

### PIAAC 2012: Overview of the Main Results

Rammstedt, Beatrice; Ackermann, Daniela; Helmschrott, Susanne; Klaukien, Anja; Maehler, Débora B.; Martin, Silke; Massing, Natascha; Zabal, Anouk

Veröffentlichungsversion / Published Version

Arbeitspapier / working paper

Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:

GESIS - Leibniz-Institut für Sozialwissenschaften

#### Empfohlene Zitierung / Suggested Citation:

Rammstedt, B., Ackermann, D., Helmschrott, S., Klaukien, A., Maehler, D. B., Martin, S., ... Zabal, A. (2013). PIAAC 2012: Overview of the Main Results. Münster: Waxmann. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-59175-7>

#### Nutzungsbedingungen:

Dieser Text wird unter einer Deposit-Lizenz (Keine Weiterverbreitung - keine Bearbeitung) zur Verfügung gestellt. Gewährt wird ein nicht exklusives, nicht übertragbares, persönliches und beschränktes Recht auf Nutzung dieses Dokuments. Dieses Dokument ist ausschließlich für den persönlichen, nicht-kommerziellen Gebrauch bestimmt. Auf sämtlichen Kopien dieses Dokuments müssen alle Urheberrechtshinweise und sonstigen Hinweise auf gesetzlichen Schutz beibehalten werden. Sie dürfen dieses Dokument nicht in irgendeiner Weise abändern, noch dürfen Sie dieses Dokument für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen.

Mit der Verwendung dieses Dokuments erkennen Sie die Nutzungsbedingungen an.

#### Terms of use:

This document is made available under Deposit Licence (No Redistribution - no modifications). We grant a non-exclusive, non-transferable, individual and limited right to using this document. This document is solely intended for your personal, non-commercial use. All of the copies of this documents must retain all copyright information and other information regarding legal protection. You are not allowed to alter this document in any way, to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public.

By using this particular document, you accept the above-stated conditions of use.

# PIAAC 2012: Overview of the Main Results

Beatrice Rammstedt, Daniela Ackermann,  
Susanne Helmschrott, Anja Klaukien, Débora B. Maehler,  
Silke Martin, Natascha Massing and Anouk Zabal

In collaboration with Heike Solga, Juergen Baumert, Eckhard Klieme,  
Ursula M. Staudinger, Christof Wolf and Ludger Woessmann

Translated from the German by Miriam Geoghegan

COMMISSIONED BY

**gesis**  
Leibniz Institute  
for the Social Sciences



Federal Ministry  
of Education  
and Research

**WAXMANN**



## Aims of PIAAC

The *Programme for the International Assessment of Adult Competencies* (PIAAC), which is managed by the Organisation for Economic Co-operation and Development (OECD), assesses central basic skills of the adult population – such as literacy, numeracy and problem solving in technology-rich environments – that are considered essential for successful participation in today’s society. These skills are an important foundation for developing various other, more specific, skills and competencies. PIAAC aims to compare these key adult skills across countries. The focus is on the working-age population (between the ages of 16 and 65). However, some countries, including Germany, have national extensions that assess the skills of older adults, thus providing important information on skill maintenance, which is particularly relevant given adjustments to the retirement age in Germany.

PIAAC provides information about the extent to which the adult population in the participating countries differs in terms of the basic skills assessed. Moreover, it examines factors associated with the acquisition and maintenance of these skills. Finally, it sheds light on the effects of these skills on social, and, in particular, economic participation. Hence, on the one hand, the results provide insights into the effectiveness of education and training systems in developing these key skills and therefore in successfully preparing members of society for active social participation. On the other hand, PIAAC provides some indication of a society’s skill resources and potential and how well these are being exploited economically and socially. Thus, PIAAC provides policy makers with empirically based results regarding the importance and use of key skills. The international comparative dimension reveals where strengths lie and where skill acquisition and maintenance is in need of improvement, and it highlights the role that, for example, educational institutions, training activities and on-the-job learning can play in meeting these needs.

► PIAAC assesses central basic skills: literacy, numeracy and problem solving in technology-rich environments

► International comparison of adult skills

► Empirically based results regarding importance and use of key skills

## Basic Skills Assessed

Three central basic skills are assessed in PIAAC: literacy, numeracy and problem solving in technology-rich environments.

### ► Literacy

*Literacy* encompasses the ability to understand, use and interpret written texts. Literacy is a prerequisite for developing one's knowledge and potential and participating in society. The literacy domain in PIAAC includes tasks such as reading and understanding a drug label or a brief newspaper article. In addition, there are tasks that involve digital media, such as reading an online job posting.

### ► Numeracy

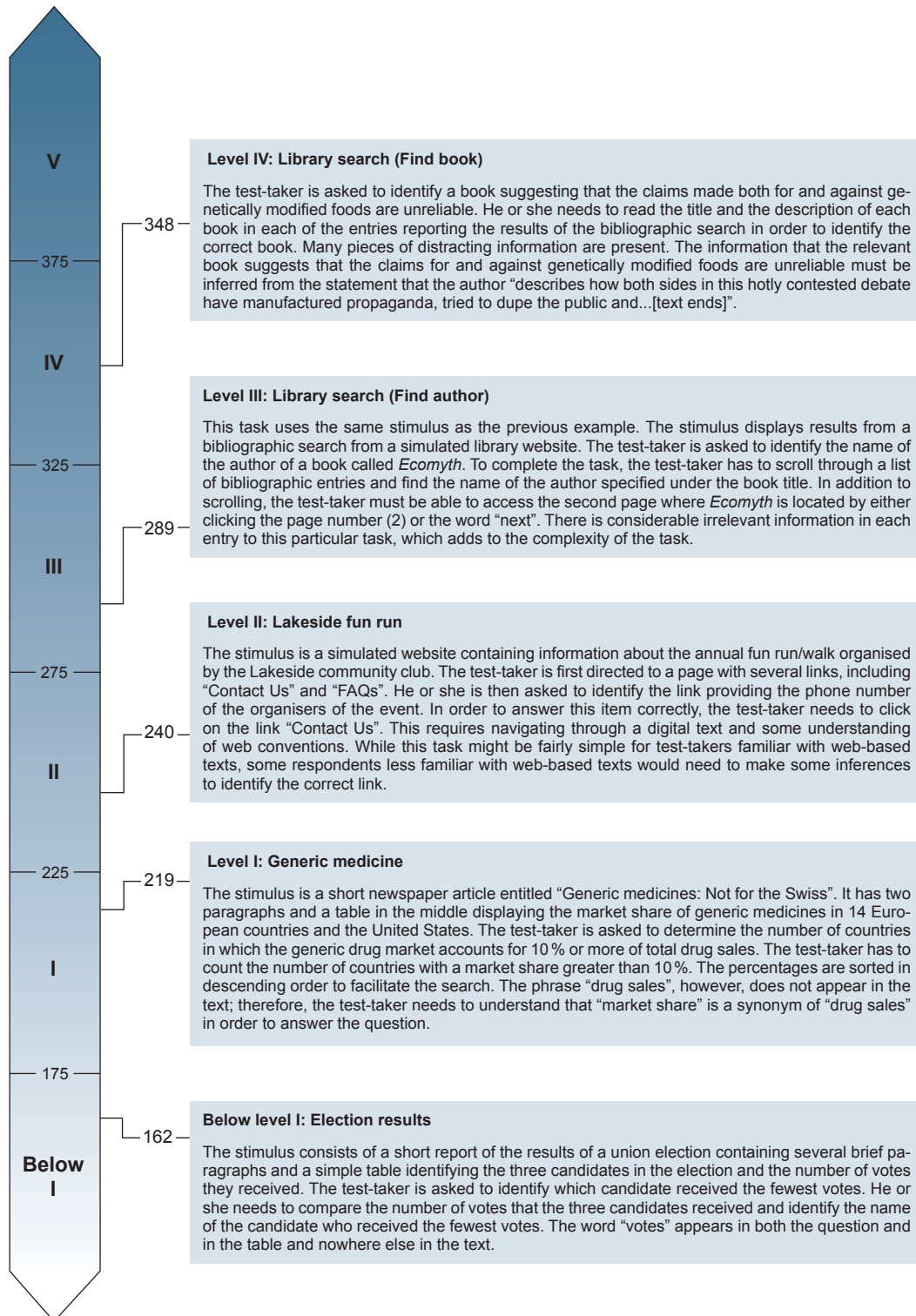
*Numeracy* refers to the ability to access, use and interpret everyday mathematical information in order to manage mathematical demands in daily life. This is measured, for example, with items involving the evaluation of a special offer or the interpretation of numerical information in figures and tables.

