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► Occupational labour shortages in North Macedonia

Principal component analysis
of administrative data on job vacancies



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Daniela Zampini

► Abstract

The aim of this study is to contribute to a better understanding of labour shortages and imbalances by broadening the discussion beyond the well-researched subject of skills shortages. The main innovation is the introduction of a new measure of labour imbalances in North Macedonia. The study applies principal component analysis (PCA) to a rich dataset of job vacancy advertisements from North Macedonia's Employment Service Agency and creates an index to capture "hard-to-fill" job vacancies. This allows us to examine labour shortages across years, occupations, sectors and regions. The results indicate significant labour shortages in low to medium skill occupational groups, with some easing between 2017 and 2022, and intensification thereafter. In contrast, high-skill occupational groups experienced a slight intensification followed by an easing of the shortage. Sectors with the highest number of job vacancies, such as accommodation, construction and manufacturing, faced the biggest labour shortages. Labour shortages were most significant in the Skopje region and less so in the Polog and Southwest regions. The findings should be used to inform targeted policies to address labour imbalances and enhance employment policy overall in North Macedonia.

Keywords: labour shortages, job vacancies, employment service agency, North Macedonia

JEL classification: J23, J63.

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First published 2026.

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ISBN: 9789220434055 (print); 9789220434062 (web PDF)
DOI: <https://doi.org/10.54394/00033737>

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Printed in North Macedonia

► 1. Introduction

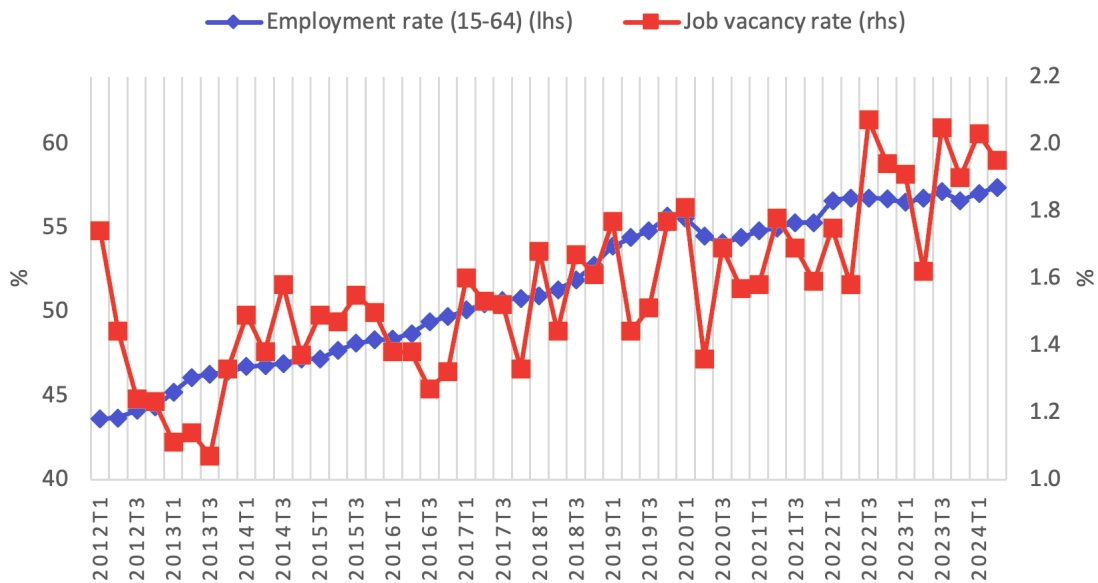
Labour imbalances and sectoral occupational shortages (or labour shortages),¹ represent a growing concern for countries in the European region, as the demographic transition continues to have an impact on labour markets. Research and periodic reports,² drawing on both survey and administrative data, have made it possible to trace the dynamics of labour shortages and surpluses in the EU Member States over more than a decade. Significantly less has been written on the Western Balkan economies and even fewer researchers have attempted to quantify labour shortages in these contexts. Located in the neighbourhood of more affluent European Union (EU) countries, however, these economies have experienced a domino effect, whereby occupational shortages in more attractive labour markets (in the EU, but also in North America and elsewhere) have drawn people away from critical sectors, such as health care, ICT, construction, manufacturing, hospitality and retail, to name but a few.

Employers in North Macedonia have regularly highlighted this problem, in conjunction with frequent requests that the government adjust regulations that facilitate the import of labour. According to the business trends statistics of the State Statistical Office (SSO), less than 1 per cent of employers reported labour shortages as a limiting factor for production in 2002. By 2019, however, this share had increased to over a 25 per cent, falling to about 15 per cent during the pandemic, but then rising once more to about 22 per cent by late 2022 (latest available figure). Similarly, the job vacancy rate increased by 40.9 per cent between 2012 and 2024, with significant growth in some service sectors, such as trade (128 per cent), finance (103.2 per cent) and IT (71.1 per cent). In terms of occupations, over the period 2012–2022 the number of vacant jobs surged in particular among the occupational groups with the largest share of workers in the service sector and sales workers (165.2 per cent), plant and machine operators (218.2 per cent), and technicians and associate professionals (157.8 per cent). The overall increase across occupations was 92 per cent.

Figure 1 presents a clear positive correlation between the job vacancy rate and the employment rate in North Macedonia over more than a decade. The increase in the vacancy rate, though peaking in 2022, points to a progressive tightening of the labour market that predates the Covid-19 pandemic. In Figure 1, the vacancy rate is plotted with the employment-to-population ratio (instead of with the unemployment rate, as seen in other reports) because the authors considered it to be a more accurate summary metric of the labour market situation in North Macedonia.

1 *Labour shortages* refer to situations in which economies are nearing *full employment* – in other words, almost all available workers are employed. *Labour imbalances*, on the other hand, occur when there is labour market slack (broadly speaking, this refers to workers who are unemployed or outside the labour force, with varying degrees of labour market attachment). Thus, while theoretically there is an available pool of persons who could move into certain sectors and occupations, employers are still unable to fill existing vacancies.

2 Such as those prepared periodically by the European Network of Public Employment Services (PES Network) and EURES (lately in collaboration with the European Labour Authority).

Figure 1: Job vacancy rate and employment rate in North Macedonia

Source: State Statistical Office.

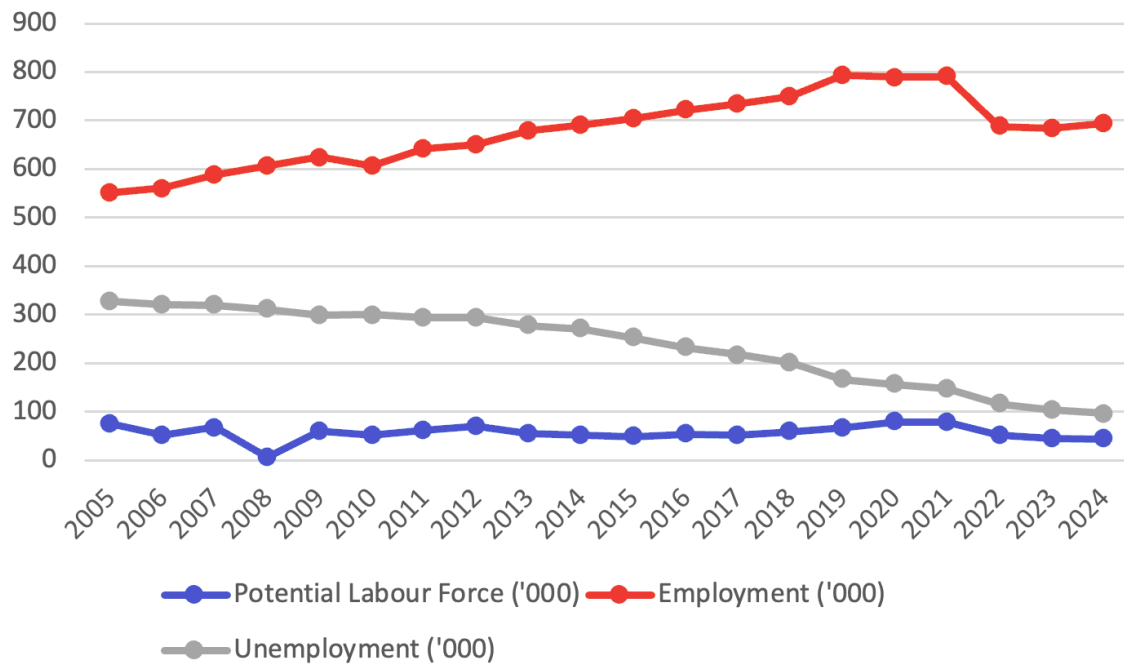
A number of caveats apply to the SSO data on business trends and the use of job vacancy rates to understand labour shortages. For instance, it is unclear from the way the questions are formulated in the survey, whether at times employers may be confounding and conflating the notions of skills and labour shortages. Additionally, job vacancy rates tend to be scant and very aggregated, and thus do not provide policymakers with useful guidance on where occupational labour shortages are located. Overreliance on job vacancy rates, amid the lack of a unified approach to measuring labour shortages in the literature, may also hide other important intervening factors. For instance, the 2023 EURES Report on labour shortages and surpluses, covering the EU Member States, found no consistent statistical correlation between the incidence of labour shortages (signified by the number of shortage occupations reported) and the labour market situation as summarized by the unemployment rate or the job vacancy rate.

