4

How skills are used in the workplace

This chapter examines the use of information-processing skills at work and in everyday life, and the relationship between the use of skills and wages, job satisfaction and economy-wide productivity. It also explores the factors associated with greater or lesser use of these skills in the workplace, including proficiency, the characteristics of workers and the features of their jobs.

A note regarding Israel

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Having a skilled workforce is not enough to achieve growth and raise productivity. For countries to grow and individuals to thrive in the labour market, skills must be put to productive use at work. The Survey of Adult Skills, a product of the OECD Programme for the International Assessment of Adult Competencies (PIAAC), provides insights into how frequently information-processing skills are used in the workplace and how frequently they are used in daily life.

Skills use at work can be defined as the level of skills that is observed in a worker's current job within a given skills domain. This definition is rooted in sociological theory that distinguishes between "own skills" (the skills that individuals have) and "job skills" (skills as defined by jobs). In fact, skills use is affected by both the extent to which workers are motivated to use their skills in the workplace – which in turn may depend on the incentives they are offered and on their own innate motivation – and by the skills required to carry out the specific job.

The background questionnaire of the Survey of Adult Skills asks about the frequency with which individuals carry out a number of skills-related tasks in the context of their job and in their private life. This task-based approach to measuring skills use – the so-called job requirement approach (JRA) – ensures that the resulting indicators are as unbiased as possible by the actual skills held by the respondents.

The background questionnaire also elicits information from respondents on the way work is organised and jobs are designed and on the management practices adopted by the firm. This information can be used to identify the type of environments that are associated with more frequent skills use in the workplace.[1]

Among the main findings discussed in the chapter:

- Writing and problem solving are the skills most frequently used at work. Reading skills follow close behind while numeracy and ICT skills are least used.
- Among Round-2 countries/economies, New Zealand stands out as the one whose adults use almost all measured information-processing skills the most frequently at work, along with Australia and the United States from Round 1. Singapore also stands out as a country whose adults use their skills frequently at work, particularly ICT skills. In Slovenia, the use of most information-processing skills is close to the average and, unsurprisingly, close to some other Eastern European countries, such as the Czech Republic, Estonia and the Slovak Republic. In addition, workers in Slovenia are among those who use their writing skills at work the most frequently. In all other Round-2 countries/economies once occupation and firm characteristers are taken into account, the use of information-processing skills at work is well below average and close to the bottom of the scale.
- There appears to be a strong link between skills use at work and in everyday life, suggesting that the same adults' socio-demographic characteristics and personal dispositions play a role in defining their level of engagement with literacy, numeracy and ICT in both their personal and work environments.
- Skills-use indicators do not mirror measures of skills proficiency, as countries rank differently on the two dimensions of skills proficiency and skills use. Proficiency accounts for only about 5% of the variation in adults' use of numeracy skills at work across participating OECD countries once occupation and firm characteristics are taken into account; it accounts for less of the variation in the use of reading or writing at the workplace. Put differently, the distribution of skills use among workers with different levels of proficiency overlap substantially. While the median use of both literacy and numeracy skills increases consistently as levels of proficiency increase, it is not uncommon that more proficient workers use their skills at work less intensively than less proficient workers do. Skills use is a strong predictor of productivity.
- In all the countries and economies covered in the Survey of Adult Skills, differences in skills use between socio-demographic groups are strongly associated with the type of jobs held by workers.
- High-Performance Work Practices – including work organisation and management practices – are positively related to the use of information-processing skills at work. They account for between 14% and 27% of the variation in skills use across individuals. The way work is organised – the extent of team work, autonomy, task discretion, mentoring, job rotation and applying new learning – influences the degree of internal flexibility to adapt job tasks to the skills of new hires. Some management practices – bonus pay, training provision and flexibility in working hours – provide incentives for workers to use their skills at work more fully.

This chapter begins with a picture of how frequently information-processing skills are used in the workplace. It then compares skills use at work with skills use in everyday life and goes on to examine key factors related to skills use at work, such as workers' socio-demographic traits and the characteristics of jobs and firms.

MEASURING SKILLS USE IN THE WORKPLACE AND IN EVERYDAY LIFE

The Survey of Adult Skills (PIAAC) includes detailed questions about the frequency with which respondents perform specific tasks in their jobs and in everyday life. Based on this information, the survey measures the use of information-processing skills – reading, writing, numeracy, ICT and problem solving – which can be related to those measured in the direct assessment.

However, although there are some parallels between the skills included in the direct assessment – literacy, numeracy and problem solving in technology-rich environments – and the use of reading, numeracy, problem-solving and ICT skills at work and in everyday life, there are important differences. For instance, while information about the frequency of writing tasks is available in the background questionnaire, writing skills are not tested in the survey's direct assessment. Similarly, questions about the use of problem-solving and ICT skills at work are not to be confused with the assessment of proficiency in problem solving in technology-rich environments. Even when there is a parallel between skills use and skills proficiency – notably between the use of reading skills and literacy proficiency, and between the use of numeracy skills and proficiency – there is no direct correspondence between the questions about the tasks performed at work (or in everyday life) and those asked in the survey's direct assessment of skills. In light of these differences, the term "skills use" should not be interpreted as necessarily referring to the use of skills that are measured in the survey's direct assessment, but rather as the use of information-processing skills more generally.

Given the large amount of information collected in the background questionnaire, it is helpful to construct indices that group together tasks associated with the use of similar information-processing skills. Five indicators were created (see Table 4.1) referring to the use of reading, writing, numeracy, ICT skills and problem solving at work. Following the same procedure, indicators of the use of reading, writing, numeracy and ICT in everyday life were also constructed.[2]

Box 4.1 lists the individual items associated with each of the skills-use indicators. For example, the reading and writing indices are derived from a large set of questions concerning the frequency with which several types of documents (directions, instructions, memos, e-mails, articles, manuals, books, invoices, bills and forms) are read or written during one's regular work activity. Higher values on the indices correspond to more frequent use of literacy skills.

Box 4.1 Measuring the use of information-processing skills in the Survey of Adult Skills

The Survey of Adult Skills elicits information on the use of a number of information-processing skills at work and in everyday life. These include reading, writing, numeracy, ICT and problem solving. Rather than asking workers directly about how frequently and in what context they use their skills, the survey enquires about the frequency with which tasks relevant to each skill are carried out (a complete list is provided in Table 4.1).

Table 4.1 Indicators of skills use at work and in everyday life

		Skills put to use at work	Group of tasks measured in the survey
Skills use at work	Skills use in everyday life	**Reading**	Reading documents (directions, instructions, letters, memos, e-mails, articles, books, manuals, bills, invoices, diagrams, maps)
		Writing	Writing documents (letters, memos, e-mails, articles, reports, forms)
		Numeracy	Calculating prices, costs or budgets; using fractions, decimals or percentages; using calculators; preparing graphs or tables; using algebra or formulas; using advanced mathematics or statistics (calculus, trigonometry, regressions)
		ICT skills	Using e-mail, Internet, spreadsheets, word processors, programming languages; conducting transactions on line; participating in online discussions (conferences, chats)
	n.a.	**Problem solving**	Facing hard problems (at least 30 minutes of thinking to find a solution)

Frequency is measured as follows: a value of 1 indicates that the task is never carried out; a value of 2 indicates that it is carried out less than once a month; a value of 3 indicates that it is carried less than once a week but at least once a month; a value of 4 indicates that it is carried out at least once a week but not every day; and a value of 5 indicates that it is carried out every day.

...

For most skills-use domains, information is collected for a large number of tasks, improving the reliability of the derived variable. The only exception is problem-solving skills, the use of which is measured through a single question that asks: "How often are you usually confronted with more complex problems that take at least 30 minutes to find a good solution?" Thus, indices are constructed for reading, writing, numeracy and ICT skills use and used as such in the analyses. Respondents' answer to the question on problem-solving skills use is included directly the analyses.

The composite variables – those derived from multiple task-related questions – are constructed using sum scales. Cronbach's Alpha, a statistical technique, is used to ensure that the items used to derive each skills-use composite variable are grouped appropriately. The resulting scale for these variables is semi-continuous and ranges from 1 to 5 as is the case for the underlying items: a value close to 1 indicates that the person does not use that particular skill at work while a value close to 5 suggests that the person uses the skill every day.

Questions concerning ICT-related tasks at work are only asked of adults who reported using a computer at work; thus few adults reported "never" using their ICT skills at work. In order to ensure comparability with the other skills-use scales, adults who reported that they do not use a computer at work are assigned to "never" carrying out ICT-related tasks at work.

Because all indices are expressed on the same scale ranging from 1 to 5, numerical comparisons between countries/economies and indicators are possible. Nevertheless, some comparisons may not be conceptually meaningful. For instance, the appropriate frequency of use of reading skills may not be the same as the frequency with which workers are required to solve complex problems. One additional concern is that the semi-continuous indices of skills use created for this chapter and used in related publications (OECD, 2016a; Quintini, 2014) implicitly assume that the distance between values is linear and equivalent. For instance, the distance between "never carried out" (value of 1) and "less than once a month" (value of 2) is the same as the distance between "at least once a week" (value of 4) and "every day" (value of 5). This is a strong assumption, and it could have implications when using skills use in regression analysis. The *First Results from the Survey of Adult Skills* (OECD, 2013) shows that results are similar when focusing on the share of workers who use each skill – i.e. carry out each set of tasks – frequently.

Sources:
OECD (2016a), *OECD Employment Outlook 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/empl_outlook-2016-en.
OECD (2013), *OECD Skills Outlook 2013: First Results from the Survey of Adult Skills*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264204256-en.
Quintini, G. (2014), "Skills at work: How skills and their use matter in the labour market", *OECD Social, Employment and Migration Working Papers*, No. 158, OECD Publishing, Paris, http://dx.doi.org/10.1787/5jz44fdfjm7j-en.

LEVELS OF SKILLS USE IN THE WORKPLACE AND IN EVERYDAY LIFE

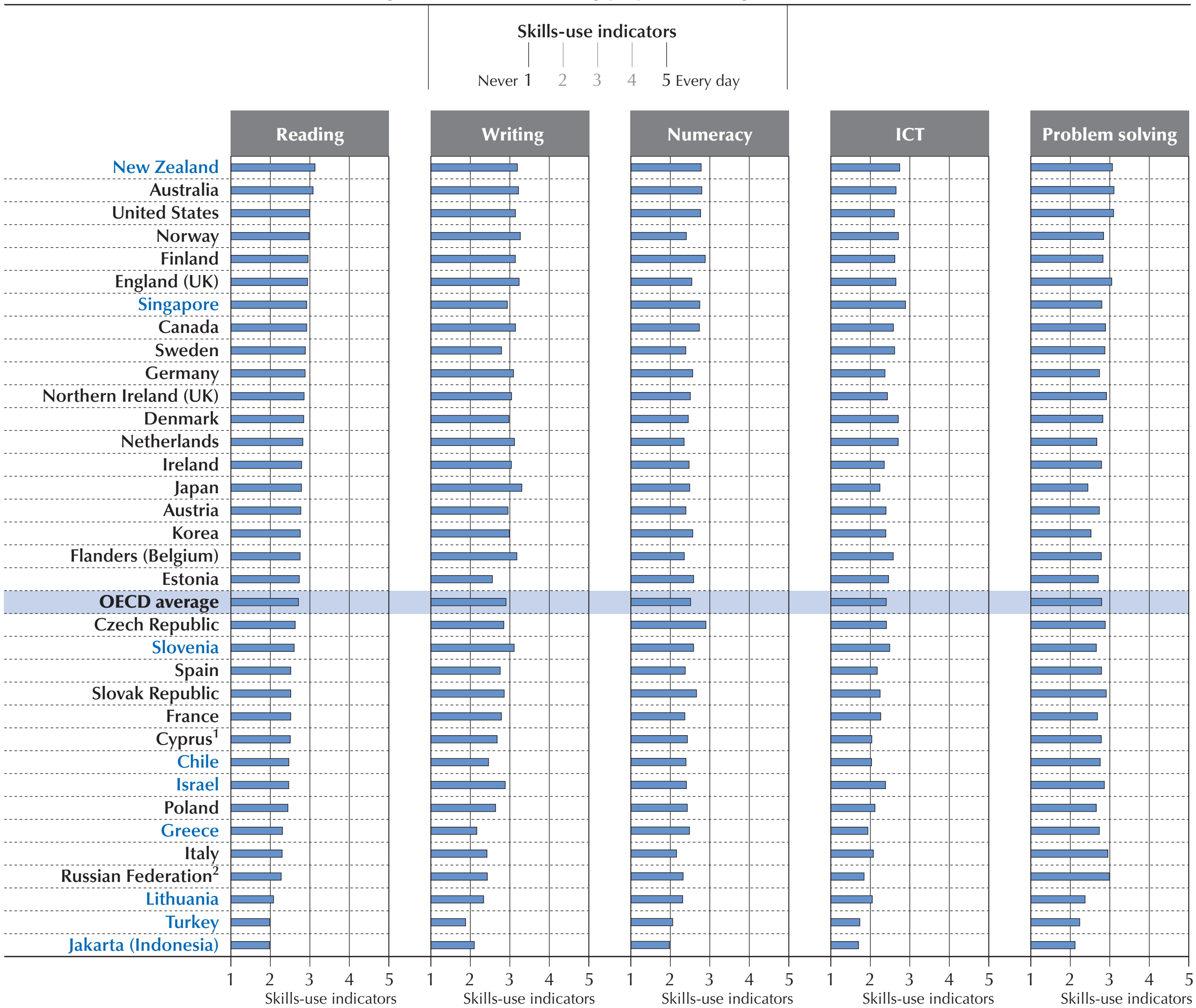
On average across countries, the skills most frequently used at work are writing and problem solving. In both cases, the average-use indicator has a value close to three. Reading skills at work follows close behind, while numeracy and ICT are the least frequently used, with an index value closer to two (Figure 4.1).

