EURES

Report on labour shortages and surpluses

2022

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COUNTRY CODES

Code	Country	Code	Country	Code	Country	Code	Country
AT	Austria	**EE**	Estonia	**IT**	Italy	**PT**	Portugal
BE	Belgium	**EL**	Greece	**LT**	Lithuania	**RO**	Romania
BG	Bulgaria	**ES**	Spain	**LU**	Luxemburg	**SE**	Sweden
CH	Switzerland	**FI**	Finland	**LV**	Latvia	**SI**	Slovenia
CY	Cyprus	**FR**	France	**MT**	Malta	**SK**	Slovakia
CZ	Czechia	**HR**	Croatia	**NL**	The Netherlands		
DE	Germany	**HU**	Hungary	**NO**	Norway		
DK	Denmark	**IE**	Ireland	**PL**	Poland		

ACRONYMS

Acronym	Full title
CBP	EURES Cross-border partnership
Cedefop	European Centre for the Development of Vocational Training
ECE	European Centre of Expertise
EFTA	European Free Trade Association
ELA	European Labour Authority
EU	European Union
EURES	European Employment Services
ISCED '11	International Standard Classification of Education; 2011
ISCO '08	International Standard Classification of Occupations; 2008
LFS	Labour Force Survey
NCOs	EURES National Coordination Offices
NUTS	Nomenclature of territorial units for statistics

Acronym	Full title
PES	Public Employment Service
PP	Percentage points
STEM	Science, Technology, Engineering, Mathematics

DEFINITIONS

Variable	Definition
Inactivity rate	The proportion of people outside the labour force (i.e. economically inactive persons) in the total population of the same age group.
ISCED 0-2	Persons who are unqualified or have only participated in lower secondary education or the second stage of basic education.
ISCED 3-5	Persons who have completed the secondary school cycle but have not progressed to further education or training programmes.
ISCED 5+	Persons who have participated in programmes that are classified as being on a level above the basic secondary school cycle.
Labour market imbalances	A misalignment between the demand and supply of labour in an economy.
Labour market slack	An unmet demand for paid labour within a given population. The term describes the shortfall between the workers' desired amount of work and the amount of paid work available.
Labour shortage	When there is a sufficient number of skilled persons, but an insufficient number of them take up employment in the occupation and location in question.
Labour surplus	When there is a higher number of skilled persons looking to take up employment in the occupation and location in question than there are roles available.
Severe shortage	Severe shortage is equivalent to a shortage of a high magnitude, as defined by NCOs (see Annex 1 and 2 for more details).
Skills shortage	When there is an insufficient supply of persons with the appropriate skills.
Skills surplus	When the supply of persons with the appropriate skills is greater than the market requires.
Widespread shortage	A shortage that has been identified by NCOs in at least 11 countries (see Annex 1 and 2 for more details).
Widespread surplus	A surplus that has been identified by at least five countries (see Annex 1 and 2 for more details).

EXECUTIVE SUMMARY

Prevalence of labour shortages and surpluses in Europe

The analyses of labour market imbalances in the EU27, Norway and Switzerland conducted in the second and third quarter of 2022 and mostly based on data provided by EURES National Coordination Offices, found that 29 countries experience labour shortages and 24 labour surpluses. The occupations which dominated the list of widespread shortages were related to software, healthcare and construction and engineering craft occupations. The occupations which dominated the list of widespread surpluses were clerical related occupations, elementary occupations and professional occupations in the humanities and in the arts.

Most of the shortage occupations (i.e., the demand for those occupations is greater than the supply of jobseekers with required skills at the required location) were rated as shortages of high magnitude and an analysis over time shows that they tend to have been identified as shortage for the last five years. These results suggest that many of the shortages are persistent and are of a structural nature rather than transient.

Regional dimension of labour market imbalances

An analysis of the main regional labour market imbalances within the countries participating in the study shows that in many cases the imbalances reflect a difference in the level of economic development and in education facilities between regions. In Eastern Europe, the less developed areas tend to be located in the east of the country; in Scandinavia, they are located in the north, while in Italy they are located in the south. Less developed areas in general do not attract inward investment because the local labour force does not possess the high-level technical skills that many companies require. In turn, skills upgrading is difficult to achieve in an environment of more limited provision of services of public interest, including education and training providers. Furthermore, in many countries, there is a reluctance on the part of many jobseekers to migrate to other regions within their own country in pursuit of employment.

This reluctance to move in search of employment has created clusters of disadvantaged jobseekers in specific regions in Europe. Examples include regions in the south of Italy where over half of the female labour force is unemployed, and high unemployment among older workers (55+) in many regions in Lithuania and Bulgaria.

The study also explores examples of cross-border movements of labour. These movements are particularly evident between regions which are physically adjacent to one another and where the working conditions and levels of remuneration are superior in one region compared to the other region. However, cross-border labour mobility is not confined to these areas and there is a general movement of labour from less developed regions in Central-Eastern Europe to highly developed and prosperous regions in the north and west of the EU.

Main reasons for labour market imbalances

The study places the emergence of labour market imbalances in the context of the major drivers of change in the labour market. These include the rapid diffusion of new digital technologies to every sector of the European economy, the ageing of the European population, the transition to a climate-neutral economy and the working conditions associated with being employed in different occupations.

The rapid diffusion of new digital technologies is reflected in the presence at all levels of occupations which require STEM (science, technology, engineering, and mathematics) qualifications among the list of shortage occupations which have been identified by most countries. The ageing of the European population has contributed to the presence of a number of healthcare occupations on this list, while working conditions may also be a factor in the identification of widespread shortages in hospitality. In addition, there is a reference to more recent developments and their impact on labour market imbalances such as the COVID-19 pandemic and Russia's invasion of Ukraine. The former has had a significant impact on certain sectors, particularly hospitality which suffered adversely as a result of restrictions on the freedom of movement imposed in many countries in 2020 and 2021 in order to stem the spread of the virus. In contrast, the European software sector flourished during the pandemic. There

is evidence that the sector is now retrenching and laying off a considerable number of staff. The pandemic has also had a more general impact on labour market imbalances. Many European employers have reported that a significant number of their staff did not return to their pre-pandemic employment when restrictions were removed, and this has created labour shortages for many of them - particularly in countries such as Germany.

Profile of workers in shortage and surplus occupations

The analysis found that some segments of the population are overly represented in surplus occupations. For example, two out of every three of those employed in surplus occupations were women and only one in three employed in shortage occupations were women. Furthermore, if the healthcare occupations were removed from the list of widespread shortages, the share of women employed in the identified shortage occupations would be even lower.

This is because of the dominance STEM-related qualifications among the widespread shortage occupations. Shortage of jobseekers with these qualifications were reported at every level, including professional, technical and most of all, craft level – particularly for construction and engineering craft occupations. Indeed, there was not a significant difference between the education profiles of those who were employed in the shortage occupations compared to those who were employed in surplus occupations. The medium level of education (ISCED 3-4) was the highest level of education attained by most of those employed in both shortage and surplus occupations.

The share of those born outside the country in which they were employed in the shortage occupations was higher than the national average, but this was also the case for those employed in the surplus occupations although the share was marginally lower than in the case of shortage occupations. Nevertheless, a profile of very disadvantaged workers can be drawn from the findings of this report. That profile includes women who are poorly qualified, born outside the country of their employment and of a young age and are employed in surplus occupations.

Conclusions

The findings of this report confirm that there are significant labour shortages and surpluses throughout the economies of the EU27, Norway and Switzerland. This imbalance in labour demand and supply exists at both the national and the regional level, and it is due to a multiplicity of factors. It is noteworthy that the report found that employment in many of the most often identified shortage and surplus occupations is dominated by one gender. Factors such as new technologies, the transition to a climate-neutral economy, the ageing of the workforce and conditions of work and employment have all made significant contributions to the evolving relationship between labour demand and supply in Europe. The imbalance is present at every level of education. The overall situation however is that most of those employed in either the widespread shortage or surplus occupations have a medium level of education – albeit those employed in the shortage occupations tend to have medium level qualifications of a more technical nature.

There is a considerable degree of labour mobility between European countries, and between European countries and other countries. In general, this movement is motivated by a desire to find employment which offers higher remuneration and improved conditions of work and employment.

The report found that the lack of the skills required by employers in the local labour market is a major contributary factor in the level of labour shortages and surpluses in Europe, and consequently any strategy designed to resolve these imbalances must include a significant role for the education and training system.

1. BACKGROUND, SCOPE, AND METHODOLOGY OF THE REPORT

1.1. Background

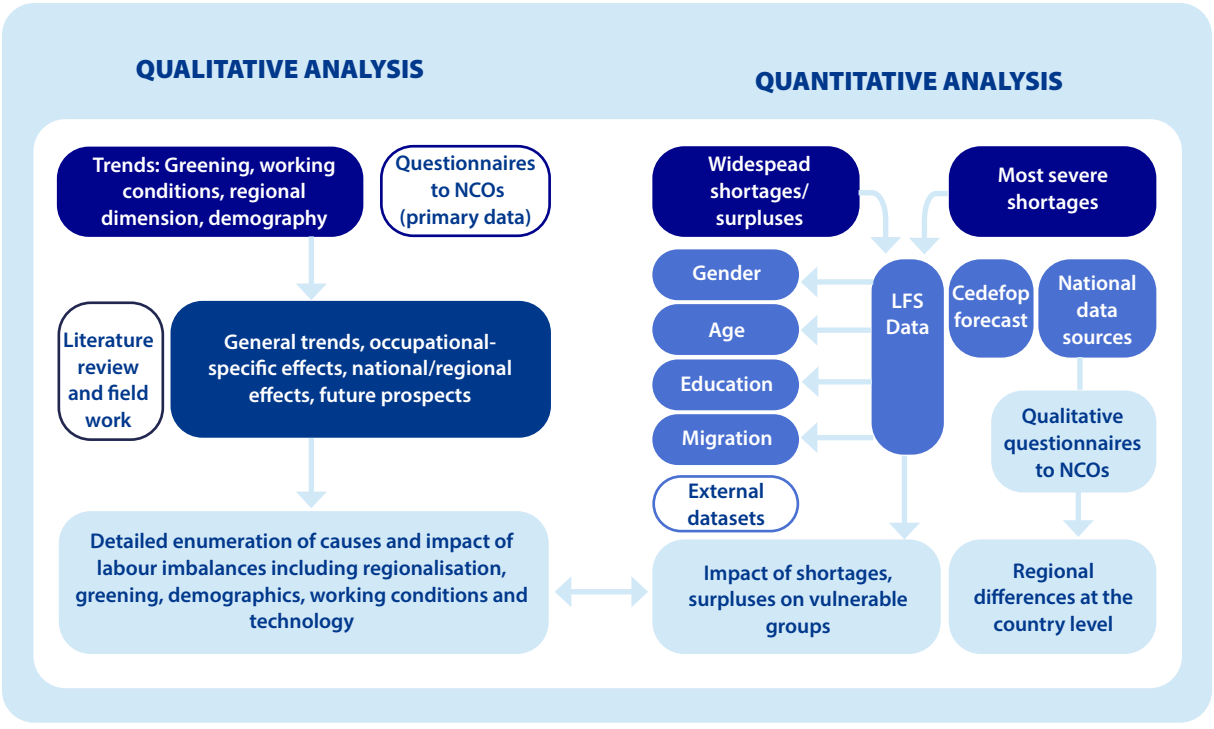
The present report is produced in line with Article 30 of EURES Regulation (EU) 2016/589, which states that *'Each Member State shall, in particular, collect and analyse gender/disaggregated information on […] labour shortages and labour surpluses on national and sectoral labour markets, paying particular attention to the most vulnerable groups in the labour market and the regions most affected by unemployment'* and that *'The EURES National Coordination Offices (NCOs) shall be responsible for sharing the available information within the EURES network and contributing to the joint analysis'.*

While previous yearly editions of the report focused on the identification of shortage and surplus occupations as reported by NCOs, the current 2022 report goes beyond previous reports by including a more intensive focus on the impact of labour market imbalances in Europe on vulnerable groups, and by providing an analysis of the factors which have given rise to labour market imbalances in Europe.

1.2. Scope and methodology

The report is based on different data-gathering tools and methodologies of analysis, which are summarised in the diagram below.

Figure 1 – Methodology of the study



Source: Author's own elaboration

As shown on the right-hand side of Figure 1, the quantitative analysis is based on a questionnaire circulated to NCOs (see Annex 2); answers to the questionnaire represent the primary source for labour market imbalances as presented in this report. Additional sources used are data extracted from the European Labour Force (LFS) database; and detailed CEDEFOP forecasts. The analysis also makes use of national data sources, which were utilised by NCOs to identify regional differences (see Chapter 4).

The general results of the quantitative analysis were validated by reference to the results of a number of studies which were undertaken around the same time as this study. However, there is also a more detailed analysis which compares the findings of this survey with the CEDEFOP forecasts of skill shortages in each of the countries surveyed in this report over the period 2021–2026. The hypothesis being tested is that the geographic distribution of shortages identified in this report includes those countries where EU above average annual employment growth in these occupations were forecast over the period 2021–2026.

There is also a detailed analysis of four characteristics of those who are employed in the EU27 in the widespread shortage and surplus occupations. These four personal characteristics are gender, education profile, age, and country of birth. The purpose of creating these profiles is to assess the extent to which those working in shortage and surplus occupations belong to specific population segments that tend to be disadvantaged on the labour market.

This is particularly important for those who are working in an occupation which has been identified as a widespread surplus occupation, as the possibility of becoming unemployed is greater for them than those working in an identified shortage occupation. New paragraph quantitative analysis is in many respects similar to the methodology applied in previous editions of the report, to ensure comparability of results. However, it does contain some important changes to the data collection template submitted to NCOs[1] , i.e.

- no limit to the number of shortages or surpluses to be identified;
- requirement for an objective assessment of magnitude of shortage or surplus;
- indication of driver of shortage or surplus; and
- questions on the impact of the transition to a climate-neutral economy, new technology and working conditions on labour market imbalances.

On the left-hand side Figure 1 shows that the methodology includes a qualitative analysis which explores the context in which labour market imbalances emerge. The qualitative analysis consisted of an extensive literature review focused on the causes of labour market imbalances. The review included documents (both reports and grey literature) published between 2018 and 2022, mostly focusing on the EU level with specific national examples. Information was then triangulated with findings derived from the organisation of three focus group meetings targeted to NCOs, employees' and employers' representatives, as well as members of the EU committee on cross-border mobility.[2] To augment data from the literature review and the focus groups, an additional (qualitative) questionnaire was circulated to the NCOs seeking their views on a number of issues relating to labour market imbalances – particularly the impact of regionalisation and cross-border movements on labour market imbalances (see Annex 3). A detailed elaboration of the data collection methodology is included in Annex 1 to this report.

Table 1 – Participating countries, 2022

Countries which submitted data on shortage occupations

AT, BE, BG, CH, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, MT, NL, NO, PL, PT, RO, SE, SI, SK

Countries which submitted data on surplus occupations

AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, LT, LU, LV, NO, NL, PT, RO, SE, SI, SK

Source: Analyses of data submitted by EURES National Coordination Offices

1 Details on the data collection methodology are provided in Annex 1.

2 Unfortunately, trade union representatives did not manage to attend the relevant meeting; to partially make up for this, briefings of the main European-level trade unions on the issue of labour market imbalances were consulted and taken into consideration in the literature review phase.

The questionnaires were completed in the summer of 2022 by 29 countries (see Table 1 above). Data received were quality checked for completeness and consistency and when necessary NCOs were contacted for clarifications to the data provided. This means that in some instances data provided by NCOs had to be aligned and adjusted for comparability purposes: this might imply that the number of shortage and surplus occupations submitted on some of the templates may not be the number of shortages and surpluses transferred to the database for further analyses (see Annex 1 for details).

In the case of 19 countries, the data submitted referred to the first half of 2022, while in the case of the other 10 countries, the data were based on the latter half of 2021. A wide range of sources was used to identify shortage and surplus occupations by NCOs responding to the questionnaire (see Table 2). The source most frequently used was the administrative data of the Public Employment Service (PES). This source was used by 18 countries and the indicator of shortages and surpluses was the ratio of jobseekers to vacancies and the length of time it took to fill vacancies.

A total of 11 countries used different indicators – in the case of four countries, the identification of shortages was based on a recent study of the labour market, while three countries used a combination of different sources.

Through PES administrative data – either on its own or in combination with other indicators - 24 countries could identify surplus occupations. The most common indicator used was a significant surplus of jobseekers when compared to the volume of vacancies for their qualifications and experience.

Table 2 – Main sources used to identify shortages and surpluses, 2022

Sources	Number of countries
Primarily PES administrative data	19
Combination of different sources	3
National study on occupation demand	4
Occupation barometer[3]	1
Expert opinion	1
Not stated	1

Source: Analyses of data submitted by EURES National Coordination Offices

Each NCO was asked to provide a list of shortages and surpluses in their country – there was no maximum or minimum number stipulated. The NCOs were requested to provide the data in 4-digit ISCO '08 occupation codes.

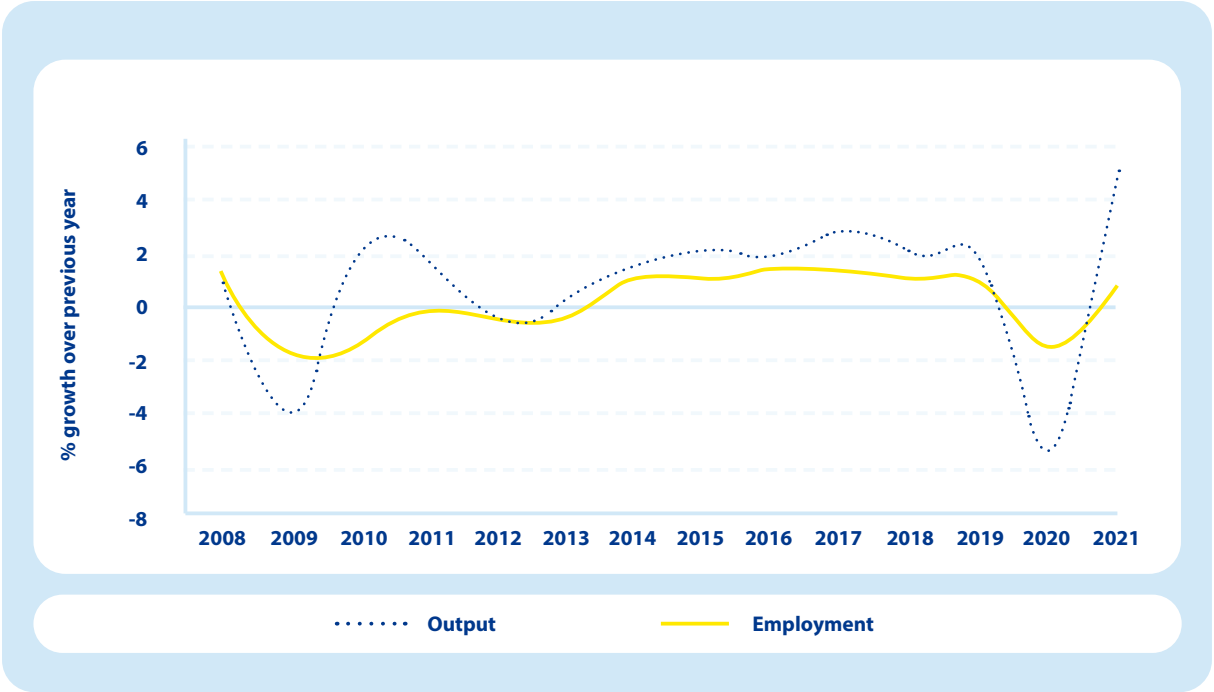
It is important to note that many countries use a bespoke and quite refined occupation classification system (e.g. Denmark, the Netherlands, etc.). In these cases, it is quite common for two or more unique occupation codes to align with the same 4-digit ISCO '08 occupation code, when these bespoke codes are aggregated up to the level of 4-digit ISCO '08 codes. Consequently, some useful information on more refined descriptions of shortage and surplus occupations is lost. However, as a core objective of this report is to compare labour shortages and surpluses across the EU27 and Switzerland, Norway and Iceland, and as the 4-digit ISCO '08 code is the most granular occupation classification available in most of these countries, it is necessary to continue using that classification system until a more refined system acquires general usage (e.g. ESCO).

3 An occupation barometer is often based on qualitative data and has a shorter time horizon than a typical forecast.

2. RECENT DEVELOPMENTS ON THE EUROPEAN LABOUR MARKET

Over a relatively short period of time European economies and labour markets have experienced a series of sharp shocks. After the financial crisis in 2008, Europe's economy and labour market experienced a period of prolonged growth. However, 2020 saw COVID-19, and the resulting economic lockdowns brought about a precipitous fall in output. In 2020, real GDP growth fell by 6.1%, which was more than during the 2008 financial crisis. At the beginning of COVID-19, employment levels steeply declined, but this began to subside as various countries introduced furlough schemes to save jobs (Eurofound/JRC, 2022; Fana et al., 2020). Many people remained in employment but were not working any hours.

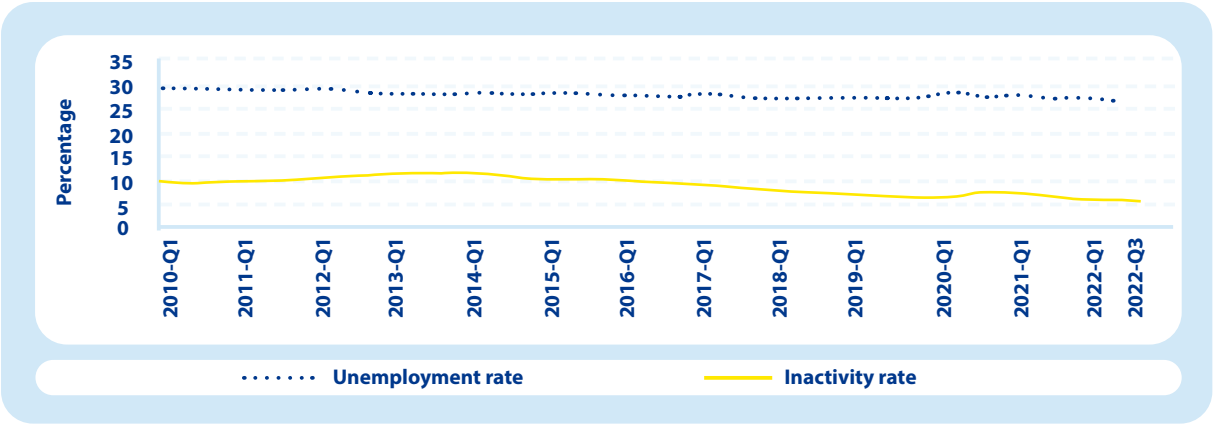
Figure 2 – Output and employment growth in the EU27, 2008–2021



Source: Eurostat National Accounts [NAMA_10_GDP] and Labour Force Survey [LFSA_EGAN]

Before the COVID-19 pandemic commenced the unemployment rate stood at 6.8% in June 2019. By June 2020 it had risen to 7.4%, before dropping to 6.1% in June 2022. At the time of writing, in December 2022, the EU unemployment rate stands at a historically low level. Inactivity rates rose slightly during the pandemic, indicating that some people may have withdrawn from the labour market during the pandemic but, as Figure 3 demonstrates, inactivity rates have returned to their pre-pandemic levels during 2022. Accordingly, one might conclude that there is relatively little evidence, at least at the EU level, of a fall in economic activity levels exacerbating the tightness of the EU labour market.

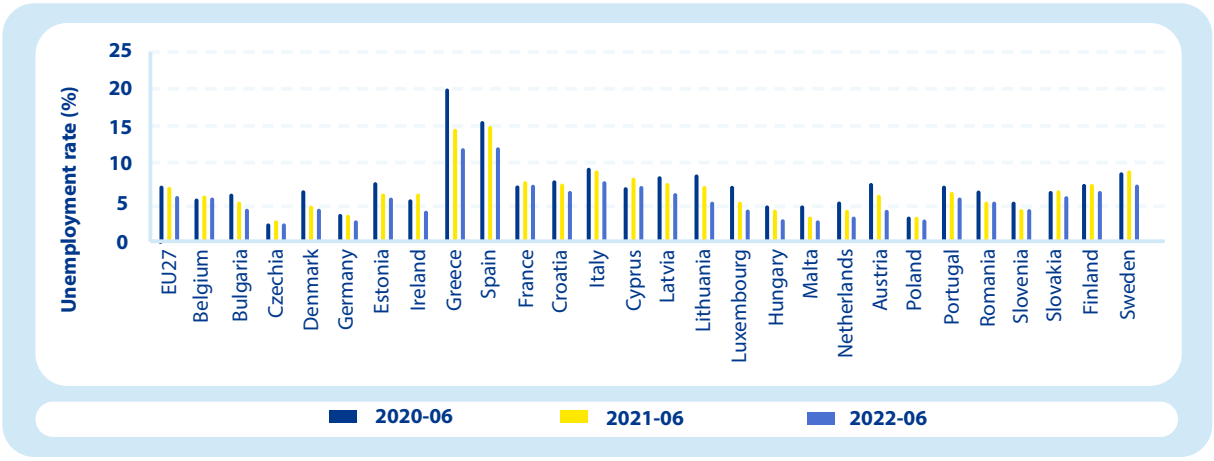
Figure 3 – Unemployment and inactivity rates, 2010–2022



Source: Eurostat Unemployment [UNE_RT_Q] and inactivity [LFSQ_IPGA]

Not all countries were affected to the same degree by COVID-19 as shown in Figure 4. While some Member States have experienced a decline in unemployment levels since the height of the pandemic during 2020/2021, countries such as Greece experienced relatively high increases in levels of unemployment (European Commission, 2022). It is also evident that not all population groups were affected equally by the pandemic. The employment of young people, relatively low paid female workers, those on temporary contracts, and people working in sectors where remote working proved to be difficult or impossible (such as manufacturing), were all adversely affected by COVID-19 (Eurofound / JRC, 2022; Pouliakas and Branka, 2020). At the end of 2022 it was evident that the employment situation of all these groups had improved (European Commission, 2022).

Figure 4 – Unemployment rate by Member State, 2020, 2021, and 2022

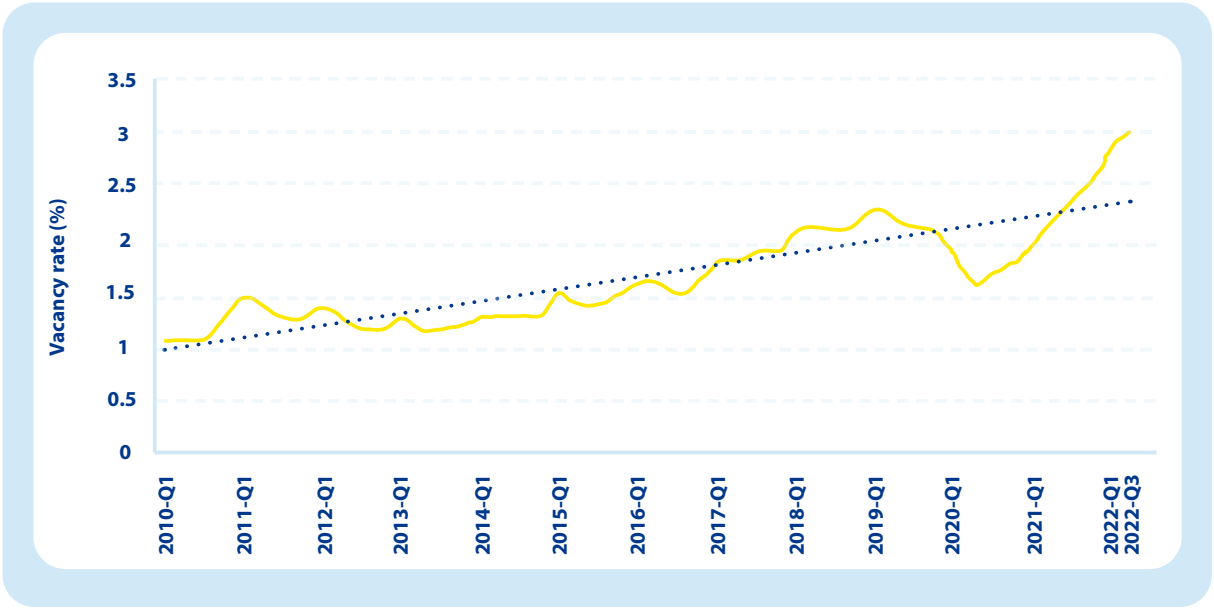


Source: Eurostat Unemployment [UNE_RT_Q]

With the end of the COVID-19 induced lockdowns the economy experienced a rapid bounce back during 2021/2022 with a resulting impact on the demand for labour. The extent to which there is a reserve army of labour which can take-up these jobs has been decreasing over time. This is captured by Eurostat's labour slack indicator which measures the share of people in the extended labour market who are not economically active but are potentially available to take-up work along with the share of people unemployed or underemployed. In 2019Q2 it stood at 13.6% of the extended workforce, but this had dropped to 12.1% in 2022Q2. Over the last 10 years, the extent of any labour market slack in the EU economy has been in decline (except for the period during the pandemic when it increased).

The vacancy rate, as a measure of unmet demand for labour, provides further insight into the degree of labour market tightness. As shown in Figure 5, there has been a relatively sharp pick-up in the vacancy rate over recent quarters. It has more or less doubled over the period between 2020Q2, when lockdowns were introduced, and 2022Q2 when they had all been lifted across Europe. Over the longer-term, from 2010 onwards, it is also apparent that the vacancy rate has been increasing over time but its rate of increase has accelerated over the last couple of years such that by 2022Q2 it stood at a substantially higher level than a simple extrapolation of its longer term trend might suggest.

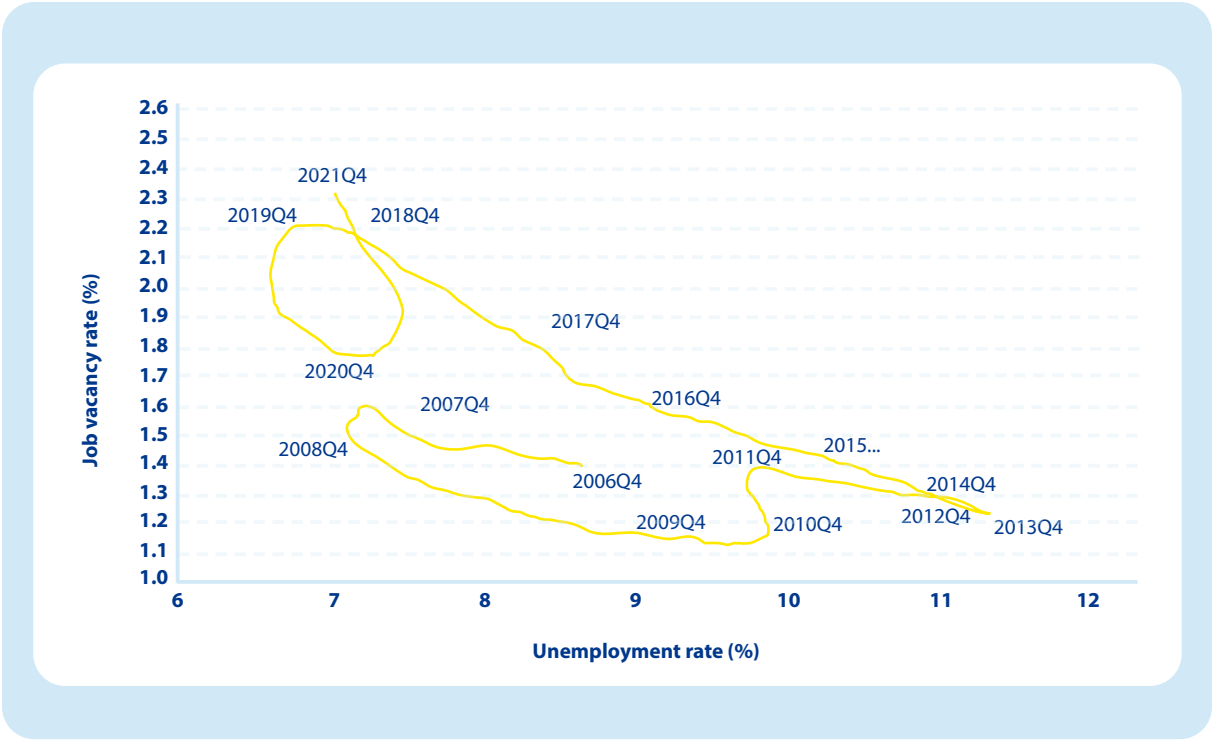
Figure 5 – Vacancy rate in the EU27, 2010Q1 to 2022Q2



Source: Eurostat job vacancy statistics [JVS_Q_NACE2]

The Beveridge curve provides a measure of labour shortages (or surpluses). Over time - the pandemic excepted - it increasingly reveals that the EU is characterised by high levels of vacancies and relatively low levels of unemployment. In other words, the EU increasingly faces labour shortages (see Figure 6).

Figure 6 – Beveridge curve, 2009–2021



Source: Eurostat [jvs_q_nace2, lfsq_urgan]

The evidence points to Europe struggling to meet the labour demands which have emerged in the immediate aftermath of COVID-19. This is something which is common to countries outside of Europe with the OECD reporting that unemployment levels are at unprecedented low levels as employment growth has gathered pace with the creation of many more new jobs than those destroyed during the pandemic (OECD, 2022). It is certainly the case that the rapid increase in economic activity following the ending of the COVID-19 lockdowns has exacerbated the extent to which the demand for labour outstrips its supply. If one, however, looks at the longer-term trends then it points to the labour market tightening over a longer period. This has taken place against a backdrop of other changes which affect the demand for labour. Demographic change, for instance, especially the ageing of the workforce, which has been reinforced in some countries by high levels of emigration by relatively young people, has placed pressure on the demand for labour. Technological change, digitalisation, and greening have all had an impact on the types of labour/skills required by organisations. This can result in labour shortages existing side-by-side with surpluses where there are skill mismatches. These issues are further discussed in Chapter 6.

3. IDENTIFIED LABOUR MARKET IMBALANCES

3.1. Introduction

This chapter contains a detailed profile of the shortage and surplus occupations identified in the 27 Member States of the European Union and Norway and Switzerland by the EURES NCOs in the summer and autumn of 2022. The information on shortages and surpluses was provided to the NCOs by the national Public Employment Services and a number of different indicators were used to identify shortages and surpluses (for further details on the data collection methodology please refer to Annexes 1 and 2).

This chapter also contains a summary of a number of reports on skill shortages which were undertaken at roughly the same time as the survey of the NCOs. The purpose of exploring the findings from these reports is to establish whether the shortages identified in this report are similar to those identified in other reports.

This chapter also includes a summary of labour market imbalances at the regional level in many of the larger countries who participated in this study. The purpose of including a regional perspective is to ascertain whether the shortages and surpluses reported by the NCOs at national level differ significantly from the labour market imbalances identified in the regions.

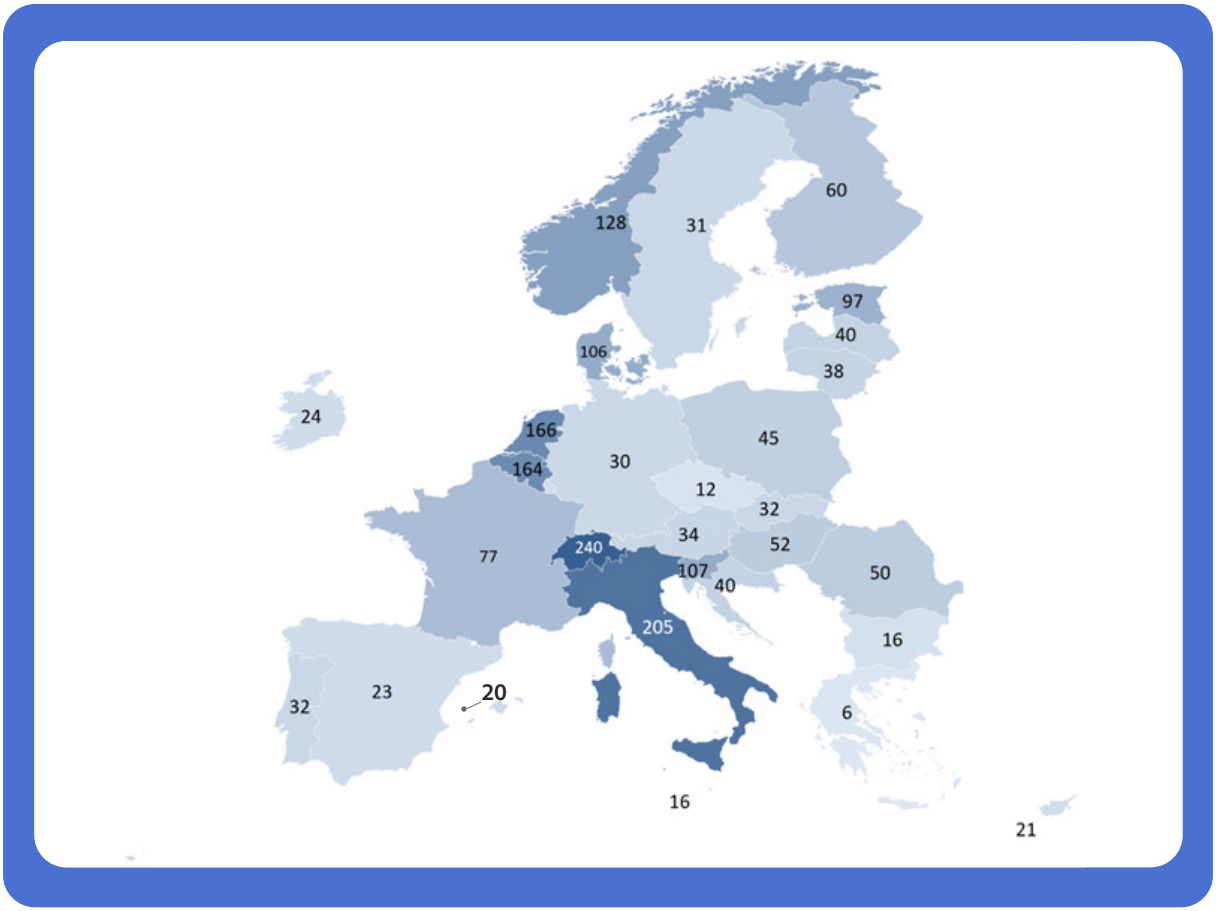
The section on regional labour markets includes an analysis of how cross-border labour mobility in some adjacent countries contributes to an alleviation of labour market imbalances.

3.2. Shortage occupations across Europe

The NCOs identified hundreds of shortages, covering about 400 distinct 4-digit occupations from a possible total of 436 occupations in the 4-digits ISCO '08 nomenclature[4]. A statistical relationship could not be found between the numbers employed in a country and the number of identified shortage occupations submitted by the country.

4 In the case of most shortage occupations, they were identified by only one or two out of 29 countries.

Figure 7 – Total number of shortage occupations identified by each country, 2022



Source: Analysis of data submitted by EURES National Coordination Offices

The highest number of shortage occupations was submitted by Switzerland (240), Italy (205), the Netherlands (166), Belgium (164), Norway (128), Slovenia (107), Denmark (106), Estonia (97), France (77) and Finland (60). The 10 countries that submitted the smallest number of shortages were Greece (6), Czechia (12), Malta (16), Bulgaria (16), Luxemburg (20), Cyprus (21), Spain (23), Ireland (24), Germany, (30), and Sweden (31).

Despite the inclusion of Sweden and Germany among the countries that submitted the lowest number of shortages, and of Italy and Slovenia among the countries that submitted the highest numbers, the north-west of the European continent is prominently represented among the countries that submitted the most shortages occupations (see Figure 7).

The relaxation of the restrictions imposed as a result of the COVID-19 pandemic contributed to an increasing number of identified shortage occupations. Notably, the largest increase in employment over the period 2021 Q1 to 2022 Q2 was in the accommodation and food sector which expanded by over 40% – adding 2.8 million additional workers to that sector. Traditional tourist destinations around the Mediterranean fared particularly well. Greece more than doubled the numbers employed in food and accommodation, while Italy (67%), Croatia (57%), and France (54%) enjoyed strong employment growth as indeed did Austria (54%)[5].

The retail and wholesale sectors contributed almost 1 million workers to the overall increase in employment during this period, but employment expanded by at least half a million in most sectors, including information technology, construction, professional services, manufacturing, healthcare, and the arts. Significantly, over 60% of the increase of 740,000 in the employment of construction workers over this period was made up of building craft workers[6]. More information on the causes of labour market imbalances can be found in Chapter 6.

