



# Empowering adults through upskilling and reskilling pathways

**Volume 1:** adult population with potential  
for upskilling and reskilling



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## Volume 1

Adult population with potential  
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# Foreword

Upskilling and reskilling of adults is an urgent priority for European policy-makers and stakeholders. But how big is that challenge?

The answer is not simple. Low-skilled status is a multidimensional and dynamic phenomenon which goes beyond formal educational attainment. A comprehensive approach needs to consider both the determinants and effects of low skills and, in doing this, include a wider typology of people, such as those with specific skills gaps or obsolete skills. To design and implement policies tailored to this very heterogeneous population, policy-makers need a comprehensive and robust evidence base.

This publication provides such evidence. In the EU-28 Member States, Iceland and Norway (EU-28+) we estimate 128 million adults with the potential for upskilling and reskilling (46.1% of the adult population). These adults may present low education, low digital skills, low cognitive skills or are medium-high educated at risk of skill loss and obsolescence. Our estimates paint an alarming picture and hint to a much larger pool of talent and untapped potential than the 60 million adults usually referred as low-skilled in the EU-28.

This reference publication forms part of Cedefop's project *Empowering adults through upskilling and reskilling pathways*. The purpose of the project is to support the design, diffusion and implementation of VET policies and measures helping adults, especially low-skilled adults, to achieve the knowledge, skills and competences required for work, employability and lifelong learning.

As shown in this report, the magnitude of the low skills phenomenon, and the complexity and heterogeneity of the needs of low-skilled adults, call for a renewed approach to upskilling and reskilling, to enable pulling together various resources and exploiting synergies across the different measures and policies already in place in Europe. Developing coordinated and coherent approaches to upskilling and reskilling pathways for adults is the theme of the second reference publication in this series.

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# Executive summary

This publication is the first volume of Cedefop research on empowering adults through upskilling and reskilling pathways.

As 2020 approaches, and the EU is still far from attaining its benchmark of 15% adult participation in learning, our societies face multiple challenges: technological changes, including digitalisation and its consequences for the future of work; ageing societies; the need for the greening of the economy; and social inclusion. Europe must improve and maintain high-level skills and competences to remain competitive and innovative; skills are therefore essential, not only to access and progress in the labour market but also to achieve one's full potential and play an active role in society.

The benefits of investing in the upskilling and reskilling of adults have long been acknowledged in the literature. Cedefop analysis <sup>(1)</sup> demonstrates how adults with low cognitive skills and/or low education are a vulnerable segment of the population, characterised by lower earnings and employment rates, lower quality of health, wellbeing and life satisfaction, lower civic and social engagement, and higher probability of involvement in criminal activities. Empowering low-skilled adults by promoting their upskilling and/or reskilling is associated with large social and economic incentives. According to the estimates, upskilling the EU-28 adult population (upskilling scenario: a faster increase on skill levels in the EU-28 Member States compared to the current trend) would lead to an average yearly gain of EUR 200 billion in the 10-year period between 2015 and 2025. Lack of exhaustive data prevents determining a comprehensive figure for the cost of low skills. These estimates, while alarming, should be regarded as underestimating the real economic and social costs of low skills in Europe and call for immediate action.

However, the low-skilled adult population is heterogeneous and includes adults with different needs and characteristics. For policy-makers to design

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(1) Cedefop (2017). *Investing in skills pays off: the economic and social cost of low-skilled adults in the EU*. Luxembourg: Publications Office. Cedefop research paper; No 60.  
<http://dx.doi.org/10.2801/23250>

and implement tailored policies, there is a need to develop a comprehensive and robust evidence base in order to understand better the magnitude of the low-skilled adult population and which groups of adults are more at risk of being low-skilled.

To date, lack of exhaustive data has meant that analysis of ‘low-skilled’ status has been rather narrow and primarily conducted on the basis of either the level of educational attainment of the population or as people working in low-skilled jobs. However, low-skilled status is a multidimensional and dynamic phenomenon which goes beyond educational attainment. A comprehensive approach to understanding low skills should consider both the determinants and effects of low skills; in doing this, it should also include a wider typology of people with low skills, such as those with obsolete skills and mismatched workers.

The aim of this reference report is to understand better the magnitude of the low-skilled adult population in the EU-28 Members States, Iceland and Norway (hereafter EU-28+). It also seeks to identify which groups of adults are most at risk of being low-skilled according to a wider definition that goes beyond educational attainment to digital skills, cognitive skills (literacy and numeracy) and the effects of skill loss and obsolescence.

For the purpose of this research, adults (aged 25 to 64) have been investigated according to these skill domains:

- (a) educational attainment (LFS 2016 <sup>(2)</sup>);
- (b) computer and digital skills (Community statistics on information society, CSIS 2015, 2014 for Iceland <sup>(3)</sup>);
- (c) cognitive skills (numeracy and literacy, OECD PIAAC 2012, 2015 <sup>(4)</sup>);

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<sup>(2)</sup> Educational attainment levels according to the international standard classification of education ISCED 2011, as reported in the Eurostat-European Union labour force survey (LFS). <http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/lfs>

<sup>(3)</sup> The Eurostat Community Statistics on information society survey provides information on access and use of information and communication technologies including: computer use, internet access, digital competences. CSIS 2015 covers all EU-28+ countries except Iceland. CSIS 2014 data have been used for Iceland. <https://ec.europa.eu/eurostat/web/microdata/community-statistics-on-information-society>

<sup>(4)</sup> The OCED-PIAAC (Programme for the International Assessment of Adult Competencies) is a programme of assessment and analysis of adult skills. The Survey of Adult Skills conducted as part of PIAAC measures adults' proficiency in cognitive skills (literacy and numeracy) and problem-solving in technology-rich environments. PIAAC covers 21 countries of the EU-28+: 18 surveyed in round 1 (2012): AT, BE, CY, CZ, DE, DK, EE, ES, FI, FR, IE, IT, NL, NO, PL, SE, SK, UK; and three surveyed in round 2 (2015): EL, LT, SI. No data in proficiency in problem-solving in technology-rich environments are available for ES, FR, CY and IT. <https://www.oecd.org/skills/piaac/>

- (d) adults with medium or high education (ISCED 5-8, LFS) but working in elementary occupations (ISCO 88-09) as a proxy for skills obsolescence/skill loss.

## Low-skilled adults in the EU-28+: descriptive statistics

Data show that EU-28+ countries present significant differences in the share of adults with low skills in all dimensions considered. In particular:

- (a) according to Eurostat-LFS 2016 data, the share of adults with low levels of education (ISCED 0-2 and 3c short) varies from over 50% for Malta and Portugal to less than 10% in some eastern Europe countries (Czechia, Lithuania);
- (b) in countries such as Bulgaria, Italy and Romania, one in four adults (25%) declared in 2015 they had never used the computer, while this share drops to less than 5% in Germany, the Netherlands and the United Kingdom (CSIS-2015);
- (c) significant differences among countries are also found in the use of the internet and digital skills. According to CSIS-2015 data, in Bulgaria, Cyprus, Poland and Romania, 60% or more of adults have insufficient digital skills; they either have not used the internet in the three months prior to the interview or, if they have used it, they have below basic digital skills in activities such as information, communication, content creation and problem-solving;
- (d) among the countries investigated by the PIAAC survey (2012;2015), the share of adults with low cognitive skills (literacy and numeracy) is particularly high (over 36%) in Greece, Spain and Italy, while it is much lower (below 20%) in the Scandinavian countries, as well as in Czechia, Estonia, the Netherlands and Slovakia.

Overall, the incidence of low skills across the EU-28+ shows that Greece, Spain, France, Italy and Malta present higher than average shares of low-skilled adults in almost all the skills concepts investigated (for which data are available for the country). In contrast, the Netherlands, Austria and Nordic countries (Denmark, Finland, Norway and Sweden) perform better than average in terms of low skills in all dimensions.

## Estimation of the adult population with potential for upskilling and reskilling in the EU-28+

As there is no single European data set encompassing information on all skill domains considered in this study, estimation of the magnitude of the adult population with potential for upskilling and reskilling has been carried out using a four-step residual approach. To reduce overlapping of relevant information, four sets of low-skilled adults have been estimated and summed up to arrive at a single value:

- (a) adults with low education <sup>(5)</sup> (LFS 2016 microdata);
- (b) adults with medium-high education working in elementary occupations (LFS 2016 microdata) <sup>(6)</sup>;
- (c) adults with low digital skills <sup>(7)</sup>, among those which have medium-high education and are not employed in a manual job (CSIS 2015 microdata, plus CSIS 2014 for Iceland);
- (d) adults with low cognitive skills (low literacy and/or low numeracy) <sup>(8)</sup>, among those which have medium-high education, who are not working in an elementary occupation (ISCO 9) and having already used computer (PIAAC 2012; 2015 public use microdata files).

According to these estimates, in the EU-28+, there are 128 million adults (46.1% of the adult population of this area) with potential for upskilling and reskilling, since they present either low education, low digital skills, low cognitive skills or are medium- to high-educated at risk of skill loss and obsolescence, because they work in elementary occupations.

These estimates depict an alarming picture and hint at a much larger pool of talent and untapped potential than the 60 million low-educated adults usually referred as low-skilled adults in the EU-28.

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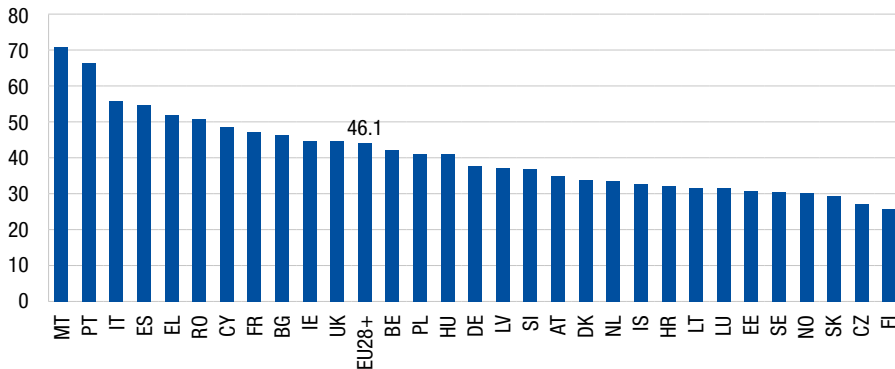
<sup>(5)</sup> Low education refers to people who have successfully completed at most ISCED levels 0-2 or ISCED 3c short programmes lasting less than two years.

<sup>(6)</sup> Adults with medium and high educational attainment levels (ISCED 3 to 8) working in elementary occupations (ISCO 08 group 9).

<sup>(7)</sup> Refers to people with low use of internet or below basic digital skills.

<sup>(8)</sup> Low literacy or numeracy skills are defined as PIAAC scores lower than 226 points (i.e. at most level 1 on the proficiency scale ranging from below level 1 to level 5 of OECD-PIAAC).

Figure 1. **Estimated adult population with potential for upskilling by country (%), EU-28+**



(\*) EU-28+ = EU-28 plus Iceland and Norway.

Source: Cedefop calculation based on LFS 2016, CSIS 2015, OECD PIAAC 2012 and 2015.

There are considerable differences among countries. Very high shares of adults with potential for upskilling and reskilling (around 70%) are observed in Malta and Portugal. Estimates are also quite alarming for Greece, Spain, Italy and Romania, all of which report values over 50%. Conversely, the lowest shares can be observed in Czechia and Finland (28% and 27% respectively) but also in Estonia, Norway, Slovakia and Sweden (between 31 and 33%).

## Identification of subgroups of adults most at risk of being low-skilled

While the magnitude of the estimated adult population with potential for upskilling and reskilling calls for immediate action, one of the major challenges is the high heterogeneity of low-skilled adults, who may present very different needs and characteristics.

Due to data limitation and reliability, identification of the groups of adults most at risk of low skills, and by skill dimension, could be performed only by labour market status (unemployed, inactive and employed) and by age groups (young adults aged 25 to 34, adults aged 35 to 54 and older adults aged 55 to 64). When data were available and reliable at country level,

this analysis was complemented by analysis by gender and country of origin. These analyses are presented in the country factsheets on the adult population with potential for upskilling and reskilling which complement the corresponding reference publication <sup>(9)</sup>.

According to results of this analysis, in EU-28+ countries the risk of low skills increases with age and is higher for inactive and unemployed adults compared to the employed:

- (a) young adults (25 to 34) present a risk of being low-skilled which is lower by about 30% than that observed among the overall adult population. In contrast, older adults (55 to 64) present a risk of low skills in all the dimensions considered, which is about 40% higher than that observed among the overall adult population;
- (b) the unemployed and adults out of the labour force show higher than average risks of low skills, especially in relation to education levels: unemployed and inactive adults have a risk of having low education which is, respectively, around 60% and 70% higher than that observed among the overall adult population.

Analysis combining both age and employment status provides more insights:

- (a) in the EU-28+ countries, the subgroups with most potential for upskilling (top three) are: unemployed and people out of the labour force (inactive) aged 55 to 64, followed by inactive people aged 35 to 54. They present an average risk of low skills in the four skill dimensions considered (education, digital skills, literacy and numeracy) which is between 65% and 73% higher than the risk registered by the overall population aged 25 to 64;
- (b) unemployed adults aged 35 to 54 also have, on average, a high risk of having low education, low digital and low cognitive skills (56% higher than the overall population aged 25 to 64).

Analysis by skill dimension of the risk of being low-skilled shows that, compared to the average adult population:

- (a) unemployed and inactive adults aged 55 to 64 and 35 to 54 are at particular risk of being low-skilled in all skills dimensions investigated;
- (b) young adults when unemployed or inactive also present a higher risk of being low-skilled in all skill dimensions but digital skills;

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<sup>(9)</sup> [www.cedefop.europa.eu/en/publications-and-resources/publications/3081](http://www.cedefop.europa.eu/en/publications-and-resources/publications/3081)



- (c) employed adults of all age groups considered show a relatively lower risk of low skills compared to unemployed and inactive adults. Nevertheless, digital competences remain scarce among older adults, even when employed (almost half are at risk of low digital skills);
- (d) unemployed and inactive adults aged 55 to 64 and 35 to 54 record a particularly high risk of having low digital skills, at 70% and 60% respectively;
- (e) inactive adults aged 35 to 54 and 55 to 64 report the highest risk of having low numeracy skills, at 43% and 41% respectively.

## In conclusion

- (a) Estimates tell us that there are 128 million adults in the EU-28+ with potential for upskilling and reskilling. This is an impressive pool of untapped talent waiting to be unlocked.
- (b) Significant differences exist among EU-28+ countries. Country factsheets on the adult population with potential for upskilling and reskilling provide more information on national contexts <sup>(10)</sup>.
- (c) While analysis presented in this report provides sufficiently reliable estimates of the adult population with potential for upskilling and reskilling, and identification of different subgroups of adults most at risk of low skills, more comparable data are needed to determine more comprehensive and reliable figures.
- (d) The magnitude of the low skills phenomenon and the complexity and heterogeneity of the needs of low-skilled adults call for a renewed approach to upskilling and reskilling of adults; this should be addressed in a comprehensive and systematic manner which enables pulling together various resources and exploiting synergies across the different measures and policies already in place in Europe. Developing coherent and coordinated approaches to upskilling and reskilling pathways for adults will be the core theme of the second volume of this research series <sup>(11)</sup>.

<sup>(10)</sup> [www.cedefop.europa.eu/en/publications-and-resources/publications/3081](http://www.cedefop.europa.eu/en/publications-and-resources/publications/3081)

<sup>(11)</sup> Cedefop (forthcoming). *Empowering adults through upskilling and reskilling pathways. Volume 2: developing coordinated and coherent approaches to upskilling pathways for adults*. Cedefop reference series; No 113. Luxembourg: Publications Office of the European Union.

## CHAPTER 1.

# Introduction

## 1.1. Background

The benefits of investing in the upskilling and reskilling of adults have long been acknowledged in the literature. Cedefop analysis (Cedefop, 2017) demonstrates how adults with low cognitive skills and/or low education are a vulnerable segment of the population. Evidence shows that being low-skilled (defined in Cedefop, 2017, as having low educational attainment and/or low cognitive skills) is often associated with a set of negative consequences, both for the individual and society, including lower earnings and employment rates, lower quality of health, wellbeing and life satisfaction, lower civic and social engagement, and higher probability of involvement in criminal activities. There are significant social and economic incentives for empowering low-skilled adults by promoting their upskilling and/or reskilling. According to the estimates, upskilling the EU-28 adult population (upskilling scenario: a faster increase in skill levels in the EU-28 Member States compared to the current trend) would lead to an average yearly gain of EUR 200 billion in the 10-year period between 2015 and 2025. Lack of exhaustive data prevents determining a comprehensive figure for the cost of low skills. These estimates, while alarming, should be regarded as underestimating the real economic and social costs of low skills in Europe and call for immediate action.

Against this background, improving people's skills, competences and knowledge is now at the core of European policies: The *New skills agenda for Europe: working together to strengthen human capital, employability and competitiveness* <sup>(12)</sup> and the recommendation on *Upskilling pathways: new opportunities for adults* <sup>(13)</sup>, have been initiated at EU level to support Member States in ensuring that every European acquires the skills to realise fully his/her talent and potential.

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<sup>(12)</sup> European Commission, 2016a.

<sup>(13)</sup> Council of the European Union, 2016.

While educational attainment has increased substantially in recent years, especially among younger generations, according to latest Eurostat data, in 2018 more than one quarter of the EU-28 adult population held only low qualifications <sup>(14)</sup>. Further, according to the Organisation for Economic Cooperation and Development (OECD) survey of adult skills (programme for the international assessment of adult competences, PIAAC), about one in five adults has low literacy and numeracy skills (20% and 18% respectively). The OECD also found approximately one in four adults has no or limited experience with computers or lacks confidence in using computers, while nearly one in two adults has low proficiency in problem-solving in a technology-rich environment (OECD, 2016a). These trends are of increasing concern as a growing number of jobs require both a higher level and a broader range of skills; even jobs of an elementary nature require some level of digital competence (Council of the European Union, 2016). According to the European Commission, by 2025, 48.7% of all job openings (including both new and replacement jobs) in the EU will require high qualifications, 39.8% will be for the medium-skilled and only 11.5% will require low or no qualifications (European Commission, 2016b).

Rapidly changing labour markets and multiple challenges, such as digitalisation and its consequences for the future of work, technological changes, the environment, ageing societies and social inclusion, require not only strong skill foundations, but also constant updating and acquiring new skills.

Technological advancements and digitalisation already permeate most economic activities and occupations: Cedefop's *European skills and jobs survey* (ESJS) shows that about 85% of all EU jobs need at least a basic digital skills level, 70% of EU jobs require at least a moderate level of information and communications technology (ICT) skills, and 14% require advanced ICT skills (Cedefop, 2015). A recent investigation into the job profiles of 12 occupations which are typically viewed as being outside of the digital sector (such as dairy farmer, machine operator, industrial designer, vocational education and training (VET) teacher), highlighted that the use of ICT is increasingly essential for workers within such occupations (European Commission et al., 2016).

Despite fears of increased automation resulting in significant job losses, the OECD has found that fewer than 10% of workers are in jobs that are at risk of being replaced by machines; 25% are in jobs where

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<sup>(14)</sup> International standard classification of education (ISCED) 0-2.

a high percentage of tasks (50-70%) could be automated in the future (OECD, 2016b). While automation poses a risk to some occupations, future workers will require flexible digital skills, which enable them to shift to tasks which cannot be automated, but are increasingly processed and managed through digital systems.

What these figures make clear is that technological advances, such as machine learning, big data analytics, the internet of things and advanced robotics, together with restructuring in global value chains, are radically altering the nature of work and the skills required of the labour market. Yet new technology and digitalisation permeate more than just the workplace; they play a key role in the way services are offered, as well as in the way people learn and interact. Therefore, future-ready societies and labour markets need a renewed approach to upskilling and reskilling, underpinned by lifelong continuing learning and by providing those skills and competences enabling each individual to fully realise his/her potential and progress in the labour market and society.

## 1.2. Objective of the research and methods

Empowering low-skilled adults by promoting their upskilling and reskilling requires a clear understanding of the magnitude of the phenomenon (how many low-skilled adults are there in the EU-28 Member States, Iceland and Norway, EU-28+), as well as understanding of low-skilled adults' characteristics and needs: who are the low-skilled adults and which subgroups of adults are most at risk of being low-skilled and in which skill.

To this end, this report:

- (a) provides an estimate of the magnitude of the adult population with potential for upskilling and reskilling in the EU-28+, according to a broader definition of low skills; this goes beyond educational attainment levels and also considers digital skills, cognitive skills and the effect of skill loss and skill obsolescence;
- (b) identifies different subgroups of adults most at risk of being low-skilled by skill dimension.

### 1.2.1. Analysing low-skilled adults: concepts and methods

Due to data limitations, analysis of the low-skilled has been generally carried out using educational attainment levels or type of occupation <sup>(15)</sup>. However, as discussed in Cedefop (2017), this approach fails to capture the complexity of the low-skilled phenomenon. Educational attainment does not take into account different types of skills, abilities and factors that can result in low-skilled status, especially among adults: long-term unemployment and/or disengagement from the labour market, skill obsolescence due to ageing, rapid technological change, product/process innovation, changes in production processes and/or work organisation, skills mismatch and socioeconomic factors, such as migrant background and gender.

Second, this narrow conceptualisation fails to capture the role of other knowledge, skills and competences gained outside formal education environments, such as those acquired through training, informal learning and work experience.

Within this context, and in line with Cedefop (2017), this study adopts a definition of low-skilled status for adults which moves beyond educational attainment, to embrace the different dimensions which comprise the overall skills and competences of adults.

This broader conceptualisation of low skills looks at three skills dimensions:

- (a) educational attainment level;
- (b) computer and digital skills;
- (c) cognitive skills: literacy and numeracy.

Further, it also includes adults with medium and high education levels, working in elementary occupations, as a proxy for people in potential risk of skill obsolescence and skill loss <sup>(16)</sup>.

For purpose of this report, adults are people aged from 25 to 64 years old. Boxes 1 and 2 illustrate the main definitions and the source of information of the different skill domains used for the analyses.

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<sup>(15)</sup> Dieckhoff, 2008; Eurofound, 2008.

<sup>(16)</sup> Several studies show that job-worker mismatches induce cognitive decline with respect to immediate and delayed recall abilities, cognitive flexibility and verbal fluency (De Grip et al., 2008; Kureková, Haita and Beblavý, 2013; Kureková et al., 2013).

### Box 1. Concepts of low skills used in the analysis: definition and source

#### Educational attainment level:

- low education refers to people who have successfully completed, at most, international standard classification of education (ISCED) levels 0-2 or ISCED 3c programmes lasting less than two years. ISCED 2011 is the reference international classification for organising education programmes and related qualifications by levels and fields:
  - ISCED 0: pre-primary education;
  - ISCED 1: primary education;
  - ISCED 2: lower secondary education;
  - ISCED 3: upper secondary education.

[Source of data used: European Union Labour Force Survey (EU LFS) 2016 anonymised microdata for research].

#### Digital skills:

- never used computer: refers to people who declare of having never used a computer [Source of data: Eurostat community statistics on information society (CSIS) 2015 anonymised microdata for research; CSIS 2014 for Iceland];
- low use of internet: refers to people who last used the internet more than three months prior to the survey interview or who have never used the internet [Source of data: CSIS 2015 anonymised microdata for research; CSIS 2014 for Iceland];
- below basic digital skills: among those people with last use of the internet less than three months prior to the survey interview, individuals who have carried out activities in, at most, one of the four digital competence dimensions surveyed: information, communication, content-creation and problem-solving [Source of data: CSIS 2015 anonymised microdata for research];
- low digital skills: refers to people who have either low use of the internet or below basic digital skills [Source of data: CSIS 2015 anonymised microdata for research];
- low problem-solving in technology-rich environments: refers to people who scored less than 241 points in PIAAC (i.e. below level 1 on the proficiency scale ranging from level 1 to level 3 of OECD PIAAC). Problem-solving in technology-rich environments is defined as 'using digital technology, communication tools and networks to acquire and evaluate information, communicate with others and perform practical tasks'. [Source of data: PIAAC 2012; 2015 public use files].