### ► Problem solving in technology-rich environments

PIAAC is the first international survey to implement *problem solving in technology-rich environments*. This key skill is defined as the ability to successfully use digital technologies, communication tools and networks to search for, communicate and interpret information. The first wave of PIAAC focuses on how persons access and make use of information in a computer-based environment. Items include sorting and sending e-mails, filling out digital forms, and evaluating the informational content and credibility of different websites.

### ► Assessing basic skills

For each domain, assessment items were developed following the respective theoretical framework. Figure 1 shows sample items for literacy and their location on the literacy scale. The quality and adequacy of these items was thoroughly tested before the main data collection. Proficiency scales were created using Item Response Theory models. Each skill domain was reported on a separate scale. To facilitate the interpretation and the classification of proficiency scores, each scale was divided into proficiency levels with 50-point intervals (similar to other comparable studies such as PISA), resulting in five proficiency levels for both the lit-



Note. Adapted from *OECD Skills Outlook*, 2013.

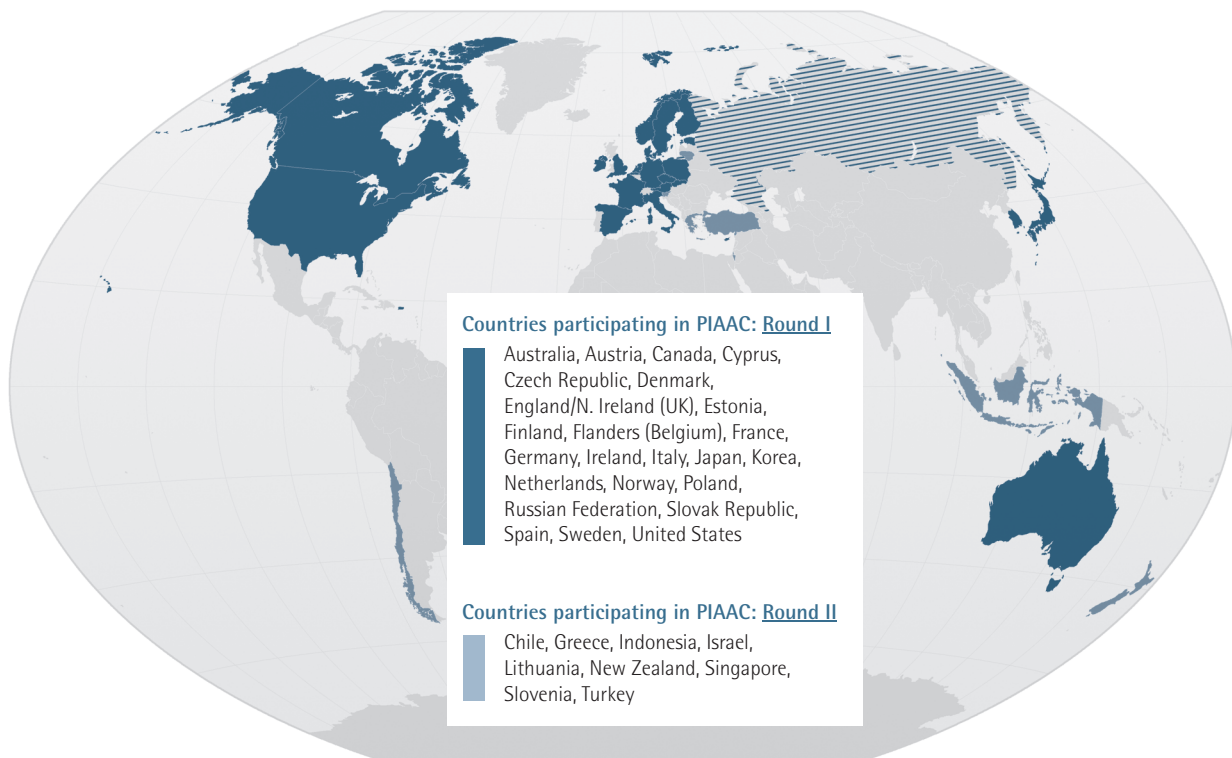
**Figure 1:** Literacy scenarios

eracy and numeracy domain and three proficiency levels for problem solving in technology-rich environments. In addition, the area below the lowest level is classified as “below Level I”.

## Survey Design

► 10-year cycle

PIAAC was initiated by the OECD member states in 2008 and, like PISA, it is designed as a multi-cycle programme. The current wave, PIAAC 2012, is the starting point, and further waves are planned at ten-year intervals. Subsequent cycles will allow future changes in adult skills to be monitored and analysed and will provide first indications of where improvements have been achieved and deficits persist.



**Figure 2:** Countries participating in PIAAC Rounds I and II

Twenty-four countries participated in PIAAC Round I. Nine additional countries also expressed interest in participating in PIAAC. A second round of PIAAC starting at a later date was initiated for these countries and the results should be published in 2016. Figure 2 shows the geographic distribution of the participating countries.

► 24 participating countries

The OECD aims to ensure that PIAAC meets the highest quality standards – especially with regard to sample design and survey operations – in order to provide governments, scientists and other users with reliable data. To date, compliance with these quality standards has been examined and affirmed for 23 of the 24 countries that participated in PIAAC Round I. Results are reported for these countries only. At the time the present report was compiled, the quality of the Russian Federation’s data had not yet been conclusively adjudicated.

At least 5 000 randomly selected respondents between the ages of 16 and 65 were interviewed and assessed in each participating country. The survey was carried out as a personal interview comprising a questionnaire followed by a skills assessment, a computer- or paper-based version of which was independently completed by the respondent in the presence of the interviewer; the entire interview (including the assessment) took between 1 1/2 and 2 hours to administer.

► Representative random sample of adults between the ages 16 and 65 in each country

In Germany, approximately 5 400 interviews were carried out. This corresponds to a response rate of 55 %, which is very high for such surveys, especially in Germany. The extent to which respondents and non-respondents differed was examined as part of the PIAAC quality control procedures. No indications of large differences were found. Thus, the PIAAC results can be regarded as representative of the population between the ages of 16 and 65 in Germany.



## Main Results of PIAAC

### How proficient are adults in Germany compared to other countries?

#### ... in literacy

► Literacy proficiency slightly below average in Germany

Adults in Germany achieve a mean score of 270 points in literacy, which is numerically only slightly, but statistically significantly, below the OECD average of 273 points. The mean literacy scores of the participating countries range from 250 points (Italy) to 296 points (Japan). Germany's comparatively low score is due mainly to skill deficits at the lower percentiles. Although adults in Germany achieve slightly lower scores than the OECD average for different percentiles, this difference is most striking for adults with low proficiency. For the 25% lowest-performing adults, the difference relative to the OECD average increases to up to 6 score points. Moreover, compared to the OECD average, Germany (with 18%) has a slightly higher proportion of adults who do not surpass the lowest proficiency level (Level I).