5 Ibid.
6 Ibid.

3.3. Widespread and severe shortages occupations in 2022

While a total of about 400 4-digit occupations were identified by the 29 countries covered by this study as shortage, 79 of these occupations were identified as a shortage by only one country, while a further 61 occupations were identified by two countries and 64 occupations were identified by three countries. Clearly, these occupations would qualify as niche shortages rather than widespread shortages.

In this study, the definition of a widespread shortage is a shortage that has been identified by at least 11[7] countries. This represents 38% of the countries in the study, and it produces a list of 38 shortage occupations.

Those occupations are outlined in Table 3 below. The building trades have 15 different occupations on the list and many of these occupations have been identified by the NCOs as also being among the most severe shortages, i.e. a shortage of a high magnitude, as identified by an objective source or criterion by NCOs (see Annex 1 for more details on the methodology).

The occupation of bricklayer is the occupation which was identified as a shortage by the highest number of countries (i.e., 19). This is closely followed by another building trade, that of carpenter and joiner. Both plumbers and pipefitters and building electricians are also building trades which are within the top 10 occupations which were reported by a large number of countries, while painters and related workers, floor layers and tile setters, plasterers, and concrete placers and finishers, and roofers are also building trades which are on the list.

Operative-level occupations associated with the construction industry such as earthmoving and related plant operators are also on the list - as are building labourers. Civil engineers – who typically require a university degree level qualification - are also on the list.

Many of the engineering trades which appear on the list are also involved in the construction industry such as welders and flame throwers, sheet metal workers, and structural metal preparers and erectors.

Four of the five software occupations in the 4-digit ISCO '08 classification also appear on the list of most widespread shortages. These are software developers, applications programmers, systems analysts and software applications, developers and analysts not elsewhere classified (nec.).

Table 3 – Shortage occupations reported by many countries and the degree of severity, 2022

Occupation	Number of countries reporting the occupation as a shortage	Percentage of countries who ranked shortage as 'high magnitude'[8] (i.e. 'severe shortage')
Bricklayers and related workers	19	57%
Carpenters and joiners	18	38%
Heavy truck and lorry drivers	18	73%
Metal working machine tool setters and operators	18	50%
Nursing professionals	18	54%
Plumbers and pipe fitters	18	38%
Building and related electricians	18	40%
Welders and flame cutters	17	54%
Concrete placers, concrete finishers and related workers	17	62%

7 The threshold of 11 countries for inclusion in the list of most widespread shortages is arbitrary. If the threshold was 10, another 9 occupations would be included, and if 9 was the threshold, another 14 occupations would be included. The threshold is determined by what is considered a reasonable number of widespread shortages. A similar approach is taken for the list of widespread surpluses.

8 These shares of those who made a rating.

Occupation	Number of countries reporting the occupation as a shortage	Percentage of countries who ranked shortage as 'high magnitude'[8] (i.e. 'severe shortage')
Sheet metal workers	16	44%
Floor layers and tile setters	16	36%
Software developers	15	58%
Cooks	15	55%
Building construction labourers	15	38%
Electrical mechanics and fitters	15	22%
Applications programmers	15	64%
Generalist medical practitioners	14	55%
Bus and tram drivers	14	50%
Motor vehicle mechanics and repairers	14	33%
Specialist medical practitioners	14	55%
Software and applications developers and analysts not elsewhere classified	14	58%
Earthmoving and related plant operators	14	44%
Waiters	13	44%
Early childhood educators	13	43%
Structural metal preparers and erectors	13	33%
Painters and related workers	13	63%
Agricultural and industrial machinery mechanics and repairers	12	67%
Bakers, pastry-cooks and confectionery makers	12	25%
Systems analysts	12	56%
Butchers, fishmongers and related food preparers	12	38%
Health care assistants	12	60%
Cleaners and helpers in offices, hotels and other establishments	12*	63%
Electrical engineering technicians	12	63%
Psychologists	11	75%
Plasterers	11	25%
Civil engineers	11	57%
Physiotherapists	11	40%
Roofers	11	78%
Average number of countries who gave a high rating		**50%**

Note (*): DK was counted twice as it reported the occupation both as a skill and labour shortage.
Source: Analysis of data submitted by EURES National Coordination Offices

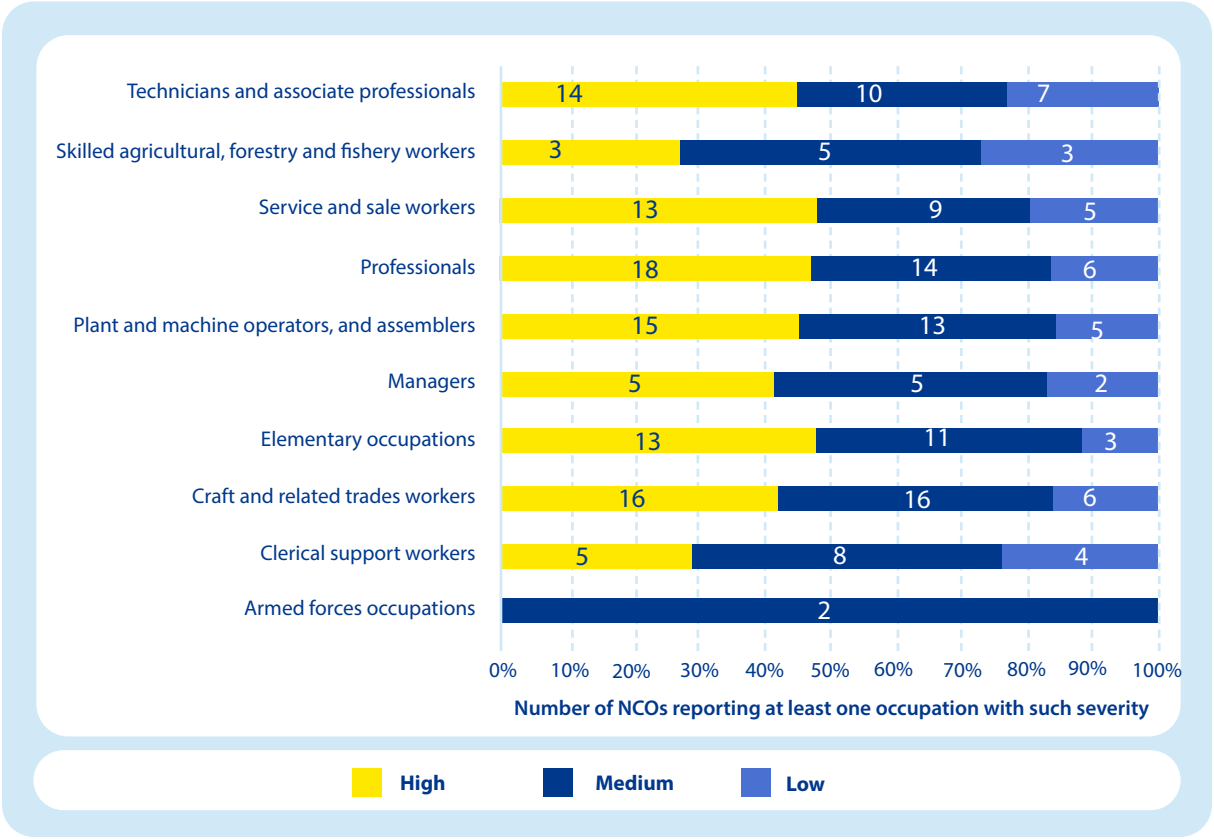
Healthcare-related occupations also feature strongly, with both general medical doctors and specialist doctors appearing on the list together with nursing professionals. Psychologists, physiotherapists, and healthcare assistants are also represented.

The hospitality sector is strongly represented with four occupations including cooks, waiters, bakers, pastry cooks and confectionary makers, and butchers, fishmongers, and related food preparers.

However, there was considerable variation between occupations in terms of their rating. The occupations which attracted a rating of high magnitude from most countries included psychologists, painters, heavy truck and lorry drivers, and agricultural and industrial mechanics not elsewhere classified.

The next group includes software developers not elsewhere classified, bricklayers, cleaners, application programmers, healthcare assistants, and physiotherapists.

Figure 8 – Severity of shortages by broad occupation group, 2022



Source: Analysis of data submitted by EURES National Coordination Offices

To derive an appreciation of the significance of these figures, they are compared to the average rating assigned to the 1-digit broad occupation group each occupation belongs to. The results are shown in Figure 8 above. There were 38 ratings of professional occupations and 18 were assigned a rating of high magnitude. Thus, professional occupations attracted on average 47% of all high ratings. This is significantly lower than the average number of high ratings (57%) assigned to the 11 professional occupations on the list of most widespread shortages and indicates that these 11 professional occupations were not only the most widespread, but also the most severe shortages.

The results regarding the craft occupations are mixed. These occupations attracted 38 ratings of which 16 were ratings of high magnitude – representing an average of 42%. This is almost identical to the average high rating (44%) of the 18 craft occupations on the list of most widespread occupations.

This result suggests that the craft occupations which were among the most widespread shortages were not in general classified as the most severe shortages, although roofers, painters, bricklayers and agriculture and industry mechanics not elsewhere stated are exceptions.

3.4. Widespread and severe shortages over time

This study is the fifth in a series of reports on labour market imbalances in Europe conducted under the umbrella of EURES. While this report incorporates important changes compared to previous editions, the methods used by the NCOs to identify shortages has not changed significantly.

Table 4 – Comparison of widespread shortages over time, 2017 – 2022

	Ranked as a shortage in				
Occupation	**Current report**	**2021 report**	**2020 report**	**2019 report**	**2017 report**
Bricklayers and related workers	1st	7th	5th	7th	6th
Carpenters and joiners	2nd	6th	6th	4th	0
Heavy truck and lorry drivers	2nd	4th	3rd	1st	4th
Metal working and machine tool setting	2nd	9th	0	0	0
Nursing professionals	2nd	2nd	1st	6th	4th
Plumbers and pipefitters	2nd	1st	2nd	4th	2nd
Building and related electricians	2d	7th	5th	4th	6th
Welders and flame throwers	3rd	3rd	3rd	2nd	3rd
Concrete, placers, finishers etc.	3rd	6th	6th	6th	0
Sheet metal workers	4th	0	0	0	0
Floor layers and tile setters	4th	0	0	0	0
Software developers	5th	5th	4th	8th	4th
Cooks	5th	10th	3rd	5th	1st
Building construction labourers	5th	0	0	0	0
Electrical mechanics and fitters	5th	7th	0	0	0
Applications programmers	5h	8th	4th	0	0
General medical practitioners	6th	6th	4th	7th	2nd
Bus and tram drivers	6th	0	0	0	0
Motor vehicle mechanics, repairers	6th	8th	7th	6th	6th.
Specialist medical practitioners	6th	8th	0	0	0
Software, applications developers nec.	6th	10th	6th	8th	0
Earth moving and related plant operators	6th	0	0	0	0
Waiters	7th	0	0	0	0
Early childhood educators	7th	0	0	0	0
Structural metal preparers and erectors	7th	0	0	0	0
Painters and related workers	7th	0	0	0	0
Agriculture, industrial machinery mechanics	8th	7th	6th	3rd	5th
Bakers, pastry-cooks, confectionary makers	8th	0	0	0	0

Occupation	Ranked as a shortage in				
	Current report	2021 report	2020 report	2019 report	2017 report
Systems analysts	8th	3rd	6th	2nd	5th
Butchers, fishmongers, related food preparers	8th	0	0	0	0
Health-care assistants	8th	8th	7th	0	0
Cleaners and helpers in offices, hotels etc.	8th	0	0	0	0
Electrical, engineering technicians	8th	0	0	0	0
Psychologists	9th	0	0	0	0
Plasterers	9th	0	0	0	0
Civil engineers	9th	5th	6th	8th	0
Physiotherapists	9th	0	0	0	0
Roofers	9th	10th	0	0	0

Note: Zero (0) means that the occupation was not identified within the top 10 shortage occupations in the respective year.
Source: Analysis of data submitted by EURES National Coordination Offices for current and previous reports

The number of shortages which were classified as widespread in previous reports has varied. Consequently, it is not possible to compare a similar number of occupations over time, and the comparison shown in Table 4 is based on the top 10 identified shortages in the previous four reports. The results display a high degree of convergence between the occupations which were ranked in the top 10 in the current and previous reports. Indeed, 12 of the 38 most widespread occupations in the current report are in the top 10 rankings in all four previous reports. They include bricklayers, heavy truck drivers, plumbers, nurses, welders, building electricians, software developers, cooks, doctors, motor mechanics, agriculture and industry machinery mechanics, and systems analysts.

A further four occupations, carpenters, concrete placers and finishers, software and application developers not elsewhere classified, and civil engineers were classified in the top 10 rankings in 2021, 2020 and 2019. The rankings of the occupations are also significant. The convergence over time is most prominent in the case of the most widespread occupations. A total of 10 of the top 15 most widespread occupations in the current report were classified as shortages in all previous reports, whereas only two occupations from the remaining 14 occupations were classified as shortages in all previous reports. The lowest level of convergence occurs for those occupations which are ranked from seventh to ninth in the list of most widespread shortages in the current report.

The trends over time also reveal some interesting patterns. In terms of healthcare-related occupations, doctors and nurses have been represented in the most widespread occupations in all previous reports. The healthcare assistant on the other hand first appeared on the list in 2020 and it has remained on the list ever since. Specialist doctors did not appear on the list until last year (2021) and it has appeared again in the current report. Both psychologists and physiotherapists appear on the list in the current report for the first time.

This pattern may have been influenced by the COVID-19 pandemic. The pandemic began in early 2020, and it quickly created a strong demand for nurses, healthcare assistants, and specialised doctors.

While employment in the construction sector expanded by 6% between 2021Q1 and 2022Q2, the employment of craft workers in that sector expanded by 5.8%. This may have created a tension in the sector as the employment of craft workers would be expected to at least keep pace with the overall increase in employment. This may be a contributory factor in the number of construction craft occupations which have been identified in this report as shortages.

When assessing the demand for the building trades, consideration should be taken of the fact that cabinet makers and construction supervisors were identified as shortage occupations by 10 countries – this placing them just outside the list of the most widespread shortages.

With the exception of the occupation of cook which has appeared on all previous lists of the most widespread shortages, the other three hospitality occupations of waiter, butchers, fishmongers and related food preparers, and bakers, pastry cooks and confectionary makers appear on the list for the first time. This pattern is consistent with the surge in employment in the food and accommodation sector in Europe in recent months.

It is notable in this regard that both chefs and kitchen helpers were identified by 10 countries as shortages, thus placing them just beyond inclusion on the list of most widespread shortages.

There are five software-related occupations in the 4-digit ISCO '08 nomenclature and four of them appear on the current list of widespread shortages. Two of those occupations, systems analysts and software developers, were identified in all previous reports as shortage occupations, while software applications and developers not elsewhere classified appear on the list of widespread shortages in the last three reports. The fourth occupation of application programmers appears on the list of widespread shortages in the previous two reports.

Table 5 – Comparison of most severe shortages over time, 2017–2022

	Ranked as a most severe shortage in				
Occupation	**Current report**	**2021 report**	**2020 report**	**2019 report**	**2017 report**
Bricklayers and related workers*	1st	3rd	2nd	2nd	0
Heavy truck and lorry drivers*	2nd	3rd	2nd	1st	4th
Nursing professionals*	2nd	1st	1st	0	3rd
Welders and flame throwers*	2nd	2nd	2nd	2nd	2nd
Concrete placers, finishers*	3rd	5th	2nd	1st	2nd
Software developers*	3rd	2nd	3rd	3rd	4th
General medical practitioners*	3rd	4th	2nd	3rd	0
Software applications etc. *	3rd	0	0	0	0
Metal working, tool setters. *	4th	0	0	0	0
Plumbers and pipe fitters*	4th	2nd	2nd	2nd	2nd
Cooks*	4th	0	0	0	0
Application programmers*	4th	4th	1st	3rd	3rd
Specialist medical*	4th	0	0	0	0
Psychologists*	4th	0	0	0	0
Roofers	4th	0	0	0	0

(*): Occupation in the 2022 list of most widespread shortages

Note: Zero (0) means that the occupation was not identified within the top 10 shortage occupations in the respective year.

Source: Analysis of data submitted by EURES National Coordination Offices for current and previous reports

It is also informative to compare the most severe shortages over time. However, as only 19 occupations received such a rating over the last four years, the comparison is made against the top 4 placed occupations in the current report – which is composed of 15 different occupations (see Table 5 above).

All 15 occupations appear in the top 38 widespread occupations in the current report.

The degree of convergence over time is quite striking. One in three of the occupations in the top 4 places in the current report also achieved a top 4 placing in all the previous four reports. These include the occupations of heavy truck and lorry drivers, welders and flamethrowers, software developers, plumbers and pipefitters, and application programmers.

In addition, the occupation of concrete placers and finishers would also have been included had it not been placed fifth in the 2021 report. A further three occupations achieved a fourth place ranking in four of the five reports.

To conclude, with the exception of two occupations, machine tool setters and sheet metal workers, the data suggest that the top 10 occupations listed in Table 4 and which occupy a ranking of between first and fourth place have persisted over time as shortage occupations.

Consequently, it is reasonable to consider these shortage occupations as reflecting structural issues in the European labour market, rather than being of a transient nature.

It is apparent from the analyses of widespread shortage occupations over the last few years that three groups of skills feature regularly on the list. These are software professionals, health professionals and building trades. Some engineering trades have featured regularly, but they have not dominated the list to the same extent as the building trades. Furthermore, some of these trades - notably welders and steel erectors – are also involved in construction activity.

To the extent that they feature strongly in the list of widespread shortages in previous editions of the report, it may be deduced that the shortages of software professionals, health professionals and building trades is more deep-rooted than the shortages identified in other occupations. This conclusion is also supported by the analyses of labour market imbalances in the regions, with health professionals, software professionals and building trades identified in many regions as serious shortages.

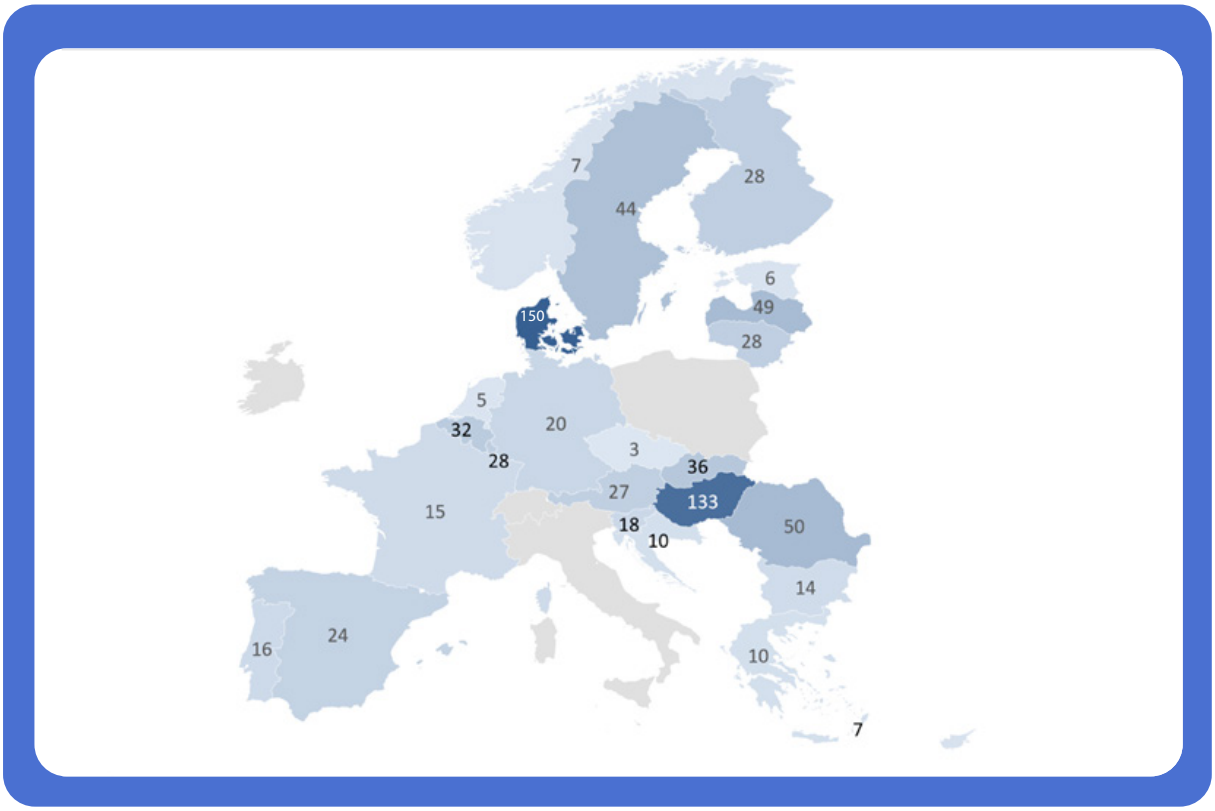
3.5. Surplus occupations across Europe

While 29 countries participated in the study and each of them identified shortage occupations, 24 countries identified surplus occupations. This appears to be connected to the source of the information on labour market imbalances. For example, in the case of both Ireland and Italy, the PES referred to specific studies on skill shortages in their assessment of labour market imbalances, while Malta used data on work permits and engagements and separations in their assessment of which occupations were in short supply.

The NCOs identified 321 distinct surplus occupations. As in the case of shortage occupations, there was not a statistical relationship between the number of identified surplus occupations and the numbers employed in each country. Only two countries, Denmark (150) and Hungary (133) identified more than a hundred occupations. None of the other 22 countries identified more than 50 surplus occupations. Romania (50), Latvia (49) and Sweden (44) identified the highest numbers, while the Netherlands (5), Czechia (3), Estonia (6), Cyprus (7) and Norway (7) submitted fewer than 10 surplus occupations. The geographic distribution is quite varied, and no particular region in Europe stands out in terms of the number of identified surplus occupations.

The relatively modest number of surplus occupations identified by 22 of 24 countries indicates that labour market imbalances in Europe in 2022 are primarily a reflection of excess demand rather than excess supply.

Figure 9 – Total number of surplus occupations identified by each country, 2022



Note: In grey, countries that did not identify any surplus.
Source: Analysis of data submitted by EURES National Coordination Offices

3.6. Widespread and severe surplus occupations in 2022

The list of surplus occupations is shown in Table 6 below. It is apparent from the table that clerical and professional occupations dominate. Both of these groups together account for 18 specific occupations.

General office clerks, executive secretaries and general secretaries are among the most widely identified surplus occupations and they contain very large numbers of workers – particularly in the case of general office clerks and general secretaries. Furthermore, 80% of the countries that rated these two occupations in terms of the severity of the surplus gave them a high rating. Both general receptionists and hotel receptionists are also on the list, but they attract a much lower rating.

There are six elementary occupations on the list. They include kitchen helpers, cleaners, building labourers, hand packers, shelf fillers and elementary occupations not elsewhere classified. Their inclusion on the list is consistent with the view that technology is replacing workers in unskilled occupations dominated by a large share of routine tasks (see Chapter 6).

However, the inclusion of 11 occupations which require third-level qualifications may surprise many. These occupations however are either in the humanities or the creative arts. Regarding the latter, the list includes musicians, singers and composers, visual artists, graphic and multi-media designers, interior decorators and designers, and journalists. The humanities include social work and counselling professionals; sociologists, anthropologists, and related disciplines; advertising and marketing professionals, public relations professionals; and translators, interpreters, and other linguists; philosophers, historians, and political scientists.

There are two occupations related to the travel industry, travel consultants and clerks, and travel guides. Their presence on a list of surplus occupations may be a legacy of the pandemic which resulted in a major reduction in the number of workers involved in the travel industry.

Table 6 – Surplus occupations reported by many countries and the degree of severity, 2022

Occupation	Number of countries reporting the occupation as a surplus	Percentage of countries who ranked surplus as 'high magnitude'[9] (i.e. severe surplus)
Graphic and multi-media designers	13	20%
Administrative and executive secretaries	11	0
General office clerks	11	80%
Shop sales assistants	10	25%
Secretaries	10	80%
Interior designers and decorators	8	67%
Journalists	8	25%
Elementary workers not elsewhere classified	8	100%
Car, taxi and van drivers	8	33%
Photographers	7	100%
Translators, interpreters, and other linguists	7	0
Travel consultants and clerks	7	50%
Product and garment designers	7	50%
Visual artists	7	67%
Kitchen helpers	7	50%
Receptionists	7	0
Building construction labourers	7	50%
Cleaners and helpers in offices, hotels and other establishments	6	33%
Tailers, dressmakers, furriers and hatters	6	0
Travel guides	6	50%
Advertising and marketing professionals	6	0
Beauticians and related workers	6	33%
Childcare workers	6	50%
Sociologists, anthropologists and related	6	67%
Building caretakers	5	50%
Library clerks	5	0
Security guards	5	67%
Gardeners, horticultural, nursery growers	5	100%

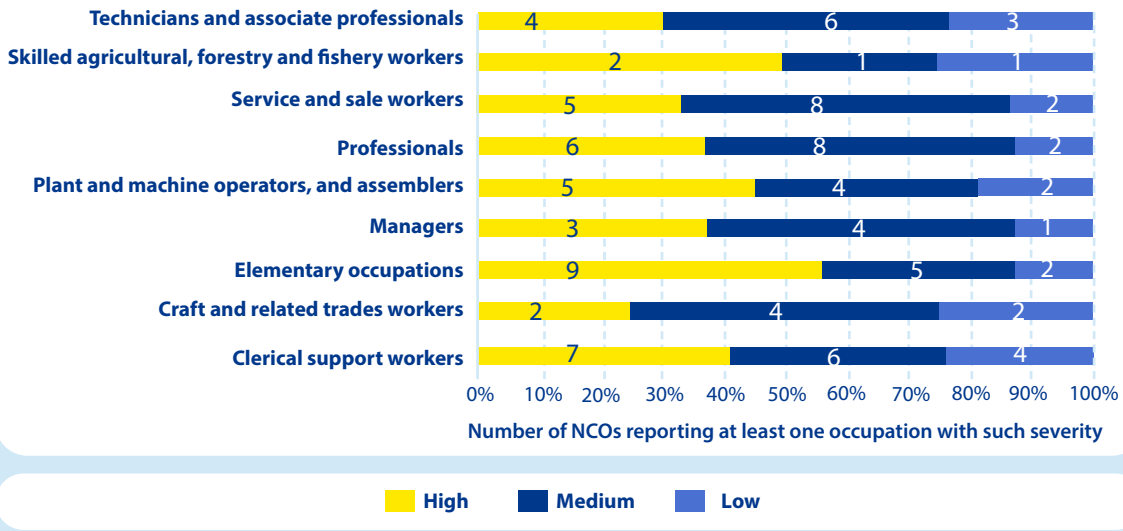
9 These shares of those who made a rating.

Occupation	Number of countries reporting the occupation as a surplus	Percentage of countries who ranked surplus as 'high magnitude'[9] (i.e. severe surplus)
Hotel receptionists	5	50%
Cashiers and ticket clerks	5	50%
Hand packers	5	33%
Public relations professionals	5	0
Shelf fillers	5	0
Social work and counselling professionals	5	0
Stock clerks	5	50%
Musicians, singers and composers	5	33%
Philosophers, historians and political scientists	5	0

Note: Zero (0) means that the occupation was not ranked as 'high magnitude' by any country.
Source: Analysis of data submitted by EURES National Coordination Offices to ELA

The second column in Table 6 shows the number of NCOs who gave each specific widespread occupation a high rating. Figure 10 below gives the number of NCOs who gave a high rating to the severity of surplus of each group of occupations.

Figure 10 – Severity of surpluses by broad occupation group, 2022

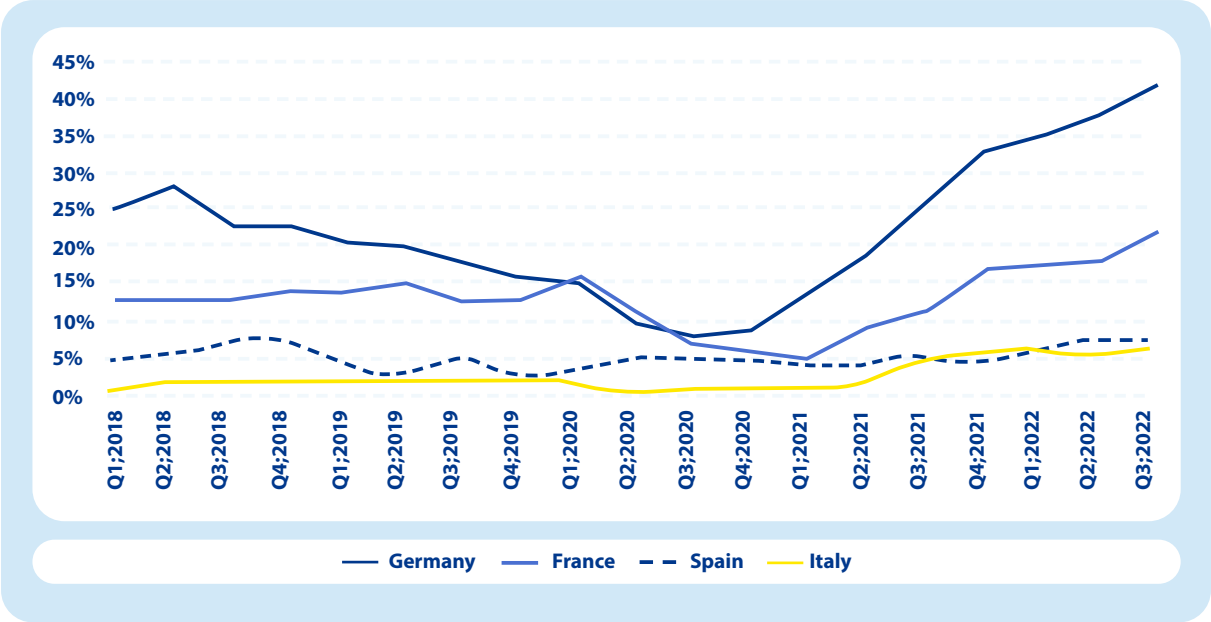


Source: Analysis of data submitted by EURES National Coordination Offices

3.7. Comparing the quantitative findings with relevant external sources

The data on skill shortages and surpluses analysed in this chapter comes from the EURES National Coordination Offices and the Public Employment Services. The data were gathered during the 2022Q2 and 2022Q3. There was a relatively small number of other quantitative analyses of skill imbalances in Europe which cover this period.

Figure 11 – Share of firms reporting labour shortages, 2018–2022



Source: Eurostat survey of manufactory employment

The relatively high number of shortages reported by the NCOs is consistent with the results of a number of surveys on labour shortages. Eurostat's survey of manufacturing companies shows a significant increase in the number of firms reporting labour shortages between the first and third quarter of 2022. For example, the share of firms reporting such shortages reached 42% in the third quarter in Germany, while the shares recorded in France (22%), Spain (8%) and Italy (7%) were also relatively high and rising. These figures compare to shares of 18%, 12%, 5% and 2% respectively for the same quarter in the pre-pandemic year of 2019.

However, these figures only refer to manufacturing industry. When all sectors are surveyed, the results are more dramatic. In France, a survey by the employers' association CPME found that approximately 50% of companies were trying to recruit staff and 95% said that they were struggling to find suitable candidates[10]. In Germany, a survey by the Munich based IFO institute found that 87% of family businesses were suffering from the impact of shortages of workers. Similar situations were reported for Finland, Austria, and Spain.[11]

10 See the EURACTIVE report at https://www.euractiv.com/section/politics/news/labour-shortages-felt-all-over-europe/.

11 As above.

These surveys confirm that there were extensive labour shortages in many European countries. However, in order to validate the findings of this report, it is also necessary to identify which occupations exhibited the highest levels of shortage in 2022.

The 2022 annual review of Labour Market and Wage developments in Europe has an interesting analyses of sector shortages. With regard to the latter, the report notes that according to the European Centre of Expertise (ECE), one of the highest concentrations of labour shortages was in healthcare (Germany; Denmark; Belgium; France; Croatia; Romania; and Sweden). Shortages however were also concentrated in hospitality (Germany; Croatia; Cyprus and Spain), and in construction (Ireland; Luxemburg and Poland) and in ICT (Germany; Spain and in Poland).

While in general the shortages identified in this report have a wider geographic range than the countries reported by the ECE, there is a very strong overlap between the sectors identified by the ECE and the occupations in the widespread list of shortages. Indeed, the only significant omission is that a significant number of engineering crafts are also on the list of widespread shortages, but the fact that some of those engineering crafts are typically involved in construction activity means that they may be implicitly included under the construction sector.

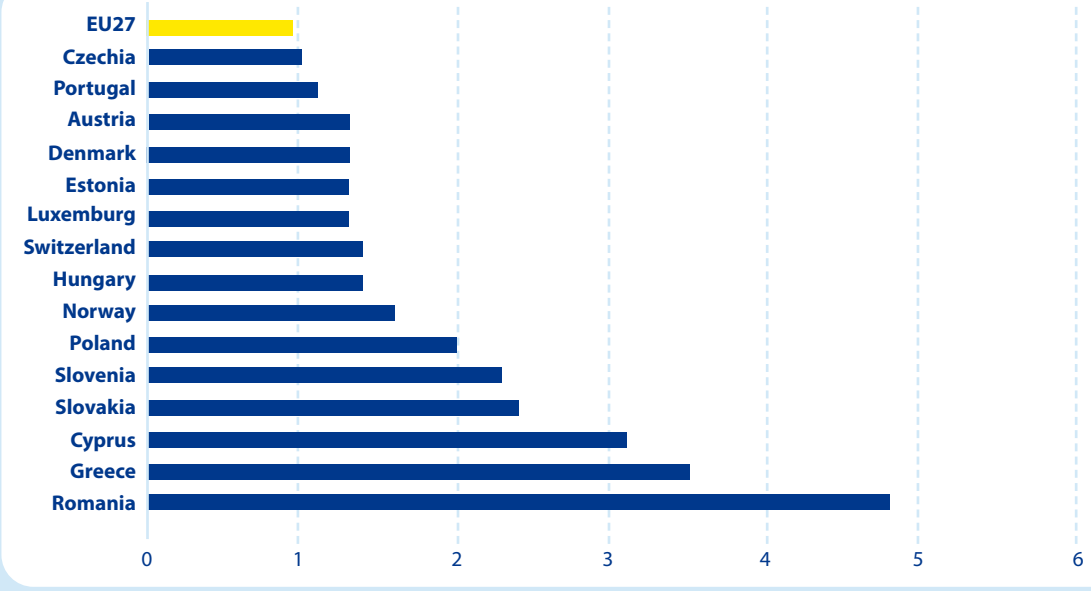
It is also interesting to compare the geographic distribution of shortages in this report with the results of CEDEFOPs analyses of skill shortages for the period 2021-2026 for the 29 countries covered in this report. The CEDEFOP analyses is of occupations at the 2-digit level and the comparison below is of the three most prominent groups of shortage occupations identified in this report; health professionals; ICT professionals and building trades.

The analyses identify all those countries where the forecast of annual employment growth for the three 2-digit occupation groups is either at, or above the forecast for the overall European Union annual employment growth rate. These countries are then compared to the countries where the NCOs classified these occupations as shortages. The purpose of these analyses is to explore the extent to which the shortages identified in this report are consistent with the high employment growth forecast.

The first occupation group is health professionals which account for four of the occupations on the list of the 38 most widespread occupations.

The results of the Cedefop forecast are that the projected annual employment growth rate for health professionals is higher than the overall EU growth rate over the period 2021–2026 for 15 countries.

Figure 12 – Countries where the forecast (2021–2026) for health professionals is equal or above the EU average



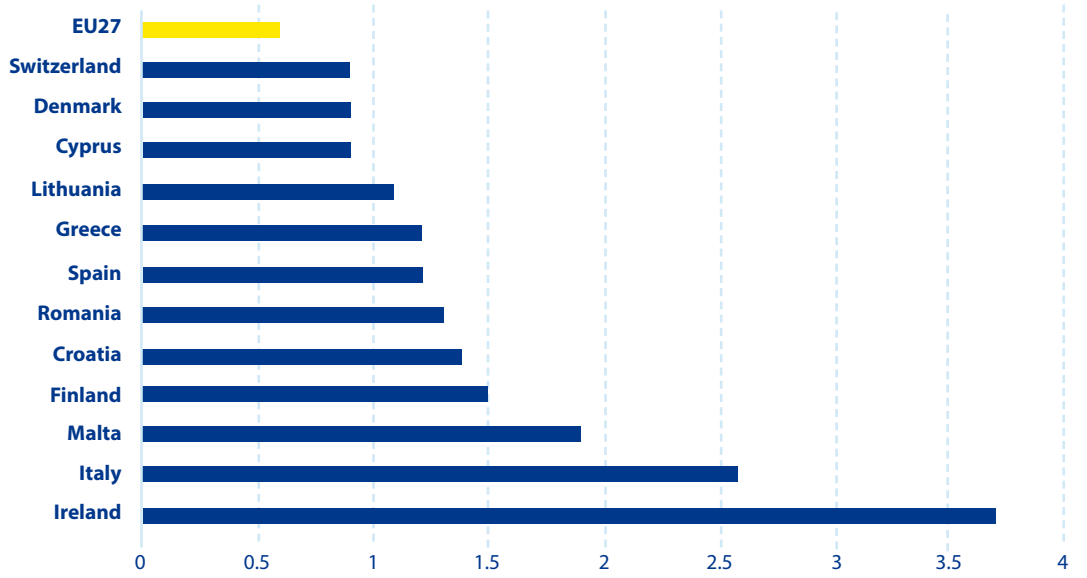
Source: Cedefop online skill forecast 2021–2026

However, there are differences between the countries where the NCOs report shortages and the countries where Cedefop forecasts a high demand for health professionals. Specifically, the NCOs in Greece and Romania did not report any shortages of health professionals – despite the fact that the Cedefop annual employment forecast for health professionals was the highest in these two countries.

The 12 countries which are forecast by Cedefop to have above average EU annual employment growth over the period 2021–2026 for the occupation group titled 'building and related trades workers (excluding electricians)' are shown below in Figure 13.

With regard to the building trades, there are some discrepancies between the countries which are forecast to have an above average EU employment growth rate in the building trades and the countries where the NCOs reported shortages of building trades. Specifically, the NCOs of Malta and Ireland did not report shortages in the building trades, although Cedefop reported above average EU employment growth rates for these occupations.

Figure 13 – Countries where the forecast for building trades is equal or above the EU average (2021–2026)



Source: Cedefop online skill forecast 2021–2026

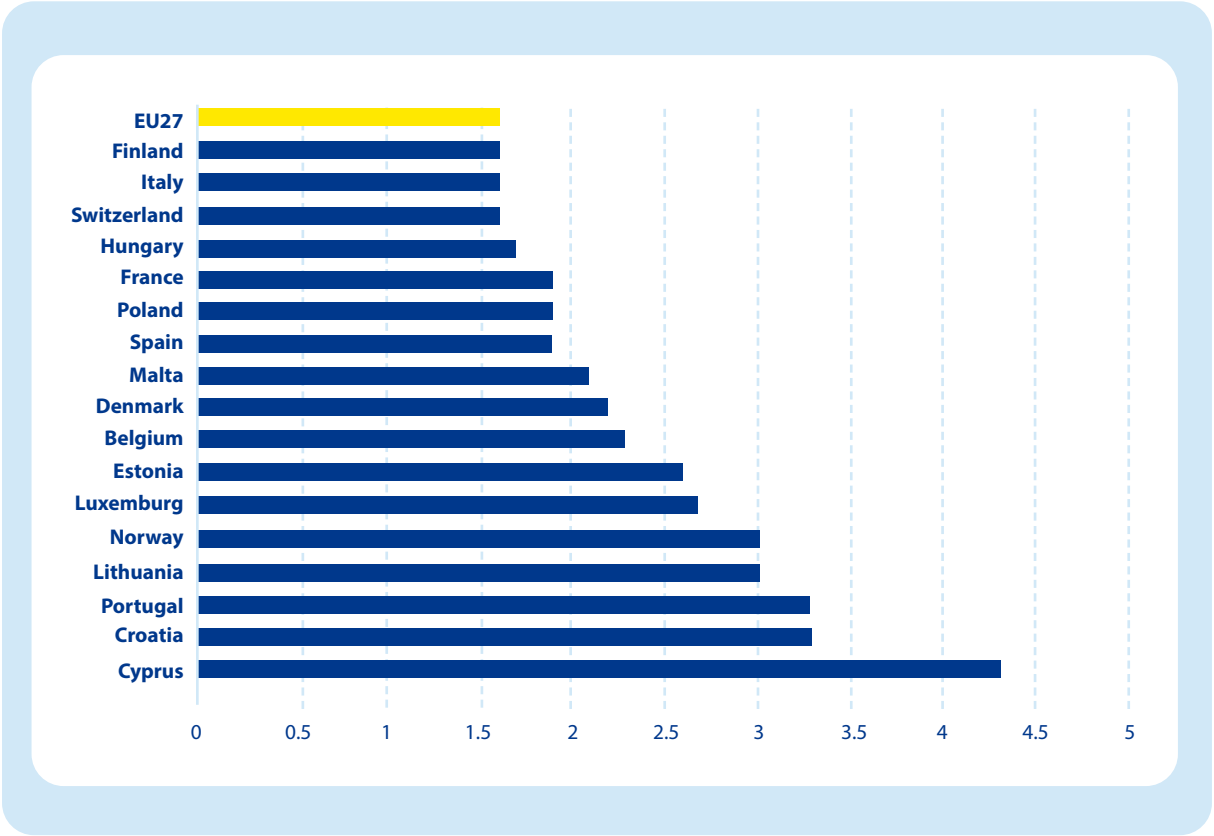
However, national situations are more complex than can be captured in a data collection exercise as conducted for the current report. While Ireland, for example, did not report skill shortages when the template was submitted, their national skills unit in its 2022 National Skills Bulletin[12] did concede that shortages of some building trades were likely in view of the government's anticipated high spending on construction activity. By the end of 2022, there was widespread agreement that the high level of public and private spending on construction was having an impact on shortages of building craft workers; employment in the construction sector over the most recent 12-month period has expanded by 17%[13] and all construction trades in Ireland have been placed on the work permit system.[14] This also shows how time-sensitive data collection and analysis on labour shortages and surpluses can be in practice.