#### Cognitive skills:

- low literacy refers to people who scored less than 226 points in PIAAC (i.e. at most, level 1 on the proficiency scale ranging from below level 1 to level 5 of OECD PIAAC). Literacy refers to the ability to understand, evaluate, use and engage with

written texts to participate in society, achieve one's goals, and develop one's knowledge and potential. [Source of data: PIAAC 2012; 2015 public use files];

- low numeracy refers to people who scored less than 226 points in PIAAC (i.e. at most, level 1 on the proficiency scale ranging from below level 1 to level 5 of OECD PIAAC). Numeracy refers to the ability to access, use, interpret and communicate mathematical information and ideas in order to engage in, and manage the mathematical demands of, a range of situations in adult life. [Source of data: PIAAC 2012; 2015 public use files];
- low cognitive skills: refers to people with low literacy and/or numeracy (see above) [Source of data: PIAAC 2012; 2015 public use files].

**At risk of skill loss:**

- medium-high educated at risk of skill loss: refers to people who have medium and high educational attainment levels and work in elementary occupations (international standard classification of occupations ISCO-08, group 9). Where, medium education is defined as having completed ISCED 3 programme of duration of two years or more or ISCED level 4 (post-secondary education), and high education is defined as having completed ISCED levels 5-8 (tertiary education). ISCED 2011. [Source of data used: EU LFS 2016 anonymised microdata for research].

Source: Cedefop.

### 1.3. Structure of the report

This report is structured as follows:

- (a) Chapter 2 provides descriptive statistics on low-skilled adults in the EU-28+;
- (b) Chapter 3 presents an estimation of the magnitude of the adult population with potential for upskilling and reskilling in the EU-28+;
- (c) Chapter 4 presents the identification of different subgroups of low-skilled adults most at risk of being low-skilled;
- (d) Chapter 5 presents main statistics on adult participation in education and training, as well as information on expenditure for active labour market policies (ALMPs) and public employment services (PES) activation measures and target groups;
- (e) Chapter 6 is the concluding chapter.

## Box 2. Data sources

### **EU LFS 2016 anonymised microdata for research <sup>(17)</sup>**

The Eurostat-European Union labour force survey provides robust information for all the 28EU+ countries on labour market conditions and characteristics of low-educated adults and jobs. It contains data on a wide range of sociodemographic characteristics of individuals including education (ISCED) and training participation (in the four weeks before the survey interview), as well as on employment status and employment characteristics of the main job, including occupation (ISCO).

<https://ec.europa.eu/eurostat/web/microdata/labour-force-survey>

### **CSIS 2015 anonymised microdata for research <sup>(18)</sup>**

The Eurostat Community statistics on information society survey provides information on access and use of information and communication technologies (including computer use, internet access, digital competences) by households and individuals aged 16 to 74 in the EU-28+. It contains background information on gender, age, education level, employment status, occupation (manual vs non-manual job). CSIS 2015 covers the EU-28+ countries, apart from Iceland. CSIS 2014 have been used for Iceland.

<https://ec.europa.eu/eurostat/web/microdata/community-statistics-on-information-society>

### **PIAAC 2012; 2015 public use files – anonymised microdata <sup>(19)</sup>**

The Programme for the international assessment of adult competences (OECD PIAAC) contains information on cognitive skills (literacy and numeracy), problem-solving in technology-rich environments, computer experience, level of education (ISCED) and training, as well as, on a range of demographic, economic and social variables, including occupations (ISCO). PIAAC covers in total 21 countries of the EU-28+:

- 18 surveyed in round one (2012): AT, BE, CY, CZ, DE, DK, EE, ES, FI, FR, IE, IT, NL, NO, PL, SE, SK, UK;
- three surveyed in round two (2015): EL, LT, SI.

Hence, the following EU-28+ countries are not covered by this survey: BG, HR, HU, IS, LU, LV, MT, NO, PT, RO. Some other countries did not participate in the assessment of proficiency in problem-solving in technology-rich environments: CY, ES, FR and IT.

<http://www.oecd.org/site/piaac/>

Source: Cedefop.

<sup>(17)</sup> Eurostat, a.

<sup>(18)</sup> Eurostat, b.

<sup>(19)</sup> OECD, a; b.



The analysis in this report is complemented by country factsheets<sup>(20)</sup> aimed at providing an overview of the adult population with potential for upskilling and reskilling in the 28-EU Member States, Iceland and Norway. Country factsheets originate from the EU-28+ comparative analysis presented in this report; due to data availability and data limitations, some analysis could not be performed at country level. The factsheets should be interpreted as a source of inspiration which may stimulate reflections on whether the groups with most potential for upskilling, according to this analysis, are in line, or not, with national defined priorities. Analysis underpinning these country factsheets could also be replicated using national data, overcoming some of the limitations of the EU comparable data sets used in this report.

This report is the first volume of Cedefop's research on empowering adults through upskilling and reskilling pathways. The second volume<sup>(21)</sup> focuses on developing coherent and coordinated approaches to upskilling pathways for low-skilled adults.

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<sup>(20)</sup> [www.cedefop.europa.eu/en/publications-and-resources/publications/3081](http://www.cedefop.europa.eu/en/publications-and-resources/publications/3081)

<sup>(21)</sup> Cedefop (forthcoming). *Empowering adults through upskilling and reskilling pathways. Volume 2: developing coordinated and coherent approaches to upskilling pathways for adults*. Cedefop reference series; No 113. Luxembourg: Publications Office of the European Union.

## CHAPTER 2.

# Low-skilled adults in the EU-28, Iceland and Norway

Chapter 2 aims at investigating low-skilled adults in the EU-28+, adopting a comprehensive approach to low skills that considers the following skill domains:

- (a) educational attainment level;
- (b) computer and digital skills;
- (c) cognitive skills: literacy and numeracy.

The analysis also includes an estimate of adults with medium and high education levels working in elementary occupations as a proxy for skill obsolescence and skill loss <sup>(22)</sup>.

For the definitions and the source of information of the different skill domains used for the analyses, as well as data sources, please refer to Boxes 1 and 2 in Chapter 1.

## 2.1. Low-skilled adults in the EU-28+: descriptive statistics

Section 2.1 reports main statistics on education, computer and digital skills, cognitive skills and skill loss/skill obsolescence for adults in the EU-28+ countries.

### 2.1.1. Educational attainment

Data on educational attainment levels for 2016 shows that one in five adults in the EU-28+ still has, at most, low education (Figure 2) <sup>(23)</sup>. At country level, the situation is diverse: in Malta and Portugal, educational attainment

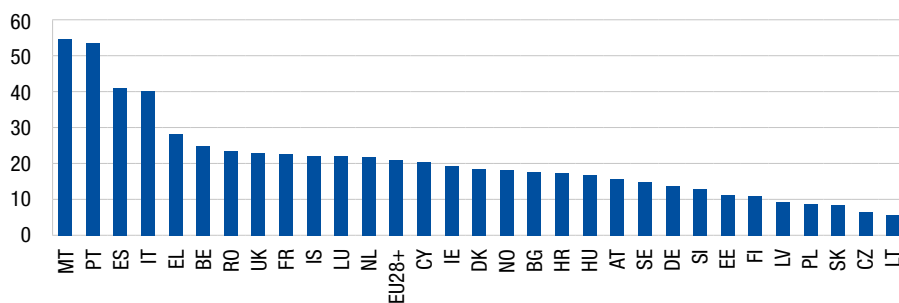
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<sup>(22)</sup> Several studies show that job-worker mismatches induce cognitive decline with respect to immediate and delayed recall abilities, cognitive flexibility and verbal fluency (De Grip et al., 2008; Kureková, Haita and Beblavý, 2013, Kureková et al., 2013).

<sup>(23)</sup> For the purposes of this publication, EU-28+ refers to EU-28 plus Iceland and Norway.

rates are particularly alarming, as one in two adults were at lower secondary (ISCED 0-2, plus 3c short). Spain and Italy also report a relatively high incidence of adults with only low educational attainment at around 40% of the adult population. Conversely, Czechia, Latvia, Lithuania, Poland and Slovakia report the lowest shares (less than 10%).

Figure 2. **Adult population (25 to 64) with low education, EU-28+ (%)**



NB: % of adults aged 25-64 who have completed ISCED (2011) levels 0-2 or ISCED 3 programmes lasting less than two years.

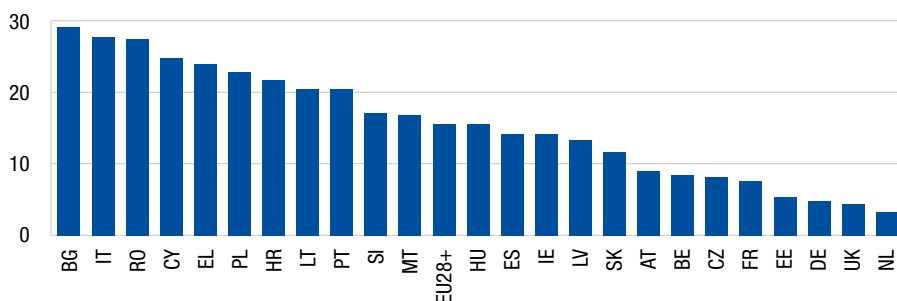
EU-28+: unweighted average of reported countries.

Source: Eurostat, a [2016].

### 2.1.2. Digital skills

There is no single comparable data set at EU-level capturing the complexity of digital skills (Box 1), so different data sets have been explored in order to capture different elements of computer and digital skills. According to Eurostat Community statistics on information society, low digital skills are widespread among the European population. In 2015, the share of adults aged 25 to 64 who have never used a computer was nearly 30% in Bulgaria, Italy and Romania (Figure 3) and 20% or more in several other EU countries (Greece, Croatia, Cyprus, Lithuania, Poland, Portugal).

Figure 3. **Adult population (25 to 64) who have never used a computer, EU-28+ (%)**



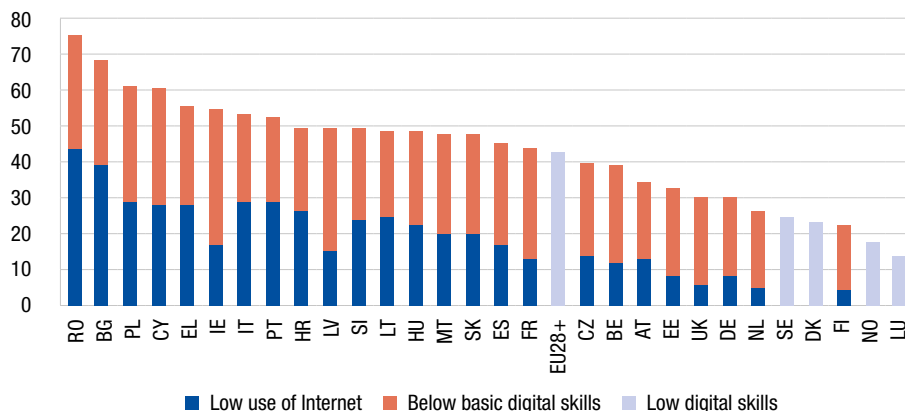
NB: % of adults aged 25-64 who have never used computer.  
 No data available or unreliable data for: DK, FI, IS, LU, NO, SE.  
 EU-28+: unweighted average of reported countries.  
 Source: Eurostat, b [2015].

The same survey shows that, in 2015, 43% of the EU-28+ adult population had an insufficient level of digital skills, since they rarely used the internet or, although using the internet, they showed low skills in the four digital competence dimensions surveyed: information, communication, content-creation and problem-solving. In Romania and Bulgaria this percentage is above 60%, mainly because of limited access to the internet. Among those who use the internet, low digital competences are relatively high in Ireland, Cyprus, Latvia and Poland (Figure 4).

Figure 5 reports the incidence of adult population with low skills in problem-solving in technology-rich environments in a limited number of European countries for which data is available in the PIAAC survey <sup>(24)</sup>. According to these data, in Lithuania and Greece, 39% and 37% of the adult population aged 25 to 64 show low skills in problem-solving in technology-rich environments. High shares of similar low skills are also recorded by Slovenia and Poland.

<sup>(24)</sup> The concept of low skills in problem-solving in technology-rich environments is used only in Section 2.1.2 since it does not cover all the EU-28+ countries, the focus of this study.

Figure 4. **Adult population (25 to 64) with low digital skills, EU-28+ (%)**



NB: % of adults aged 25-64 with low digital skills, which comprise those with low internet use and those with below basic digital skills. Low internet use: last use was more than three months prior to survey interview or never used; Below basic digital skills: among those people with last use of the internet less than three months prior to the survey interview, individuals who have carried out activities in, at most, one of the four digital competence dimensions surveyed: information, communication, content-creation and problem-solving.

No data available for IS.

Data for DK, LU, NO, SE are aggregated values for both low use of the internet and below basic digital skills. Due to the limited number of observations in these countries, values cannot be disaggregated in the two digital skills dimensions (low use of the internet, below basic digital skills) and refer to low digital skills as an aggregate. Values for EU-28+ being the unweighted average of reported countries also correspond to low digital skills as an aggregate and cannot be disaggregated into low use of the internet and below basic digital skills.

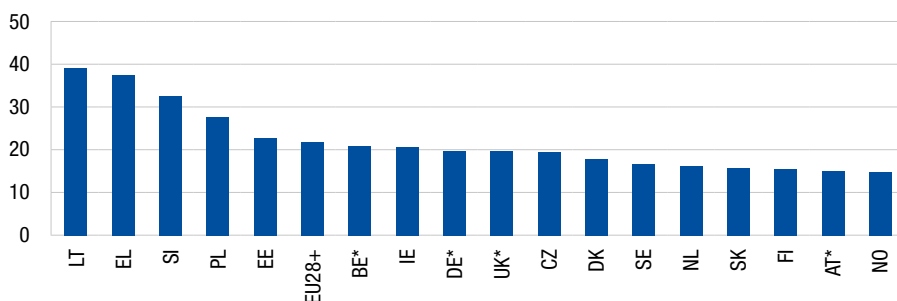
EU-28+: unweighted average of reported countries.

Source: Eurostat, b [2015].

### 2.1.3. Cognitive skills: literacy and numeracy

Among the European countries for which PIAAC data are available, more than 35% of adults aged 25 to 64 in Greece, Spain and Italy have low literacy or numeracy skills; these countries also have high shares of adults with only low education. However, low cognitive skills are also widespread in countries which have a lower proportion of the low-educated among the adult population, such as France and Slovenia (Figure 6).

Figure 5. **Adult population (25 to 64) with low problem-solving in technology-rich environments, EU-28+ (%)**



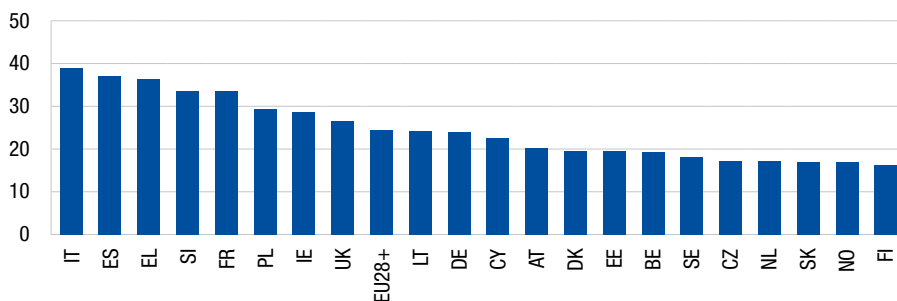
NB: % of adults aged 25-64 whose problem-solving in technology-rich environments score was below 226 points (i.e. most level 1). No data available for: BG, CY, ES, FR, HR, HU, IS, IT, LU, LV, MT, PT, RO. EU-28+: unweighted average of reported countries.

EU-28+: unweighted average of reported countries.

\* Information on problem-solving refers to the population 25-65 for AT and DE; Belgium data refer to Flanders and UK data refer to England and Northern Ireland.

Source: OECD a; b.

Figure 6. **Adult population (25 to 64) with low cognitive skills, EU-28+ (%)**



NB: % of adults aged 25-64 whose literacy score or numeracy score was below 226 points (i.e. most level 1).

No data available for: BG, HR, HU, IS, LU, LV, MT, PT, RO.

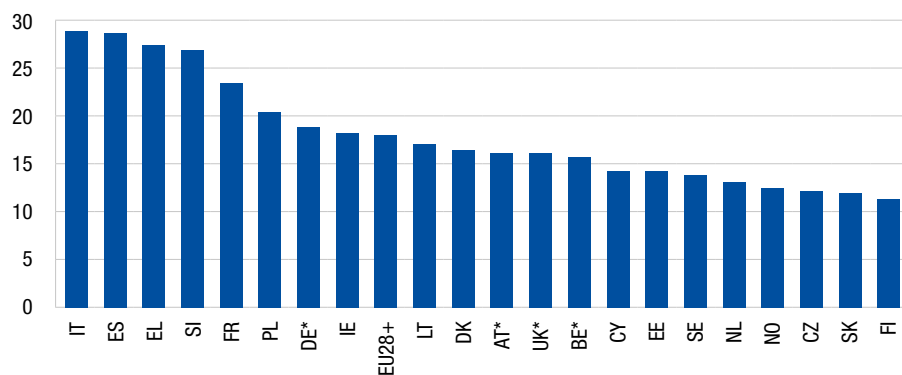
EU-28+: unweighted average of reported countries.

\* Information on literacy and numeracy refers to the population 25-65 for AT and DE; Belgium data refer to Flanders and UK data refer to England and Northern Ireland.

Source: OECD a; b.

As can be observed in Figures 7 and 8, low numeracy among adults is usually more widespread than low literacy. Greece, Spain, France, Italy and Slovenia report particularly high shares of low cognitive skills in both literacy and numeracy. Low numeracy (Figure 8) is also of concern in Ireland, Poland and the UK (England and Northern Ireland only).

Figure 7. **Adult population (25 to 64) with low literacy, EU-28+ (%)**



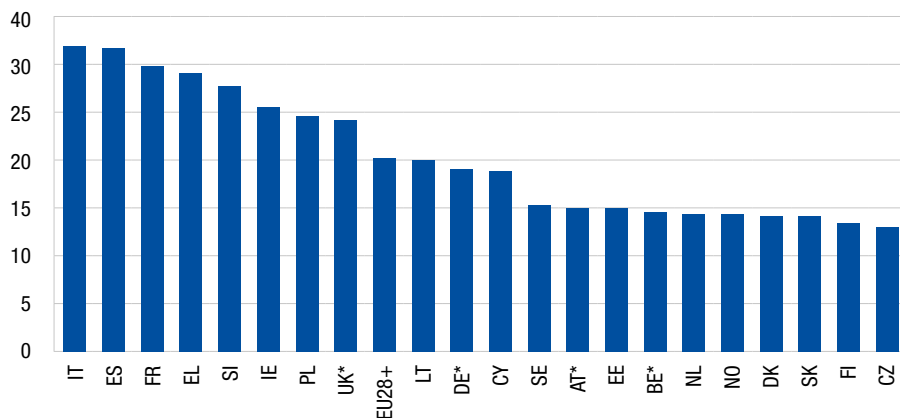
NB: % of adults aged 25-64 whose literacy score was below 226 points (i.e. most level 1).

No data available for: BG, HR, HU, IS, LU, LV, MT, PT, RO.

EU-28+: unweighted average of reported countries.

\* Information on literacy refers to the population 25-65 for AT and DE; Belgium data refer to Flanders and UK data refer to England and Northern Ireland.

Source: OECD a; b.

Figure 8. **Adult population (25 to 64) with low numeracy, EU-28+ (%)**

NB: % of adults aged 25-64 whose numeracy score was below 226 points (i.e. most level 1).

No data available for: BG, HR, HU, IS, LU, LV, MT, PT, RO.

EU-28+: unweighted average of reported countries.

\* Information on numeracy refers to the population 25-65 for AT and DE; Belgium data refer to Flanders and UK data refer to England and Northern Ireland.

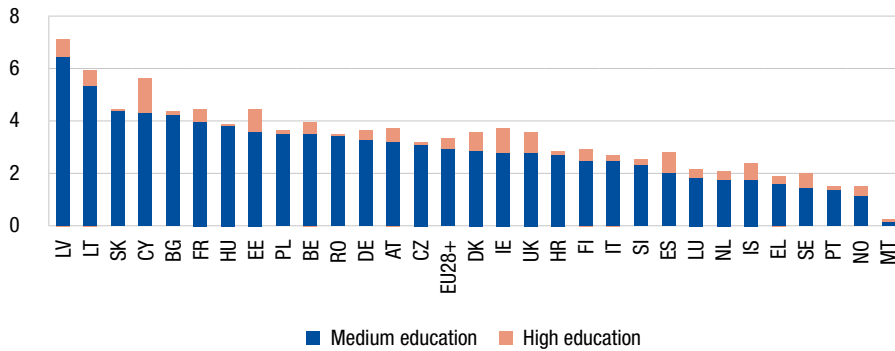
Source: OECD a; b.

#### 2.1.4. Skill loss/skill obsolescence

There is no comparable EU-28+ data set on skill loss and skill obsolescence. Within this study, statistics for adults with medium to high education working in elementary occupations are analysed as a simple proxy for potential risk of skill loss and skill obsolescence. According to the data, only 3.3% of adults in the EU-28+ are at risk of skill loss and skill obsolescence. The share of this group is higher in countries with a low share of low-educated adults (Latvia, Lithuania, Slovakia), possibly implying also a higher risk of overqualification (Figure 9).



Figure 9. **Adult population (25 to 64) with medium-high education working in elementary occupations, EU-28+ (\*) (%)**



NB: (\*) EU-28+ = EU-28 + IS, NO

% of adults aged 25-64 working in elementary occupations (ISCO-08 group 9) and having a medium-high educational attainment level. Medium education: completed ISCED (2011) 3 programme of duration of two years or more or ISCED (2011) level 4; High education: adults who have completed ISCED (2011) levels 5-8.

Source: Eurostat, a [2016].

From the analysis presented in Chapter 2, Greece, Spain, France, Italy, and Malta present higher than average shares of low-skilled adults in almost all the skills dimensions investigated (for which data are available for the country). In contrast, the Netherlands, Austria and Nordic countries (DK, FI, NO, SE) perform better than average in terms of low skills in all the dimensions.

## CHAPTER 3.

# How many adults at risk of low skills?

### 3.1. Methodological approach

As there is no single European data set encompassing information on all skill domains considered in this study, estimating the magnitude of the adult population with potential for upskilling and reskilling is done using latest available data from three statistical sources (Box 2):

- (a) EU LFS (2016) <sup>(25)</sup>;
- (b) CSIS (2015; 2014 for IS) anonymised microdata for research <sup>(26)</sup>;
- (c) PIAAC (2012; 2015 public use files) <sup>(27)</sup>.

The methodology applied for the estimation follows a simple four-step residual approach: adopting the basics of the set theory, four sets of low-skilled adults have been estimated and summed to arrive to a single value. This approach was adopted to reduce overlapping (double counting) among the different subgroups of the population with potential for upskilling and reskilling.

The four sets of low-skilled adults are (Figure 10):

- (a) low educated (using LFS 2016);
- (b) medium-high educated working in elementary occupations (using LFS 2016 microdata);
- (c) adults with low computer (C1) and low digital skills (C2) <sup>(28)</sup>, among those which have medium-high education and are not employed in a manual job <sup>(29)</sup> (using CSIS 2015 microdata; CSIS 2014 for Iceland);

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<sup>(25)</sup> Eurostat, a.

<sup>(26)</sup> Eurostat, b.

<sup>(27)</sup> OECD, a; b.

<sup>(28)</sup> Set C1 considers as potential for upskilling, adults who never used a computer, while set C2 considers also adults with low internet use and those who use the internet more frequently but have below basic digital skills (Box 1).

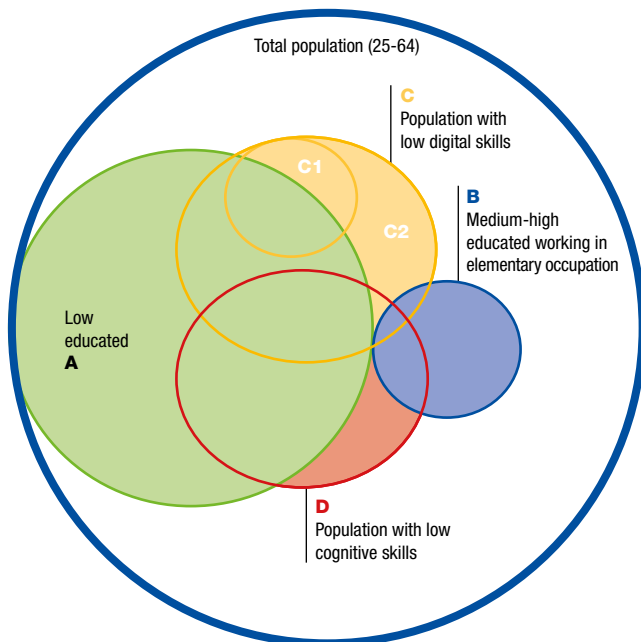
<sup>(29)</sup> Eurostat CSIS 2015 anonymised microdata for research do not have information on workers' occupations (ISCO 9); they only distinguish between manual and non-manual work.