New Zealand stands out as the country where adults use almost all information-processing skills the most frequently, along with Australia and the United States.[3] Among Round-2 countries/economies, Singapore also stands out with relatively high skills use in all five domains; and it has the most frequent use of ICT skills at work among all participating countries and economies. In Slovenia, the use of most information-processing skills is close to the OECD average and, unsurprisingly, close to some other Eastern European countries, such as the Czech Republic, Estonia and the Slovak Republic. In addition, Slovenian workers are among those who use their writing skills at work the most frequently. In all other Round-2 countries/economies, the use of information-processing skills at work is well below average and close to the bottom of the scale.

Across countries and economies, writing and numeracy skills are used less frequently in everyday life than in the workplace (Figure 4.2). In most cases, country/economy rankings of skills use in everyday life are similar to those presented for skills use at work. New Zealand ranks highest in using information-processing skills most frequently in everyday life, Slovenia ranks close to the average and most other Round-2 countries/economies are close to the bottom, well below the average. An exception is Singapore, which ranks just below the average for skills use in everyday life, compared to a fairly frequent use of information-processing skills in the workplace.

Figure 4.1 ■ **Information-processing skills used at work**

Average skills use, working population aged 16 to 65



Note: For reading, writing, numeracy and ICT skills, skills-use indicators are scaled between 1 "Never" and 5 "Every day". Problem-solving skills use refers to respondents' answers to "How often are you usually confronted with more complex problems that take at least 30 minutes to find a good solution?". The set of possible answers also ranges between 1 "Never" and 5 "Every day".

1. *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.

2. See note at the end of this chapter.

Countries and economies are ranked in descending order of the average use of reading skills at work.

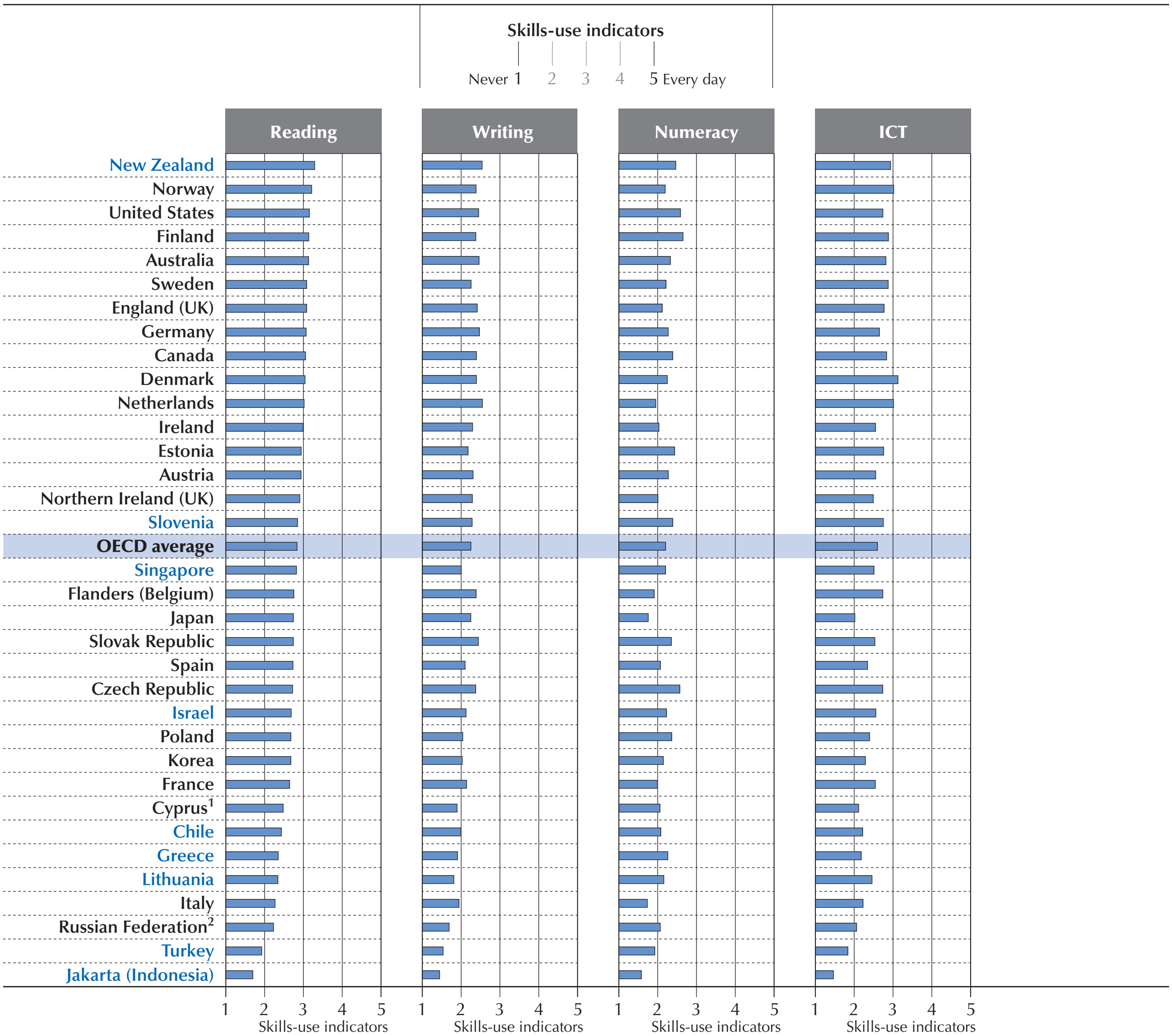
Source: Survey of Adult Skills (PIAAC) (2012, 2015), Table A4.1.

StatLink http://dx.doi.org/10.1787/888933366159

As Figures 4.1 and 4.2 suggest, the use of skills in everyday life and at work are highly correlated at the country/economy level. The correlation coefficient between the average use of skills at work and in everyday life ranges between 0.81 for numeracy skills to 0.94 for reading skills. This strong link is confirmed at the individual level, when the responses about the use of skills in everyday life are compared to those about the use of skills at work. However, in this case, the correlation is lower than at the country /economy level, and varies between 0.40 for numeracy skills and 0.56 for reading skills (not shown). Since the time available outside of work may affect the relationship between skills use in the two contexts – e.g. those working longer hours may have less time to read, write, use ICT or perform numeracy-related tasks in their free time – the figures are adjusted to account for working hours. When this is done, the correlation at the individual level is stronger and closer to the country /economy-level correlation, ranging from 0.66 for numeracy skills to 0.80 for writing skills (not shown).

Figure 4.2 ▪ **Information-processing skills used in everyday life**

Average skills use, working population aged 16 to 65



Note: Skills use in everyday life indicators are scaled between 1 "Never" and 5 "Every day".

1. See note 1 under Figure 4.1.
2. See note at the end of this chapter.

Countries and economies are ranked in descending order of the average use of reading skills in everyday life.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Table A4.2.

StatLink http://dx.doi.org/10.1787/888933366163

The strong link between skills use at work and in everyday life suggests that adults' socio-demographic characteristics and attitudes towards learning play a role in defining a similar level of engagement with literacy, numeracy and ICT in their personal life, in and outside of the workplace.[4] At the same time, the use of skills at work is also influenced by job-related characteristics, such as the occupation and industry in which an adult works, which are unlikely to affect skills use in everyday life beyond the time constraints they may impose.

WHY SKILLS USE AT WORK MATTERS

Skills use, wages and job satisfaction

As shown in Chapter 5, workers who use their skills more frequently also tend to have higher wages, even after accounting for differences in educational attainment, skills proficiency and occupation. The use of ICT and reading skills are the most closely related to hourly wages. By contrast, while using numeracy and problem-solving skills at work matters as much as proficiency, their correlation with wages is much weaker than that of ICT and reading skills (OECD, 2016a).

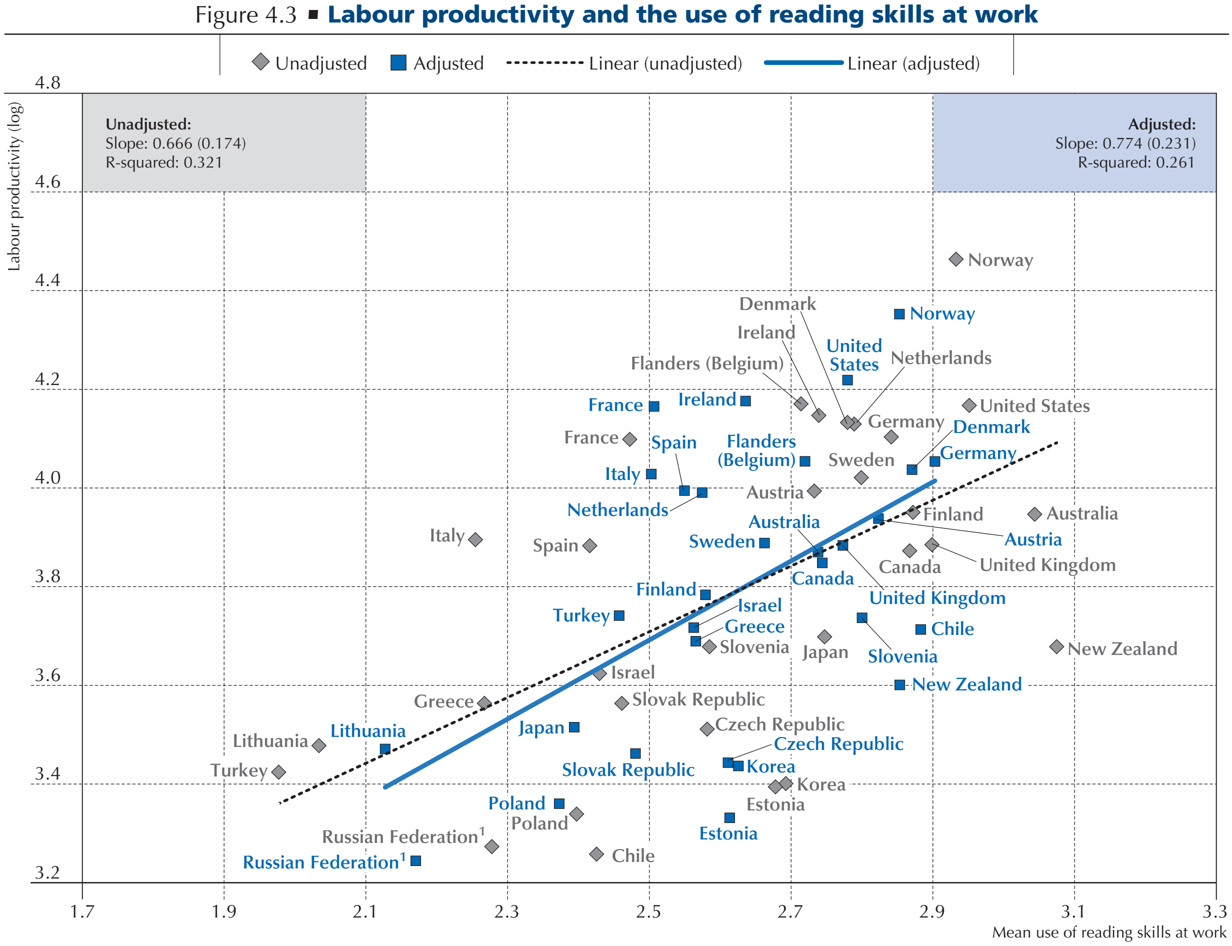
More effective skills use has also been linked to greater job satisfaction and employee well-being. For this reason, the concept of skills use has sometimes been closely associated with that of job quality (e.g. Green et al., 2013), with possible spill-over effects into life satisfaction, more generally, and better health. A study conducted by the OECD in parallel to this report (OECD, 2016a) shows how, on average across countries, skills use is related to the likelihood of being extremely satisfied at work. It emerges that the use of information-processing skills has a stronger association with job satisfaction than a workers' actual skills or years of education. Although magnitudes vary, patterns across countries are similar, on average. The relationships between the use of reading, writing and ICT skills at work and job satisfaction are statistically significant in nearly all countries, while this is not always the case for the use of numeracy and problem-solving skills.