12 The national skills unit is formally known as the Skills and Labour Market Research Unit (SLMRU). See the 2022 National Skills Bulletin: SLMRU, 2022.

13 This refers to the period 2021Q3 to 2022Q3. Most of the increase was in the skilled trades which expanded by 10% over this period.

14 Under the work permit system, employers are allowed to recruit workers from outside the European Economic Area (EEA) for skilled workers when it is not possible to source those skills either domestically or from within the EEA.

Figure 14 – Countries where the forecast for ICT professionals is equal or above the EU average (2021–2026)



Source: Cedefop online skill forecast 2021–2026

The threshold for inclusion in the Cedefop forecasts – equal or above the projected annual EU employment rate – is 1.6 percentage points for ICT professionals. This is a higher threshold than in the case of either the projections for healthcare professionals or for the building trades. Nevertheless, there are more countries included (17) in the list of countries who are forecast to have above average EU rates of employment growth than in the case of either health professionals or the building trades.

There were four ICT professional occupations among the 38 most frequently identified shortage occupations. For all 17 countries where the annual projected employment growth of ICT professionals is forecast to be above the EU average, the NCOs also reported shortages of IT professionals.

In addition, a forecast is not provided by Cedefopfor the annual growth of ICT professionals in Ireland. The NCO in Ireland did report a shortage of high magnitude for software developers and the inclusion of an employment forecast for these professionals for Ireland would almost certainly have been above the EU average, and consequently increased the number of countries to 18.

Nevertheless, that is still eight countries less than the number of countries reported by the NCOs to have shortages of software professionals.

To conclude, there is an extensive overlap between the countries which are forecast to have above EU average annual employment growth for three 2-digit groups of occupations over the period 2021–2026, and the countries where the NCOs reported shortages in the specific occupations which make-up those groups.

However, the main conclusion to be drawn from the analyses is that the shortages identified in this report are by no means confined to countries which were expected by Cedefop to record relatively strong employment growth in the relevant occupations. While employment growth is clearly a contributary factor in many cases, it is not the only factor. Overall employment in the EU over the duration of the survey (2022Q1–2022Q3) was 1.7%. This is higher than the Cedefop average annual employment forecasts for the three occupation groups over the period 2021-2026 and this may have contributed to the number of countries reporting shortages as the market demand for these skills in 2022 was somewhat higher than the average Cedefop forecast.

3.8. Chapter summary

The shortages are concentrated in the north and west of Europe, although a considerable number of shortages has also been identified in Italy.

The main shortages are in the craft occupations and in particular in the building trades, but to some extent in engineering trades, too. There are also many shortage occupations identified in the healthcare, software, and hospitality sectors.

The main surpluses are in the professional, clerical, and elementary occupations. The 10 professional occupations which are classified as being in excess of market demand included five occupations in the creative arts and five occupations in the humanities.

In terms of the severity of the reported shortages, many of the 38 most widespread occupations are assigned a high rating by significantly more countries than was the case for all the reported occupations.

There was a high degree of overlap between the shortage occupations which were identified by a large number of countries in the current report and the shortage occupations which were identified by a large number of countries in four previous reports.

There was also a high degree of overlap between the shortages which attracted a high rating over the last five reports – including in the current report. In this respect, it may be argued that many of the more widespread shortages are deep-rooted or structural in nature.

The shortages identified in this report are similar to the sectors identified as having many shortages by the EU Council of Experts in 2021 namely healthcare, software, and construction.

There is a strong overlap between the countries for which Cedefop forecast has above EU average annual employment growth rates for health professionals, software professionals and building trades over the period 2021–2026 and the countries which reported labour shortages in these occupations in this report.

However, many countries which are forecast by Cedefop to have below average annual employment growth in these occupations also reported shortages in these occupations in this report. The reason may lie in the fact that the Cedefop forecast pre-dates the pandemic and therefore did not anticipate the surge in employment in many countries which has been triggered by the opening-up of the economy following the removal of restrictions.

4. GEOGRAPHIC DISTRIBUTION OF LABOUR MARKET IMBALANCES AND CROSS-BORDER LABOUR MOBILITY

4.1. National distribution of widespread shortages

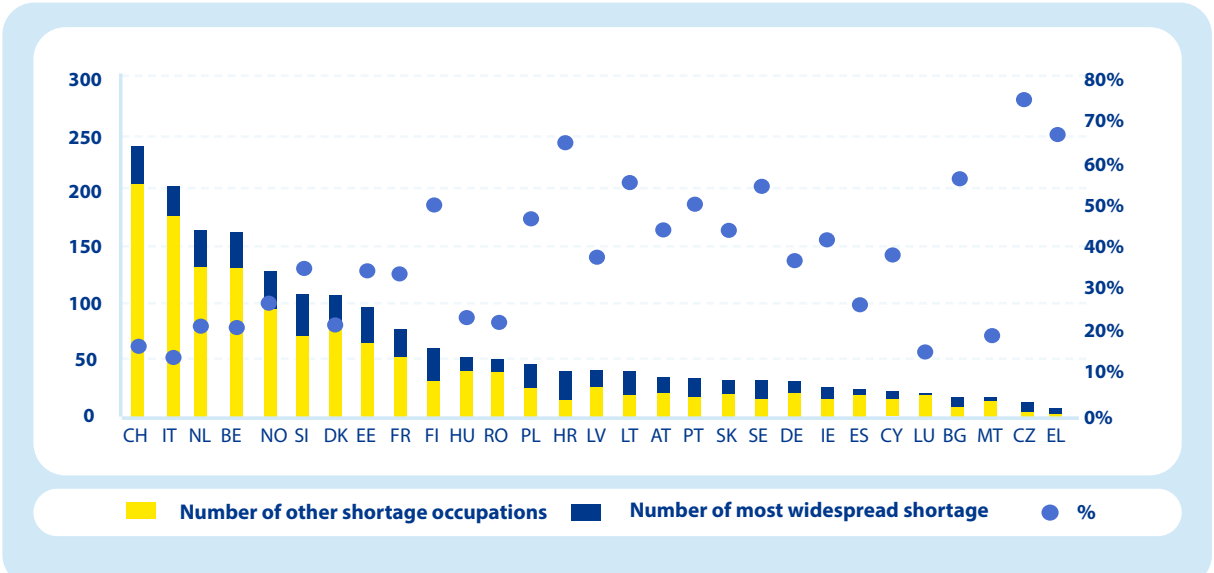
All 29 countries which participated in the study identified at least three of the 38 occupations on the list of the most widespread shortage occupations. Slovenia (37), the Netherlands (35), Belgium (34), Norway (34), Estonia (33), Switzerland (33), Finland (30), Italy (27) and France (26) identified almost all of the 38 occupations, but as shown in Figure 7, these were also among the countries which identified the highest number of occupations as shortages.

The countries which identified the lowest number of the most widespread shortages are Malta (3), Luxembourg (3), Greece (4), Spain (6), Cyprus (8), Czechia (9), Bulgaria (9) and Ireland (10). These were also among the countries which identified the lowest number of occupations as shortages.

While it is to be expected that the total number of shortages that a country identifies has an impact on the extent to which some of those shortages are among the most widespread, it is notable that the countries which identified relatively few shortage occupations also had a relatively high share of occupations on the list of the most widespread shortages.

This is apparent from Figure 15 below. The countries are arranged from left to right along the x-axis in respect of the total number of shortage occupations they identified. Thus, Switzerland identified the highest number of shortage occupations, followed by Italy and so on. Many of these countries classified more than 100 occupations as shortages, and consequently, it is not surprising that the number of widespread occupations – when expressed as a percentage of the total occupations they identified - is relatively low.

Figure 15 - Share of the most widespread shortages by reporting country, 2022



Source: Analysis of data submitted by EURES National Coordination Offices

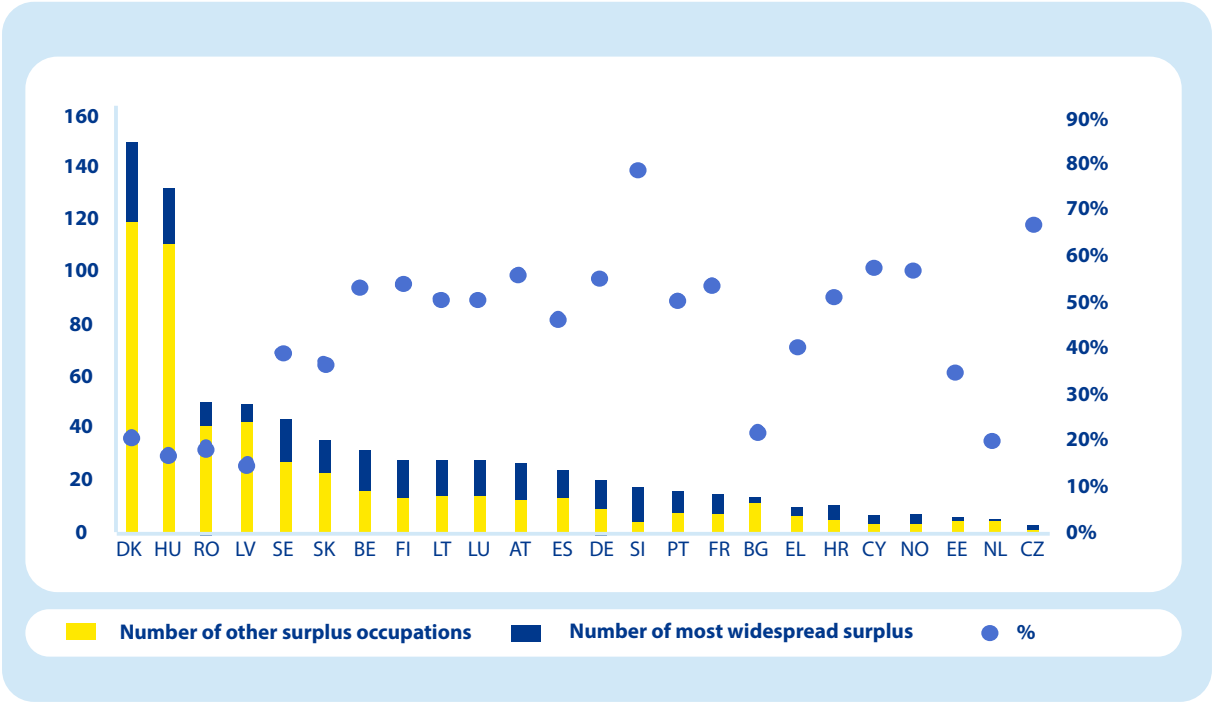
Examples include Greece that - despite identifying a total of only six shortage occupations - included four (67%) which are on the list of the most widespread shortages, or Czechia that identified only 12 occupations, but these included nine occupations (75%) which were on the list of most widespread shortages.

It is notable that even countries that identified only a few shortage occupations still included those occupations that other countries were also identifying as shortages.

4.2. National distribution of widespread surpluses

Figure 16 shows that all 24 countries that identified surplus occupations included some of the most widespread occupations. This includes those countries such as Norway, Cyprus, Estonia, Czechia, and the Netherlands that identified very few surplus occupations. Despite the fact that these countries identified so few surplus occupations, most of the occupations they identified were widespread surpluses. [15]

Figure 16 - Share of the most widespread surpluses by reporting country, 2022



Source: Analysis of data submitted by EURES National Coordination Offices

15 The exception is Estonia where one in three occupations were widespread surpluses.

The 37 occupations which are on the list of the most widespread surpluses are less than 10% of the number of 4-digit ISCO '08 occupations the countries could choose from. The finding is consistent with the results of a similar analysis of shortage occupations (Figure 15) and confirms that there is a high degree of convergence between the NCOs in 24 European countries on what is considered to be a surplus occupation.

The fact that many countries identified a rather low number of surplus occupations places a limit on the extent to which occupations which have been identified as shortages in many European countries may be matched with occupations which were identified as surpluses in other countries (see next section).

4.3. Matching shortages and surpluses across borders

One of the advantages of identifying both labour shortages and labour surpluses is that the data create the potential to match an occupation which was identified as a surplus in one country with the same occupation which was identified as a shortage in another country. Such matches are particularly feasible when the countries in question are located quite close to each other, share the same language or similar culture.

Figure 17 shows the number of potential cross-border matches for the 38 identified most widespread shortage occupations. The highest number of matching surplus occupations are for building labourers and cleaners. These two elementary occupations have been identified as surpluses by seven and six countries respectively, while they have been identified as shortage occupations by 15 and 11 countries respectively. With the exception of these two occupations, the most matches are between three countries, and they are for the occupations of agricultural and industry mechanics not elsewhere classified and bricklayers. For all other occupations, there are between one and two cross-border matches.

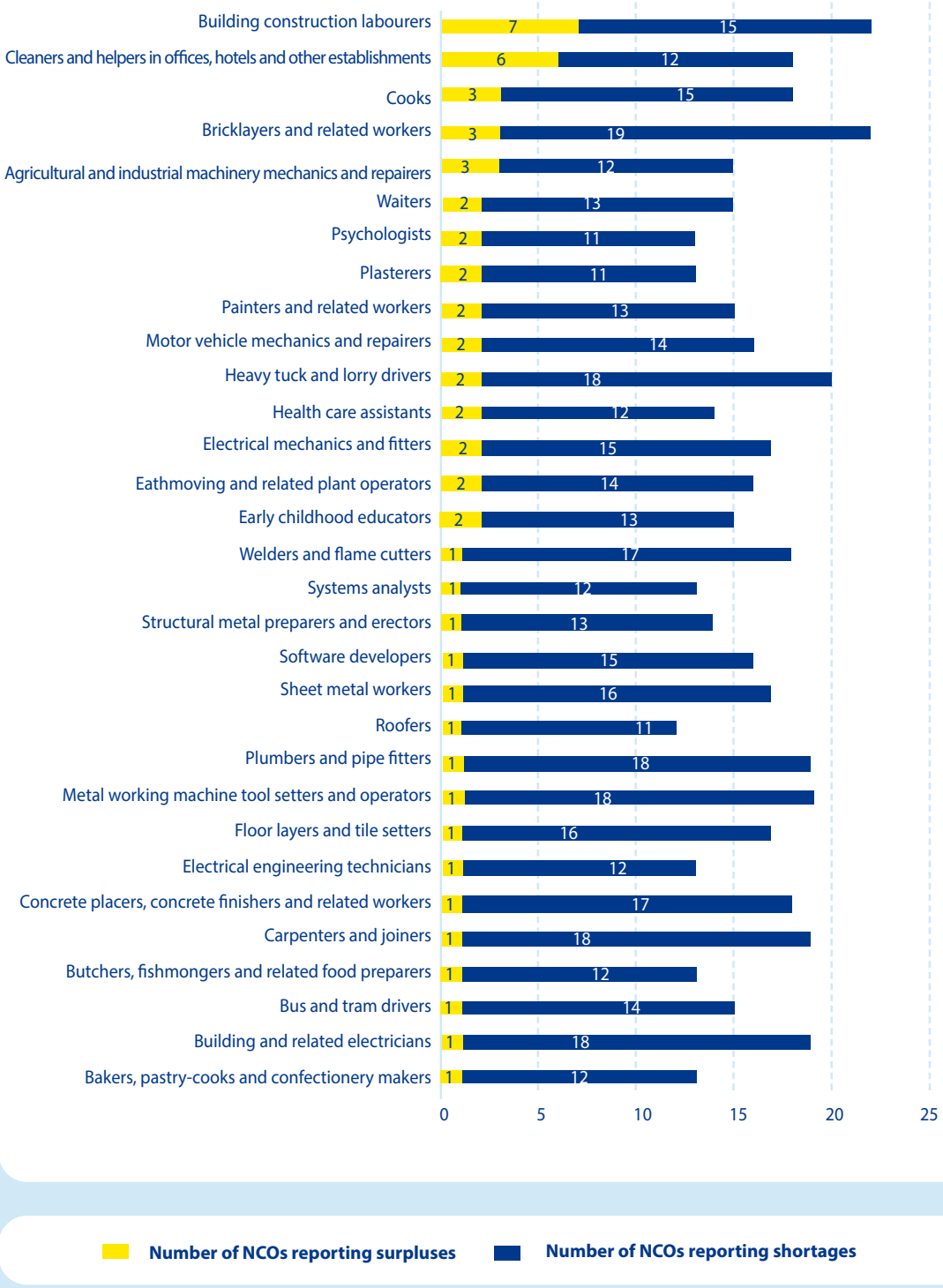
The number of surplus occupations which were also identified as shortage occupations is relatively modest. These cross-border matches however may be useful especially if some of the countries experiencing shortages and surpluses in similar occupations are physically adjacent to each other. Examples include Norway and Germany being short of electrical and mechanical fitters and Denmark and Sweden having a surplus; Italy and Switzerland having a shortage of healthcare assistants and Austria having a surplus of them; Bulgaria having a shortage of bus and tram drivers and Greece having a surplus; Norway having a shortage of systems analysts and Denmark having a surplus; and Slovakia having a shortage of bakers and pastry cooks etc. and Hungary having a surplus of them.

These results only refer to the 38 most widespread shortage occupations. There are in fact almost 300 shortage occupations which have matching potential, and some of these matching possibilities could be very useful to EURES and other stakeholders. Annex 4 includes the full list of cross-border matches.

The occupation of advertising and marketing professionals is a good example of how useful this information can be. This occupation does not appear on the list of widespread shortages because it is classified as a shortage in only six countries. However, in six entirely different countries it is classified as a surplus. Similarly, forklift drivers are classified as a shortage in Czechia, Croatia, Italy, Netherlands, Poland, Romania, and Slovakia, but as a surplus occupation in Belgium, Denmark, Hungary, and Luxembourg.

Each of the 29 countries covered by this study has its own unique characteristics which impact on the balance between labour demand and supply. Fertility rates for example differ between countries and this has implications for the levels of demand for some specific occupations such as primary teachers. The analysis in this report found that this occupation is classified as a shortage in 10 different countries, but is it also classified as a surplus in three other countries, specifically Austria, Cyprus, and Romania.

Figure 17 – Cross-border match between most widespread shortages and surpluses, 2022



Source: Analysis of data submitted by EURES National Coordination Offices

4.4. Regional labour market imbalances and labour market flows

As part of the data collection process, the NCOs in the 29 countries were asked in a separate qualitative survey whether there were significant regional differences regarding labour market imbalances, and whether there was any evidence of cross-border mobility impacting labour shortages or surpluses in their regions.

Not all of the NCOs were in a position to provide information on their regional labour market. The NCOs from many of the smaller countries (e.g., Cyprus, Malta, Estonia, Slovenia, Luxembourg etc) reported that their country was too small to accommodate meaningful regional differences in terms of labour demand and supply.

However, the NCO from most of the other countries provided detailed qualitative data on the impact of their regions both on labour balances and on cross-border movements of labour. The following paragraphs provide an overview of the information collected, although it should be mentioned that this is not meant to be exhaustive but rather provide illustrative examples.

In general, the pattern of employment and unemployment reported by the NCOs in their regions reflected the pattern found by Eurostat in their recent study of employment and unemployment in NUTs 2 regions.[16] Specifically, in many Eastern European countries and some countries in the west of Europe, the employment rate was highest in the vicinity of the region where the capital was located. Thus, very high employment rates were recorded in 2021 in Noord-Brabant (84.1%) and Utrecht (84.4%) in the Netherlands; in Mellersta Norrland (84%) and Stockholm (83.8%) in Sweden, in Warszawski Stoleczny in Poland (83.7%); in Sostines regions in Lithuania (83.6%), in Bratislavsky Krai in Slovakia (83.4%) and in Unterfranken, Chemnitz and Niederbayern in Germany (83.4%).

In contrast, rural and peripheral areas were characterised by low investment, low employment and few higher education facilities and high unemployment rates. Some of the regions most adversely affected include much of Greece, many rural regions in Spain, southern Italy and peripheral regions in France. In some regions such as Sicily, Campania and Calabria in southern Italy and Mayotte and Guyana in France less than half the population of working age are in employment.

The response from the NCOs shows that these patterns of employment and unemployment have a significant impact on labour market imbalances. There are a number of factors that are contributing to the emergence of shortages and surpluses at regional level. In some cases, significant employment had been associated with industries which are no longer viable – for example coal mining in Wallonia in Belgium. But a culture of staying in the local area is also a major factor. The NCO in Slovakia for example, cites the 'regional factor' as the major contributor to labour market imbalances and notes that the further east one travels away from the capital Bratislava, the lower the level of investment in business or education and the higher the unemployment rate.

Low investment in many peripheral and rural areas also gives rise to cross-border movements of skills. While these movements are not extensive in Slovakia, there is emigration of some occupations – some of which are already in short supply in the country. This is particularly true of health professionals who are migrating to Austria or Czechia seeking higher salaries and better working conditions.

The emigration of health professions is also a major challenge in Hungary. It is also motivated by the availability of significantly higher salaries in Germany, the UK, Austria and Sweden and the NCO reports that it is seriously affecting the supply of doctors, nurses, and midwifery professionals to the domestic market.

In Poland in 2022 the largest number of shortages were occurring in the north-western regions such as Lubuskie, Pomorskie, Dolnośląskie and Wielkopolskie. These shortages were extensive and include health professionals, construction trades, hospitality, teaching and financial professions. There were no surplus occupations identified in these regions.

There were also shortages identified in 2022 in the southern regions of Poland including Opolskie, Małopolskie, Świętokrzyskie and Śląskie and northern regions such as Kujawsko–Pomorskie, and Zachodniopomorskie. The type of occupations are broadly similar (e.g., construction, health, hospitality etc.), although there is also a specific shortage of IT professionals in certain regions.

16 https://ec.europa.eu/eurostat/databrowser/view/tgs00010/default/table?lang=en

In contrast, a smaller number of shortage occupations are occurring in the regions located in the eastern part of the country such as Podkarpackie, Warmińsko-Mazurskie, Lubelskie, and Podlaskie. The occupations which are in demand are in some respects different from the more prosperous areas and include drivers of buses, trucks and tractors, electrical mechanics and assemblers, and welders and accountants.

The NCO reports that a culture of staying in the local area is a major factor in the emergence of labour market imbalances in Bulgaria. The shortages are located mainly in regions which are characterised by a high concentration of manufacturing industries. These regions include the capital Sofia, Plovdiv and Stara Zagora. The occupations which are most in demand are professionals with technical skills, but these are not available in sufficient numbers in the relevant regions and there is little regional mobility. Indeed, the NCO in Bulgaria reported that in the Yambol region, there is a surplus of welders, mechanical engineering technicians and agricultural machinery mechanics. At the same time, in the neighbouring region of Haskovo, there is a shortage of these metalworking skills.

The striking aspect about Romania's labour market is that half of the top 10 vacancies in 2022 are of elementary occupations such as kitchen helpers, various labourers, and hand packers. Furthermore, the highest share of vacancies in elementary professions is not in the Bucharest or central regions but in the less developed south-east and south Muntenia regions.

A surplus of workers in elementary occupations in less developed regions is also evident in many other east European countries, for example Lithuania. In the summer of 2022, the share of unskilled workers among the registered unemployed in the regions of the largest cities of Vilnius, Kaunas, and Klaipeda was 29.3%, 34.7% and 30.2% respectively. To place these figures in perspective, in six of the seven other regions, more than half of all registered job-seekers were unskilled.

In Kaunas and Klaipeda, the difference between the demand for unskilled workers – as indicated by notified vacancies and the supply of registered jobseekers – is around 15%. The situation is becoming more balanced in the Vilnius region, but in the rest of the country, there were twice as many unskilled jobseekers as there were notified vacancies for those jobs.

The underdeveloped regions are also less attractive to many professionals in Lithuania – in particular doctors and other healthcare professionals who have a preference for working in the major cities.

A shortage of skilled construction workers is also evident throughout Lithuania. Emigration to other European countries is a major contributory factor in the shortage of skilled building workers. The shortage has given rise to a policy of attracting skilled workers from other EU countries and to a greater extent from third countries. Ukrainians – especially after the outbreak of war with Russia – have the highest share of employment from third countries, but Belarusians, Russians, Kyrgyz, and Uzbeks also have a significant presence among the employed.

The phenomenon of a significant surplus of unskilled workers residing outside of the major cities reflects the fact that in Eastern Europe in particular, there are many regions which are underdeveloped in terms of enterprise development and education facilities. This is a major source of labour market imbalances in the less developed regions, as investment is not attracted to these regions because of a lack of suitable high-level skills among the labour force. In turn, skills upgrading is difficult to achieve in an environment of more limited provision of services of public interest, including education and training providers.

The situation is somewhat different in Western Europe. Firstly, there is a greater geographical distribution of very large cities within the countries, and consequently, the difference between regions in terms of investment and the skills profile of the workers is not so pronounced.

Nevertheless, there are distinct differences between labour markets in some countries, particularly in Scandinavia and in Italy. However, it is clear from the reports of the NCOs in these countries that these regional differences are between the northern and southern regions rather than between the east and west regions.

The reports from the NCOs of Norway, Sweden and Finland illustrate this difference. In Norway, the PES 2022 spring survey showed that the two northern regions Nordland and Troms and Finnmark and the regions of More and Romsdai were experiencing the highest levels of shortages. It is suspected that the high number of young people who leave the north of the country to work in the cities in the south is a significant contributary factor to the growth of shortages in these regions.

Similarly, in Sweden, shortages which occur at the national level, such as shortages of carpenters, chefs, mechanical engineers, IT specialists and health professionals, are more severe in the less populated areas in the north of the country.

There are many different reasons for these shortages. There is a thriving green industry in the north, and this has resulted in a significant requirement for mechanical engineers. Like many countries, Sweden has experienced a shortage of chefs after the hospitality industry reopened following the lifting of COVID-19 related restrictions. But while the shortage of chefs is a national problem, the shortage is more severe in the less populated regions of the north.

Labour market imbalances in Sweden are also impacted by both emigration from Sweden and immigration to Sweden. The shortage of IT specialised is being addressed by attracting talents from third countries – especially India – while the shortages in the construction sector are being alleviated by the immigrants from Eastern Europe.

There is also emigration from Sweden to Norway and Denmark of people who live in the regions which border these countries. In the case of shop sales assistants – which is a surplus occupation in Sweden - the movement of skills does not have an adverse impact on the local economy. However, the NCO also reports that there is also considerable emigration of health and transport occupations and many of these are shortage occupations in Sweden.

Healthcare is the sector which has the most severe shortages, and these shortages exist throughout the country. In the most northerly region, Lapland, the shortage of construction workers and lorry drivers is more acute than in other regions, while the Kainuu area of the north is experiencing many shortages including hairdressers, butchers, construction workers, bakers and schoolteachers.

In the Pirkanmaa-Tempere region, the NCO has reported shortages of lorry drivers, waiters and air-hostesses, while in the capital region there are shortages of restaurant workers.

Regarding cross-border movements, the NCO noted the similarity between the labour markets in the northern regions of Finland, Sweden and Norway. The shortages are common in all three northern regions and include healthcare, metal industry, construction, transportation, mining, hospitality, and tourism. A number of large investments in the regions in recent years may accentuate these shortages. There is some movement of workers between the regions but it is modest and involves movements into Finland rather than emigration from Finland.

In Italy, according to the annual Borsino Excelsior survey[17], the skills which are most difficult to recruit include healthcare, telematics and software engineering. At the craft level, specific occupations which are in short supply are welders and smelters, metal processing and mineral products machinery workers, building finishing trades, and electrical and electronic equipment installation and maintenance workers.

In July 2022, the regions with the highest level of shortages were Trentino Alto Adige (51.3% of companies); Valle d'Aosta (50.7%), Umbria (47.4%), Friuli Venezia Giulia and Veneto (46.5%).

The Italian PES are involved with their Slovenian counterparts in the exchange of information on shortage occupations in their respective regions. While some of the shortages – most notably in health, construction, and manufacturing – are common to both jurisdictions, it is hoped that the project will succeed in matching some occupations which are surplus in the relevant areas of Slovenia with occupations which are in shortage in the relevant regions of Italy (more information on the Italian-Slovenian cross-border partnership can be found Box 1 below).

17 https://excelsior.unioncamere.net/

Box 1 – Italian-Slovenian cross-border region – Euradria Cross-border Partnership[18]

Euradria is the EURES Cross-border Partnership (CBP) that supports mobility in the cross-border area between Italy and Slovenia. The CBP supports jobseekers and workers who wish to commute across the border by assisting them overcome some of the obstacles faced when travelling across borders to work. Euradria estimates that there are between 10,000 and 12,000 cross-border workers.[19] In recent years there has been a rebalancing of flows between the two countries as more people living in Italy are taking work in Slovenia. Although no study has yet been undertaken to explain this phenomenon, one possible reason is the relocation of Italian companies across the border. Importantly, as only 20 km separates Italy from Croatia, the region also receives numerous workers from Croatia. It is therefore possible that shortly the Euradria Partnership will be extended to include Croatia.

To assist workers Euradria has created a network of 'InfoDesks' located along the Italian-Slovenian border to provide information and support to jobseekers and workers on practical issues such as tax returns and contributions, healthcare coverage, sick leave, maternity leave, etc. The desks access started to grow since the pandemic started, giving concrete support to those high-needed frontier workers in emergency/needed sectors (e.g. health, personal/domestic assistance, transport) and to employers in search of information. The number of contacts made by InfoDesks 2021/2022 was around 7,000. Considering the number of daily direct contacts and questions asked, the InfoDesks became an important source of information for the partnership that gained relevant data (i.e., with respect to age, gender, employment sector) that allowed to identify the extent of vulnerable groups among the frontier workers. They are also engaged to identify and appropriately report the administrative obstacles to free movement, as some national regulations show some deficiencies at bordering level, as those related for example to residency and/or double taxation that increase the burdens on cross-border workers. The number of InfoDesks will be increased to 12 by March 2023. Additionally, since 2019, discussions have been initiated between partners and institutions involved in cross-border movements to further structure and align the procedures for frontier workers (in terms of, for example, social security, taxation, etc.). Euradria is also investigating the specific skill sets held by frontier workers.

Labour market imbalances identified in the cross-border region do not necessarily mirror the wider national situation given the specific needs (not only for language skills, but also for specific habits/needs). Since 2020, Euradria maps the set of skills and competencies needed in specific professions within sectors already well-established between the bordering countries. The action involved employers in defining specific cross-border datasheets for the selected occupations.

Source: Focus group and position paper sent from Euradria CBP

18 https://euradria.eu/?lang=en
19 Total employment in the Euradria region in 2020 was 675,300 (Eurostat data: NAMA_10R_3EMPERS).

In France, regional labour market imbalances tend to reflect the type of economic activity in the area and its proximity to the borders of other countries. For example, there are shortages of information technology engineering in the Ile de France region because of the concentration of ICT firms in that region, while the food processing industry reports many shortages in the Bretagne region. Regions such as Grand-Est, Bourgogne-Franche-Comté and Auvergne-Rhône-Alpes experience significant outward migration to countries such as Switzerland, Luxembourg or Germany due to a significant disparity in salaries and this is having an impact on the health and software sectors. There is also some outward movement of labour to countries bordering France from the Hauts-de-France, Provence-Alpes-Côte d'Azur and Occitaine regions.

There is also considerable cross-border movements of skills from Czechia to Germany and Austria, and this movement is having a detrimental impact on the availability of skills in the domestic labour market – especially nurses and medical technicians. The rates of pay and the working conditions are considered to be better in Germany or Austria than they are in Czechia.

Regarding labour market imbalances in general, the situation in Czechia is that the most developed regions such as the capital Prague and the Central Bohemian region has the highest employment rate and the most vacancies. In contrast, a less developed region such as the north has the highest unemployment rate.

The NCO in Czechia reported that two recent developments in particular had a significant impact on labour market imbalances. Firstly, the pandemic triggered a strong demand for IT specialists and secondly, Russia's invasion of Ukraine deprived the economy of many skilled construction workers.

In Germany, there are extensive shortages throughout the country. The greatest shortages are of those with relevant technical vocational qualifications. Shortages of skilled construction workers are widespread, as are shortages in the health and caring professions.

There are however differences between regions. In the technology-intensive regions such as in Baden-Württemberg, Bavaria and North Rhine-Westphalia, there are significant shortages of technical specialists who have a qualification from a technical college or a relevant degree from a university. There are also significant shortages of technically qualified workers evident in Saxony.

There are very few surplus occupations in Germany. Those that are reported by the NCO include persons qualified in the textile industry and those with qualifications in philology and the humanities. Germany has tried to address its skill shortages through a targeted policy of attracting persons from other countries. However, that policy was placed on hold during the pandemic and the legacy of that loss of a stream of technically qualified workers is having an adverse impact on productivity in German manufacturing industry.

In many cases, the cross-border workers are daily commuters who return home every evening. The largest numbers of such cross-border commuters are in technical occupations in machine-building and the automotive industry; drivers and operators of vehicles and transport equipment and logistics, and occupations in metal-making and in metal construction. These cross-border commuters account for almost 9% of employment in some regions.

Finally, a reluctance to leave the region of their birth also contributes to regional labour market imbalances. For example, there are surpluses of lorry drivers and waiters in the Pirkanmaa-Tampere region of Finland, but there is a reluctance on the part of the unemployed with these skills to seek employment in other regions.

A lack of willingness to travel to other regions or countries in search of employment is quite common in the more traditional areas of Scandinavia and Eastern Europe and it is a significant factor contributing to labour market imbalances in Europe.

4.5. Chapter summary

There is a high degree of convergence between the 29 countries that participated in the current study regarding their reporting of both shortage and surplus occupations. This is the case even for countries that identified relatively few shortage and surplus occupations, and it means that the same occupations are being identified by many countries. It may be concluded therefore that the most widespread shortages identified in this report are ubiquitous throughout the European labour market.

The relatively low number of surplus occupations which were reported places a limit on the extent to which a shortage in one occupation in one country could be matched by a surplus in the same occupation in another country. Nevertheless, the report provides many examples of countries which are adjacent physically to one another and who could match a shortage in one occupation with a surplus in the adjacent country in the same occupation.

Cross-border potential matches exist to a greater or lesser extent for almost 300 different occupations. Information on these potential matches could be useful to EURES and other relevant stakeholders.

There are significant labour market imbalances between regions in many of the countries that participated in this study. In general, regions which contain the capital city or are adjacent to the region which contains the capital city have fewer labour market imbalances than in the less developed regions. In Eastern Europe, the latter tend to be located in the eastern regions, while in Scandinavia, they tend to be located in the northern regions. In Italy in contrast, the northern regions are much more developed than the south.

There are significant cross-border movements of labour. In general, these movements occur between regions which are physically adjacent to each other and where the levels of remuneration and the working conditions are superior in one region.

However, they can also occur between regions which are very far apart geographically, for example immigration to Sweden or Ireland of workers from Poland and Lithuania.

The cross-border movements of workers give rise to significant labour market imbalances when the skills of the workers are required in the region they migrate from. There is some evidence from the reports of the NCOs that these cross-border movements are contributing to the emergence of shortages in healthcare and construction in particular.

A reluctance to move within the same country to regions which have more employment possibilities was cited by many NCOs as a barrier to match shortages with surpluses.

5. RELATIONSHIP BETWEEN LABOUR MARKET IMBALANCES AND VULNERABLE GROUPS

5.1. Number of workers employed in shortage and surplus occupations

There were 40.53 million workers employed in the 38 most widespread shortage occupations, and 43.3 million in the 37 most widespread surplus occupations in 2021. However, when adjustments are made for the fact that both cleaners and building labourers appear on both lists, the totals are 38.82 and 39.88 million.

The total number of workers from the 75 shortage and surplus occupations is 78.71 million. The total number of persons employed in all occupations in the EU27 was 195.247 million. Thus, 40% of the workers employed in the countries surveyed in the report are working either in a classified shortage occupation or in a classified surplus occupation which represent only 17% of the 436 occupations in the 4-digit ISCO '08 classification system.

The explanation lies in the nature of the occupations. Specifically, both the list of most widespread shortage and surplus occupations includes most of the occupations which contain the highest levels of employment. For example, there were almost 8 million sales assistants employed in 2021, and over 5 million general office clerks, over 4 million cleaners of hotels and offices and more than 3 million secretaries and heavy truck and lorry drivers.

There were over 2 million working as healthcare assistants, stock clerks, or car, van, and taxi drivers, while numerous other occupations on both lists had over 1 million employed in each of them.

It is clearly less desirable to be working in an occupation which is classified as being in excess of market demand rather than working in an occupation which is classified as being in strong demand. Consequently, it is important to identify the characteristics of those who are employed in these vulnerable occupations.

In the qualitative survey, the NCOs were asked about the impact of labour market imbalances on vulnerable groups. There was considerable variation in their responses.

Firstly, many NCOs pointed to record low unemployment rates in their country as an indication that surplus occupations were very few indeed. Among the countries included in this category were Germany, Malta, Slovakia, Estonia, the Netherlands, and Norway. There are some surpluses, but they are not extensive and tend to be located in a particular region or sector. For example, in Slovakia, there are surpluses in the hospitality sector which are a legacy of the pandemic. Similarly in Germany there are some surplus occupations associated with textile design and with qualifications in the humanities. In these responses, there was a sense that the labour market was so buoyant that most jobseekers could find employment.

In a second group of countries, the predominant theme was the vulnerability created by students not learning the type of skills and knowledge which employers in the local labour market required. Among these countries are Cyprus, Poland, Finland, Sweden and Croatia. One of the most significant factors resulting in regional labour market imbalances in these countries according to the responses is the fact that students pursue traditional academic disciplines in the humanities while most employers in their local labour market require young jobseekers qualified in technical disciplines from a technical college or university.

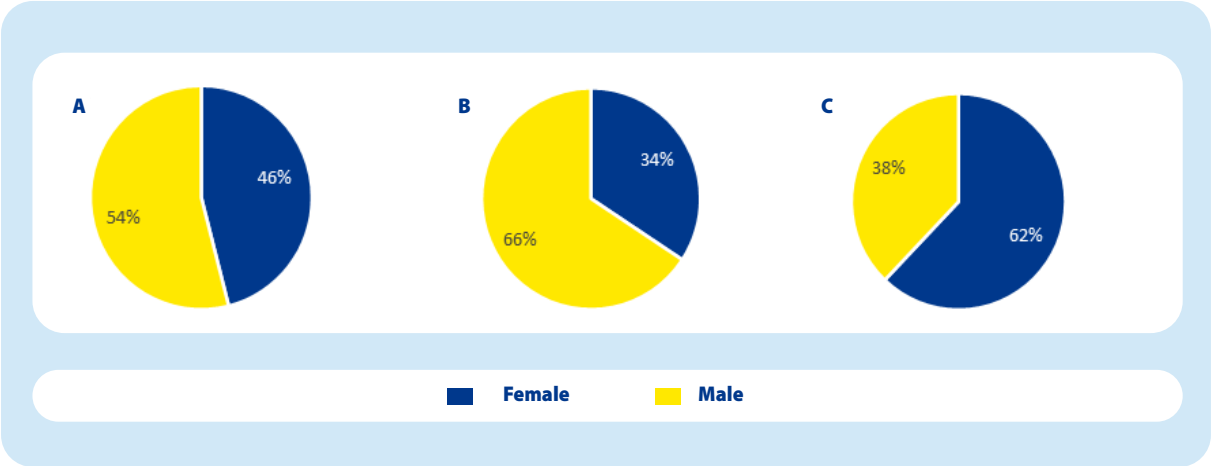
The third category are those who have personal characteristics which make them vulnerable to unemployment. For example, while the south of Italy is not very well developed in terms of industry and this has created above average levels of unemployment, the consequence for female workers is particularly severe. In regions such as Sicily, Campania and Apulia, less than half the female population of working age are in employment.