(d) adults with low cognitive skills (low literacy and/or low numeracy), among those which have medium-high education, are not working in an elementary occupation (ISCO 9) and having already used a computer <sup>(30)</sup> (using PIAAC 2012; 2015 public use microdata files, Box 3) <sup>(31)</sup>.

On this basis, two estimates have been calculated according to different specifications of the population with low computer and digital skills:

- (a) a low estimate considers as potential for upskilling those adults who never used a computer (set C1);
- (b) a high estimate also includes adults with low internet use and those who use the internet more frequently but have below basic digital skills (set C2).

Figure 10. **Estimation of the population with potential for upskilling**



Source: Cedefop.

<sup>(30)</sup> Since the PIAAC survey does not include the same variables on digital skills as the CSIS survey, we have proxied this information with the derived PIAAC variable computer experience (the respondent has/does not have computer experience).

<sup>(31)</sup> For countries not covered by PIAAC (BG, HR, HU, IS, LU, LV, MT, NO, PT, RO) we proxied this information with the unweighted average of the share observed in the other EU-28+ countries

As can be seen from Figure 10, sets C and D are residual sets, since some of the adults with low digital skills and low cognitive skills have already been included in the other sets. For example, set D refers to adults with low cognitive skills, which are not yet included in the other sets: low-educated adults, adults who may be at risk of skill loss/skill obsolescence (medium- and high-educated adults working in manual occupations) and adults with low digital skills (set C). Hence, the order used to estimate the four different sets (A, B, C, D) influences the values of the individual sets and their relative shares, but not the total share of the population with potential for upskilling and reskilling, which is calculated as the sum of the four sets.

The methodological approach adopted consisted of the following steps:

- (a) calculation, using LFS microdata, of the share of low-educated adults (set A) and of medium and high-educated adults working in manual occupations (set B);
- (b) calculation of the residual share of adults with low digital skills (set C) using CSIS microdata;
- (c) calculation of the residual share of adults with low cognitive skills (set D) using PIAAC microdata;
- (d) calculation of the total share of population with potential for upskilling and reskilling calculated as the sum of the shares of the four sets (A, B, C, D);
- (e) estimate of the absolute value of the adult population with potential for upskilling and reskilling calculated by multiplying the estimated total share, identified in (d) above, by the adult population (25 to 64) recorded in the 2016 LFS microdata <sup>(32)</sup>.

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participating in PIAAC. This choice was made after also considering an alternative approach using econometric techniques to estimate this residual share for countries not covered by PIAAC. The use of the unweighted average compared to the econometric approach resulted in the preferred solution presenting a lower prediction error (Box 3).

<sup>(32)</sup> The LFS is calibrated on the census population. Moreover, we have decided to use the LFS to avoid introducing another data source.

### Box 3. Assessment of low cognitive skills for countries not surveyed by OECD PIAAC

The approach used for estimating the magnitude of the adult population (25 to 64) with potential for upskilling and reskilling also includes the use of PIAAC data, since this survey provides information on cognitive skills. PIAAC allows the estimation of the residual share of population with low cognitive skills (adults with low literacy and/or low numeracy), among those who have medium-high education, are not working in an elementary occupation, and have digital skills.

Since PIAAC does not cover all the EU-28+ countries, it was necessary to use an estimation for the countries not included in PIAAC (i.e. BG, HR, HU, IS, LU, LV, MT, NO, PT, RO). To this end, an attempt to estimate missing values was carried out, using both information on the structure of the population in these countries (deriving from the Eurostat LFS) and correlations between the incidence of low cognitive skills and the structure of the population observed in this segment of population in PIAAC data. However, the estimation approach has not produced any improvement compared to the use of the simple average of the shares observed in the countries surveyed by PIAAC. For this reason, the residual share of population with low cognitive skills for countries not covered by PIAAC has been estimated using the unweighted average of the shares observed in the surveyed countries.

Detailed methodology and results are presented in Annex 1, Table A1.1.

Source: Cedefop.

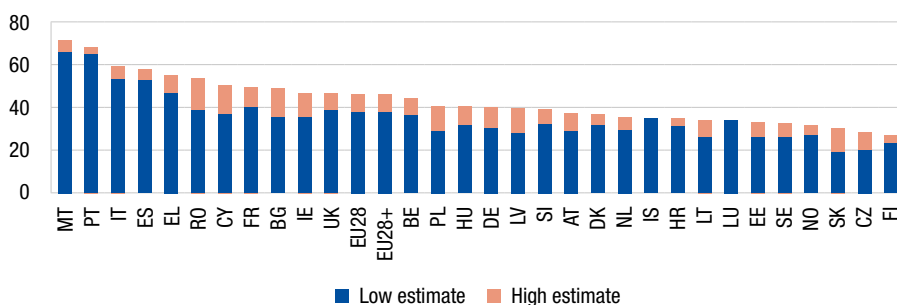
## 3.2. Results of the estimates

Figure 11 reports the estimated shares (both high and low estimates) of the population with potential for upskilling and reskilling in the EU-28+. According to the estimations, in the EU-28+, between 38% and 46% of the EU-28+ population aged 25 to 64 (105 and 128 million people) <sup>(33)</sup> would benefit from upskilling and reskilling, since they have either low education, low digital skills, low cognitive skills or are medium- to high-educated at risk of skill loss/skill obsolescence.

<sup>(33)</sup> The lower estimate considers among the adult population with potential for upskilling those who have never used a computer, while the higher estimate considers also those with low internet use and adults with below basic digital skills. Information at country level is reported in the additional tables in Annex 2.

There are considerable differences among countries: in Malta and Portugal, for example, around 70% of the adult population has potential for upskilling and reskilling. Estimates are also quite alarming for Greece, Italy and Spain which reports values between 59 and 55%, as well as Romania (54%). Conversely, the lowest shares can be observed in Czechia with (28%) and Finland (27%). Relatively low shares of adults with potential for upskilling and reskilling (between 31 and 33%) can also be observed in Estonia, Norway, Slovakia and Sweden.

Figure 11. **Estimated share of the adult population (25 to 64) with potential for upskilling and reskilling by country (%), EU-28+**



NB: Shares of population aged 25-64 with either: low education (ISCED11 0-2, 3c short); low literacy and/or low numeracy (at most level 1 on the proficiency scale from below level 1 to level 5); medium-high education (ISCED11 levels 3-8) working in elementary occupation (ISCO-08 level 9); low digital skills (high estimate) or never used computer (low estimate). For countries not surveyed by PIAAC (BG, HR, HU, IS, LU, LV, MT, PT, RO), low cognitive skills are assumed to be equal to the average level observed in EU-28+ surveyed countries. EU-28+ and EU-28 population average. For IS and LU data high and low estimate coincide (IS has no data on digital skills level; LU has low data numerosity).

Source: Eurostat, a [2016]; Eurostat b [2015; 2014 for IS]; OECD, a; b.

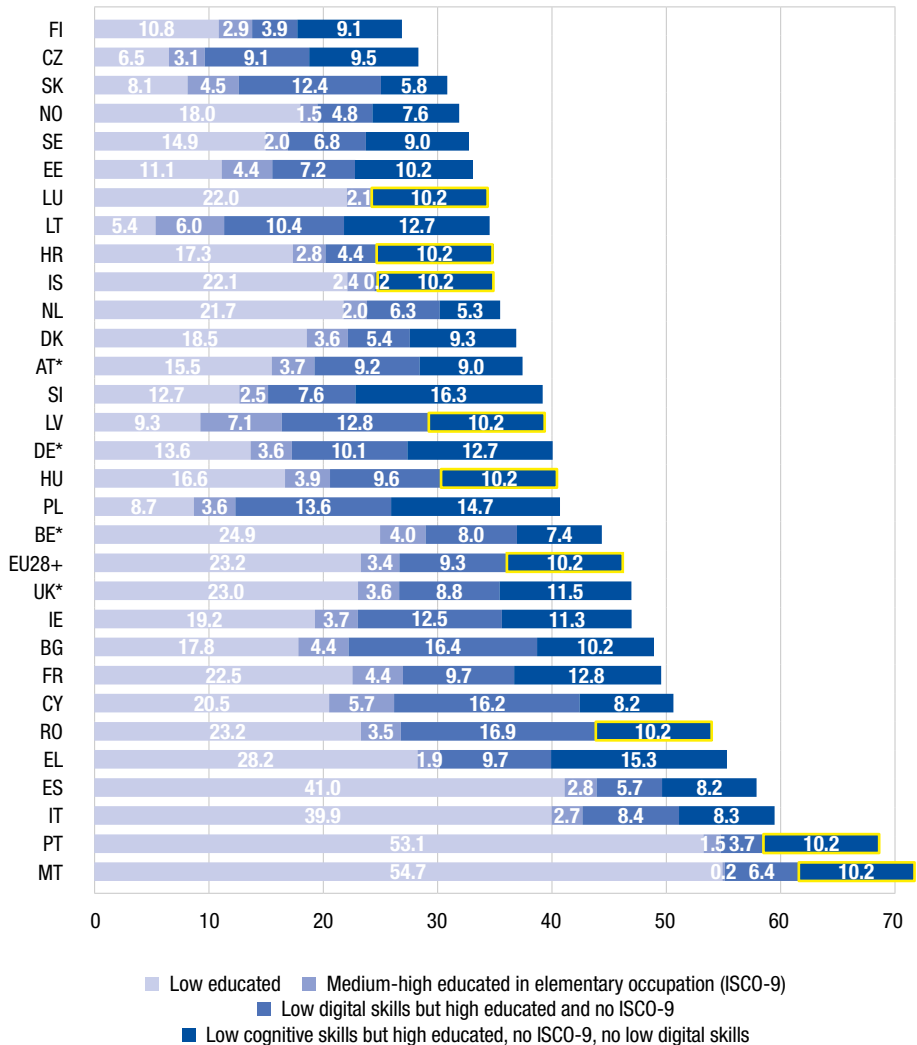
It is important to note that the above estimation has the following limitations:

- (a) as there is no single European data set encompassing information on all skill domains considered in this study, the adopted methodology resorts to different statistical sources, with different observation periods:
  - (i) LFS 2016;
  - (ii) CSIS 2015;
  - (iii) PIAAC 2012;
  - (iv) PIAAC 2015;

- (b) the different data sources used in the analysis do not always provide the same information. For this reason, the adopted methodology uses the following proxies:
- (i) as CSIS 2015 anonymised microdata for research does not have information on workers' occupations but only distinguishes between manual and non-manual work, the residual shares of adults with low computer and/or digital skills among those which have medium-high education and are not working in elementary occupations (set C) is calculated using 'not employed in a manual job' as a proxy for not working in elementary occupation (see Footnote 29);
  - (ii) as PIAAC does not include the same variables on digital skills as the CSIS survey, the residual share of adults with low cognitive skills among those which have medium-high education, are not working in an elementary occupation and do not have low digital skills (set D) is calculated using PIAAC variable 'not having computer experience' as a proxy for low digital skill (see Footnote 30);
- (c) as discussed in Box 3, the estimated residual share of adults with low cognitive skills (set D) for the nine countries (BG, EE, HR, LV, LU, HU, MT, PT, RO) not covered by PIAAC and for the EU-28+ average are calculated as the arithmetic average of the values registered in the EU-28+ countries for which data on cognitive skills is available (see Footnote 31).

Figure 12 shows the composition of the indicator which estimates the adult population (aged 25 to 64) with potential for upskilling and reskilling. It reports the residual shares of the different sets which have been summed to obtain the high estimate (considering among the adult population with potential for upskilling those with no computer use, low internet use or below basic digital skills – Box 1). The first two shares from the left (shares of low-qualified adults and of adults with medium-high education working in elementary occupations) correspond to the actual share of these groups over the total population aged 25 to 64; the other two shares are residual shares. The residual share 'low digital skills but high-educated and no ISCO-9' refers to adults with medium-high education who do not work in elementary occupations but have low digital skills. The residual share 'low cognitive skills but high-educated, no ISCO-9, no low digital skills' refers to adults with medium-high education, not working in elementary occupations, with computer skills but with low cognitive skill (low literacy and/or low numeracy).

Figure 12. **Adult population (25 to 64) with potential for upskilling (high estimate): stepwise approach and residual shares (%)**



NB: Residual shares composing the higher estimate of the population with potential for upskilling. The higher estimate considers adults with low digital skills those who have low internet use and, among those who more frequently use the internet, those who have below basic digital skills.  
 Information on literacy, numeracy refers to the population 25-65 for AT and DE; Belgium data refer to Flanders and UK data refer to England and Northern Ireland.  
 EU-28+: population weighted average.

Source: Eurostat, a [2016]; Eurostat b [2015; 2014 for IS]; OECD, a; b.



## CHAPTER 4.

# Who are the adults most at risk of low skills?

In Chapter 3, we estimated that 128 million adults, 46.1% of the EU-28+ adult population, have potential for upskilling and reskilling. The low-skilled adult population, however, is a heterogeneous group with different characteristics and needs (Cedefop, 2017). Chapter 4 aims to identify different subgroups of low-skilled adults with greatest risk from low skills in the different skill dimensions considered in this study.

### 4.1. Subgroups of adults with greatest risk from low skills in the EU-28+

Within Section 4.1, we aim to analyse the composition of the adult population with potential for upskilling by identifying specific subgroups of adults most at risk of being low-skilled in education, digital skills, literacy and numeracy.

Several subgroups of relevant adults have been identified through two main sociodemographic characteristics (see Box 4):

- (a) employment status:
  - (i) employed;
  - (ii) unemployed;
  - (iii) out of labour force (inactive);
- (b) age, in three age classes:
  - (i) 25 to 34;
  - (ii) 35 to 54;
  - (iii) 55 to 64.

#### Box 4. Selection of sociodemographic subgroups for investigation

A preliminary feasibility analysis considered different combinations of several sociodemographic characteristics (age classes, gender, country of birth, employment status, long-term unemployment) for which data were available in all the databases used (LFS, CSIS, PIAAC). Then, selection of the combination of sociodemographic characteristics and of the subgroups for investigation took place according to:

- feasibility and reliability of data (number of observations for the subgroup);
- policy-oriented subgroups (identifiable as target groups for upskilling interventions).

Based on the results of the feasibility study, two sociodemographic characteristics<sup>(34)</sup> were selected:

- employment status: employed, unemployed, out of labour force (inactive);
- age, in three age classes: 25 to 34; 35 to 54; 55 to 64.

A total of nine subgroups of adult population have been selected for investigation:

- unemployed people aged 25 to 34, 35 to 44, 55 to 64;
- inactive people aged 25 to 34, 35 to 44, 55 to 64;
- employed people aged 25 to 34, 35 to 44, 55 to 64.

At national level, when data were available and reliable, the risk of low skills was also analysed for women and for foreign-born adults. This information is presented in the country factsheets<sup>(35)</sup> produced to complement this report.

Source: Cedefop.

For each of the nine subgroups identified, the risk of being low-skilled in education (using LFS 2016 microdata), digital skills (using CSIS 2015 microdata), and cognitive skills (PIAAC 2012 and PIAAC 2015 public use files) has been calculated using four indicators:

- (a) the absolute risk of low skills, calculated as the simple share of individuals with low skills among those of the same sociodemographic subgroup<sup>(36)</sup>. It represents the incidence of low skills in the subgroup population;

<sup>(34)</sup> Combinations that consider additional sociodemographic characteristics have produced, at country level, subgroups with no or too few observations.

<sup>(35)</sup> [www.cedefop.europa.eu/en/publications-and-resources/publications/3081](http://www.cedefop.europa.eu/en/publications-and-resources/publications/3081)

<sup>(36)</sup> Absolute risk of low skills calculated as: (low skilled population)<sub>ij</sub>/(total population)<sub>ij</sub>; where subscript i refers to subgroup and j to country.

- (b) the relative risk of low skills, calculated as the share of low-skilled adults in the sociodemographic subgroup (absolute risk) over the share of low-skilled among the whole adult population aged 25 to 64 in the country <sup>(37)</sup>. It compares the incidence of low skills in the subgroup to the incidence of low skills in the total adult population of the country. Values above/below 100 indicate that the risk of low skills is higher/lower for the subgroup than the average risk observed for the total adult population of the country;
- (c) the low skills composite index, calculated as the arithmetic mean of the relative risk of low skills in education, digital skills, literacy and numeracy. It provides the average risk of low skills in the four domains analysed. Again, values of the index above/below 100 indicate a higher/lower than average risk;
- (d) the relative performance index of low skills, calculated as the relative risk of low skills within the country over the relative risk of low skills observed on average in the EU-28+ for the same sociodemographic subgroup <sup>(38)</sup>. It compares the relative performance in terms of low skills of the subgroup in the country to the relative performance of the subgroup in the EU-28+ as a whole. Values above 100 indicate that the relative risk of low skills registered by the subgroup within the country is higher than the one registered by the same subgroup on average in the EU-28+. As opposite, values below 100 indicate a lower relative risk (results of the relative performance index are presented in the country factsheets).

#### 4.1.1. Overall results

Results show that the risk of low skills increases with age and is higher for inactive and unemployed adults compared to the employed. Young adults (25 to 34) register a 30% lower risk of being low-skilled in all skill dimensions, compared to the total adult population. In contrast, older adults (55 to 64) register a risk of low skills, in all the dimensions considered, which is higher by about 40% than the one observed among the overall adult population. Similarly, the unemployed and adults out of the labour force have higher than average risks of low skills, especially in education levels: unemployed and

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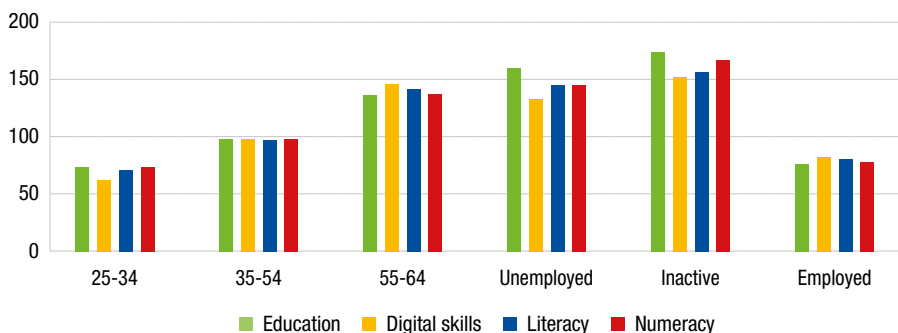
<sup>(37)</sup> Relative risk of low skills calculated as:

$\frac{\{(low\text{-skilled population})_{ij}/(total\ population)_{ij}\}}{\{(low\text{-skilled population})_i/(total\ population)_i\}} \times 100$ ;  
where subscript i refers to subgroup and j to country.

<sup>(38)</sup> Relative performance index calculated as:  $\frac{[(relative\ risk\ of\ low\ skilling)\ ij]}{[(relative\ risk\ of\ low\ skilling)\ i_{EU28+}]} \times 100$ ; where subscript i refers to subgroup, j to country and EU28+ to European average.

inactive adults have a risk of having low education, respectively around 60% and 70% higher than observed among the overall adult population (Figure 13).

Figure 13. **Relative risk of low skills for age groups and employment status by type of skill, EU-28+**

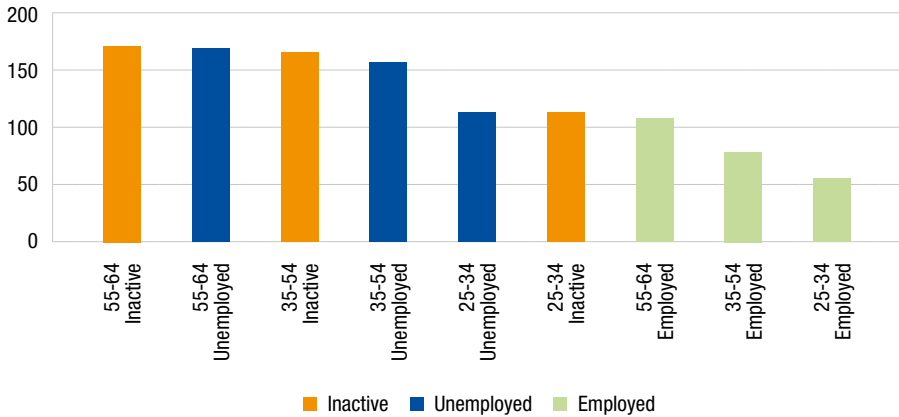


NB: The relative risk of low skills is calculated as the share of low-skilled in the sociodemographic subgroup over the share of low-skilled among adults aged 25-64. Values of the index below 100 indicate a lower than average risk; values above 100 indicate higher than average risk. European average: EU-28+ for education; EU-28 and NO for digital skills, PIAAC countries for literacy and numeracy.

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD a; b.

However, the analysis combining age and employment status provides more insights. The unemployed and people out of the labour force (inactive) aged 55 to 64, followed by inactive people aged 35 to 54, are the subgroups of the adult population with most potential for upskilling and reskilling. They present an average risk of low skills in the four skill dimensions (education, digital skills, literacy and numeracy) which is between 65% and 73% higher than that registered by the overall population aged 25 to 64 (Figure 14). Unemployed adults aged 35 to 54 also have, on average, a high risk of having low education, low digital and low cognitive skills (56% higher than the overall population aged 25 to 64).

Figure 14. **Low skills composite index (\*), EU-28+**



NB: (\*) Low skills composite index: calculated as the arithmetic mean of the relative risk of low skills in four domains: education, digital skills, literacy and numeracy. For each skill domain, the relative risk is calculated as the share of low-skilled in the sociodemographic subgroup over the share of low-skilled among adults aged 25-64. Values of the index below 100 indicate a lower than average risk; values above 100 indicate higher than average risk. European average: EU-28+ for education; EU-28 and NO for digital skills, PIAAC countries for literacy and numeracy.

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a, b.

To investigate better the skill needs of the nine subgroups of low-skilled adults identified above, we proceed with investigating the risk of being low-skilled in four skill dimensions:

- (a) education;
- (b) digital;
- (c) literacy;
- (d) numeracy.

In line with the ultimate aim of this study, which is providing evidence for policy-making in this area, the subgroups analysis is presented according to employment status. For each subgroup the following results are presented:

- (a) the absolute risk of low skills, registered by the subgroup in each of the four skills dimensions;
- (b) the relative risk of low skills, registered by the subgroup in each of the four skills dimensions for all the EU-28+ countries, in order to compare

the low skills performance of subgroups among European countries and with respect to the European average.

#### 4.1.2. Unemployed adults

The absolute risk of low skills, recorded on average in the EU-28+ for unemployed adults, is reported in Figure 15.

Results seem to suggest the existence of a negative relationship between unemployment and skill development: compared to the general adult population, unemployed adults report a higher risk of being low-skilled in all skill dimensions, with the sole exception of digital skills for young adults. Low digital skills seem to be a significant issue for older unemployed adults as seven out of 10 have low digital competences or seldom use the internet. Older unemployed adults also report a relatively high risk of having low educational attainment and low numeracy (four out of 10). Low skill is also relatively high among unemployed aged 35 to 54 and particularly in relation to digital skills: six out of 10 have low digital skills. Conversely, younger adults have a lower risk of having digital skills than the total adult population.

Figure 15. **Unemployed adults: absolute risk of being low-skilled by age and type of skill, EU-28+**

Age	Education	Digital skills	Literacy	Numeracy
55-64	43.1	71.1	32.6	39.8
35-54	39.5	60.9	33.6	36.8
25-34	29.2	39.2	23.3	30.2
Total unemployed 25-64	36.7	56.3	29.9	34.9
Total adult population 25-64	23.2	43.0	20.8	24.3

NB: % of individuals with low skills among those of the same sociodemographic subgroup. European average: EU-28+ for education; EU-28 and NO for digital skills, PIAAC countries for literacy and numeracy.

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a, b.

At country level, there are significant differences in the risks of low skills for unemployed adults across age classes and type of skill, both in absolute (Table 1) and relative terms (Figures 16 to 19).

For example, cross-country comparisons, presented in Figure 16, indicate that, among the unemployed, young adults are at particular high risk of having low education in Estonia, Latvia and Slovakia (twice the risk

recorded by the total adult population in their respective country), and they also account for 3.5 to 5% of all adults with low education in their respective country. Low education also seems to be a particularly significant issue for adults aged 35 to 54 in Lithuania (2.5 higher risk than the total adult population); this group accounts for almost 10% of all adults with low education in the country. In all countries, older unemployed adults report a higher risk of having low education compared to the total adult population of their country. Older adults in Bulgaria and Slovakia report considerably high risk, accounting for about 2.5% of the total adult population with low education in their respective countries.