Apart from Japan, mean literacy scores above the OECD average are achieved by Finland (288 points), the Netherlands (284 points), Australia (280 points), Sweden (279 points), Norway (278 points), Estonia (276 points) and Flanders (Belgium; 275 points). Apart from Italy, Spain also has a strikingly low level of literacy, with a mean score of 252 points. England/Northern Ireland (UK; 272 points), Denmark (271 points), the United States (270 points), and Austria and Cyprus (269 points each) achieve mean scores similar to that of Germany.

► Better results for 16 to 24-year-olds

The already small gap between Germany and the OECD average further decreases for the youngest age group of 16 to 24-year-olds, thus indicating that the comparatively older age groups, in particular, have a lower level of literacy proficiency, whereas the younger age groups achieve higher scores in this domain.

**Table 1:** International comparison of mean literacy proficiency scores and measures of variation

Countries	Percentiles									
	<i>M</i>	( <i>SE</i> )	<i>SD</i>	( <i>SE</i> )	5 %	10 %	25 %	75 %	90 %	95 %
Japan	296	(0.7)	40	(0.6)	226	244	272	324	344	355
Finland	288	(0.7)	51	(0.8)	200	224	258	322	347	362
Netherlands	284	(0.7)	48	(0.6)	196	219	256	317	341	355
Australia	280	(0.9)	50	(0.8)	193	217	251	315	340	355
Sweden	279	(0.7)	51	(0.8)	188	215	251	313	338	351
Norway	278	(0.6)	47	(0.6)	195	218	251	311	333	347
Estonia	276	(0.7)	44	(0.5)	199	218	248	306	330	344
Flanders (Belgium)	275	(0.8)	47	(0.6)	191	213	246	309	332	344
Czech Republic	274	(1.0)	41	(0.8)	203	221	249	302	323	336
Slovak Republic	274	(0.6)	40	(0.6)	201	221	250	301	321	332
Canada	273	(0.6)	50	(0.5)	185	208	243	309	334	348
OECD average	273	(0.2)	47	(0.1)	190	212	245	305	329	342
Korea	273	(0.6)	42	(0.5)	199	219	248	301	322	335
England/N. Ireland (UK)	272	(1.0)	49	(0.8)	188	209	241	307	333	347
Denmark	271	(0.6)	48	(0.6)	186	210	244	303	326	339
Germany	270	(0.9)	47	(0.6)	186	206	239	304	328	341
United States	270	(1.0)	49	(0.8)	182	204	238	305	330	344
Austria	269	(0.7)	44	(0.5)	194	213	242	300	323	336
Cyprus	269	(0.8)	40	(0.5)	198	215	244	296	318	331
Poland	267	(0.6)	48	(0.6)	182	204	237	300	325	340
Ireland	267	(0.9)	47	(0.7)	182	207	239	298	323	337
France	262	(0.6)	49	(0.4)	174	197	232	297	321	334
Spain	252	(0.7)	49	(0.6)	164	187	222	286	311	325
Italy	250	(1.1)	45	(0.7)	173	192	222	282	306	319

Statistically significantly above the OECD average
  Statistically not significantly different from the OECD average
  Statistically significantly below the OECD average

Notes: Countries are ranked in descending order of mean literacy proficiency. The OECD average includes all countries participating in PIAAC with the exception of Cyprus. Statistical significance ( $p < .05$ ) refers to the difference between a country's mean score and the OECD average. *M* = mean score. *SE* = standard error. *SD* = standard deviation.

## ... in numeracy

- ▶ Numeracy proficiency slightly above average in Germany
  - ▶ Strong performance of highest-performing adults
- Germany achieves a mean score of 272 points in numeracy and is therefore slightly, but statistically significantly, above the OECD average of 269 points. This is due mainly to the comparatively large proportion of people with higher proficiency. In contrast to literacy, the scores achieved by adults at lower percentiles in Germany are comparable to the OECD average, whereas the scores of adults at higher percentiles are above the OECD average. The 25% highest-performing adults in Germany achieve up to 5 points more than the corresponding OECD average. Similar to literacy, mean numeracy proficiency scores are lowest in Spain (246 points) and Italy (247 points), and highest in Japan (288 points) and Finland (282 points). Estonia's mean score (273 points) is similar to Germany's.

**Table 2:** International comparison of mean numeracy proficiency scores and measures of variation

Countries	Percentiles									
	<i>M</i>	( <i>SE</i> )	<i>SD</i>	( <i>SE</i> )	5 %	10 %	25 %	75 %	90 %	95 %
Japan	288	(0.7)	44	(0.6)	213	232	261	318	342	355
Finland	282	(0.7)	52	(0.7)	194	217	251	317	345	361
Flanders (Belgium)	280	(0.8)	51	(0.7)	191	214	249	316	342	356
Netherlands	280	(0.7)	51	(0.7)	189	215	251	315	340	354
Sweden	279	(0.8)	55	(0.8)	182	210	249	316	343	358
Norway	278	(0.8)	54	(0.8)	181	210	248	315	341	357
Denmark	278	(0.7)	51	(0.6)	190	213	247	313	339	355
Slovak Republic	276	(0.8)	48	(0.8)	189	214	249	308	331	346
Czech Republic	276	(0.9)	44	(0.8)	201	218	248	305	329	343
Austria	275	(0.9)	49	(0.6)	190	213	246	309	334	349
Estonia	273	(0.5)	46	(0.5)	195	215	245	304	329	344
Germany	272	(1.0)	53	(0.7)	179	202	238	309	335	351
OECD average	269	(0.2)	51	(0.2)	178	203	238	304	330	346
Australia	268	(0.9)	57	(0.8)	169	198	235	305	334	352
Canada	265	(0.7)	56	(0.5)	169	194	231	304	332	349
Cyprus	265	(0.8)	47	(0.7)	183	205	236	296	321	335
Korea	263	(0.7)	46	(0.6)	181	204	236	295	318	332
England/N. Ireland (UK)	262	(1.1)	55	(0.8)	167	192	227	300	329	345
Poland	260	(0.8)	51	(0.6)	171	194	229	294	322	338
Ireland	256	(1.0)	54	(1.0)	161	190	225	291	319	336
France	254	(0.6)	56	(0.5)	152	180	220	294	322	337
United States	253	(1.2)	57	(1.0)	152	178	217	293	323	340
Italy	247	(1.1)	50	(0.8)	161	183	215	282	309	324
Spain	246	(0.6)	51	(0.6)	149	178	216	281	307	322

Statistically significantly  
above the OECD average

Statistically not significantly  
different from the OECD average

Statistically significantly  
below the OECD average

Notes: Countries are ranked in descending order of mean numeracy proficiency. The OECD average includes all countries participating in PIAAC with the exception of Cyprus. Statistical significance ( $p < .05$ ) refers to the difference between a country's mean score and the OECD average. *M* = mean score. *SE* = standard error. *SD* = standard deviation.

