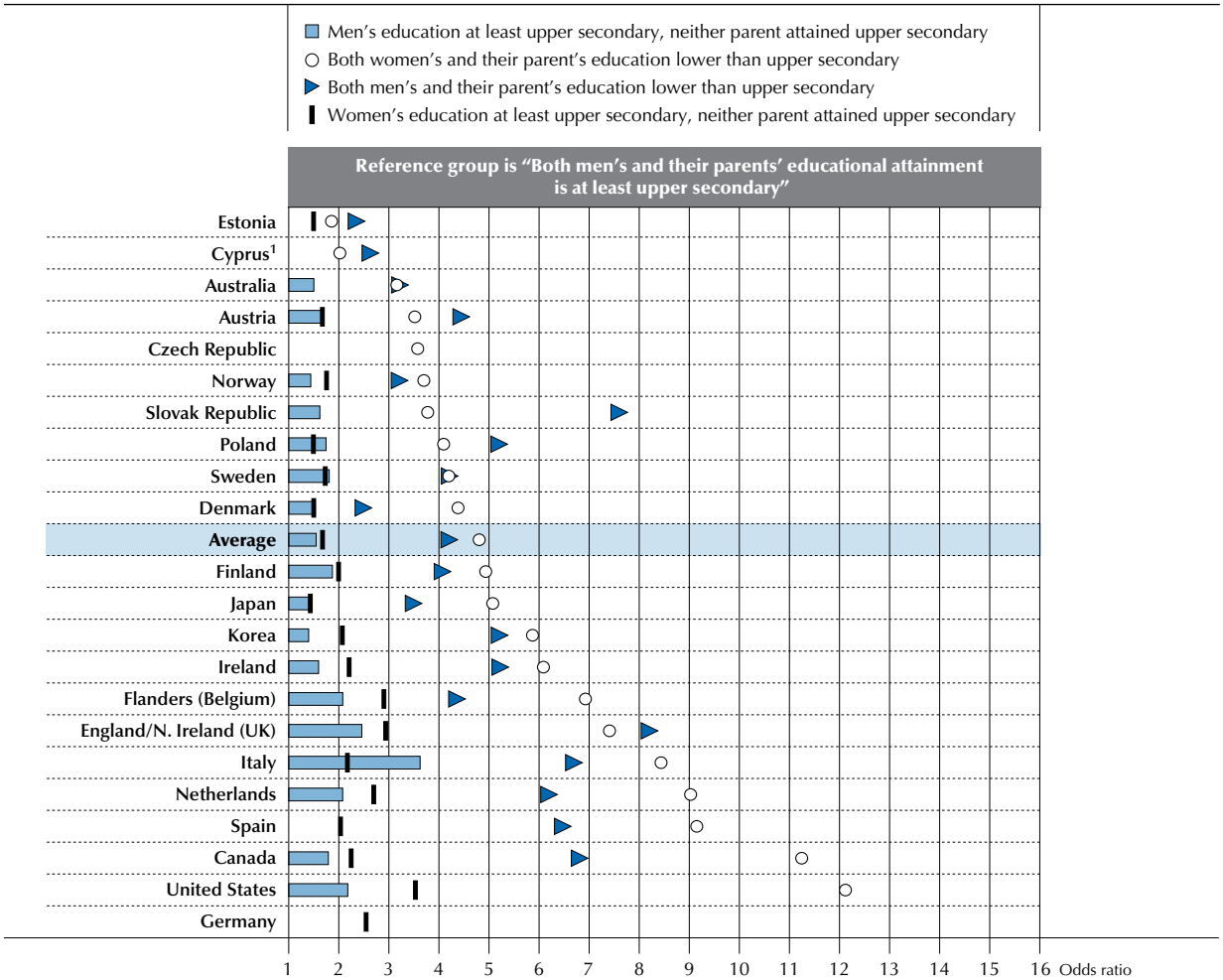
Gender differences among low-educated adults from socio-economically disadvantaged backgrounds

On average across countries, older low-educated women from disadvantaged backgrounds face a slightly higher risk of scoring at lower levels of proficiency on the literacy scale than older men with the same profile (Figure 3.13 [L]). On average, women with this profile have nearly five times the odds of scoring at lower levels of proficiency in literacy, while men with the same profile have a slightly lower risk, closer to four times, when compared with men who have attained at least upper secondary education and who have a more advantaged background. This pattern holds in about half of the participating countries and is particularly evident in Canada, Flanders (Belgium), Italy, the Netherlands, and Spain.

■ Figure 3.13 (L) ■

Likelihood of lower literacy proficiency among older women and men

Adjusted odds ratios of women and men aged 45-65 scoring at or below proficiency Level 2 on the literacy scale, by respondent's and parents' educational attainment



1. See notes at the end of this chapter.

Notes: Estimates based on a sample size less than 30 or are not statistically different from the reference group are not shown. For more detailed results, see corresponding table mentioned in the source below. Odds ratios are adjusted for age, type of occupation, and immigrant and language background.
Countries are ranked in ascending order of the odds ratios of women scoring at or below proficiency Level 2 when their and their parents' educational attainment is lower than upper secondary.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.13 (L).

StatLink http://dx.doi.org/10.1787/888932901087

In England/Northern Ireland (UK), Poland and the Slovak Republic, the pattern is reversed: men from disadvantaged backgrounds face a greater risk of scoring at lower levels of proficiency. That these patterns vary by country might be related to gender differences in labour force participation, occupational segregation and migrant profiles.

DIFFERENCES IN SKILLS PROFICIENCY RELATED TO COUNTRY OF ORIGIN AND LANGUAGE

Migration has changed the demographic profile of most OECD countries. In 13 of the countries that participated in the Survey of Adult Skills, immigrants now represent at least 10% of the total population. Foreign-born populations have also been growing rapidly in some countries. In Norway, for example, the population of immigrants almost doubled from 6.8% to 11.6% of the total population between 2000 and 2010 (OECD, 2012c, Table A4). Immigrant populations vary considerably from country to country, depending on national migration policies, the immigrants' countries of origin, and the mix of different categories of immigrants, such as whether they arrived to work, as part of a family-reunification policy, or through free movement among countries; they may even be undocumented, which poses an enormous challenge for policy making.

Many OECD countries are now grappling with the challenges that migration raises, including how to strike a balance between labour and other forms of migration, how to manage inflows, and how to ensure that immigrants are integrated into society. The recent global economic crisis has prompted many countries to review aspects of their immigration policies, often with the aim of reducing inflows and/or imposing greater selectivity. At the same time, fostering integration remains a top priority. A common trend is to emphasise labour market integration and strengthen educational programmes, particularly language training. This often involves recognising foreign skills and qualifications to increase immigrants' participation in the labour market (OECD, 2012c, pp. 120-21).

The Survey of Adult Skills is an important source of information for policy makers interested in migration. In particular, it provides a range of information regarding the family and linguistic backgrounds of immigrants, their qualifications and skills, and their participation in the labour market. What chances do immigrants have in the host country? How skilled are immigrants at processing information in the local language? How do the skills of immigrants compare to those of native-born populations? As a first step towards addressing some of these issues in more detail, this section highlights observed differences in skills proficiency between native- and foreign-born adults, and between adults whose first or second language learned as a child is the same as the language in which the assessment was taken and those for whom it was not. Adults whose country and language of origin is different from the country of assessment are used as a proxy for foreign-language immigrants.[3] While a more comprehensive definition of immigrants might include adults who are the children of foreign-language immigrants but who were born in the country of assessment, results for this latter group are reported only briefly in this chapter and require further analysis.

Immigrants settling into a host country without key information-processing skills – in the language of the host country – face significant obstacles to integrating economically and socially into host countries. Indeed, the findings of the Survey of Adult Skills confirm that foreign-language immigrants have a clear disadvantage when it comes to having the information-processing skills needed to succeed in their host countries. The fact that immigrants, particularly those from foreign-language backgrounds, have low proficiency in the language of the assessment does not imply that they have poor proficiency in their mother tongue. In addition, in many non-English-speaking countries, there are often labour markets for highly skilled professionals (e.g. academia, business services) in which English is the language of professional communication. At the lower end of the skills spectrum, it is also possible that there are labour markets in which individuals can operate principally in their mother tongue.

The fact that foreign-language immigrants have lower proficiency in literacy, numeracy and problem solving in technology-rich environments in the language or languages of the receiving country than native-born adults is hardly surprising. The challenge for policy makers is to design policies and programmes that ensure that foreign-language immigrants either have an adequate knowledge of the language of the host country on entry to the country or can develop that knowledge effectively after entry. Several countries with points-based labour-migration schemes, such as Australia and Canada, give considerable weight to proficiency in their national languages. However, such requirements are neither possible in all countries nor necessarily desirable for all categories of immigrants. Greater selectivity, by emphasising language proficiency, may help to improve immigrants' proficiency. However, several countries face the compound challenge of having an immigrant population with very low average proficiency and large differences in proficiency between foreign-language migrants and native-born adults.