Another group who are very vulnerable to unemployment in certain countries and regions in Europe are older workers (i.e. 55+). A striking example is provided by Lithuania where the workforce is ageing at a far faster rate than in other European countries and this is creating significant unemployment among this group. This phenomenon is also observed in many less developed regions in Eastern Europe such as the Yambol region in Bulgaria. The ageing of the workforce is accentuated where there is a relatively high degree of outward migration of young people.

5.2. Labour market imbalances and gender

The pie charts displayed in Figure 18 show the distribution of females in the EU27 compared to their distribution in the most widespread shortage and surplus occupations. It is apparent from the charts that whereas females represent almost half of those employed in the EU, their representation among the most widespread shortage occupations is significantly lower, while their representation among the most widespread surplus occupations is significantly higher – making many female workers vulnerable to periods of unemployment.

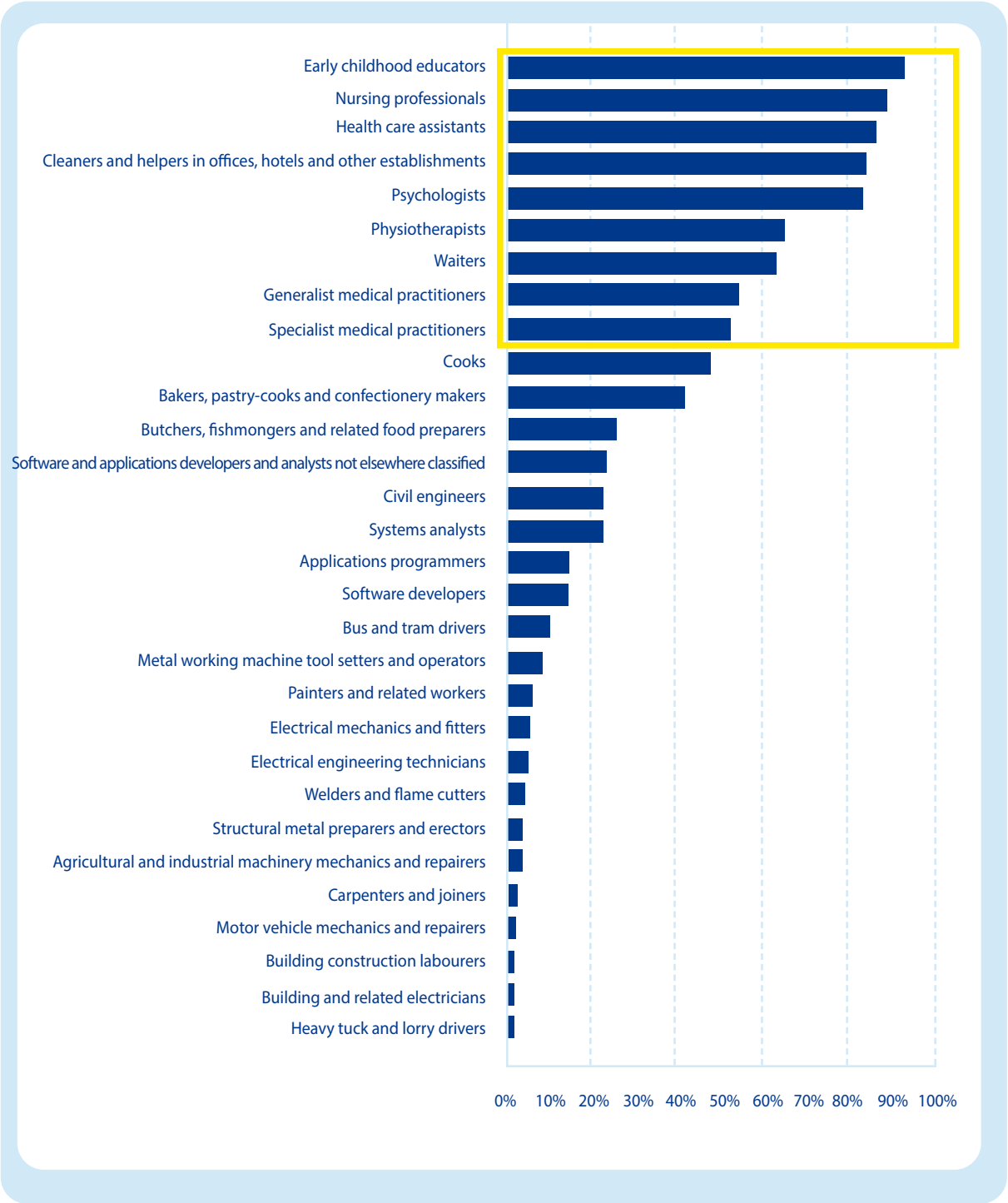
Figure 18 - Share of females in all occupations (A), in most widespread shortages (B) and surplus occupations (C) of the EU27, 2021



Source: European Labour Force Survey special data extracts

To understand why the gender distribution is so unfavourable to female workers, it is necessary to profile the gender composition of the occupations on each list of widespread shortages and surpluses.

Figure 19 - Share of females in the most widespread shortage occupations, 2021



Note: In yellow, occupations with at least 50% of employed women.

Note 2: Occupations employing 0% of women (i.e. bricklayers and related workers, concrete placers, concrete finishers and related workers, earthmoving and related plant operators, floor layers and tile setters, plasterers, plumbers and pipe fitters, roofers) are excluded from the list.

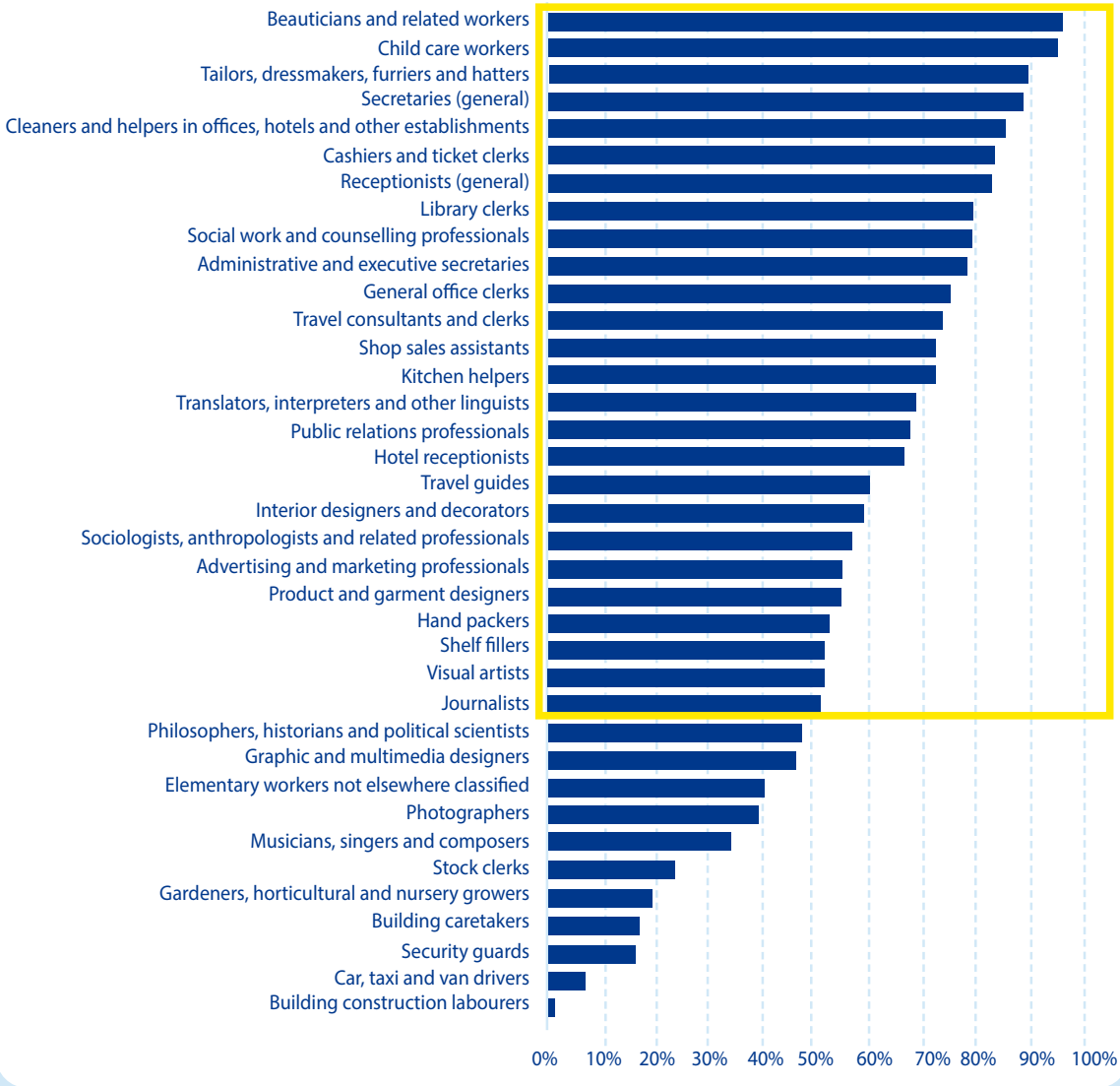
Source: European Labour Force Survey special data extracts

Women represent more than half of the workers employed in the top nine shortage occupations. However, two out of three of these occupations are in the healthcare sector and include general practitioners, specialist doctors, professional nurses, psychologists, psychiatrists, and healthcare assistants. Of the other three occupations, one is in education, and the others are cleaners and waiters.

Female workers are poorly represented in the software related occupations and in civil engineering, and their representation among the craft occupations is very low, too. The latter include 18 different occupations, and they are by far the largest single group of occupations on the list. The low representation of female workers among this group results in the fact that their overall representation in the occupations which have been identified by the highest number of countries as shortages is very poor.

To accentuate the difficulties which female workers encounter on the European labour market, their representation in those occupations which are on the list of the most widespread surpluses is, in contrast, very high.

Figure 20 - Share of females in the most widespread surplus occupations, 2021



Note: In yellow, occupations with at least 50% of employed women.

Source: European Labour Force Survey special data extracts

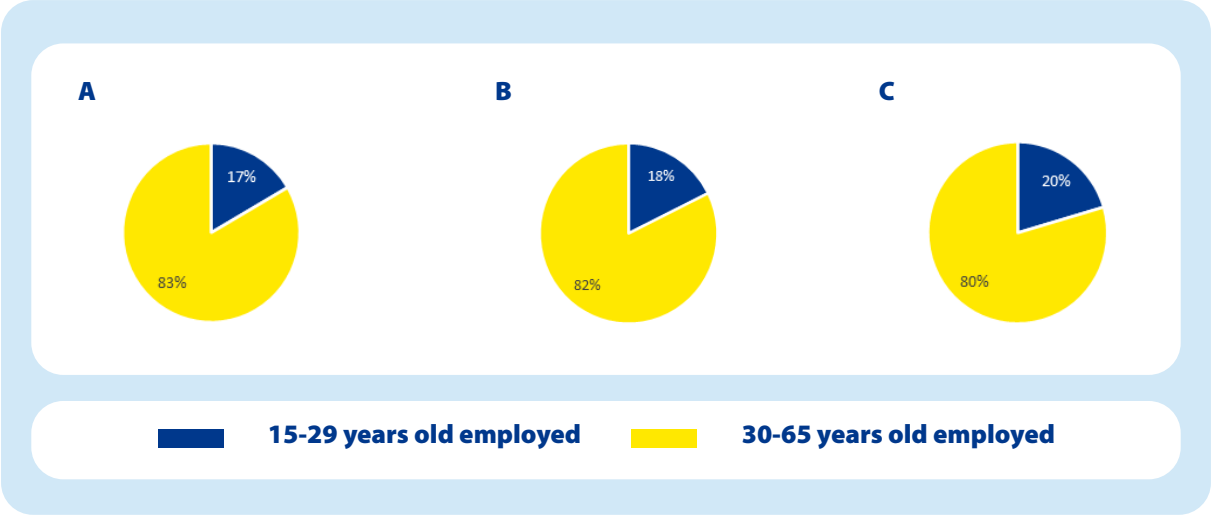
In the case of the most widespread surpluses, female workers represent over half of the workforce in the case of 26 of the 37 occupations. Furthermore, their representation is over 70% in 14 of the occupations, and crucially these occupations include some of the occupations with the highest employment in 2021 such as secretaries, cleaners, general office clerks, and shop sales assistants.

The other striking aspect of the graph is that the relatively high female representation features in almost all occupations which require a third-level qualification. Thus, almost 80% of those working in social work and counselling are female, as are 70% of those employed as public relations professionals and translators, interpreters, and other linguists. Almost 60% of interior designers and sociologists and anthropologists are also female.

5.3. Labour market imbalances and youth

There were 32.393 million workers employed in the EU27 in 2021 who were under 30 years of age. They represented approximately 17% of the total workforce.

Figure 21 - Comparison of share of employed youth aged under 30 and employed older people aged 30 to 65 overall (A), in most widespread shortages (B) and in most widespread surpluses (C) in EU27, 2021



Source: European Labour Force Survey special data extracts

There were 6.849 million workers under 30 years of age employed in the most widespread shortage occupations from a total employment in these occupations of 38.824 million workers. This is equivalent to a share of 18% - essentially the same as the overall share of workers under 30 years of age employed in all occupations in 2021.

However, there were 8.152 million under 30 years of age employed in the most widespread surplus occupations from a total employment of 39.880 million employed in these occupations. That is equivalent to 20%, and therefore higher than the overall share of workers under 30 years of age in the total workforce.

Table 7 - Share of workers under 30 years employed in widespread shortages in 2021

Occupation	Percentage employed under 30 years of age	Occupation	Percentage employed under 30 years of age
Waiters	44%	Systems analysts	16%
Building construction labourers	27%	Butchers, fishmongers and related food preparers	16%
Applications programmers	25%	Electrical engineering technicians	16%
Roofers	24%	Health care assistants	16%
Software developers	24%	Welders and flame cutters	16%
Motor vehicle mechanics and repairers	24%	Painters and related workers	16%
Physiotherapists	24%	Civil engineers	15%
Agricultural and industrial machinery mechanics and repairers	23%	Bricklayers and related workers	14%
Bakers, pastry-cooks and confectionery makers	22%	Nursing professionals	14%
Building and related electricians	21%	Earthmoving and related plant operators	14%
Metal working machine tool setters and operators	20%	Generalist medical practitioners	14%
Plumbers and pipe fitters	20%	Plasterers	14%
Cooks	20%	Floor layers and tile setters	14%
Early childhood educators	19%	Psychologists	12%
Carpenters and joiners	19%	Concrete placers, concrete finishers and related workers	11%
Sheet metal workers	19%	Heavy truck and lorry drivers	9%
Electrical mechanics and fitters	19%	Specialist medical practitioners	9%
Structural metal preparers and erectors	18%	Cleaners and helpers in offices, hotels and other establishments	9%
Software and applications developers and analysts not elsewhere classified	18%	Bus and tram drivers	5%

Source: European Labour Force Survey special data extracts

Table 7 shows the age profile of the shortage occupations. Almost all of the occupations on the left-hand side of the table have a share of workers under 30 years of age which is above the average of 18% for all occupations. The highest share is for waiters (44%), followed by building labourers (27%). These are relatively unskilled occupations, and both occupations contain a relatively high share of migrant workers and workers with poor education attainment. Two software related occupations, application programmers (25%) and software developers (24%), contain the next highest shares, while roofers, motor mechanics and physiotherapists also have shares of 24%.

At the other end of the scale, less than 10% of heavy truck drivers were under 30 years of age in 2021, while the share of young workers in nursing and in many of the building trades is also low. There is a risk that this age profile will accentuate the level of shortages in the European labour market over the next few years.

Table 8 - Share of workers under 30 years of age employed in widespread surpluses in 2021

Occupation	Percentage employed under 30 years of age	Occupation	Percentage employed under 30 years of age
Shelf fillers	52%	Sociologists, anthropologists and related professionals	19%
Cashiers and ticket clerks	37%	Gardeners, horticultural and nursery growers	18%
Hotel receptionists	32%	Interior designers and decorators	18%
Library clerks	28%	Social work and counselling professionals	17%
Shop sales assistants	28%	Photographers	16%
Public relations professionals	27%	Travel consultants and clerks	16%
Building construction labourers	27%	Secretaries (general)	16%
Kitchen helpers	26%	Car, taxi and van drivers	16%
Hand packers	25%	Musicians, singers and composers	15%
Graphic and multimedia designers	25%	Security guards	13%
Receptionists (general)	25%	General office clerks	13%
Beauticians and related workers	24%	Translators, interpreters and other linguists	11%
Child care workers	24%	Administrative and executive secretaries	11%
Advertising and marketing professionals	24%	Visual artists	11%
Travel guides	22%	Cleaners and helpers in offices, hotels and other establishments	9%
Stock clerks	21%	Tailors, dressmakers, furriers and hatters	7%
Journalists	21%	Building caretakers	5%
Product and garment designers	20%	Philosophers, historians and political scientists	0%
Elementary workers not elsewhere classified	19%		

Source: European Labour Force Survey special data extracts

As already noted, the share of young workers employed in many of the occupations which have been identified as surplus to market demand is high compared to their share in all occupations. This is especially true of those occupations in the second column of Table 8. While the occupations of public relations professionals, graphic and multi-media designers, advertising and marketing professionals and journalists require third level qualifications, many of the other occupations are of low skill, and have a high proportion of persons with the lowest qualifications (see Figure 24). Over 40% of shelf fillers, kitchen helpers and hand packers have the lowest possible qualifications (i.e. 0-2 ISCED) and are very vulnerable to unemployment.

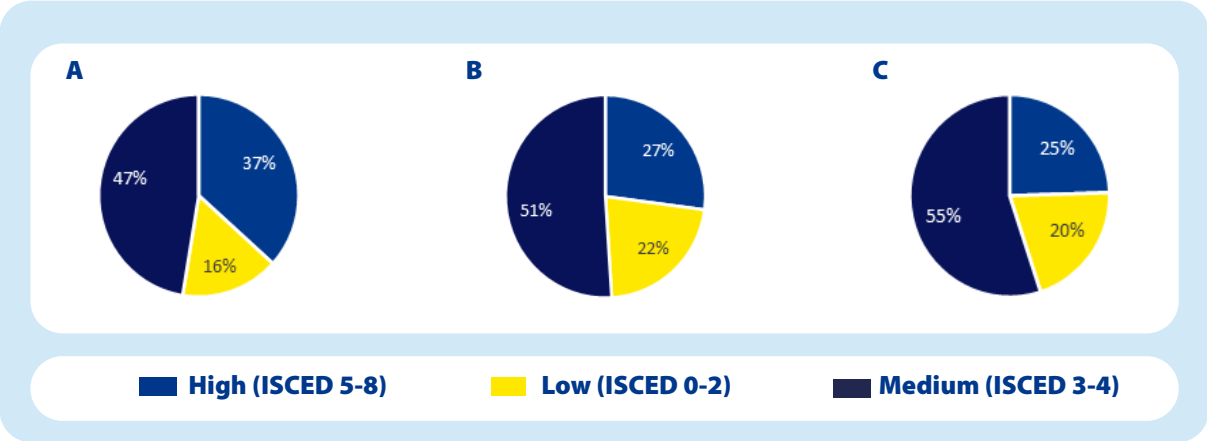
The occupation of shop sales assistants is a case in point. There were approximately 7.7 million employed in the EU27 in 2021; 70% are female, 30% have the lowest possible qualifications, and over 10% were not born in the country in which they are employed, and 28% of them are under 30 years of age.

There are many identified surplus occupations which have similar – and sometimes more disadvantageous – profiles as shop sales assistants. The young workers employed in these occupations require targeted support to enable them to reskill so that they may enter an occupation where the prospects of decent, long-term employment are positive.

5.4. Labour market imbalances and educational attainment

The pie charts in Figure 22 show the educational attainment of those working in the most widespread shortage and surplus occupations in terms of the ISCED codes. The figures reveal that the share of lowly educated workers in the EU27 at 16% is below the share in both the occupations in the list of widespread shortages (22%) and of widespread surpluses (21%).

Figure 22 - Comparison of share of education levels in EU27 (A) and in widespread shortages (B) and surpluses (C), 2021



Source: European Labour Force Survey special data extracts

Furthermore, there is relatively little difference in the share of the lowly educated between those working in widespread shortage occupations and those working in widespread surplus occupations.

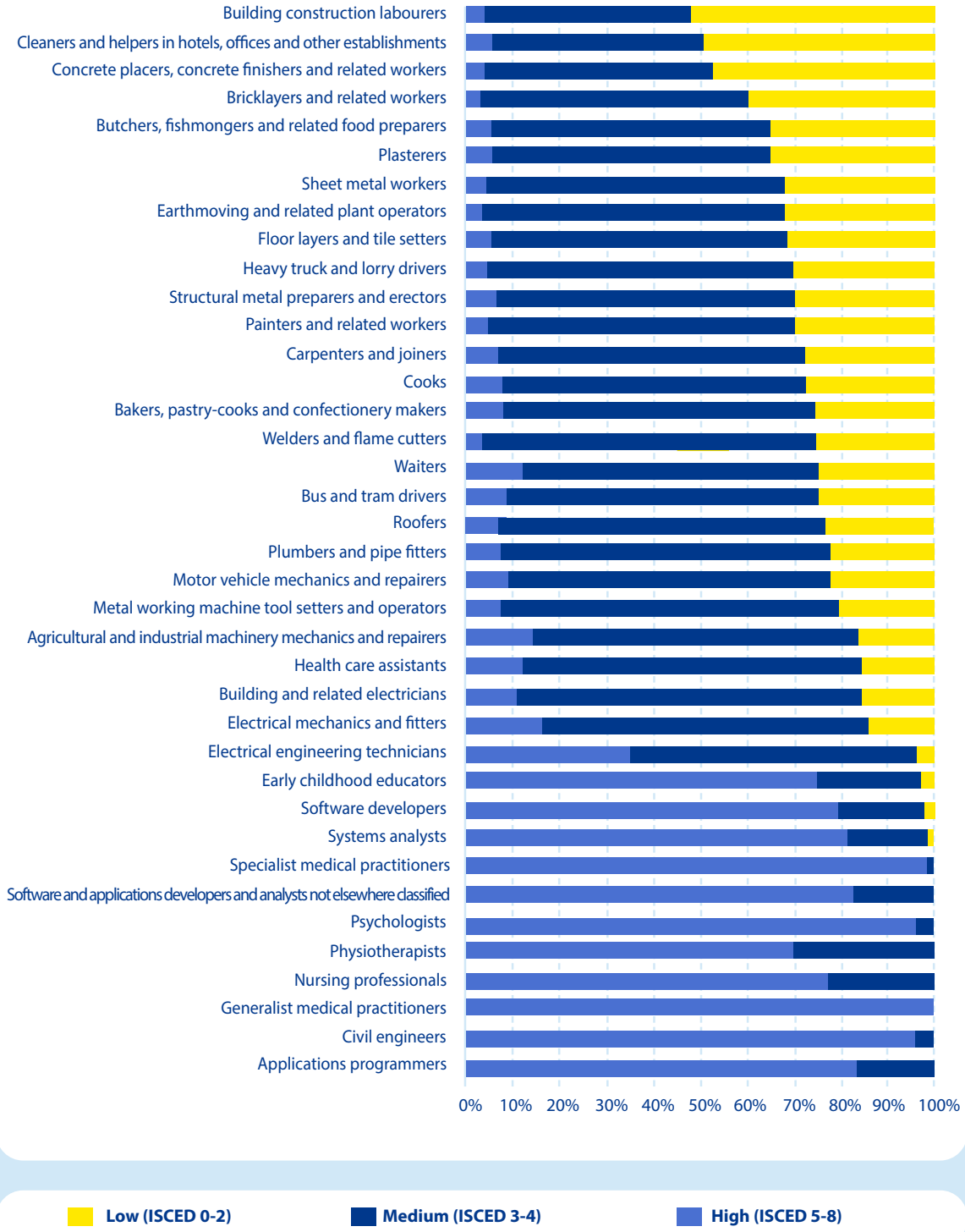
To understand why this is the case, it is necessary to explore the education profile of each of the most widespread shortage and surplus occupations.

The education profile of the most widespread shortage occupations is shown below in Figure 23. It has been pointed out in Chapter 3 that these occupations are dominated by the crafts - especially the building crafts. The graph shows that many of these occupations are associated with a relatively high percentage of workers with the lowest level of education attainment. This is the case for bricklayers and masons, concrete placers and finishers, plasterers, butchers and fishmongers, sheet metal workers, floorers and tilers, and painters , roofers and carpenters and joiners.

Those employed in operative occupations such as heavy truck and lorry drivers and earth moving equipment have also a relatively high number of workers with the lowest qualifications. Not surprisingly, those employed in the elementary occupations have among the highest percentages of workers with the lowest levels of education attainment. This applies in particular to cleaners and building labourers.

There is nobody with the lowest qualifications working in the healthcare professional occupations or in civil engineering or in two of the four software related occupations. There are four occupations with a very low percentage of workers with the lowest qualifications. These include one teacher occupation and two software related occupations and the only associate professional occupation of electrical engineering technician.

Figure 23 - Education profile of shortage occupations, 2021



Source: European Labour Force Survey special data extracts

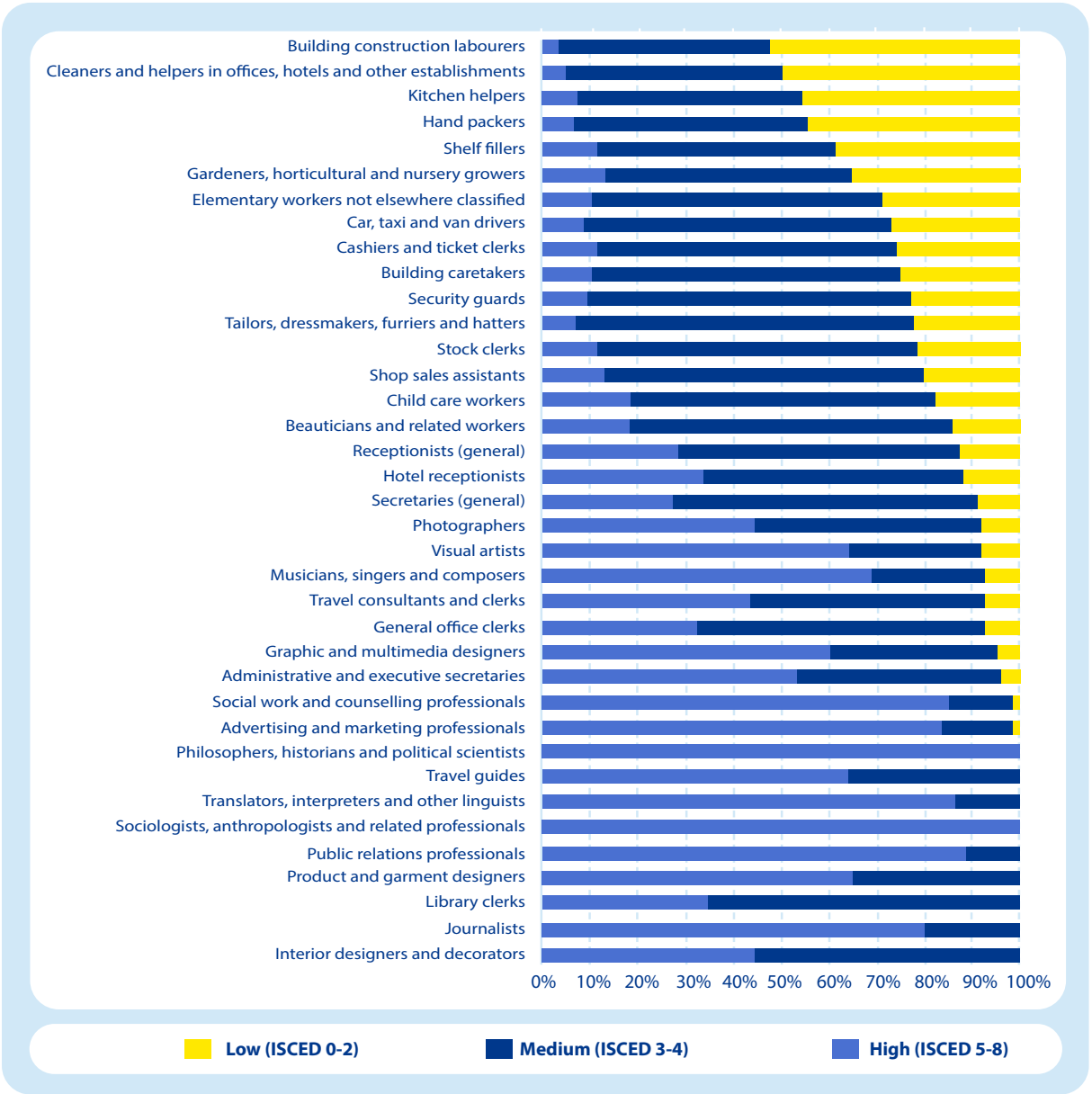
A striking feature of the data is the overall dominance of medium level qualifications among those working in the most widespread shortage occupations. This may be explained at least in part by the number of craft occupations on the list. In most European countries, the completion of an apprenticeship is required to work in these occupations and a national craft qualification is usually considered to be a medium level qualification (i.e. 3-5 ISCED code).

The education profile of the most widespread surplus occupations is shown in Figure 24. It is apparent from the graph that the overall distribution of qualifications is broadly similar to the distribution of the widespread shortage occupations.

The reason for this result is that many of these occupations – particularly those relating to clerical work, sales, and personal services – require a medium level qualification. While this qualification – which is usually associated with the completion of the second level school cycle – differs from a craft qualification, they are both given the status of a medium level qualification under the ISCED code.

In addition, there are almost as many professional occupations on the list of widespread surpluses as there are on the list of widespread shortages. Indeed, workers with third level qualifications are distributed more evenly across the surplus occupations than across the shortage occupations. This finding suggests that there is not always a positive correlation between employability and level of education attainment.

Figure 24 - Education profile of surplus occupations, 2021

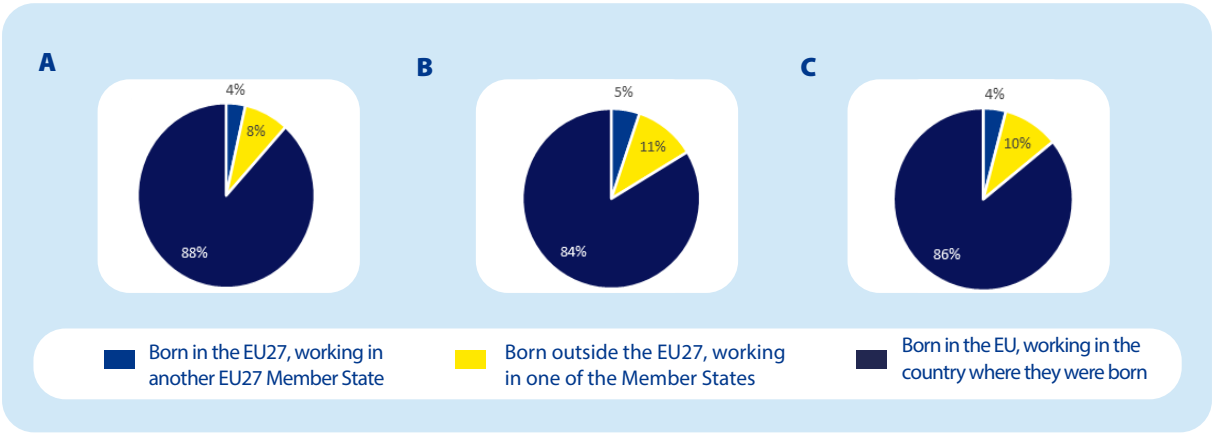


Source: European Labour Force Survey special data extracts

5.5. Labour market imbalances , labour mobility and migration

There were 193.25[20] million persons employed in the EU27 in 2021, of which 170.435 (88%) were born in the country where they were employed; 15.804 million (8%) were born outside the EU and 6.74 million (4%) in another EU Member State.

Figure 25 - Comparison of share of migrants in EU27 (A) and in widespread shortages (B) and surpluses (C), 2021

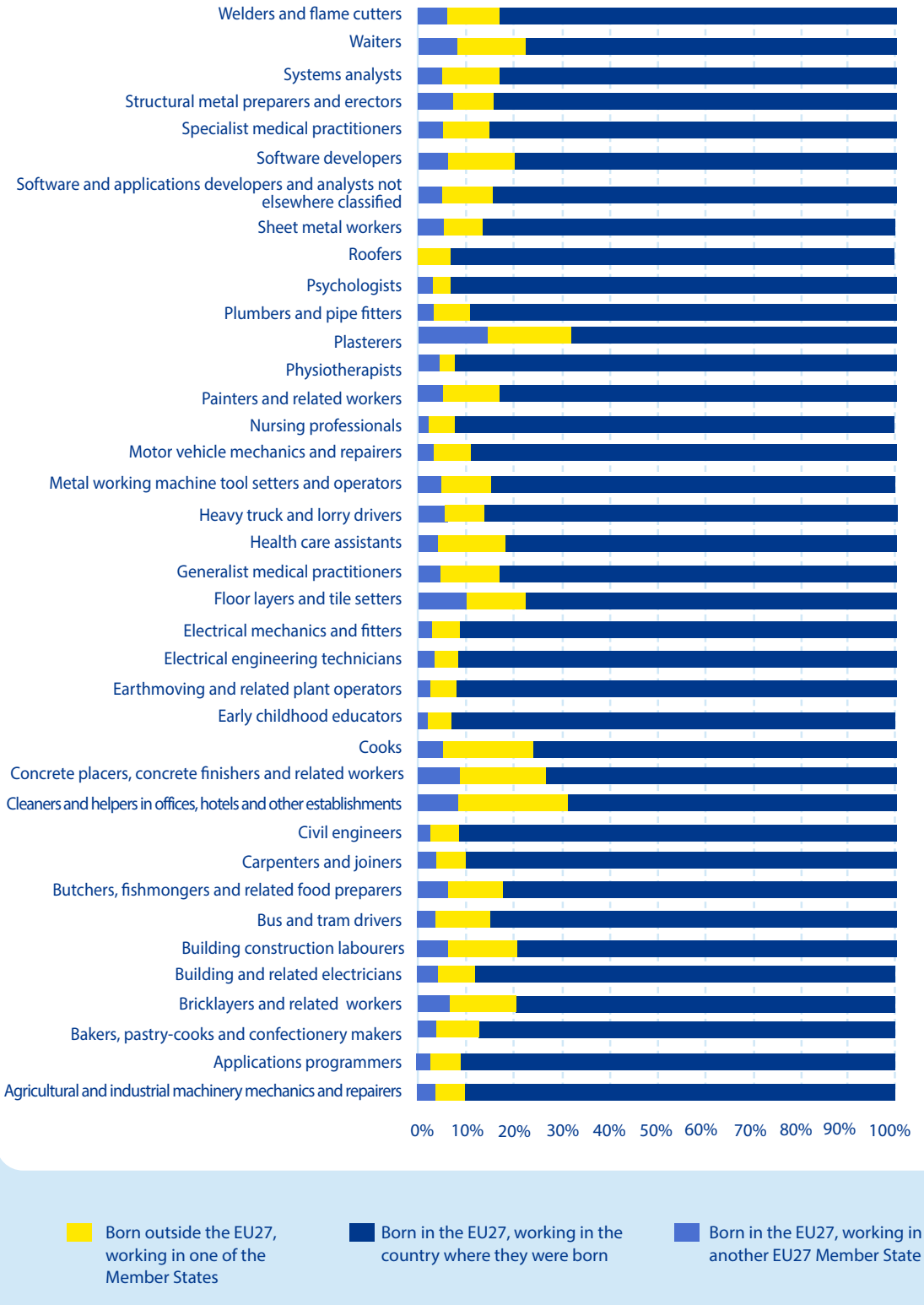


Source: European Labour Force Survey special data extracts

It is apparent from the pie charts that there was a higher percentage of migrants employed in both the widespread shortage occupations and in the widespread surplus occupations than there were in the EU27 in 2021. While the share of migrants employed in all occupations is 12%, the share employed in the widespread shortage occupations is 16%, and the share in the widespread surplus is 14%.

20 This is the number of those whose birthplace is known in 2021, not the total which is 195.25.

Figure 26 - Share of migrants in widespread shortage occupations, 2021

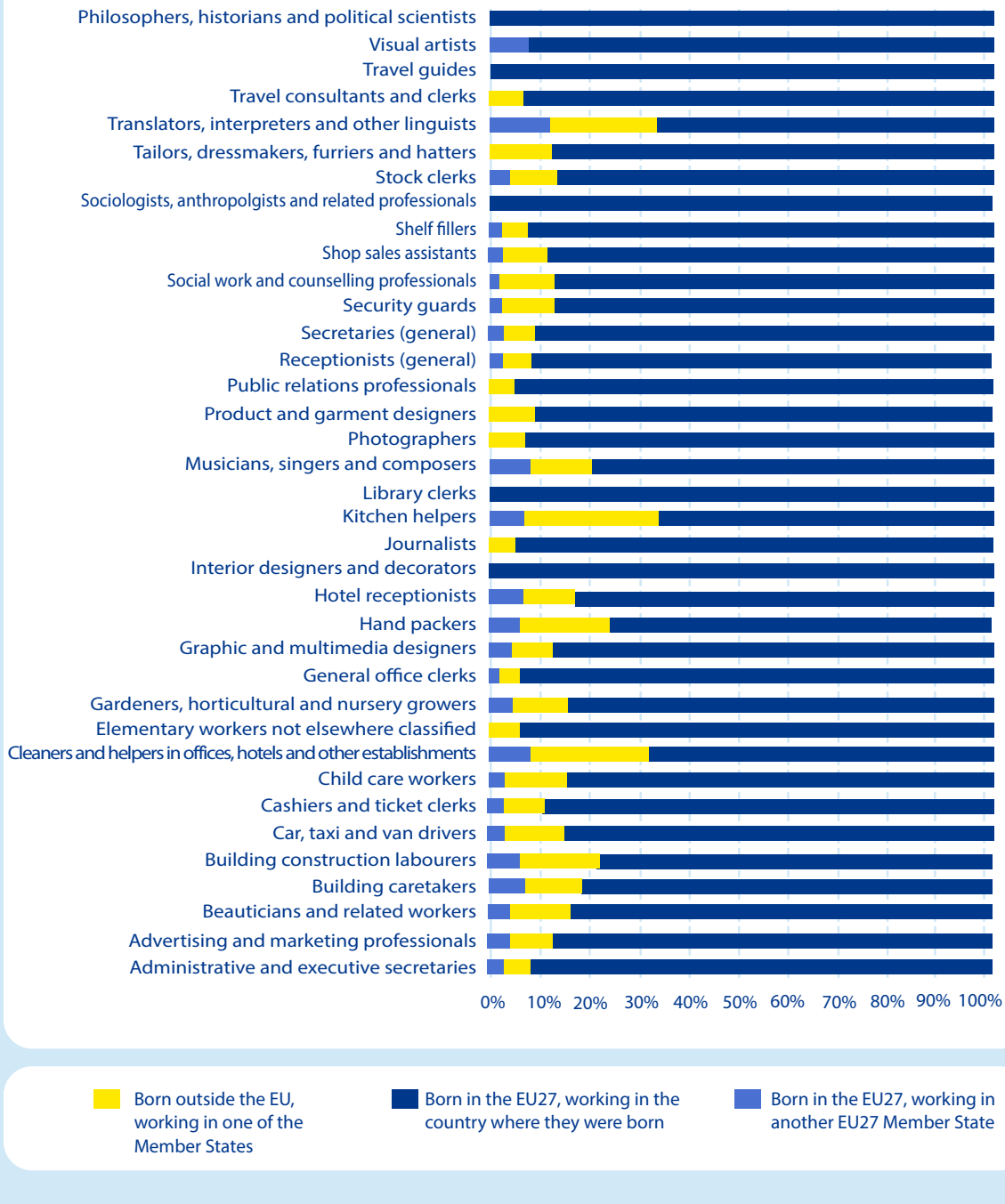


Source: European Labour Force Survey special data extracts

It is interesting to identify which occupations account for these differences. The result for the widespread shortages is shown in Figure 26 above. Many of these shortage occupations have a higher percentage of workers who are not born in the EU country where they were employed than the percentage for all occupations (i.e. 12%).