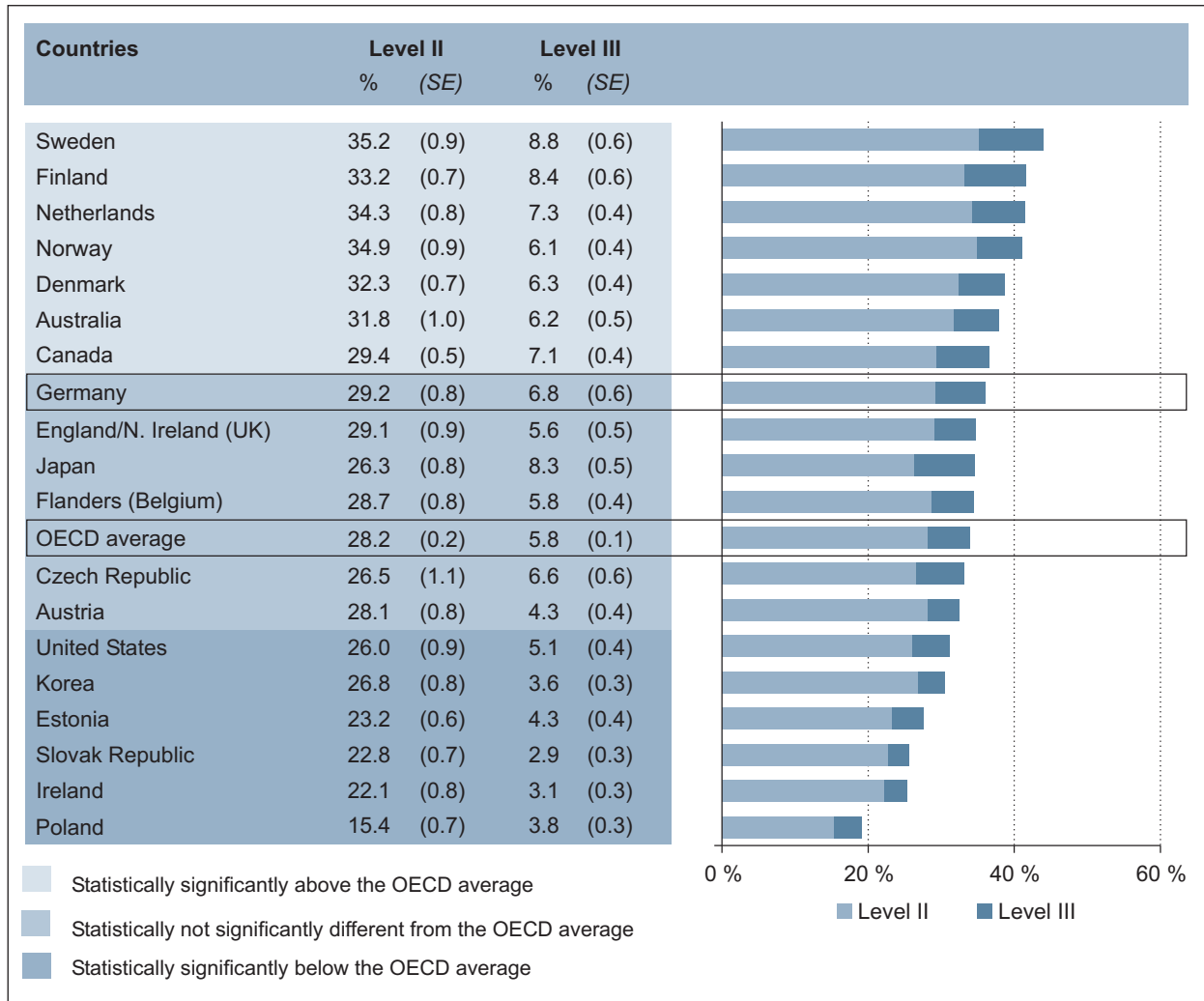
### ... in problem solving in technology-rich environments

The assessment of problem solving in technology-rich environments was an international option, i.e. participating countries were free to choose whether to assess this domain or not. All countries with the exception of France, Italy, Spain and Cyprus opted to do so.

Because the assessment of this skill domain was, by definition, exclusively computer-based, no scores could be determined for respondents who did not have adequate computer skills or who refused to do the computer-based assessment for other reasons. Hence, mean scores cannot be estimated for the entire population. Instead, the results are reported merely in the form of proportions of the population at the three proficiency levels on the problem solving in technology-rich environments scale (cf. Fig. 3 for the proportions at Levels II and III).

► Proficiency in problem solving in technology-rich environments in Germany comparable to OECD average

Overall, scores for problem solving in technology-rich environments were determined for 81 % of the German population and, thus for 5 % more than the OECD average. In the German population as a whole, 45 % of adults have only low proficiency (Level I or below) in solving problems in technology-rich environments, 29 % have medium proficiency (Level II) and 7 % are highly proficient (Level III). Although these proportions are numerically somewhat higher than the OECD average, they are nonetheless comparable to it. Whereas 36 % of the population in Germany have medium or high proficiency in this domain, Sweden, with 44 %, and Finland and the Netherlands, with around 42 % each, have the highest population proportions at Levels II and III. Poland, with 19 %, and Ireland, with 25 %, have the lowest proportions at these upper two proficiency levels.



Notes: Countries are ranked in descending order of the proportion of adults at Levels II and III on the problem solving in technology-rich environments scale. The OECD average includes all countries participating in PIAAC with the exception of France, Italy, Spain and Cyprus. Statistical significance (as given in *OECD Skills Outlook, 2013*) refers to differences in the sum of proportions of adults at Levels II and III between the country and the OECD average. *SE* = standard error.

**Figure 3:** International comparison of percentages of adults scoring at Levels II and III on the problem solving in technology-rich environments scale

## How do basic skills differ within the population?

► Largest differences in proficiency for formal education

Differences in basic skills between specific population subgroups within countries are more pronounced than the differences across countries. In all participating countries, these differences are most pronounced for formal education (Fig. 4 shows this for literacy). In most countries, there are considerable differences in proficiency between people with and without an immigrant background or between people from different birth cohorts. However, all of these differences decrease substantially when the influence of other factors – such as educational attainment in the case of birth cohorts – is taken into account.