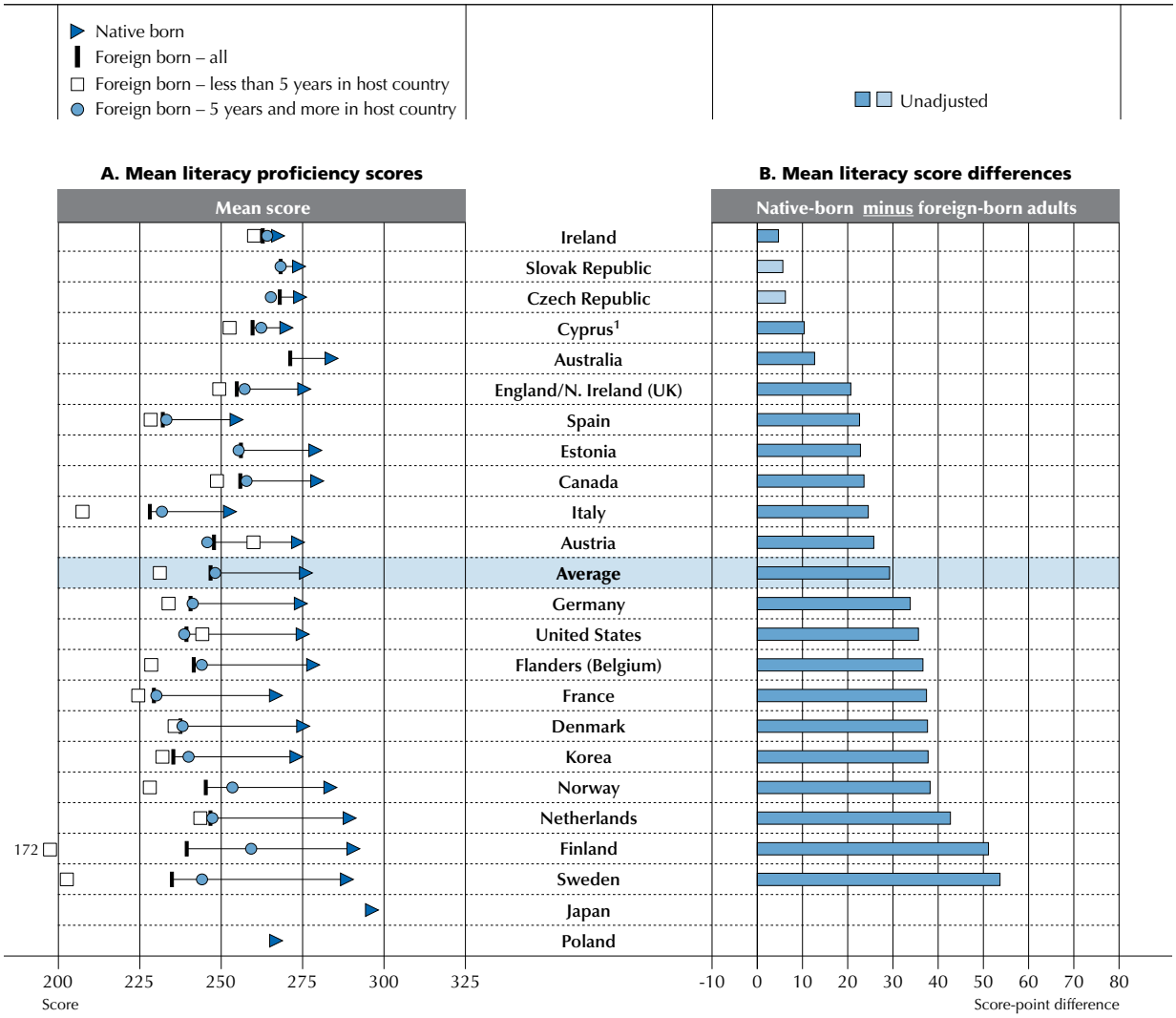
Proficiency in literacy among native- and foreign-born adults

On average across countries, foreign-born adults score lower than native-born adults on the literacy scale (Figure 3.14 [L]). Results are similar on the numeracy scale. The mean score for foreign-born adults is 247 points (Level 2) on the literacy scale, whereas for native-born adults it is 276 points (Level 3). But there is wide variation in the scores of foreign-born adults across countries. The mean proficiency of foreign-born adults is lowest in Italy (228 points), France (229 points), Spain (232 points), Sweden (235 points) and Korea (235 points). It is highest in Australia (271 points), Estonia (256 points) and Canada (256 points).

In most countries, the length of time that persons born abroad have been living in the host country makes a significant difference. This can be because integration into a new society takes time, because immigration policies change over the years, and/or because of changes in the number, countries-of-origin and original language of immigrants.

■ Figure 3.14 (L) ■

Differences in literacy proficiency scores between native- and foreign-born adults



1. See notes at the end of this chapter.

Notes: Statistically significant differences in Panel B are marked in a darker tone. Estimates based on a sample size less than 30 are not shown in Panels A and B. The differences between the two categories are unadjusted. No adjusted differences are provided for foreign-born and native-born adults since the adjusted model (see Table A3.1 [L]) is based on a variable combining immigrant background as well as language background. See Table A3.15 (L) for adjusted differences between foreign-born and foreign-language adults compared to native-born and native-language adults.

Countries are ranked in ascending order of difference in literacy scores (native-born minus foreign-born adults).

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.14 (L).

StatLink http://dx.doi.org/10.1787/888932901106

In most cases, adults who have lived less than five years in the host country score significantly lower than those who have lived in the host country for more than five years. Recent immigrants to Finland, Italy and Sweden score very low: at or near the bottom of Level 1, on average; but those who are more established within those countries have significantly higher scores. Difficulty in learning languages that are less common may play a role, but so may the availability and support for effective language courses that are designed for immigrants.

Across countries, the average difference in score between native- and foreign-born adults is about 29 points on the literacy scale. Differences across countries vary substantially. The largest differences in literacy proficiency are found in Sweden (54-point difference) and Finland (51-point difference), which appear to be a consequence of very low average scores among recent immigrants. The Netherlands (43-point difference) and Norway (38-point difference) follow. Denmark, Flanders (Belgium), Germany, Korea and the United States also show above-average differences in scores. Two countries with a comparatively low proportion of foreign-born adults – namely the Czech Republic and the Slovak Republic – show among the smallest score differences. Ireland also shows a small difference in scores, but this country has one of the highest proportions of foreign-born adults – although well over half of them reported that their native language is the same as or similar to the language of assessment in Ireland.

Proficiency in literacy among foreign-language immigrants

Differences in proficiency can also stem from adults' familiarity with, and ease in using, the language most widely used in society. Not all immigrants use a different language in their host country; more importantly, there are many native-born adults who either are second-generation immigrants or belong to a language minority, making it necessary to take into consideration their language background as well.

Not surprisingly, the survey reveals that the negative relationship between skills and foreign-language background is stronger than that between skills and foreign-born background (Figure 3.15 [L]). On average across countries, foreign-born adults who report having a native language, other than the language of assessment (i.e. foreign-language immigrants), score low on the literacy scale (240 points). On average across countries, about 7% of adults are foreign-born and did not learn the language of assessment as children; but this proportion ranges from very low in Japan and Poland to a high of about 17% in Canada (see Table B3.11 in Annex B). In contrast, native-born adults who report having a native language other than the language of assessment (i.e. second-generation immigrants or persons belonging to a language minority) score higher (264 points) than foreign-language immigrants, and closer to the average score of native-born adults who learned the language of assessment as a first or second language as a child (276 points). On average, about 2% of adults are included in this group, but 5% of adults in Canada and the Slovak Republic belong to this group. Depending on the country, native-born adults, who learned a foreign or minority language as a child, may be children of immigrants (i.e. second-generation immigrants) or children of parents from established but not necessarily recognised minority communities. The fact that they are native-born, and that most have probably lived in the country since birth, gives them a significant advantage over foreign-language immigrants.