Skills use and productivity

Many skills are not actually used at work – for example, among workers who are mismatched in their job – making skills use a potentially stronger determinant of wages and productivity than skills proficiency. This is also argued in the relevant literature that finds, for instance, that at the level of the firm, better skills use results in higher productivity and lower staff turnover (UKCES, 2014). Some have also argued that better skills use stimulates investment, employees' engagement, and innovation (Wright and Sissons, 2012).

Figure 4.3 shows that the use of reading skills at work correlates strongly with output per hour worked. This is also the case for writing skills. One possible explanation for this is that using skills simply reflects workers' proficiency in those skills. In other words, they both represent the human capital available to the firm. If so, the link between the use of reading skills at work and productivity could actually reflect a relationship between literacy proficiency and productivity.

Figure 4.3 ▪ **Labour productivity and the use of reading skills at work**



Notes: Lines are best linear predictions. Labour productivity is equal to the GDP per hour worked, in USD current prices 2012 for Round-1 and 2014 for Round-2 countries/economies. Adjusted estimates are based on OLS regressions including controls for literacy and numeracy proficiency scores. Standard errors in parentheses.

1. See note at the end of this chapter.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Table A4.3.

StatLink http://dx.doi.org/10.1787/888933366179

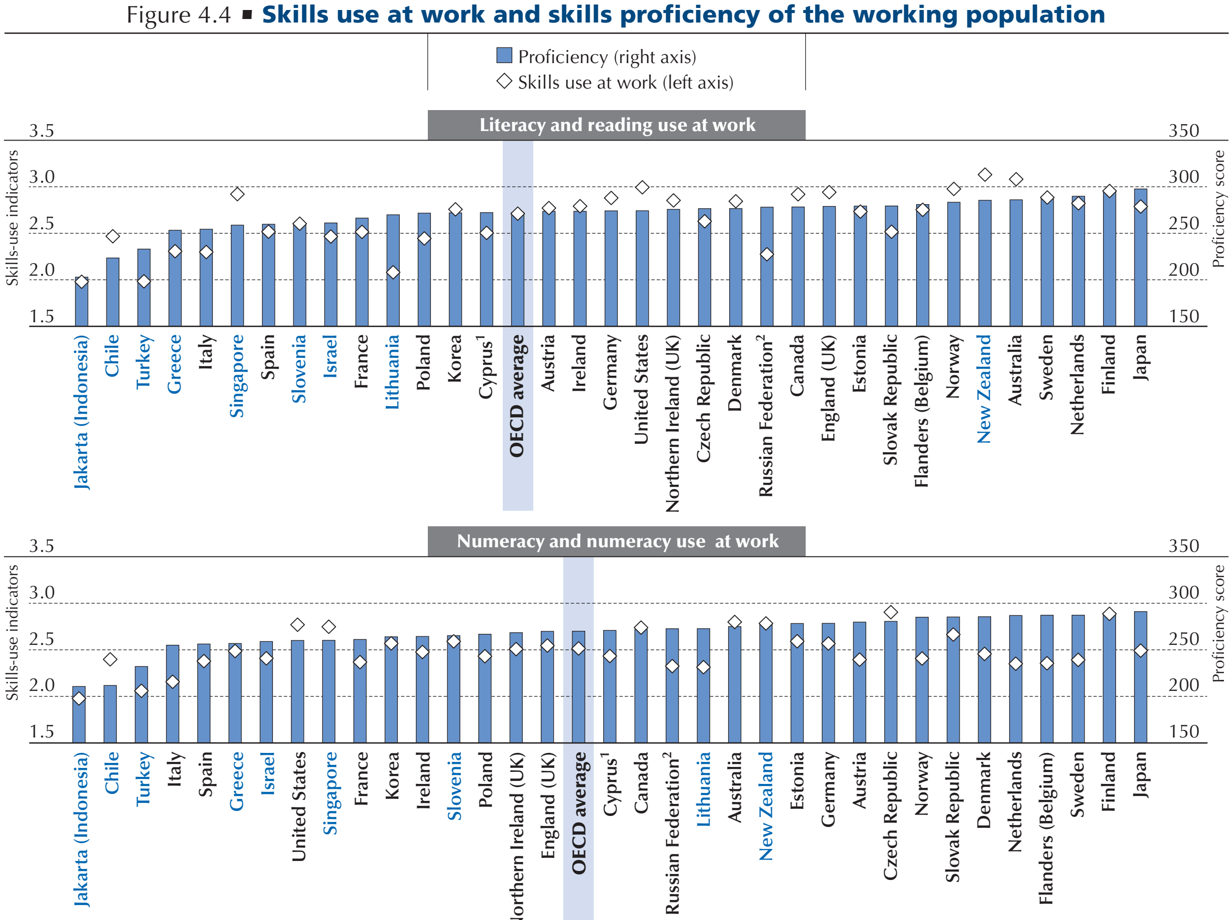
But this is not what the data show. The positive link between labour productivity and reading at work remains strong even after accounting for average proficiency scores in literacy and numeracy.[5] Once these adjustments are made, the average use of reading skills accounts for less of the variation in labour productivity across countries (26% compared to 32% before the adjustment) but remains statistically significant. Put simply, the frequency with which skills are used at work is important, in itself, in explaining differences in labour productivity over and above the effect of proficiency.

The strength of the link across countries/economies varies, depending on a number of factors, such as the capital stock, the quality of production technologies, and the efficiency of the match between workers and jobs.[6] Similarly, these additional factors may influence output per hour along with human capital as captured by skills use and proficiency. The *OECD Employment Outlook* (OECD, 2016a) tests the link between skills use and productivity further by looking at individual industries. Not only does this analysis confirm the relationship, found at the country/economy level, between productivity and the use of reading and writing skills, but it also confirms an association between productivity and the use of problem-solving and ICT skills.

THE LINK BETWEEN PROFICIENCY AND USE OF INFORMATION-PROCESSING SKILLS

One key question concerning skills use is whether it simply reflects proficiency. Figure 4.4 sheds some light on the relationship between skills use and proficiency at the country/economy level. Though countries/economies that have higher skills proficiency tend to show more frequent skills use, it is also apparent that countries/economies rank differently on the two dimensions of skills proficiency and skills use, which suggests that proficiency and use are two different, albeit to some extent related, concepts.

Figure 4.4 ▪ **Skills use at work and skills proficiency of the working population**



Notes: For reading, writing, numeracy and ICT skills, skills-use indicators are scaled between 1 "Never" and 5 "Every day". Problem-solving skills use refers to respondents' answers to "How often are you usually confronted with more complex problems that take at least 30 minutes to find a good solution?". The set of possible answers also ranges between 1 "Never" and 5 "Every day". Proficiency scores range from 0 to 500.

1. See note 1 under Figure 4.1.

2. See note at the end of this chapter.

Countries and economies are ranked in ascending order of the proficiency score.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Tables A4.1 and A4.4.

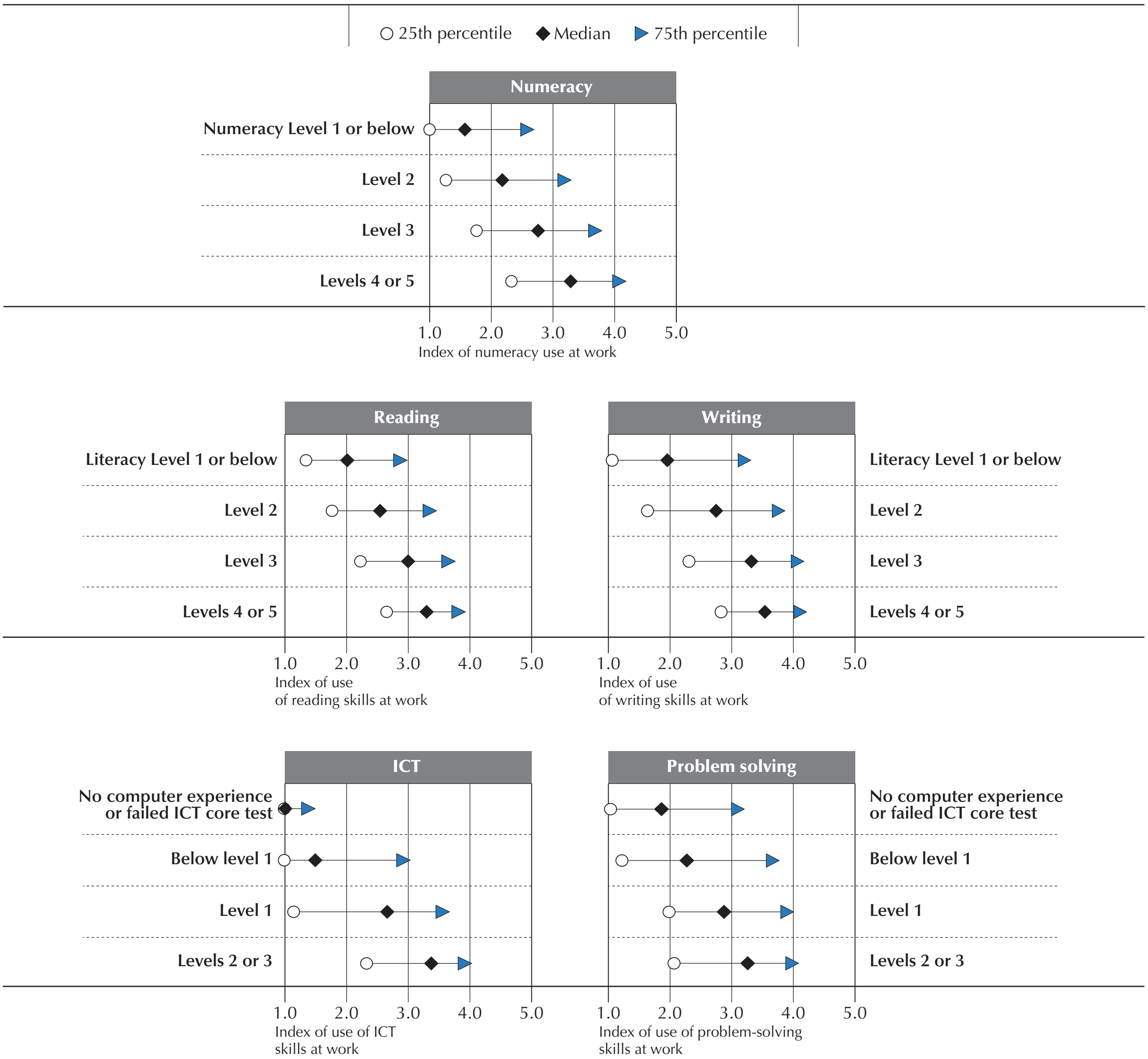
StatLink http://dx.doi.org/10.1787/888933366180

This could be the result of the way skills are measured in the direct assessment and in the questionnaire; but it could also point to a more fundamental discrepancy between the skills held by workers and the extent to which they are used on the job or to the way other factors (e.g. the way work is organised) allows for skills to be used more frequently.[7]

A similar picture emerges when looking at how skills use varies across proficiency levels. Figure 4.5 shows that, across countries and economies, the distributions of skills use among workers with different levels of proficiency overlap substantially. While the median use of literacy skills increases consistently as levels of proficiency increase, it is not uncommon that more proficient workers use their skills at work less frequently than less proficient workers do. This may reflect the limited comparability between skills proficiency as measured in the survey's direct assessment and tasks included in the skills-use indicators. However, it also suggests that the use of skills may depend on factors other than workers' actual skills.