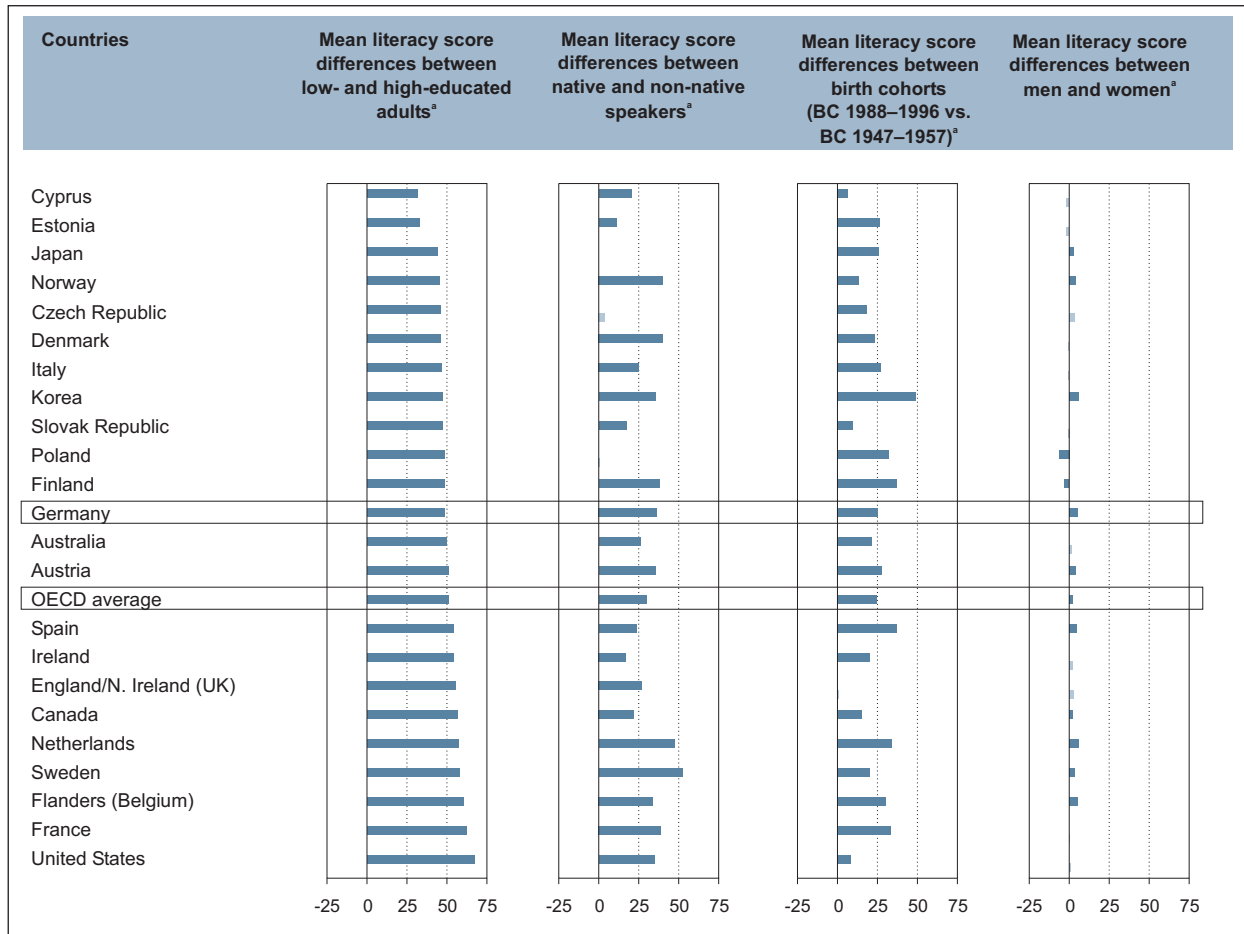
### ... between people with different levels of education

► Literacy proficiency of adults with a *Hauptschule* leaving certificate is approximately 75 points lower than that of adults with a university degree

In all countries, the most noticeable differences in basic skills are observed in relation to the level of educational attainment. In Germany, the literacy proficiency of adults who have at most a *Hauptschule* leaving certificate is, on average, around 75 points – and therefore one-and-a-half proficiency levels – lower than that of people with a university degree. The *Hauptschule*, which is aimed at basic general education, is the lowest tier of lower secondary education. The *Hauptschule* leaving certificate can be obtained on completion of grade 9. Classifying levels of education according to the International Standard Classification of Education (ISCED) into Low, Medium and High, there is a difference of approximately 50 points, i.e. one proficiency level, between people with low and high levels of education in Germany. This corresponds approximately to the average difference across all participating OECD countries (cf. Fig. 4).

► Each additional educational qualification is related to higher proficiency

The comparison of differences in proficiency across educational attainment levels reveals that, on average, any further education acquired after the *Hauptschule* leaving certificate, either through further schooling, an apprenticeship, or a tertiary education programme, is related to distinctly higher proficiency. Those who underwent vocational training after graduating from *Hauptschule* also achieve higher scores in literacy and numeracy than *Hauptschule* graduates without vocational training.



Notes: Countries are ranked in descending order of the difference in literacy proficiency scores between the lowest and the highest level of educational attainment. The OECD average includes all countries participating in PIAAC with the exception of Cyprus. BC = birth cohort.

<sup>a</sup> Dark blue bars show statistically significant ( $p < .05$ ) differences; light blue bars show differences that are not statistically significant.

**Figure 4:** International comparison of differences in mean literacy proficiency scores between specific population subgroups



► Over half of those with at most a *Hauptschule* leaving certificate can only cope with basic tasks

The very low average literacy and numeracy proficiency among those who have either no school-leaving qualification or only a *Hauptschule* leaving certificate are particularly alarming. Over half of these people achieve Level I at most and are therefore only capable of completing very simple, basic tasks. Hence, there is reason to fear that, because of their low level of basic skills, members of this subgroup may have poor labour market opportunities. These poor opportunities are in turn related to limited opportunities for learning and skill acquisition in the workplace. Furthermore, in Germany in particular, it is striking that, even in adulthood, proficiency is still strongly influenced by the educational background of parents.

► Proficiency is strongly influenced by educational background of parents

### ... between people with and without an immigrant background

► On average, people with an immigrant background achieve lower proficiency scores

In almost all countries, adults with an immigrant background achieve, on average, lower proficiency scores than those without an immigrant background. However, compared to the differences due to education, this difference is only about half as large in Germany. The disparity is not surprising, as immigrant background is determined based on the respondent's mother tongue, and the assessment of skills in PIAAC was administered in the national language(s). However, the differences across countries are striking. In the classical immigration countries such as Canada and Australia for example, proficiency differences between native- and non-native speakers are comparatively low, whereas larger, but actually quite similar, disparities exist in Germany and neighbouring countries (such as Austria, France and the Netherlands). It can therefore be assumed that, besides the fact that the classical immigration countries are Anglo-Saxon, the countries' immigration policy also influences linguistic integration and, therefore, the observed proficiency differences in the national language.

### ... between birth cohorts

Adults who were born earlier, and are therefore older, have lower proficiency scores than younger adults, who were born later. These differences are also substantially smaller than the differences due to education, and they vary strongly across countries. In countries such as Cyprus or England/Northern Ireland (UK) there are almost no proficiency differences between birth cohorts, whereas these differences are very pronounced in Korea. This indicates that the observed differences between birth cohorts are not caused by biological ageing processes alone, but also result from different socialisation processes and differences in educational opportunities and length during certain time periods in the PIAAC countries. On average, the proficiency scores of the 16 to 44-year-olds in Germany are very similar, whereas those born between 1947 and 1967 (45 to 65-year-olds) show comparatively lower proficiency scores.

► Older adults have lower proficiency scores than younger adults

### ... between men and women

Men and women differ only marginally in terms of their proficiency in the basic skills assessed. However, in the case of literacy the direction of the difference varies across countries. In some countries, women outperform men in literacy; in other countries men outperform women. By contrast, men consistently achieve slightly higher average numeracy scores than women – a difference that is only slightly more pronounced in Germany compared to the OECD average. In Germany, however, this difference is considerably smaller in the younger birth cohorts.