Proficiency in problem solving in technology-rich environments among foreign-language immigrants

On average across countries, about 7% of adult populations are foreign-language immigrants (Figure 3.16 [P]). Of this group, about 18% score at Level 2 or higher and 82% score at or below Level 1, or did not show any proficiency either because they opted out of the computer based assessment, had no computer experience or failed the ICT core.[4]

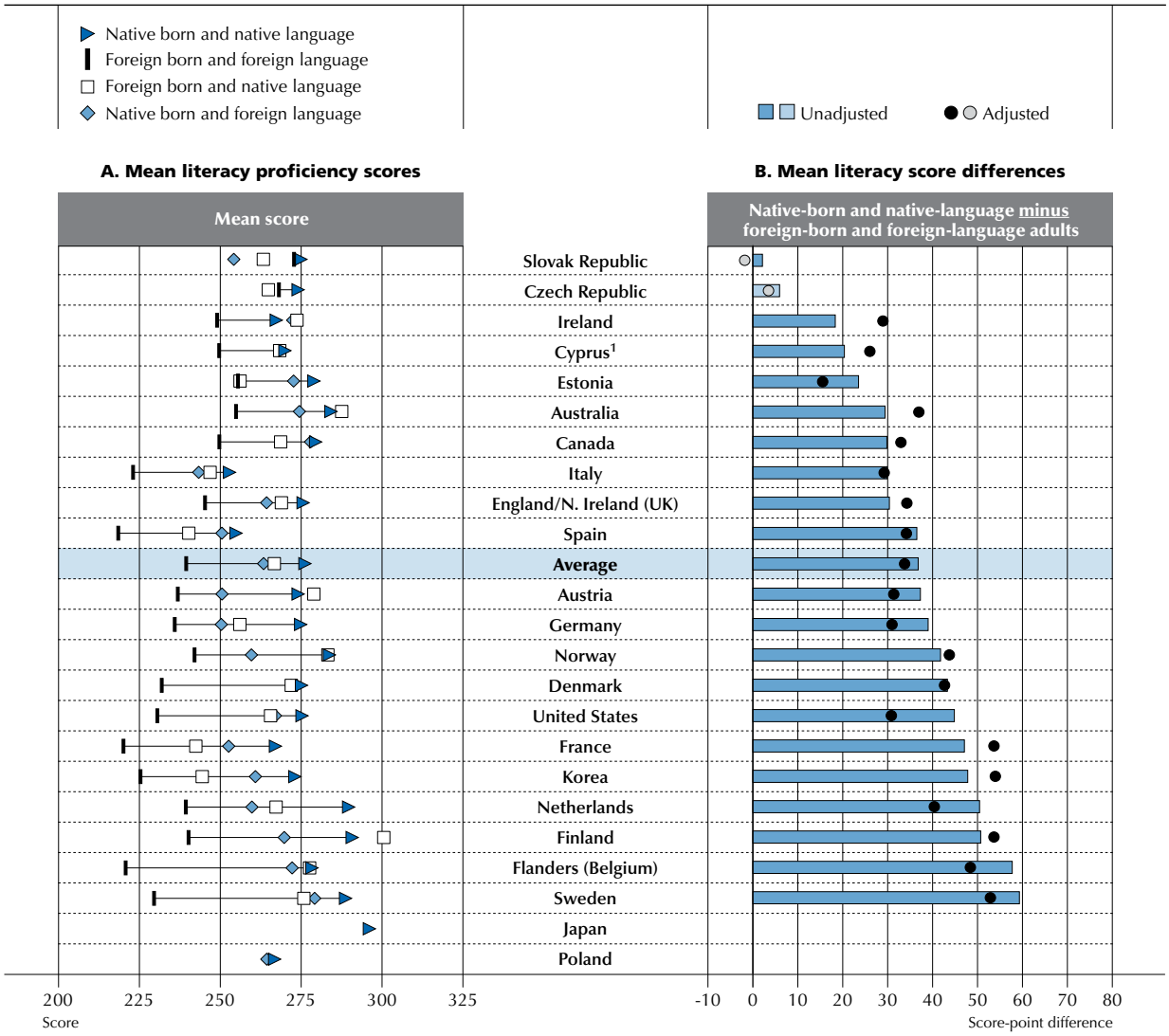
Among countries in which foreign-language immigrants exceed 10% of the population, Australia (25%), Canada (24%) and Norway (22%) feature among the largest proportions of foreign-language immigrants who score at Level 2 or higher.

In contrast, the United States (12%), Germany (13%) and Austria (14%) feature among the smallest proportions of foreign-language immigrants who score at Level 2 or higher. Denmark (18%) and Sweden (18%) also feature below-average proportions of foreign-language immigrants at Level 2 or higher.

In most countries, accounting for the influence of other characteristics has a relatively small impact on the size of the gap in proficiency between foreign-language migrants and their native-born counterparts. In most cases, net differences are smaller among the native-born. However, accounting for other factors increases the relative disadvantage of foreign-language immigrants, particularly in Australia and Ireland.

■ Figure 3.15 (L) ■

Differences in literacy proficiency scores, by immigrant and language background



1. See notes at the end of this chapter.

Notes: Statistically significant differences in Panel B are marked in a darker tone. Estimates based on a sample size less than 30 are not shown in Panels A and B. Unadjusted differences are the differences between the two means for each contrast category. Adjusted differences are based on a regression model and take account of differences associated with all of the following variables: age, gender, education, socio-economic background, and type of occupation. Only the score-point differences between two contrast categories are shown in Panel B, which is useful for showing the relative significance of an immigrant background vis-a-vis observed score-point differences. For more detailed regression results, including for each category of each variable included in the model, see Table B3.17 (L) in Annex B. Native language refers to whether the first or second language learned as a child is the same as the language of assessment, and not whether the language has official status. Foreign language refers to whether the first or second language learned as a child is not the same as the language of assessment. Thus in some cases, foreign language might refer to minority languages in which the assessment was not administered.

Countries are ranked in ascending order of the unadjusted difference in literacy scores (native-born and native-language minus foreign-born and foreign-language adults).

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.1 (L) and A3.15 (L).

StatLink http://dx.doi.org/10.1787/888932901125

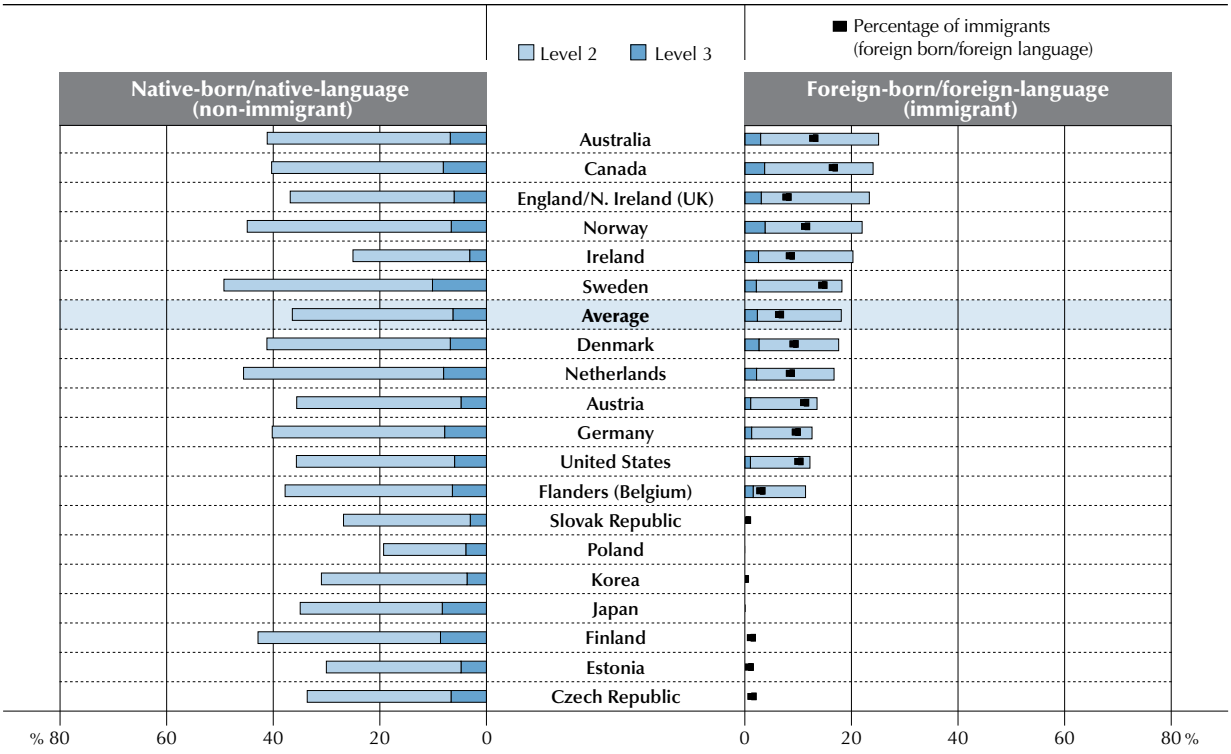
Cumulative disadvantage in key information-processing skills for foreign-language immigrants

Results presented in Figures 3.14 (L) and 3.15 (L) confirm that foreign-born and foreign-language adults have a clear disadvantage when it comes to having the key information-processing skills needed to succeed in daily life and in work situations involving the host country's language. Specifically, results show that foreign-language immigrants are more likely than non-immigrants to display lower proficiency.

■ Figure 3.16 (P) ■

Problem-solving proficiency among foreign-language immigrants and non-immigrants

Percentage of foreign-born/foreign-language (immigrants) and native-born/native-language (non-immigrants) adults scoring at Level 2 or 3 in problem solving in technology-rich environments



Notes: Estimates based on low sample sizes are not shown. Percentages on the problem solving in technology-rich environments scale are computed so that the sum of proportions for the following mutually exhaustive categories equals 100%: opted out of computer-based assessment; no computer experience; failed ICT core test; below Level 1, Level 1, Level 2 and Level 3. For more detailed results for each category, see corresponding tables mentioned in the source below. Native language refers to whether the first or second language learned as a child is the same as the language of assessment, and not whether the language has official status. Foreign language refers to whether the first or second language learned as a child is not the same as the language of assessment. Thus in some cases, foreign language might refer to minority languages in which the assessment was not administered.