Figure 4.5 ▪ **Skills use at work, by proficiency level**

Median, 25th and 75th percentiles of the distribution of skills use, by level of proficiency



Notes: The data correspond to the average of OECD countries/economies participating in the Survey of Adult Skills (PIAAC). For reading, writing, numeracy and ICT skills, skills-use indicators are scaled between 1 "Never" and 5 "Every day". Problem-solving skills use refers to respondents' answers to "How often are you usually confronted with more complex problems that take at least 30 minutes to find a good solution?". The set of possible answers also ranges between 1 "Never" and 5 "Every day".

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Tables A4.5 (L), A4.5 (N) and A4.5 (P).

StatLink http://dx.doi.org/10.1787/888933366193

THE VARIATION OF SKILLS USE AT WORK

Figure 4.6 shows the extent to which various factors – including individual proficiency, job/firm characteristics and human-resource practices – explain the variation of skills use at work. As the figure shows, after considering workers' occupation and the way their work is organised, proficiency accounts for a small part of the variation in skills use at work among adults (from around 1% in problem solving and reading to just under 6% in ICT), with the main role played by occupation and human-resource practices.[8] This is not to say that skills proficiency is unrelated to skills use. Skills proficiency and use are related as selection to occupations and firms that make more frequent use of skills depends on skills proficiency. Human-resource practices account for up to 27% of the variation in the use of reading skills at work while occupation accounts for up to 25% of the variation in ICT use at work. The relationship between skills proficiency and skills use at work is thus not direct but mediated by variables like workers' occupation and work organisation.

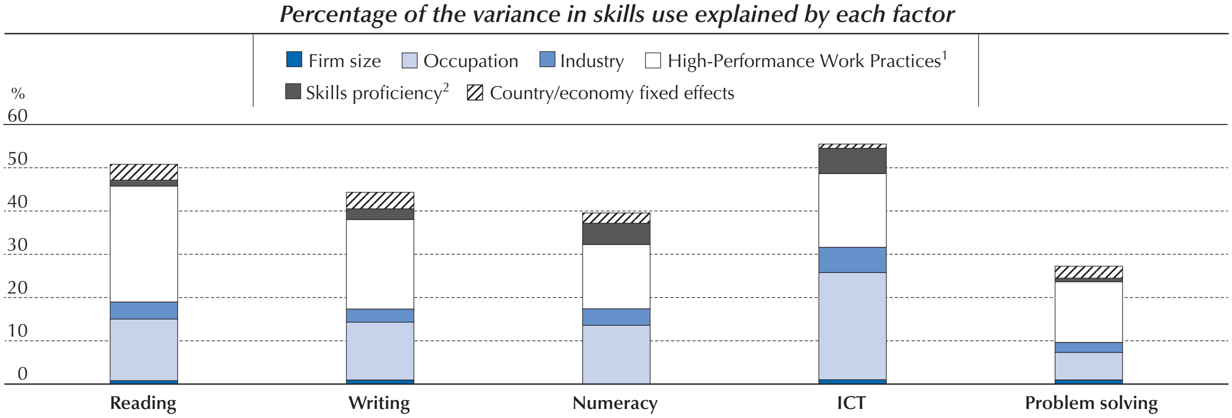
Occupations are important predictors of skills use at work. They account for 25% of the variance in ICT skills use at work, around 14% of the variance in reading, writing and numeracy skills, and 6% of the variance in problem-solving skills use at work. Skills use varies by occupation: skills use is lowest among workers in elementary occupations and highest among managers and professionals. ICT and writing skills use varies across occupations. While managers, professionals, technicians and clerical-support workers use these skills relatively often, workers in service and sales, agriculture, forestry and fishery, craft and trades, plant and machine operators, and elementary occupations use these skills more frequently (OECD, 2013, 2016a).

The *OECD Employment Outlook* (OECD, 2016a) also confirms that human-resource practices are highly correlated with skills use at work. This finding is in line with a growing body of literature showing that participatory practices at work – such as those allowing workers more flexibility in determining the way and rhythm at which they carry out their tasks – encourage better use of skills in the workplace. Management practices also help, with bonuses, training and working time flexibility all providing incentives for workers to use their skills at work more fully.

Overall, these results suggest that the job-requirement approach (JRA) to measuring skills use at work has succeeded in reflecting job-specific demands and skills use in the workplace. It clarifies the complex relationship between workers' proficiency and actual skills use. High skills proficiency may set the foundation for high skills use, but this is not necessary. The JRA's success in measuring skills use is important, as this methodology was applied to improve the quality of data over that collected from self-reports, in which workers' views would be more influenced by their level of proficiency.

Figure 4.6 ▪ **Explaining information-processing skills used at work**

Percentage of the variance in skills use explained by each factor



Notes: The figures presented in this table are based on a pooled regression of all OECD countries/economies in the Survey of Adult Skills, including country/economy fixed effects. Individual country results can be found in the tables cited in the source. For reading, writing, numeracy and ICT skills, skills-use indicators are scaled between 1 "Never" and 5 "Every day". Problem-solving skills use refers to respondents' answers to "How often are you usually confronted with more complex problems that take at least 30 minutes to find a good solution?". The set of possible answers also ranges between 1 "Never" and 5 "Every day".

1. High-Performance Work Practices include the following variables: choosing and changing the sequence of your tasks, the speed of work and how to do your work, organising your own time and planning your own activities; co-operating with others; instructing, teaching or training people; sharing information with co-workers; bonus; participating in training; flexible working hours.

2. For reading and writing, skills proficiency refers to proficiency in literacy; for numeracy, skills proficiency refers to proficiency in numeracy; for ICT and problem solving, skills proficiency refers to proficiency in problem solving in technology-rich environments (hence, the analysis excludes countries for which this proficiency domain is not tested). Using literacy proficiency to include all countries when decomposing the variance of ICT and problem solving use does not change the main thrust of the results presented here.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Table A4.6.

StatLink http://dx.doi.org/10.1787/888933366204

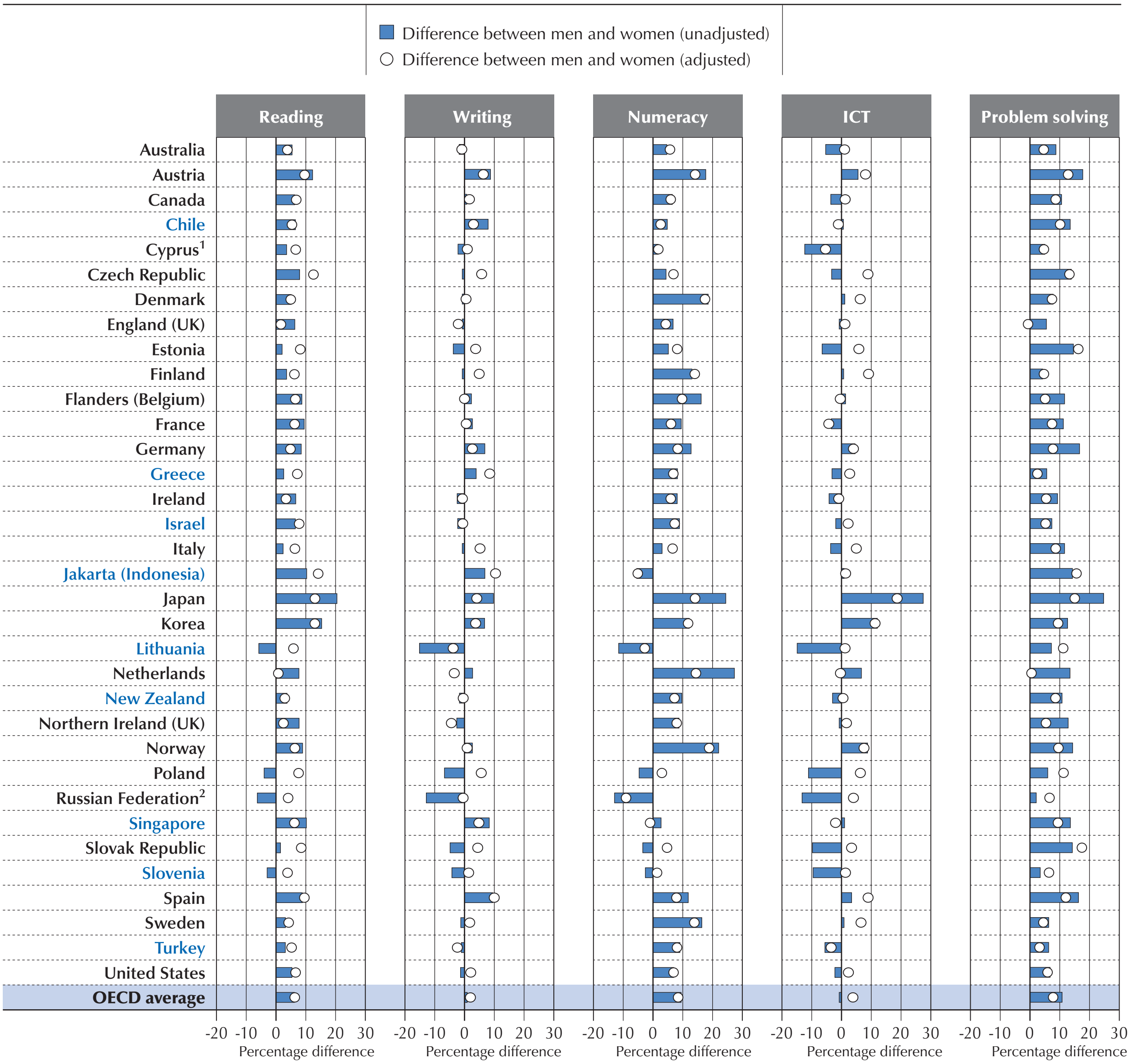
THE DISTRIBUTION OF SKILLS USE, BY WORKERS' GENDER, AGE AND EDUCATIONAL ATTAINMENT

Gender

With only a few country/economy exceptions, differences in reading, writing and ICT use at work related to gender are small (Figure 4.7). Larger differences, generally showing more frequent use by men than women, are observed in the use of numeracy and problem-solving skills in the workplace. Differences between men and women in the use of skills may be the result of gender discrimination, but may also be explained by differences in skills proficiency (in numeracy) and/or in the nature of the job (part-time versus full-time, and occupation).

Figure 4.7 ▪ **Information-processing skills used at work, by gender**

Adjusted and unadjusted gender differences in the mean use of skills, in percentage of the average use of skills by women



Note: Adjusted estimates are based on OLS regressions including controls for literacy and numeracy proficiency scores, hours worked, and occupation dummies (ISCO 1-digit).