This lack of correlation suggests that factors other than the dynamics between employment and unemployment are better predictors of the emergence and persistence of labour market imbalances in an economy. Current policy debates tend to focus on the compounded effects of demographic factors and skills mismatches, with employers emphasizing the need for skills and, where they are deemed to be missing, ways of sourcing those skills through immigration.

Naturally, the underlying megatrend with regard to the demographic transition (population ageing) is affecting North Macedonia's workforce, as evidenced by the significant increase in the median age (40.6 years as of 2024) and the decline in birth rates (9.2 per 1,000 population according to the 2021 census). Emigration and internal mobility patterns, fuelled by a persistent urban/rural divide, have contributed to demographic changes and depopulation of rural areas. Over the past two decades, countries that host large Macedonian diaspora communities, such as Germany and Switzerland, have been attracting scores of prime-age workers from the Macedonian labour market. Additionally, Petreski (2021) argues that the intensified influx of multinational corporations (MNCs) in the free economic zones after the launch of the policy "Invest in Macedonia" in 2007 has led to significant inflows of labour onto the labour market, with multinational corporations and emigration competing for the same pool of medium-skilled workers. Thus, demographic and other factors brought the unemployment rate to an historic low at 12.4 per cent in 2024 from its peak of 37 per cent in 2005, albeit in conjunction with severe labour imbalances and

the intensification of shortage occupations (those in which demand for jobseekers is greater than the supply). Interestingly, over the same period (2005–2024), labour force participation for the population 15–64 years of age remained stable overall (peaking at 56.1 per cent in 2014 and reaching its lowest point at 51.8 per cent in 2023), significantly below the EU average. Improvements in the dynamics between employment and unemployment have only marginally impacted the size of the potential labour force in North Macedonia (Figure 2).

Figure 2: Employment, unemployment and potential labour force levels, 2005–2024



Source: State Statistical Office, Labour Force Survey.

Thus, a basic taxonomy of the root causes of labour imbalances in North Macedonia would need to include a multiplicity of factors, some of a structural nature and others more likely to influence the rapid increase of existing occupational shortages in the short run. These include, among others, reservation wages, the interplay between active and passive labour market policies, workplace policies, barriers or resistance to geographical mobility, job quality, industrial relations, working conditions and occupational stigma, as well as individual preferences and expectations with regard to quality of life and dissatisfaction with the predominant political situation.

With this paper we would like to contribute to expanding the debate on labour shortages outside the European Union by providing better estimates for the Macedonian labour market. The analysis highlights that labour shortages vary significantly across occupations, sectors and geographic locations. Thus, while observable at the aggregate level, labour shortages occur asymmetrically across the economy, suggesting that they are driven by what happens at the micro level.

This study is novel in two respects. First, it relies on a large administrative dataset from the Employment Service Agency (ESA) on job advertisements and information on employee difficulties in filling these vacancies. We have access to data for eight years and an average of 150,000 job advertisements per

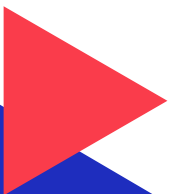
year for the period 2017–2024. Secondly, the study employs principal component analysis to capture a latent variable “labour market pressure” stemming from labour shortages via a few independent variables, all measuring the difficulty of filling job vacancies. To our knowledge, no other empirical study has attempted to measure the significance of the challenge and the impacts of labour shortages in North Macedonia.

There are two caveats related to this approach. The first is that the dataset captures only labour-demand,³ albeit over an eight-year period. This means that we have not observed how labour supply, wages and other elements potentially adjusted to ameliorate the labour imbalance. The second caveat is that administrative data do not necessarily capture the full picture of labour market dynamics in North Macedonia, with regard, for instance, to informal employment (12.7 per cent in 2024).⁴ Moreover, according to the information obtained from the ESA, job vacancies published through the private employment agencies are not fully captured in the dataset (as some of them do not supply relevant data to the ESA, whether in good time or fully). However, there may be only a small number of cases; according to the LFS 2022, for example, only 0.16 per cent of wage employees were hired through temporary employment agencies.

The study is organized as follows. Section 2 introduces some general considerations on labour shortages and their measurement, based on the existing literature for the EU and other advanced economies. Section 3 presents the methodology employed and data used. Section 4 presents the results; first, a general snapshot of the estimated occupational labour shortages over time; second, a deeper look into the shortages occurring in 2024. Section 5 concludes and offers some reflections on the policy implications and the need for further analytical work.

3 On the supply side, personal characteristics (such as age, gender and disability status) and personal preferences of individuals with regard to wage and non-wage aspects of certain occupations can influence the decision to apply for a job and hence the likelihood that a vacancy will be filled.

4 According to Article 22 (2) of the Law on Labour Relations, an employer must enter data on job vacancies in the electronic system of the Employment Service Agency of the Republic of North Macedonia, before publishing a vacancy. Technically, the employer must submit the information to the ESA system even if a potential candidate for the job has already been identified. In this case, the vacancy is only pro-forma. Conversely, this implies that if the job is intended to be informal, that is, without a formal contract, then such a job advertisement is not posted at the ESA. An employer may experience a labour shortage even when trying to recruit workers without a formal contract. This would, however, not be captured in our dataset, resulting in a potential underestimation of the labour shortage (imbalance) in North Macedonia.



► 2. Measuring labour shortages

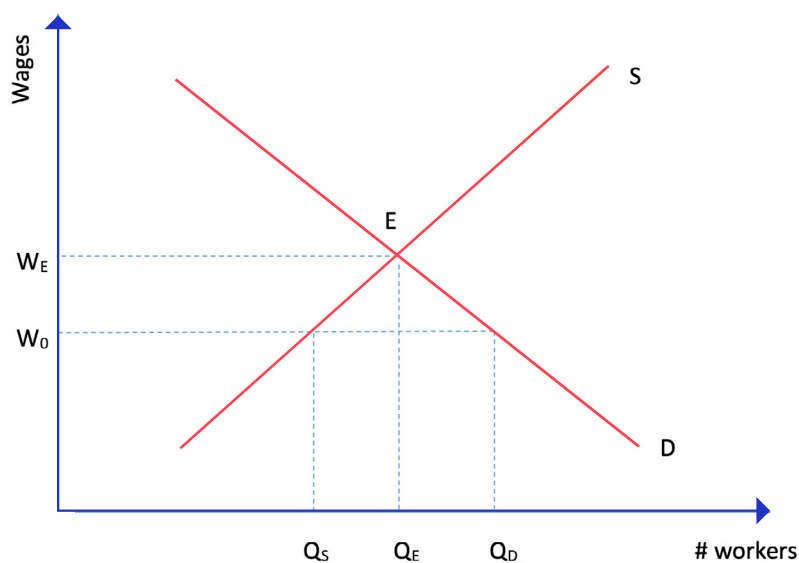
2.1. General considerations and relevant literature

The lack of an agreed upon definition of the term labour shortage in the literature partially explains the differences between attempts to measure the phenomenon. In a broad sense, the term refers to a shortfall in the total number of persons in the labour force as a result of certain factors, mainly demographic, such as ageing or outmigration. According to Barnow et al. (2013), an occupational labour shortage is a sustained market disequilibrium between supply and demand in which the quantity of workers demanded exceeds the supply available and willing to work at prevailing wage and working conditions at a particular place and point in time.

Labour shortages should thus be distinguished from skills shortages. While a labour shortage is generally associated with the quantity of labour – for example, a lack of candidates willing to take up a specific job, a skills shortage is associated with the quality of labour, that is, the lack of candidates with the skills required for the job (Quintini, 2011). The skill-level requirement is just one of several factors determining the likelihood that a vacancy will be filled. The literature is more frequently focused on the latter, however, while many papers use the two kinds of shortage interchangeably (for example, Leitner, 2022).