Countries are ranked in descending order of the combined percentage of foreign-born/-language (immigrant) adults scoring at Levels 2 and 3.

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.16 (P) and B3.11 in Annex B.

StatLink http://dx.doi.org/10.1787/888932901144

Foreign-language immigrants with socio-economically disadvantaged backgrounds

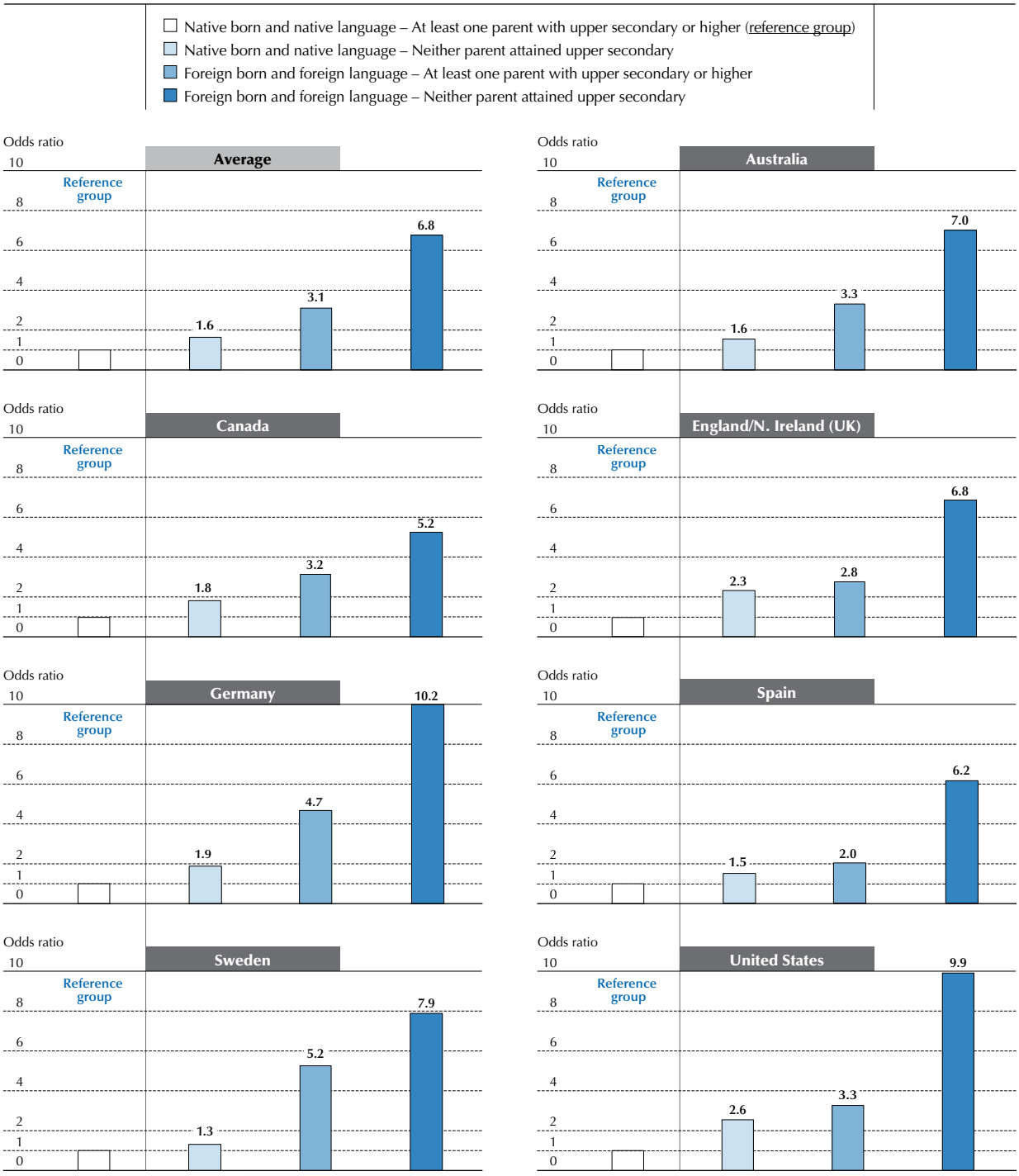
The problem is exacerbated for foreign-language immigrants (those who are foreign-born and did not learn the language of assessment as a child) who come from socio-economically disadvantaged backgrounds. Survey results show that, on average across countries, non-immigrants from disadvantaged backgrounds have about 1.5 times the odds of scoring at Level 2 or below on the literacy scale compared to non-immigrants from advantaged backgrounds (Figure 3.17a [L]). By comparison, a foreign-language immigrant from a disadvantaged background has nearly seven times the odds of scoring at that level compared to a non-immigrant from a more advantaged background. On average across countries, about 40% of foreign-language immigrants come from a socio-economically disadvantaged background; but this ranges from a very low proportion in countries with few immigrants to as high as 60% in Spain (see Table B3.12 in Annex B). Even if from more advantaged backgrounds, foreign-language immigrants still have higher odds of scoring at Level 2 than non-immigrants from disadvantaged backgrounds when compared to non-immigrants from advantaged backgrounds.

Country-by-country results for selected countries that participated in the survey and that have among the highest proportions of foreign-born adults reveal a similar pattern. Foreign-language immigrants from more advantaged backgrounds tend to be much less likely than immigrants from socio-economically disadvantaged backgrounds to have lower proficiency scores, but are more likely to score at lower levels than non-immigrants from disadvantaged backgrounds. This shows that even if they come from well-educated families, foreign-language immigrants often have limited chances to develop their information-processing skills in the local language.

■ Figure 3.17a (L) ■

Likelihood of lower literacy proficiency among foreign-born and foreign-language adults

Adjusted odds ratios of scoring at or below Level 2 in literacy, by immigrant, language and socio-economic background



1. See notes at the end of this chapter.

Notes: For more detailed results, see corresponding table mentioned in the source below. Odds ratios are adjusted for age, gender, education and type of occupation. Native language refers to whether the first or second language learned as a child is the same as the language of assessment, and not whether the language has official status. Foreign language refers to whether the first or second language learned as a child is not the same as the language of assessment. Thus in some cases, foreign language might refer to minority languages in which the assessment was not administered.

Only a sample of countries with a relatively high proportion of foreign-language immigrants are shown as an example. For the full set of countries, consult Figures 3.17b (L) and 3.17c (L) in the web package.

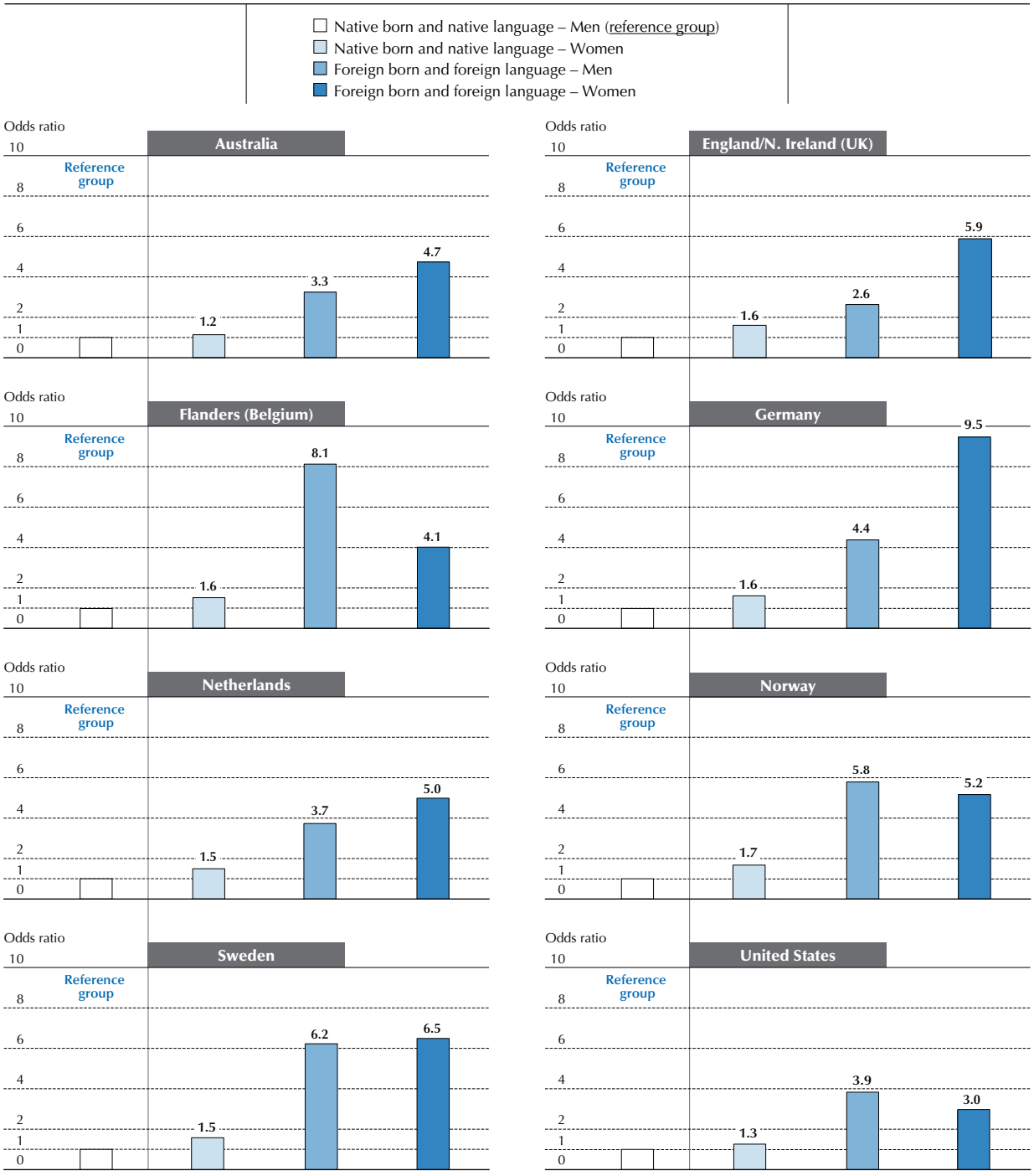
Source: Survey of Adult Skills (PIAAC) (2012), Table A3.17 (L).