Cross-country comparison of low digital skills among unemployed adults is reported in Figure 17. In almost all countries, young adults reported a lower risk of having low digital skills than the country's total adult population. Conversely, in all countries, older adults report a higher risk of having low digital skills than the country's total adult population. Older adults in Croatia report twice the risk of having low digital skills than the total adult population in their country; further, they account for almost 8% of the total adult population with low digital skills in the country.

Cross-country comparison of low literacy among unemployed adults is reported in Figure 18. In Sweden, unemployed young adults have 2.5 times higher risk of having low literacy than the average adult population in their country; they also account for 4% of total adults with low literacy in the country. In Slovakia, unemployed adults aged 35 to 54 have a very high risk of having low literacy and account for about 7% of all adults with low literacy in the country. The risk of older unemployed adults having low literacy in Denmark and Spain is almost twice than the risk of the total adult population in the country. However, while the older unemployed account for only 1% of total adults with low literacy in Denmark, in Spain they account for almost 3%.

In Germany, Slovakia, Sweden and the UK, unemployed young adults have twice the risk of having low numeracy than the average adult population in the country (Figure 19). In Lithuania, unemployed adults aged 35 to 54 have twice the risk of having low numeracy of adults in their country and they also account for 9% of all adults with low numeracy. In Sweden, older unemployed adults have 2.5 times higher risk of having low numeracy than the total adult population of the country and account for 2% of all adults with low numeracy.

**Table 1. Unemployed adults: absolute risk of being low-skilled by age, gender and type of skill, EU-28+ countries**

Country	Education				Digital skills				
	25-34	35-54	55-64	Total population 25-64	25-34	35-54	55-64	Total population 25-64	
AT	25.7	27.1	21.1	15.5	:	53.3	:	33.8	
BE	34.3	38	42.8	24.9	24.4	56.9	66.9	38.6	
BG	28.8	37	41.6	17.8	75.4	90	96.5	67.9	
CY	13.6	25.9	40.9	20.5	46.2	75.4	82.7	60	
CZ	20.5	24.4	17.8	6.5	:	63.8	75.6	39.7	
DE	31.7	28.4	19.8	13.6	32.6	44.2	60	30	
DK	15.6	20.7	23.2	18.5	:	:	:	23	
EE	26.4	14.5	:	11.1	:	53.7	80.5	32.8	
EL	16.2	31.1	51.9	28.2	28.8	68	90.3	55.1	
ES	43.7	53.7	66.9	41	40.6	58.4	74.3	44.8	
FI	11.7	11	21	10.8	:	:	:	22.1	
FR	25.2	34.7	38.3	22.5	35.6	53.2	53.2	43.5	
HR	8.1	21.5	22.5	17.3	:	65.9	91.4	49	
HU	34.9	32.9	29.2	16.6	56.3	72	83.9	48	
IE	19.2	29.6	41.8	19.2	55.7	73.2	85.3	54.4	
IS	:	:	:	22.1	:	:	:	:	
IT	31.9	53.2	65.4	39.9	44.1	68.1	81.8	54.1	
LT	:	14.6	:	5.4	:	81.4	91.4	48.3	
LU	23.2	29.4	:	22	:	:	:	13.9	
LV	18.5	18.1	11.4	9.3	52	73.1	88	48.9	
MT	67.7	82.4	70.5	54.7	:	:	:	47.6	
NL	24.8	26.7	31.3	21.7	:	:	:	26	
NO	34.2	31.2	25.1	18	:	:	:	16.8	
PL	11.8	14.4	14	8.7	49	81.4	96.1	61.2	
PT	30.7	59.4	77.1	53.1	32.7	62.4	92.7	52.6	
RO	28	24.9	30	23.3	73.5	87.1	100	75.4	
SE	29.6	36.8	29.7	14.9	:	:	:	24.7	
SI	9.8	19.6	22	12.7	:	73	:	48.7	
SK	17.4	18.5	18.7	8.1	39.9	66.8	93.6	47.5	
UK	28.2	31.6	31.5	23	:	44.4	:	30	
<b>EU-28+</b>	<b>29.2</b>	<b>39.5</b>	<b>43.1</b>	<b>23.2</b>	<b>39.2</b>	<b>60.9</b>	<b>71.1</b>	<b>43</b>	

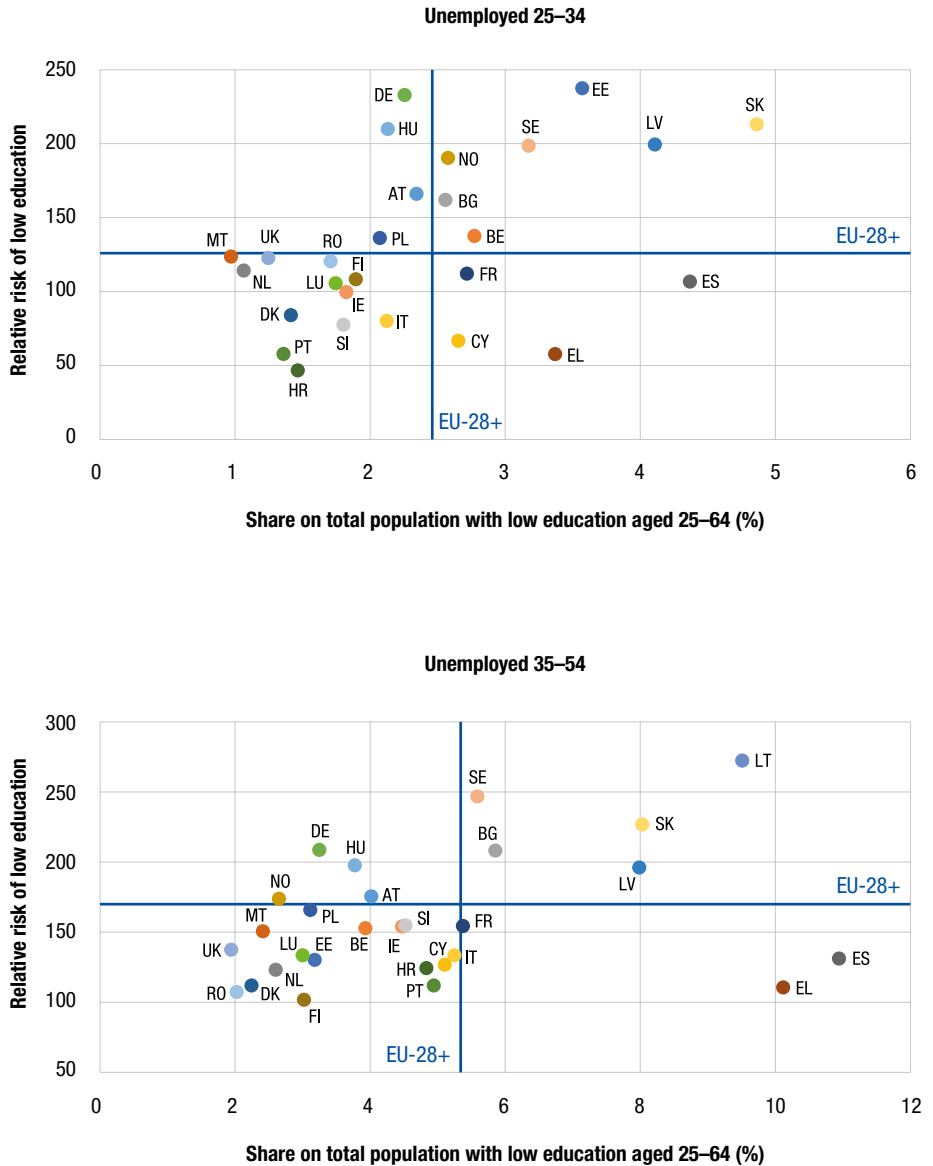


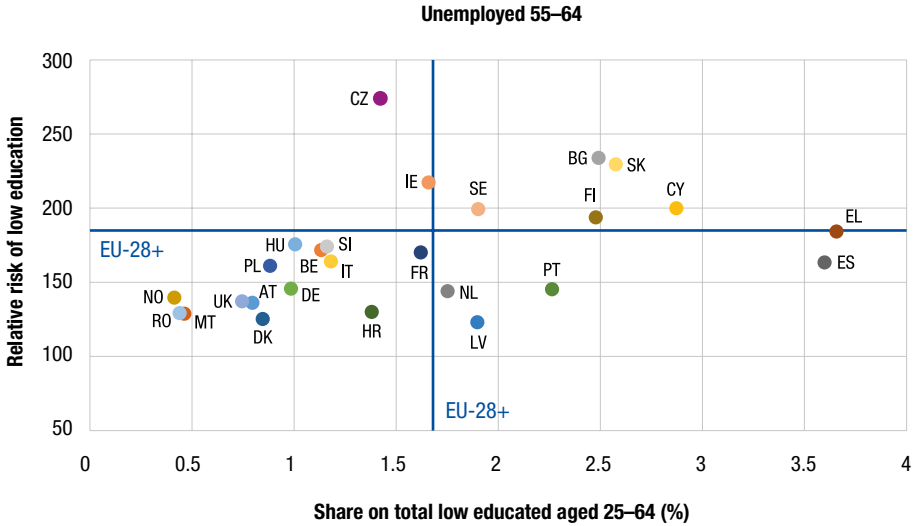
NB: (-) not available; (:) unreliable

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

	Low literacy				Low numeracy			
	25-34	35-54	55-64	Total population 25-64	25-34	35-54	55-64	Total population 25-64
	26.5	25.4	:	16	23.1	22.4	:	15
	:	:	:	15.1	:	:	:	14.3
	-	-	-	-	-	-	-	-
	17.4	19.7	:	14.4	22.8	27.1	:	19.8
	5.9	13.8	:	12.3	18.1	19.3	:	12.9
	33.6	35.2	:	18.9	38.1	32	:	18.7
	18	23	31.2	16.4	17.8	25.1	21.1	14.7
	13.8	22.1	22.1	14.2	22	26.8	26.1	15
	21.3	21.2	32.2	26.8	19.2	21.9	37.8	27.9
	23.4	41.2	52	28.7	28.6	43.2	57.2	32.1
	:	:	:	11.1	:	20.9	:	12.9
	25.2	30.2	36.1	23	38.5	38.7	51.7	30.2
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	19.9	22.9	:	18.4	26.6	30.9	29.8	26.2
	-	-	-	-	-	-	-	-
	20.9	39.7	46	28.2	25.2	38.1	48.6	32.1
	19.1	27.8	26.2	17.3	22.6	41.1	26.5	19.8
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	:	22.2	:	13.1	:	25.9	:	14.4
	:	:	:	11.6	:	:	:	14
	18.6	27.8	27	20.5	24.2	36.3	44.1	25.7
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	34.2	27.1	:	13.9	33.2	28.3	40.8	15.7
	14.8	36.9	:	27.2	17.6	38.1	:	27
	19	21.3	:	12.1	26.9	24.3	:	13.9
	25.8	30.5	:	15.7	48.4	44.6	30.2	23.2
	<b>23.3</b>	<b>33.6</b>	<b>32.6</b>	<b>20.8</b>	<b>30.2</b>	<b>36.8</b>	<b>39.8</b>	<b>24.3</b>

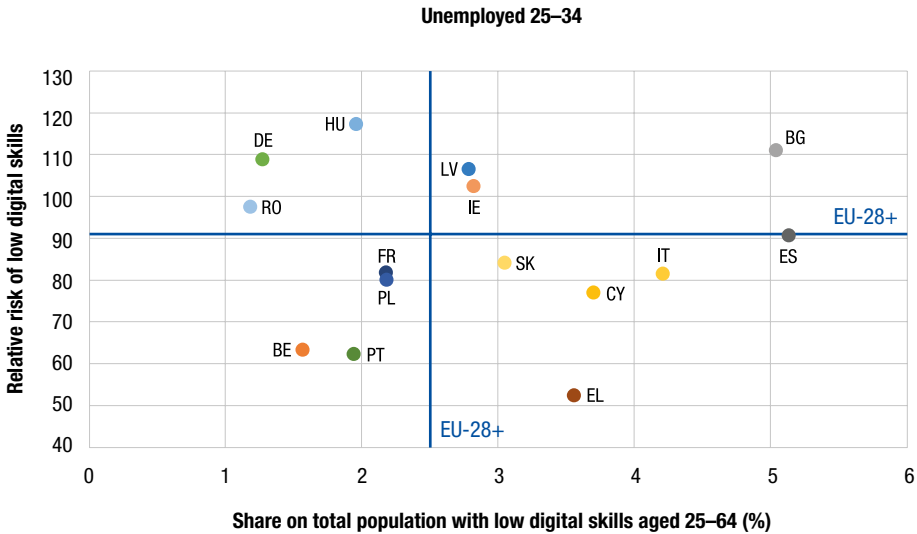
Figure 16. **Cross-country comparison of low education among unemployed adults**

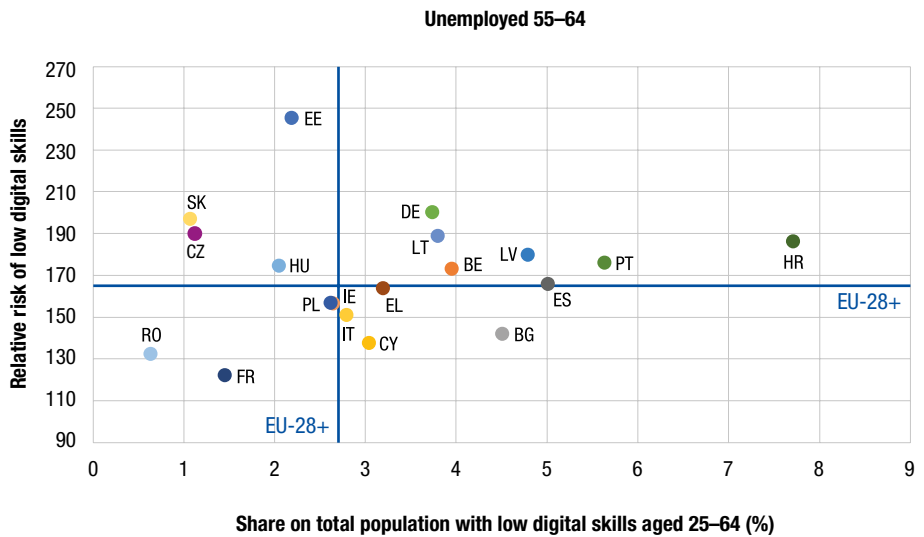
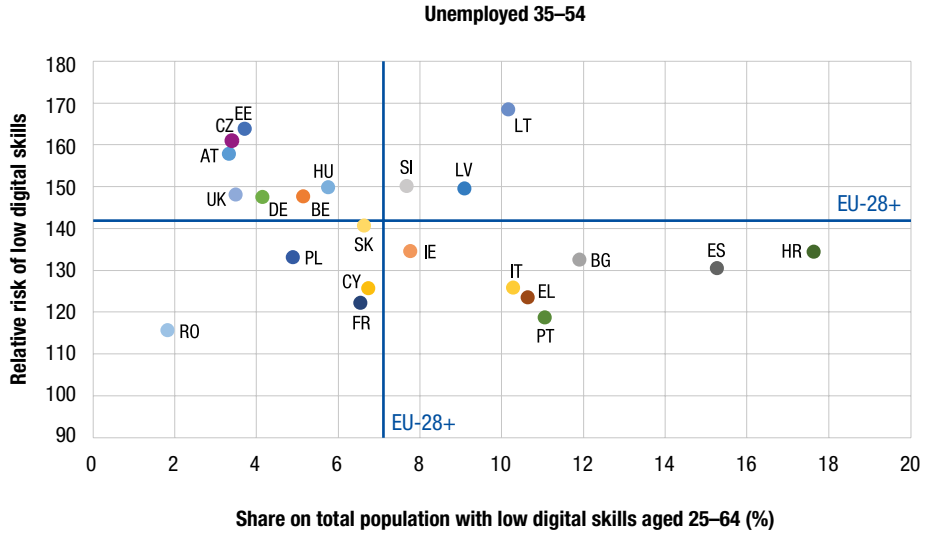




NB: No data (unreliable): 25-34 (IS, LT). 35-54 (IS); (EE, IS, LT, LU).  
 Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

Figure 17. **Cross-country comparison of low digital skills among unemployed adults**

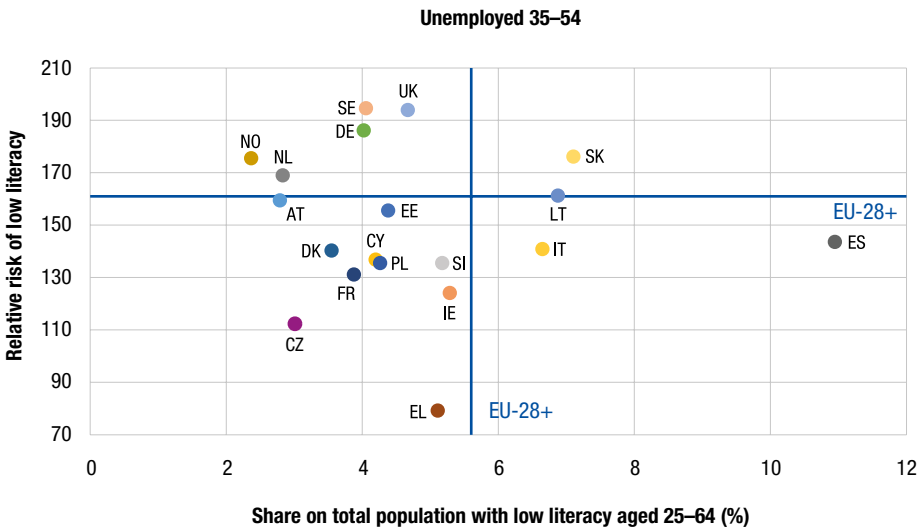
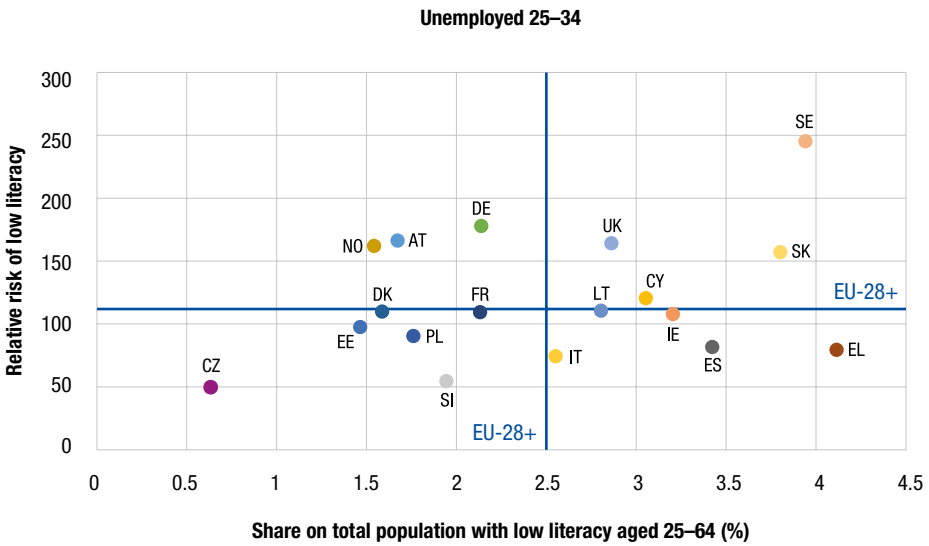


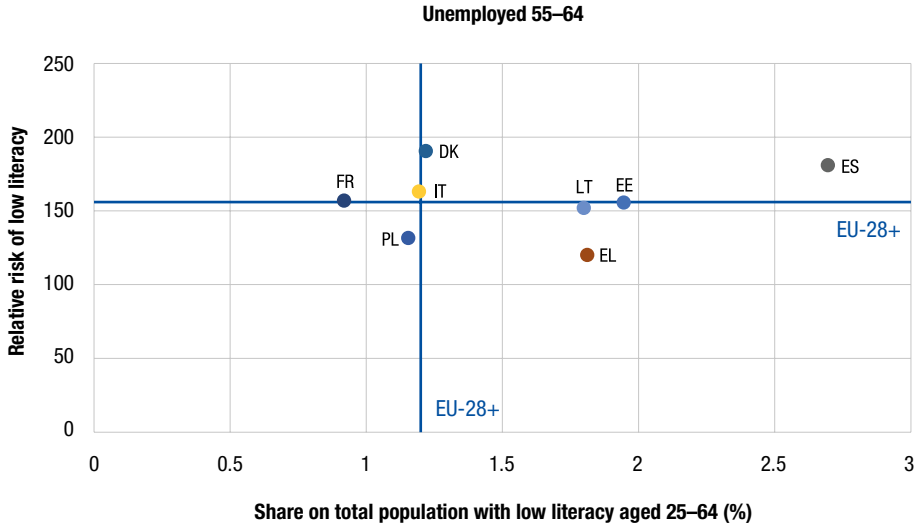


NB: No data (unreliable): 25-34 (AT, CZ, DK, EE, FI, HR, IS, LT, LU, MT, NL, NO, SE, SI, UK); 35-54 (DK, FI, IS, LU, MT, NL, NO, SE); 55-64 (AT, DK, FI, IS, LU, MT, NL, NO, SE, SI, UK).

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

Figure 18. Cross-country comparison of low literacy skills among unemployed adults

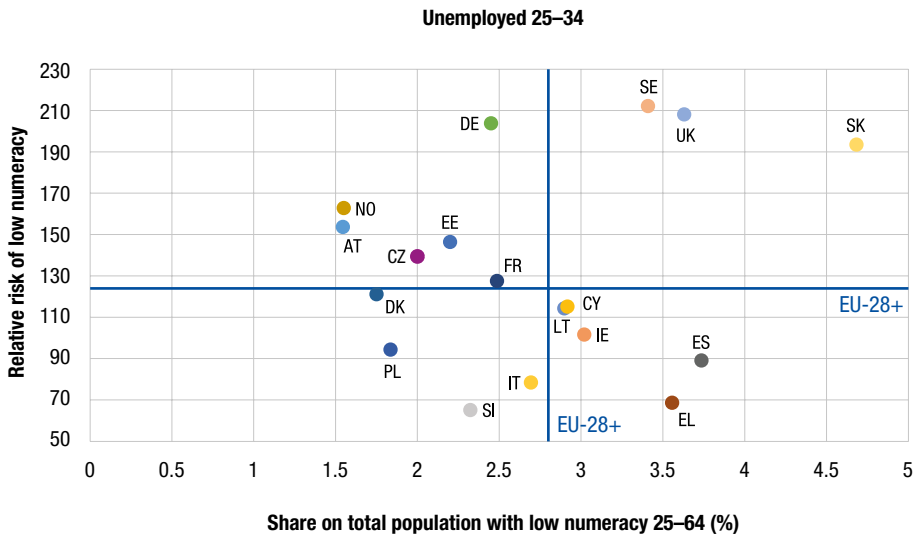




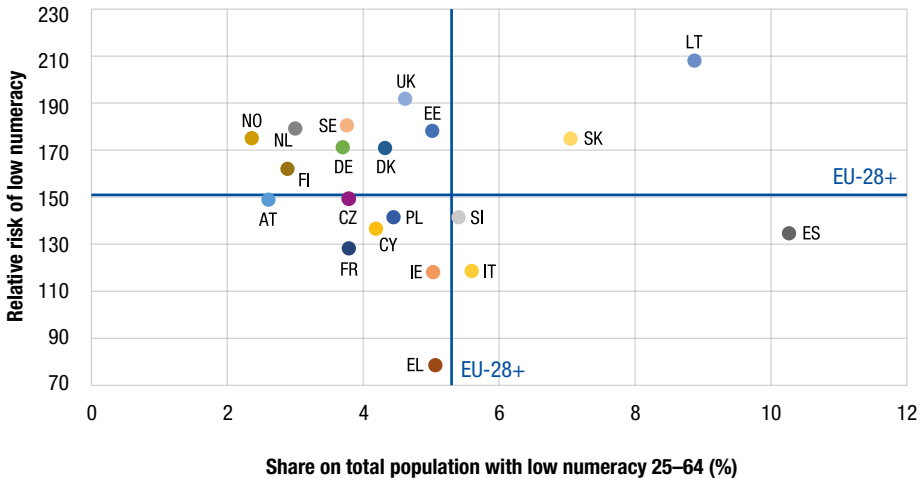
NB: No data (not available): BG, HR, HU, IS, LU, LV, MT, PT, RO; (unreliable): 25-34 (BE, FI, NL); 35-54 (BE, FI); 55-64 (AT, BE, CY, CZ, DE, FI, IE, NL, NO, SE, SI, SK, UK).