The most obvious are cleaners, kitchen helpers and for obvious reasons, translators, interpreters, and other linguists, where the share of workers born outside the EU is over 30%, followed by concrete placers and finishers, and waiters.

Figure 27 - Share of migrants in widespread surplus occupations, 2021



Source: European Labour Force Survey special data extracts

5.6. Chapter summary

There are approximately 38.82 million workers employed in the occupations identified by the NCOs as widespread shortages, and 39.88 million employed in occupations identified by the NCOs as widespread surpluses.

Female workers are significantly underrepresented (34%) in the widespread shortage occupations, while they are significantly overrepresented in the widespread surplus occupations (62%). If healthcare occupations were removed from the list of widespread shortages, the female representation would further decline by 10 million to 3.9 million or 14%.

There is not a significant difference between the education profile of the most widespread shortages occupations and the most widespread surplus occupations. Both have a higher share of lowly qualified workers (ISCED 0-2) and a lower share of higher qualified workers (ISCED 5+) than the education profile of employment in all occupations.

The reason for the broad similarity in the education profiles is that most of the shortage occupations require a medium level craft qualification, while most of the surplus occupations require a medium level qualification also – albeit a more academic qualification than the craft qualification. Both lists of widespread shortages and surpluses have a similar number of occupations which require third-level qualifications.

The 11 surplus occupations which require third level qualifications come from the humanities and the creative arts. The 11 shortage occupations which require third level qualifications come mainly from the software and healthcare sectors, although they include one engineering and one teacher occupations.

The biggest difference between the occupations on the lists of the most widespread shortage and surpluses is that most of the occupations on the shortage list are STEM related, while most of the surplus occupations are not.

The share of migrants working in the most widespread shortage occupations (16%) and in the most widespread surpluses (14%) in 2021 was higher than the share in all occupations (12%).

Most migrant workers came from outside the EU27, and the share among the widespread shortages was highest for cooks, waiters, and cleaners and for many of the building crafts (e.g. plasterers). With the exception of translators and interpreters, the highest shares in the surplus occupations were mainly among the lower skilled such as cleaners, hand packers and kitchen helpers.

The share of workers under 30 years of age employed in the widespread shortages in 2021 was broadly similar to the share in all occupations. However, the share in the widespread surplus occupations was significantly higher, creating a situation where many young workers were vulnerable.

6. AN EXPLORATION OF THE CAUSES OF LABOUR SHORTAGES AND SURPLUSES

6.1. Introduction

Labour shortages and surpluses, at an aggregate level, reflect too many or too few people available to meet labour demand. Any observed mismatch between the demand for, and supply of, labour is likely to derive from volume of demand for certain skills at a certain location and its rate of change, and the supply of labour and its change over time. Mismatches may be temporary where actors in the labour market are able to effectively adjust their behaviour in response to the signals they receive about the demand for labour. They may also be temporary where an economic shock, which disrupts the balance between labour demand and supply, quickly plays out and the labour market returns to its previous state or something near to it. Mismatches may be more intractable where structural factors, such as an ageing population or shifts in levels of economic activity, inhibit the capacity of labour supply to keep pace with demand over the longer term. Over time policy makers have sought to address labour market imbalances at the aggregate level through employment and social policies which have sought, amongst other things, to: increase levels of economic activity in the working age population; support people to make the transition from unemployment into work; increase the state pension age (thereby extending working life), and facilitate geographical mobility (both moving people to jobs, and moving jobs to people).

The evidence in the previous two chapters reveals that there is an occupational dimension to labour shortages and surpluses across Europe many of which have proved to be persistent over time. This then begs a series of questions about the extent to which there is something specific about an occupation or job which results in it being characterised by a relatively high level of labour shortage or surplus. Skill may be an issue here. Too many or too few people might train to enter a given occupation, or there may be changes to job content – as a result of, for example, technological change - which affects the capability of existing employees to do their job. The result will be skill shortages (where skills supply has failed to keep pace with demand) or surpluses (where skills obsolescence leads to people losing their jobs). This then focuses the discussion on how education and training systems can better match skills supply to demand. Again, this has been an active area of policy making at European and national levels as countries look to make their education and training systems more responsive to skills demand (Cedefop, 2018; European Commission, 2020).

While the previous chapters have shown that many labour shortages are found in relatively skilled jobs (for example for skilled construction, ICT and health workers), some are concentrated in jobs which require relatively modest levels of skill (such as cleaners). Evidence for Europe, now a little dated, indicated that where employers struggled to recruit people with the skills and attributes they sought, this often reflected the terms and conditions of employment on offer rather than a shortage of skills (Cedefop, 2015). The latest European Working Conditions Survey (EWCS) shows that a substantial percentage of jobs in Europe exhibit relatively low levels of job quality – i.e. reflected in the share of jobs which are categorised as strained ones (Eurofound, 2022).

Labour shortages and surpluses, in practice, will result from a combination of factors outlined below (see Table 9). Some may well arise mainly as a consequence of the economic cycle and its occasional vicissitudes, and some will reflect the uneven distribution of employment opportunities across Europe and within countries. Others may well be the result of:

- education and training systems not being sufficiently attuned to the changing nature of skill demand;
- mechanisms designed to anticipate emerging labour and skill needs being under-developed; or
- information about the changing demand for labour being poorly disseminated to individuals and employers.

Some mismatches may result from employers' challenges to identify and express their HR needs and realise effective recruitment. There is also the role of employment and social policies and the extent to which these affect labour supply (e.g. reservation wages, active and passive labour market policies, benefit traps).[21]

Table 9 - Factors influencing the demand for and supply of labour

Labour demand	Labour supply
Shifts in labour demand reflecting macroeconomic conditions.	Labour market participation (measured with reference to, for example, activity rates, and the policies in place which affect participation rates).
Technological change (e.g. automation substituting for some jobs, creation of new jobs resulting in, for example, sectoral and occupational changes in the distribution of employment).	Population ageing (and its impact on net labour supply).
Transition to climate-neutral economy (e.g. leading to the emergence of new types of jobs and employment – i.e. sectoral and occupational changes in the distribution of employment). This may also have an impact on regional labour demand.	Participation levels in education and training – both initial and continuing (e.g. changes in flows through the education and training system, such as volumes of learners and the courses/subjects studied).
Shifts in the sectoral structure of employment, which may also have an impact on where demand is concentrated.	Individuals' personal work preferences (i.e. the number of days or hours they are willing to work) or their preferences regarding phased or early retirement.
Regional shifts in employment demand.	Migration and mobility (net gains or losses to the working age population).
Terms and conditions of employment (e.g. relative wage levels, workplace well-being).	Active labour market policies and their capacity to stimulate activity rates.
Employers' preferences for labour – such as demand for people to work part-time.	

Source: Authors

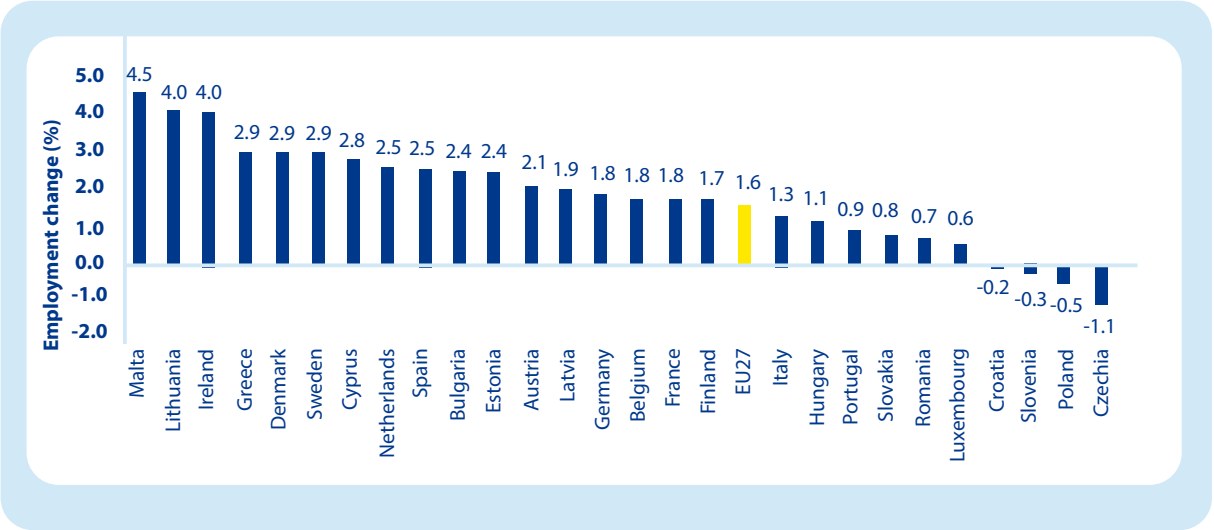
21 The examination of employment and social policy is outside the scope of this study where the focus is primarily upon understanding recent shifts in labour shortages and surpluses across Europe.

6.2. Aggregate shifts in the demand for and supply of labour

6.2.1. Changes in the demand for labour

Employment increased substantially across nearly all Member States during 2022 (see Figure 28).[22] This has been observed across nearly all countries though there are exceptions (i.e. in Croatia, Slovenia, Poland, and Czechia). Alongside the increase in employment levels was an increase in the vacancy rate (i.e. vacancies as a percentage of employment plus vacancies) further indicating the relatively strong bounce back in the labour market following COVID-19 (Figure 29). Other things being equal, one might expect this to result in labour shortages. The bounce back was not even across Member States with several countries recording a fall in employment levels between 2021Q3 and 2022Q3, alongside a fall in the vacancy rate, perhaps presaging a more general weakening of the labour market over the short-term in Europe (European Commission, 2022).

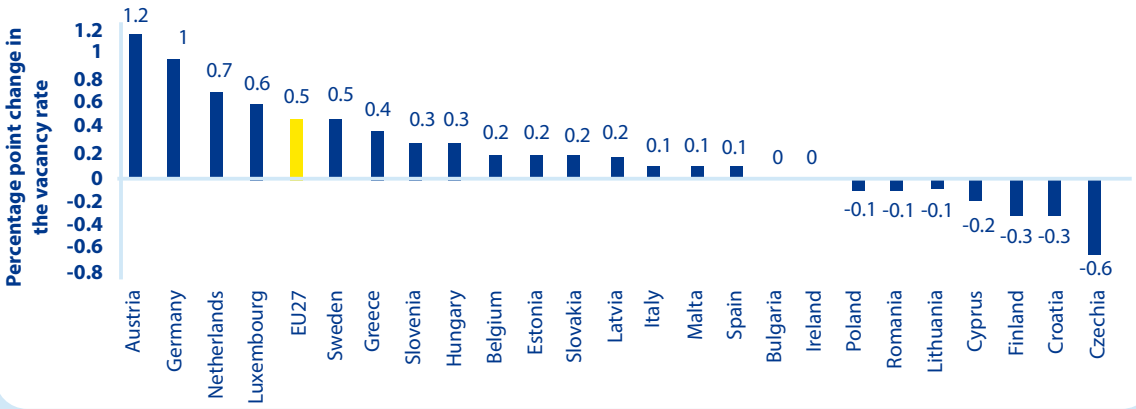
Figure 28 - Change in employment 2021Q3 to 2022Q3 (%)



Source: Eurostat Employment and activity by sex and age - quarterly data [LFSI_EMP_Q]

22 While EURES and the analysis of shortages and surpluses in the preceding chapters cover both EU and non-EU countries, the analysis in this chapter focuses on the EU in order to provide a consistent coverage of all the main issues.

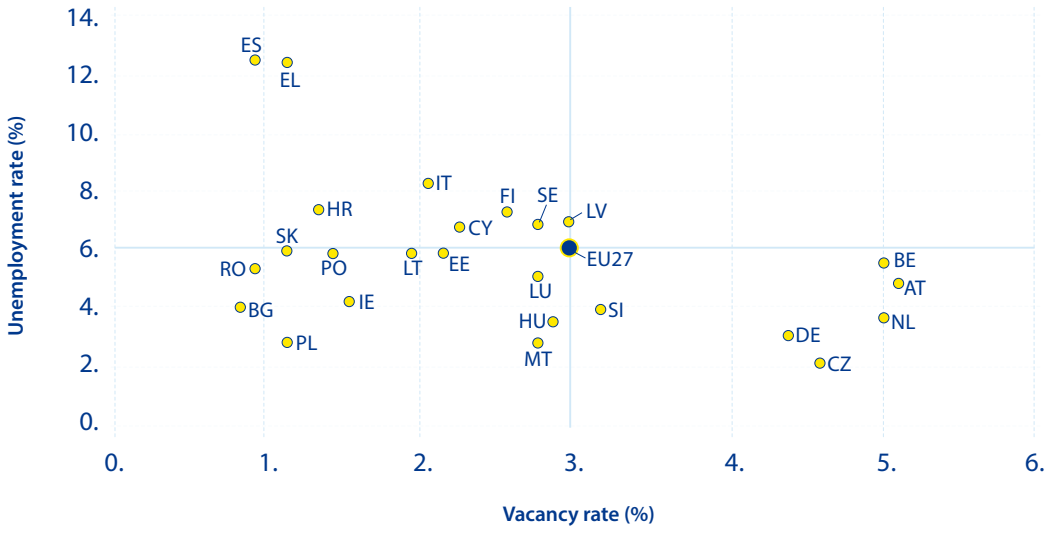
Figure 29 - Percentage point change in the vacancy rate 2021Q3 to 2022Q3 (%)



Source: Eurostat Job vacancy statistics [JVS_Q_NACE2]

A comparison of unemployment and vacancy rates provides an indication of the extent to which there is an excess stock of labour which might be drawn upon to fill vacancies. Countries in the lower right quadrant of Figure 30 exhibit both relatively low levels of unemployment compared with the EU27 average and relatively high vacancies rates. These are the countries which experience relatively tight labour market conditions. This group includes Belgium, Germany, the Netherlands, and Austria. It also includes Czechia where the number of people in employment contracted in 2022. The upper left quadrant of Figure 30 shows countries with relatively high unemployment rates but relatively low vacancies rates. In other words, those are countries where one might expect relatively high incidence of labour surpluses. This includes Spain and Greece.

Figure 30 - Unemployment and vacancies rates by Member State, 2022Q3



Source: Eurostat Job vacancy statistics [JVS_Q_NACE2] and Unemployment quarterly data [UNE_RT_Q]

The degree of consistency between the data presented above to the shortages and surpluses reported in Chapter 3 is modest. For example, Chapter 3 revealed that Slovenia, Belgium, Estonia, Norway, Switzerland, Finland, Italy, and France reported a relatively high number of shortage occupations. These countries are not exclusively ones which are characterised by low unemployment rates, strong employment growth, or high vacancy rates. Similarly, if one looks at labour surpluses, Denmark and Hungary stand out as reporting a large number of surplus occupations. Yet Denmark, over the recent past, has experienced relatively high levels of employment growth, and the vacancy rate in Hungary has increased.

The information provided above indicates that employment growth in aggregate, and along with it an increase in the number of vacancies, are not sufficient in themselves to explain the shortages and surpluses reported in Chapter 3. In general, standard labour market indicators at the aggregate level are not sufficient to identify labour shortages and surpluses. As observed above, countries experiencing relatively high employment and vacancy rates can nevertheless be characterised by a wide range of surpluses and, likewise, countries where employment levels and vacancy rates have been in decline also report shortages across a number of occupations. Evidently there are factors which relate to specific occupations or jobs which drive the incidence of labour shortages and surpluses.

Consideration is given to developments on the supply side, at an aggregate level, which are likely to have some bearing on the incidence of labour mismatches.

6.2.2. Supply side factors: Activity rates and labour market slack

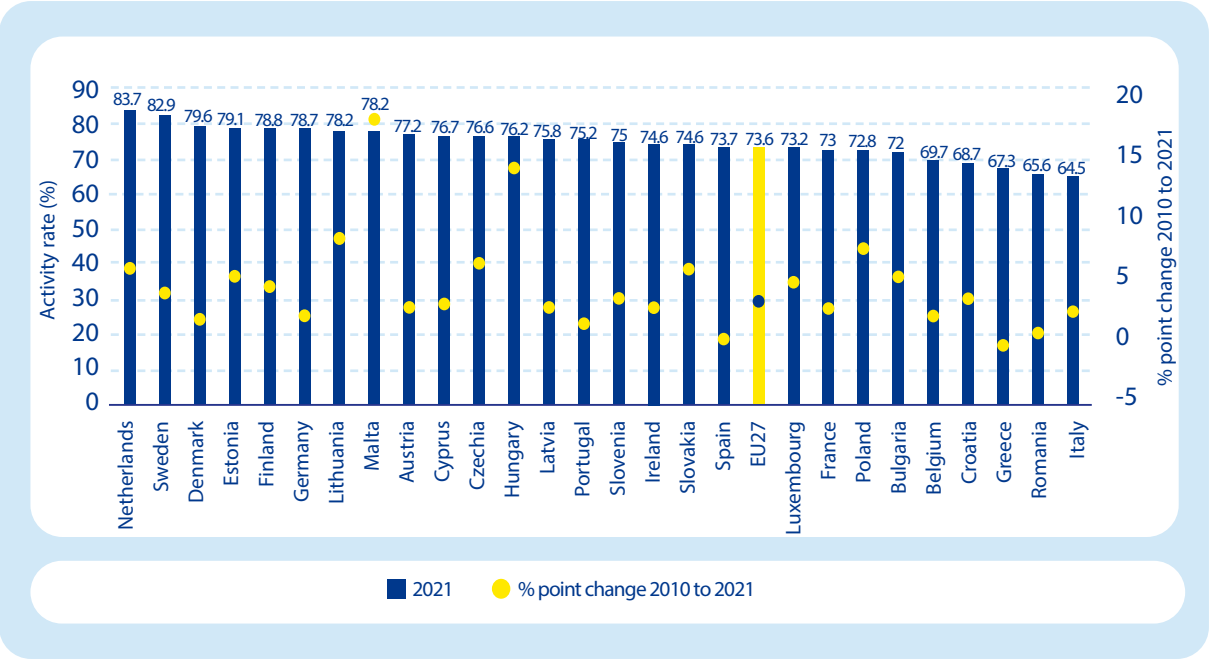
Table 10 reveals that activity rates have increased over time suggesting that there has been an increase in the potential labour available to meet labour demand. Growth in activity rates has increased particularly for older people (aged 50 to 74 years), namely by 7.1 percentage points over the 2010 to 2021 period (compared with 3.3 percentage points for the population as a whole). Certain groups remain disadvantaged. The activity rates of women remain below those of men. Those of migrants remain below those born in a country. These all act to constrain the capacity of countries to respond to labour shortages. There is also substantial variation in activity rates by Member State: from 84% in the Netherlands to 65% in Italy (Figure 31).

Table 10 - Economic activity rates by age, sex and citizenship, 2010 and 2021

	2010	2021	% point change
All	70.3	73.6	3.3
Men	77.0	78.7	1.7
Women	63.7	68.5	4.8
EU migrants	76.5	78.2	1.7
Non-EU migrants	68.8	67.0	-1.8
20-24 year olds	60.5	59.7	-0.8
50 to 74 year olds	42.6	49.7	7.1

Source: Labour Force Survey [LFSA_ARGAN]

Figure 31 - Activity rates by Member State, 2021

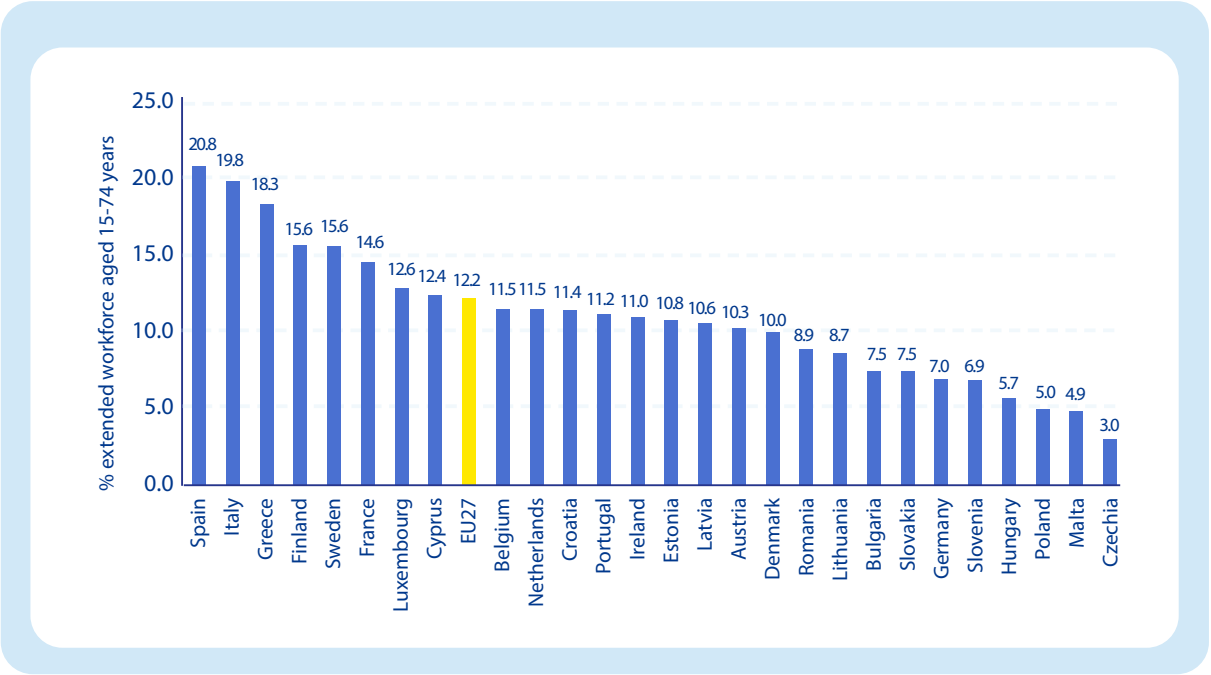


Source: Labour Force Survey [LFSA_ARGAN]

In order to assess the potential capacity to address unmet labour demand, Eurostat has developed a measure of labour market slack (Eurostat, 2022). This includes, in addition to the number of people who are unemployed, the following groups: part-time workers who want to work more, people available for work but do not look for work, and people who are looking for work but are not immediately available. Over time the amount of labour market slack has been in more or less continuous decline. In 2010Q3, 17.1%, of the extended labour force comprised those potentially available to work,[23] in 2019Q3 - just before the pandemic - it stood at 13.6%, and by 2022Q3 it was 12.%. The implication is that over time the potential pool of labour that could be activated to meet increases in labour demand has been in decline. This may be a result of changes in employment policies which are better able to engage people in the labour force. Whatever the cause, labour markets in Europe are becoming tighter. The situation varies by country, from 20.8% in Spain to 3.0% in Czechia (see Figure 32). It is evident that countries with relatively low shares of labour market slack are also ones which report a relatively large amount of labour surplus occupations (e.g. Denmark and Hungary).

23 The extended labour force is defined by Eurostat as those who are in the labour force plus those people available for work but do not look for work, and people who look for work and are immediately available for work.

Figure 32 – Labour market slack by Member State, 2022Q3



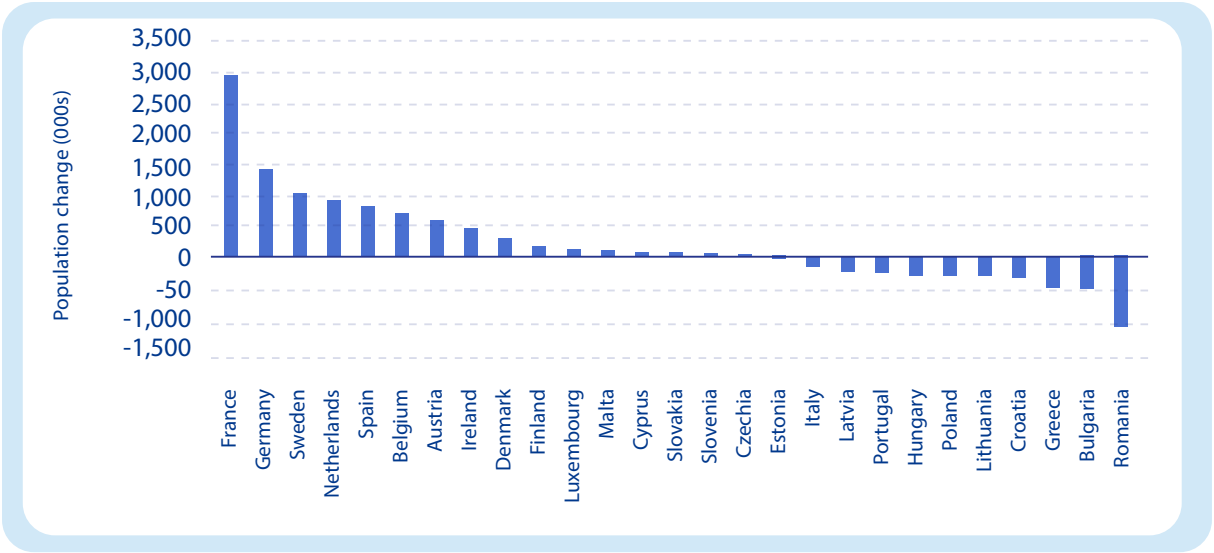
Source: Eurostat Labour market slack - quarterly data [LFSI_SLA_Q]

6.2.3. Supply side factors: Working-age population change

Any increase in the supply for labour will be constrained by the size of the population (especially the working age population). In many European countries, populations are ageing with, consequently, an impact on population size. It also has implications for the characteristics of labour demand. It is readily apparent that ageing increases the demand for a range of activities linked to, for example, health and social care (older people are more likely to experience health problems and require social care) and construction (e.g. building or adapting homes to meet the needs of older people). Health, social care, and construction occupations are shortage ones across many, if not all, European countries.

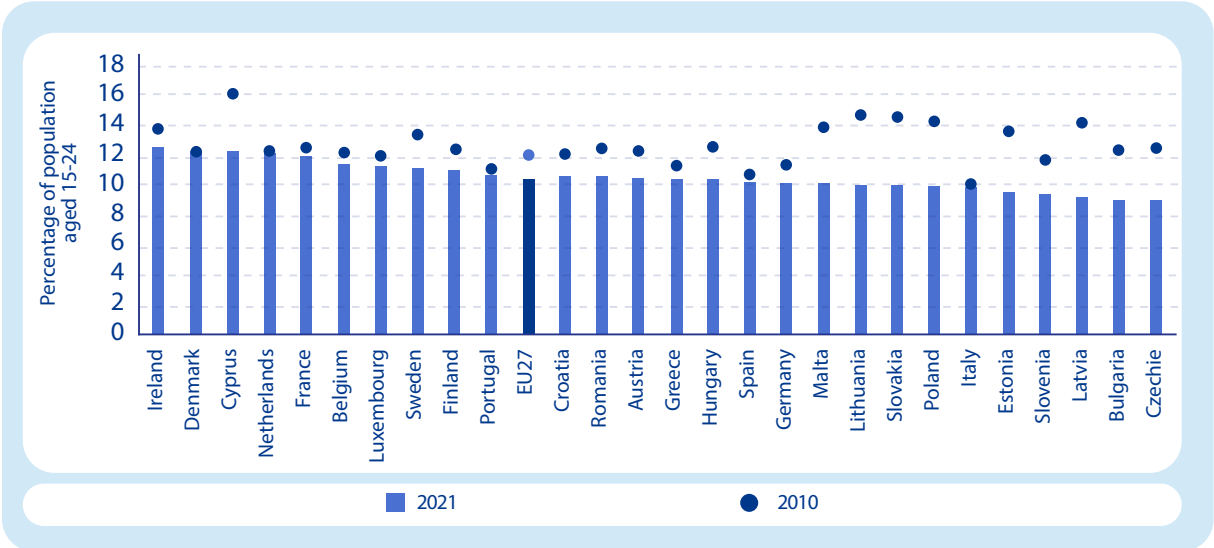
While the population of the EU grew by nearly 6 million people in the period between 2010 and 2021, the situation varied by Member State with several recording a decline in their population (see Figure 30). The implication is that the potential supply of labour available within some countries has been shrinking and is expected to continue to do so in the future. A clearer picture on the implications for the labour market can be gleaned from Figure 33 and Figure 34. Figure 33 shows that the percentage of the population accounted for by people aged 15 to 24 years has been in decline across all countries. In many respects this age group represents the workforce of tomorrow; its proportionate decline, especially in countries with a shrinking population, has major implications, other things being equal, for meeting labour demand.

Figure 33 - Population change by Member State, 2010 to 2021



Source: Population change - Demographic balance and crude rates at national level [DEMO_GIND]

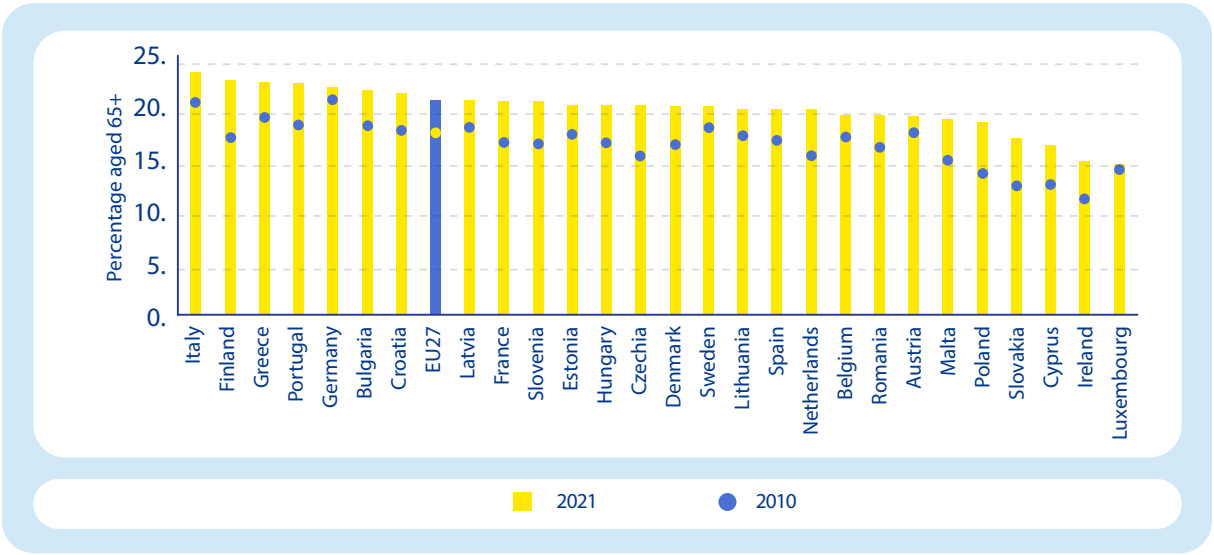
Figure 34 - Proportion of the population aged 15–24 years, 2010 and 2021



Source: Population change - Demographic balance and crude rates at national level [DEMO_GIND]

Alongside the proportionate decline in the population aged 15–24 years has been the increase in the share of the population aged 65 and over (see Figure 35). While some of this group are still economically active many are retired. This has implications for replacement demands – i.e. the number of people who will be required to enter employment in order to offset the loss of those leaving work to take retirement. It is evident that several countries with relatively high shares of their population aged over 65 years are ones that reported a relatively high number of shortage occupations in Chapter 3 (i.e. Italy and Finland).

Figure 35 - Proportion of the population aged 65+ years, 2010 and 2021

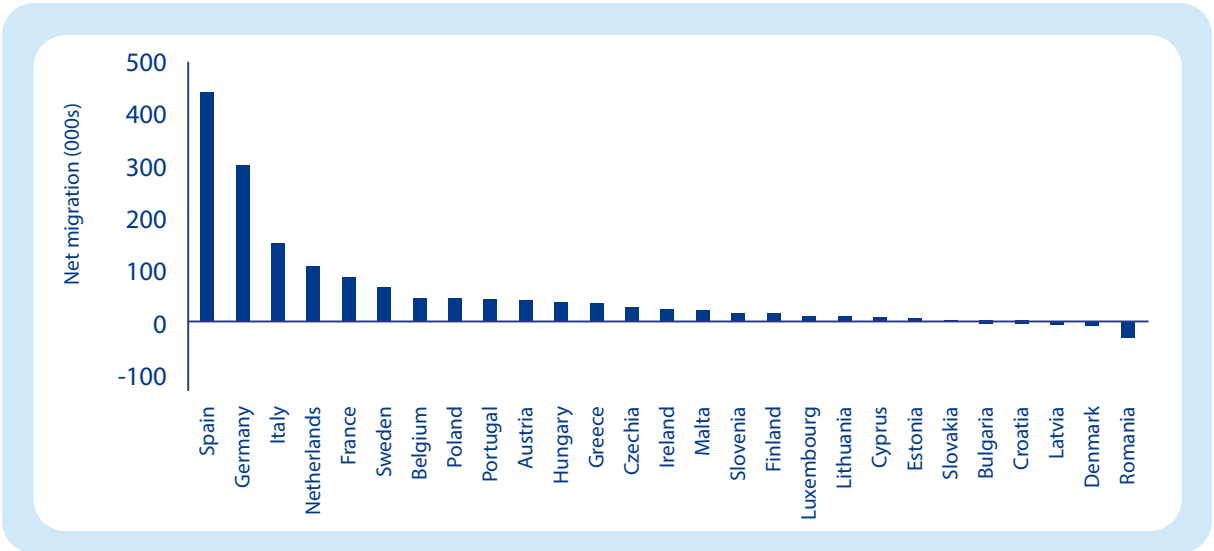


Source: Population change - Demographic balance and crude rates at national level [DEMO_GIND]

6.2.4. Supply side factors: Labour mobility migration

Migration and labour mobility provide a source of labour supply to countries. Figure 36 shows the net migration (including intra-EU mobility) to countries in 2019 (this year was chosen because the latest data available are for 2020 and these are affected by the lockdowns which prevented the international movement of labour). It shows that migration and labour mobility make, in many countries, a net positive contribution (more people move into a county than move out) and thereby a contribution, potentially, to labour supply.

Figure 36 - Net migration in Member States, 2019 (including intra-EU mobility and extra-EU migration)



Source: Eurostat Emigration and Immigration [MIGR_EMI2 and MIGR_IMM8]

The impact of labour mobility and migration can have an uneven effect on a country. Its impact may be concentrated on particular sectors or jobs. In Greece, for instance, following the financial crisis many people left the country and never returned. This had an impact on several sectors, but notably construction where substantial hikes in wage levels proved insufficient to retain or return construction workers to the country (Financial Times, 2022). After the COVID-19 lockdowns had been lifted in late 2020, many Eastern Europeans living elsewhere in the EU returned to their home during the pandemic and remained there, thereby reducing labour supply in the countries they had left but having a beneficial impact on labour supply in the countries to which they returned. Russia's invasion of Ukraine also affects labour supply. In Poland, the construction industry which has had a dependence upon migrant labour from Ukraine lost some of its workforce as Ukrainians returned home to fight in the war against Russia (Euroactiv, 2022; Ciobanu and Gosling, 2022). As noted in Chapter 3, construction jobs are ones that are identified as shortage ones in many countries.

Box 2 below provides further details of how Russia's invasion of Ukraine has affected labour mismatches.

Box 2 - Demographic effect of Russia's invasion of Ukraine

Almost a year after its start, Russia's invasion of Ukraine has had important consequences for labour supply. While the outflow of many Ukrainian male workers from EU Member States to fight is driving up labour shortage in some sectors (especially construction, manufacturing, and transport), the flows of those fleeing the country have the potential of alleviating the labour shortages at least over the short term. Indicative evidence suggests that some sectors which have faced labour shortages – such as accommodation and catering – may have benefited from this inflow of labour.

Source: Focus group with NCOs; Ciobanu and Gosling, 2022

While there are positive stories about labour mobility and migration relieving pressures on some shortage occupations the volume of people moving between Member States for work is modest with most people heading for either Germany or Spain (as shown in Figure 36 above). More speculatively, the Eurobarometer on the intentions of Europeans to move country for work suggests labour mobility may have a more significant role to play. Around 18% of individuals in the EU are interested in working abroad of which 60% said they were likely to do so in the next five years (Eurobarometer, 2022). This implies that around 27 million people plan to work in another country over the next five years. This potentially improves labour supply in recipient countries (i.e. in the most popular destination countries - Germany, Switzerland, the UK, Spain, and North America). A substantial share of those who are thinking about moving have relatively high levels of educational attainment, so they have the potential to fill a range of skilled jobs, and tend to be relatively young. Where people are thinking about moving, finding a better job is an important reason for doing so.

For those countries which are able to attract labour from abroad, this might not solve all labour imbalances. Workforce may, for example, end up being geographically concentrated within a country. People often settle in those areas where there is an existing community from their home country. There is also a tendency to settle in large cities. In Europe, 48 cities are home to 20% of the continent's population but have, as estimated by Smit et al. (2020), generated more than one-third of the EU's job and population growth since 2007. These cities - including Amsterdam, Copenhagen, London, Madrid, Munich, and Paris - have become Europe's leading hubs of innovation and talent that are able to attract people from other regions and countries. This then exacerbates regional divides and the capacity to meet labour demand in the disadvantaged regions. It also indicates that labour mobility and migration is unlikely to be a solution to the depopulation of less well-developed regions in Europe.

In an ideal world, labour shortages in one country or region would be met from labour surpluses in other countries or regions. There is evidence – as provided by the example in Chapter 4 – that initiatives are in place to help achieve this goal. On the whole, however, the evidence suggests that the situation is much more complex and less optimistic than this might suggest. Many occupational shortages and surpluses are common to countries across Europe. Moving country in Europe is about finding a job, but it is also about finding a better job and progressing one's career (Eurobarometer, 2022). The implication is that people with the attributes to fill shortage jobs in the destination country might well be contributing further to the shortages in their country of origin at least in the short-term. There is some evidence that people return to their country of origin after a period of time away bringing with them the wealth of experience they have obtained while working abroad. This appears to be the case in Estonia for example where, until recently, there had been substantial net outflows of people of working age to other parts of Europe (Cedefop, 2020).

6.2.5. The regional dimension

People tend to search for jobs in local labour markets. Their capacity to move region or country for work is typically inhibited by a range of factors such as family ties, limited information about jobs in other areas, and personal preferences or tastes about where they want to live and work. Accordingly it is important to consider the local labour market dimension when addressing labour shortages and surpluses. Table 11 shows the areas in the EU which reveal the highest and lowest rate of employment growth over the 2010 to 2021 period. Two features are immediately apparent: first, the difference in the rate of change over time between those areas which have grown most strongly and those which have contracted is substantial; and second, countries which have as a whole experienced relatively weak employment growth (such as Spain) have areas within them which have grown at a high rate. This shows that the nature of employment growth reflects local economic specificities.