StatLink http://dx.doi.org/10.1787/888932901163

■ Figure 3.18a (P) ■

Likelihood of lower problem-solving proficiency among foreign-born and foreign-language women

Adjusted odds ratios of scoring at or below Level 1, or receiving no score, in problem solving in technology-rich environments, by immigrant and language background, and gender



1. See notes at the end of this chapter.

Notes: For more detailed results, see corresponding table mentioned in the source below. Odds ratios are adjusted for age, education, socio-economic background, and type of occupation. Native language refers to whether the first or second language learned as a child is the same as the language of assessment, and not whether the language has official status. Foreign language refers to whether the first or second language learned as a child is not the same as the language of assessment. Thus in some cases, foreign language might refer to minority languages in which the assessment was not administered.

Only a sample of countries with a relatively high proportion of foreign-language immigrants are shown as an example. For the full set of countries, consult Figures 3.18b (P) and 3.18c (P) in the web package.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.18 (P).

StatLink http://dx.doi.org/10.1787/888932901182

Gender differences among foreign-language immigrants

Among the general adult population, gender differences in key information-processing skills are small, especially after accounting for educational qualifications. Survey results, presented in Tables A3.4 (L, N) in Annex A, confirm this. Distinguishing between immigrant and non-immigrant background reveals large differences, however. On average across countries, immigrant women who did not learn the language of assessment as children have about four times the odds of displaying no proficiency[4] or of scoring at or below Level 1 on the problem-solving scale compared to non-immigrant men (Figure 3.18a [P]). Immigrant men who did not learn the language of assessment as children are also more likely to display no proficiency or score at or below Level 1, but are less likely to do so than immigrant women with a similar language profile, on average. This pattern is particularly evident in Germany, is observed in Australia and England/Northern Ireland (UK), and is present, but weak, in the Netherlands and Sweden. In Flanders (Belgium), Norway and the United States, however, the situation is reversed: immigrant men are found to be more likely to display low or no proficiency on the problem solving in technology-rich environments scale compared to immigrant women who have a foreign-language background.

DIFFERENCES IN SKILLS PROFICIENCY RELATED TO OCCUPATION

In modern economies, a wide range of occupations, including traditional manual labour, requires the use of information-processing skills such as literacy, numeracy and problem solving in technology-rich environments. For example, car mechanics often use computers for diagnostics, and manufacturing processes rely heavily on computer numerical control (CNC) machines and require workers to be able to operate and programme them. Nevertheless, there are still many reasons why variations in skills proficiency are expected across occupations. Proficiency in the skills measured by the Survey of Adult Skills determines, to a greater or lesser extent, an individual's occupation. For example, adults aspiring to skilled occupations (e.g. engineer, dental assistant) typically need to have good literacy and numeracy skills to obtain their job and adequately perform the tasks involved. Conversely, low-skilled occupations (e.g. cleaner, mining labourer) do not necessarily require particularly high levels of proficiency in these skills. In addition, adults holding jobs in skilled occupations also tend to have higher educational attainment, which, in turn, is also associated with skills proficiency. At the same time, a person's job also influences how their skills evolve over their lifetime. Skilled occupations tend to provide more opportunities for using, thus maintaining and developing, literacy, numeracy and problem-solving skills. Conversely, adults in low-skilled occupations face a higher risk of losing those skills for lack of use. The Survey of Adult Skills provides insights into these complex relationships.

This section examines the differences in skills proficiency among adults who work in low- and high-skilled occupations. The extent of skills use in the workplace is discussed in Chapter 4, while the role of work in developing and maintaining information-processing skills over a lifetime is discussed in Chapter 5. The analysis distinguishes among skilled, semi-skilled and low-skilled occupations as follows: skilled occupations (e.g. legislators, senior officials and managers; professionals; technicians and associate professionals); semi-skilled white-collar occupations (e.g. clerks; service workers and shop and market sales workers); semi-skilled blue-collar occupations (e.g. skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers); and elementary occupations (e.g. labourers).

Differences in skills proficiency are clearly associated with differences in occupations, although in a small number of countries the mean score of semi-skilled blue-collar workers is the same as or lower than that of workers in elementary occupations. In some countries, adults in all occupational categories have relatively high scores. In the domain of literacy, for example, Finland and Japan clearly stand out in this respect.

At the broadest level, the findings confirm expectations. In a competitive labour market, it would be expected that adults with higher proficiency are allocated to more skilled jobs. This would also be true if there were an element of sorting on the basis of qualifications, as individuals with higher qualifications tend to have high levels of proficiency. At the same time, the aggregate picture may hide some level of mismatch between skills and job requirements. This is investigated in more depth in Chapter 4.

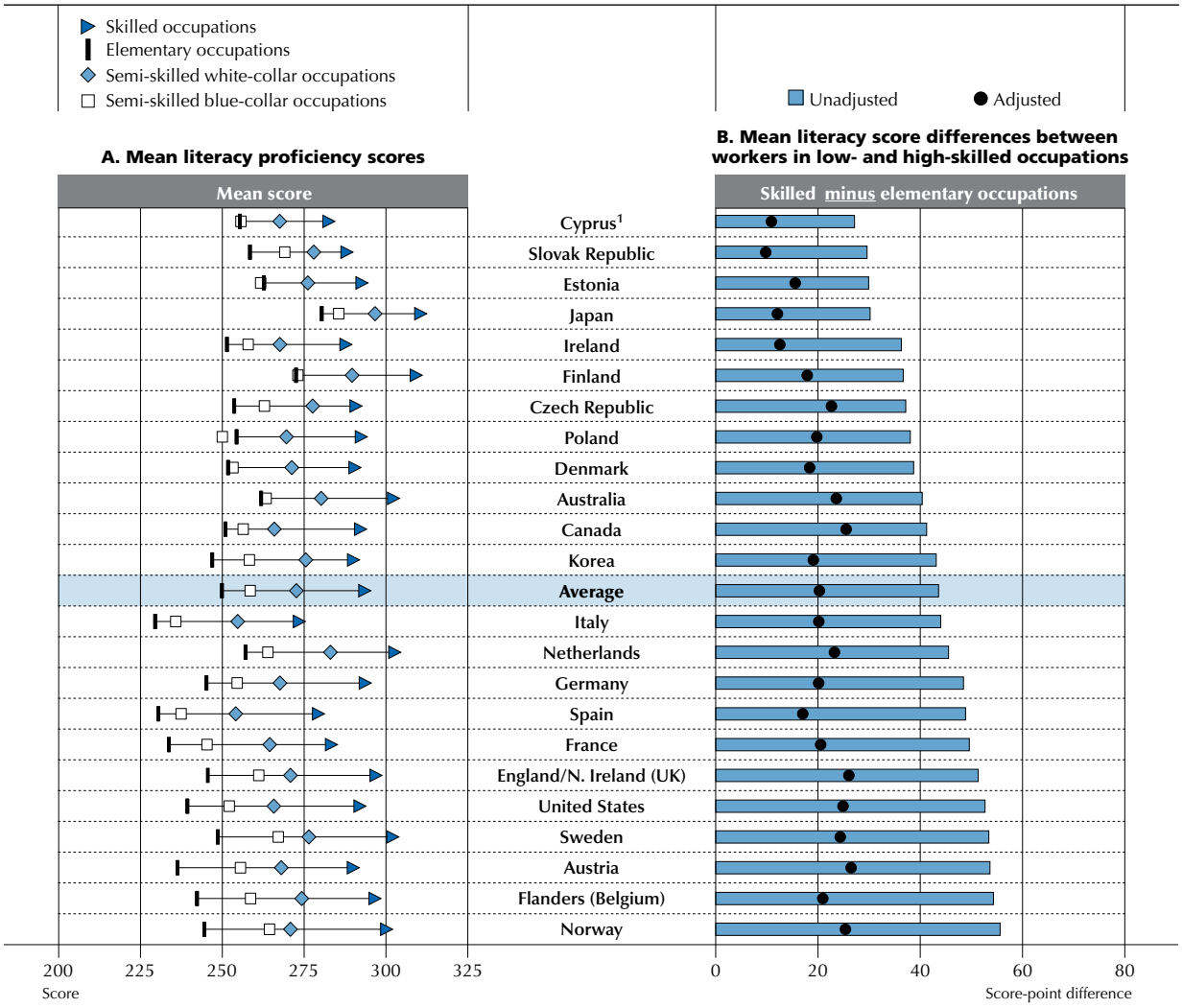
The particularly low levels of proficiency observed among workers in elementary occupations in a number of countries should be a cause for concern. Low levels of proficiency in information-processing skills may hamper the introduction of technological and organisational changes that could increase productivity, such as greater use of information technologies. In addition, lower proficiency in information-processing skills will place many of these workers at considerable risk in the event that they lose their jobs or have to assume new or different duties when new technologies, processes and work organisations are introduced (see Chapter 1).