Figure 3 illustrates a labour shortage. The labour supply curve is upward sloping as the quantity of labour workers are willing to provide increases with the wages they are paid. Hence, as wages increase, more workers are willing to enter the labour market. The labour demand curve is downward sloping, indicating that the number of workers employers are willing to hire declines as wages increase. The market equilibrium is at point E, so W_E is the equilibrium wage that clears the market. However, if for some reason the prevailing wage rate is lower, at W_0 , than the quantity of labour that workers are willing to supply, it is equal to Q_S , which is lower than what employers demand, at Q_D . The difference between the amount of labour that employers wish to hire and the amount that workers are willing to provide ($Q_D - Q_S$) is the amount of the shortage. So, competitive market forces will drive up the wage rate, eliminating the shortage. Hence, at the macrolevel, higher nominal pay can eliminate labour shortages for a short while by encouraging work and discouraging hiring. However, if higher wages do not bring demand and supply into line, inflationary pressure would require central banks to raise interest rates to reduce demand for labour.

Figure 3: Illustration of a labour shortage



Source: Authors' presentation.

Theoretically, therefore, labour shortages should not exist, as the market would adjust. However, several countries, particularly advanced economies, have experienced significant labour shortages for prolonged periods of time without a simultaneous rise in wage levels. This has been acknowledged, for instance, in the EURES reports on labour shortages and surpluses in the EU.

Often, a labour shortage is not easy to identify because markets may have some vacancies even at equilibrium. In essence, a labour shortage may be imagined in terms of excess vacancies that persist on the market for a specific period of time. Arrow and Capron (1959) and Blank and Stigler (1957) produced two early papers that defined a labour shortage as a situation in which aggregate labour demand (the number of employed plus the number of vacancies) grows faster than labour supply (the size of the labour force). However, the EURES reports cited above show persistently high labour shortages in EU countries with a relatively stable gap between demand and supply, and in those with a relatively large potential labour force.

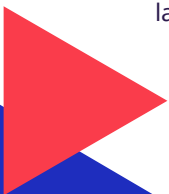
Shortages can also emerge when non-market mechanisms prevent the market from clearing, such as when long periods go by before employers or workers become aware of, or make adjustments to, changes in supply or demand (Barnow et al. 2013). One example is the time needed to train a medical doctor even if demand is booming, particularly if there is a cap on the number of places in medical schools. Finally, labour shortages may exist in regulated markets, in which wages may be set by a third party or when supply depends on entry restrictions, as in occupations requiring certification and licensing.

In the medium to long term, labour shortages can be linked to technological innovations, demographic changes and changes in patterns of consumption (Brunello and Wruuck 2021). With globalization, the influx of multinational corporations, particularly in small developing economies, is a critical driver of a technological shift. This results in the continuous emergence of new sectors and jobs, while others shrink. In the event of such sectoral shifts, labour may be slow to move from declining to growing sectors in which different skillsets may be required (Goos et al. 2014). The spread of global value chains has affected mainly medium-skilled workers, increasing labour shortages for occupations in the right half of the occupational ladder (Dauth et al. 2014). Even within existing occupations, the skills required to carry out tasks may be subject to important changes as a result of major structural transformation, such as the green and digital transitions. In particular, technological progress has reduced demand for routine cognitive and manual tasks, while increasing the reliance on non-routine tasks that cannot easily be automated. This has increased demand for low- and high-skilled occupations and reduced demand for medium-skilled ones (Das and Hilgenstock 2022).

Technological advancements, shifting consumer preferences and expansion of online retail have also changed consumption patterns, which in turn can influence the demand for certain products and services and, consequently, the demand for labour in specific industries. The Covid-19 pandemic provides a vivid example. The sudden change in consumption patterns away from the food service sector to meals prepared and consumed at home eased existing labour shortages, but they immediately reappeared with the easing of restrictions and people's renewed desire to spend time and money in restaurants. This exceeded "standard" demand and created labour shortages in the hospitality sector over 2021 and 2022 (Hobbs 2020).

Importantly, the current literature and policy debates on labour shortages tend to ignore or dismiss the role of job quality, even though labour shortages seem to have increased most and are most severe in jobs with lower wages and worse non-wage working conditions (Zwysen 2023), including the typology of contracts, shift work, and exposure to occupational safety and health (OSH) risks. Ekkehard and Feist (2024) note that working hours in the OECD countries have declined rather markedly in the sectors hardest hit by shortages, such as transportation and storage, accommodation and food services, and ICT. They compare average and total hours worked, and argue that falling total and average hours it may be an indication that workers are leaving the relevant sectors, possibly in response to poor working conditions and changed preferences.

In this study, we look only briefly at sectoral issues and focus predominantly on the analysis of labour shortages at the disaggregated level of occupations, hoping to shed some light on the linkage between labour shortages and the stigma associated with certain occupations, where it exists.



2.2. Approaches to measuring labour shortages

Labour shortages cannot be captured by a single indicator but rather through a set of indicators of job market conditions. Roy et al. (1996) depict two broad classes of measures: market economic indicators and employer-based surveys. The commonly used market-based indicators include:

- ▶ unfilled vacancy rates;
- ▶ occupational unemployment rates;
- ▶ vacancy / unemployment (VU) ratio;
- ▶ wages;
- ▶ other indicators (such as hours and intensity of work, flows of new entrants and leavers).

Employer-based surveys are commonly used to assess labour shortages by relying on employers' perceptions. Usually, these surveys ask questions about employers' experiences with labour shortages, filling vacancies and skills gaps among their current workforce. For example, Frohm (2021) relies on the Swedish Public Employment Service's interview survey (the AFU) and on questions about the current number of employees, if the employer has experienced labour shortages in connection with recruitment over the past six months, and the average salary has increased over the past year. An establishment-level measure of relative labour shortages is the ratio between the number of labour shortages in the establishment in each time period and the total number of employees at the establishment. The aggregate measure of a relative labour shortage in a market is the average of the establishment-level indicator over time.

EU member states⁵ rely on a combined set of market- and employer-survey-based indicators to identify labour shortages (McGrath 2019):

- ▶ ratio of job seekers to vacancies;
- ▶ time needed to fill vacancies;
- ▶ work permits;
- ▶ percentage of filled vacancies compared with average;
- ▶ employment growth vs education output;
- ▶ employers' views;
- ▶ occupational barometer / multiple indicators.

The first two (market-based) are used most frequently and are based on administrative data from the public employment services. However, McGrath (2019) proposes using the Labour Force Survey (LFS) to validate/complement the results. The LFS systematically gathers data on workers recruited and their occupations and the numbers looking for a work and their previous occupation. Hence, an LFS ratio could be calculated by occupation for (i) the number of persons looking for work with previous working experience in the occupation, (ii) the number of persons who in the respective period found a job in that occupation, and (iii) the ratio of unemployed to new hires.

The caution required when interpreting such a ratio is that recruits could be found also outside unemployment: first-time jobseekers and inactive persons are two other sources outside the workforce. Hence, the unemployment rate will always understate the numbers recruited to a particular occupation. Something else that should be borne in mind is that the ratio itself is suspect as a measure of relative shortage or surplus for occupations with few, if any barriers to entry. This is because the jobseekers recruited to these occupations may have previous experience in a wide range of different occupations as previous experience may not be necessary in the occupation the jobseeker is being recruited into.

⁵ The need to measure and analyse labour shortages in the EU member states is subject to the EURES Regulation (EU) 2016/589, whose Article 30 stipulates, among other things: "Each Member State shall, in particular, collect and analyse gender-disaggregated information on: (a) 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."

Therefore, when relying on the LFS, it is indispensable to cross-analyse the conclusions obtained across the different methods and even continue with expert discussions in case of significant divergences.

► 3. Methodology and data

In the absence of adequate information on vacancies and other measurement challenges, one approach to capturing labour shortages could be to analyse the actions taken by employers to obtain additional labour. In this scenario, a shortage exists when an employer has a budgeted vacant position and is unable to fill it at the prevailing wage rate (Ariste et al. 2019). Thus, the employer would need to intensify recruitment efforts, for instance by contacting the employment agency – multiple times if necessary – and re-advertising the job post, among other things (Carrillo-Tudela et al. 2020). In practical terms, a shortage on the labour market and/or for a particular occupation can thus be defined as the aggregate of hard-to-fill vacancies across firms. These vacancies are those that remain unfilled after a certain time despite all reasonable efforts by the firm (Shah and Burke 2003). This is the conceptual approach we take in this paper.