► Proficiency scores of men and women differ only marginally

## How important are basic skills in the labour market?

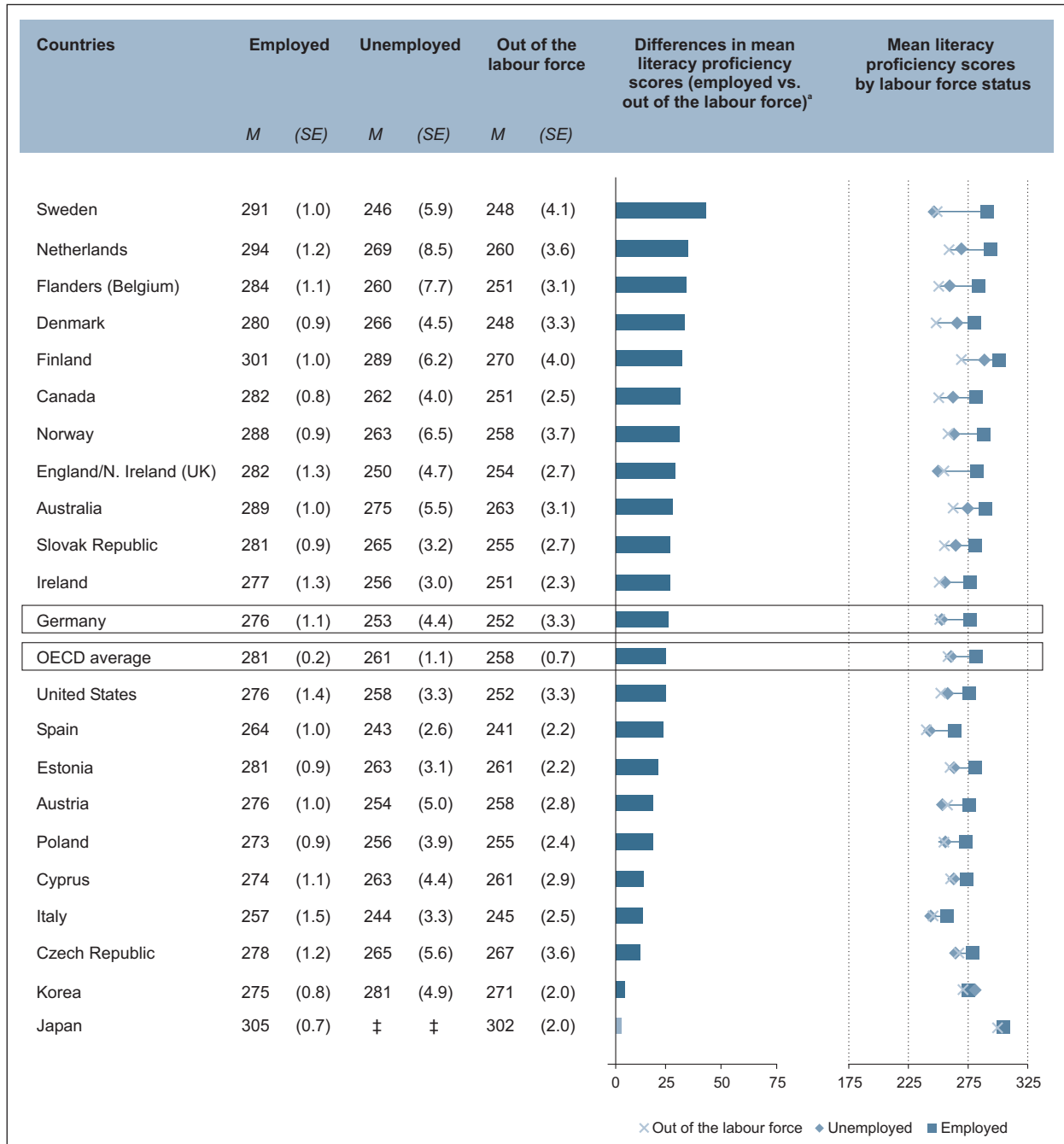
### ► Basic skills relevant for labour market

The basic skills assessed in PIAAC are not specifically job-related skills. However, in Germany's occupationally structured labour market they are very relevant for labour market participation, labour market placement, and income. Despite the importance of professional qualifications in the German labour market, the basic skills assessed in PIAAC are strongly linked to various aspects of adults' employment opportunities.

### ... in terms of labour market participation

### ► On average, employed persons have higher proficiency scores than unemployed persons and those who are not in the labour force

There is a strong relation between basic skills and labour market participation (Fig. 5 shows this for literacy). According to the definition of the International Labour Organization (ILO), employed persons are persons who work for at least one hour per week for pay or any form of profit or gain. In almost all countries participating in PIAAC, including Germany, employed persons between the ages of 25 and 54 have, on average, a higher level of basic skills than unemployed persons and persons who are not in the labour force. In Germany, these differences of 23 and 24 points in literacy and 35 and 36 points in numeracy are slightly more pronounced than for the average of the participating OECD countries. In Japan, for example, the difference between employed persons and persons who are not in the labour force is merely 3 points for literacy and 12 points for numeracy. Unemployed persons and persons who are not in the labour force show similar mean proficiency scores both for Germany and the OECD average. However, the long-term unemployed – that is, persons who have been unemployed for 12 months or more – have particularly severe skill disadvantages. In Germany, they achieve strikingly low proficiency scores in both skill domains – scores that are below the OECD average for this group.



Notes: Countries are ranked in descending order of the difference between employed persons and persons outside the labour force. The OECD average includes all countries participating in PIAAC with the exception of France and Cyprus. M = mean score. SE = standard error. ‡ = values not included due to small number of cases (n < 62).

<sup>a</sup> Dark blue bars show statistically significant ( $p < .05$ ) differences; light blue bars show differences that are not statistically significant.