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

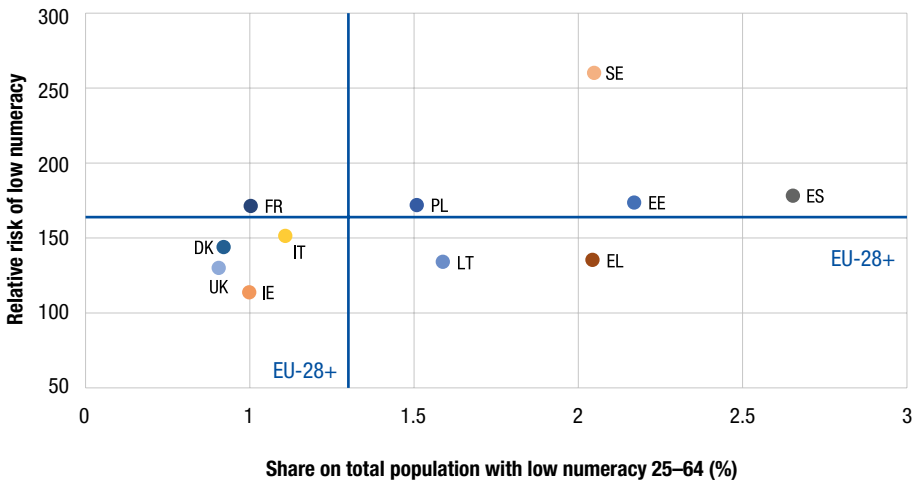
Figure 19. **Cross-country comparison of low numeracy among unemployed adults**



### Unemployed 35–54



### Unemployed 55–64



NB: No data (not available): BG, HR, HU, IS, LU, LV, MT, PT, RO; (unreliable): 25-34 (BE, FI); 35-54 (BE); 55-64 (AT, BE, CY, CZ, DE, FI, NL, NO, SI, SK).

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD a; OECD b.

### 4.1.3. Inactive adults

Among adults out of the labour force, older adults have a very high risk of having low skills in all skill domains considered, especially digital (76% higher). They have higher risks than the ones registered by the unemployed of the same age in digital skills, literacy and numeracy. The risk of having low digital skills is also very high among inactive people aged 35 to 54: six out of 10 have low digital competences or seldom use the internet. This subgroup also presents the highest risk of low numeracy, at almost 43% in the countries participating in PIAAC. Young adults (25 to 34) out of the labour force show relatively high risks of low skills when compared to the average risks registered by the overall adult population: around one out of three have low education level or low numeracy.

Figure 20. **Inactive adults: absolute risk of being low-skilled by age and type of skill, EU-28+**

Age	Education	Digital skills	Literacy	Numeracy
55-64	41.4	75.8	35.4	41.0
35-54	43.2	61.4	32.1	42.8
25-34	30.3	33.8	23.2	31.4
Total inactive 25-64	40.0	64.3	32.3	40.1
Total adult population 25-64	23.2	43.0	20.8	24.3

NB: % of individuals with low skills among those of the same sociodemographic subgroup. European average: EU-28+ for education; EU-28 and NO for digital skills, PIAAC countries for literacy and numeracy.

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD a; b.

At country level, there are significant differences in the risks of low skills for inactive adults across age classes and type of skill, both in absolute (Table 2) and relative terms (Figures 21 to 24).

In Lithuania, young adults out of the labour force have four times the risk of being low educated compared to the total adult population; they also account for a significant share of the total adults with low educational attainment in the country (10%) (Figure 21); inactive adults aged 35 to 54 have a higher risk of having low education than the average adult population in the country (more than three times higher), and they account for more than 17% of all adults with low education. In Iceland, older adults who are out of the labour force report more than 2.5 times the risk of having low



education than the average Icelandic adult population. Older inactive adults in Ireland, Slovakia and Sweden report 2.5 times higher risk of having low education than the average adult population in their respective country. In Slovakia, older inactive adults also account for almost 25% of all adults with low education in the country.

Considering digital skills (Figure 22), inactive young adults tend to have lower risks of low digital skills than older inactive adults. In the UK, however, inactive young adults report 10% higher risk of having low digital skills compared to the adult population in the country; they also account for 6% of all adults with low digital skills. In Denmark and the Netherlands, inactive adults aged 35 to 54 report a relatively high risk of having low digital skills, at 70% higher than the risk reported by the total adult population in the respective countries; they also account for a significant share (11-12%) of all adults with low digital skills in their respective countries. In all countries, older adults report high risks of low digital skills. In Norway, older inactive adults report an almost three times higher risk than the total adult population in the country, and they also account for more than 15% of all adults with low digital skills in the country.

Figures 23 and 24 report cross-country comparison of low cognitive skills among inactive adults. In Slovakia, inactive young adults have almost twice the risk of having low literacy compared to the total adult population in the country; they also account for a significant share of total adults with low literacy in the country (11%). In Finland, older inactive adults report almost three times higher risk of having low literacy than the total adult population in the country, and account for 30% of all adults with low literacy. Figure 24 reports cross-country comparison of low numeracy among inactive adults. In Slovakia, young adults out of the labour force have more than double the risk of having low numeracy, compared to the total adult population in the country, and they also account for a significant share of all adults with low numeracy (12%). In Denmark, the inactive aged 35 to 54 have three times higher risk of having low numeracy than the total adult population in the country, and account for 16% of all adults with low numeracy. In Finland, older inactive adults report 2.5 times higher risk of having low numeracy than the total adult population in the country, and account for more than a quarter of all adults with low literacy.

Table 2. **Inactive adults: absolute risk of being low-skilled by age, gender and type of skill, EU-28+ countries**

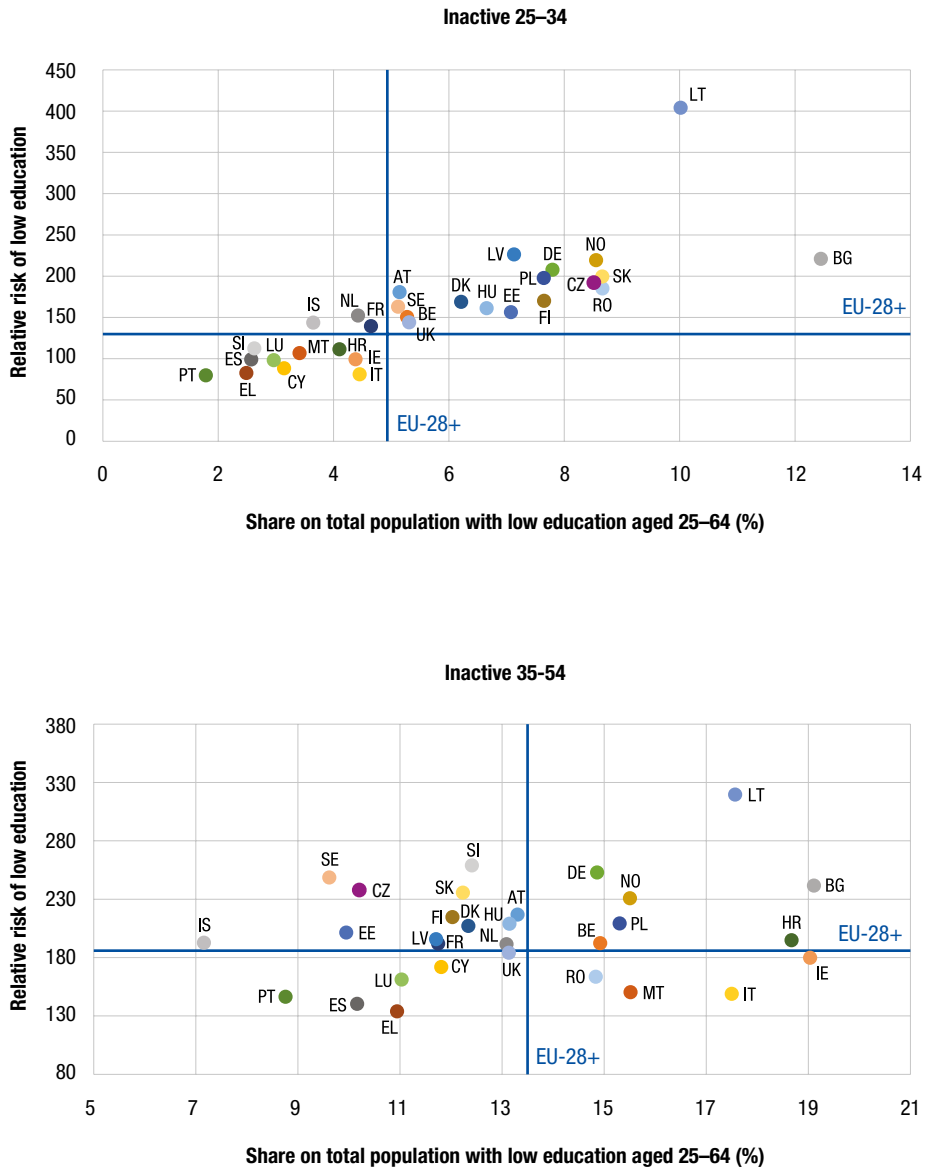
Country	Education				Digital skills				
	25-34	35-54	55-64	Total population 25-64	25-34	35-54	55-64	Total population 25-64	
AT	28	33.5	28.8	15.5	:	50.4	70.5	33.8	
BE	37.5	47.9	50.8	24.9	39.1	62.3	62.2	38.6	
BG	39.3	43	29.7	17.8	51.5	85.5	95	67.9	
CY	18.1	35.2	41.2	20.5	54.8	83.9	91.1	60	
CZ	12.6	15.5	17.4	6.5	32.5	53.4	80.1	39.7	
DE	28.3	34.4	22.3	13.6	13.5	47.2	62.7	30	
DK	31.3	38.4	35.7	18.5	20.1	39.1	54.5	23	
EE	17.4	22.4	21.7	11.1	:	52.5	80.7	32.8	
EL	23.3	37.7	46.5	28.2	45.8	80.8	91.4	55.1	
ES	40.6	57.5	68.6	41	30.6	70.4	81.5	44.8	
FI	18.5	23.3	24.3	10.8	:	36.7	51.7	22.1	
FR	31.4	43.2	42.4	22.5	37.4	61.4	67.1	43.5	
HR	19.3	33.7	35.7	17.3	:	71.7	85.7	49	
HU	26.8	34.8	30	16.6	36	66.9	80.5	48	
IE	19.1	34.6	46.8	19.2	52.8	71.2	83	54.4	
IS	31.7	42.5	56.8	22.1	:	:	:	:	
IT	32.3	59.3	66.8	39.9	46.6	82.5	84.4	54.1	
LT	21.6	17.1	8.4	5.4	30	:	89.8	48.3	
LU	21.6	35.5	39.7	22	:	20	33.9	13.9	
LV	20.9	18.1	12.1	9.3	31	71.4	84.1	48.9	
MT	58.4	82.3	82.8	54.7	:	66.3	80.3	47.6	
NL	33.1	41.6	47	21.7	:	:	56	26	
NO	39.4	41.4	32.4	18	:	26.1	51.5	16.8	
PL	17.2	18.2	19.7	8.7	50.2	82	92	61.2	
PT	42.3	77.7	81.1	53.1	:	85.1	85.9	52.6	
RO	43.1	38	34.1	23.3	77.3	:	95.3	75.4	
SE	24.3	37.1	36.7	14.9	:	:	65.7	24.7	
SI	14.2	32.8	27	12.7	:	90.1	82.2	48.7	
SK	16.2	19.2	20.1	8.1	28.1	70.5	86.3	47.5	
UK	33.1	42.3	39.5	23	33.2	36.4	56.9	30	
<b>EU-28+</b>	<b>30.3</b>	<b>43.2</b>	<b>41.4</b>	<b>23.2</b>	<b>33.8</b>	<b>61.4</b>	<b>75.8</b>	<b>43</b>	

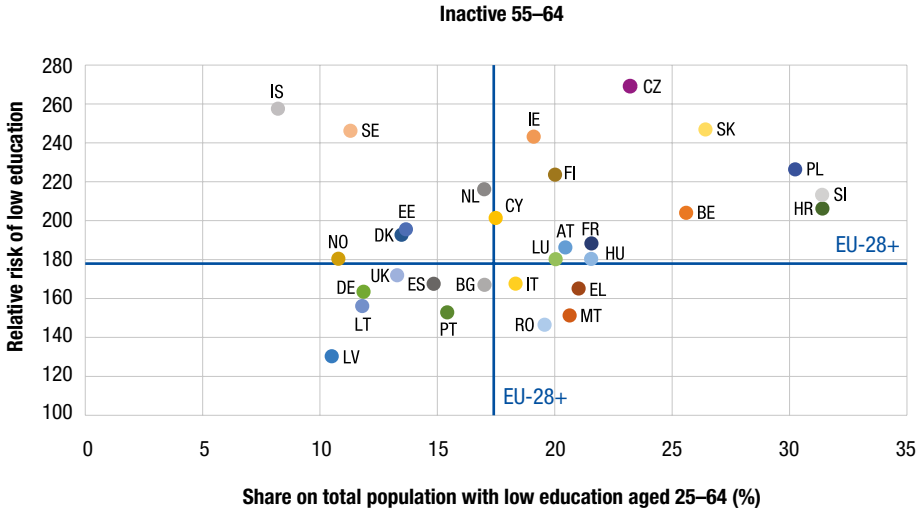
NB: (-) not available; (c) unreliable

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

	Low literacy				Low numeracy			
	25-34	35-54	55-64	Total population 25-64	25-34	35-54	55-64	Total population 25-64
	16	25.7	29.3	16	14	27.4	26.4	15
	28	29.5	32.2	15.1	32.6	32.7	30.7	14.3
	-	-	-	-	-	-	-	-
	18.2	19.5	23	14.4	22.7	31.6	35.9	19.8
	14.3	25.5	20.6	12.3	19.2	16.2	23.9	12.9
	18.1	40	35.3	18.9	22.4	44.3	35.2	18.7
	19.8	39.7	38.2	16.4	21.4	43.7	30.8	14.7
	16.6	24.4	27.4	14.2	20.8	29.7	29.2	15
	24.2	24.9	27.5	26.8	31.1	35.2	31.8	27.9
	30.6	37.4	48	28.7	34.4	42.5	55.9	32.1
	9.6	27.9	31.7	11.1	15.2	34.9	32.5	12.9
	25.9	35.3	37.7	23	39.6	50.3	46.3	30.2
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	25.5	28.5	31.9	18.4	33.4	39.7	45.2	26.2
	-	-	-	-	-	-	-	-
	24.3	28.1	45	28.2	31.8	48.5	49.7	32.1
	14.5	28.5	24.6	17.3	18.1	34.4	31.4	19.8
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	18.5	27.2	28.6	13.1	31.7	34.7	30.3	14.4
	11.5	26.9	27	11.6	21.3	35.2	33.8	14
	22.7	30.3	30.9	20.5	29	37	42.2	25.7
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	26.5	37.2	34.2	13.9	29.7	40.8	30.4	15.7
	19.1	48.3	42.3	27.2	23.3	52	42.8	27
	22.9	25.7	16.2	12.1	31	31.3	23.9	13.9
	26.1	27.9	22.2	15.7	43.8	42.7	31.2	23.2
	<b>23.2</b>	<b>32.1</b>	<b>35.4</b>	<b>20.8</b>	<b>31.4</b>	<b>42.8</b>	<b>41</b>	<b>24.3</b>

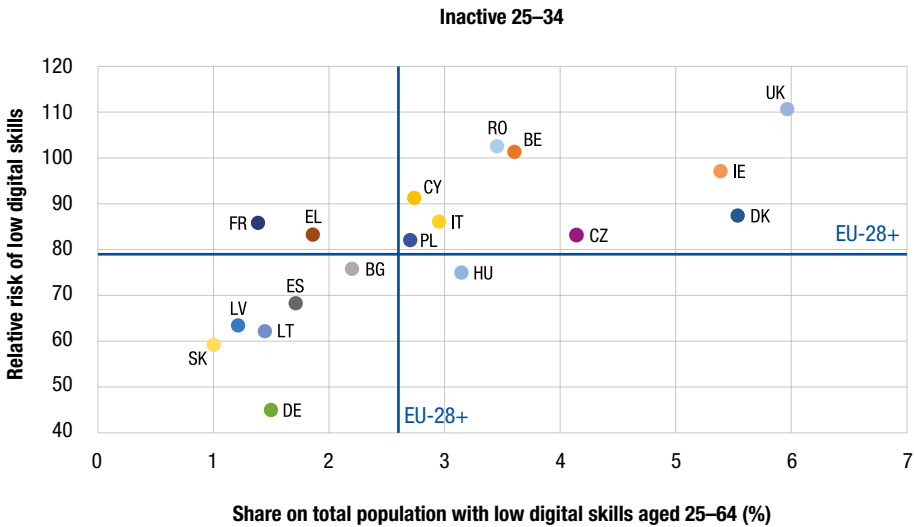
Figure 21. **Cross-country comparison of low education among inactive adults**



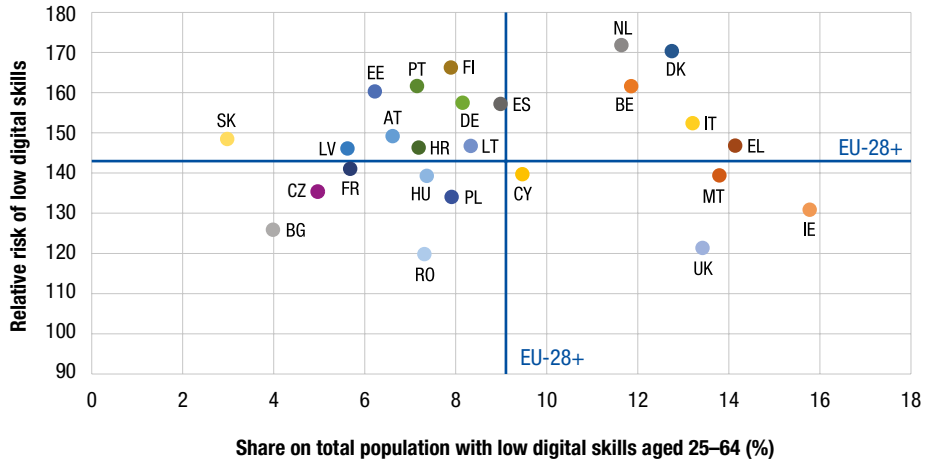


Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

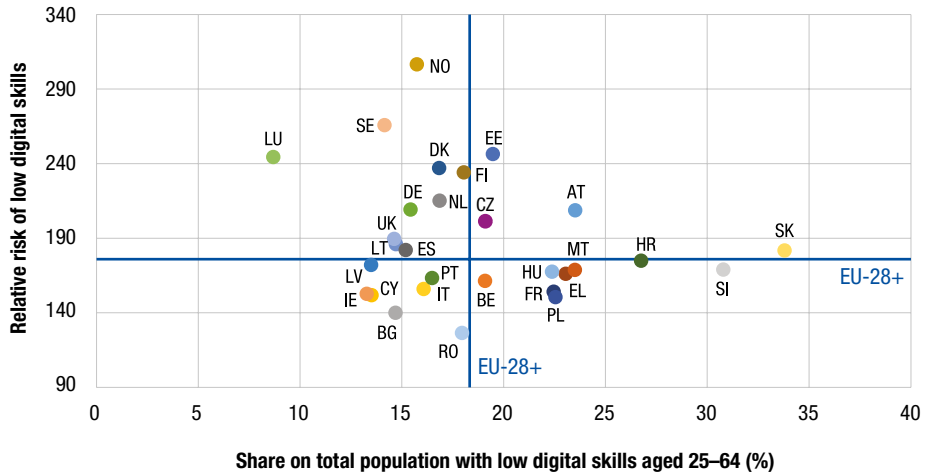
Figure 22. **Cross-country comparison of low digital skills among inactive adults**



### Inactive 35-54

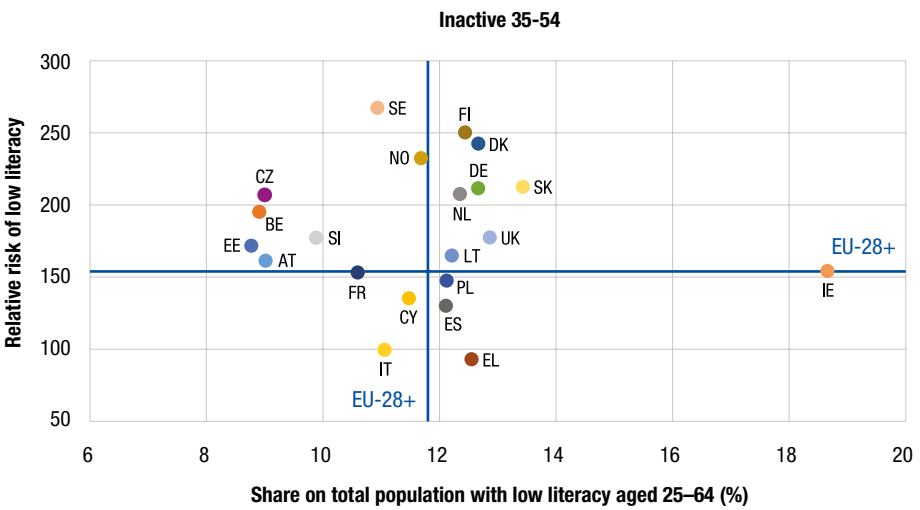
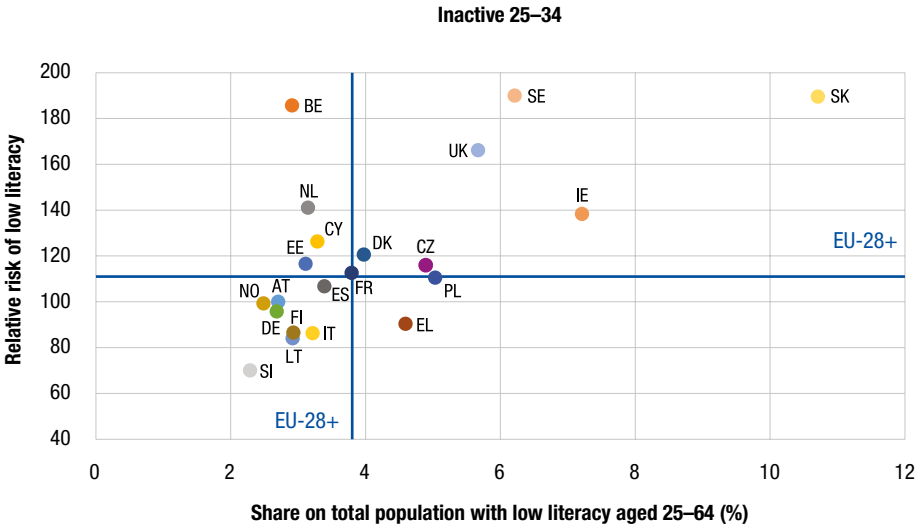


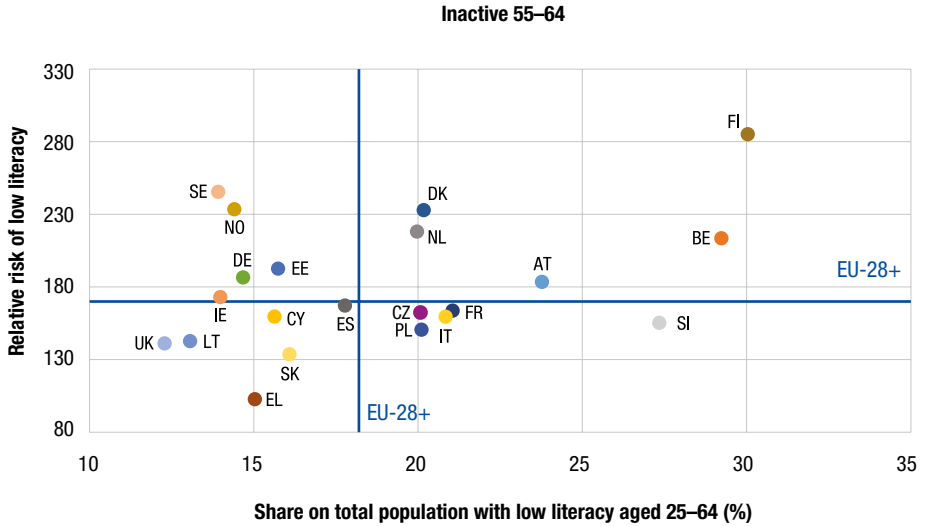
### Inactive 55-64



NB: No data (unreliable): 25-34 (AT, EE, FI, HR, IS, LU, MT, NL, NO, PT, SE, SI); 35-54 (IS, LU, NO, SE, SI); 55-64 (IS).  
 Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