1. See note 1 under Figure 4.1.
2. See note at the end of this chapter.

Countries and economies are listed in alphabetical order.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Tables A4.7a and A4.7b.

StatLink http://dx.doi.org/10.1787/888933366214

For instance, if numeracy skills were used less frequently in part-time jobs than in full-time jobs, this may explain part of the difference in skills use between the genders, as women are more likely than men to work part time.[9] This reasoning could apply to occupations as well, with women more likely to be found in jobs that presumably require less intensive use of certain skills, such as problem solving. For instance, women may sort themselves into jobs that require less investment in human capital during the period of childrearing.

However, as Figure 4.7 suggests, adjusting for hours worked, occupation and proficiency levels does not change the sign or order of magnitude of the differences. Looking closer at the results, this appears to be because some of the adjustments cancel each other out. Hours worked and proficiency tend to reduce gender differences as expected; but occupation increases them. In other words, when the type of job held is taken into account, the differences in how men and women use their skills at work are larger. This is particularly striking for the use of ICT skills at work, where the gender gap in skills use increases markedly in most countries/economies after accounting for occupation. This is somewhat surprising, given that the concentration of women in low-paying occupations is often considered one of the key determinants of gender discrimination and the gender gap in wages (Blau and Kahn, 2000, 2003; Goldin, 1986; OECD, 2012). One possible explanation is that, while women tend to be concentrated in certain occupations, they use their skills more intensively than do the relatively few men who are employed in similar jobs.

Looking at countries and economies individually, large gender differences across most skills-use domains are observed in Japan and Korea, where men use their skills up to 20-30% more than their female counterparts, and also in Austria and Spain, where differences are smaller but still reach 15% in some domains. The type of jobs women do and their working hours reduce the differences markedly only in Japan. Interestingly, Lithuania and the Russian Federation stand out as countries where women use their skills in the workplace more than men, although this is mostly due to differences in the jobs they hold. Focusing on Round-2 countries/economies, New Zealand and Turkey both show small differences between the genders, although they stand at the two opposite ends of the distribution of skills use at work: the average use of skills in Turkey is among the least frequent in most domains, while in New Zealand it is among the most frequent.

Age

In all countries/economies except the Russian Federation, 16-24 year-old workers and 55-65 year-old workers use information-processing skills at work less than do workers of prime age (25-54 year-olds) (Figure 4.8). Differences tend to be more pronounced between younger and prime-age adults, but the size of those differences varies across countries/economies.

Contrary to the conventional wisdom that young people are more intense users of ICTs, it is precisely in ICT use that young people lag behind prime-age workers the most. In Canada, Denmark, Finland, Israel, the Netherlands, New Zealand, Norway and Sweden, 16-24 year-olds use ICT at work about 30% less than 25-54 year-olds do. The opposite picture emerges for the use of ICT in everyday life (not shown): 16-24 year-old workers use ICT consistently more at home than prime-age and older workers do. Of course, some of the computer activities in which young adults engage at home (playing videogames, browsing the Internet, chatting) may not be the same as those required on the job. Nevertheless, it would be useful to explore differences in skills use between younger and older cohorts in more depth, including by shedding light on whether young people's ICT skills might be underused in the labour market.

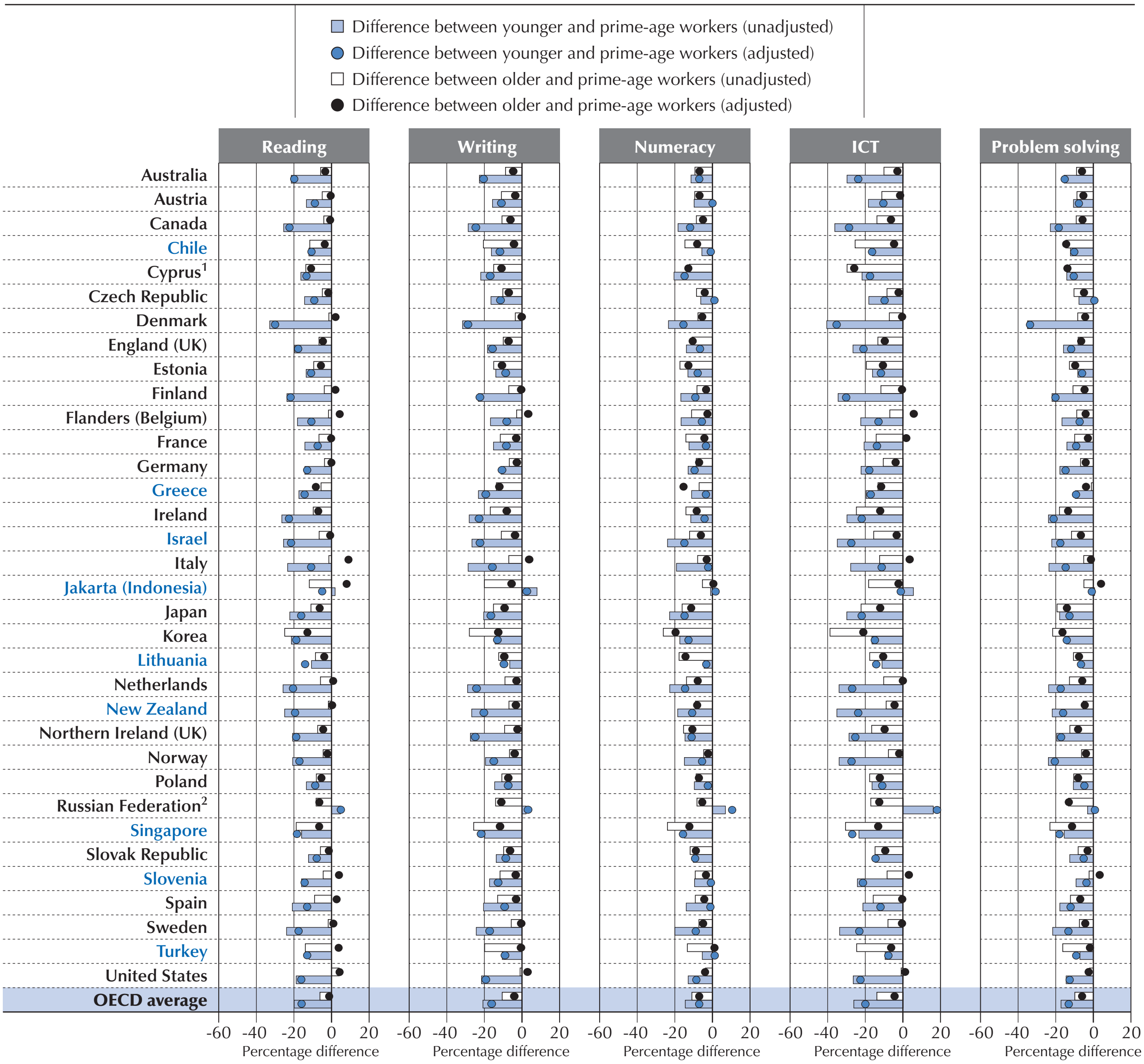
Focusing on other Round-2 countries/economies, in Singapore, Turkey and, to a lesser extent, Chile and Slovenia, raw differences in skills use at work between older (55-65 year-old) and prime-age workers are the most pronounced. This is also the case in Korea among Round-1 countries and economies.

The fact that skills use appears to peak between the ages of 25 and 54 can be interpreted in several ways. For instance, it is possible that older workers move into less demanding positions prior to retirement while young people follow the opposite path as they move out of entry-level jobs into more stable career positions. Alternatively, skills use may decline as skills proficiency does. Skills accumulate in the initial stages of one's career, reach a maximum in the early 30s, and then depreciate over time due to a lack of investment in training and lifelong learning activities (see Chapter 3).[10] Finally, some of the countries with a pronounced difference in skills use at work between older and prime-age workers have seen a marked increase in educational attainment – and presumably skills – over time. In these cases, the decline in proficiency may be due to a cohort effect, possibly in addition to age-related skills depreciation.

The role of proficiency in explaining differences in skills use over a lifetime is supported by differences between raw and adjusted figures in skills use at work, particularly for older workers relative to prime-age workers. Large differences in proficiency seem to be substantially more important in explaining differences in skills use between prime-age and older workers than between prime-age and younger workers.[11]

Figure 4.8 ▪ **Information-processing skills used at work, by age group**

Adjusted and unadjusted age differences in the mean use of skills, in percentage of the average use of skills by prime-age workers



Notes: Adjusted estimates are based on OLS regressions including controls for literacy and numeracy proficiency scores and contract type. Younger workers are 16 to 25 years old, prime-age workers are 26 to 54, and older workers are 55 to 65.

1. See note 1 under Figure 4.1.

2. See note at the end of this chapter.

Countries and economies are listed in alphabetical order.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Tables A4.8a and A4.8b.

StatLink http://dx.doi.org/10.1787/888933366224

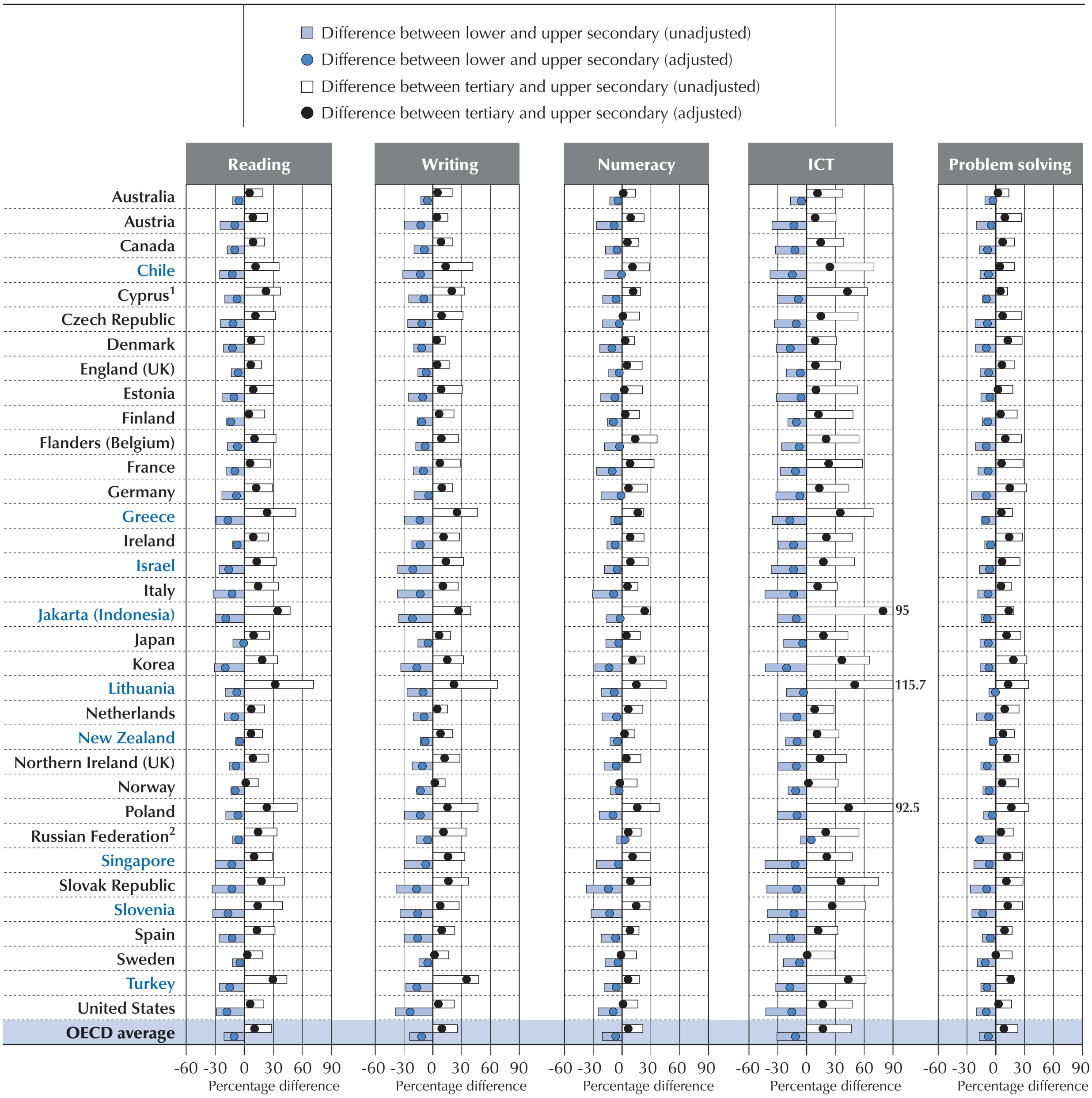
Educational attainment

Although skills are developed in a variety of settings and evolve with age, formal education remains the primary source of learning, and it seems natural to expect greater use of skills among better-educated individuals.