**Figure 5:** International comparison of mean literacy proficiency scores by labour force status, 25 to 54-year-olds

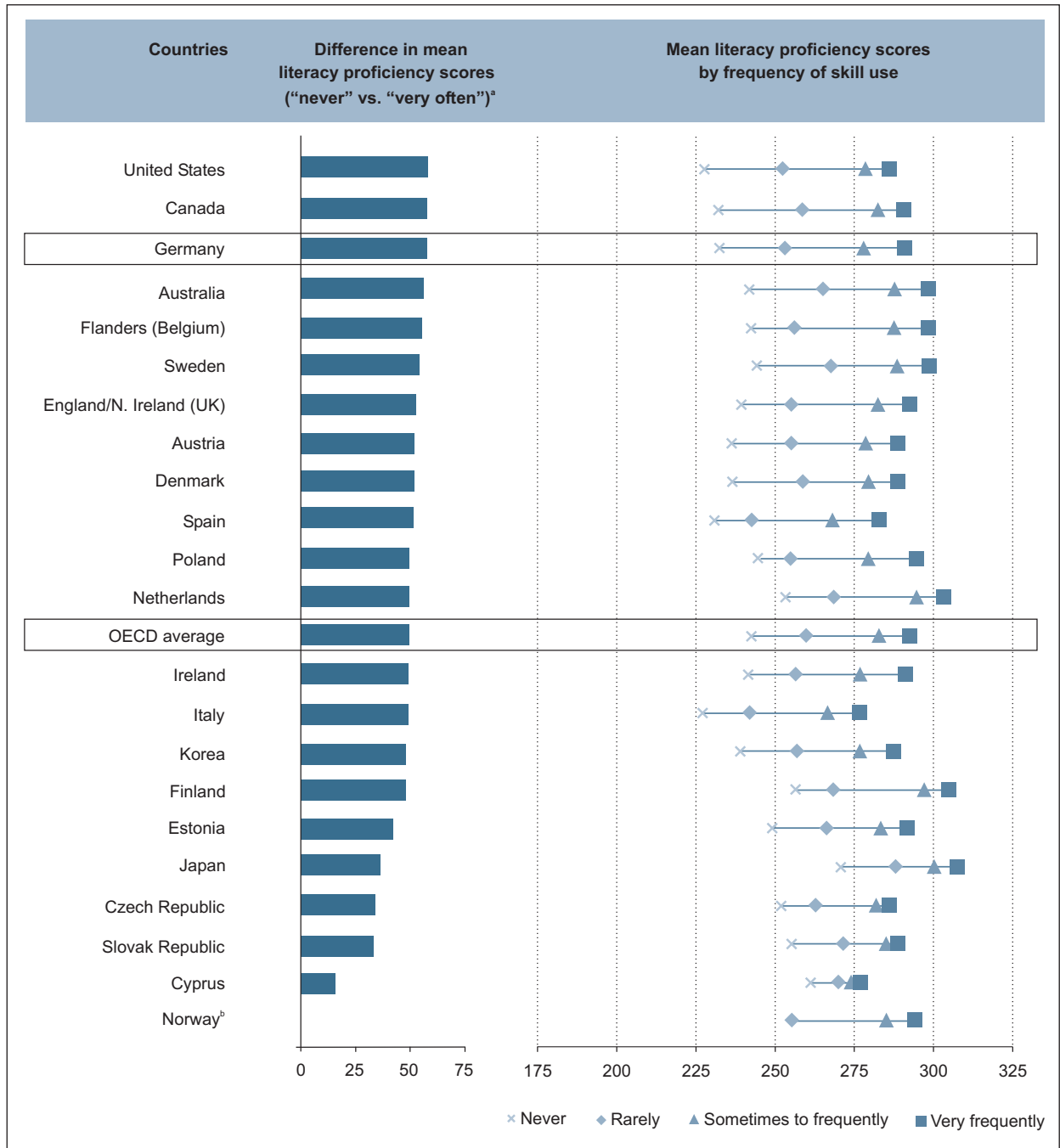
## ... in terms of their use at work

- ▶ Job requirements vary considerably across occupational groups and countries

Depending on the job, the work-related cognitive and non-cognitive demands on employed persons vary considerably. In Germany, and on average across all OECD countries, numerical tasks are required in around 80% of jobs. As is to be expected, job requirements vary considerably across occupational groups, whereby these variations are more pronounced in some countries than in others. In Germany, for example, managers, professionals and clerks perform numerical tasks more often, on average, than their counterparts in the other OECD countries, whereas unskilled workers do so much less frequently. Across almost all occupational groups, jobs in Germany are particularly characterised by a comparatively high degree of task discretion.
- ▶ Higher job requirements are related to higher proficiencies

In all countries, there is a clear relation between job requirements with regard to reading and numeracy and the level of basic skills of the job holder (Fig. 6 shows this for literacy). Employed persons who frequently perform reading and numerical tasks have, on average, a considerably higher level of literacy and numeracy skills than employed persons whose jobs never require these skills. Whether this is the result of a selection process whereby persons are matched with jobs according to their skills, or the fact that (further) skills are acquired due to more frequent performance of such tasks, or whether both factors are involved, cannot be clarified on the basis of the cross-sectional PIAAC data.
- ▶ Two-thirds of employed persons in Germany are suitably qualified for their jobs

The educational qualifications of the overwhelming majority – around two-thirds – of employed persons in Germany match the qualification requirements of their jobs. However, as in other countries, the existing qualifications potential is not being fully exploited in the labour market. In Germany, the proportion of over-qualified employed persons – that is, persons who have a higher educational qualification than their jobs require – is 23%, and thus twice as high as the corresponding proportion of under-qualified persons (11%). While the proportion of over-qualified persons in Germany is above the OECD average, the proportion of under-qualified persons is below it.



Notes: Countries are ranked in descending order of the difference between the literacy proficiency of those who never read at work and those who do so very frequently. The OECD average includes all countries participating in PIAAC with the exception of France and Cyprus. <sup>a</sup> Dark blue bars show statistically significant ( $p < .05$ ) differences. <sup>b</sup> Values for the response category "never" are not included due to the small number of cases ( $n < 62$ ).

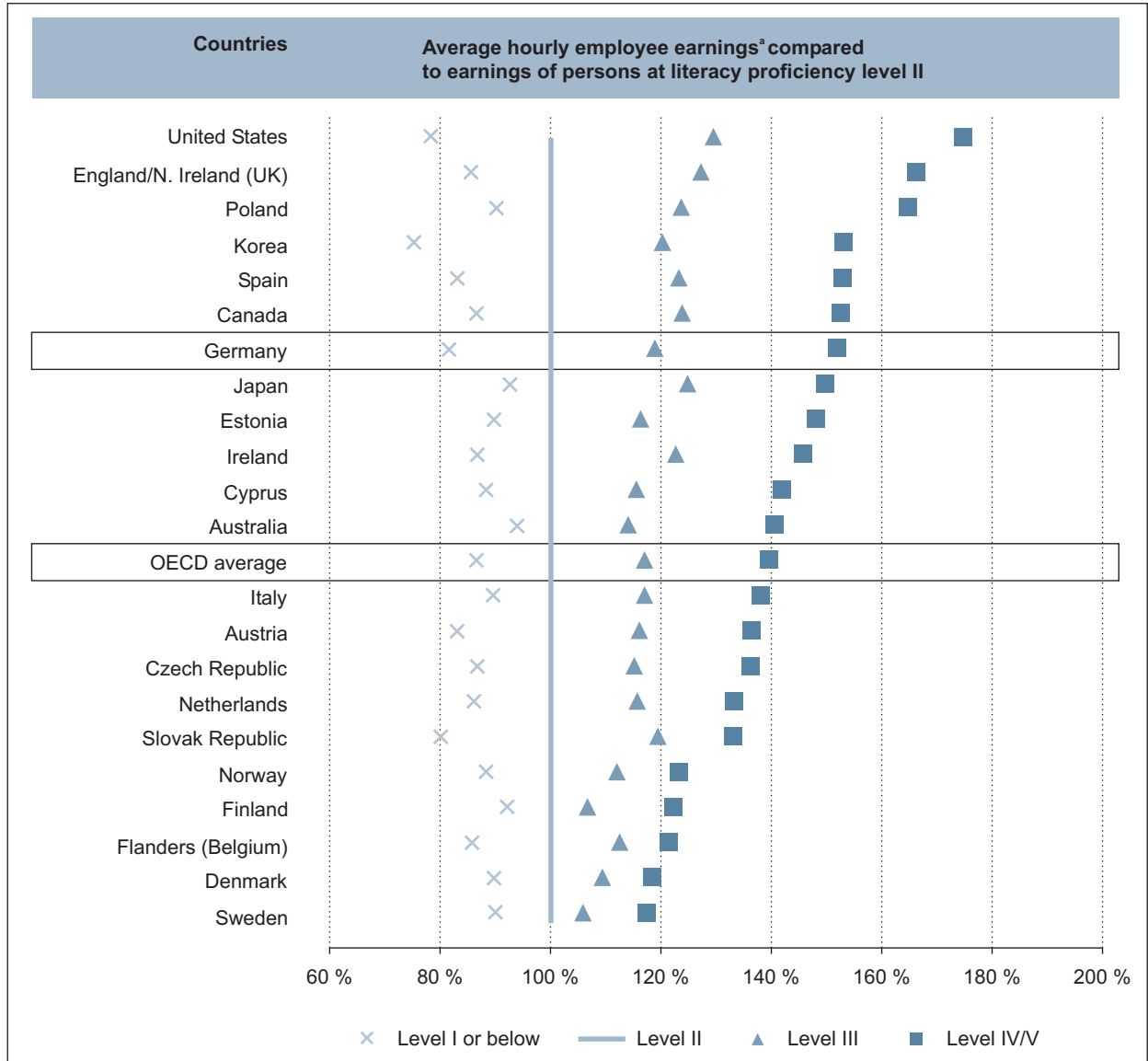
**Figure 6:** International comparison of mean literacy proficiency scores by frequency of reading at work, employed persons between the ages of 16 and 65

## ... in terms of income

► Higher levels of basic skills are related to higher earnings

► Differences in earnings across proficiency levels are relatively large in Germany

Proficiency differences in basic skills are related to substantial differences in earnings. In all countries participating in PIAAC, employees with higher levels of proficiency in literacy and numeracy obtain, on average, higher earnings than employees with lower proficiency levels (Fig. 7 shows this for literacy). Across OECD countries, employees at the highest literacy proficiency level earn on average approximately 40% more than those at proficiency Level II and approximately 61% more than employees at the lowest proficiency level. In Germany, the corresponding differences in earnings (52% and 86%) are even more pronounced. This effect decreases somewhat when additional factors such as gender and education length are taken into account, but it still remains substantial. Even after controlling for these factors, an increase in literacy proficiency of one proficiency level (50 points) is related, on average, to an almost 10% increase in hourly earnings in Germany. Based on average hourly earnings of around 16 euros, this increase in earnings corresponds to around 1.60 euros per hour or, in the case of full-time employment, about 265 euros per month.