We have a rich administrative dataset on job vacancy advertisements from North Macedonia's Employment Service Agency (ESA), spanning between 2017 and 2024 (October).⁶ There are 1,176,441 observations in total and thus there is information on about 150,000 job vacancy ads published each year, on average. The basic information provided refers to the number of job vacancies per advertisement and the resulting selection, that is, the extent to which the vacancies are filled.⁷ Jobs are identifiable through a 6-digit ISCO-08 classification of occupations, which is the level we work with. Each job vacancy is assigned to the establishment that published it, which means that information is available about the sector of work (identifiable by the 4-digit NACE Rev.2 classification of activities) and the location of the establishment (in terms of the 30 ESA centres across the country). Other information provided includes the envisaged duration of the contract (definite or indefinite) and the medium of publication (through the ESA, a daily newspaper or otherwise). Information on the required educational profile, computer and language skills, and possession of specific skill certificates is available for a smaller subset of the entire population of job vacancies.

Our methodological objective is to capture the pressure arising from existing labour shortages by aggregating hard-to-fill vacancies across establishments. Given the available data, we could capture the difficulty experienced in filling the vacancies through the set of measurements set out in **Table 1**.

However, if employers publish a vacancy without the intention of hiring (for instance to test the market or to create a pool of candidates for future reference), this could introduce a potential statistical bias into the dataset, as the presence of non-genuine vacancies may distort the true picture of labour demand. To the extent this may be the case – and we believe it is fairly rare – caution is needed when interpreting the results.

⁶ It should be noted that the analysis in the following pages refers also to 2024, even though there is no information on the outcome of job vacancies published at the end of the period and which may have expired without being filled. We believe that the influence of these observations on the overall analysis is negligible, however.

⁷ It is important to clarify that according to [the Law on Employment and Insurance in Case of Unemployment](#) employers must publish a job vacancy with the ESA for at least five days. This implies that there are at least two potential scenarios: (i) the vacancy is published, and the process follows its course; and (ii) the vacancy is published but the employer has already identified a person for the job through other channels and the ESA-mandated process is run only to satisfy a formality (pre-filled vacancies). In such cases, employers may wait for the mandated five-day period to elapse before formally registering the worker and issuing a contract. While the presence of these “artificial” job vacancies may inflate the total count of advertised positions, it does not inherently bias our measurement of labour shortages. We gauge labour shortages through multiple indicators (see Table 1), which provide a more nuanced understanding of labour market dynamics. Therefore, although artificially inflated vacancy numbers may complicate the analysis, the selected indicators can still accurately reflect the actual labour shortages and hiring challenges faced by employers. This is because vacancies that are pre-filled would inevitably be more strongly correlated with low – or no – labour shortages, reflecting low or no pressure on the labour market for that specific occupation.

These variables capture various facets of the pressure stemming from existing labour shortages on the market and they are highly correlated. However, the pressure itself is latent, that is, it is unobserved. One common approach in such cases is to use principal component analysis (PCA) to create an index from these (independent) variables. Principal component analysis reduces the dimensionality of a dataset while retaining as much variation in the data as possible. It creates new variables, called principal components, which are linear combinations of the original variables. These principal components are orthogonal and uncorrelated, and they capture the most significant patterns of variation in the data (Greene 2018).

► **Table 1: Difficulties involved in filling job vacancies**

Variable	Description	Potential correlation with labour market pressure due to a labour shortage
Number of times a job has been advertised (times_advertised)	How many times the given job (by 6-digit ISCO-08 classification) has been advertised over a year	(positive) The more times a job has been advertised, the higher the pressure stemming from a labour shortage: <ul style="list-style-type: none"> ► either because the vacancy was not filled before, or has been filled only partially, ► or because the hired worker has left and the job became vacant again
Share of vacancies filled per occupation (av_filling)	Average percentage of fulfilment of vacancies (by 6-digit ISCO-08 classification)	(negative) The higher the average percentage of fulfilment over a year, the lower the pressure stemming from a labour shortage
Share of job ads filled out of total number of job ads (sh_times_filled)	Percentage of cases in which the advertised job was filled in accordance with the advertisement, out of the total number of times the job was advertised during the year	(negative) The higher the share of times the job was filled, the lower the pressure stemming from a labour shortage
Was the job filled the last time it was advertised? (last_ad)	An indicator (ordered variable) of whether the job was filled or not the last time it was advertised within the year: 1 = not filled; 2 = partially filled; 3 = fully filled	(negative) The more the job vacancy was filled the last time it was advertised within the year, the lower the pressure stemming from a labour shortage
Share of next-round job ads with a higher number of vacancies than those left in the previous round (sh_next_time_bigger)	The share of next rounds of publishing an ad (hence, excluding the initial ad in the year), when the number of advertised vacancies was higher than the vacancies left in the previous round	(positive) The higher the share of next-round vacancies when the employer needed to advertise more vacancies than were left in the previous round signals higher pressure from labour shortages

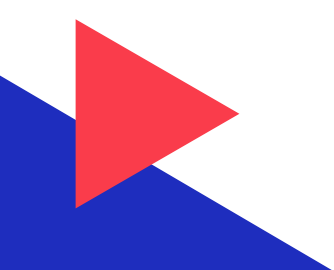
The labour shortage index we create is thus based on weights derived from the factor loadings on the first component of the principal component analysis. The first component explains between 55 and 60 per cent of the common variance across the indicators and across the years. The loadings are presented in **Table 2**.

► **Table 2: Factor loadings of principal component analysis (the same occupation is compared across years)**

Variable	2017	2018	2019	2020	2021	2022	2023	2024
times_advertised	0.045	0.037	0.035	0.049	0.048	0.033	0.041	0.073
av_filling	-0.584	-0.585	-0.586	-0.585	-0.585	-0.586	-0.586	-0.583
sh_times_filled	-0.575	-0.576	-0.576	-0.575	-0.576	-0.576	-0.576	-0.574
last_ad	-0.570	-0.569	-0.569	-0.569	-0.569	-0.569	-0.569	-0.569
sh_next_time_bigger	0.030	0.016	0.004	0.012	0.018	-0.006	-0.007	0.044

Source: Authors' calculations.

We observe that the factor loadings have signs in accordance with the expectations deriving from **Table 1** and their values are relatively stable across years. These loadings provide insights into the contribution of each variable to the principal component and help us to interpret the structure of the data in a reduced dimensional space. The magnitude of a factor loading indicates the strength of the relationship between the given variable and the principal component. Factor loadings on the “share of vacancies filled per occupation”, “share of job ads filled” and “job filled when last advertised” suggest a medium to strong association with the principal component, which implies that these three primarily drive the dynamics of the index. We demean the created index so that we have both positive and negative values for the index, whereby positive values indicate strong labour shortages, while negative values indicate either low/non-existent labour shortages or even labour surpluses. This implies that **index values**, no matter at what level they are aggregated, **should be understood only in relative terms, such as when compared with each other in the same year**.⁴ Results and discussion



► 4. Results and discussion

4.1. Results on occupational labour shortages

Labour shortages across years are presented in **Figure 4**. There are two general patterns. The first is that labour shortages are weak, non-existent or turn in to labour surpluses for high-skilled occupational groups, while as we go down the skill ladder, the labour-market pressure, and hence the labour shortage, intensifies. The second pattern is that there is declining trend for all occupational groups across years. Labelling the situation in the high-skilled occupations “labour surpluses”, we could infer that these have declined over the years, which signals that labour market pressure has increased. On the other hand, in the lower-skilled occupations, labour shortages have eased over time, even though they started increasing again around 2022. This could be understood as a structural shift on the labour market over the years, despite the persistence of shortages. Such a shift may have been related to adjustments in other segments, such as the large rise in wages observed over the same period, reliance on foreign labour in some sectors (for example, construction), demographic shifts triggered primarily by migratory patterns, or other structural change induced by events such as the Covid-19 pandemic.

Figure 4 reveals some other findings. For example, among high-skilled occupations, labour shortages have been lowest among managers, but by 2022, technical and associate professionals recorded lower shortages than managers. Among the three high-skilled occupations, professionals have been under relatively higher labour market pressure, which eased again after 2022. Clerical support workers have a labour shortage index hovering around the mean across the years, with almost negligible increase over time. The same, on average, holds true for skilled agricultural workers, despite strong variability ranging from intense labour shortages in 2017 to significantly eased pressure in 2021. Craft and related trade workers are scarcest on the Macedonian labour market, with only slightly easing shortages over the years. They are followed by plant and machine operators and assemblers, and then by service and sales workers. For elementary occupation workers shortages were relatively low and diminishing, until they followed the same trend of other medium and low skilled occupational groups and started increasing again from 2022.