For this analysis, only three groups of workers are considered: those who have less than upper secondary education, those who have completed upper secondary education, and those who have completed tertiary education.[12] With very few exceptions, the results show that workers with higher educational qualifications use their information-processing skills more intensively in their jobs than upper secondary graduates (Figure 4.9). The opposite is true for workers without an upper secondary qualification.

Figure 4.9 ▪ **Information-processing skills used at work, by educational attainment**

Adjusted and unadjusted differences in the mean use of skills, by educational attainment, in percentage of the average use of skills by workers with upper secondary education



Note: Adjusted estimates are based on OLS regressions including controls for literacy and numeracy proficiency scores and occupation dummies (ISCO 1-digit).
1. See note 1 under Figure 4.1.
2. See note at the end of this chapter.
Countries and economies are listed in alphabetical order.
Source: Survey of Adult Skills (PIAAC) (2012, 2015), Tables A4.9a and A4.9b.
StatLink http://dx.doi.org/10.1787/888933366239

Differences are large – comparable to those observed between age groups and larger than those found between men and women. The gap in skills use between tertiary and upper secondary graduates is largest in ICT, with raw differences of 50-60% in several countries. As for other socio-demographic characteristics, differences in skills proficiency and in the distribution of workers across occupations explain most of the variation in skills use between people with different educational qualifications. However, it is the jobs that people hold – as reflected by their occupations – rather than their competency in literacy and numeracy that have the greatest impact on skills use by educational attainment.

Despite the adjustment for skills proficiency and occupation, differences in ICT use at work between tertiary and upper secondary graduates remain sizeable, particularly in some Eastern European countries, including Lithuania, Poland, the Slovak Republic and Slovenia, and in Greece, Jakarta (Indonesia), Korea and Turkey.

While unsurprising, it is something of a wasted opportunity that the best-educated workers are also those who use their skills the most frequently at work. The use of skills at work can, and should, complement initial education in helping workers to acquire new skills and master those they already have. This calls for identifying incentive mechanisms for employers to encourage further skills use and development.

THE DEMAND SIDE: HOW FIRM AND JOB CHARACTERISTICS INFLUENCE SKILLS USE

Analysis of data from Survey of Adult Skills shows that how workers are distributed across occupations has a strong impact on skills use. In fact, accounting for occupation (along with skills proficiency) significantly reduces the differences in skills use between key socio-demographic groups. But these differences persist after occupation has been accounted for, suggesting that other factors may be at play. For instance, occupation categories – particularly when defined by broad groups of jobs[13] – can mask differences between jobs that are identified by the same occupation code. In addition, how firms are organised and managed could also influence the extent of skills use.

This section examines additional job and firm characteristics likely to be related to skills use. In most cases, only the average use of skills across countries is shown in the figures, as the high number of categories would make a presentation of results by country too cumbersome.

Table 4.2 Industries with highest and lowest skills use at work

Skills use at work	**Top 5 industries** (ISIC 2-digit code)	**Bottom 5 industries** (ISIC 2-digit code)
Reading	**69** – Legal and accounting activities **71** - Architectural and engineering activities; technical testing and analysis **72** – Scientific research and development **62** – Computer programming, consultancy and related activities **70** – Activities of head offices; management consultancy activities	**81** – Services to buildings and landscape activities **56** – Food and beverage service activities **15** – Manufacture of leather and related products **10** – Manufacture of food products **38** – Waste collection, treatment and disposal activities; materials recovery
Writing	**70** – Activities of head offices; management consultancy activities **65** – Insurance, reinsurance and pension funding, except compulsory social security **69** – Legal and accounting activities **61** – Telecommunications **64** – Financial service activities, except insurance and pension funding	**81** – Services to buildings and landscape activities **56** – Food and beverage service activities **96** – Other personal service activities **14** – Manufacture of wearing apparel **15** – Manufacture of leather and related products
Numeracy	**65** – Insurance, reinsurance and pension funding, except compulsory social security **70** – Activities of head offices; management consultancy activities **64** – Financial service activities, except insurance and pension funding **71** – Architectural and engineering activities; technical testing and analysis **66** – Activities auxiliary to financial service and insurance activities	**87** – Residential care activities **80** – Security and investigation activities **81** – Services to buildings and landscape activities **88** – Social work activities without accommodation **53** – Postal and courier activities
ICT	**63** – Information service activities **66** – Activities auxiliary to financial service and insurance activities **64** – Financial service activities, except insurance and pension funding **70** – Activities of head offices; management consultancy activities **62** – Computer programming, consultancy and related activities	**81** – Services to buildings and landscape activities **56** – Food and beverage service activities **16** – Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials **49** – Land transport and transport via pipelines **96** – Other personal service activities
Problem solving	**64** – Financial service activities, except insurance and pension funding **63** – Information service activities **61** – Telecommunications **70** – Activities of head offices; management consultancy activities **62** – Computer programming, consultancy and related activities	**81** – Services to buildings and landscape activities **56** – Food and beverage service activities **15** – Manufacture of leather and related products **53** – Postal and courier activities **96** – Other personal service activities

Notes: Industries with two-digit codes on the ISIC classification are ranked on the basis of their average skills use. The top five and bottom five in the ranking are reported in the table.

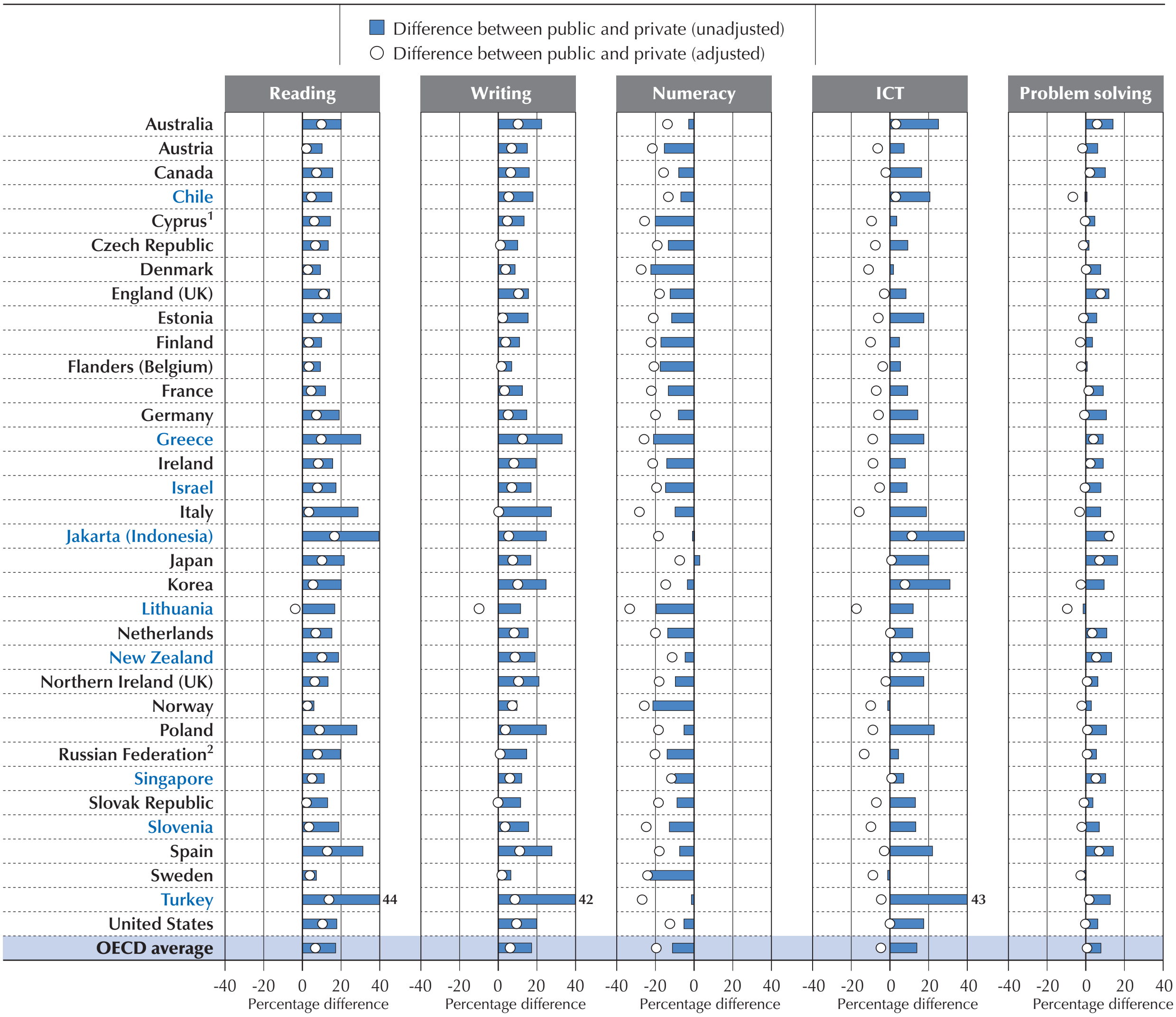
Industry, firm size and sector

Only limited information is available in the Survey of Adult Skills concerning the characteristics of the respondents' employer: the number of employees, the industry in which the firm operates, and whether the firm operates in the public or private sector. To be more precise, survey questions refer to the geographical location where the job is mainly carried out or based – i.e. not the firm but the establishment where the worker is based – a relevant distinction in the case of large firms operating in several branches or regions.

Starting with skills use by industry, it emerges that information-processing skills are most frequently used in the "activities of head offices and consultancy", "financial services" and, to a lesser extent, "computer programming" (Table 4.2). At the other end of the scale, skills are least frequently used in "services to buildings", "food and beverage services" and also in "personal services" and the "manufacturing of leather products". Overall, the results are not surprising; but it is interesting to note that both the top and bottom rankings are consistent across most of the information-processing skills analysed in this chapter.

Figure 4.10 ▪ **Information-processing skills used at work, by sector**

Adjusted and unadjusted sector differences in the mean use of skills,
in percentage of the average use of skills in private sector



Note: Adjusted estimates are based on OLS regressions including controls for literacy and numeracy proficiency scores, hours worked and occupation dummies (ISCO 1-digit).

1. See note 1 under Figure 4.1.
2. See note at the end of this chapter.

Countries and economies are listed in alphabetical order.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Tables A4.10a and A4.10b.

StatLink http://dx.doi.org/10.1787/888933366247

Comparing public and private sector firms delivers a mixed picture (Figure 4.10). Reading and writing at work are more frequently used among adults working in public sector firms. The difference in the use of these skills between adults working in the public and private sectors is largest in Turkey, followed by Jakarta (Indonesia), Spain and Greece. The situation is inverted for numeracy skills: adults working in the private sector reported using their numeracy skills at work more frequently, although in some countries, the differences are small. The picture is mixed for ICT and, to a lesser extent, problem-solving skills, which tend to be used more frequently by workers in the public sector, although the differences are smaller than for reading and writing skills.

The nature of the jobs and the proficiency of workers in the two sectors explain the differences somewhat, particularly for reading, writing and problem-solving skills use at work. But adults working in the private sector appear to make more frequent use of numeracy and ICT skills once the difference between sectors is adjusted to take account of differences in the composition of workers across occupations and in workers' proficiency levels.