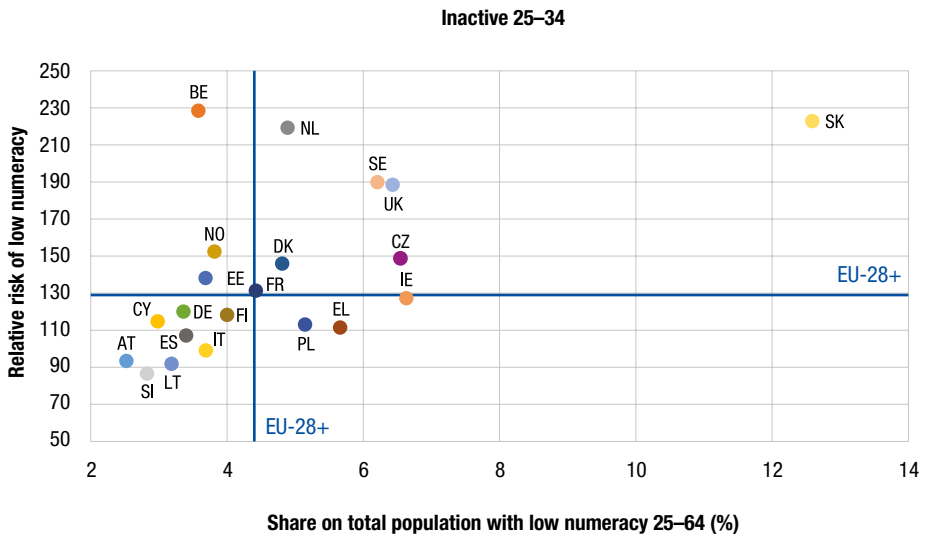
Figure 23. Cross-country comparison of low literacy among inactive adults



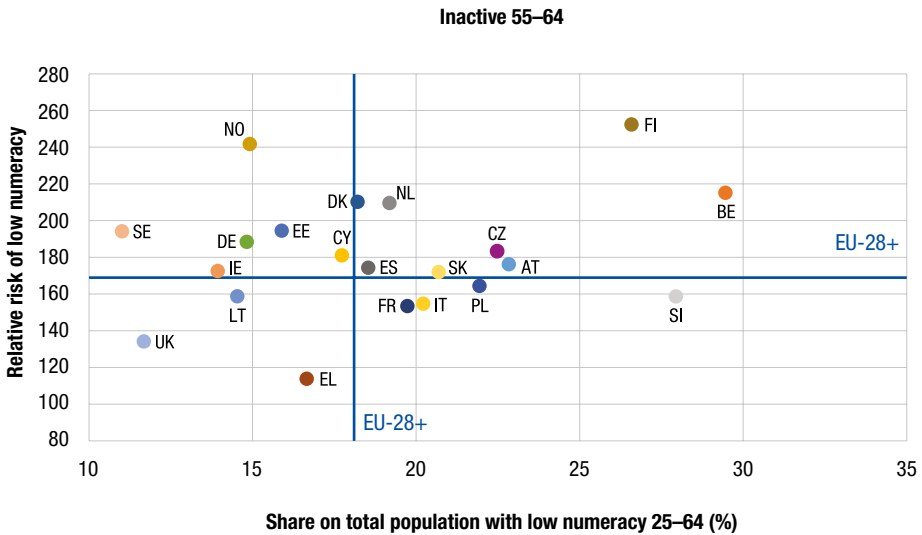
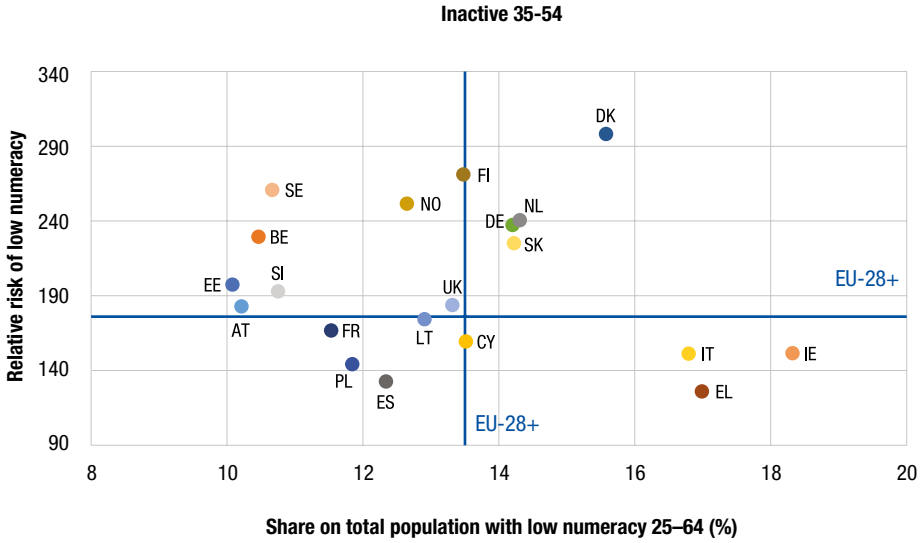


NB: No data (not available): BG, HR, HU, IS, LU, LV, MT, PT, RO.  
 Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

Figure 24. **Cross-country comparison of low numeracy among inactive adults**







NB: No data (not available): BG, HR, HU, IS, LU, LV, MT, PT, RO.  
 Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

#### 4.1.4. Employed adults

Employed adults of all age classes considered have relatively lower risks of low skills compared to unemployed and inactive people. Nevertheless, digital skills remain scarce among individuals aged 55 to 64: almost one in two have low digital skills (Figure 25).

Figure 25. **Employed adults: absolute risk of being low-skilled by age and type of skill, EU-28+**

Age	Education	Digital skills	Literacy	Numeracy
55-64	23.0	48.9	23.3	25.1
35-54	17.6	36.2	16.6	18.8
25-34	12.5	22.6	12.0	13.8
Total employed 25-64	17.4	35.1	16.5	18.5
Total adult population 25-64	23.2	43.0	20.8	24.3

NB: % of individuals with low skills among those of the same sociodemographic subgroup. European average: EU-28+ for education; EU-28 and NO for digital skills, PIAAC countries for literacy and numeracy.

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

The cross-country comparison also shows high variability for employed adults among EU-28+ countries in the risk of low skills across age subgroups, both in absolute (Table 3) and in relative terms (Figures 26 to 29).

Figure 26 reports cross-country comparison of low education among employed adults. The first two scatterplots show that, in all countries with the slight exception of Latvia, young employed adults and employed adults aged 35 to 54 report a lower risk of having low education than the total adult population in their country. Nonetheless, the young employed account for more than 20% of all adults with low education in Estonia and Latvia, while employed adults aged 35 to 54 account for about 40% of all adults with low education in Luxembourg and Portugal. In several countries, older employed adults have a higher risk of having low education: for instance, in Greece, Ireland and Cyprus, this subgroup of adults reports 60% higher risk of having low education than the total adult population in the country. In Cyprus and Ireland they also account for about 17% of all adults with low education in their respective countries.

Similar to risk patterns for low education, in all countries young employed adults and employed adults aged 35 to 54 report a lower risk of having low

digital skills than the total adult population in the country. However, in several countries, digital skills remain scarce among older adults, even when they are employed: in Estonia and Norway, older adults report 50% higher risk of having low digital skills compared to the risk reported for the total adult population in their respective country; they also account for a quarter of all adults with low digital skills.

Figure 28 reports cross-country comparisons of low literacy among employed adults. In almost all countries, young and 35 to 54 employed adults report lower or equal risk of having low literacy; however, in Cyprus and Norway, young employed adults account for a significant share (almost 20%) of all adults with low literacy in their country. In Greece, employed adults aged 35 to 54 report a slightly higher risk of having low literacy than the total adult population of the country; further, they account for over 35% of all adults with low literacy. In the Netherlands, older employed adults have a relatively high risk of having low literacy (about 40%); they also represent almost 19% of all adults with low literacy in the country.

Figure 29 shows that young employed adults and employed adults aged 35 to 54 report lower risk of having low numeracy than the total adult population. However, in Greece, Spain and France, older employed adults have a risk of low skills in numeracy between 20 to 30% higher than the national averages (population 25 to 64). Older employed adults in Spain and France also account for a significant share (12% to 14%) of all adults with low numeracy in their respective countries.

Table 3. **Employed adults: absolute risk of being low-skilled by age, gender and type of skill, EU-28+ countries**

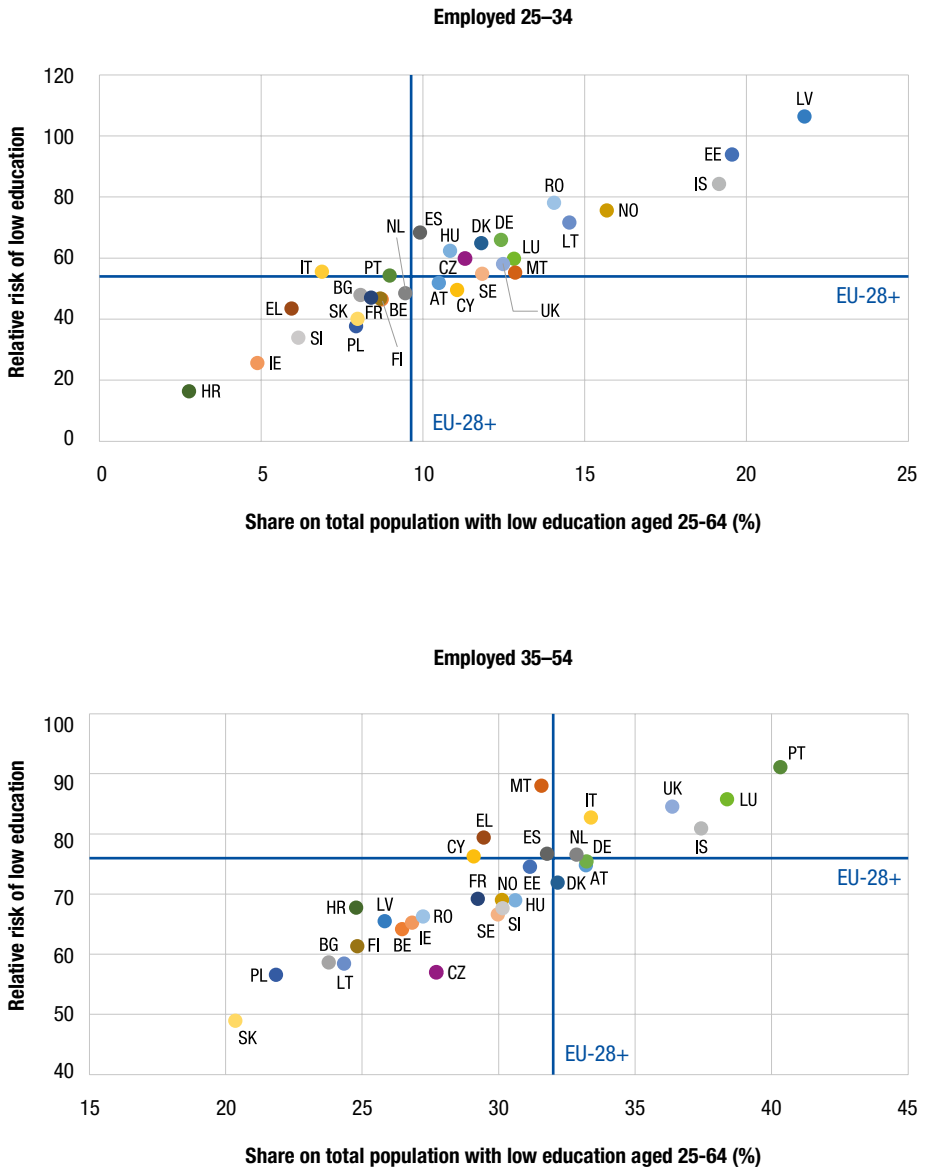
Country	Education				Digital skills				
	25-34	35-54	55-64	Total population 25-64	25-34	35-54	55-64	Total population 25-64	
AT	8	11.6	14.2	15.5	14.3	30.4	38.6	33.8	
BE	11.6	16	25.3	24.9	19.8	32	44.8	38.6	
BG	8.5	10.4	11.4	17.8	41.8	61.1	75.3	67.9	
CY	10.2	15.6	31	20.5	36.8	57.1	76	60	
CZ	3.9	3.7	4.7	6.5	21.6	32.8	52.3	39.7	
DE	9	10.3	10.6	13.6	12.3	25.1	40.7	30	
DK	12	13.3	22.4	18.5	11.8	16.5	32.1	23	
EE	10.4	8.3	7.6	11.1	10.2	27.5	50.7	32.8	
EL	12.3	22.4	43.8	28.2	19.5	45.3	74.5	55.1	
ES	28	31.4	45	41	22.3	34.4	53.8	44.8	
FI	5.1	6.7	13.2	10.8	:	17	29.1	22.1	
FR	10.6	15.6	27.1	22.5	22.9	39.7	49.1	43.5	
HR	2.9	11.7	18.3	17.3	:	38.3	55.8	49	
HU	10.4	11.5	13.8	16.6	29.6	39	57.3	48	
IE	4.9	12.6	29.7	19.2	31.4	45.6	68.6	54.4	
IS	18.6	17.9	25.2	22.1	:	:	:	:	
IT	22.2	33	36.8	39.9	32.5	43.9	55.7	54.1	
LT	3.8	3.1	1.9	5.4	18.2	43.5	58.2	48.3	
LU	13.2	18.9	24.4	22	:	17.9	:	13.9	
LV	9.9	6.1	5.5	9.3	22.1	42.9	62.1	48.9	
MT	30.3	48.2	60.4	54.7	26.5	37.1	59.1	47.6	
NL	10.5	16.6	24.5	21.7	12.2	22.1	27.6	26	
NO	13.6	12.4	15.5	18	:	13.5	25.9	16.8	
PL	3.3	4.9	8	8.7	28.5	56.3	70.1	61.2	
PT	28.9	48.4	67.9	53.1	21.8	43.6	73.2	52.6	
RO	18.2	15.4	26.1	23.3	58.3	72.8	80.4	75.4	
SE	8.2	9.9	18.8	14.9	:	18.8	30.4	24.7	
SI	4.3	8.6	12.9	12.7	23.4	39.6	58.3	48.7	
SK	3.3	4	6.4	8.1	22.9	40.4	50.2	47.5	
UK	13.4	19.4	25.4	23	19.9	23.3	37.9	30	
<b>EU-28+</b>	<b>12.5</b>	<b>17.6</b>	<b>23</b>	<b>23.2</b>	<b>22.6</b>	<b>36.2</b>	<b>48.9</b>	<b>43</b>	

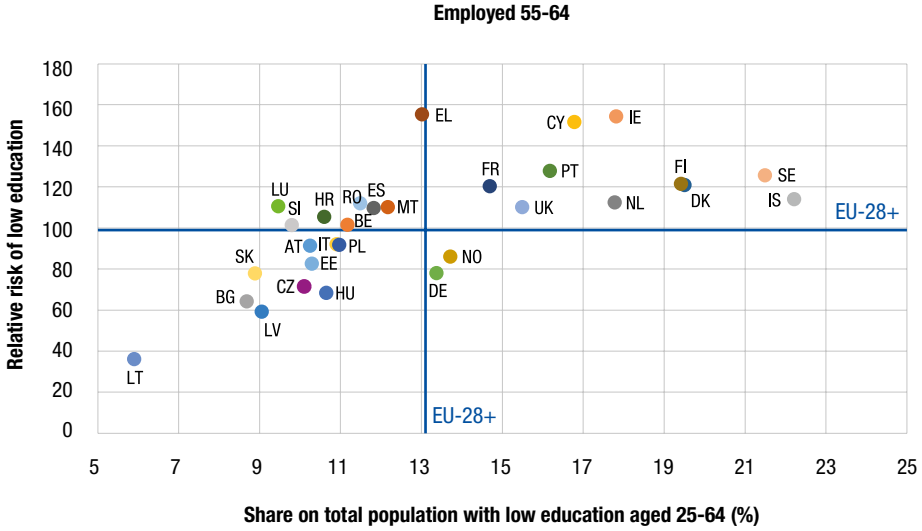
NB: (-) not available; (c) unreliable.

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

	Low literacy				Low numeracy			
	25-34	35-54	55-64	Total population 25-64	25-34	35-54	55-64	Total population 25-64
	8.8	12.9	19.4	16	10.3	11.8	16	15
	5.9	11.2	17.9	15.1	4.9	11	14.1	14.3
	-	-	-	-	-	-	-	-
	11.6	11.8	14.7	14.4	13.4	14.9	23.2	19.8
	6.2	11.1	14.4	12.3	6	10.8	16.4	12.9
	12.5	14.9	18.6	18.9	11.8	13.8	18.8	18.7
	9.9	11	17.1	16.4	10.4	8.8	14.4	14.7
	8.8	12.3	14.6	14.2	8.6	12.5	14.2	15
	27.3	28.3	31.2	26.8	24.2	25.2	34	27.9
	16.5	20.9	39.8	28.7	18.3	23.3	43.1	32.1
	4	6.5	13.1	11.1	4.8	7.9	14	12.9
	9.3	19.2	30.7	23	13	25.4	36.9	30.2
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	9.3	14.7	21.9	18.4	16.1	20.5	30.7	26.2
	-	-	-	-	-	-	-	-
	20.7	23.2	36.2	28.2	18.3	26.3	34.2	32.1
	7.9	17.3	14.5	17.3	10.7	16.9	16.9	19.8
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	6.9	8.8	17.6	13.1	6.7	9.7	16.6	14.4
	10.3	7.3	13.3	11.6	11.2	9.1	14.5	14
	11.1	19.5	20	20.5	16.5	21.3	24.4	25.7
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	6.3	10.1	13.8	13.9	7.6	12.5	15.2	15.7
	17.4	22.3	30.7	27.2	15.6	21.1	29.5	27
	6	8.1	14.3	12.1	7.3	7.2	12.2	13.9
	8.7	13.1	17	15.7	14.8	19.2	20.3	23.2
	<b>12</b>	<b>16.6</b>	<b>23.3</b>	<b>20.8</b>	<b>13.8</b>	<b>18.8</b>	<b>25.1</b>	<b>24.3</b>

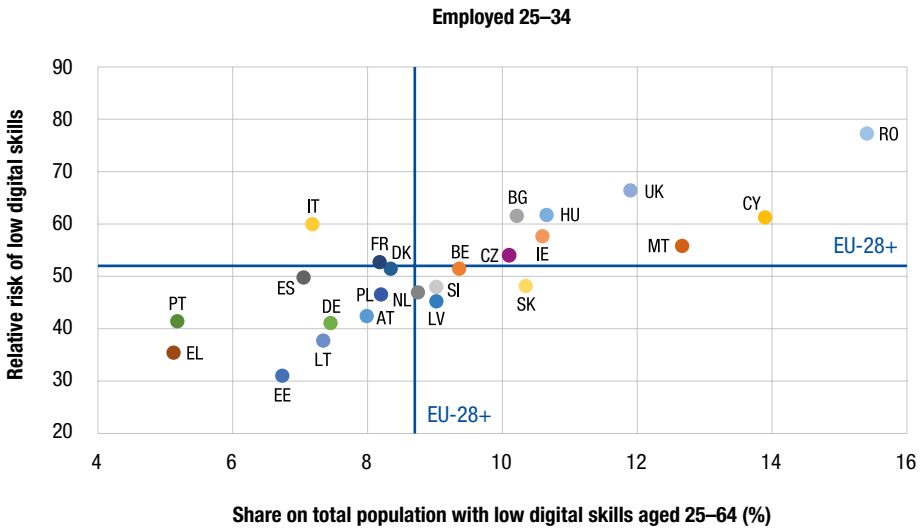
Figure 26. **Cross-country comparison of low education among employed adults**

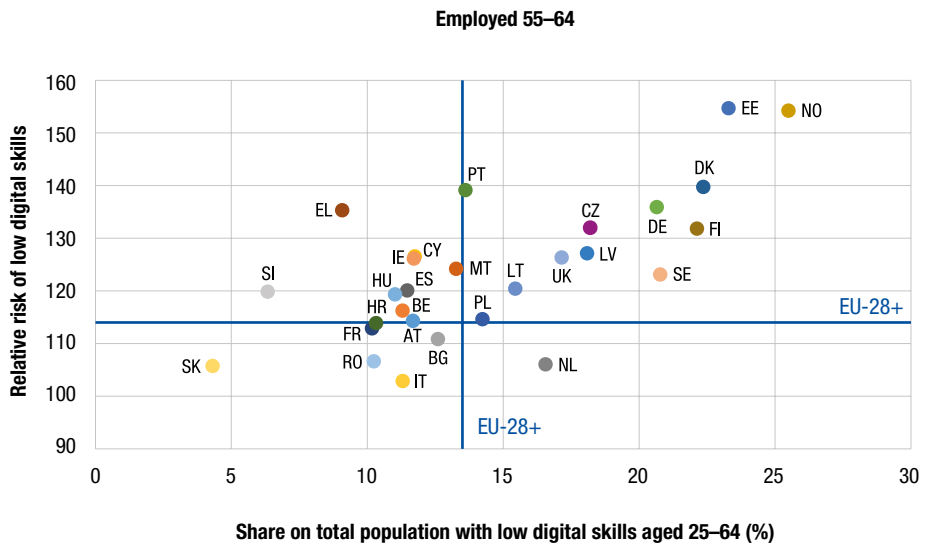
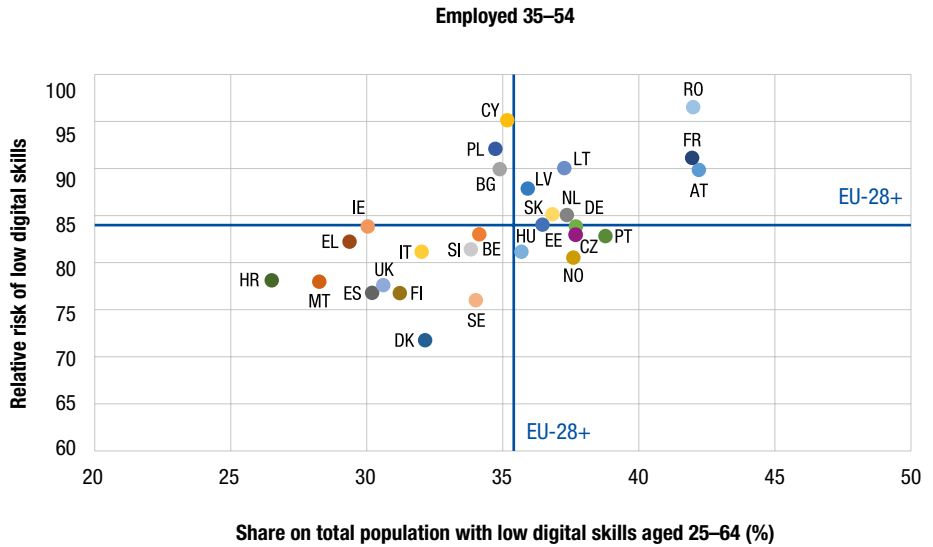




NB: No data (unreliable): 25-34 (IS, LT); 35-54 (IS); 55-64 (EE, IS, LT, LU).  
 Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