When looking at the impact of factors such as the transition to a climate-neutral economy on the demand for labour, there are indications that the effects are localised as well. For example, fossil fuel production is regionally concentrated. Employment in peat production is concentrated in specific regions of Ireland, Sweden and Finland, oil shale in Estonia, and coal production in regions spread across Germany, Poland, Czechia, Slovakia, Hungary, Slovenia, Romania, Bulgaria, Greece and Spain.[24]

Table 11 - Top 10 and bottom 10 regions by employment growth, 2011 to 2021

Top 10	% change	Bottom 10	% change
Ciudad de Melilla, ES	30.5	**Ipeiros, EL**	-21.6
Közép-Magyarország, HU	27.2	**Sud-Vest Oltenia, RO**	-20.9
Pomorskie, PL	26.6	**Severozapaden, BG**	-16.8
Észak-Alföld, HU	26.5	**Macroregiunea patru, RO**	-15.2
Schwaben, DE	24.4	**Swietokrzyskie, PL**	-15.2
Nyugat-Dunántúl - HU	24.0	**Sud – Muntenia, PT**	-14.9
Niederbayern, DE	22.4	**Ionia Nisia, EL**	-13.7
Zachodniopomorskie, PL	22.2	**Makroregion Centralny, PL**	-13.2
Wielkopolskie, PL	21.7	**Dytiki Ellada, EL**	-13.1
Alföld és Észak, HU	21.5	**Nord-Est, RO**	-13.0

Source: Eurostat Employment by NUTS2 regions [LFST_R_LFE2EMP]

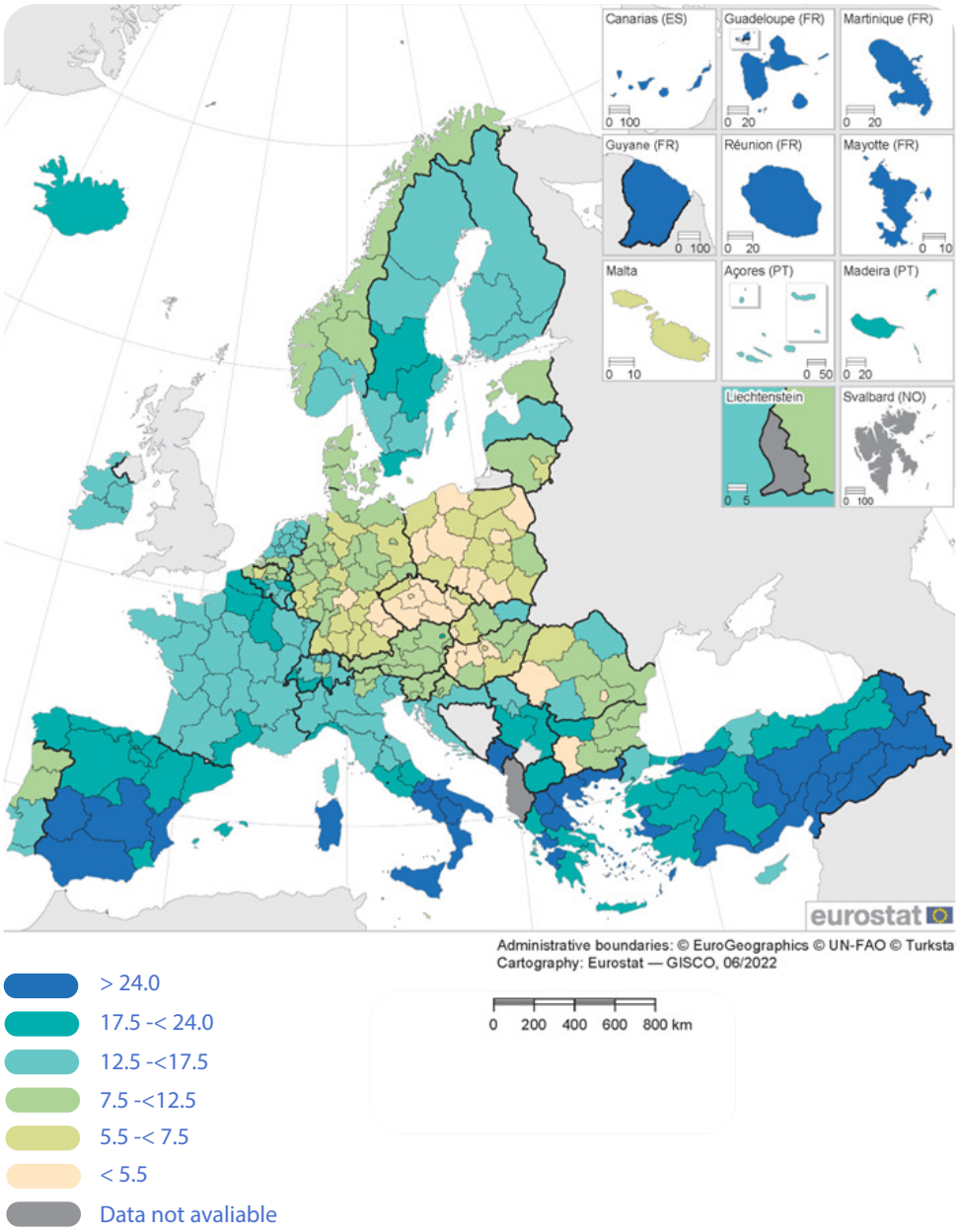
There is also a local dimension to the degree of labour market slack and thereby the capacity to respond to increases in the demand for labour Figure 37) reveals that within countries there are, at most, modest regional variation in the degree of labour market slack. There are, however, countries which show a relatively high level of regional variation such as Bulgaria and Romania, which might suggest that in some instances there is a relatively strong regional dimension to labour market slack. In general, labour market slack seems to be driven by national rather than local factors.

24 https://energy.ec.europa.eu/topics/oil-gas-and-coal/eu-coal-regions/coal-regions-transition_en

Figure 37 – Labour market slack by region, 2021

Labour market slack, 2021

(5 of extended labour force, people aged 15-74, by NUTS 2 regions)



Source: Eurostat (online data [lfst_r_sla_ga] available here: https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20221124-2)

6.3. Qualitative changes in the demand for and supply of labour: The occupational dimension

6.3.1. Changes in the occupational structure of employment

Chapter 3 indicated the range of occupations where NCOs reported shortages or surpluses. In general, the shortage occupations are related to construction, health care, software/ICT, and hospitality.

Many affected jobs are in the middle of the occupational hierarchy (e.g. associate professionals/technicians and craft and related trades workers) along with some professional occupations. The surplus occupations include a mix of professional and clerical occupations.

Table 11 shows how the demand for skills has changed over the last 10 years. Occupation provides a proxy measure of skills demand albeit a far from perfect one. Over time employment has become increasingly concentrated in jobs which are characterised by relatively high levels of skill. This is notable with respect to the increase in the share of employment accounted for by professional and associate professional/technician occupations. This change has taken place alongside an increase in the qualification levels of those in employment (see Table 12). As can be seen, over time the share of those in employment with a tertiary level qualification has increased substantially.

The implication of the information contained in Table 12 and Table 13 is that the nature of labour demand over time has become more highly skilled. Attempts have been made to explain this largely with reference to the way in which technological change has an impact on the skill content of existing jobs (e.g. requiring new combinations of skills), created new types of job (the nature and skill needs of which are only just beginning to emerge), and destroyed some jobs (where automation substitutes workers). Arguably it is important not to exaggerate the extent to which employment is becoming more highly skilled. Table 12, for instance, indicates that a sizable share of employment remains concentrated in occupations requiring modest levels of skill, such as in the clerical and support worker occupation where employment has continued to grow.

Table 12 – Occupational change in the EU27, 2011–2021

	Share of employment 2011 (%)	Share of employment 2021 (%	Change (000s)	Percentage change
Managers	5.4	5.0	-251.5	-2.5
Professionals	16.8	21.4	10,953.1	34.8
Technicians and associate professionals	15.8	16.0	2,199.7	7.4
Clerical support workers	9.9	10.0	1,368.1	7.4
Service and sales workers	16.7	15.6	-336.2	-1.1
Skilled agricultural, forestry and fishery workers	4.6	3.0	-2,735.3	-31.7
Craft and related trades workers	12.7	11.7	-528.2	-2.2
Plant and machine operators and assemblers	7.8	7.6	349.4	2.4
Elementary occupations	9.3	8.5	-469.3	-2.7

Source: Eurostat Labour Force Survey [LFSA_EISN2]

Table 13 – Qualification change in the EU27, 2011–2021

	Share of employment 2011 (%)	Share of employment 2021 (%)	Change (000s)	Percentage change
Less than primary, primary and lower secondary education (levels 0-2)	21.2	15.9	-8,202.6	-21.1
Upper secondary and post-secondary non-tertiary education (levels 3 and 4)	49.9	47.3	-417.7	-0.5
Tertiary education (levels 5-8)	28.7	36.6	17,962.2	34.1

Source: Eurostat Labour Force Survey [LFSA_EGEAD]

Occupational change is driven largely by changes in the sectoral structure of employment. Table 14 shows that over a 10 year period there have been sharp changes in the sectoral structure of employment toward a service-oriented economy, especially with the relatively strong growth in employment in information and communication services (which grew by 37%), professional, scientific and technical services (23%), and health and social work (16%). At the same time, the content of jobs undertaken within sectors is likely to change as a consequence of, amongst other things, the introduction of new technologies and associated changes in the organisation of work. Even in those jobs where the overall level of skill required to do the job may not have changed there may well be substantial changes to the type of tasks which need to be carried out, thereby resulting in the content of jobs changing.

In looking further at how the content of jobs has changed, and the implications of this for labour shortages and surpluses, consideration is given to some of the key drivers of occupational change in the labour market. These are:

- technological change;
- the transition to a climate-neutral European economy;
- demographic change; and
- COVID-19 and its immediate aftermath.

Table 14 – Employment change by economic activity in the EU27, 2011–2021

	Share of employment 2011 (%)	Share of employment 2021 (%)	Change (000s)	Percentage change
Agriculture, forestry and fishing	5.1	3.6	-2,438.6	-25.9
Mining and quarrying	0.4	0.3	-161.5	-22.2
Manufacturing	16.8	16.3	645.6	2.1
Electricity, gas, steam and air conditioning supply	0.8	0.8	32.5	2.2
Water supply; sewerage, waste management and remediation activities	0.8	0.8	213.5	15.2
Construction	7.4	6.7	-676.4	-5.0

	Share of employment 2011 (%)	Share of employment 2021 (%)	Change (000s)	Percentage change
Wholesale and retail trade; repair of motor vehicles and motorcycles	14.0	13.7	593.2	2.3
Transportation and storage	5.1	5.3	838.0	8.9
Accommodation and food service activities	4.4	4.0	-281.9	-3.5
Information and communication	2.8	3.6	1,899.2	37.0
Financial and insurance activities	2.9	2.8	167.8	3.2
Real estate activities	0.7	0.8	249.3	18.3
Professional, scientific and technical activities	4.8	5.6	2,012.9	22.9
Administrative and support service activities	3.8	3.9	485.1	6.9
Public administration and defence; compulsory social security	7.3	7.3	569.2	4.2
Education	6.9	7.5	1,709.4	13.5
Human health and social work activities	10.0	11.0	2,856.5	15.5
Arts, entertainment and recreation	1.4	1.5	302.2	11.4
Other service activities	2.4	2.7	753.8	17.2

Source: Eurostat Labour Force Survey [LFSA_EISN2]

6.3.2. Technological change as a driver of occupational change

Table 13 reveals the way in which the sectoral structure of employment has changed over time. Various forms of technological change drive these developments, and influence the impact on the number and content of jobs. The theory of skills-biased technological change sees new technologies – especially digitalisation – increase the demand for people with relatively high levels of qualification (and a decrease in the demand for people working in less skilled jobs). The evidence has not always supported the changes predicted by skills-biased technological change, mainly because growth in employment at the bottom end of the skills hierarchy as well as at the top has been observed over time. The explanation, according to the theory of routine-biased technological change, is that automation (however defined) affects some jobs more than others. Jobs considered to be susceptible to automation are those in the middle of the occupational hierarchy because they contain tasks which are routine in the sense that they are predictable and thereby codifiable such that they can be replaced by machines (robots/AI routines) (Autor, et al. 2003; Acemoglu and Restrepo, 2018). Low-skilled jobs which required a degree of personal interaction with customers – i.e. the application of non-cognitive skills – were regarded as being much less susceptible to automation because the tasks carried out were less predictable (as were the tasks in high-skilled jobs for much the same reasons). Skills obsolescence was much more likely to take place in the middle of the occupational hierarchy resulting in potential surpluses unless training was available to allow people to move into new jobs.

The evidence for the skills-biased technological change has been rather weak in Europe (Fernandez Macias and Hurley, 2017; Cedefop, 2022a). And there has always been an issue about the extent to which automation actually substitutes for workers in practice. While some commentators have suggested that the new generation of robots might potentially wipe out large swathes of employment across the occupational hierarchy (Frey and Osborne, 2017; Brynjolfsson and McAfee, 2014), less speculative

econometric analyses have shown that around 8–14% of jobs are potentially replaceable by automation and these are predominantly low-skilled ones where people have little access to training/reskilling (Nedelkoska and Quintini, 2018; Pouliakas, 2018). Access to training is seen as important in preventing skills obsolescence and job loss.

Indubitably technological change is driving up the demand for higher level skills. This is evident from the latest European Skills and Jobs Survey (Cedefop, 2022a). Technological change is often incremental, allowing companies and their workforces time to adapt to changes introduced (Bessen, 2015). The observations from the NCOs, whilst recognising that technological change has implications for labour shortages and surpluses, tend towards de-exaggerating its importance (see Box 3). It is also evident from information provided in Chapter 3 that many of the shortage occupations are in the middle of the occupational hierarchy – exactly the kind of jobs which one might expect to be in surplus rather than shortage.

Box 3 – Labour shortages and surpluses resulting from new technologies

According to the survey answers submitted by NCOs, new technologies are related to 23 shortages and 41 surpluses (2% and 6% of the answers provided).[25] More specifically, technological changes affect six of the most widespread shortages – contact centre information clerks (Portugal); software and applications developers and analysts not elsewhere classified (Ireland and Portugal); software developers (Czechia); systems analysts (Portugal); telecommunications engineering technicians (Portugal). They also affect eight of the most widespread surpluses – i.e. administrative and executive secretaries (Portugal); bricklayers and related workers (Slovakia); building construction labourers (Slovakia); data entry clerks (Estonia); electrical and electronic equipment assemblers (Slovakia); general office clerks (Portugal); hand packers (Bulgaria); and shop sales assistants (Slovakia).

A much higher number of NCOs said that shortages (422, 36% of the answers analysed) and surpluses (210, 31% of the answers analysed) were unrelated to the impact of technological changes.

Source: Analysis of data provided by NCOs; Cedefop 2021

Surpluses are, to some extent, concentrated in elementary occupations. It may well be the case that automation is able to substitute for these workers which results in surpluses arising (as indicated by Pouliakas, 2018). But it is difficult to see these as skill surpluses given that the skills needed to undertake many of these jobs are modest. Other shortages are at a professional level.

It may be that there is an over-supply of qualified people to work in the occupations identified as being in surplus, especially where technology has been able to substitute workers to some degree such as in journalists, photographers, or psychologists. One feature of digitalisation is its capacity to affect the job content of a wide-range of jobs including those previously thought to lie outside the scope of its reach.

25 Data were collected through the questionnaire sent to NCOs in June 2022 (please refer to Annex 1 for a detailed description of the methodology). Missing values are excluded from the analysis. The answers analysed relate to 1,187 shortages and 679 surpluses.

6.3.3. The transition to a climate-neutral economy and occupational employment

The transition to a climate-neutral economy is likely to have a substantial impact on the way in which goods are produced and consumed (such as the move to a circular economy). An indication of the scale of change which is likely to affect industry over the medium-term can be observed from the various policies being introduced in the European Union under the rubric of the European Green Deal (EGD). These changes are likely to have a substantial impact on the content of existing jobs and see the emergence of a range of new jobs related to areas of activity such as renewable energies, waste management, and agri-food.

At the outset, it needs to be stated that the impact of the transition to a climate-neutral economy on labour demand is difficult to gauge. Estimates of the impact of the European Green Deal on overall employment levels by occupation show, at an aggregate level, a modest impact (Cedefop, 2021b). It is estimated that the EGD will create over 480,000 new jobs in the EU by 2030. Waste management is one area where the implementation of the EGD will be seen to have marked positive impact on employment levels. Most of the new occupations (70%) will be filled by skilled manual and non-manual workers (Cedefop, 2021b). Eurofound's analysis of the EGD pointed to its implementation to bring about labour shortages in agriculture, manufacturing, construction, energy, transport, professional and scientific services, tourism, and education (Eurofound, 2021).

There may also be some local impact which is lost in the aggregate statistics. Policies which result in industries with relatively large carbon footprints being scaled down (such as coal mining) may take place in localities where employment losses are not immediately offset by the creation of new jobs.[26] New jobs which result as a consequence of policy ambitions such as the EGD may well be created in areas some distance from where jobs have been lost.

Often the impact of the transition to a climate-neutral economy is to not necessarily to create green occupations per se, but to alter the content of existing jobs at the margin (Dierdorff et al., 2011; Cedefop, 2019). In other words, people need some additional skills related to greening in their current job but this does not necessarily substantially change the nature of work undertaken.

For the time being the evidence which relates the transition to a climate-neutral economy to the emergence of labour shortages or surpluses is somewhat muted. Data from LinkedIn (2022) shows that the transition to a climate-neutral economy is bringing about an increase in demand for people to work in a range of green-specific jobs, such as sustainability manager, wind turbine technicians, solar consultant, ecologist, and environmental health and safety specialists. The uniqueness of these jobs, and the fact that they are new, may well result in them being difficult to fill until such a time as a sizable occupational labour market in these jobs is created.

The information provided in Box 4, based on the responses of the NCOs, indicates the extent to which the transition to a climate-neutral economy is associated with either labour shortages or surpluses. The findings are broadly consistent with the results from the latest European Working Conditions Telephone Survey (EWCTS, 2021) which found that 63% of workers in the EU27 were employed in occupations where green transition would have little or no impact. That said, 14% of workers were employed in occupations that may require enhanced skills as a result of the transition to a climate-neutral economy, and 15% were in occupations that may likely see increased demand due to the transition (Eurofound, 2022). The information reveals some of the jobs where the transition to a climate-neutral economy has the capacity to exacerbate existing shortages, such as in construction-related jobs.

26 Coal mining and related activities tend to be mostly located in Poland, Germany, Czechia, Romania, and Bulgaria (Alves Dias, et al., 2018).

Box 4 – Labour demands resulting from the transition to a climate-neutral economy

According to NCOs, the transition to a climate-neutral economy affects 59 labour market imbalances, the majority being shortages (46, 4% of the total shortages analysed), especially craft and related trades workers (15), plant and machine operators, and assemblers occupations (12).[27] A much higher number of shortages (350, 29% of the total) was not affected by 'greening'. Similarly, according to NCOs, 254 surpluses are not affected (37% of the total surpluses analysed) against 13 surpluses - all in craft and related trades occupations, elementary occupations, plant and machine operators, and assemblers occupations – that are seen to be affected by the green transition (2% of the total surpluses analysed).

Research broadly agrees that, for the time being, there is a relatively good balance between the supply and demand of green skills[28]. That said, the supply of green talent is well below the level needed to meet the goals set in the green transition and this is slowing the rate at which they can be reached. This means that, globally, 'green workers' were hired at a higher rate than 'non-green workers' which is, perhaps, indirect evidence of a skill shortage (LinkedIn, 2022). This may, however, also reflect the particular conditions in which, for example, those working in the renewables sector need to work (such as working offshore).

While assessments on future green skill demands are quite general in most countries, more detailed analysis has been carried out in a few Member States. Cyprus reports that more than one in three people employed in the green economy will be employed in professional, scientific and technical activities, a sector already experiencing significant unmet demand, which is likely to persist. Denmark highlights the importance of access to the right skills for the green sector, largely STEM ones. Ireland flags the need for training and upskilling for workers in 'new' jobs in the green economy especially eco-construction specialists, energy data analysts, and sustainable energy technicians. France underlines that all occupations should be considered part of the climate-neutral transition. Targeted training is therefore essential in all occupations. On the other hand, Poland pinpointed transport and construction as sectors that are likely to face the biggest transformations as a result of the green transition.

Overall, shortages in the construction sector are expected to worsen (also) as a consequence of the green transition, which, on one hand will require workers to acquire new skills, and, on the other, will increase overall demand – i.e. to build homes with greater energy conservation or install renewable energy heating sources in residential premises. For example, in Italy the national builders' association ANCE estimated at the end of 2021 that another 265,000 construction workers were needed just to complete current projects. Salaries in the sector rose but fail to attract enough people to meet the rising demand for construction workers. Companies in Spain and Portugal also warn that labour shortages could jeopardise EU-funded construction and renovation projects.

Source: Analysis of data submitted from NCOs

27 Data were collected through the questionnaire sent to NCO in June 2022 (please refer to Annex 1 for a detailed description of the methodology). Missing values are excluded from the analysis. The answers analysed relate to 1,188 shortages and 679 surpluses.

28 Green skills are defined as those skills that enable the environmental sustainability of economic activities. Green talent is a person who has explicitly added green skills to their profile and/or are working in green or greening job (LinkedIn, 2022, p. 6).

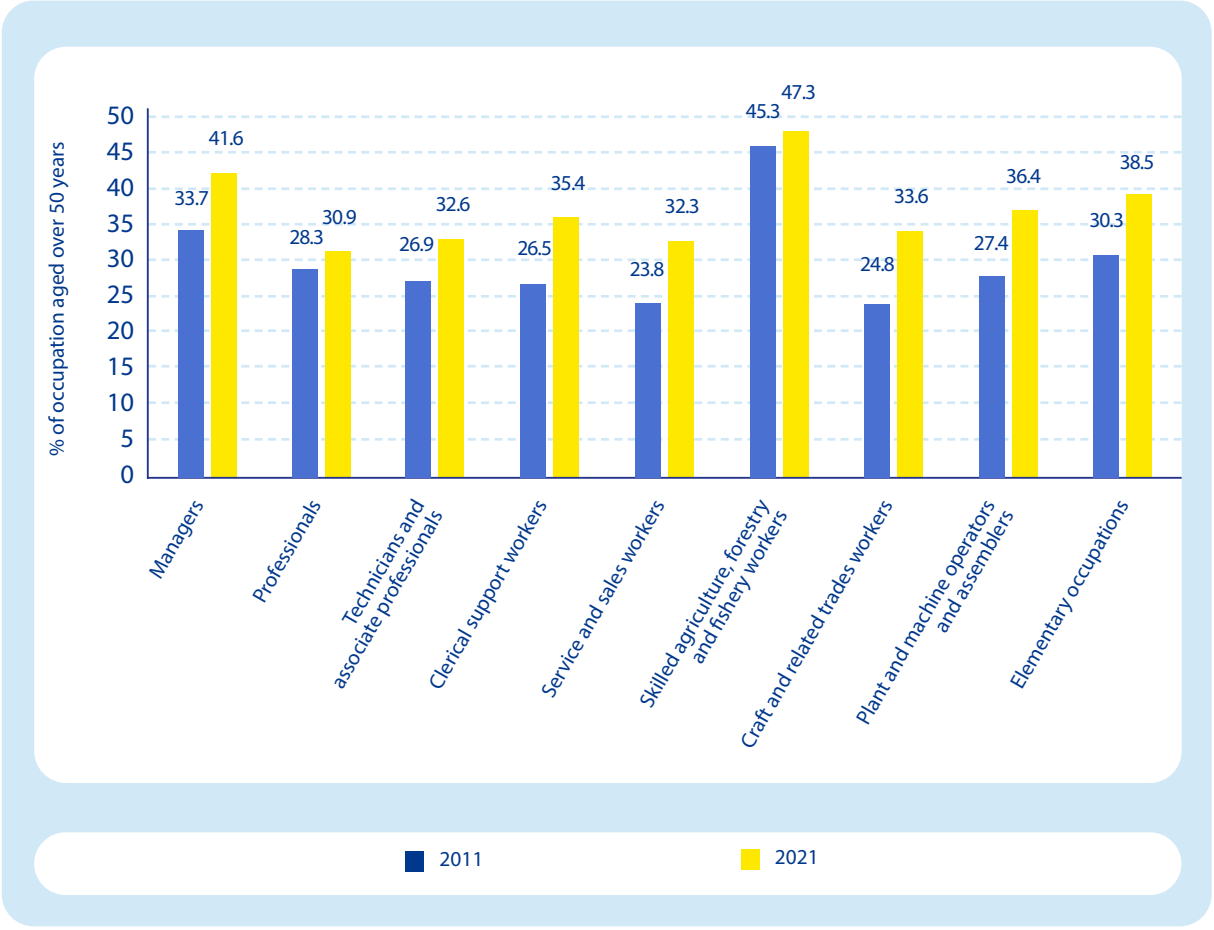
6.3.4. Demographic change as a driver of occupational change

As indicated earlier in the discussion many countries in Europe have ageing populations. This has implications for labour market imbalances with respect to:

- the need to replace workers exiting the labour market for reasons of retirement;
- meeting the needs of an ageing population, especially in relation to health and social care and in the built environment where design needs to factor in the mobility needs of older people.

At the occupational level, an indication of ageing's impact on labour demand can be gleaned from Figure 38 which shows the percentage of workers aged over 50 years in each occupation. It can be seen that this has increased over time which, in turn, indicates that other things being equal, the pressure to replace people exiting the labour market has increased. This is common to both occupations which are in shortage (e.g. craft and related workers) and those in surplus (clerical occupations). In the case of the former, this is likely to increase the number of shortages, in the case of surpluses it is likely to have the opposite effect.

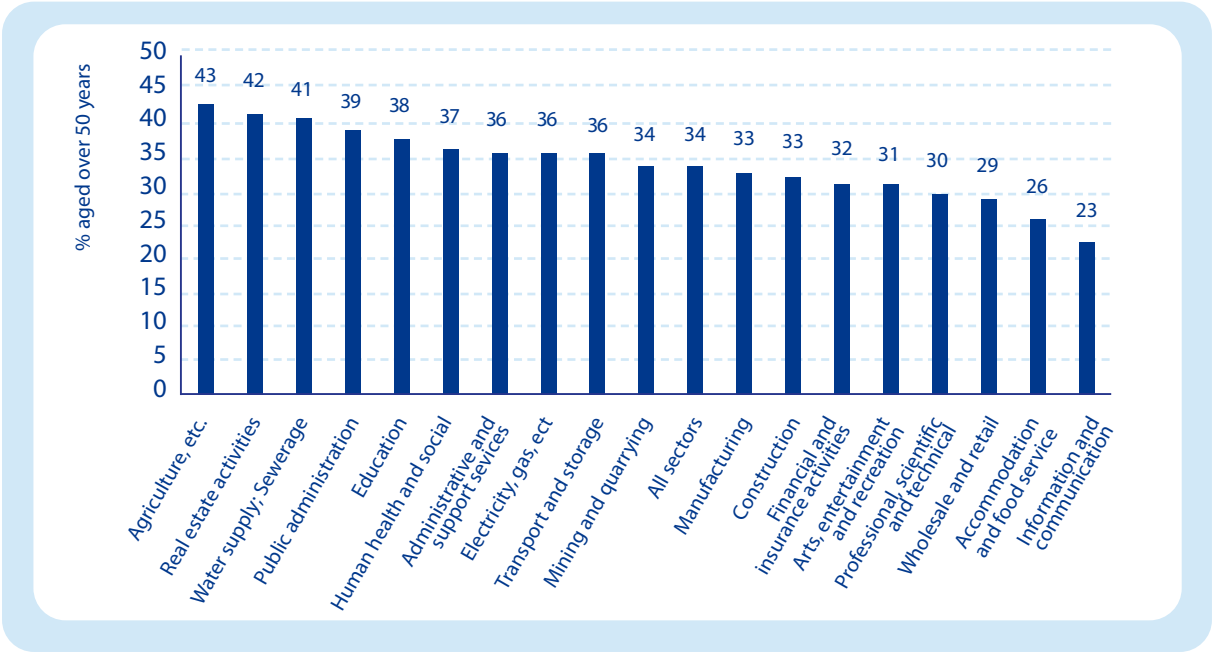
Figure 38 – People aged 50+ as a share of employment in each occupation, 2011 and 2021



Source : Eurostat Labour Force Survey [LFSA_EISN2]

There is also a sectoral dimension to potential replacement demands (see Figure 39). It is notable that sectors such as water supply have relatively aged workforces which has implications for the transition to a climate-neutral economy given that this is a sector where labour demand is likely to increase. Health and social care is also a sector with a relatively aged workforce. This has been identified as one area where there are numerous occupational shortages at a variety of levels (i.e. doctors, nurses, and carers). It is likely that the ageing of the workforce is one factor which is driving shortages in this particular occupation. Box 5, based on the responses of the NCOs, gives an insight into the nature of shortages in health and social care.

Figure 39 – Percentage of workforce aged over 50 years by sector, 2021



Source: Eurostat Labour Force Survey [LFSA_EISN2]

Box 5 – Difficulties meeting the demand for health and social care workers

As shown in Chapter 3, nursing and medical practitioners were identified as one of the most widespread shortages. This predates the pandemic which, however, increased the demand for healthcare workers. Globally, the International Council of Nurses warns that as much as half of the current nursing workforce could leave the profession within the next few years. This issue could lead to a global crisis in under a decade.[29] Migration is another driver that worsens the shortages in some countries and regions. In Eastern European countries, many nurses emigrated after the accession to the European Union. In France, recruitment of healthcare workers is especially difficult in the border areas with Luxembourg and Switzerland as both neighbouring countries are able to pay higher wages. In Luxembourg, recruitment is relatively difficult in the northern regions because of low population density. The competition for qualified healthcare workers also occurs between sectors. For example, trained nurses often prefer to work in the healthcare sector rather than the social care one because of the higher salaries and better working conditions. The competition also takes place between the public and private sectors. In Italy, following the pandemic, many doctors have resigned due to stressful working conditions, heavy-duty shifts, and low salaries compared to the European average. Many of these doctors shifted from the national health system to the private one which is able to offer higher salaries that partly compensate for the unattractive working conditions.[30] This phenomenon has come to the fore during the last months of 2022 and aggravated the shortages in the public health sector.

29 https://www.randstad.com/workforce-insights/talent-acquisition/why-there-a-global-labor-shortage/

30 https://www.corriere.it/sette/attualita/22_ottobre_29/medici-gettone-guadagno-c7f610f8-55da-11ed-be15-822086495e48.shtml?refresh_ce; https://www.sanita24.ilsole24ore.com/art/aziende-e-regioni/2022-11-10/fiaso-grandi-dimissioni-sanita-2021-via-servizio-sanitario-nazionale-3mila-medici-155536.php?uuid=AESsHuFC

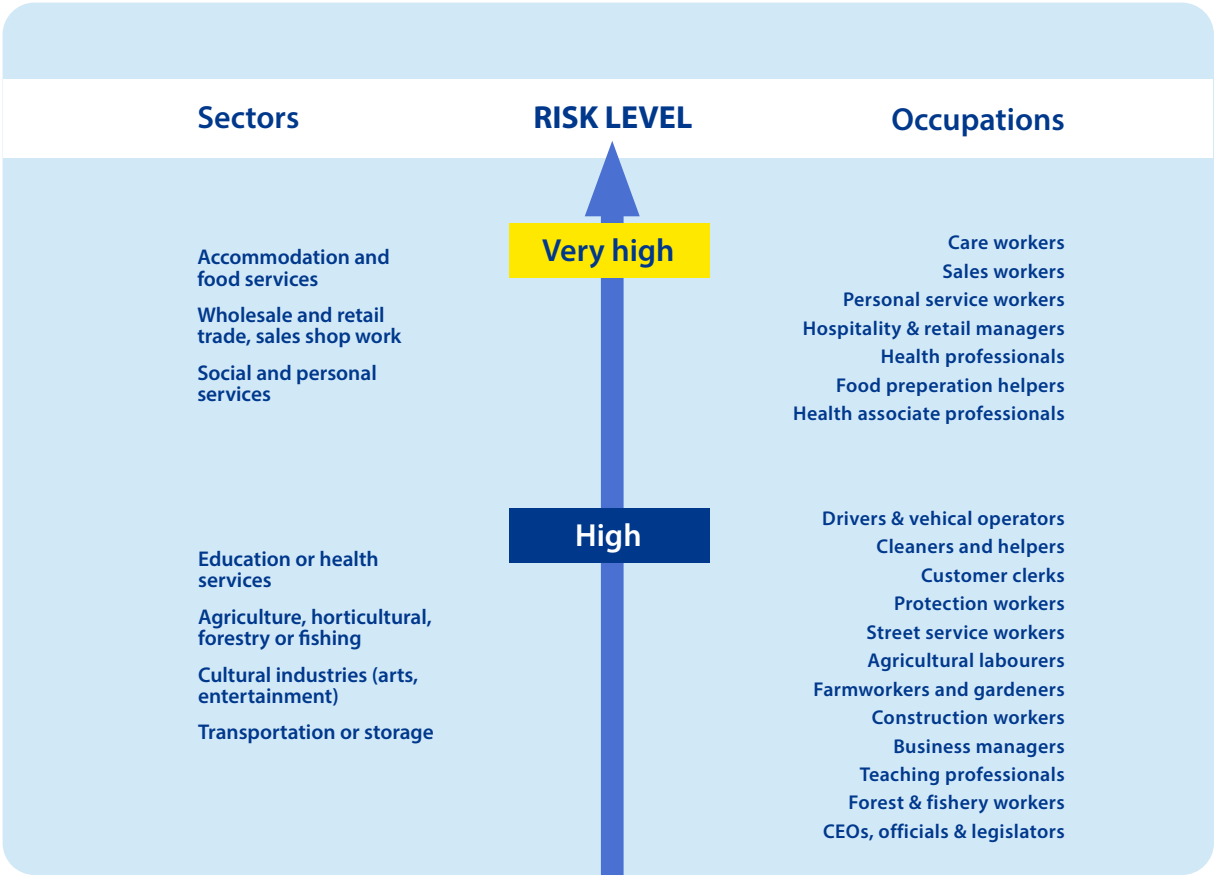
It also needs to be borne in mind that technology is also changing the skill needs required in health and social care jobs. Gerontechnologies, for instance, have the potential to change the nature of caring jobs through the use of robotics and remote monitoring of well-being (Zigante, 2020). Whether these are able to offset shortages (where technology substitutes for workers) or increase them (by increasing the skill needs required in care jobs) remains to be seen.

6.3.5. COVID-19 as a driver of occupational demand

A further driver of changing occupational labour demands is COVID-19. Although furlough schemes protected much employment across Europe during periods of economic lockdown, not all jobs and all workers were protected equally. People working in jobs where remote working/social distancing was not possible, young people, and those with temporary employment contracts have been adversely affected (Pouliakas and Branka, 2020; Adams-Prassl, et al., 2020; Redmond and McGuiness, 2020; Fana, et al, 2020; Eurofound/JRC, 2021). The impact on young people is particularly noteworthy given the ageing of the European workforce and the need to replace those who exit the labour market to take up retirement.

The analysis by Pouliakas and Branka (2020) provides an indication of those occupations where people were at risk of losing their jobs as a consequence of the pandemic (see Figure 36). Many of these are shortage occupations (notably care workers, cleaners, drivers, etc.). There is the possibility that the shortages reported in Chapter 3 reflect to some degree a bounce back from the pandemic and job lay-offs. Where people have been laid off, there is no guarantee that they will return to their former jobs when the labour market returns to growth.

Figure 40 – Occupations and sectors in which incumbents face a relatively high risk of job loss



Source: Adaptation from: Pouliakas and Branka (2021), p. 7

During 2022 many tech-companies reported lay-offs in an effort to cut costs. ICT jobs are typically in shortage (see Waters and Chavez, 2023 for an example). Whatever the reason behind the reduction in staff by tech-firms (whether it results from over-hiring during the pandemic when many people commenced using a variety of technologies in order to work from home) or other developments in the economy, it indicates the way in which shortages can quickly dissipate in response to a variety of economic imperatives.

6.4. The workplace dimension

6.4.1. Understanding employers' recruitment difficulties

One measure of a labour shortage is whether employers experience difficulties recruiting people. Where employers experience shortages this is likely to result from a number of factors, including:

- shortages of people with the skills required either in the external labour market or in internal labour markets;
- terms and conditions of employment on offer compared with other employers looking for the same skills and/or workers' preferences and expectations;
- employers' challenges to anticipate skill needs that they will need for a longer period of time;
- the degree of specificity in recruitment criteria (the more specific the qualities sought from applicants, the more likely it is that the combination of qualities will be found);
- the location of the workplace (the more remote the workplace the more difficult it will be to attract recruits);
- communication or advertising of a job vacancy;
- degree of engagement with local education and training institutions.

The focus here is upon understanding whether shortages occur as a result of skill shortages (however defined) or the terms and conditions of employment on offer. This is important because there are often claims made that recruitment difficulties result from skill shortages. This implies that the policy response should be to increase the provision of training to address skill shortages. Empirical evidence has questioned whether claims of skill shortages always bear scrutiny given that it is (also) the terms and conditions of employment that can cause recruitment difficulties (Cedefop, 2019; Eurofound, 2021).

6.4.2. Evidence of skill shortages

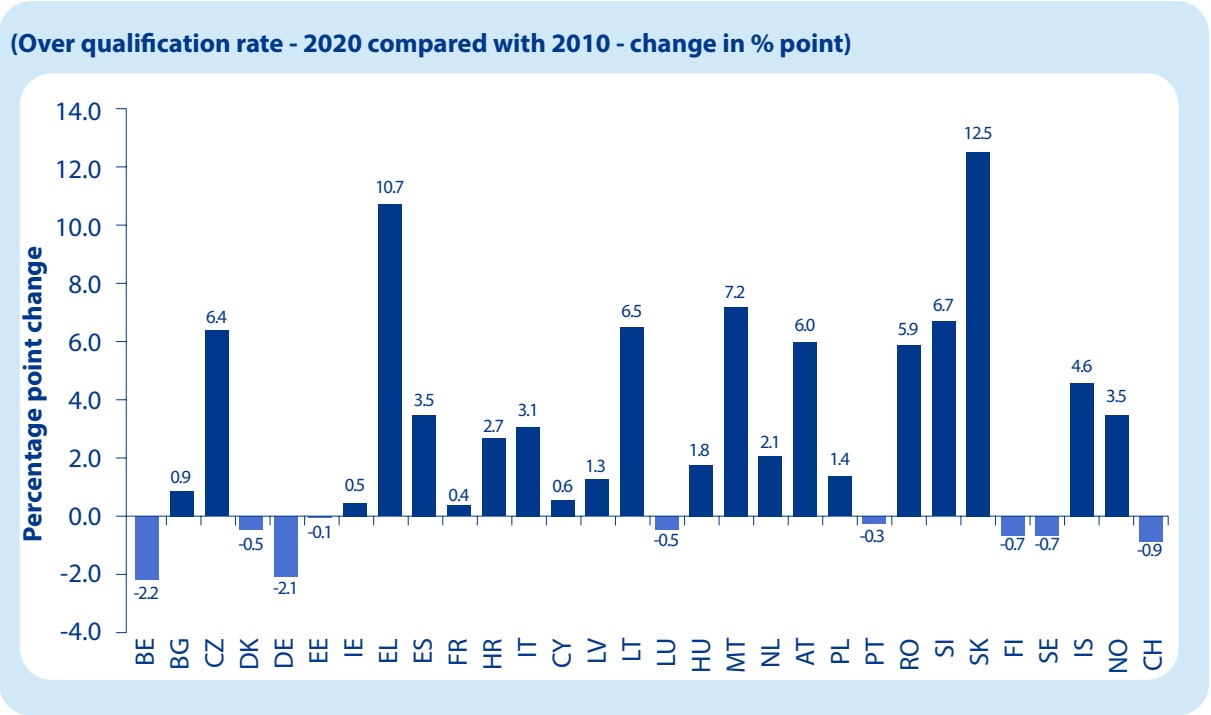
Skill shortages are difficult to define. McGuiness et al. (2016) have demonstrated the variety of ways in which skill shortages can be identified. This includes:

- qualification levels (does an individual hold a qualification commensurate with the skill level of the job);
- fields of study (is the individual qualified in a subject relevant to their job);
- differential occupational wage growth (where wage levels are rising relatively rapidly in skilled occupations this may reflect shortages of skills associated with those occupations); and
- employers' reports of skill shortages and gaps (usually with reference to recruiting skills from the external labour market or the extent to which there is a gap between the existing workforce's skills and the skills required to do the job).

One might add to the list of definitions whether an employer responds to a skill shortage in some way, such as increasing the provision of training, and whether the occupation in which the skill shortage is reported requires incumbents to have completed a substantial amount of training. When looking at the extent to which enterprises report skill shortages a degree of caution is required. Evidence from the US, for example, casts doubt on the scale of skill shortages because many employers who report them do little to resolve them (e.g. through providing training) (Cappelli, 2015).

Data on skill shortages at the EU-level are relatively scarce. By looking at the percentage of workers who possess a tertiary level qualification but are working in occupations other than managerial, professional, or associate professional ones, an indication is provided of the extent to which an individual's qualifications are commensurate with their job. The data reveal that levels of over-qualification have been static over time. In 2010, 20.3% were over-qualified compared with 21.5% in 2020. There is, however, substantial variation by Member State (see Figure 41). There are variations by sector, with relatively high levels of over-qualification recorded in sectors such as wholesale but relatively low levels in the health sector.