Proficiency scores in literacy and numeracy among adults in low- and high-skilled occupations

Proficiency in information-processing skills is strongly associated with occupation. In all countries, adults in skilled occupations score higher, on average, than those in elementary occupations, in both literacy (Figure 3.19 [L]) and numeracy. In some countries, adults in all occupational categories have relatively high scores. The difference in literacy proficiency between adults in skilled and elementary occupations is largest in Norway (56 points), followed by Flanders (Belgium) and Austria (both 54 points), Sweden and the United States (both 53 points). The smallest difference can be observed in Estonia, Japan and the Slovak Republic (all 30 points). On average across countries, about 8% of adults are in elementary occupations; but this proportion ranges from a low of about 4% in Norway to a high of about 13% in Spain (see Table B3.14 in Annex B).

■ Figure 3.19 (L) ■

Occupation differences in literacy proficiency



1. See notes at the end of this chapter.

Notes: All differences in Panel B are statistically significant. Unadjusted differences are the differences between the two means for each contrast category. Adjusted differences are based on a regression model and take account of differences associated with all of the following variables: age, gender, education, immigration, language and socio-economic background. Only the score-point differences between two contrast categories are shown in Panel B, which is useful for showing the relative significance of occupation vis-a-vis observed score-point differences. For more detailed regression results, including for each category of each variable included in the model, see Table B3.17 (L) in Annex B. Includes adults aged 16-65 who worked during the previous five years. Skilled occupations include: legislators, senior officials and managers; professionals; technicians and associate professionals. Semi-skilled white-collar occupations include: clerks; service workers and shop and market sales workers. Semi-skilled blue-collar occupations include: skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers.

Countries are ranked in ascending order of the unadjusted difference in literacy scores (skilled minus elementary occupations).

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.1 (L) and A3.19 (L).

StatLink http://dx.doi.org/10.1787/888932901201

Using a more fine-grained classification of occupations reveals the following pattern: adults in skilled occupations score highest, followed by those in semi-skilled white-collar occupations, those in semi-skilled blue-collar occupations, and those in elementary occupations. However, in Denmark, Estonia, Finland and Poland, the mean score of adults in elementary occupations is close to or higher than that of adults in semi-skilled blue-collar occupations. In contrast, Austria, Flanders (Belgium) and Norway show the large score differences between these two groups in favour of adults working in semi-skilled blue-collar occupations.

On average across countries, adults in skilled occupations score higher on the literacy and numeracy scales than adults in semi-skilled white-collar occupations. Literacy proficiency differences are largest in Canada, England/Northern Ireland (UK), Norway and the United States. Japan stands out as a country with small score differences between occupational categories. It also features the highest mean score for all occupational categories.

After accounting for other socio-demographic factors, the magnitude of the difference in proficiency scores between adults working in skilled occupations and those working in elementary occupations is reduced by around one half. In other words, a large part of the difference in proficiency observed between adults in skilled occupations and those in elementary occupations is related to factors other than occupation – e.g. educational attainment or immigrant background. On average across countries, the gap in favour of adults working in skilled occupations falls from around 44 to 20 score points.

Proficiency in problem solving in technology-rich environments among adults in low- and high-skilled occupations

As expected, the proportion of adults scoring at Level 2 or 3 on the problem solving in technology-rich environments scale is higher among those in skilled occupations than among adults in elementary occupations (Figure 3.20 [P]). On average across countries, 50% of adults in skilled occupations score at Level 2 or 3, while 20% of adults in elementary occupations attain those levels of proficiency.

The share of adults in skilled occupations who score at Level 2 or 3 is largest in Sweden (61%), Norway and Finland (both 58%), and is smallest in Poland (33%), the Slovak Republic (39%) and Ireland (41%). For adults in elementary occupations the picture is similar: Finland (33%), Denmark (28%) and Sweden (28%) show the largest proportions of adults at Level 2 or 3, while the smallest proportions are observed in Austria (12%), Ireland (14%) and Flanders (Belgium) (14%). Only a small proportion of adults have Level 3 proficiency. Across countries, an average of 10% of adults in skilled occupations score at Level 3, with proportions ranging from about 5%-6% in Ireland, Korea and the Slovak Republic, to about 14%-16% in Finland, Japan and Sweden. Among adults working in elementary occupations, less than 3% of them score at Level 3, on average across countries, while in England/Northern Ireland (UK), Norway and the Slovak Republic, the proportion is close to one.

Cumulative disadvantage in key information-processing skills for adults in low- and semi-skilled occupations

Low- and semi-skilled workers and low- and semi-skilled occupations are a source of concern among policy makers, as economic growth and competitiveness are becoming increasingly dependent on the supply of, and demand for, higher levels of skills. Nearly all employment projections predict growing prospects for those with high levels of skills and declining prospects for those without sufficient skills.

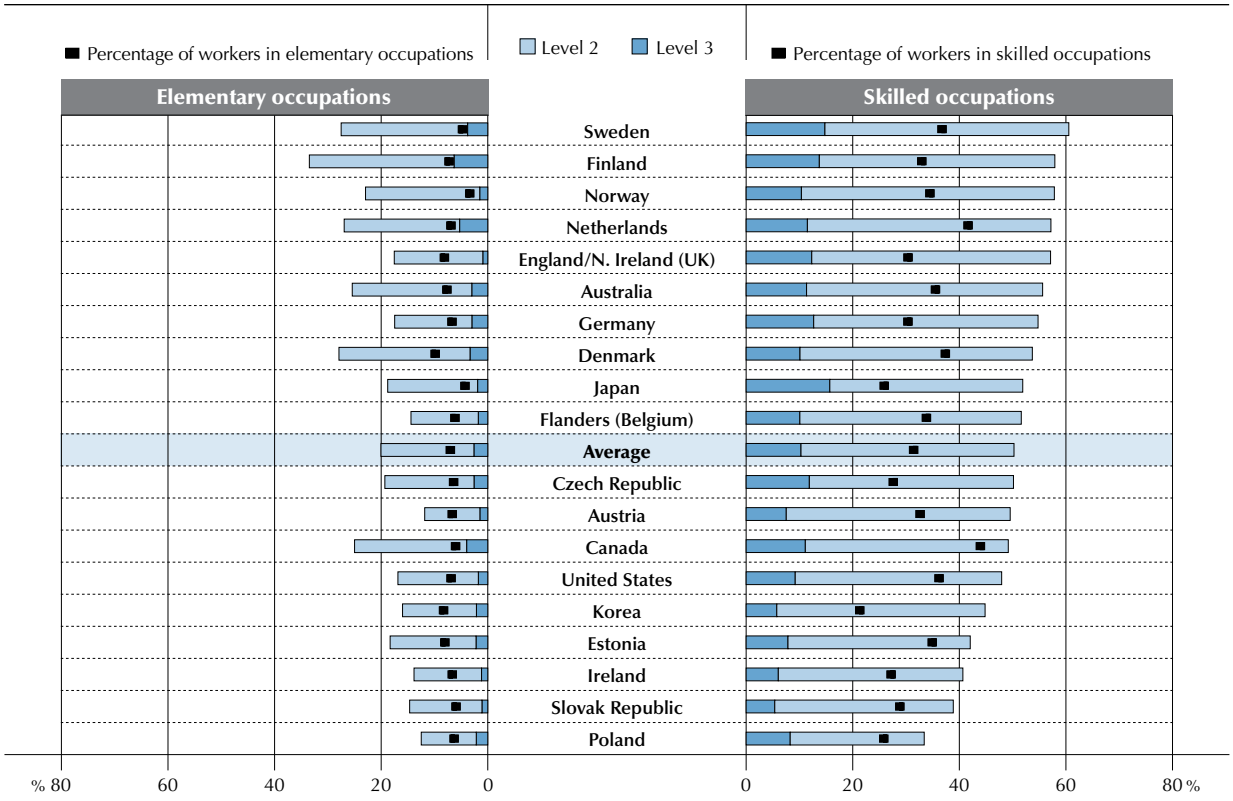
Adults in low- and semi-skilled occupations who have low levels of education

Not all adults in low-skilled occupations have low levels of education or score at lower levels of proficiency in the skills directly assessed in the Survey of Adult Skills (see Chapter 4 for a discussion of skills mismatch). However, workers in low- and semi-skilled occupations who have not completed upper secondary education face a high risk of scoring at lower levels of proficiency in key information-processing skills – skills that are believed to be growing in importance not only for the economy but for all society (see Chapter 1). The proportion of workers with this latter profile ranges from about 8% in the Czech Republic and Japan to about 30%-32% in Italy and Spain (see Table B3.15 in Annex B). On average across countries, these workers have over six times the odds of scoring at lower levels of proficiency on the literacy scale than workers in skilled occupations who completed upper secondary education (Figure 3.21 [L]). The increased odds for this group vary from highs of 10 times higher in Canada, over eight times higher in the United States, and nearly eight times higher in Germany, to lows of just over four times higher in other OECD countries.