Figure 27. Cross-country comparison of low digital skills among employed adults



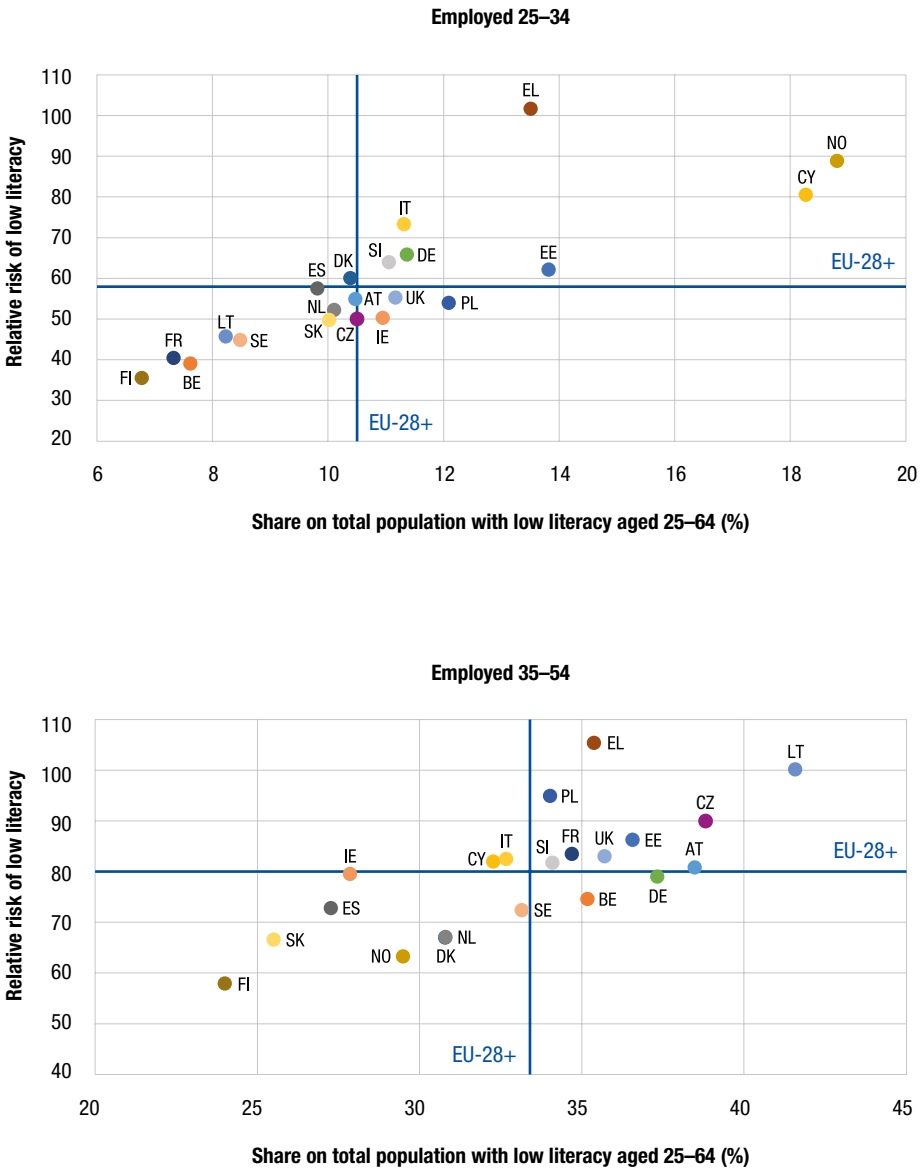


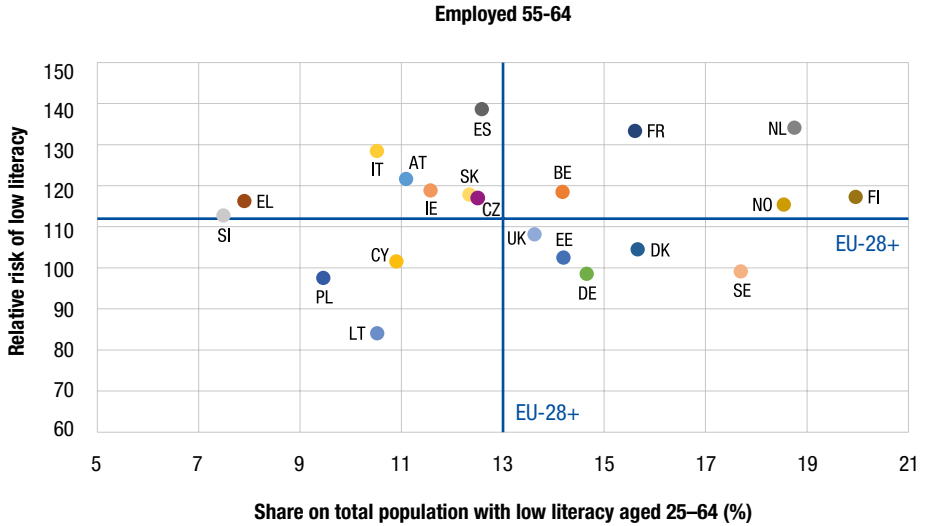
NB: No data (unreliable): 25–34 (FI, HR, IS, LU, NO, SE); 35–54 (IS); 55–64 (IS, LU).

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.



Figure 28. **Cross-country comparison of low literacy among employed adults**

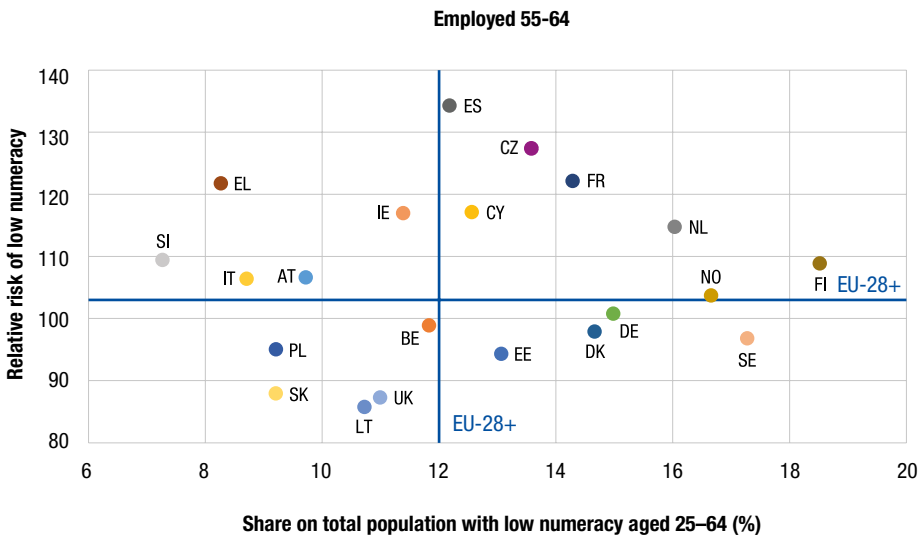
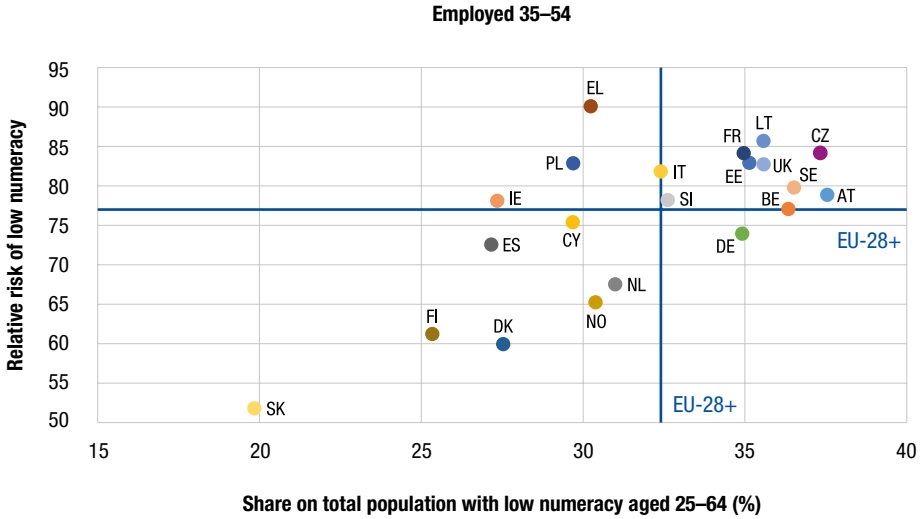




NB: No data (not available): BG, HR, HU, IS, LU, LV, MT, PT, RO.  
 Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a, b.

Figure 29. **Cross-country comparison of low numeracy among employed adults**





NB: No data (not available): BG, HR, HU, IS, LU, LV, MT, PT, RO.  
 Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.

## CHAPTER 5.

# Support to low-skilled adults and participation in education and training

The magnitude of the adult population with potential for upskilling and reskilling calls for immediate action. Analysis, presented in Chapter 4, demonstrated that the adult population with potential for upskilling and reskilling is very diverse and characterised by different skill needs. Effective policy approaches, targeted to this subgroup of the population, necessarily need to account for these differences: developing coordinated and coherent approaches to the diverse needs of low-skilled adults is the topic of the second volume in this research series. In Chapter 5 we complement the analysis presented in this volume with an overview of support to low-skilled adults through active labour market policies and public employment services, as well as providing an overview of adult participation rates in education and training.

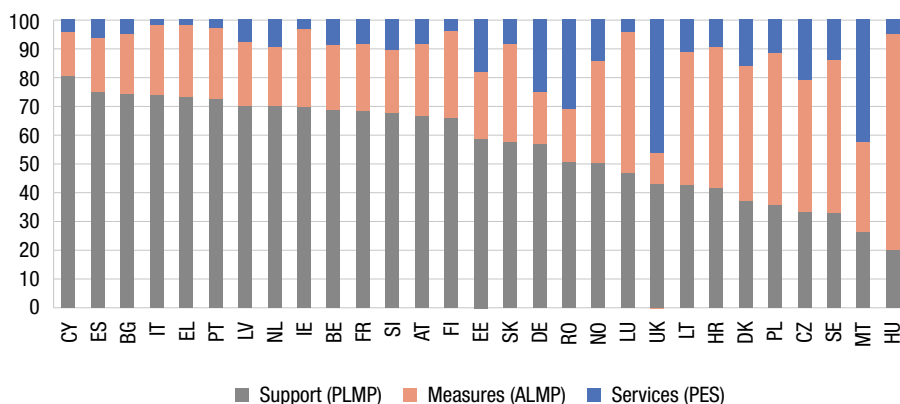
### 5.1. Active labour market policies in the EU-28+

Active labour market policies aim to increase employment opportunities for jobseekers and to improve job matching. The main target groups of ALMPs are the long-term unemployed, young people and older workers, as well as low-skilled people. ALMPs can play a crucial role in giving people access to skills and work-experience, addressing the key obstacle for these target groups to find a job.

ALMPs form part of the larger set of labour market policies, which encompass support measures (passive labour market policies, PLMPs) and services. In 2016, total spending on labour market policies varied significantly across Member States, from around 3% of GDP in Denmark and France to less than 0.5% of GDP in Malta and Romania (Figure 32). The composition of expenditure on labour market policies varies significantly among EU

countries. Some Member States with high unemployment (for example Bulgaria, Cyprus, Greece, Spain, Italy, Portugal) show a high share (more than 70%) of expenditures on passive measures (such as unemployment benefits and early retirement) and a relative low share of active measures and labour market services (Figure 30). Another group of countries allocates more than 40% of total spending on active labour market measures: Czechia, Croatia, Denmark, Hungary (74%), Lithuania, Luxembourg, Sweden and Poland (53%). Another group spends a consistent share of the LMPs budget on services (such as job-search assistance): Germany (25%), Malta (42%), Romania (31%) and the UK (46%).

Figure 30. **Composition of expenditure on LMP by country, 2016**



NB: Percentage composition of expenditure on labour market expenditures. Services (category 1): all services and activities of the public employment service, together with any other publicly funded services for jobseekers. Measures (categories 2 to 7), also called *regular activation measures*, such as training, job rotation and job sharing, employment incentives, supported employment and rehabilitation, direct job creation, and start-up incentives. Supports (categories 8 and 9): financial assistance to compensate individuals for loss of wage or salary (out-of-work income maintenance and support, mostly unemployment benefits) or which facilitates early retirement.

Italy 2015 data; UK 2010 data; IS no data available.

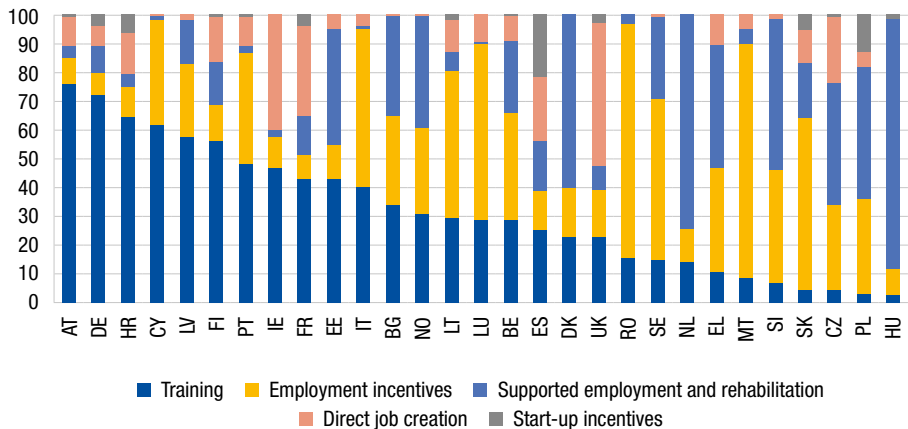
Source: European Commission DG-EMPL [database: Imp\_expsumm].

ALMPs include institutional and workplace training offers, indirect employment incentives (job retention, job sharing), supported employment and rehabilitation, direct job creation (public work schemes) and start-up incentives (Figure 31). Among ALMPs, training measures represent a consistent share of expenditure in Austria (76%) and Germany (72%), as

well as in Cyprus, Croatia, Latvia and Finland (between 55% and 65% of total expenditure on ALMPs).

Recent studies on the effects of ALMPs evidence that general programmes contribute to better matching of skills, particularly after the first entry into the labour market, while (certified) vocational training programmes (workplace-based or combined with school-based training) have been shown to be very effective in facilitating the transition from education to work (European Commission, 2017a).

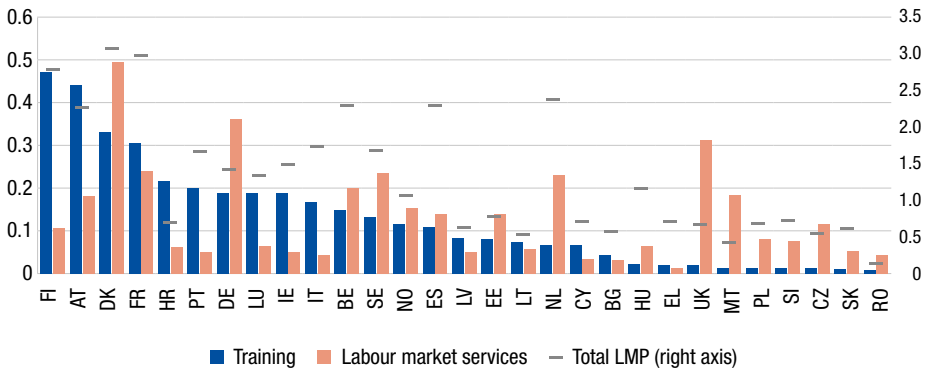
Figure 31. **Composition of expenditure on ALMPs by country, 2016**



Source: European Commission DG-EMPL [database: Imp\_expsumm].

The countries which allocate more resources on training measures are Finland and Austria (0.5% and 0.4% of GDP), followed by Denmark and France (around 0.3%). At the opposite end of the spectrum are Czechia, Romania, and Slovakia, with less than 0.01% of GDP in training measures (Figure 32).

Figure 32. **Expenditure on LMP, training and labour market services (% of GDP), 2016**



NB: Italy 2015 data; UK 2010 data; IS no data available.  
 Source: European Commission DG-EMPL [database: Imp\_exsum].

## 5.2. Public employment services in the EU-28+

Public employment services have a crucial role to play in reintegrating the unemployed. PES are the principal labour market institutions directly accountable to governments, set up to facilitate labour market integration of jobseekers and, in some cases, payment of unemployment and/or welfare benefits. Although structured differently in each country, all PES help match supply and demand in the labour market through information, placement and active support services at local, national and European levels (European Commission, 2017b).

According to Eurostat data, European PES have more than 30 million registered jobseekers, of which around 90% are adults (persons aged 25 and over). Table 4 shows the number of jobseekers registered with PES in the EU-28+ in 2016, by age and gender.

Table 4. PES registered jobseekers in EU-28+, 2016 (thousands)

Country	Total	25 years or over	25 years or over	
			Males	Females
BE	557	456	239	217
BG	290	274	122	152
CZ	406	353	169	185
DK	146	132	64	68
DE	4 820	4 343	2 314	2 029
EE	29	26	12	14
IE	303	266	155	111
EL	1 010	932	353	579
ES	5 168	4 733	2 073	2 660
FR	5 872	5 089	2 468	2 621
HR	243	203	89	114
IT*	7 964	6 928	:	:
CY*	45	40	20	19
LV	80	73	34	39
LT	188	171	86	85
LU	17	15	8	8
HU	314	265	130	135
MT	4	4	3	1
NL*	1 134	1 018	503	515
AT	370	318	180	137
PL	1 470	1 217	593	624
PT	667	579	262	318
RO	421	369	215	154
SI	113	104	51	52
SK	306	262	125	137
FI	649	558	282	275
SE	652	557	296	261
UK*	1 473	1 050	748	302
NO	274	236	119	117
<b>Total</b>	<b>34 986</b>	<b>30 570</b>	<b>11 714</b>	<b>11 928</b>

NB: NL 2015 data; IT 2014 data; CY 2012 data; UK 2010 data; IS data not available.

Source: Eurostat, c [Imp\_rjr] (DG EMPL).



The annual surveys conducted by the European Commission <sup>(39)</sup> on the 32 EU-28+ PES (one for each country, plus the three regional PES in Belgium) show that:

- (a) young people, long-term unemployed (LTU) and older jobseekers are the main target groups. In 2017, the young people represented 10.5%, older jobseekers 29.7% and long-term unemployed 43% (although LTU overlaps with the previous categories);
- (b) training and employment incentives are the main types of measure used by EU-28+ PES for all target groups. However, some differences emerge in the packages of measures most frequently offered to the different groups:
  - (i) education and training, as well as employment incentives, for young people;
  - (ii) employment incentives to encourage employers to hire the LTU and older workers;
  - (iii) supported employment and rehabilitation for people with disabilities;
- (c) in recent years, people with disabilities, immigrants and refugees have grown in importance as target groups of European PES. According to the information provided by 17 PES, together they registered some 1.3 million clients with disabilities in 2017 (7.4% of the total of clients). In Sweden, the government gave the PES the task of conducting skills assessments for newly arrived migrants during their asylum-seeking period, focusing on their education background and work experience;
- (d) PES are placing increasing focus on training measures and learning within companies for young jobseekers. In 2016, among the two dominant types of measure newly introduced for target groups, were measures providing workplace learning, work experience, and traineeships (introduced in 10 PES);
- (e) low-skilled people as a specific target is mentioned in 2016 by a small number of PES: unemployed people with no or low skills/qualifications and who lack key competences (including people with low educational attainment and Roma) in Bulgaria; low-skilled workers/unemployed without qualifications in Hungary and Slovenia.

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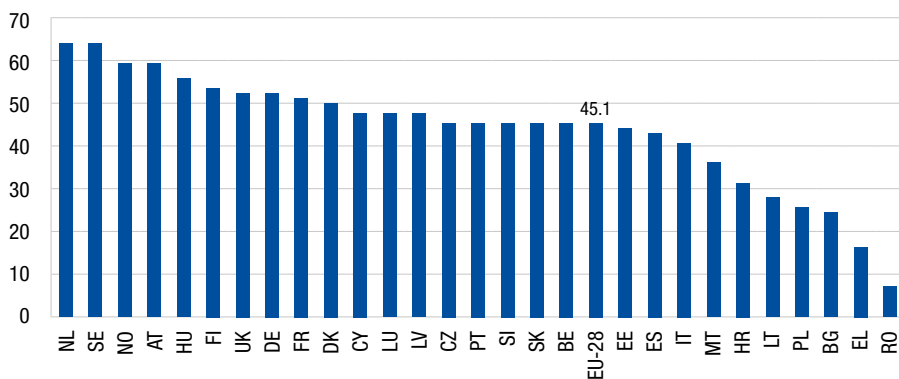
<sup>(39)</sup> European Commission, 2017c; European Commission, 2016c.

### 5.3. Participation in education and training

As discussed Section 1.1, skills are essential to progress in the labour market and in society. Current and future challenges, such as fast-changing technology, digitalisation, demographical challenges and so forth, require that adults need to continuously update and improve their skills to remain fully engaged in society and in the labour market.

Data from the adult education survey (AES) show that, in 2016, 45.1% of adults participated in education or training during the preceding 12 months (Figure 33). Great differences are registered across countries: in Austria, the Netherlands, Norway and Sweden, participation rates are near or above 60%, while in Greece and Romania they are well below 20% (16.7% and 7%, respectively).

Figure 33. **Participation rate in education and training in the EU-28 and Norway, 2016**



NB: % of the population aged 25 to 64 participating in formal and non-formal education and training in the last 12 months.

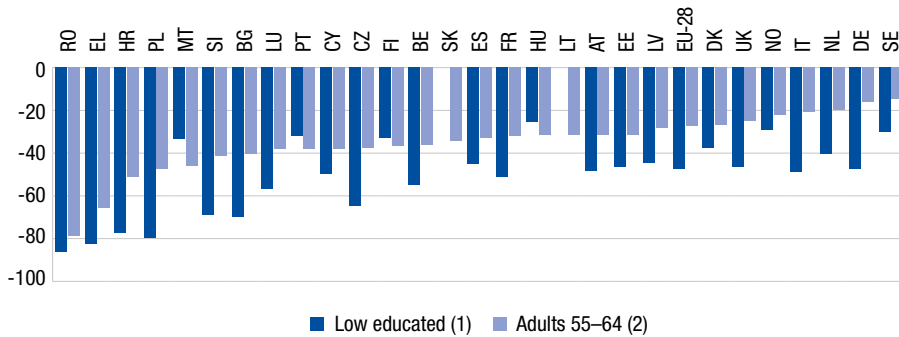
Source: Eurostat, d [database: trng\_aes\_100, AES 2016].

There are significant differences in participation in formal and non-formal education and training. Despite the magnitude of the adult population with potential for upskilling and reskilling, low-skilled adults tend to participate less.

Figures 34 and 35 show the percentage difference in average participation rates of selected sociodemographic groups from the rate for the country. Among adults aged 25 to 64, older people (55 to 64), low-

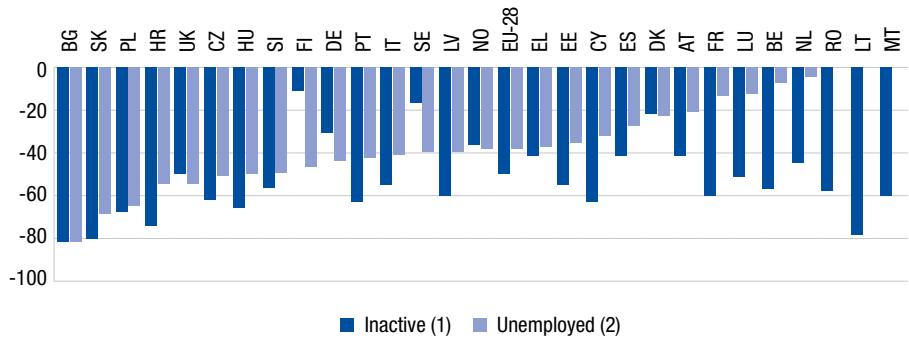
educated, unemployed and inactive people show lower rates of participation in education and training. On average in the EU-28, participation of low-educated adults in education and training is 47% lower than the average rate; in Greece, Croatia, Poland and Romania it is about 80% lower. High percentage differences are recorded also by adults out of the labour force (inactive) in most European countries, and in Bulgaria, Poland and Slovakia for unemployed. Romania is the only country with a higher rate of participation among the unemployed (11.7% compared to an average 7% for the adult population).

Figure 34. **Percentage difference from average participation rates in education and training: low educated and adults aged 55 to 64, 2016**



NB: Percentage difference from average participation rates of adults 25-64 in education and training. Participation in formal and non-formal education and training in the last 12 months.  
 (1) EL, HR: low reliability; (2) RO: low reliability.  
 Source: Eurostat, e; f [databases: trng\_aes\_101; trng\_aes\_102, AES 2016].

Figure 35. **Percentage difference from average participation rates in education and training: inactive and unemployed adults, 2016**



NB: Percentage difference from average participation rates of adults 25-64 in education and training. Participation in formal and non-formal education and training in the last 12 months.

(1) BG, HR, LT: low reliability; (2) BG, SK, SE, NO: low reliability.

\* RO for unemployed the difference is 67.1%, not reported in the chart.

Source: Eurostat, g [database: trng\_aes\_103, AES 2016].