Figure 41 – Changes in levels of over-qualification by country, 2010 to 2020



Source: Eurostat Labour Force Survey

The data in Figure 41 are indicative. Qualification is not a direct measure of an individual's capability to undertake a job and thereby not a direct measure of skill. Employer surveys provide a further and more detailed insight into the causes of labour shortages. In 2019, the European Company Survey (ECS 2019) reported that over three quarters of employers who had recruited over the past three years had experienced difficulties finding people with the required skills (26% found it very difficult and 51% fairly difficult), with 21% of establishments reporting that it was not very difficult to find candidates with the desired skills (Eurofound/Cedefop, 2020). Similarly, the global Manpower Talent Shortage Surveys have revealed, over time, the increasing incidence of employers reporting difficulties recruiting staff with the skills they wanted: from 31% in 2010 to 75% in 2022 (Manpower, 2022). Further evidence of the extent to which labour shortages result from shortage of skills is provided by the EC's analysis of occupational and qualification mismatches (European Commission, 2022). In summary, this analysis reveals that the pandemic increased the level of occupational mismatch but this has since declined. This implies that the pandemic had a differential but largely temporary impact on the occupational characteristics of labour demand.

It is easy to confound reports of employers experiencing difficulties recruiting people with the attributes they require with skill shortages. Employers are often looking for qualities that are not necessarily ones which are related to skills, such as job readiness or fit with the organisation. Analysis of the ECS 2019 classified employers according to their approaches to recruitment (Eurofound/Cedefop, 2019). Employers were classified as those which:

- experienced great difficulty recruiting job-ready candidates (this accounted for 36% of employers characterised by, amongst other things, placing an emphasis on previous job experience and job readiness when recruiting);
- focused on personality and internal transfers, recruitment somewhat challenging (this group accounted for 26% of employers; here, a personality that fits the organisation tends to be the most important recruitment criterion, as they are more prepared to take on workers who are not job-ready, and make relatively high use of internal recruitment, amongst other things);
- recruited job-ready candidates with little difficulty (this comprised 39% of all employers; the most important recruitment criteria are previous work experience in similar jobs, or having all the qualifications necessary to do the job).

The results demonstrate that the approach to recruitment had a bearing on organisational well-being and performance. ECS 2019 defines organisational well-being with reference to relationships between management and employees, worker motivation, absenteeism and staff retention. Performance is measured with reference to profitability, profit expectations, changes in production volume, and expected changes in employment. The analysis revealed that in terms of well-being, establishments of the 'recruiting job-ready candidates with little difficulty' type scored best. The implication is that a simpler approach to recruitment – with the emphasis on previous experience and required qualifications rather than issues to do with organisational fit and job readiness – is associated with the qualities that motivate and retain staff. In terms of performance, establishments of the 'focus on personality and internal transfers, recruitment somewhat challenging' type scored best.

The above comes close to saying that where organisations provide a relatively good working environment (i.e. it scores high on organisational well-being), linked to a recruitment strategy which focuses mainly on whether applicants have the qualifications and experience which indicate whether they have the capability to do the job, are better able to recruitment the skills they need. By inference, organisations which have more complicated recruitment criteria which include, for instance, fit with the organisation, may well be experiencing recruitment difficulties which, at least in part, are unrelated to skills. A person may apply for a job with the skills or experience required, but will not be recruited because they are not considered a good fit with the organisation or work-ready. Work-readiness for example may be something which needs to be acquired in the workplace (Handel, 2005).

There is indicative evidence that where organisations are engaged in high productivity activities this increases the demand for skills (European Commission, 2022). This can, in turn, at least over the short- to medium-term, result in skill shortages because the supply-side struggles to keep pace with shifts in the demand for skills. In general, however, the evidence points to high productivity organisations being the most likely to invest in the skills of their workforces, thereby reducing any tendency towards increases in skill shortages (Wrucck and Pouliakas, 2022).

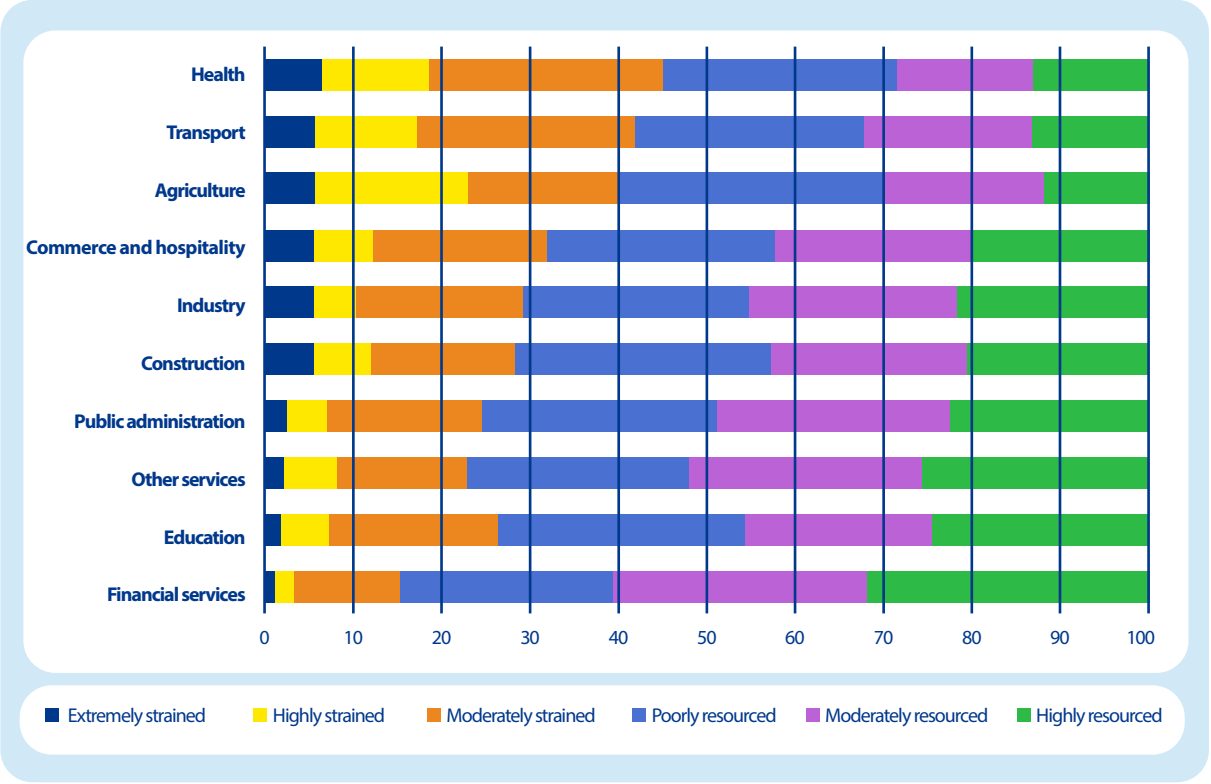
Analysis which has been able to separate the shortage of skills in the external labour market from other factors such as offering relatively poor working conditions suggests that between 60 and 80% of reports of skill shortage from employer may well derive from other non-skill related features of employment in the workplace (Cedefop, 2015). This is consistent with evidence which reveals that skills anticipation has improved along with adaptiveness of national vocational education and training systems to meeting labour market needs over the past 15 to 20 years (Cedefop, 2018; Hogarth, 2022).

6.4.3. The importance of working conditions

The implication of the commentary provided above is that a substantial share of reported skill shortage vacancies are due to non-skill factors. The non-skill factors are ones which, more or less, reflect working conditions.[31] The latest European Working Conditions Telephone Survey (EWCTS 2019) provides information on the quality of work faced by workers. Around 30%of individuals work in an environment characterised by the demands of the job being in excess of the resources available to do the job (Eurofound, 2022). This provides a measure of job strain. The survey shows that 4% of workers were in extremely strained jobs, 8% were in highly strained jobs, and 19% were in moderately strained jobs. The remainder were in resourced jobs, meaning they had more access to job resources and were less exposed to job demands. But even here, 26% were reported as being in poorly resourced jobs.

The occupational distribution of strained jobs or poorly resourced jobs is relatively pronounced in the case of craft workers – an area identified as one where shortages occupations are concentrated. From Figure 42 it can be seen that more than 50% of people working in craft, skilled agricultural, service and sales, plant and machine, and elementary occupations experienced, at best, poorly resourced working conditions. It is perhaps likely that in a jobs market characterised by relatively high levels of labour demand, that those with the skills required to fill these jobs, will look to enter jobs which have relatively good working conditions. Since working conditions may only be recognised by the worker once they are in a job, there is likely to be a relationship between labour turnover, working conditions, and recurrent recruitment which manifested itself as a labour shortage.

Figure 42 – Job quality by occupation, 2021



Note: Data are from the 2021 EWCTS

Source: Eurofound 2022, p. 55.

31 Trade unions highlight the importance of improving working conditions to relieve labour shortages in some occupations. To this end, the current imbalances might increase the bargaining power of workers. See for example https://www.socialeurope.eu/labour-shortages-offer-trade-unions-valuable-opportunity; https://www.etui.org/events/tight-labour-market-threat-opportunity; https://www.weforum.org/agenda/2023/01/trade-unions-recession-davos2023/Governments.

6.5. Chapter summary

There are a number of factors which determine labour shortages and surpluses. Over the last couple of years the EU economy and labour market has experienced a period of rapid change driven by COVID-19, the dislocations in supply-chains which followed the ending of lockdowns, and most recently the energy crisis brought by Russia's invasion of Ukraine. Over 2021/2022 employment levels have increased as the economy bounced back from the drop in output experienced during the height of the pandemic. It is perhaps unsurprising that employers experience labour shortages during a period of strong employment growth.

It is also evidence that there are changes taking place which affect the occupational demand for labour and the content of jobs. Demographic change and the transition to a digital and climate-neutral EU economy affect the occupational structure of employment, the task repertoire of jobs, and the skills people need to do their jobs. Rapid employment demand allied to changes in the job content has resulted in a situation where labour surpluses and shortages exist side-by-side.

Where labour shortages exist, there is a tendency of categorising these are skill shortages with a prescription to increase education and training so that unmet labour demands are met. Without doubt some labour shortages are skill related, but in many instances the evidence points to working conditions being a cause of shortages.

7. CONCLUSIONS AND POLICY POINTERS

7.1. Summary of the main findings

One of the most striking findings from the report is the magnitude of the current imbalance between labour demand and labour supply in Europe. Almost 400 different occupations were classified by at least one country as a shortage, while 321 different occupations were identified by at least one country as a surplus. The fact that a large number of shortage and surplus occupations were identified does not mean that many occupations are a shortage in some countries and in surplus in other countries. Such a finding would have created the possibility of successfully addressing the issue of labour market imbalances in Europe through an extensive process of matching across national borders the shortages in some countries with the surpluses in others.

Unfortunately, in the case of most of the occupations identified as shortages, there are only one or two countries where the occupations have been identified as a surplus. Nevertheless, the possibility to match many shortage occupations with surpluses even in a few countries presents a potentially useful strategic option.

There are 38 specific occupations which are classified in the report as widespread shortages – the term 'widespread' in this case refers to occupations which were identified as shortages in at least 11 different countries. The 38 shortage occupations were dominated by three groups of occupations; craft occupations – especially in construction and engineering; healthcare occupations, and occupations related to software. Most of the occupations which were identified as a widespread shortage were also identified as a severe shortage.

There were 37 specific occupations which were classified in the report as widespread surplus occupations – the term 'widespread' in this case refers to occupations which were identified as surpluses in at least five countries.[32]

Most of the occupations which were identified as a shortage were also classified as a shortage of high magnitude (i.e. severe shortage).

Some of the shortages may reflect recent events such as the COVID-19 pandemic or Russia's invasion of Ukraine and may abate in time. There are, however, also shortages that have existed for quite some time, such as software related occupations or construction craft occupations.

The situation regarding healthcare occupations is somewhat different. While a widespread shortage of doctors and nurses has been acknowledged in all previous reports back to 2019, a widespread shortage of healthcare assistants and specialist doctors has been apparent only since 2021 and the emergence of shortages in these occupations may have been influenced by the pandemic. Two other healthcare occupations, physiotherapists and psychologists have appeared on the list of widespread shortages for the first time in the current report. There are also three 'hospitality' occupations of waiter, butchers, fishmongers and related food preparers, and bakers, pastry cooks and confectionary makers for the first time, while the occupation of cook was already present in previous reports.

The list of the most widespread surplus occupations includes nine different clerical occupations, six different elementary occupations and perhaps surprisingly, 11 professional occupations (i.e. occupations which require a third level qualifications). The clerical occupations include general secretaries and receptionists and office clerks and various library clerks and stock clerks. The professional occupations include many in the creative arts and in the humanities. In contrast to the list of shortage occupations, there were no STEM disciplines among the professional surplus occupations.

The report presents a profile of persons employed in the 75 widespread shortage and surplus occupations in the EU27 in 2021.[33]

32 While 29 countries identified shortage occupations, only 24 countries were able to identify surplus occupations. The lower number of countries identifying surpluses meant that the threshold for identifying a widespread surplus occupation was lower.

33 The profiles reflect those working in the EU27, as covered by EUROSTAT data extractions received.

While females accounted for 46% of all those working in the EU27 countries in 2021, they represented only 34% of those working in the most widespread shortage occupations, and 62% of those who were employed in the most widespread surplus occupations.

The share of workers with third level qualifications (ISCED 5+) was lower in both the shortage occupations (27%) and the surplus occupations (25%) than the share in all occupations (37%). In contrast, the share of those with the lowest qualifications (ISCED 0-2) was higher in both the shortage (22%) and the surplus occupations (20%) than it was for all occupations (16%).

The dominant form of highest education attainment was the medium level (ISCED 3-4). However, the type of qualification differed between shortage and surplus occupations. Craft occupations tend to dominate the list of shortages, while a second level completion certificate (e.g., Baccalaureate) was the dominant form of education qualification[34] among those who were employed in the surplus occupations.

The youth profile (e.g. 15–29 years) of those who worked in shortage occupations (18%) or in surplus occupations (20%) in 2021 did not differ greatly from those who worked in all occupations (17%).

However, there were significant differences in the case of some occupations. For example, among waiters, 44% were under 30 years of age, while 27% of building labourers were also under 30 years of age. Among the surplus occupations, 52% of shelf fillers and 37% of cashiers and ticket clerks and 32% of hotel receptionists were under 30 years of age.

In the analyses, the location of a worker's birth is used to identify whether they are migrant within the country of their employment. On this basis, the share of migrants working in the shortage occupations was 16%, and 14% in the surplus occupations. These shares are somewhat higher than the share of migrants working in all occupations in 2021 (12%).

However, as in the case of the other personal characteristics, the share of migrants is much higher in respect of individual occupations. For example, over 30% of those employed as cleaners and plasterers are migrants, while among surplus occupations over 30% of kitchen helpers are migrants, and this is also true - for obvious reasons - of translators and interpreters.

Identifying the occupations which are associated with multiple indicators of 'disadvantage' may contribute to the design of more effective active labour market measures.

The report identifies a combination of factors which contribute to the imbalance between labour demand and supply. The tendency in recent years for young people to study academic subjects rather than train for a vocational skill is an example.

The ageing of the European population and the increasing capacity of medical technologies to prolong life has had a significant impact on the number of people seeking healthcare services, and there is evidence that the supply of appropriately qualified graduates has not kept pace with these developments.

The widespread diffusion of new technologies into every aspect of our lives is driving the demand for software skills, while it may also have resulted in reducing the market demand for some workers – particularly those who are employed in occupations which are associated with work which is typically of a routine nature.

Other influential elements refer to the structural shift in economic activities, the transition to a climate-neutral economy, migration and mobility or workplace practices including working conditions and recruitment approaches.

34 It might also have included a post-secondary qualification, but not a third-level qualification.

7.2. Policy options

The findings in this report suggest that there are a number of policy options which could be explored to alleviate the imbalances between labour demand and supply which are highlighted in this report. These policy options[35] are discussed under six specific issues.

1. Relevant education, training opportunities and career guidance for both genders

The report shows that recruitment to almost every occupation which has been classified as either a widespread shortage or a widespread surplus is predominantly from one gender. This is particularly the case for all 18 craft shortage occupations, all nine surplus clerical occupations, the four software-related shortage occupations and shortages of nurses and healthcare assistants.

This situation suggests that boys and girls are either not been given the opportunity to obtain the relevant qualifications for some occupations or are not being properly informed of the employment prospects associated with different occupations - or both. The situation poses a significant threat to the employment of girls in particular as female workers dominate employment in the surplus occupations.

It is important that the findings from reports such as this are circulated to schools and career guidance officers. It is also imperative that senior managers who are involved in sectors (e.g. software) where there are many job opportunities inform young people of these opportunities – especially those of the gender which is significantly under-represented in their workforce.

Other initiatives could be considered, such as gender-specific courses in some apprenticeships and education programmes, and in the case of the former, incentives to employers for the sponsorship of female apprenticeships – specifically in traditionally male dominated occupations.

2. European audit of apprentice numbers

There is a widespread belief that young Europeans are to an increasing extent pursuing academic studies rather than attending training courses in vocational skills. If this is the case, the subsequent reduction in supply may be contributing to the shortages in craft occupations which have been identified in many countries in this report.

It is difficult to be precise about the extent to which the numbers attending apprenticeship courses have changed in recent years. Employment in the EU27 increased by 8% over the most recent 10-year period (2012Q2 to 2022Q2) which was equivalent to an increase of 14.5 million. However, the education profile of the workforce changed significantly over this period. The share of those on the lowest qualifications (i.e. ISCED 0-2) declined from 20% to 16% - equivalent to a reduction of 5.4 million. The numbers who had completed secondary and post-secondary education or training (i.e. ISCED 3-4) also declined from 50% to 47%. However, the share of workers who had third level qualifications increased from 29% to 37% over this period.

While these figures show that there is a significant upward trend in the proportion of young people participating in third level education, it does not inform on the extent to which those attending higher secondary education and post-secondary education are participating in apprenticeship.

However, the figures which are available are consistent with a significant decline in the numbers of craft workers over the last 10 years. While total employment in the EU27 expanded by 8 percentage points (pp), the number of workers in the broad occupation group 'craft workers and related trades' increased by only 3pp.

Furthermore, in many of the countries surveyed in this report – especially those that have classified construction or engineering occupations as shortages – there was a significant contraction in employment in the broad occupation group 'craft workers and related trades' over the last 10 years.

In view of the fact that the demand for many construction craft workers is increasing due to population and employment growth and the reduction in the average household size, the significant reduction in the employment of craft workers over the last 10 years is an issue of considerable concern.

One factor which may be both contributing to the labour market imbalances among craft workers, and which could possibly also form a part of the solution to the challenge of labour shortages in this area, is the higher complexity of the work of some crafts. For these crafts, the level of education required in some European countries has increased, as indeed have the failure rates. The crafts include electrical and plumbing, toolmaking - specifically for pharma and medical devices sectors, the mechanical automotive maintenance fitter, and mechanics generally.

The demand for innovative 'green' technologies has contributed to the increasing complexity of plumbing and electrical work, while the demands of the pharma and medical devices sectors for exceptionally low levels of tolerances in tools requires a level of statistical knowledge more associated with third level courses than apprenticeships.

35 Such initiatives may already be in place in many European countries.

transport fleet with electrical and hybrid vehicles has transformed the type of engine that mechanics – to an increasing extent – are required to maintain and repair.

These technological developments could form the basis for discussions on the possible enhancement of the levels of the relevant craft qualifications for certain trades. The fact that there is a significant upward trend in the number of young people attending third level colleges – despite the earnings potential for many qualified craft workers – suggests that status may be one of the considerations motivating young people to seek white-collar employment. If this is the case, an enhancement of the status of some craft qualifications could present a partial solution to the challenge.

However, more data are required – particularly time-trends on the numbers participating in apprenticeship across European countries. Cedefop (2021c) has recently completed a major report on this issue but encountered some difficulties in constructing a comprehensive picture.

On a different scale, additional measures could include information provision and awareness raising towards workers, young people and their families, as well as incentives to opt for apprenticeships, including support to cross-border apprenticeships, and review of apprenticeship systems to check for their attractiveness (including working conditions).

3. Cross-border matching

While the number of identified widespread shortage occupations which are also identified surplus occupations in another country is limited, there are a large number of occupations which have been identified as both shortage and surplus occupations in different countries. Such information is potentially valuable in any policy initiative which is designed to address labour market imbalances.

These data have to be made available to the relevant stakeholders - particularly EURES and the national Public Employment Services (PES) - in a user-friendly, timely and flexible format. The data require to be arranged in such a manner that relevant stakeholders can easily and quickly identify those countries where the occupations which are classified as shortages in their country are classified as surpluses.

A reluctance to move to other regions which have greater employment opportunities – even within the same country – has been identified in this report as a potential barrier to resolving some labour market imbalances.

In addition to provision of information on the matching of shortages/surpluses it is important to also conceive and implement (more) awareness raising activities addressed to workers and employers on the opportunities and risks of labour mobility, as well as concrete orientation measures.

4. Monitoring technological displacement of labour

While developments in new technologies are creating a demand for those who possess relevant software-related qualifications, it is also posing a risk for those who are employed in occupations which are associated with work of a routine nature. Much of the work associated with the surplus occupations of secretaries, receptionists, shop sales assistants and hand packers could be described as routine, and consequently is vulnerable to being displaced by technology.

An exploration of employment trends in these occupations provides mixed results. The clerical and support group of occupations - which contains nine occupations which are classified as surplus - are occupations which potentially could be replaced by technology because of the routine nature of many of the tasks of a clerical worker.

At the level of the EU27, employment in clerical and support occupations increased by 8pp between 2012Q2 and 2022Q2 – the same magnitude that employment in all occupations increased by.

However, while the total EU27 employment trends in the clerical and support group of occupations over the last 10 years suggests that there was little if any technological displacement of the tasks of clerical workers, the data present a very different picture when employment trends in individual countries are analysed – particularly in those countries that classified clerical occupations as surplus. Despite the fact that all of these countries recorded positive growth in total employment, they all experienced significant reductions in the employment of clerical and support workers, resulting in a decline in their share of overall employment in every case.

It may be the case that many of those countries that classified clerical workers as surplus occupations are acting as a harbinger of future trends. A policy which is designed to address labour market imbalances in Europe should monitor the share of employment in occupations which are typically associated with routine tasks as part of an overall strategy to identify the extent to which technology is displacing employment and thus contributing to the emergence of labour market imbalances.

5. The demand for 'green' skills

All of the countries which are participating in this study have agreed targets with the European Commission in respect of reducing their level of carbon emissions.

The greatest sources of carbon emissions in Europe include transport, agriculture, the burning of fossil fuels and the built environment. From the perspective of labour market imbalances, the action plans for the reduction of carbon in the built environment are likely to have a significant impact.

One of the major strategies for the reduction of carbon in the built environment includes the retrofitting of the existing housing stock. This strategy will impose more demands on construction craft workers, who have been identified in this report as being in short supply. An example from one EU country – Ireland – will illustrate the extent to which this activity will accentuate the current shortages.

The Irish government has introduced a scheme to retrofit 500,000 houses – equivalent to a quarter of the total housing stock – to very high energy rating standards by 2030.

The most recent forecasts suggest that 23,000 workers are required to deliver this scheme and that almost all of them will require a craft qualification (Government of Ireland, 2022). To put this in perspective, total employment in the construction sector in Ireland is currently 170,000[36] of which roughly 100,000 are craft workers.

The 'green agenda' is expected to increase the demand for construction craft skills. Indeed, it may also increase the demand for software skills which is another skill area which has been classified in this report as a shortage. Some of the technologies associated with sustainability such as electric and hybrid vehicles and wind turbine technology will require some levels of computer literacy to maintain and repair the technology.

6. Working conditions

Public and policy debate on labour market imbalances do not only discuss the impact of new technologies and the transition to a climate-neutral economy, but also the influence of working conditions. According to the responses of the countries participating in this study, the shortage occupations often associated with unfavourable working conditions include heavy goods vehicle drivers, bakers, pastry cooks and confectionery makers, bricklayers and related workers, bus and tram drivers, and butchers, fishmongers, and related food preparers.

On the basis of this response, a policy designed to address the issue of labour market imbalances must address the issue of working conditions.

The issue is multi-dimensional and includes certain demographic profiles (notably qualification levels and migration background), modest wages and anti-social hours of work. The dissatisfaction with overall working conditions is generally expressed in relatively high labour turnover rates. Any policy which is designed to improve retention in these occupations must involve the sector representative bodies to ensure that changes do not result in unfair competition between firms. Focusing on younger or older jobseekers might also reap benefits as the inherently anti-social hours are particularly challenging for male and female workers with small children.

The six issues discussed above demonstrate that the factors which contribute to labour market imbalances in Europe are multi-faceted. Consequently, a successful policy initiative in this area will require a holistic approach which addresses all the different dimensions of the challenge.

36 171,000 were employed in the construction sector in Ireland in 2022Q3.

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9. ANNEXES

Annex 1: Detailed methodology for data collection

In June 2022, ELA circulated a template (see Annex 2) to the NCOs of 30 countries and three regions seeking detailed information on shortage and surplus occupations. These countries and regions include the 27 Member States of the European Union (EU) plus Iceland, Norway, Switzerland, and for the very first time, Liechtenstein. In the case of Belgium, the NCOs of the three autonomous regions, namely the Flemish Region, the Brussels-capital region, and the Walloon Region, provided separate regional data.[37]

Each NCO was asked to provide a list of shortages and surpluses in their country – there was no maximum or minimum number stipulated. The NCOs were requested to provide the data in 4-digit ISCO '08 occupation codes.

Data received were quality checked for completeness and consistency and when necessary NCOs were contacted for clarifications to the data provided. This means that in some instances data provided by NCOs had to be aligned and adjusted for comparability purposes: this might imply that the number of shortage and surplus occupations submitted in some of the templates may not be the number of shortages and surpluses transferred to the database for further analyses.

Firstly, in some of the templates, the occupation codes which identified the shortage and surplus occupations were duplicated. In these cases, the duplicates were identified and systematically removed so that the final lists of surpluses and shortages were composed exclusively of unique occupations. This procedure resulted in fewer occupation codes transferred to the database. In other cases, some occupation codes were provided in the more aggregated 2-digit or 3-digit formats rather than the more granular 4-digit format. In general in these cases, the 4-digit occupations within the more aggregated group were explicitly included in the analyses – creating more 4-digit occupations than were originally submitted in the template.

Finally, in a very small number of cases, there was an inconsistency in the template between the code and the description of the occupation. Where it was not possible to resolve the inconsistency, the occupation was not included in the analyses.

Concerning Belgium, the list of shortages and surpluses received from the three autonomous regions were merged into a single national Belgian response. Duplicates were removed and a quality check was conducted on the qualitative answers provided. When information was not convergent – e.g., the same shortage occupation is ranked as high magnitude by one autonomous region and as low magnitude by another - the national result has been labelled as 'no clear convergence'. These few results were excluded from the analysis.

It is worth noting that there were a number of modifications made to the data collection template ('quantitative' questionnaire) compared to previous editions of this report, partly stemming from a consultation with a group of NCOs at the beginning of the assignment:

- No ex-ante number of shortages or surpluses to be identified;
- Requirement for objective assessment of magnitude of shortage or surplus;
- Questions on the impact of the transition to a climate-neutral economy, new technology and working conditions on labour market imbalances.

Templates from all 27 Members of the European Union and Norway and Switzerland were completed for shortage occupations, while 24 templates were completed in respect of surplus occupations (see Table 1). The absence of information on surplus occupations from five countries was mainly due to the fact that the source of their data included only shortages.

37 The three Belgian regions are presented as one country in this report. In previous reports, Belgium was presented as three separate regions. However, the data from the three regions is available should it be required.

Special data extracts were requested from Eurostat on the profiles of persons employed in the EU27 in 4-digit ISCO '08 occupations. These profiles included gender, youth (15-29 years), highest education attainment and place of birth. The objective of seeking these data was to assess the extent to which labour market imbalances impacted on disadvantaged groups of workers.

Each country was requested to provide a range of information in respect of each identified shortage and surplus occupation. To guide the NCOs in completing the questionnaire, a definition of 'labour shortage' was provided, together with an explanation for each information sought (see Annex 2). This information included the extent of the shortage or surplus (i.e., was it of low, medium, or high magnitude). The concept of 'magnitude' was defined in strictly quantitative terms to give an indication of how 'severe' the shortages or surpluses were. The decision of ELA to expand the scope of the report meant that additional qualitative data had to be collected to provide insights into the context in which labour market imbalances emerge, both through field as well as desk research, the latter in the form of an extensive review of contemporary literature on the subject. The review concentrated on bringing the discussion up to date with some of the latest developments and their likely permanence. For this reason, only documents dated 2018-onwards were used, the majority dated in 2022. The document research concerned documents drafted in English. The review encompassed 45 documents including EU-level studies, academic and grey literature. Information was collected into a synthesis matrix that classified the impact that each driver has on (i) the labour market in general, (ii) specific sectors and occupations, and (iii) vulnerable groups.

ELA also circulated a qualitative questionnaire to the NCOs seeking their responses to a number of questions on issues such as the impact of the transition to a climate-neutral economy, of new technologies and of cross-border mobility on labour market imbalances in Europe (see Annex 3).Field work further entailed the organisation of three focus group meetings involving social partners, the NCOs and experts involved in monitoring cross-border activities:

- Focus group 1: Cross-border partnerships
- Focus group 2: NCOs
- Focus group 3: Employers' representatives

Focus group 2 was also directed to trade unions but no representatives confirmed their participation. Two trade unions representatives participated in focus group 1 and trade unions' perspective was taken into account by consulting briefs and position papers from the main European-level trade unions.

Annex 2: Template for data collection

Column	Information sought	Explanation	Format
Column 1	**Occupation title (text)**	Type in free text a list of occupations (one row one occupation) for which shortages and surpluses exist; first list occupations for which there is a shortage; unlike last years report there is no number of maximum or minimum occupations; however if your list does not contain any occupations we will consider that there are no labour shortages and surpluses in your labour market	free text
Column 2	**Shortage/surplus indicator**	For each occupation indicate if it refers to a shortage by typing in 'shortage' or surplus by typing in 'surplus'; to identify labour shortage or surplus occupations you can examine for each occupation the ratio of the number of job seekers to the number of vacancies at the end of each year; or the results of surveys or forecasting models etc. Whatever indicator you use, you can rank the occupation interms of a labour shortage or surplus and list it as such in Column 2.	"Shortage, Surplus (drop-down menu)"
Column 2a	**Optional: List whether labour shortage occupation is a skilled occupation (drop-down menu)**	Some NCO's expressed the view that it would be useful to identify which labour shortage occupations were specifically a shortage of the appropriate skills (i.e. qualifications and/or required experience rather than any of the other factors which can create labour shortages such as unattractive working conditions etc.)	"Skills shortage, Labour shortage (drop-down menu)"
Column 3	**Occupational classification used in your country**	For each occupation indicate what occupational classification (if any) was used to identify this occupation; for instance, you can report a country specific classification, ISCO, ROME, SOC, etc. If you don't use occupational classifications, type 'None'	ISCO, ROME, etc., none
Column 4	**Occupation code to the lowest level of disaggregation (e.g. ROME, SOC, ISCO at 4 digits)**	If you have indicated a classification used, type the code for each occupation; use the lowest level of disaggregation (e.g. 4 digit ISCO code); if you don't use occupational classification leave blank	9999

Column	Information sought	Explanation	Format
Column 5	**ISCO-08 code at 4-digit level (or lower if 4-digit not available)**	If you use occupational classification which is not ISCO-08 and if it is possible, provide a translation of the national code to ISCO-08 code; ISCO is the International Standard Classification of Occupations which is used to report to Eurostat; code should be at 4 digits; if this is not available than the lowest level of disaggregation that is available should be reported (3 digits if 4-digit code is not available; 2 digits if neither 4-digit nor 3-digit code is available; 1 digit if neither 4-digit, 3-digit nor 2-digit code is available); if it is not possible to provide translation to ISCO-08, leave blank; if you have already reported ISCO-08 code in column 4, repeat the code - copy column 4 to column 5	9999
Column 6	**What indicator(s) suggested that there is a shortage/surplus?**	Indicate what criteria was used to conclude that this occupation is associated with a shortage/surplus; for instance, ratio of registered job seekers to vacancies, employers views, sourcing from abroad to fill vacancies, growth in employment faster than growth in education/training output, time required to fill vacancies higher than average, etc.	free text
Column 7	**Please indicate the magnitude of the labour shortage or surplus using an objective source or criterion**	For each occupation, indicate a broad estimate of the magnitude of the labour shortage/surplus; high, medium or low. Please use an objective criterion in making this assessment (e.g. ratio of vacancies to job-seekers; results of surveys, studies you have read etc.)	high or medium or low
Column 7a	**Source or criterion iaccording to which labour shortage magnitude is identified**	Here you should indicate according to which source or criterion you defined the magnitude of the identified labour shortage; if possible elaborate on which benchmarks you used in order to define the shortage/surplus as high medium or low.	free text
Column 8	**Year for which the shortage/surplus refers to (YYYY) and if possible the first or second 6 months of that year**	Indicate the year that the information on shortages/surpluses (column 7) refers to e.g. type '2019' for a survey of difficult to fill vacancies conducted in 2019, even if the report was published in 2020. However, this year we would also like information on which part of the eyar the labour shortage or surplus refers to (i.e. first or seecodn 6 month period). If you have this information, place h1 or h2 beside the year - whichever is appropriate.	YYYY QY

Column	Information sought	Explanation	Format
Column 9	**Source of information on shortages/surplus (e.g. PES administrative data (vacancies, job seekers), PES survey, third party survey, National occupational forecasts, other (specify) etc.)**	Indicate the source of information used to assess the imbalance in the labour market - shortages and surpluses (e.g. PES administrative data on vacancies and job seekers, PES survey, third party survey, National occupational forecasts, etc.); if there is more than one source used, indicate all sources used. Please provide exact reference or weblink of the source used.	free text
Column 10	**In your experience is the shortage or surplus in this occupation related to the green agenda**	The purpose of this question is to gather information on which shortages or surpluses you consider are related to the greeen agenda. For example, you might have identified 'electrician' as a shortage occupation and you may consider that the demand for electricians in your labour market has increased because of the greeen agenda. You would then answer 'yes' in this column on the row which has electrician as a shortgage.	Yes; no; don't know (drop-down menu)
Column 11	**In your experience, is the shortage or surplus in this occupation related to the impact of new technologies!**	The purpose of this question is to gather information on which shortages or surpluses you consider are related to the impact of new technologies. For example, you may have identified retail sales assistants as surplus occupations and you may consider that the surplus was created to some extent by retail staff being displaced by bar code technologies. You would then answer 'yes' in this column on the row which has retail sales assistants as a surplus.	Yes; no; don't know (drop-down menu)
Column 12	**In your experience, is the shortage or surplus related to unattractive working conditions.**	The purpose of this question is to gather information on which shortages or surpluses you consider are related to unattractive working conditions. For example you might have identified heavy goods vehicle driving as a shortage and you may be of the view that long anti-social hours has contributed to shortages in this profession. In that case, you would answer 'yes' in this columkn in the row that contains this shortage occupation.	Yes; no; don't know (drop-down menu)
Column 13	**Have you knowledge of or access to relevant materials**	It would be of benefit to the quality of the report if you inform us of any materials you are aware of which are relevant to the issue of labour shortages and surpluses. Pleae list the references to these materials in Column 13.	References, Links

Annex 3: Questionnaire for NCOs

2022 EURES REPORT ON LABOUR SHORTAGES AND SURPLUSES

SUPPLEMENTARY QUESTIONNAIRE FOR NATIONAL INFORMATION COLLECTION

For this project, the European Labour Authority will explore different sources to obtain information on the issues which impact on labour shortages and surpluses. With that in mind, we wish to take this opportunity to inquire if the EURES NCOs, or other stakeholders they could approach without causing additional workload, have information that you could share with us on considerations related to regions and vulnerable groups (e.g. young unemployed, persons with disabilities etc.) and other topics (e.g. the role of working conditions) relevant to the assessment of labour shortages and surpluses.

If you have such information, ELA would be grateful if you share it with us. If the space provided is too limited for your comments, feel free to use additional space.

Q1: Is there a regional dimension to labour shortages or surpluses in your country and, if so, why?

Please indicate which regions have, respectively, particularly high levels of shortages and surpluses. Examples of issues that you might want to discuss are: Do you observe shortages on specific occupations in one/some regions while there are surpluses in the same occupation in other regions? What are the reasons for the observed regional shortages and surpluses? In relation to surpluses have these arisen, for example, because of recent lay-offs (e.g. because of COVID-19, disruptions caused by the war in Ukraine, closing of companies due to greening trends etc.) in certain industries which have had a particular impact on people working in certain occupations or simply the consequence of long-run economic decline? In relation to shortages, have these arisen because the rapid pace of economic growth in the region, either generally or due to sectoral specialisation (e.g. related to digitalisation or greening)?. In how far are the arising shortages/surpluses consequence of demographic and societal change (e.g. contraction of the size of the regional labour force for age reason, mobility patterns to/from the region due to personal preferences)? Are living conditions (e.g. availability, quality and prices of housing, availability and quality of services of public interest like care facilities or education provision) decisive for shortages/surpluses in the region?

Shortages

Surpluses

Q2: Do you have insights or considerations as regards vulnerable groups on the labour market and shortages/surpluses?

For example, that specific types of vulnerable groups (e.g. people with disabilities, older workers, young workers, those with low levels of educational attainment, those with caring responsibilities, people with migration background etc.) are more or less exposed to shortages/surpluses? If so, which group, and is there information on the reasons behind? How has their labour market situation (e.g. access to employment, quality of employment, working conditions etc.) improved or worsened because of shortages/surpluses in the occupation/region?

Shortages

Surpluses

Q3: Is there any evidence of cross-border mobility either increasing or decreasing levels of labour shortages/surpluses for certain occupations/regions?.

For example, does cross-border mobility associated with a certain occupation reduce surpluses in the region of origin and reduce shortages in the region of destination, or does it increase shortages in the region or origin while reducing them in the region of destination? Any examples you can provide will be much appreciated.