■ Figure 3.20 (P) ■

Problem-solving proficiency among workers in skilled and elementary occupations

Percentage of workers in skilled and elementary occupations who score at Level 2 or 3 in problem solving in technology-rich environments



Notes: Percentages on the problem solving in technology-rich environments scale are computed so that the sum of proportions for the following mutually exhaustive categories equals 100%: opted out of the computer-based assessment; no computer experience; failed ICT core test; below Level 1, Level 1, Level 2 and Level 3. For more detailed results for each category, see corresponding tables mentioned in the source below. Includes adults aged 16-65 who worked during the previous five years. Skilled occupations include: legislators, senior officials and managers; professionals; technicians and associate professionals.

Countries are ranked in descending order of the combined percentage of adults who worked during the previous five years in skilled occupations scoring at Level 2 and 3.

Source: Survey of Adult Skills (PIAAC) (2012), Tables A3.20 (P) and B3.14 in Annex B.

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Workers in the same low- and semi-skilled occupations but who have completed upper secondary education also face a high risk, but not as high. These workers have about 2.5 times the odds of scoring at lower levels of proficiency on the literacy scale than workers in skilled occupations who also completed upper secondary education. The increased odds for this group are near or over three times higher in Canada, Flanders (Belgium), Germany, Norway, Sweden and the United States, indicating that an upper secondary education is not enough to secure proficiency at Level 3 or higher on the literacy scale. Adults need continuous opportunities to maintain and develop the literacy skills they may have acquired during school, including as part of their everyday work tasks.

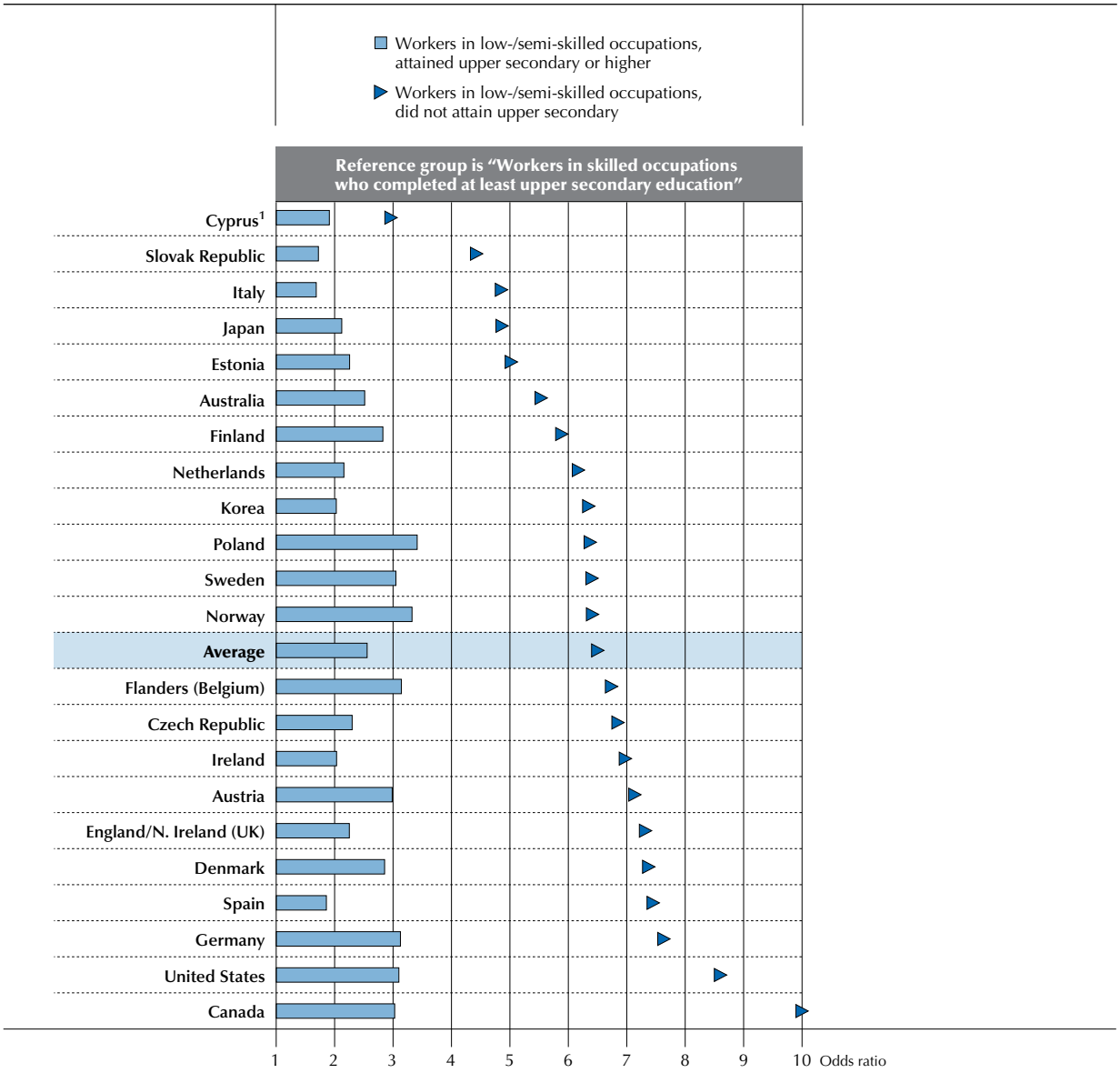
Older men and women in low- and semi-skilled occupations

Older workers in general are at a higher risk of scoring at lower levels of proficiency in key information-processing skills; but there is a clear distinction between older workers in skilled occupations and those in low- and semi-skilled occupations (i.e. workers in traditional low-skilled services and goods manufacturing). Older men and women aged 45-65 in low- and semi-skilled occupations have, on average, over eight times the odds of displaying no proficiency[4] or of scoring at or below Level 1 on the problem solving in technology-rich environments scale than adults the same age who work in skilled occupations (Figure 3.22 [P]). The increased odds for the former group compared to the reference group range between 10 and 14 times higher in Austria, Denmark, Estonia, Finland, Germany, Korea and Sweden.

■ Figure 3.21 (L) ■

Likelihood of lower literacy proficiency among adults in low-/semi-skilled occupations

Adjusted odds ratios of scoring at or below Level 2 in literacy, by educational attainment and type of occupation



1. See notes at the end of this chapter.

Notes: Estimates based on a sample size less than 30 or are not statistically different from the reference group are not shown. For more detailed results, see corresponding table mentioned in the source below. Odds ratios are adjusted for age, gender, and socio-economic, immigrant and language background. Includes adults aged 16-65 who worked during the previous five years. Skilled occupations include: legislators, senior officials and managers; professional; technicians and associate professionals. Low-/semi-skilled occupations include: clerks; service workers and shop and market sales workers; skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers; elementary occupations.

Countries are ranked in ascending order of the odds ratios of workers scoring at or below proficiency Level 2 when they are in low/semi-skilled occupations and did not complete upper secondary education.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.21 (L).