Notes: Countries are ranked in descending order of the largest relative deviations of average gross hourly employee earnings from Levels IV/V to Level II. Calculations are based on data from the *OECD Skills Outlook, 2013*. The OECD average includes all countries participating in PIAAC with the exception of France and Cyprus.

<sup>a</sup> The median is used as the measure of average hourly employee earnings. Employee earnings at Level II are normalized to 100%.

**Figure 7:** International comparison of relative average hourly employee earnings by literacy skill levels, 16 to 65-year-olds



## Overview and Outlook

- ▶ Mean proficiency in Germany corresponds approximately to OECD average for all three basic skills

The mean proficiency in Germany corresponds approximately to the international average for all three skill domains assessed. While the literacy mean score is slightly below average, the numeracy mean score is slightly above average, and the results for problem solving in technology-rich environments are average, the German results differ from the corresponding OECD average only by at most three proficiency or percentage points. The lower scores in literacy are due mainly to deficits at the lower percentiles, whereas the slight advantage in numeracy can be attributed to strong performance at the higher percentiles.
- ▶ Strikingly high levels of basic skills in Japan

In international comparison, Japan stands out because of its strikingly high scores in literacy and numeracy, and Spain and Italy because of their very low scores. Apart from these three countries, the remaining 20 countries yield a relatively homogeneous picture, with differences between countries of up to 26 points in literacy and up to 29 points in numeracy.
- ▶ Results reveal similarities to PISA

The results of PIAAC Germany reveal many similarities to those of PISA. In particular, both Germany's slightly below-average performance in literacy due to skill deficits at the lower percentiles, and the strikingly clear relation between proficiency and social background reflect the findings of PISA 2000. This indicates that the problems identified here and in PISA 2000 did not first arise in the school system of the 1990s but instead reflect long-term characteristics of the German education system. Moreover, the analysis of the youngest birth cohorts – that is, those who may have already benefited from the “post-PISA” education reforms and initiatives – reveals a positive outlook from a German point of view. These birth cohorts clearly achieve higher mean literacy scores that correspond approximately to the OECD average for this age group, thus confirming the positive trend reported in PISA 2009. Furthermore, the results of PIAAC suggest that people who did not adequately learn certain basic skills in the German education system (and therefore attained only low levels of proficiency in PISA) can hardly compensate for these deficits in later life. There are probably many reasons for this: These people have limited chances of obtaining (vocational) training, participating in the labour market or finding a cognitively challenging and stimulating job. Moreover, their participation in further education and training is comparatively low. Hence, opportunities to improve inadequate skills in adulthood are lacking.

The central role played by formal education and educational participation in the acquisition of the key skills assessed is also reflected in the findings regarding educational disparities. The difference in proficiency between the lowest and the highest educational qualification in Germany is one-and-a-half times larger than the difference between Italy and Japan – the countries with the lowest and the highest mean scores in literacy respectively. In this context, it is alarming to note that persons with at most a *Hauptschule* leaving certificate tend to have only elementary literacy and numeracy proficiency. The German school system and the subsequent educational institutions are apparently unable to equip the entire German population with basic skills that surpass the elementary skill level (Level I). Therefore, further education opportunities are needed after completion of school and training – in other words, in adulthood – to foster the acquisition and development of basic skills. The results of the national PIAAC report reveal that the subgroup with the lowest levels of proficiency has the lowest rate of participation in formal further education and training. This may be due to the fact that, in Germany, further education and training frequently takes place in a work context, and therefore a – demanding – job is a prerequisite for training. Moreover, existing further education and training opportunities are not sufficiently tailored to the needs of this subgroup.

► People with low proficiency levels participate less in further education and training

From a comparative perspective, the findings with regard to educational disparities raise the question as to whether some education systems convey basic skills more effectively than others. For example, it could be assumed that general education systems, which focus on such general skills for longer periods of time, achieve higher average levels of proficiency than vocational education systems, which are more oriented towards the occupation-specific skills. The results reveal that the distributions of skills in Germany are relatively similar to other countries with vocational education systems, such as Denmark and Austria. However, similar mean values are also found in countries with very different education systems, for example the United States, where secondary education (grades 10 to 12) does not include vocational schools and the proportion of people with a university degree is considerably higher. All these mean values are close to the OECD average. Therefore, the results do not show that any one system is clearly superior to another, nor do vocational education systems across OECD countries perform particularly poorly when it comes to teaching key skills.

► No education system is superior

► Low proficiency is related to considerable labour market problems

It should be stressed that low proficiency scores are related to considerable labour market problems. Employed persons in Germany, and in almost all other participating countries, have higher levels of basic skills than unemployed persons or persons who are not in the labour force. On the one hand, this difference may arise from selection processes in the labour market, where only those with sufficient skills are successful. On the other hand, the disparity may be reinforced by the fact that skills are lost when they are not actively used at work. However, the findings with regard to the long-term unemployed give cause for concern and indicate once again the necessity for measures to improve the comparatively low basic skills of this subgroup in order to increase their chances of reintegration into the labour market.

► Higher proficiency means higher earnings

It is worthwhile for the individual to invest in his or her own basic skills – the findings related to earnings clearly show this. The higher the proficiency, the higher the earnings. PIAAC clearly reveals that not only occupation-specific skills but also the basic skills assessed here are important in the labour market; this is also the case for Germany.

► Command of the national language is related to higher levels of key skills

To conclude, two findings with which PIAAC contributes to the debate on equal opportunity in our society should be mentioned. Firstly, after controlling for other factors such as employment, there are hardly any differences in the mean proficiency scores of men and women both in Germany and across the OECD countries. This finding is surprising given the highly segregated labour markets in almost all participating countries. The fact that jobs held by men and women differ would lead one to expect an increase in gender differences in adulthood compared to those typically found for students (for example, in PISA). However, precisely this is not found. Thus, the different tasks that men and women perform at work cannot be explained by differences in their basic skills. Secondly, in Germany there are substantial differences between the basic skills of native speakers and non-native speakers. However, the differences found in Germany are not especially remarkable compared to the average across the participating OECD countries and to neighbouring countries. Overall, it is apparent that in Germany, as in most of the other countries, command of the national language is related to higher levels of key skills, which are relevant for social participation.



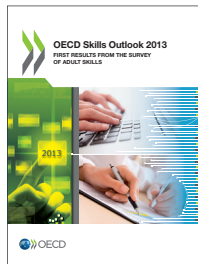
## Further information on PIAAC 2012

The present summary is based on:



Rammstedt, B. (Ed.) (2013). *Grundlegende Kompetenzen Erwachsener im internationalen Vergleich. Ergebnisse von PIAAC 2012*. Münster: Waxmann.

The OECD has simultaneously published an international report with results of PIAAC 2012:



OECD (2013). *OECD Skills Outlook 2013: First Results from the Survey of Adult Skills*. Paris: OECD Publishing.



OECD (2013). *The Survey of Adult Skills: Reader's Companion*. Paris: OECD Publishing.

Further information can be found on the following websites:

GESIS [www.gesis.org/piaac](http://www.gesis.org/piaac)

OECD [www.oecd.org/site/piaac/](http://www.oecd.org/site/piaac/)