Annex 4: Cross-border matches

Occupation

Accountants

Shortage: BE; CH; DK; IT; LU; NL; NO; RO; SI

Surplus: DK

Accounting and Bookkeeping Clerks

Shortage: DK; FR; MT; NO; PL

Surplus: FI; SE; SI; SK

Accounting Associate Professionals

Shortage: BE; CH; DK; FR; LU; NL; NO; PL ; SI

Surplus: BG; EE; SK

Actors

Shortage: IT

Surplus: AT; DK; EL; RO

Administrative and Executive Secretaries

Shortage: BE; IT; NL; MT

Surplus: AT; BE; DK; EE; FI; HR; LT; PT; SE; SI; SK

Advertising and Marketing Professionals

Shortage: CH; EE; IT; MT; NL; NO

Surplus: AT; DK; FI; PT; SE; SI

Advertising and Public Relations Managers

Shortage: IT

Surplus: DK; HU; RO

Aged Care Service Managers

Surplus: DK

Agricultural and Forestry Production Managers

Shortage: NL

Surplus: LV

Agricultural and Industrial Machinery Mechanics and Repairers

Shortage: AT; BE; EE; ES; DE; FR; IT; LT; NL; NO; PT; SI

Surplus: DK; HU; RO

Agricultural Technicians

Surplus: HU; RO

Air Conditioning and Refrigeration Mechanics

Shortage: BE; CH; DE; FI; HR; LV; NL; PL; SI

Surplus: HU

Air Traffic Controllers

Shortage: CH

Air Traffic Safety Electronics Technicians

Shortage: RO

Surplus: DK

Aircraft Engine Mechanics and Repairers

Shortage: CH; IT; LV

Surplus: DK

Aircraft Pilots and Related Associate Professionals

Shortage: CH; HU

Surplus: DK; HU

Ambulance Workers

Shortage: FR; NO; PL

Surplus: BE

Animal Producers Not Elsewhere Classified

Shortage: NO

Surplus: DK; LV

Announcers on Radio; Television and Other Media

Shortage: AT; BE; EE; ES; DE; FR; IT; LT; NO; PT; SI

Surplus: DK; HU; RO

Aircraft Pilots and Related Associate Professionals

Shortage: IT

Apiarists and Sericulturists

Surplus: HU; RO

Applications Programmers

Shortage: AT; BE; BG; CH; CY; EE; FI; FR; HR; IE; LV; NL; NO; RO; SI

Aquaculture and Fisheries Production Managers

Surplus: DK; RO

Aquaculture Workers

Shortage: CH

Surplus: DK

Archivists and Curators

Shortage: CH; IT

Surplus: DK; ES

Armed Forces Occupations; Other Ranks

Shortage: BE; CH; SI

Assemblers Not Elsewhere Classified

Shortage: CH; EE; NL; NO; SK

Surplus: BG; SK

Athletes and Sports Players

Shortage: IT

Audiologists and Speech Therapists

Shortage: BE; EE; DE; FI; IT; NL; SI

Authors and Related Writers

Shortage: CH; IT

Surplus: DK; FR; LT

Bakers; Pastry-cooks and Confectionery Makers

Shortage: BE; DK; EE; FR; HR; IT; LT; NL; NO; PL; SI; SK

Surplus: HU

Bank Tellers and Related Clerks

Shortage: CH; LU

Surplus: AT; FI; SE

Bartenders

Shortage: BE; DK; HU; NL; NO; PT

Surplus: DK; HU; LV; SE

Beauticians and Related Workers

Shortage: AT; BE; EE; ES; DE; FR; IT; LT; NO; PT; SI

Surplus: BE; DK; FI; HU; LT; SK

Bicycle and Related Repairers

Shortage: BE; HU; IT; NL

Surplus: DK; HU

Biologists; Botanists; Zoologists and Related

Shortage: CH; IE; IT

Surplus: DK; RO

Blacksmiths; Hammersmiths and Forging Press Workers

Shortage: IT

Surplus: HU

Bleaching; Dyeing and Fabric Cleaning Machine Operators

Shortage: BE; IT

Bookmakers; Croupiers and Related Gaming Workers

Shortage: RO; SK

Surplus: DE; HU

Bricklayers and Related Workers

Shortage: BE; CH; CZ; DK; EE; FI; FR; HR; HU; IT; LT; LV; NL; NO; PL ; PT; SE; SI; SK

Surplus: DK; HU; RO

Broadcasting and Audio-visual Technicians

Shortage: AT; CH

Surplus: DK; FI; LV; SI

Builders; Traditional Materials

Shortage: SK

Building and Related Electricians

Shortage: BE; CH; CZ; DK; EE; EL; DE; FI; FR; HR; LT; LV; NL; NO; PL; PT; SI; SK

Surplus: HU

Building Architects

Shortage: CH; DK

Surplus: SI

Building Caretakers

Shortage: BE; DK; FI

Surplus: AT; DK; FR; SE; SK

Building Construction Labourers

Shortage: BE; CH; CZ; DK; FI; HR; HU; IT; LV; MT; NL; PL; PT; SI; SK

Surplus: DK; EL; DE; LT; NO; SE; SK

Building finishers and related trades workers not elsewhere classified

Shortage: SI

Building Frame and Related Trades Workers Not Elsewhere Classified

Shortage: BE; EE; FI; FR;I T; LT; NL; NO; PL; SE

Surplus: DK; HU; SK

Building Structure Cleaners

Shortage: BE; LV; PL; RO

Bus and Tram Drivers

Shortage: BE; BG; CH; DK; EE; FR; IT; LT; NO; PL; RO; SE; SI; SK

Surplus: EL

Business Services Agents Not Elsewhere Classified

Shortage: RO

Surplus: LT; SE

Business Services and Administration Managers Not Elsewhere Classified

Shortage: DK; FR; NO

Surplus: BE; DK

Butchers; Fishmongers and Related Food Preparers

Shortage: BE; CH; EE; FR; HR; HU; IT; LT; NL; NO; SE; SI

Surplus: HU

Buyers

Shortage: CH; DK; NL; NO; RO

Surplus: HU; SE

Cabinet-makers and Related Workers

Shortage: BE; CH; DK; EE; FR; HU; LT; NO; PL; SI

Surplus: FI; HU

Car; Taxi and Van Drivers

Shortage: BE; DK; MT; NO

Surplus: AT; BE; DK; DE; HU; LT; PT; SK

Carpenters and Joiners

Shortage:

AT; BE; CH; DK; EE; FI; FR; HR; HU; IT; LT; NL; NO; PL; PT; RO; SE; SI

Surplus: HU

Cartographers and Surveyors

Shortage: BE; FR; NL

Surplus: DK

Cashiers and Ticket Clerks

Shortage: DK; EE; IT

Surplus: AT; BE; BG; FR; LU

Cement; Stone and Other Mineral Products Machine Operators

Shortage: BE; CH; EE; DE; LV; PT

Chefs

Shortage: BE; DK; EE; FI; FR; HR; IE; IT; MT; SI

Surplus: DK

Chemical and Physical Science Technicians

Shortage: BE; CH; DK; IE; IT; NL

Surplus: HR

Chemical Engineering Technicians

Shortage: CH

Chemical Engineers

Shortage: CH; IT; NL; SI

Surplus: SE

Chemical Processing Plant Controllers

Shortage: HU; IT; NL

Chemical products plant and machine operators

Shortage: BE; CH; ES; IT; NL; SI

Chemists

Shortage: CH

Surplus: SE

Child Care Service Managers

Shortage: BE; CH; NO

Child Care Workers

Shortage: BE; CH; DK; EE; FI; NL; NO

Surplus: BE; DK; ES; HU; LT; LU

Civil Engineering Labourers

Shortage: BE; CH; DK; EE; FI; HR; IT; NL; PL; SI

Surplus: AT; BG; LT; RO

Civil Engineering Technicians

Shortage: AT; BE; CH; DK; EE; DE; FR; NL; NO; SI

Civil Engineers

Shortage: BE; CH; DK; EE; DE; FI; IT; NL; NO; RO; SI

Cleaners and Helpers in Offices; Hotels and Other Establishments

Shortage: BE; CH; CY; DK; EE; EL; FI; IT; NL; NO; SI

Surplus: AT; DK; DE; HU; LU; NO

Cleaning and Housekeeping Supervisors in Offices; Hotels and Other Establishments

Shortage: CH; DK; NL

Surplus: HU

Cleaning Workers

Surplus: SK

Clearing and Forwarding Agents

Shortage: BE; CH; NL

Clerical Support Workers Not Elsewhere Classified

Surplus: AT; DE; LV; SK

Coding; Proofreading and Related Clerks

Shortage: CH

Surplus: DK

Commercial Sales Representatives

Shortage: BE; FI; FR; NO

Surplus: AT; PT; SK

Commissioned Armed Forces Officers

Shortage: NL

Community Health Workers

Surplus: RO

Companions and Valets

Shortage: BG; DK

Surplus: ES; LV

Computer Network and Systems Technicians

Shortage: AT; BE; IE; IT; NL; NO; SI

Surplus: BE; DK

Computer Network Professionals

Shortage: AT; BE; CY; LV; NL

Computing Professionals Not Elsewhere Classified

Shortage: SK

Concrete Placers; Concrete Finishers and Related Workers

Shortage: AT; BE; CH; EE; FI; FR; HR; HU; IT; LT; LV; NL; NO; PL; RO; SI; SK

Surplus: HU

Conference and Event Planners

Surplus: DK; HU; LU

Construction Managers

Shortage: BE; DK; FR; IT; LT; NL; NO; RO

Construction Supervisors

Shortage: BE; CH; DK; EE; DE; FI; FR; IT; NL; SI

Surplus: LV

Contact Centre Information Clerks

Shortage: BE; DK; HU; IT; MT; NL; NO; PT; SI

Surplus: SE

Contact Centre Salespersons

Shortage: CH; DK; FI; FR; HU; IT; NL; NO; SI

Surplus: HU; LV

Cooks

Shortage: BE; BG; CH; DK; EE; FI; FR; IT; LT; NL; NO; PL; PT; SI; SK

Surplus: DK; HU; NL

Counselling and Organisation of Educational Work Professional

Shortage: SI

Craft and Related Workers not Elsewhere Classified

Shortage: NO

Surplus: LV

Crane; Hoist and Related Plant Operators

Shortage: BE; CH; EE; HR; IT; NL; SI

Creative and Performing Artists Not Elsewhere Classified

Shortage: CH; IT

Surplus: DE

Credit and Loans Officers

Shortage: BE; LU; NL; RO

Surplus: DK; LV

Crop Farm Labourers

Shortage: ES; LV; NO; PT

Surplus: BG

Customs and Border Inspectors

Shortage: CH

Surplus: LV

Dairy Products Makers

Shortage: CH; IT

Surplus: HU; LV

Dancers and Choreographers

Shortage: IT

Surplus: DK; LT

Data Entry Clerks

Shortage: IT

Surplus: EE; DE; HU; LT

Database and Network Professionals Not Elsewhere Classified

Shortage: AT; LV; NL; NO; RO

Database Designers and Administrators

Shortage: AT; BE; NL; NO; RO

Debt Collectors and Related Workers

Shortage: RO

Surplus: DK; LV

Dental Assistants and Therapists

Shortage: CH; DK; FI; NL; SE; SI

Surplus: LV

Dentists

Shortage: CH; DK; ES; FI; IT; NL; SE; SI

Dieticians and Nutritionists

Shortage: IT

Surplus: DK

Dispensing Opticians

Shortage: AT; BE; CH; DE; FR; NL

Domestic Cleaners and Helpers

Shortage: BE; CY; FI; FR; IT; NL

Surplus: DE; HU; LU

Door-to-door Salespersons

Shortage: CH; EL; IT; NO; RO

Draughtspersons

Shortage: BE; CH; FR; NL

Surplus: DK

Drivers of Animal-drawn Vehicles and Machinery

Shortage: IT

Surplus: HU

Driving Instructors

Shortage: BE; CH; SI

Surplus: DK; HU

Early Childhood Educators

Shortage: BE; BG; CH; DK; EE; DE; FI; IT; LT; LU; NO; SE; SI

Surplus: CY; SK

Earthmoving and Related Plant Operators

Shortage: BE; CH; DK; EE; FI; FR; HR; IT; LT; NL; NO; PL; PT; SI

Surplus: DK; HU

Economists

Shortage: CH; DK; IT; LU; NL

Surplus: HR

Education Managers

Shortage: BE

Education Methods Specialists

Shortage: BE; CH; IT; NL; NO

Surplus: DK

Electrical and Electronic Equipment Assemblers

Shortage: BE; CH; EE; FR; NL; NO; RO; SI

Surplus: BG; SK

Electrical Engineering Technicians

Shortage: AT; BE; CH; DK; EE; DE; FR; IE; LT; NL; NO; SI

Surplus: HU

Electrical Engineers

Shortage: CH; FI; IE; LT; NL; NO; SI

Electrical Line Installers and Repairers

Shortage: BE; CH; CY; CZ; HR; IT; LV; NL; NO

Surplus: BG

Electrical Mechanics and Fitters

Shortage: BE; CH; CZ; EE; DE; FI; FR; HR; IT; LT; NL; NO; PT; SE; SI

Surplus: DK; SE

Electrical-equipment Assemblers

Shortage: SK

Electronics Engineering Technicians

Shortage: BE; CH; ES; NL; NO

Electronics Engineers

Shortage: CH; NL; NO; SI

Electronics Mechanics and Servicers

Shortage: BE; CH; FR; IT; NO; SI

Surplus: BG; DK

Elementary Workers Not Elsewhere Classified

Shortage: HU; IT; NO

Surplus: AT; BE; CY; DE; HU; SE; SI; SK

Employment agents and contractors

Shortage: NL

Surplus: DK

Engineering Professionals Not Elsewhere Classified

Shortage: BE; CH; DK; FR; IE; IT; NO; SI

Surplus: DK; HU

Environmental and Occupational Health and Hygiene Professionals

Shortage: IT; NL; SE

Surplus: DK

Shortage Environmental and Occupational Health Inspectors and Associates

Shortage: NL

Environmental Engineers

Shortage: CH; DK; IT

Environmental Protection Professionals

Shortage: CH; DK; IE; NL

Surplus: DK; RO

Express deliveries

Surplus: LU

Farming; Forestry and Fisheries Advisers

Shortage: CH; IE

Farming; Forestry and Fisheries Advisers

Surplus: RO

Fashion and Other Models

Shortage: CH; IT

Surplus: HU

Fast Food Preparers

Shortage: BE; FI; HU; NL; RO; SI

Surplus: BE; HU

Fibre Preparing; Spinning and Winding Machine Operators

Shortage: BE; HU; IT

Surplus: HU; RO

Field Crop and Vegetable Growers

Shortage: CH; LV; NO

Surplus: HU; RO

Film; Stage and Related Directors and Producers

Shortage: CH; IT

Surplus: DK; FI

Finance Managers

Shortage: LU; PL

Surplus: LV

Financial Analysts

Shortage: BE; IT; LU

Surplus: SE

Financial and Insurance Services Branch managers

Shortage: FR

Financial and Investment Advisers

Shortage: BE; IT; NO

Surplus: CY

Fire Fighters

Shortage: CH; NL; NO; SI

Fishery and aquaculture labourers

Shortage: ES; LV

Fitness and Recreation Instructors and Programme Leaders

Shortage: CH; IT; NO

Surplus: BE; DK; HU; LV

Floor Layers and Tile Setters

Shortage: AT; BE; CH; EE; FI; HR; HU; LT; LV; NL; NO; PL; PT; RO; SE; SI

Surplus: HU

Food and Beverage Tasters and Graders

Shortage: IT

Surplus: DK

Food and Related Products Machine Operators

Shortage: BE; CH; DK; EE; FR; IT; LT; NL; NO; SK

Surplus: BE; DK; HU; NO

Food Service Counter Attendants

Shortage: BE; CH; DK; EE; IT; NL; NO; RO

Surplus: AT; LV; PT

Forestry and Related Workers

Shortage: EE; FR; NO; SI

Surplus: HU; SE

Forestry Labourers

Surplus: HU; LV; SK

Forestry Technicians

Shortage: CH

Surplus: DK; HU; RO

Freight Handlers

Shortage: BE; DK; EE; IT; NL; SK

Surplus: AT; HU; LT; SK

Fruit; Vegetable and Related Preservers

Shortage: BG; HU; IT

Surplus: HU

Fumigators and Other Pest and Weed Controllers

Shortage: NL

Fur and Leather Preparing Machine Operators

Shortage: IT

Surplus: HU

Gallery; Museum and Library Technicians

Shortage: CH; IT

Surplus: ES; FR; LV

Garbage and Recycling Collectors

Shortage: CH; CY; IT; NL

Surplus: DK; LU

Garden and Horticultural Labourers

Shortage: BE; EE; PT; SK

Surplus: DK; DE

Gardeners; Horticultural and Nursery Growers

Shortage: BE; CH; NL; NO

Surplus: DK; HU; LU; LV; RO

Garment and Related Patternmakers and Cutters

Shortage: CH

Surplus: HU

General Office Clerks

Shortage: CH; DK; HR; IT; MT; NO

Surplus: AT; BE; CY; CZ; FR; HR; HU; LU; NO; PT; SK

Generalist Medical Practitioners

Shortage: AT; BE; CZ; EE; ES; FI; IE; IT; LT; NL; NO; PL; SI; SK

Geologists and geophysicists

Shortage: CH

Surplus: DK

Glass and Ceramics Plant Operators

Shortage: CY; HU; LV

Surplus: DK

Glass Makers; Cutters; Grinders and Finishers

Shortage: CH; SI

Surplus: DK; HU

Glaziers

Shortage: BE; CH; NL

Surplus: HU

Government Regulatory Associate Professionals Not Elsewhere Classified

Surplus: SE

Government Social Benefits Officials

Shortage: NL

Government Tax and Excise Officials

Shortage: BE

Graphic and Multimedia Designers

Shortage: CH; NL

Surplus: AT; BE; DK; ES; FI; FR; HU; LT; LU; PT; SE; SI; SK

Hairdressers

Shortage: BE; DK; FR; HU; IT; NO

Surplus: HU; LT; SK

Hand and Pedal Vehicle Drivers

Shortage: IT

Hand Launderers and Pressers

Shortage: IT; LT

Hand Packers

Shortage: HU; IT

Surplus: AT; BE; BG; HU; SE

Handicraft Workers in Textile; Leather and Related Materials

Shortage: CH; HU

Surplus: DK; HU; RO

Handicraft Workers in Wood; Basketry and Related Materials

Shortage: CH; PL

Surplus: RO

Handicraft Workers Not Elsewhere Classified

Shortage: CH

Health Associate Professionals Not Elsewhere Classified

Shortage: NO

Surplus: ES; LT; LV

Health Care Assistants

Shortage: BE; CH; EE; ES; FI; FR; IE; IT; LU; NL; NO; SI

Surplus: AT; BG

Health Professionals Not Elsewhere Classified

Shortage: BE; CH; DK; DE; IT; NL; SE; SI

Health Service Managers

Shortage: DE; NO; RO

Heavy Truck and Lorry Drivers

Shortage: BE; CH; DK; EE; DE; FI; FR; HR; IT; LT; LV; NL; NO; PL ; PT; RO; SI; SK

Surplus: EL; HU

Home-based Personal Care Workers

Shortage: BE; CH; CY; EE; FI; IT; PT; SI

Surplus: RO; SK

Hotel Managers

Shortage: BE; CH; IT

Surplus: DK; HU

Hotel Receptionists

Shortage: DK; NL; NO

Surplus: BG; DK; HR; LV; SE

House Builders

Shortage: EE; FI; IT; LT; PL

Surplus: RO

Human Resource Managers

Shortage: FR

Hunters and Trappers

Shortage: ES

Surplus: DK; HU

Incinerator and Water Treatment Plant Operators

Shortage: DE; IT

Surplus: LV

Industrial and Production Engineers

Shortage: BE; CH; DK; EE; FR; IE; IT; NL; NO

Information and Communication Technology Installers and Servicers

Shortage: BE; NL; CH; IT; NL

Surplus: FI; HU; RO; SI

Information and Communications Technology Operations Technicians

Shortage: AT; BE; ES; FR; IE; IT; NO

Surplus: LV

Information and Communications Technology Sales Professionals

Shortage: IT

Information and Communications Technology Service Managers

Shortage: BE; EE; LU

Information and Communications Technology User Support Technicians

Shortage: AT; IE; IT; NL; RO

Surplus: FI

Information Technology Trainers

Shortage: CH; DK; IT; NL

Inland and Coastal Waters Fishery Workers

Shortage: CH; ES; PT

Surplus: DK

Inquiry Clerks

Shortage: LV; NL; RO

Surplus: LU

Insulation Workers

Shortage: CH; FI; HR; HU; LT; NL; NO; RO; SI; SK

Surplus: HU

Insurance Representatives

Shortage: BE; CH; FR; NL; SI

Surplus: LV

Interior Designers and Decorators

Shortage: CH; DK; IT

Surplus: DK; ES; FI; HU; LT; LU; RO; SI

Jewellery and Precious Metal Workers

Shortage: CH

Surplus: DK; ES; HU

Journalists

Shortage: CH; IT; NO

Surplus: AT; DK; EE; FI; FR; LV; SE; SI

Judges

Shortage: CH; IT

Kitchen Helpers

Shortage: BE; CY; DK; EE; FI; NL; NO; PT; RO; SI

Surplus: AT; BE; DK; DE; LU; SE; SK

Landscape Architects

Shortage: BE

Surplus: DK; ES

Laundry Machine Operators

Shortage: BE; CH; EE; IT

Surplus: DK; LV

Lawyers

Shortage: CH; IT; LU; NO

Legal and Related Associate Professionals

Shortage: CH; DK; IT; PL

Surplus: LT; LV

Legal Professionals Not Elsewhere Classified

Shortage: BE; CH; DK; IT; NL; SI

Legal Secretaries

Shortage: DK; IT

Surplus: HR; HU

Librarians and Related Information Professionals

Shortage: CH; IT

Surplus: FI

Library Clerks

Surplus: DK; ES; FI; RO; SE

Life Science Technicians (excluding Medical)

Shortage: NL

Surplus: RO

Lifting Truck Operators

Shortage: CZ; HR; IT; NL; PL ; RO; SK

Surplus: BE; DK; HU; LU

Livestock and Dairy Producers

Shortage: CH; EE; NO; SI

Surplus: RO

Livestock Farm Labourers

Shortage: EE

Surplus: DK; DE

Locomotive Engine Drivers

Shortage: CH; DE; NL

Surplus: LV

Lower secondary education subject teacher

Shortage: SI

Mail Carriers and Sorting Clerks

Shortage: BE; EE; NO; SI

Surplus: DK; SE

Management and Organisation Analysts

Shortage: EE; ES; IT; NL

Surplus: DK; PT

Managing Directors and Chief Executives

Shortage: CH; IT; MT

Surplus: BE; NO

Manufacturing Labourers Not Elsewhere Classified

Shortage: CH; DK; IT; MT; NO; SI

Surplus: CZ; PT; SK

Manufacturing Managers

Shortage: BE; CH; EE; FR; IT; NO; SI

Manufacturing Supervisors

Shortage: BE; CH; DK; EE; FR; IT; NL

Surplus: DK

Mathematicians; Actuaries and Statisticians

Shortage: CH; EE

Surplus: BE; DK; EL; RO

Mechanical Engineering Technicians

Shortage: AT; BE; CH; DK; EE; FR; LT; NO; SI

Surplus: HU; RO

Mechanical Engineers

Shortage: AT; CH; DK; IE; IT; LV; NL; NO; SE; SI

Mechanical Machinery Assemblers

Shortage: BE; CH; FI; FR; HU; NL; NO; RO; SK

Surplus: HU; SK

Medical and Dental Prosthetic Technicians

Shortage: BE; CH; DE; HU

Surplus: DK; HU; LV

Medical and Pathology Laboratory Technicians

Shortage: BE; CH; FI; NL; NO

Medical Assistants

Shortage: CH; NL; NO; SE

Surplus: SE

Medical Imaging and Therapeutic Equipment Technicians

Shortage: BE; CH; DK; DE; FI; LV; NL

Medical records and health information technicians

Surplus: ES

Medical Secretaries

Shortage: DK; IT; SE

Surplus: HR; LU

Messengers; Package Deliverers and Luggage Porters

Shortage: BE; ES; HU; IT; MT; RO; SI

Surplus: HU; SE

Metal Finishing; Plating and Coating Machine Operators

Shortage: CH; DE; IT; LV; NO; SI

Surplus: BG

Metal Moulders and Coremakers

Shortage: CH; IT; SI

Surplus: DK; HU

Metal Polishers; Wheel Grinders and Tool Sharpeners

Shortage: EE; IT; PL ; SI

Metal Processing Plant Operators

Shortage: CH; DK; FR; HU; IT; SI

Surplus: HU

Metal Production Process Controllers

Shortage: BE; ES; HU; IT

Surplus: HU

Metal Working Machine Tool Setters and Operators

Shortage: AT; BE; BG; CH; DK; EE; FI; FR; HR; IE; IT; LT; NL; NO; PL ; RO; SI; SK

Surplus: HU

Meteorologists

Surplus: DK

Meter Readers and Vending-machine Collectors

Shortage: IT

Midwifery Professionals

Shortage: CH; DK; HR; NO; PL ; PT; SE

Miners and Quarriers

Shortage: CH

Miners and Quarriers

Surplus: RO

Mining and metallurgical technicians

Shortage: CH

Mining and Metallurgical Technicians

Shortage: DK; NO

Surplus: RO

Mining and Quarrying Labourers

Shortage: CH; HU

Surplus: SE

Mining Engineers; Metallurgists and Related Professionals

Shortage: CH; IT; LV; NO

Mining Managers

Shortage: IT

Mining Supervisors

Shortage: IT

Mixed Crop and Animal Producers

Shortage: CH; NL; NO

Surplus: BE; HU; SE

Mixed Crop and Livestock Farm Labourers

Shortage: DK; ES

Surplus: RO

Mobile Farm and Forestry Plant Operators

Shortage: EE; ES; FR; HR; IT; NL; SE

Motor Vehicle Mechanics and Repairers

Shortage: AT; BE; CH; EE; FI; FR; HR; IT; NL; NO; PL; PT; SE; SI

Surplus: HU; SK

Motorcycle Drivers

Shortage: IT; NL; RO

Musical Instrument Makers and Tuners

Shortage: CH

Surplus: DK

Musicians; Singers and Composers

Shortage: CH; DK; IT

Surplus: EL; FI; LV; SE; SI

Non-commissioned Armed Forces Officers

Shortage: NL

Nursing and Midwifery Professionals

Shortage: CZ

Nursing Associate Professionals

Shortage: BE; CH; EE; DE; FI; FR; LU; NL; SI

Nursing Professionals

Shortage: BE; BG; CH; CY; CZ; DK; EE; ES; FI; HR; IE; IT; LT; NL; NO; PT; SE; SI

Odd Job Persons

Shortage: EE; IT

Surplus: LT; LV

Office Supervisors

Shortage: IT; MT; NL

Surplus: HR; LT; LV

Optometrists and Ophthalmic Opticians

Shortage: IT

Other Artistic and Cultural Associate Professionals

Shortage: IT

Surplus: DK; FI; FR

Other Arts Teachers

Shortage: CH; IT

Surplus: DK

Other Cleaning Workers

Shortage: BE; IT; NL

Surplus: SE

Other Language Teachers

Shortage: CH; EE; IT

Surplus: DK; EL; DE; HU

Other Music Teachers

Shortage: CH; DK; IT

Surplus: DK; FR

Other Teaching Professionals Not Elsewhere Classified

Surplus: SK

Packing; Bottling and Labelling Machine Operators

Shortage: BE; DK; LT

Surplus: HU

Painters and Related Workers

Shortage: BE; DK; EE; FI; FR; HR; LV; NL; NO; PL; RO; SE; SI

Surplus: ES; HU

Paper Products Machine Operators

Shortage: LV

Paper Products Machine Operators

Shortage: ES; RO

Paramedical Practitioners

Shortage: LV; NL

Payroll Clerks

Shortage: AT; DK; NL; PL

Surplus: SE

Pelt Dressers; Tanners and Fellmongers

Shortage: CH

Surplus: DK; HU

Personal Care Workers in Health Services Not Elsewhere Classified

Shortage: CH; NL; NO

Surplus: BE; LV; NO; RO

Personal Services Workers Not Elsewhere Classified

Shortage: DK; NO

Surplus: SE

Personnel and Careers Professionals

Shortage: CH; EE; IT; LU; NL; RO; SI

Surplus: BE; DK; ES; PT

Personnel Clerks

Shortage: BE; DK

Surplus: BE

Pet Groomers and Animal Care Workers

Shortage: CH; HU

Surplus: DK; NL

Petroleum and Natural Gas Refining Plant Operators

Shortage: IT

Surplus: RO

Pharmaceutical Technicians and Assistants

Shortage: BE; FI; FR; NL

Pharmacists

Shortage: BE; CH; ES; DE; IT; NL; SI

Philosophers; Historians and Political Scientists

Shortage: CH; IT

Surplus: DK; HU; LT; RO; SI

Photographers

Shortage: CH; IT

Surplus: ES; DE; HR; HU; LT; SE; SI

Photographic Products Machine Operators

Shortage: CH

Surplus: DK; ES; HU

Physical and Engineering Science Technicians Not Elsewhere Classified

Shortage: BE; CH; FR; NL; NO

Surplus: DK; HU; RO

Physicists and Astronomers

Shortage: CH; LU

Surplus: DK

Physiotherapists

Shortage: BE; CH; CY; ES; DE; FR; IT; NL; PL; SE; SI

Physiotherapy Technicians and Assistants

Shortage: CH; CY; EE; HU; PL

Surplus: DK

Plasterers

Shortage: BE; CH; FI; HR; HU; LT; LV; NL; RO; SI; SK

Surplus: DK; HU

Plastic Products Machine Operators

Shortage: BE; CH; DK; IT; LT; NO; RO; SI; SK

Surplus: BG

Plumbers and Pipe Fitters

Shortage: BE; CH; CZ; DK; EE; EL; DE; FI; FR; HR; HU; LT; NL; NO; PL ; SE; SI; SK

Surplus: HU

Police Officers

Shortage: BE; CH; SE; SI

Policy Administration Professionals

Shortage: BE; DE; IT; NL; NO; SI

Surplus: DK; ES

Policy and Planning Managers

Shortage: LU

Potters and Related Workers

Shortage: CH; HU

Surplus: DK; HU

Poultry Producers

Shortage: CH

Surplus: HU

Power Production Plant Operators

Shortage: BE; CH; FR; IT

Precision-instrument Makers and Repairers

Shortage: BE; CH; NL

Surplus: DK

Pre-press Technicians

Shortage: CH; NL

Surplus: FI; RO

Primary Education Teaching Professionals

Surplus: SK

Primary School Teachers

Shortage: BE; BG; CH; DK; EE; IT; NL; NO; SE; SI

Surplus: AT; CY; RO

Print Finishing and Binding Workers

Shortage: BE; FR

Printers

Shortage: BE; CH; FR

Surplus: DK; FI; SE

Prison Guards

Shortage: EE; LV

Private passenger road transport

Surplus: LU

Process Control Technicians Not Elsewhere Classified

Shortage: BE; IT; RO

Surplus: HU

Product and Garment Designers

Shortage: CH; NL

Surplus: DK; ES; FI; HR; HU; LT; LV

Product Graders and Testers (except Foods and Beverages)

Shortage: BE; CH; NL

Product Graders and Testers (excluding Foods and Beverages)

Shortage: RO

Production Clerks

Shortage: BE; DK; NL; NO

Professional Services Managers Not Elsewhere Classified

Shortage: IT; NL; NO

Surplus: DK

Protective Services Workers Not Elsewhere Classified

Shortage: CH; DK; NL; NO; RO

Psychologists

Shortage: CH; DK; EE; FI; IT; LV; NL; NO; PL ; SE; SI

Surplus: DK; PT

Public Relations Professionals

Shortage: CH; DK; IT

Surplus: BE; DK; FR; LU; SE

Pulp and Papermaking Plant Operators

Shortage: BE; CY; FR; HU; IT

Railway Brake; Signal and Switch Operators

Shortage: CH; DE; NL

Surplus: DK; LV

Real Estate Agents and Property Managers

Shortage: BE; CH; DK; FR; NL

Surplus: HU; LU; SE

Receptionists (general)

Shortage: CH

Surplus: BE; DK; ES; DE; HU; SE; SI

Refuse Sorters

Shortage: CH; EE; ES; IT

Religious Associate Professionals

Shortage: CH; IT

Surplus: DK; HU; RO

Religious Professionals

Shortage: CH

Religious Professionals

Shortage: IT

Surplus: RO

Research and Development Managers

Shortage: EE; IT; LU; NL

Restaurant Managers

Shortage: CH; IT; NL

Surplus: AT; DK; HU; LV

Retail and Wholesale Trade Managers

Shortage: BE; DK; IT

Surplus: DK; LU; LV

Riggers and Cable Splicers

Shortage: BE; CH; HU; IT

Surplus: RO

Roofers

Shortage: AT; BE; CH; FI; FR; HR; HU; NL; NO; PL; SI

Surplus: HU

Rubber Products Machine Operators

Shortage: CH; PT; SI

Surplus: DK

Sales and Marketing Managers

Shortage: BE; IT; LU

Surplus: DK; EE

Sales Demonstrators

Shortage: CH; IT

Surplus: SE

Sales Workers Not Elsewhere Classified

Shortage: CH; IT; NO

Surplus: SE

Secondary Education Teachers

Shortage: BE; BG; CH; DK; EE; IT; NL; NO; SI

Surplus: AT; DK; EL; RO

Secretaries (general)

Shortage: IT

Surplus: BE; CY; DK; EL; FI; LT; LU; LV; SE; SI

Securities and Finance Dealers and Brokers

Shortage: LU; RO

Security Guards

Shortage: BE; CH; EE; IT; MT; NL; NO; SI

Surplus: AT; DK; HU; LU; SK

Senior Government Officials

Shortage: CH; EL

Surplus: DK; LV

Senior Officials of Special-interest Organisations

Shortage: CH

Service Station Attendants

Shortage: CH; EE; IT; NL

Surplus: BE

Sewing Machine Operators

Shortage: BE; BG; EE; FR; HU; IT; PT

Surplus: ES; DE; HU

Sewing; Embroidery and Related Workers

Shortage: CH

Surplus: HU; LU; RO

Sheet Metal Workers

Shortage: AT; BE; CH; DK; EE; DE; FI; FR; HR; HU; IT; LV; NL; PL; SE; SI

Surplus: HU

Shelf Fillers

Shortage: DK; EE; HU; IT; NL

Surplus: BE; ES; DE; HU; LU

Ships' Deck Crews and Related Workers

Shortage: CH; CY; IT; NO

Ships' Deck Officers and Pilots

Shortage: BE; CH; NO

Surplus: LV

Ships' Engineers

Shortage: EE; NL

Surplus: DK; HU

Shoemakers and Related Workers

Shortage: CH; PT

Surplus: DK; HU

Shoemaking and Related Machine Operators

Shortage: IT; PT

Surplus: HU

Shop Sales Assistants

Shortage: BE; CH; DK; EE; HU; IT; MT; NL; NO

Surplus: AT; BE; CY; CZ; DK; HU; LU; PT; SE; SK

Shop Supervisors

Shortage: BE; IT; NL; NO

Surplus: FR; LV

Shopkeepers

Shortage: IT; NL

Surplus: HU

Short haul driving and delivery

Surplus: LU

Shotfirers and Blasters

Surplus: HU

Sign Writers; Decorative Painters; Engravers and Etchers

Shortage: CH; HU

Surplus: DK; HU

Social Welfare Managers

Surplus: DK

Social Work and Counselling Professionals

Shortage: BE; CH; DK; EE; FI; IT; SI

Surplus: AT; BE; DK; NL; PT

Social Work Associate Professionals

Shortage: BE; CH; EE; DE; FI; IT; NL

Surplus: AT; FR; NL; RO

Sociologists; Anthropologists and Related Professionals

Shortage: CH; IT; NO

Surplus: DK; EL; FI; LT; RO; SI

Software and Applications Developers and Analysts Not Elsewhere Classified

Shortage: AT; CH; CY; DK; EE; FI; FR; HR; IE; LU; NL; NO; PT; SI

Software Developers

Shortage: AT; CH; CY; CZ; DK; EE; FI; HR; IE; MT; NO; PT; RO; SE; SI

Surplus: DK

Special Needs Teachers

Shortage: BE; CH; FI; IT; LT; NL; NO; SI

Specialist Medical Practitioners

Shortage: BG; CH; CZ; EE; ES; FI; HR; IE; IT; LT; LV; NL; NO; SE; SI

Sports Coaches; Instructors and Officials

Shortage: BE; CH; IT

Surplus: DK; HU; LT; LV

Sports; Recreation and Cultural Centre Managers

Shortage: IT

Surplus: DK

Spray Painters and Varnishers

Shortage: AT; BE; DK; EE; FR; HR; LV; NL; NO; SI

Surplus: HU

Stall and Market Salespersons

Shortage: HU; IT

Surplus: HU; LT; LV

Stationary Machine Operators Not Elsewhere Classified

Surplus: SK

Stationary Plant and Machine Operators Not Elsewhere Classified

Shortage: CY; EE; FR; NO; RO; SK

Surplus: DK

Statistical; Finance and Insurance Clerks

Shortage: BE; DK

Surplus: DK

Statistical; Mathematical and Related Associate Professionals

Shortage: NL

Surplus: LV

Steam Engine and Boiler Operators

Surplus: LV

Stock Clerks

Shortage: BG; DK; NL; NO; PL; PT; SI; SK

Surplus: BE; DK; NO; PT; SK

Stonemasons; Stone Cutters; Splitters and Carvers

Shortage: BE; CH; FR; HR; HU; IT; LV

Surplus: HU

Street and Related Service Workers

Shortage: NL

Surplus: DK

Street Food Salespersons

Shortage: HU; IT

Street vendors (excluding food)

Surplus: LT

Structural Metal Preparers and Erectors

Shortage: BE; CH; EE; DE; FR; HR; IT; LT; LV; NL; NO; PT; SI

Surplus: HU

Supply; Distribution and Related Managers

Shortage: BE; FR; IT; NL

Surplus: DK

Survey and Market Research Interviewers

Shortage: LV

Sweepers and Related Labourers

Shortage: CH; DK; IT

Surplus: DK; PT; SK

Systems Administrators

Shortage: AT; BE; EE; HR; LU; NL; NO

Systems Analysts

Shortage: AT; BE; CH; CY; EE; HR; IE; LV; NL; NO; PT; SE

Surplus: DK

Tailors; Dressmakers; Furriers and Hatters

Shortage: BG; CH; FR; LT

Surplus: DK; ES; DE; FI; HU; SK

Teachers' Aides

Shortage: CH; DK

Surplus: SE

Teachers and assistants of vocational subjects

Shortage: SI

Teachers' Aides

Shortage: RO

Teaching Professionals Not Elsewhere Classified

Shortage: BE; CH; FI; IT; NO; PL

Surplus: BE; DK

Technical and Medical Sales Professionals (excluding ICT)

Shortage: BE; EE; FR; IT; NL; RO

Telecommunications Engineering Technicians

Shortage: AT; BE; CH; PT

Surplus: RO

Telecommunications Engineers

Shortage: AT; CH; FI; FR

Telephone Switchboard Operators

Surplus: HU

Textile; Fur and Leather Products Machine Operators Not Elsewhere Classified

Shortage: IT

Textile; Fur and Leather Products Machine Operators Not Elsewhere Classified

Shortage: RO; SI

Tobacco Preparers and Tobacco Products Makers

Shortage: IT

Toolmakers and Related Workers

Shortage: AT; BE; CH; EE; IT; LT; NL; PL; PT; SI

Surplus: BG; HU; RO; SK

Town and Traffic Planners

Shortage: CH; DE; NL

Surplus: DK; ES

Trade Brokers

Shortage: BE; SI

Traditional and Complementary Medicine Associate Professionals

Shortage: HU

Surplus: HU

Traditional and Complementary Medicine Professionals

Shortage: CH

Surplus: DK; HU

Training and Staff Development Professionals

Shortage: IT; NO; RO

Surplus: DK; EE

Translators; Interpreters and Other Linguists

Shortage: CH; IT; SE

Surplus: DK; DE; HU; LT; LU; RO; SI

Transport Clerks

Shortage: BE; CH; FR; NL; SI

Surplus: DK

Transport Conductors

Shortage: CH

Surplus: FR

Travel Attendants and Travel Stewards

Shortage: CH; HU; LV; RO

Surplus: HU

Travel Consultants and Clerks

Surplus: DK; ES; FI; FR; HU; RO; SI

Travel Guides

Shortage: CH

Surplus: DK; ES; DE; FI; HU; RO

Tree and Shrub Crop Growers

Shortage: BE; CH; HU; NL

Surplus: DK; HU

Typists and Word Processing Operators

Shortage: IT

Surplus: DK; RO

Undertakers and Embalmers

Shortage: CH

Surplus: DK; NL

Underwater Divers

Surplus: DK

University and Higher Education Teachers

Shortage: CH; DK; EE; NL; NO; SI

Surplus: DK; LV

Upholsterers and Related Workers

Shortage: BE; CH; HU; LT; NL

Surplus: DK; HU

Valuers and Loss Assessors

Shortage: NL

Surplus: HU

Vehicle Cleaners

Shortage: IT

Surplus: SE

Veterinarians

Shortage: CH; NL

Veterinary Technicians and Assistants

Shortage: DK

Surplus: LU; RO

Visual Artists

Shortage: CH; IT

Surplus: DK; FI; FR; HU; LT; LV; RO

Vocational Education Teachers

Shortage: BE; CH; DK; EE; FR; IT; NL; NO; P ; SE

Surplus: DK

Waiters

Shortage: BE; BG; DK; EL; FI; FR; HU; IT; MT; NL; NO; SI; SK

Surplus: HU; SK

Water and Firewood Collectors

Shortage: IT

Weaving and Knitting Machine Operators

Shortage: BE; IT

Web and Multimedia Developers

Shortage: AT; CH; CY; EE; FI; HR; IE; LV; NL

Surplus: DK

Web Technicians

Shortage: AT; DK; IE; IT

Surplus: LV

Welders and Flame Cutters

Shortage: AT; BE; BG; CH; CY; EE; FI; FR; HR; HU; IT; LV; NL; NO; PL; SI; SK

Surplus: HU

Well Drillers and Borers and Related Workers

Shortage: LV; NL

Surplus: DK; HU

Window Cleaners

Shortage: BE; DK; IT; NL; RO

Surplus: LU; SE

Wood Processing Plant Operators

Shortage: CY; EE; HU; IT; PL

Surplus: HU

Wood Treaters

Shortage: CH; EE; ES; PL; RO; SI

Surplus: HU

Woodworking Machine Tool Setters and Operators

Shortage: BE; CH; EE; LT; NL; PL; SI

Surplus: FI; HU

Elementary Assembling Labourers Not Elsewhere Classified

Shortage: SK

Manufacturing Labourers in Food Processing

Shortage: SK

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