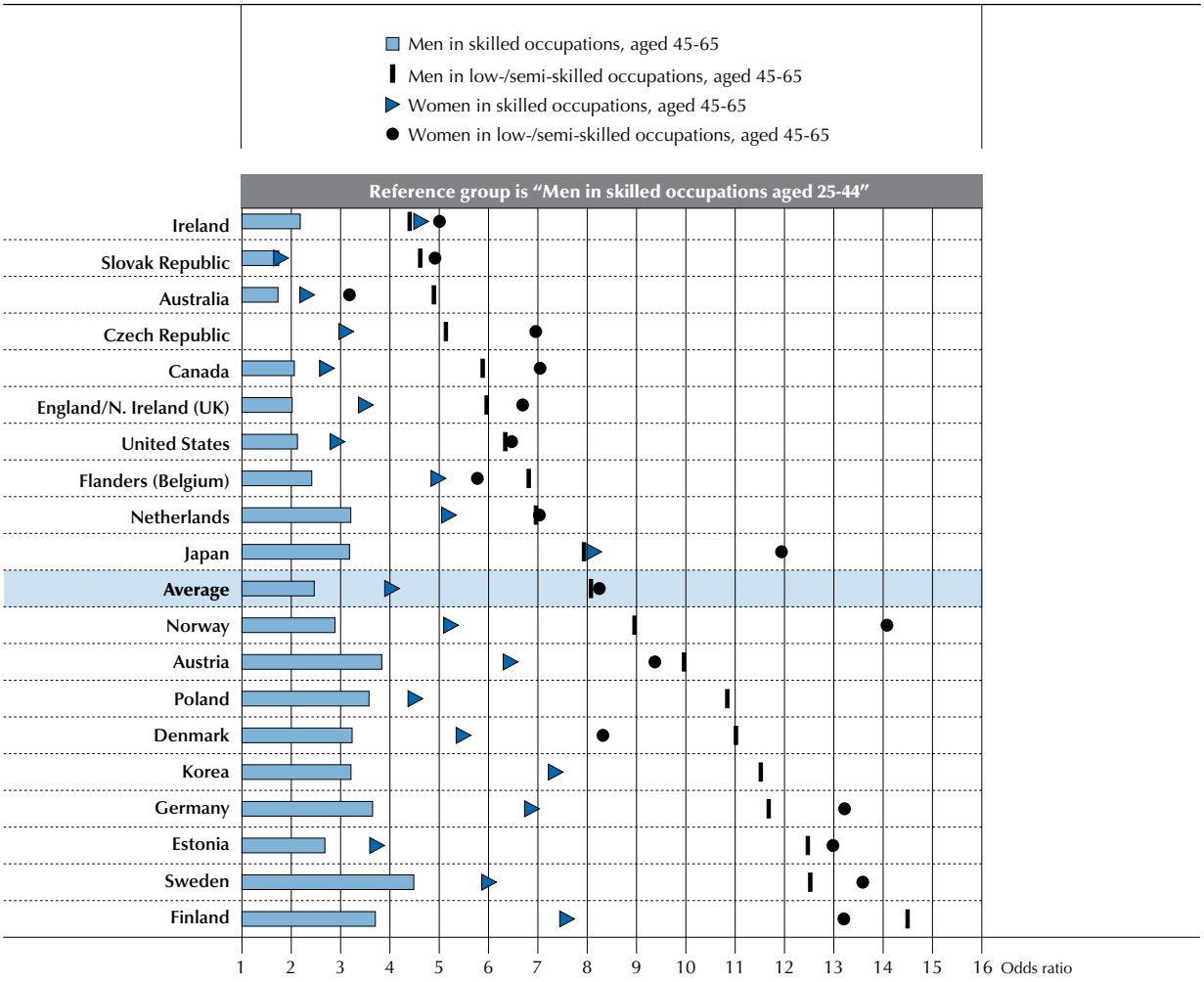
StatLink http://dx.doi.org/10.1787/888932901239

Even if employed in skilled occupations, older women are more likely to have lower scores on the problem solving in technology-rich environments scale than men with the same profile. On average across countries, these women have about four times the odds of scoring at lower levels of proficiency than younger workers in skilled occupations; in Finland, Germany, Japan and Korea, the odds are around seven times higher or more.

■ Figure 3.22 (P) ■

Likelihood of lower problem-solving proficiency among older adults in low-/semi-skilled occupations

Adjusted odds ratios of scoring at or below Level 1, or receiving no score, in problem solving in technology-rich environments, by age, gender and type of occupation



Notes: Estimates based on a sample size less than 30 or are not statistically different from the reference group are not shown. For more detailed results, see corresponding table mentioned in the source below. Odds ratios are adjusted for education, and socio-economic, immigrant and language background. Includes adults aged 16-65 who worked during the previous five years. Skilled occupations include: legislators, senior officials and managers; professional; technicians and associate professionals. Low-/semi-skilled occupations include: clerks; service workers and shop and market sales workers; skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers; elementary occupations.
Countries are ranked in ascending order of the odds ratios of men aged 45-65 scoring at or below proficiency Level 2 when they are in low-/semi-skilled occupations.

Source: Survey of Adult Skills (PIAAC) (2012), Table A3.22 (P).

StatLink http://dx.doi.org/10.1787/888932901258

SUMMARY

Educational attainment has a strong positive relationship to proficiency. Adults with tertiary-level qualifications have a 36 score-point advantage on the literacy scale, on average, over adults who have completed less than a full secondary education, after other characteristics have been taken into account. This is both expected and desired. Adults who have completed tertiary education will have spent longer in education and received higher levels of instruction than their less-qualified peers. Due to the processes of selection through which access to higher levels of education is determined, adults with higher levels of qualifications are also likely to be those who generally have greater ability and interest in and motivation for study. In addition, completing higher levels of education often provides access to jobs that involve higher levels of further learning and information-processing tasks.

The issue for policy makers is not so much the gap between the proficiency level of highly qualified adults and that of adults with few qualifications as the evidence that adults with low levels of education perform very poorly in some countries. There are a number of countries (Canada, England/Northern Ireland [UK], Ireland, Italy, Spain and the United States) in which adults with low levels of educational attainment have average proficiency scores at the bottom end of Level 2 on the literacy and numeracy scales. The risk is that a combination of poor initial education and lack of opportunities to further develop proficiency becomes a vicious cycle, in which poor proficiency leads to fewer opportunities and vice versa.

Being an immigrant with a foreign-language background is associated with significantly poorer proficiency in literacy, numeracy and problem solving in technology-rich environments than being a native-born whose first or second language learned as a child was the same as the language of assessment, even when other factors are taken into account. Again, this is not surprising. However in some countries, the time since arrival appears to make little difference to proficiency, suggesting either that the incentives to learn the language of the host country are not strong, or that policies encouraging learning the language of that country are not particularly effective. Foreign-language immigrants who have low levels of education are particularly at risk: when low educational attainment is combined with poor proficiency in the language of the country of residence, integration into the labour market and society becomes even more difficult.

While older adults generally have lower proficiency than their younger counterparts, the extent of the gap between generations varies considerably among countries. This suggests that differences in proficiency related to age are a function of many factors in addition to biology. These include the quality of the initial education and the opportunities to undertake further training or to engage in practices that help to maintain and develop proficiency over a lifetime. Governments cannot change the past; however, policies designed to provide high-quality initial education and ongoing opportunities for learning can go part of the way towards ensuring that the older adults of the future maintain their skills.

The children of parents with low levels of education have lower proficiency than those whose parents have higher levels of education, after taking other factors into account. This mirrors the findings of other adult literacy surveys and studies of students, such as PISA. Initial, compulsory education should do as much as possible to ensure that school-leavers have the skills necessary to be successful in modern societies.

As expected, differences in skills proficiency are associated with occupation. Other things being equal, workers in skilled occupations have higher proficiency than those in elementary occupations. In a competitive labour market, adults with higher proficiency should be allocated to more skilled jobs. This would also be true if there were an element of sorting on the basis of qualifications, as individuals with higher qualifications tend to have higher levels of proficiency.

Nevertheless, policy makers in a number of countries should be concerned about the particularly low levels of proficiency observed among workers in elementary occupations. Low levels of proficiency in information-processing skills among workers may hamper the introduction of changes in technologies and organisational structures that can improve productivity. Low proficiency in information-processing skills may also place workers at considerable risk in the event that they lose their jobs or have to take on new or different duties when new technologies, processes and forms of work organisation are introduced. Enterprises and governments, then, should invest in workplace-based literacy and numeracy programmes, and in training more generally, and develop forms of work organisation that allow all workers to engage, to a greater or lesser degree, in text-processing tasks.

There is little variation between men and women in proficiency, although men show a small advantage in all three domains. On average, men have higher scores in numeracy and problem solving in technology-rich environments than women, but the gap is not large and is further reduced when other characteristics are taken into account. In literacy, the gap in favour of men is narrower. In half the countries surveyed, there is no difference between young men and young women in their proficiency in numeracy, and they are equally proficient in literacy, with young women slightly more proficient in some cases.

Notes

1. A thematic report is planned for 2014 to provide additional detailed analyses of results on the problem solving in technology-rich environments scale.

2. Information on the occupation of parents was collected in some countries. Thus, in the analysis of the full sample, socio-economic background is proxied by parental education only. Socio-economic background is a difficult concept to measure. While there is much socio-economic background information that is not captured in the Survey of Adult Skills (e.g. income, wealth, and occupation of parents), parents' educational background is one of the most important proxies for socio-economic background since education is an important predictor of income, wealth and occupation.

3. For the purposes of the analysis presented in this report, native language refers to whether the first or second language learned as a child is the same as the language of assessment, and not whether the language has official status. Foreign language refers to whether the first or second language learned as a child is not the same as the language of assessment. Thus in some cases, foreign language might refer to minority languages in which the assessment was not administered.

4. Adults who opted out of the computer based assessment, had no computer experience or who failed the ICT core test did not receive a proficiency score on the problem solving in technology-rich environments scale.

Notes regarding Cyprus

Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

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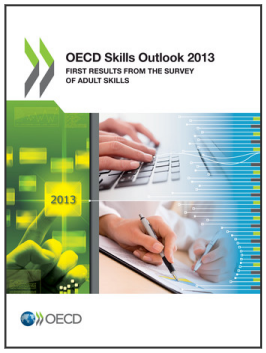

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