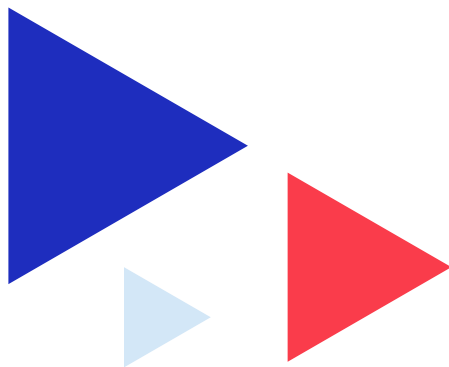
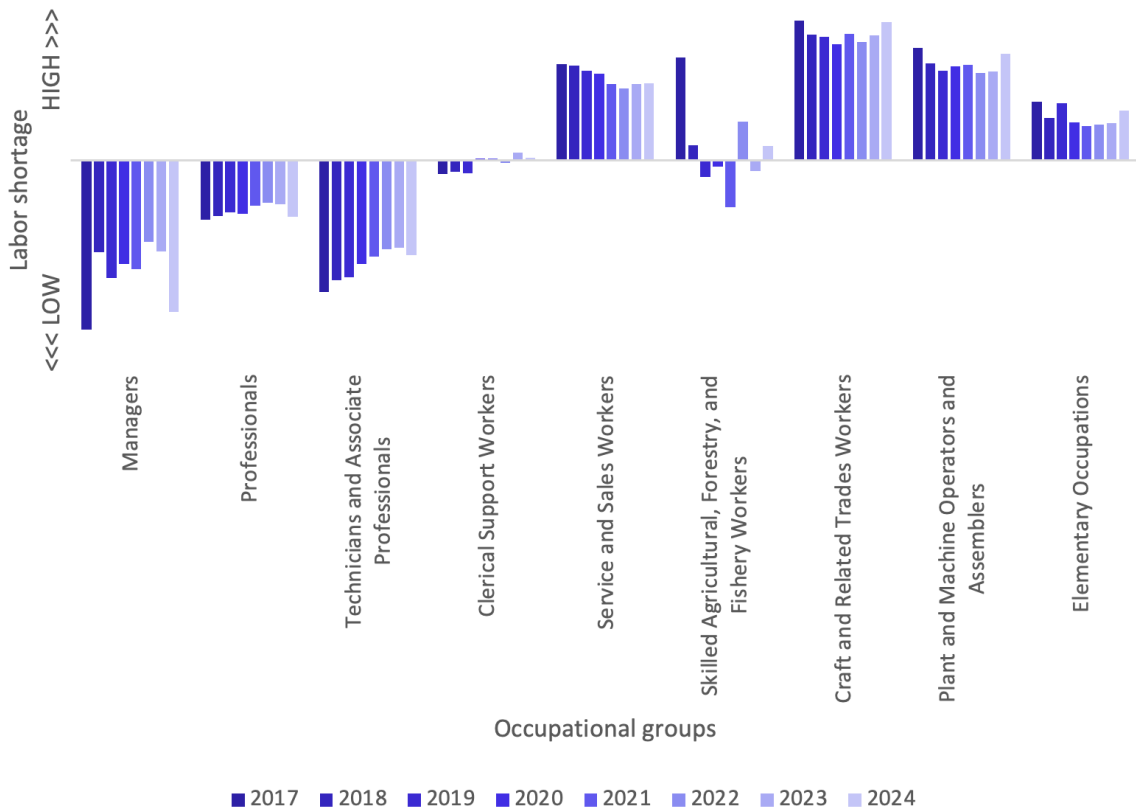


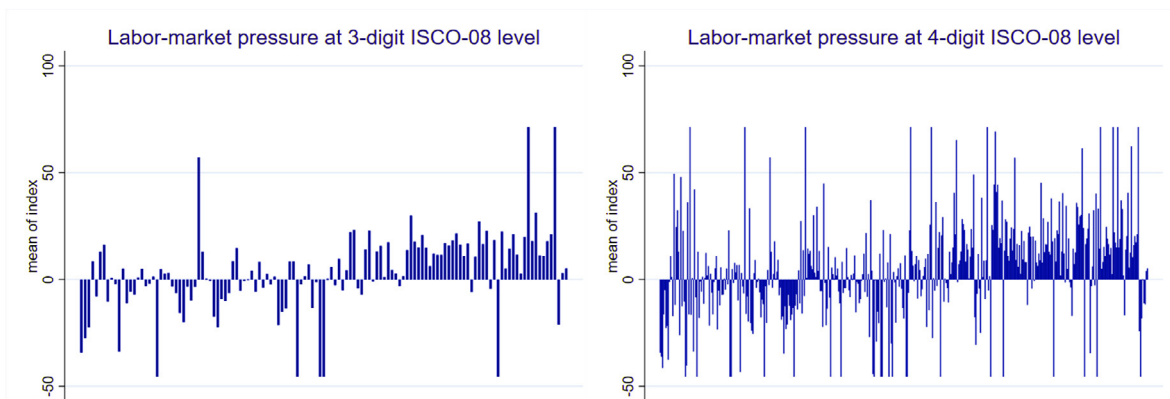
Figure 4: Labour market pressure by occupation (broad categories) (2017–2024)



Source: Authors' calculations based on ESA administrative data.

Such aggregation of results may hide important information, however. To illustrate, in **Figure 5** we present index averages at the three- and four-digit level of the ISCO-08 for 2024. Observed in their entirety, the figures reveal the same pattern as in **Figure 3**: the labour market pressure stemming from labour shortages is higher among medium- and low-skilled occupations. However, the lower the level of observation of occupations, the more index values appear on both sides of the zero-value of the index. This implies that intense shortages may exist for specific occupations in the groups which, at the aggregate level, appear “calm” on the market, in other words, the high-skilled occupational groups, and vice versa. This is consistent with the fact that, in the presence of labour shortages, the skill-level requirement is only one of the factors determining the likelihood that a vacancy in a specific occupation will be filled.

Figure 5: Labour market pressure by occupation (three- and four- digit level) in 2024



Source: Authors' calculations based on ESA administrative data.

In light of the above, in order to identify the occupations (at the 4-digit level) that most commonly face high labour shortages, we take the 50 occupations at this level of disaggregation whose index value has been the highest in each of the eight years of observation. For each identified top labour-shortage occupation in 2024, we look back and check whether the same occupation appears in the top 50 labour-shortage occupations in previous years; we label this a “retrospective view”. Similarly, for each top labour-shortage occupation in 2017, we look forward and check whether the same occupation appears in the top 50 labour-shortage occupations in the following years; we label this a “prospective view”.

We define an arbitrary rule, whereby a persistent labour shortage exists if the occupation appears in at least four⁸ of the seven years preceding 2024 or following 2017, respectively. This is to account for possible distortions that may have occurred due to the pandemic, or to account for occupation-specific interventions (such as a government intervention to modify criteria for obtaining certification or accessing a certain profession).

Table 3 presents the labour shortages that appear to be most persistent over time and in 2024, by occupation. Persistent labour shortages in both the retrospective and prospective views are to be found in the following ISCO-08 groups: 5 - Service and Sales Workers, 7 - Craft and Related Trades Workers, and 8 - Plant and Machine Operators and Assemblers. This is in line with the general finding that labour shortages have been more intense in these occupational groups (**Figure 3**).

When occupations are ranked based on the “intensity” of the labour shortage over time, only two of those that are found in both the retrospective and prospective views are also found in the top 15 occupational labour shortages of 2024. This reveals some structural changes in labour shortages over time. In 2024, along the occupational groups 5, 7 and 8, occupations from groups 1 - Managers and 3 - Technical and Associate Professionals appear among the top 15. For example, the appearance of occupations 1223 - Research and Development Managers and 2352 - Special Needs Teachers, seems to reinforce the argument that a shift of labour shortages is occurring from lower-skilled to higher-skilled occupations in North Macedonia, which we also documented in Figure 4.

It should be noted that when we first ran the principal component analysis on the 2017–2022 dataset, both the retrospective and prospective views highlighted, in multiple instances, bartenders, chefs and food preparers as shortage occupations. Clearly, much of the short-term fluctuations between 2020 and 2022 can be attributed to the provision of government support in reaction to the Covid-19 pandemic. Indeed, in North Macedonia, as in other Western Balkan economies, fiscal support packages were put in place to provide relief for lost economic activity as a result of lockdowns and other health-related measures. Significantly, some of the support measures in North Macedonia targeted the tourism and hospitality sector. This is also consistent with the list of shortage occupations in the EURES report for the same period, with reference to EU member states.