## CHAPTER 6.

# Conclusions

Our societies are increasingly faced with multiple challenges, such as digitalisation and its consequences for the future of work, technological changes, the environment, population ageing and social inclusion. While Europe needs to improve and maintain high-level skills and competences to remain competitive and innovative, skills are not only essential to access and progress in the labour market. They are also essential to achieve one's full potential and to play an active role in society.

Policy-makers have long recognised the importance of skilled human capital for both economic and social prosperity. A growing body of research, including Cedefop research on the economic and social costs of low-skilled adults (Cedefop, 2017), demonstrates that equipping people with the right skills to realise their full potential and talent is associated with large social and economic benefits, not only for individuals but also for society and the economy.

To date, lack of data meant that analysis of low-skilled status has been narrow and primarily conducted either on the basis of educational attainment of the population or from people working in low-skilled jobs. However, low-skilled status is a multidimensional and dynamic phenomenon which goes beyond educational attainment. A comprehensive approach to understanding low skills should consider both its determinants and effects and, in doing this, should also include a wider typology of people with low skills, such as those with obsolete skills and mismatched workers.

The low-skilled adult population is a heterogeneous group with different needs and characteristics. Recognising different and specific target groups within the heterogeneous group of adults with potential for upskilling and reskilling is crucial to better design and implementation of effective upskilling pathways for those most in need.

The aim of this reference publication was to provide a better understanding of the magnitude of the low-skilled adult population and identification of subgroups of adults most at risk of being low-skilled and in which skill dimension.

Outcomes from this study allow us to reach several conclusions and recommendations for future work in this area:

- (a) estimates tell us that there are 128 million adults in the EU-28+, Iceland and Norway with potential for upskilling and reskilling. This is an impressive pool of untapped talent waiting to be unlocked;
- (b) older unemployed and inactive adults are at particular risk of being low-skilled in all the skills dimensions considered in this study:
  - (i) educational;
  - (ii) digital skill;
  - (iii) literacy and numeracy;
- (c) employed adults of all the age groups show relatively lower risks of low skills in all skill dimensions;
- (d) digital skills remain particularly scarce among older adults aged 55 to 64, even when employed;
- (e) significant differences exist among EU-28+ countries. Country factsheets on the adult population with potential for upskilling and reskilling <sup>(40)</sup> provide more information on national contexts;
- (f) while analysis presented in this report provides sufficiently reliable estimates of the adult population with potential for upskilling and reskilling, and identification of different subgroups of adults most at risk of low skills, lack of exhaustive data prevents determining comprehensive figures. More comparable data are needed;
- (g) the magnitude of the adult population with potential for upskilling and reskilling, as well as the heterogeneity of this population, call for a renewed approach to upskilling; it must be addressed in a comprehensive and systematic manner and enables pulling together various resources and exploiting synergies across the different measures and policies already in place in Europe. Developing coherent and coordinated approaches to upskilling pathways for adults will be the core theme of the second volume of this research series <sup>(41)</sup>.

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<sup>(40)</sup> [www.cedefop.europa.eu/en/publications-and-resources/publications/3081](http://www.cedefop.europa.eu/en/publications-and-resources/publications/3081)

<sup>(41)</sup> Cedefop (forthcoming). *Empowering adults through upskilling and reskilling pathways. Volume 2: developing coordinated and coherent approaches to upskilling pathways for adults*. Cedefop reference series; No 113. Luxembourg: Publications Office of the European Union.

# Abbreviations/Acronyms

<b>AES</b>	adult education survey
<b>ALMP</b>	active labour market policy
<b>CSIS</b>	Community statistics on information society
<b>Cedefop</b>	European Centre for the Development of Vocational Training
<b>DG EMPL</b>	Directorate-General for Employment, Social Affairs and Inclusion
<b>ESJS</b>	European skills and jobs surveys
<b>EU</b>	European Union
<b>EU-28+</b>	The 28 Member States, plus Iceland and Norway
<b>Eurofound</b>	European Foundation for the Improvement of Living and Working Conditions
<b>ICT</b>	information and communications technology
<b>ISCED</b>	international standard classification of education
<b>ISCO</b>	international standard classification of occupations
<b>LFS</b>	labour force survey
<b>LMP</b>	labour market policy
<b>LTU</b>	long-term unemployed
<b>OECD</b>	Organisation for Economic Cooperation and Development
<b>PES</b>	public employment service
<b>PIAAC</b>	programme for the international assessment of adult competences
<b>PLMP</b>	passive labour market policy
<b>VET</b>	vocational education and training
<b>WBL</b>	work-based learning

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ANNEX 1.

# Assessment of low cognitive skills for countries not surveyed by OECD PIAAC

## A1.1. Methodological approach

Since the PIAAC survey does not cover all the EU-28+ countries, we estimated the residual share of the population with low cognitive skills among countries not included in PIAAC (BG, HR, HU, IS, LU, LV, MT, NO, PT, RO).

An attempt to estimate missing values was carried out using both information on the structure of the population in these countries (deriving from the Eurostat LFS) and correlations between the incidence of low cognitive skills and the structure of the population observed in this population segment in PIAAC data.

The methodology used follows these steps:

- (a) a probabilistic model on PIAAC data of surveyed countries was estimated to assess the probability of having low cognitive skills (literacy and/or numeracy) on a subsample of population aged 25 to 64 (25 to 65 for AT and DE), excluding those with low educational attainment, working in elementary occupations, or having low digital skills (proxied by the self-reported variable having or not computer experience). Having low cognitive skills was regressed on a series of dummy variables (correlated with low cognitive skills): gender, age, level of education (medium or high), participation in formal or informal training, nationality and working status. The model specification was restricted to explicative variables for which information was also available in the Eurostat LFS. Then, marginal effects of the independent variables of the probit model were estimated;
- (b) using the LFS 2016 microdata, we selected a subsample of the population as similar as possible to the subsample considered in PIAAC: people aged 25 to 64, excluding those with low educational attainment or working in elementary occupations. The subsamples derived from the LFS also include people without computer experience, since no information was

available in this survey on computers skills. Therefore, the structure of the population of the LFS subsample is necessarily different from the subsample analysed in PIAAC. This difference may result in an overestimation of low cognitive skills incidence;

- (c) using the LFS subsample, we calculated average values of the dependent variables used in the probit model in step (a) (gender, age, working status). Since all variables are expressed as binary variables (0-1), the average values correspond to the share observed in the subsample (for example 0.3 for the variable female indicates that 30% of the subsample is represented by women). Some approximations were used when considering formal and informal education and training and when considering nationality, since information on these two variables in the two surveys (PIAAC and LFS) differ <sup>(42)</sup>;
- (d) to estimate the residual share of the population 25 to 64 with low cognitive skills, we applied the marginal effects estimated on PIAAC microdata to a matrix containing average values (the shares) of the variables observed in the LFS subsample for each EU-28+ country and summed results.

Table A1.1 reports the results obtained for the two approaches investigated and the estimation errors. Column 2 shows the shares calculated from PIAAC data for countries included in the survey, column 3 reports the predicted values estimated, and column 5 the estimation errors with respect to the predicted values.

As shown by the mean squared error of the predictions (MSPE) presented in columns 5 and 6, the estimation approach carried out did not produce any overall improvement compared to the use of the simple average of the shares observed in the countries surveyed by PIAAC. For this reason, the residual share of population with low cognitive skills for countries not covered by PIAAC was estimated using the unweighted average of the shares observed in the surveyed countries.

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<sup>(42)</sup> PIAAC reports information on formal or informal education or training received during the previous 12 months, while the LFS reports information on formal or informal education or training received during the previous four weeks. In PIAAC the information on non-nationals is approximated by people foreign-born in the LFS, information used corresponds to citizenship.

**Table A1. 1. Observed and estimated shares, errors and variance errors**

Country	Incidence over total population 25 years or over			Errors	
	Observed PIAAC	Predicted	Unweighted average	Error of predicted values	Error of unweighted average
AT	0.090	0.138		0.049	0.012
BE	0.074	0.112		0.038	0.028
BG	-	0.131	0.102		
CY	0.082	0.118		0.037	0.020
CZ	0.095	0.157		0.062	0.007
DE	0.127	0.143		0.017	-0.025
DK	0.093	0.106		0.014	0.009
EE	0.102	0.140		0.038	0.000
EL	0.153	0.120		-0.033	-0.051
ES	0.082	0.079		-0.003	0.020
FI	0.091	0.119		0.028	0.011
FR	0.128	0.109		-0.019	-0.026
HR	-	0.136	0.102		
HU	-	0.136	0.102		
IE	0.113	0.118		0.005	-0.011
IS	-	0.099			
IT	0.083	0.103		0.020	0.019
LT	0.127	0.139		0.012	-0.025
LU	-	0.121	0.102		
LV	-	0.149	0.102		
MT	-	0.063	0.102		
NL	0.053	0.108		0.055	0.049
NO	0.076	0.114		0.039	0.026
PL	0.147	0.150		0.003	-0.045
PT	-	0.063	0.102		
RO	-	0.136	0.102		
SE	0.090	0.114		0.025	0.012
SI	0.163	0.140		-0.023	-0.061
SK	0.058	0.157		0.099	0.044
UK	0.115	0.109		-0.006	-0.013
<b>Average (unw.)</b>	<b>0.102</b>	<b>0.121</b>		<b>0.022</b>	<b>0.000</b>
<b>Error variance</b>				<b>0.0009</b>	<b>0.0009</b>
<b>MSPE*</b>				<b>0.0014</b>	<b>0.0009</b>

NB: \* Mean squared prediction error.

No PIAAC data for the countries in bold (BG, HR, HU, IS, LU, LV, MT, PT, RO), hence we calculated the unweighted average.

Source: Cedefop calculations on Eurostat, a [2016]; OECD a; b.

## ANNEX 2.

## Additional tables

Table A2. 1. **Adult population (25 to 64) with low skills, EU-28+ countries (thousands)**

Country	LFS 2016		CSIS 2015				PIAAC 2012; PIAAC 2015			
	Low educated (A)	Medium-high educated in elementary occupation (B)	Never used computer (C)	Low use of internet (D)	Below basic digital skills (E)	Low digital skills (D+E)	Low problem-solving (F)	Low literacy skills (G)	Low numeracy skills (H)	Low cognitive skills (I+H)
AT*	744	179	421	584	1 017	1 601	709	771	711	955
BE*	1 490	238	486	716	1 572	2 288	712	534	494	649
BG	709	175	1 173	1 566	1 181	2 747	-	-	-	-
CY	94	26	115	129	152	281	-	68	88	105
CZ	387	185	482	804	1 559	2 363	1 152	732	766	1 025
DE*	6 275	1 664	2 125	3 664	9 589	13 253	8 906	8 431	8 628	10 713
DK	545	105	:	:	619	668	519	480	413	565
EE	80	32	37	55	179	234	164	102	107	139
EL	1 656	114	1 400	1 662	1 603	3 266	2 238	1 639	1 738	2 176
ES	10 684	731	3 686	4 366	7 371	11 737	-	7 718	8 501	9 914
FI	307	82	:	102	514	616	437	319	374	452
FR	7 515	1 469	2 506	4 314	10 249	14 563	-	7 612	9 681	10 880
HR	395	65	492	588	526	1 114	-	-	-	-
HU	900	212	808	1 164	1 392	2 556	-	-	-	-
IE	480	93	344	418	933	1 352	504	447	625	693
IS	37	4	:	-	-	-	-	-	-	-
IT	13 140	880	9 137	9 446	8 188	17 635	-	9 477	10 492	12 760
LT	83	93	312	379	367	745	618	271	316	381
LU	72	7	:	:	29	33	-	-	-	-
LV	99	76	130	151	330	481	-	-	-	-
MT	129	0	39	46	65	111	-	-	-	-
NL	1 939	182	270	440	1 879	2 319	1 452	1 194	1 304	1 546
NO	497	41	:	:	450	480	778	648	749	870
PL	1 793	746	4 820	6 122	6 838	12 960	5 988	4 423	5 355	6 292
PT	2 974	84	1 132	1 595	1 354	2 949	-	-	-	-
RO	2 580	384	3 065	4 860	3 617	8 477	-	-	-	-
SE	753	99	:	:	925	1 205	781	652	715	849
SI	148	29	201	277	297	574	387	324	330	400
SK	259	142	367	626	882	1 508	492	375	444	530
UK*	7 777	1 210	1 328	1 761	7 689	9 450	5 627	4 617	6 909	7 554

NB: (A) low educated (ISCED 0-2; 3c lasting less than two years); (B) medium-high educated (ISCED 4-8 and 3 more than two years) working in elementary occupations (ISCO 9); (C) people who declare having never used a computer; (D) people who last used the internet more than three months prior to survey interview or who have never used internet; (E) people, having used the internet in the last three months, who have carried out activities in, at most, one of the four digital competence dimensions surveyed: information, communication, content-creation and problem-solving; (F) proficiency score in PS below 241 (below level 1 on the proficiency scale ranging from level 1 to level 3 of OECD PIAAC); (G)/(H) proficiency score in literacy/numeracy below 226 (below level 1 on the proficiency scale ranging from below level 1 to level 5 of OECD PIAAC).

\* Adult population aged 25-64. Information on literacy, numeracy and problem-solving (PIAAC data) refers to the population 25-65 for AT and DE; Belgium data refer to Flanders and UK data refer to England and Northern Ireland.

(-) data not available (:) unreliable data.

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.



**Table A2. 2. Share of adult population (25 to 64) with low skills by type of skill, EU-28+ countries (%)**

Country	LFS 2016		CSIS 2015				PIAAC 2012; PIAAC 2015			
	Low educated (A)	Medium-high educated in elementary occupation (B)	Never used computer (C)	Low use of internet (D)	Below basic digital skills (E)	Low digital skills (D+E)	Low problem-solving (F)	Low literacy skills (G)	Low numeracy skills (H)	Low cognitive skills (I+H)
AT*	15.5	3.7	8.9	12.3	21.5	33.8	15.0	16.3	15.0	20.1
BE*	24.9	4.0	8.2	12.1	26.5	38.6	20.8	15.6	14.4	19.0
BG	17.8	4.4	29.0	38.7	29.2	67.9	-	-	-	-
CY	20.5	5.7	24.5	27.5	32.5	60.0	-	14.3	18.6	22.3
CZ	6.5	3.1	8.1	13.5	26.2	39.7	19.3	12.3	12.8	17.2
DE*	13.6	3.6	4.8	8.3	21.7	30.0	19.7	18.7	19.1	23.7
DK	18.5	3.6	:	:	21.2	22.9	17.7	16.4	14.1	19.3
EE	11.1	4.4	5.2	7.7	25.1	32.8	22.7	14.2	14.9	19.2
EL	28.2	1.9	23.6	28.0	27.0	55.1	37.3	27.3	29.0	36.3
ES	41.0	2.8	14.1	16.7	28.1	44.8	-	28.7	31.6	36.8
FI	10.8	2.9	:	3.7	18.4	22.1	15.5	11.3	13.2	16.0
FR	22.5	4.4	7.5	12.9	30.6	43.5	-	23.4	29.7	33.4
HR	17.3	2.8	21.7	25.9	23.2	49.0	-	-	-	-
HU	16.6	3.9	15.2	21.9	26.2	48.0	-	-	-	-
IE	19.2	3.7	13.9	16.8	37.6	54.4	20.6	18.3	25.6	28.4
IS	22.1	2.4	-	-	-	-	-	-	-	-
IT	39.9	2.7	27.6	28.5	24.7	53.2	-	28.9	31.9	38.9
LT	5.4	6.0	20.2	24.6	23.8	48.3	39.1	17.2	20.0	24.1
LU	22.0	2.1	:	:	12.1	13.8	-	-	-	-
LV	9.3	7.1	13.2	15.3	33.5	48.9	-	-	-	-
MT	54.7	0.2	16.6	19.6	27.9	47.6	-	-	-	-
NL	21.7	2.0	3.0	4.9	21.1	26.0	16.0	13.2	14.4	17.1
NO	18.0	1.5	:	:	16.5	17.6	14.8	12.3	14.2	16.5
PL	8.7	3.6	22.8	28.9	32.3	61.2	27.6	20.4	24.7	29.0
PT	53.1	1.5	20.2	28.5	24.2	52.6	-	-	-	-
RO	23.3	3.5	27.3	43.3	32.2	75.5	-	-	-	-
SE	14.9	2.0	:	:	18.6	24.3	16.6	13.8	15.2	18.0
SI	12.7	2.5	17.0	23.5	25.2	48.7	32.4	27.1	27.6	33.4
SK	8.1	4.5	11.5	19.7	27.8	47.5	15.7	11.9	14.1	16.9
UK*	23.0	3.6	4.2	5.6	24.4	30.0	19.7	16.2	24.2	26.4

NB: (A) low educated (ISCED 0-2; 3c lasting less than two years); (B) medium-high educated (ISCED 4-8 and 3 more than two years) working in elementary occupations (ISCO 9); (C) people who declare having never used a computer; (D) people who last used the internet more than three months prior to survey interview or who have never used internet; (E) people, having used the internet in the last three months, who have carried out activities in at most one of the four digital competence dimensions surveyed: information, communication, content-creation and problem-solving; (F) proficiency score in PS below 241 (i.e. below level 1 on the proficiency scale ranging from level 1 to level 3 of OECD PIAAC); (G)/(H) proficiency score in literacy/ numeracy below 226 (i.e. below level 1 on the proficiency scale ranging from below level 1 to level 5 of OECD PIAAC).

\* Adult population aged 25-64. Information on literacy, numeracy and problem-solving (PIAAC data) refers to the population 25-65 for AT and DE; Belgium data refer to Flanders and UK data refer to England and Northern Ireland.

(-) data not available (:) unreliable data.

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a, b.

**Table A2. 3. Estimated share of adult population (25 to 64) with potential for upskilling and residual shares, EU-28+ countries (%)**

Country	LFS 2016		CSIS 2015		PIAAC	Sum of shares	
	Low educated (A)	Medium-high educated in elementary occupation (B)	Never used computer but high educated and no ISCO-9 (C)	Low digital skills but high educated and no ISCO-9 (D)	Low cognitive skills but high educated, no ISCO-9, no low digital skills (E)	Low estimate (A+B+C+E)	High estimate (A+B+D+E)
AT*	15.5	3.7	0.9	9.2	9.0	29.1	37.3
BE*	24.9	4.0	0.2	8.0	7.4	36.5	44.2
BG	17.8	4.4	2.7	16.4	10.2	35.1	48.8
CY	20.5	5.7	2.6	16.2	8.2	36.9	50.5
CZ	6.5	3.1	0.7	9.1	9.5	19.9	28.2
DE*	13.6	3.6	0.5	10.1	12.7	30.4	39.9
DK	18.5	3.6	0.1	5.4	9.3	31.5	36.8
EE	11.1	4.4	0.2	7.2	10.2	26.0	32.9
EL	28.2	1.9	1.4	9.7	15.3	46.8	55.1
ES	41.0	2.8	0.4	5.7	8.2	52.5	57.7
FI	10.8	2.9	0.0	3.9	9.1	22.9	26.8
FR	22.5	4.4	0.3	9.7	12.8	40.0	49.4
HR	17.3	2.8	0.8	4.4	10.2	31.2	34.7
HU	16.6	3.9	0.8	9.6	10.2	31.6	40.4
IE	19.2	3.7	0.9	12.5	11.3	35.2	46.8
IS	22.1	2.4	0.1	0.2	10.2	34.7	-
IT	39.9	2.7	2.2	8.4	8.3	53.0	59.3
LT	5.4	6.0	1.9	10.4	12.7	25.9	34.5
LU	22.0	2.1	0.0	0.0	10.2	34.3	34.3
LV	9.3	7.1	1.4	12.8	10.2	27.9	39.3
MT	54.7	0.2	0.5	6.4	10.2	65.6	71.5
NL	21.7	2.0	0.4	6.3	5.3	29.4	35.4
NO	18.0	1.5	0.0	4.8	7.6	27.0	31.8
PL	8.7	3.6	1.9	13.6	14.7	28.9	40.6
PT	53.1	1.5	0.1	3.7	10.2	64.9	68.4
RO	23.3	3.5	1.7	16.9	10.2	38.6	53.8
SE	14.9	2.0	0.0	6.8	9.0	25.9	32.6
SI	12.7	2.5	0.9	7.6	16.3	32.3	39.1
SK	8.1	4.5	0.7	12.4	5.8	19.1	30.8
UK*	23.0	3.6	0.4	8.8	11.5	38.5	46.8
EU-28+	23.2	3.4	0.9	9.3	10.2	37.7	46.1
EU-28	23.3	3.4	0.9	9.4	10.3	37.8	46.3

NB: (A) share of people with low education (ISCED 0-2; 3c lasting less than two years); (B) share of people with medium or high education (ISCED 4-8 and 3 more than two years) working in elementary occupations (ISCO 9); (C) share of people with medium-high education who do not work in manual occupation and who never used a computer; (D) share of people with medium-high education who do not work in manual occupation and who have low digital skills (either low use of the internet or low digital competences); (E) share of people with medium-high education, computer skills, who do not work in a manual occupation and who have low literacy and/or low numeracy (proficiency literacy/numeracy is below 226 – at most level 1).

\* Adult population aged 25-64. Information on literacy, numeracy and problem-solving (PIAAC data) refers to the population 25-65 for AT and DE; Belgium data refer to Flanders and UK data refer to England and Northern Ireland. For BG, HR, HU, IS, LU, LV, MT, PT, RO the residual share of population with low cognitive skills (not already included among low educated or among people working in elementary occupations) is assumed to be equal to the unweighted average of the same share observed in the other EU-28+ countries surveyed in PIAAC. EU-28+ and EU-28 population weighted averages.

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a, b.

**Table A2. 4. Estimated adult population (25 to 64) with potential for upskilling, EU-28+ countries**

Country	Total population 25-64 (A)	Estimated share of population (25-64) with potential for upskilling (%)		Estimated population (25-64) with potential for upskilling (in thousand)	
		Low estimate (B1)	High estimate (B2)	Low estimate (A)*(B1)	High estimate (A)*(B2)
AT*	4 808	29.1	37.3	1 397	1 794
BE*	5 982	36.5	44.2	2 185	2 646
BG	3 986	35.1	48.8	1 397	1 944
CY	460	36.9	50.5	170	232
CZ	5 937	19.9	28.2	1 179	1 677
DE*	46 071	30.4	39.9	13 999	18 402
DK	2 942	31.5	36.8	926	1 082
EE	720	26.0	32.9	187	237
EL	5 876	46.8	55.1	2 751	3 239
ES	26 075	52.5	57.7	13 679	15 046
FI	2 829	22.9	26.8	647	759
FR	33 393	40.0	49.4	13 363	16 496
HR	2 279	31.2	34.7	710	792
HU	5 407	31.6	40.4	1 707	2 182
IE	2 494	35.2	46.8	877	1 167
IS	169	34.7	34.8	59	59
IT	32 967	53.0	59.3	17 478	19 541
LT	1 551	25.9	34.5	402	534
LU	329	34.3	34.3	113	113
LV	1 065	27.9	39.3	297	418
MT	235	65.6	71.5	154	168
NL	8 922	29.4	35.4	2 627	3 156
NO	2 769	27.0	31.8	748	881
PL	20 648	28.9	40.6	5 962	8 381
PT	5 601	64.9	68.4	3 635	3 833
RO	11 097	38.6	53.8	4 287	5 974
SE	5 043	25.9	32.6	1 304	1 647
SI	1 170	32.3	39.1	378	457
SK	3 174	19.1	30.8	605	977
UK*	33 826	38.5	46.8	13 023	15 833
EU-28+	277 824	37.7	46.1	104 625	128 058
EU-28	274 886	37.8	46.3	103 994	127 301

NB: (A) refers to total adult population aged 25-64 observed in Eurostat LFS 2016 microdata. The estimated population with potential for upskilling (low and high estimate) is obtained as a product of estimated shares (low and high estimate) for total adult population: A\*B1 and A\*B2, respectively.

Source: Eurostat, a [2016]; Eurostat, b [2015]; OECD, a; b.











# Empowering adults through upskilling and reskilling pathways

## Volume 1: adult population with potential for upskilling and reskilling

This study is the first volume of Cedefop research on empowering adults through upskilling and reskilling pathways. It estimates the magnitude of the low-skilled adult population according to a broader conceptualisation which goes beyond educational attainment levels, and considers digital skills, literacy and numeracy, as well as skill loss and skill obsolescence. The study also identifies different subgroups of adults most at risk of being low-skilled, by skill dimension. Better understanding the magnitude of the low-skilled adult population and recognising different and specific target groups within the heterogeneous group of adults with potential for upskilling and reskilling, is crucial to better design and implementation of effective upskilling pathways for those most in need.

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