Another factor that determines how workers use their skills is the size of the firm in which they work. It could be expected that workers employed in small firms use their skills differently than do those employed in large firms, even within the same occupational group and the same industrial sector. One possibility is that large firms employ more skilled workers and adopt more sophisticated production technologies (Brown and Medoff, 1989; Gibson and Stillman, 2009), resulting in better use of information-processing skills relative to smaller firms. But small start-up firms may also distinguish themselves by giving their workers more flexibility, allowing them to use their skills more fully (OECD, forthcoming). Overall, the former hypothesis is confirmed for reading, numeracy, ICT and problem-solving skills use, all of which increase with firm size. The only exception is numeracy, which shows a slight U shape, with higher use at both ends of the firm-size scale (Figure 4.11).

Figure 4.11 ▪ **Information-processing skills used at work, by firm size**

Average use of information-processing skills by firm size

Notes: The data correspond to the average of OECD countries/economies participating in the Survey of Adult Skills (PIAAC). For reading, writing, numeracy and ICT skills, skills-use indicators are are scaled between 1 "Never" and 5 "Every day". Problem-solving skills use refer to repondents' answers to "How often are you usually confronted with more complex problems that take at least 30 minutes to find a good solution?". The set of possible answers also ranges between 1 "Never" and 5 "Every day". Firm size is measured by asking workers about the size of the establishment for which they work.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Table A4.11.

StatLink http://dx.doi.org/10.1787/888933366254

Type of contract

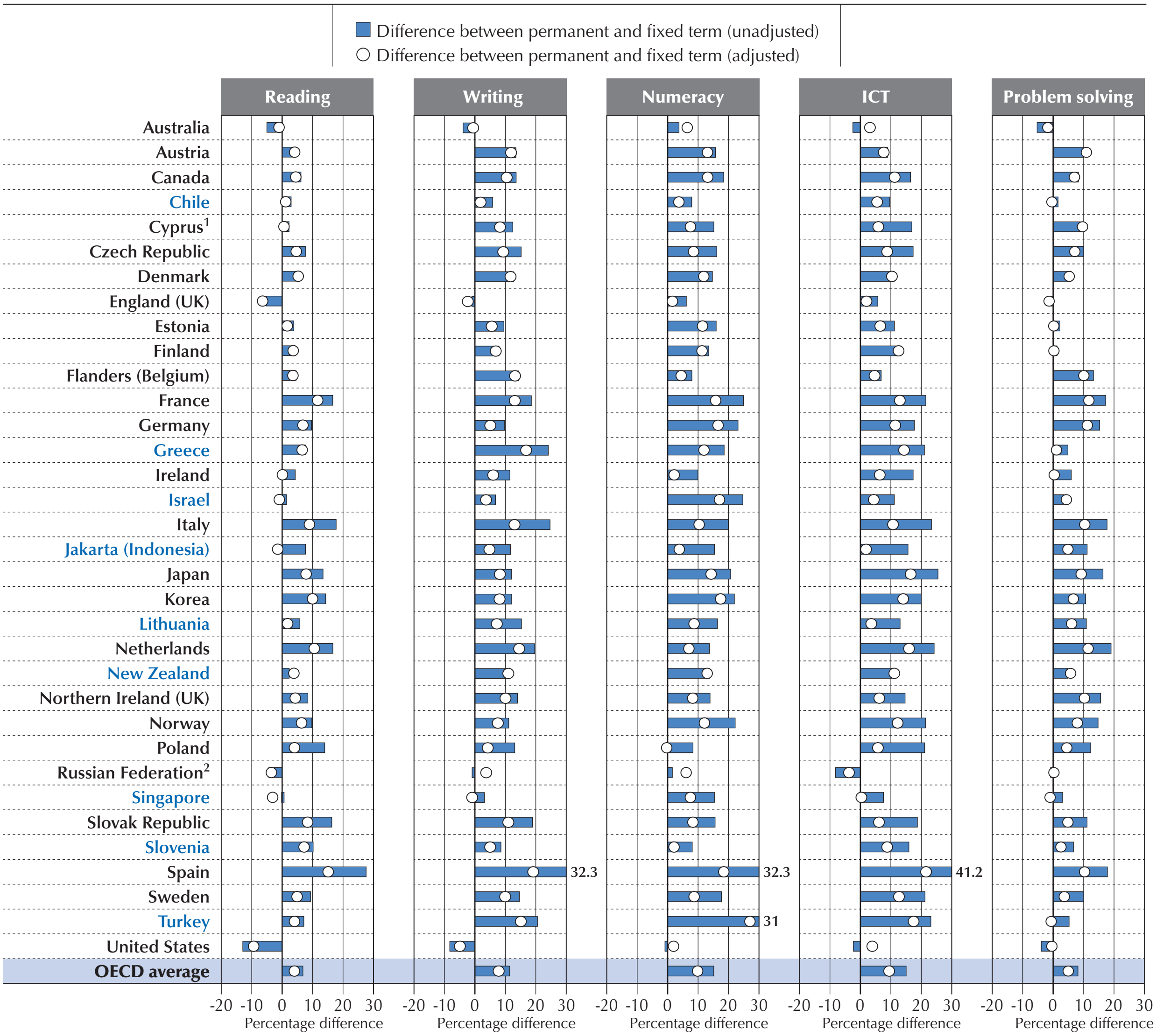
Contract type may also influence the extent of skills use at work through several mechanisms, including different degrees of attachment to the firm because of varying job security, willingness and flexibility to adapt job content to workers' skills or simply different job descriptions. This is an important issue as the use of temporary contracts has become pervasive in several OECD countries in recent years.[14] When combined with low rates of transition to permanent contracts and the fact that young people represent a disproportionate share of workers on temporary contracts, greater use of these contracts could have adverse effects on both individual workers and the economy as a whole.

For example, it has been extensively documented that workers on temporary contracts receive less training from their employers (Autor, 2001; OECD, 2006) when compared to workers in permanent contracts. Further, workers in temporary contracts have fewer opportunities to accumulate job-specific skills, thus potentially reducing their opportunities for career development and jeopardising the growth of labour productivity among younger generations. Understanding the differences in the skills used by workers on temporary and permanent contracts would shed further light on an additional mechanism of skills accumulation.

With very few exceptions, workers on fixed-term contracts use their information-processing skills less intensively than their colleagues in permanent employment (Figure 4.12).[15] The largest differences are found in Spain, but Greece and Turkey, among Round-2 countries/economies, also show a clear disadvantage among fixed-term workers, compared to those on permanent contracts, when it comes to using skills at work, particularly writing, numeracy and ICT skills.

Figure 4.12 ▪ **Information-processing skills used at work, by contract type**

Adjusted and unadjusted differences in the mean use of skills, by type of contract, in percentage of the average use of skills by employees with a fixed-term contract



Note: Adjusted estimates are based on OLS regressions including controls for literacy and numeracy proficiency scores, hours worked and occupation dummies (ISCO 1-digit).

1. See note 1 under Figure 4.1.

2. See note at the end of this chapter.

Countries and economies are listed in alphabetical order.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Tables A4.12a and A4.12b.

StatLink http://dx.doi.org/10.1787/888933366263

At the other extreme, in Chile, differences are close to nil, similar to Australia, England (United Kingdom), the Russian Federation and the United States among Round-1 countries/economies.[16] Differences in the use of reading, writing and problem-solving skills between workers on different contract types are also small in Israel and Singapore.

In a number of countries, accounting for workers' skills proficiency, number of hours worked and occupation reduces the gap in skills use between contract types. However, while the correction reduces the differences, it does not eliminate them entirely, suggesting that other factors might be at play. For instance, in the Round-2 countries Greece, New Zealand and Turkey, the adjustment makes very little difference. The opposite is true for Jakarta (Indonesia) and Lithuania, where the adjustment reduces the difference in writing, numeracy and ICT skills use at work. Marked reductions in the gap in skills use are also observed in several Round-1 countries/economies, notably France, Italy, Poland and Spain.

The persistence of a gap in the use of skills between contract types could also be due to differences in management/organisational practices. On the one hand, workers on temporary contracts might enjoy less flexibility in the way they carry out their tasks at work and have less voice in firms' decisions, reducing incentives to use their skills. On the other hand, employers may be less inclined to tailor job content and descriptions to the skills of their workers, exacerbating the effect of any qualification/skills mismatch on skills use.

Work organisation

The way work is organised and jobs are designed as well as the management practices adopted by the firm are likely to influence the extent to which skills are used in the workplace. In particular, it has been argued that better skills use and higher productivity can be achieved by implementing what are known as "High-Performance Work Practices" (HPWP), which include both aspects of work organisation – such as team work, autonomy, task discretion, mentoring, job rotation, applying new learning – and management practices – such as employee participation, incentive pay, training practices and flexibility in working hours (Bloom and Van Reenen, 2010; Johnston and Hawke, 2002).[17]

The Survey of Adult Skills collects information on a number of job aspects that are often associated with HPWP, including: whether workers have any flexibility in deciding on the sequence of tasks they perform, how they do the work, the speed of the work, and working time; how often they organise their own time and plan their own activities; how often they co-operate or share information with others; how often they instruct, teach or train other people; whether they participated in education/training in the previous 12 months; and whether they received a bonus payment. Figure 4.6 above confirms that these practices contribute substantially to the variation in adults' use of skills. The share of variation in skills use accounted for by HPWP ranges from 27% in reading to about 14% in problem solving. This makes HPWP the largest contributor to the variation in skills use in all domains except ICT, where occupation accounts for the largest share of this variation.

Figure 4.13 shows the use of information-processing skills by HPWP intensity. With only a few exceptions, workers who benefit from HPWP make greater use of reading, writing, numeracy, ICT and problem-solving skills than those who do not. Adults' use of their skills also tends to increase with HPWP intensity, i.e. skills use increases the more frequently workers engage in HPWP. Country-specific results follow similar patterns.

To get a sense of how widespread HPWP are across OECD countries, a scale aggregating the individual HPWP items shown in Figure 4.13 was constructed.[18] As shown in Figure 4.14, countries/economies vary in the intensity of HPWP at work. The figure shows the intensity of HPWP as well as the prevalence of its subcomponents: work organisation factors and management practices. Two measures of the overall prevalence of HPWP are shown in the figure: the average score and the share of jobs that adopt HPWP at least once a week. Countries and economies are ranked similarly on both measures, with HPWP being most prevalent in several Nordic countries, but also in New Zealand and, to a lesser extent, Israel among Round-2 countries/economies, and the least prevalent in Greece, Jakarta (Indonesia), Lithuania, the Russian Federation and Turkey.

Similar rankings are observed for work-organisation factors and for prevalence of training and flexible working hours. By contrast, the cross-country/economy distribution of the awarding of bonuses follows a different pattern, with bonuses widespread in Austria, Belgium and the Netherlands and least common in Australia, England (United Kingdom), Northern Ireland (United Kingdom) and Norway, and also in Lithuania, New Zealand and Turkey among Round-2 countries/economies. Additional analysis conducted for the *OECD Employment Outlook* (OECD, 2016a) confirms a strong correlation between HPWP and the use of information-processing skills at work.