⁸ There is no need for these years to be consecutive.

► **Table 3: Persistent (over years) and 2024's top occupational labour shortages (ranked by "intensity" of shortage)**

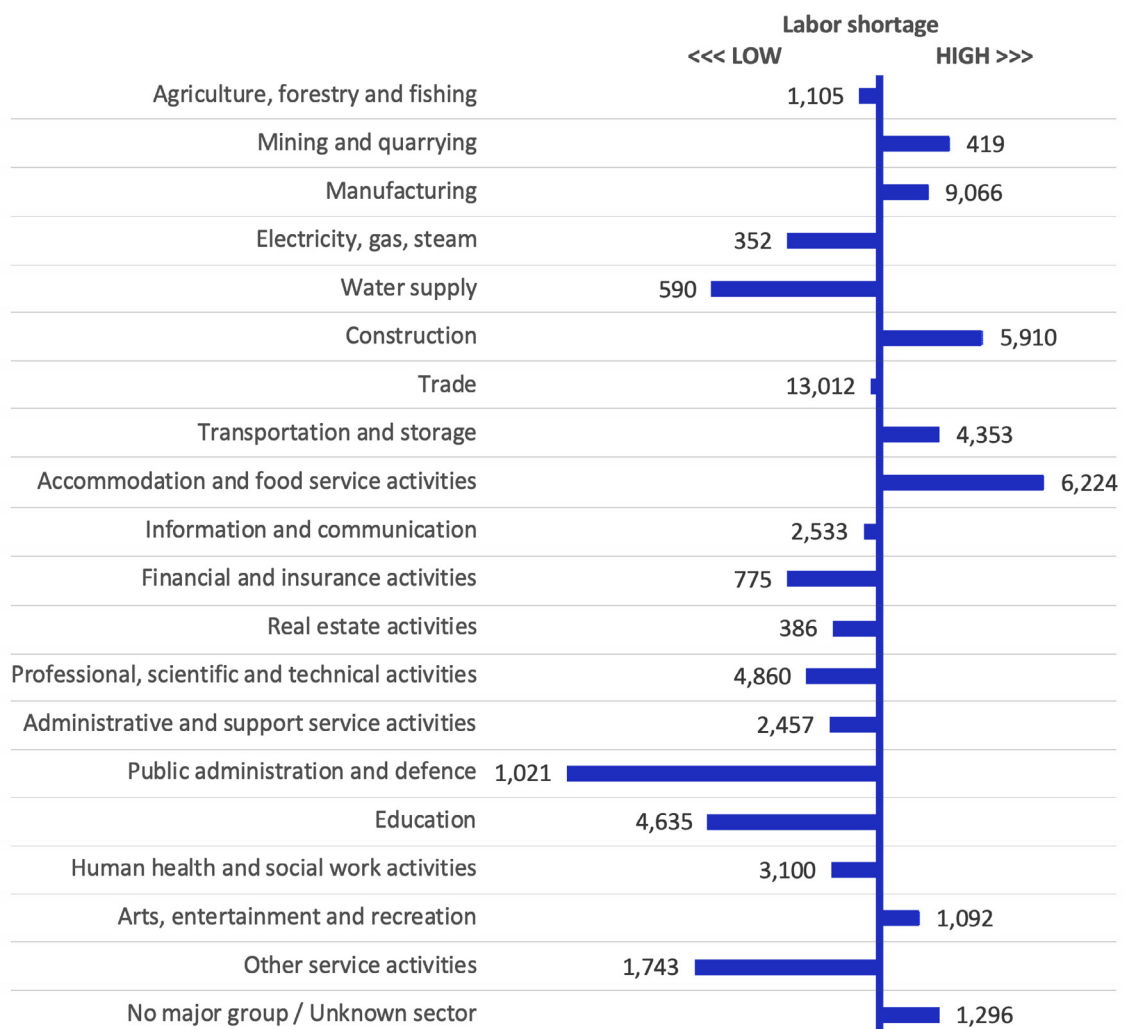
Persistent labour shortages in the past 8 years (retrospective view)		Persistent labour shortages in the past 8 years (prospective view)		Top labour shortages in 2024	
ISCO-08 code	Description	ISCO-08 code	Description	ISCO-08 code	Description
8181	Glass and Ceramics Plant Operators	8153	Sewing Machine Operators	8154	Bleaching, Dyeing and Fabric Cleaning Machine Operators
8151	Fiber Preparing, Spinning and Winding Machine Operators	7124	Insulation Workers	3117	Mining and Metallurgical Technicians
5111	Travel Attendants and Travel Stewards	9313	Building Construction Laborers	8155	Fur and Leather Preparing Machine Operators
7536	Shoemakers and Related Workers	7115	Carpenters and Joiners	8181	Glass and Ceramics Plant Operators
7124	Insulation Workers	7112	Bricklayers and Related Workers	8211	Mechanical Machinery Assemblers
5169	Personal Services Workers Not Elsewhere Classified	7536	Shoemakers and Related Workers	1223	Research and Development Managers
9313	Building Construction Laborers	7114	Concrete Placers, Concrete Finishers and Related Workers	9214	Garden and Horticultural Laborers
7114	Concrete Placers, Concrete Finishers and Related Workers	5132	Bartenders	8311	Locomotive Engine Drivers
7115	Carpenters and Joiners	6222	Inland and Coastal Waters Fishery Workers	2352	Special Needs Teachers
7112	Bricklayers and Related Workers	5111	Travel Attendants and Travel Stewards	8152	Weaving and Knitting Machine Operators
8156	Shoemaking and Related Machine Operators	5212	Street Food Salespersons	3121	Mining Supervisors
5212	Street Food Salespersons	8181	Glass and Ceramics Plant Operators	8113	Well Drillers and Borers and Related Workers
7113	Stonemasons, Stone Cutters, Splitters and Carvers	8321	Motorcycle Drivers	8151	Fiber Preparing, Spinning and Winding Machine Operators
8321	Motorcycle Drivers	8151	Fiber Preparing, Spinning and Winding Machine Operators	1345	Education Managers
		1124	Senior Officials of Special-Interest Organizations	5111	Travel Attendants and Travel Stewards

Source: Authors' calculations based on ESA administrative data.

4.2. Disaggregation of occupational labour shortages in 2024

In this section, we delve into the results on the occupational labour shortages for 2024. **Figure 6** presents the results for the labour shortages by sector of work of the relevant establishments; the bar indicates the labour shortage, while the bar label gives the sample size. The sectors containing the largest number of job vacancies faced the heaviest labour shortages. This is apparently the case in accommodation, construction and manufacturing, all of which could be associated predominantly with low-to-medium-skilled occupations. In accommodation and restaurants, this is consistent with persistent shortages of waiters, bartenders and chefs. The labour shortages in the other sectors have been lower than average. Most notably, public sectors such as public administration, education, health care and water supply, are likely to have been experiencing even labour surpluses. Particularly in public administration, the anecdotal evidence about job queues determined by the activities of political parties is evident in **Figure 6**.

Figure 6: Occupational labour shortages by sector of work

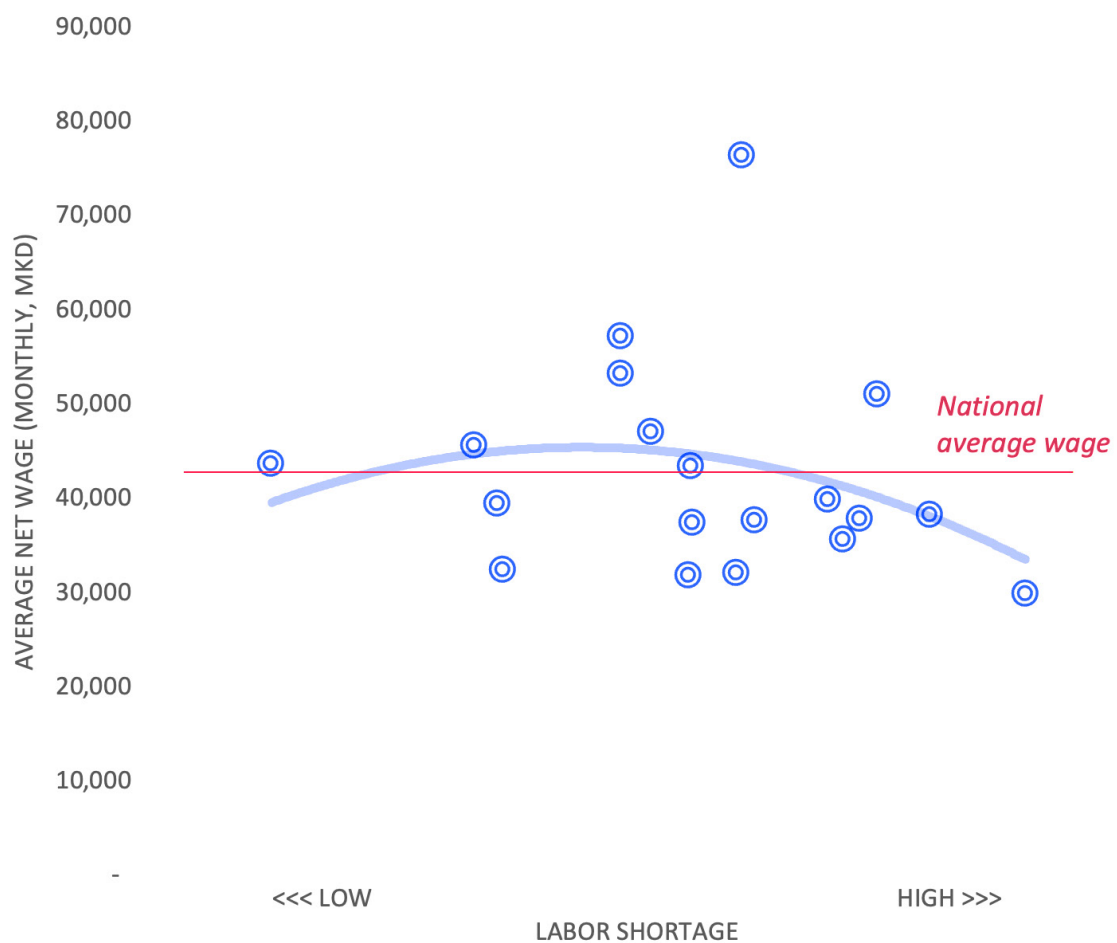


Note: Bar labels refer to the sample size in each group. Job vacancies are aggregated at the level of establishment and occupation (at 6-digit ISCO-08 code), resulting in a total sample of 64,929 observations. Results for the sectors "households as employers" and "activities of extraterritorial organizations" are not shown because of the small number of observations.

Source: Authors' calculations based on ESA administrative data.

However, no clear picture emerges (**Figure 7**) when the labour-market pressure (as represented by labour shortages) is crossed with the sectoral average wage. Increasing pressure from labour shortages may be associated with higher wages, but only in sectors in which labour-market pressure is below the average (more frequently associated with labour surpluses). Then, above the average, lower wages are likely to be associated with more intensive labour shortages. This may mean that, at least partially and in sectors more prone to labour shortages, higher wages could help to reduce labour shortages.

Figure 7: Occupational labour shortages and average wages by sector of work

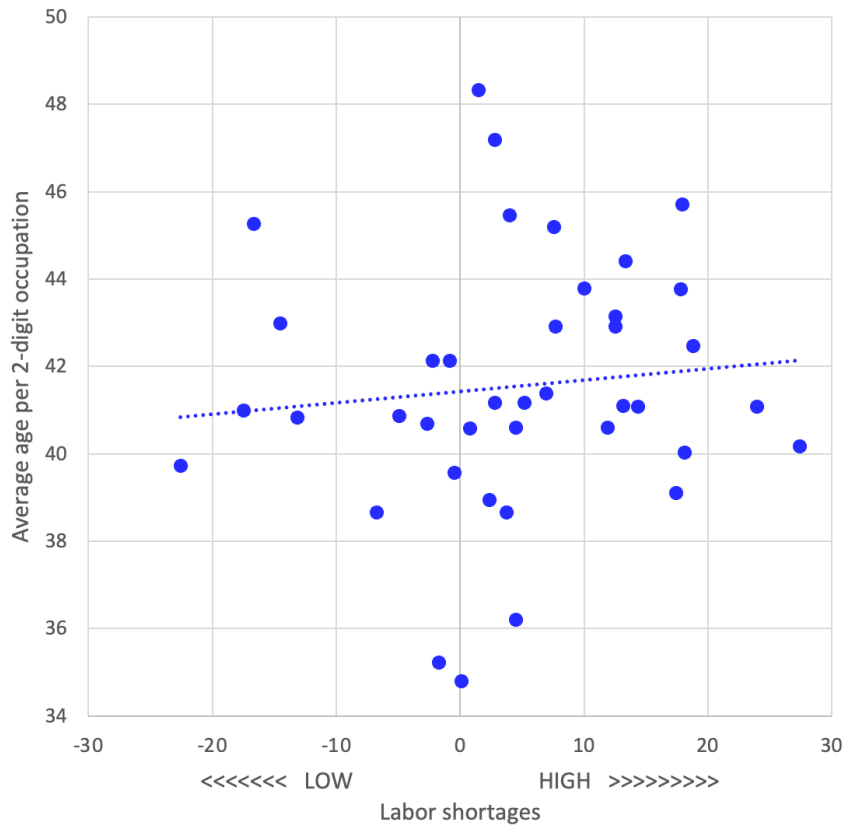


Source: Authors' calculations based on ESA administrative data. Wage data from the SSO.

Figure 8 points to a slightly positive association between the average age per 2-digit occupational group and the labour shortage, potentially suggesting that vacancies for occupations in which the existing workforce tends to be older also tend to be more difficult to fill. This could result from a combination of factors, including overall ageing, skills requirements and individual preferences. Empirical studies show that young workers tend to be more mobile in terms of job-to-job transitions than prime-age workers (Causa et al. 2021). As the share of younger workers across occupations declines due to population ageing, job-to-job transitions, which are an important adjustment channel with regard to labour imbalances, are likely to decrease (Hyatt 2015). Additionally, occupations held by

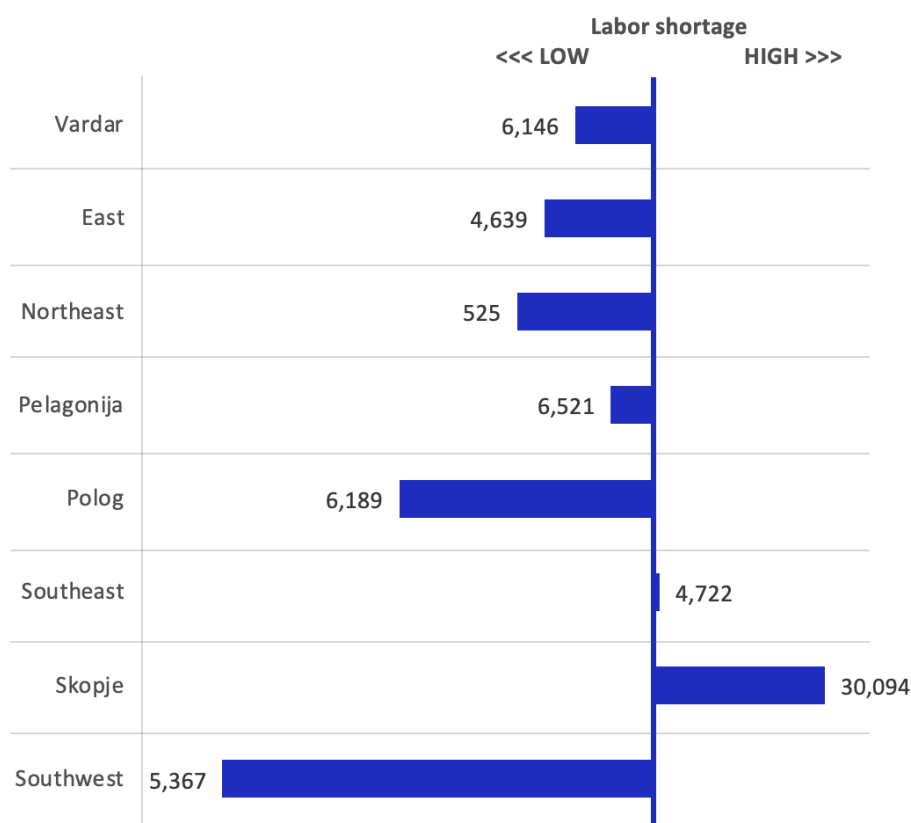
more senior workers may at times have higher skills requirements. Lastly, individual preferences and cultural norms may lead to certain traditional occupations being considered unsuitable by younger workers, particularly if characterised by unsocial working hours or other difficult working conditions (such as bakers and pastry cooks).