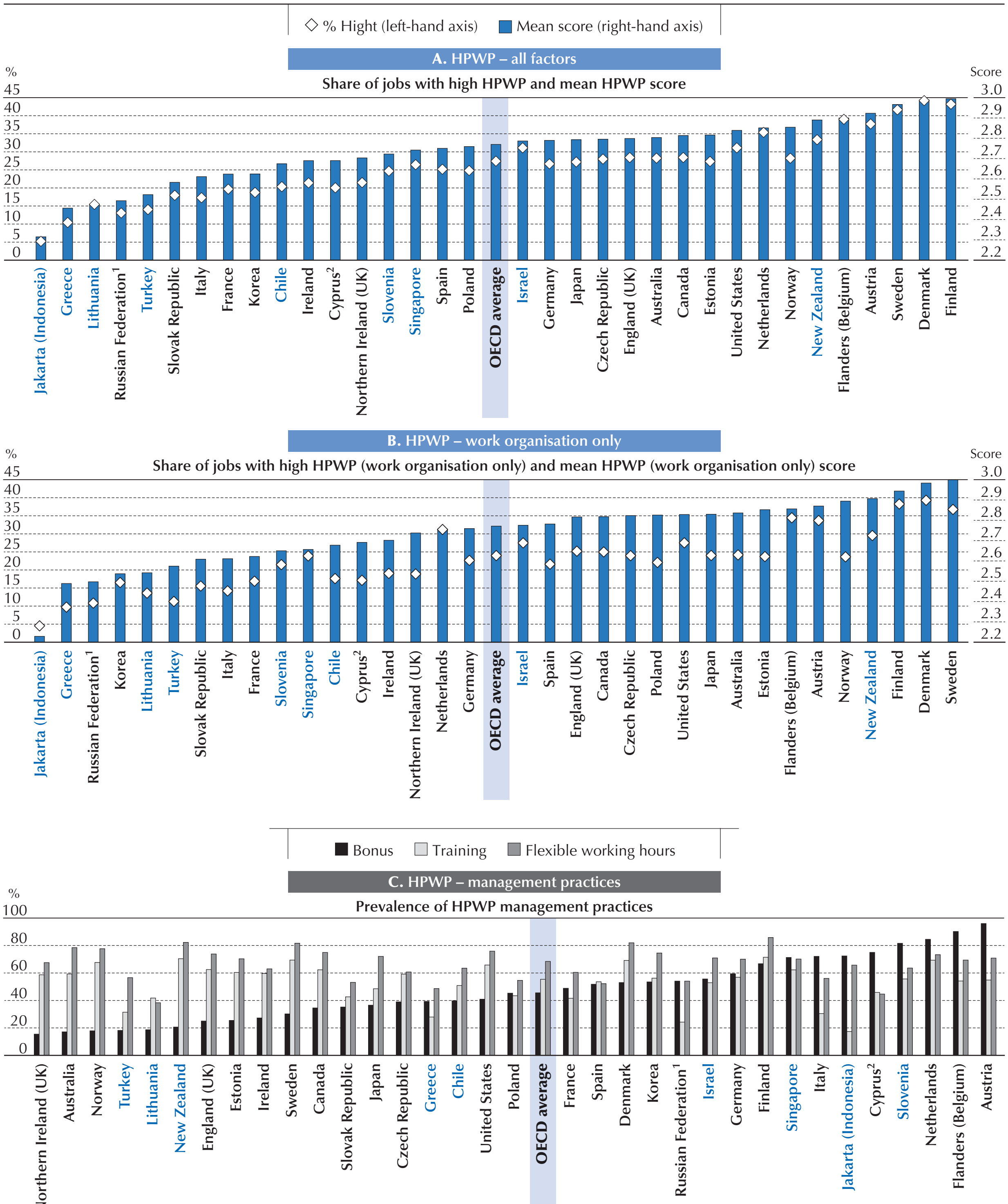
Figure 4.13 ▪ **Skills use, by High-Performance Work Practices**

Notes: The data correspond to the average of OECD countries/economies participating in the Survey of Adult Skills (PIAAC). For reading, writing, numeracy and ICT skills, skills-use indicators are scaled between 1 "Never" and 5 "Every day". Problem-solving skills use refers to respondents' answers to "How often are you usually confronted with more complex problems that take at least 30 minutes to find a good solution?". The set of possible answers also ranges between 1 "Never" and 5 "Every day". Estimates for Panel I, "Management practices" show the difference in average skills use between: workers enjoying flexibility in working hours and those who do not; workers who participated in training over the previous year and those who did not; workers who receive annual bonus and those who do not.

Source: OECD (2016), Survey of Adult Skills (PIAAC) (2012, 2015), Table A4.13.

StatLink http://dx.doi.org/10.1787/888933366276

Figure 4.14 ■ **High-Performance Work Practices, by type of practice**



Notes: Panels A and B report the mean value of the HPWP indicator and the percentage of individuals in jobs above the 75th percentile in the respective pooled HPWP distribution. The HPWP index is obtained by summing the scales of all subcomponents shown in Figure 4.13 (Panel A) or summing the scales of work organisation subcomponents only (Panel B). Panel C reports the share of workers receiving annual bonuses, having participated in training over the previous year and those enjoying flexibility in working hours.

1. See note at the end of this chapter.

2. See note 1 under Figure 4.1.

Countries and economies are ranked in ascending order of the mean HPWP indicators in Panels A and B; in Panel C, countries/economies are ranked in ascending order of the prevalence of bonuses.

Source: Survey of Adult Skills (PIAAC) (2012, 2015), Table A4.14.

StatLink http://dx.doi.org/10.1787/888933366282

SUMMARY

Writing and problem solving are the skills most frequently used at work. Reading skills follow close behind while numeracy and ICT skills are least used. Among Round-2 countries/economies, New Zealand stands out as the one whose adults use almost all information-processing skills the most frequently at work, along with Australia and the United States from Round 1. Singapore also stands out as a country whose adults use their skills frequently at work, particularly ICT skills. Adults in Singapore show the most frequent use of ICT at work among all participating countries/economies. In Slovenia, the use of most information-processing skills is close to the average and, unsurprisingly, close to some other Eastern European countries, such as the Czech Republic, Estonia and the Slovak Republic. In addition, workers in Slovenia are among those who use their writing skills at work the most frequently. In all other Round-2 countries/economies, the use of information-processing skills at work is well below average and close to the bottom of the scale.

There appears to be a strong link between using skills at work and in everyday life, suggesting that adults' socio-demographic characteristics and personal dispositions play a role in defining their level of engagement with literacy, numeracy and ICT in their personal life.

Two themes emerge from the analysis that could have an impact on policy. First, countries and economies rank differently on the two dimensions of skills proficiency and skills use. Across all participating countries/economies, proficiency explains only about 5% of the variation in adults' use of numeracy skills at work across all participating countries/economies after accounting for workers' occupation and firm characteristics; it explains even less of the variation in adults' use of literacy skills. This is not to say that skills proficiency does not affect skills use; it does so indirectly through selection into occupations and firms. Put differently, the distribution of skills use among workers with different levels of proficiency overlap substantially. While the median use of both literacy and numeracy skills increases consistently as levels of proficiency increase, it is not uncommon that more proficient workers use their skills at work less intensively than less proficient workers do.

Second, in all the countries/economies covered in the Survey of Adult Skills, the type of jobs held by workers and the human-resource practices adopted in their job are the most important factors explaining the variation in skills use. High-Performance Work Practices – including work organisation and management practices – are positively related to the use of information-processing skills at work. They explain between 14% and 27% of the variation in skills use across adults. The way work is organised – the extent of team work, autonomy, task discretion, mentoring, job rotation and applying new learning – influences the degree of internal flexibility to adapt job tasks to the skills of new hires. Some management practices – bonus pay, training provision and flexibility in working hours – provide incentives for workers to use their skills at work more fully.

Many countries have put initiatives or policies in place to try to promote better skills use through workplace innovation. They recognise that adopting modern leadership and management practices in the workplace can create opportunities for workers to better use their skills, and that productivity gains can be achieved by engaging workers more fully. Concretely, many initiatives focus on raising awareness about the benefits of using skills more effectively, and present High-Performance Work Practices as a win-win option for both employers and workers. Countries have also focused on disseminating good practice and sharing good advice, such as by identifying model firms. In some instances, funding is available to develop diagnostic tools to help companies identify both bottlenecks and measures that will promote better use of their employees' skills. In the context of limited resources, small and medium-size enterprises with growth potential are often targeted on the grounds that employers of smaller firms tend to find it more difficult or costly to adopt innovative work-organisation practices (OECD, 2016a).

Notes

1. This information was originally included for the purpose of measuring the use of generic skills at work. See OECD (2013) and Quintini (2014) for analysis of these variables in Round-1 countries/economies.

2. Questions concerning the frequency of solving problems are only asked in the context of work.

3. It should be borne in mind that these data are self-reported by respondents, and that between-country/economy variations may be partly due to cultural differences in response behaviours. As discussed later in the chapter, cross-country/economy differences will also depend on demand-side factors, such as industry composition, the prevalence of certain contract types, the share of SMEs and the extent to which firms apply work-organisation and management practices that are likely to influence skills deployment at work.

4. These results could also suggest that skills learned and used more frequently in the workplace can transfer to skills use in everyday life.

5. The adjustment is based on multivariate regression analysis. First, both labour productivity and the average use of reading skills at work are separately regressed on average proficiency scores in literacy and numeracy, i.e. they are adjusted to control for the effect of literacy and numeracy proficiency. Then, the residuals of the two regressions are, in turn, regressed on one another. The adjusted results displayed in Figure 4.3 come from such a regression. This is a standard econometric procedure, commonly known as *partitioned regression*.

6. It is possible that the link between skills use at work and productivity may reflect the association between reading (or writing or problem solving) use and the use of other skills, or the link between use and the nature of the work environment (e.g. capital intensity).

7. Singapore provides an interesting example, where the apparently contradictory findings based on the skills-use data and the proficiency data could partly be due to the difference in language-specificity of the two sets of data. Specifically, while the literacy and numeracy proficiencies were measured only in the English language in Singapore, the skills used at work as reported by the respondents in the background questionnaire were non-language-specific.

8. The variance analysis presented here uses Fields (2004) regression-based decomposition technique. This approach is only one way of comparing the importance of a factor as a correlate of skill use. An alternative would be to use regression analysis. The advantage of the variance decomposition approach is that it allows for a comparison of factors that are measured on different scales. See also OECD (2014), Chapter 5.

9. Differences in the use of skills between part-time and full-time workers should be interpreted with caution, as they may simply relate to the fact that part-time workers are less often at work than full-time workers.

10. In the absence of panel data, this interpretation cannot be tested against the alternative possibility that there is a trend towards less-intensive use of certain skills over time. However, given the evolution of technology and labour demand towards more skills-intensive work this latter explanation does not seem particularly plausible.

11. Although the correction also includes contract type, proficiency has the strongest effect.

12. Less than upper secondary considers ISCED levels 0, 1, 2 and 3C short; completed upper secondary education includes ISCED levels 3A, 3B, 3C long or 4A, B, C; and tertiary education considers ISCED levels 5A, B or 6.

13. The adjustment is made using the workers' 1-digit ISCO occupational classification.

14. In the Survey of Adult Skills (PIAAC), approximately 12% of employees reported being employed under a fixed-term contract.

15. Self-employed workers are excluded from these calculations.

16. In the case of Australia, England (United Kingdom) and the United States, this could partly be because of the limited employment protection provided, regardless of the type of job. This is especially the case in the United States, where the distinction between temporary and permanent contracts is much more blurred, and where fixed-term contracts refer to a much more distinctive, and relatively uncommon, form of contract, than they do in other countries. On the other hand and rather surprisingly, this is not the case in New Zealand where differences are relatively large.

17. The literature on organisation capital – covering practices that are similar to those listed as High-Performance Work Practices – provides additional insights into the potential role of management practices on skills use (Squicciarini and Le Mouel, 2012). The *OECD Employment Outlook 2016* provides a more comprehensive analysis on the relationship between High-Performance Work Practices and skills use (OECD, 2016a).

18. To construct a single scale, items are standardised – across countries – to have mean of 2.79 and variance equal to one. The value of Cronbach's alpha for the resulting sum scale is 0.7, suggesting that the items are well-suited to form a single scale.

A note regarding the Russian Federation

The sample for the Russian Federation does not include the population of the Moscow municipal area. The data published, therefore, do not represent the entire resident population aged 16-65 in the Russian Federation but rather the population of the Russian Federation *excluding* the population residing in the Moscow municipal area.

More detailed information regarding the data from the Russian Federation as well as that of other countries can be found in the *Technical Report of the Survey of Adult Skills, Second Edition* (OECD, forthcoming).

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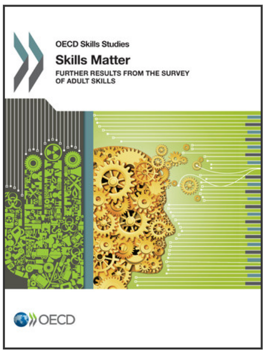

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