Figure 8: Occupational labour shortages and average age per occupational group



Source: Authors' calculations based on ESA administrative data and LFS (2021).

Labour shortages are more significant in the Skopje region and less so in the Southwest region (**Figure 9**). Skopje region, location of the capital and of the largest number of enterprises, accounted for about half of all vacancies in 2024.

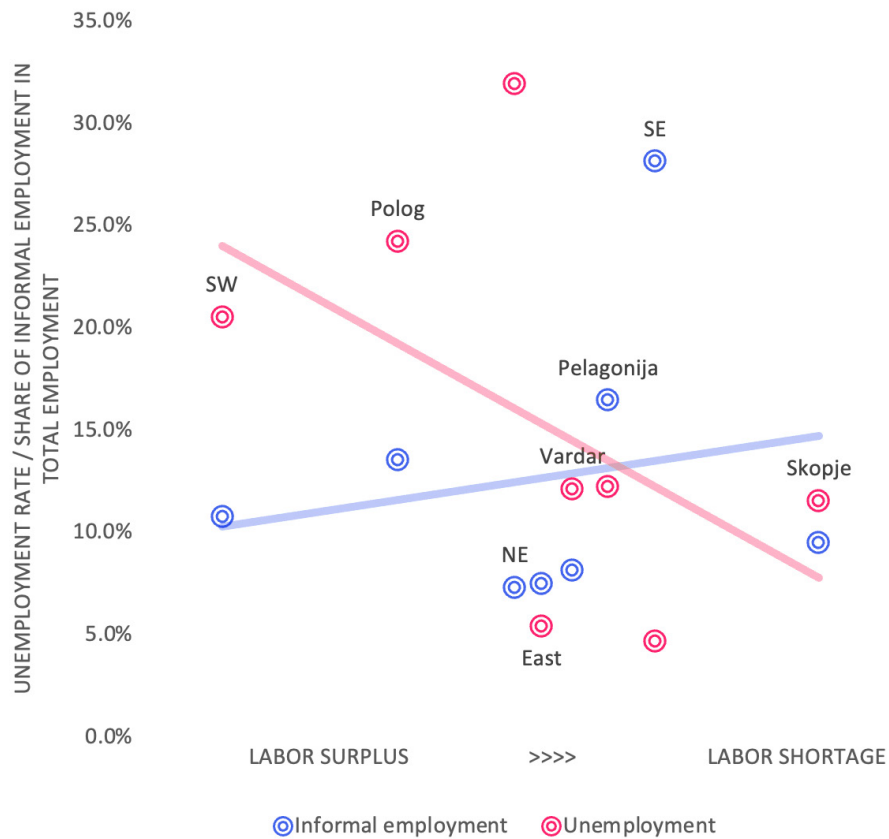
Figure 9: Occupational labour shortages by region

Note: Bar labels refer to the sample size in each group. Job vacancies aggregated at the level of establishment and occupation (at 6-digit ISCO-08 code), resulting in a total sample of 64,929 observations.

Source: Authors' calculations based on ESA administrative data.

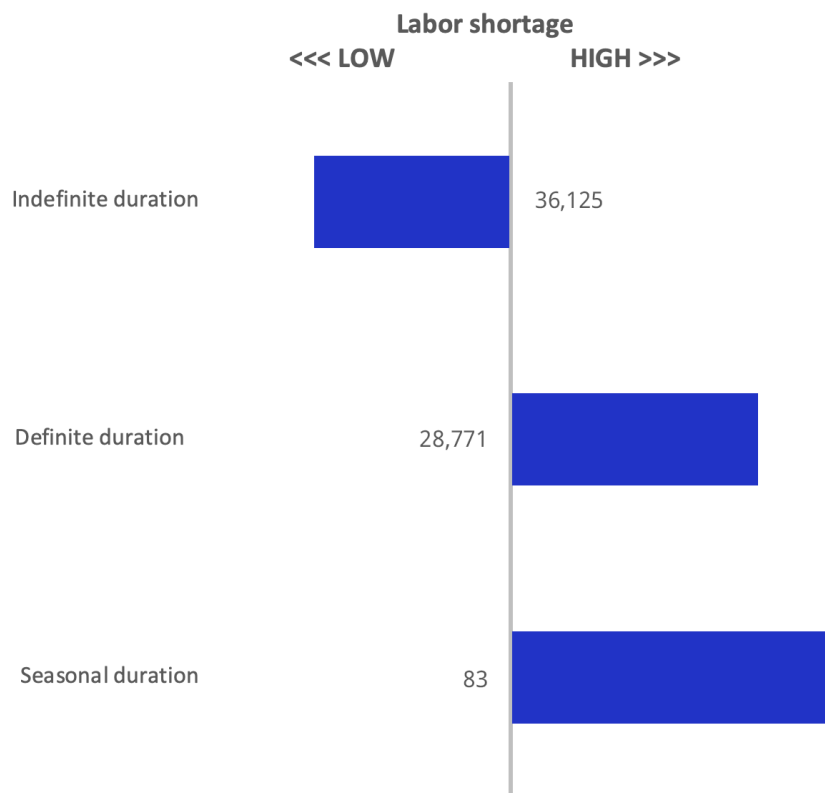
The Southwest and Polog regions display the lowest labour shortages. This is not unexpected as these regions face the highest unemployment rates; in Figure 9 the negative relation between the unemployment rate and labour shortages is clear. Less clear is the existence of a relationship between informal employment and the labour shortages. While the argument could be made that the administrative data used for this analysis do not capture informality and thus underestimate the labour market pressure and the shortages, Figure 10 does not lend strong support to this hypothesis: these two regions are not characterised by a high incidence of informal employment, while the overall correlation between informal employment and labour shortages appears rather weak.

Figure 10: Occupational labour shortages and unemployment and informal employment by region



Source: Authors' calculations based on ESA administrative data. Labour market data from the LFS of SSO.

Macedonian workers prefer contracts of indefinite duration, which is observable in **Figure 11**. Labour shortages are significantly more pronounced when advertised jobs refer to fixed-term contracts. The pressure in the case of hiring seasonal workers is significantly higher than in the other two contractual relations, though the sample is small. However, it may be associated with the prevailing seasonal work in hospitality and construction, for example, which were found to experience the strongest labour shortages among sectors (**Figure 5**).

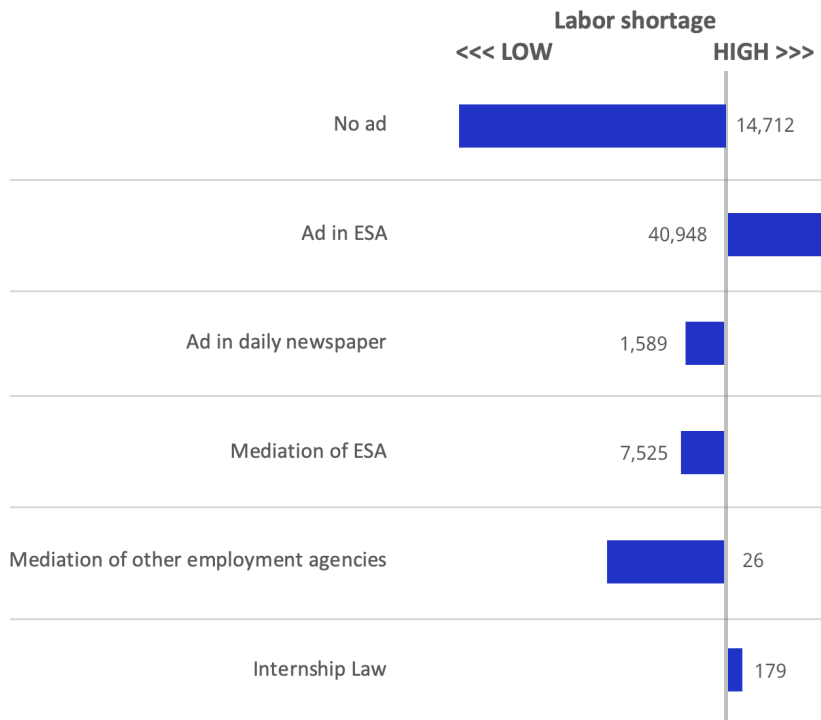
Figure 11: Occupational labour shortages by length of contract

Note: Bar labels refer to the sample size in each group. Job vacancies are aggregated at the level of establishment and occupation (at 6-digit ISCO-08 code), resulting in a total sample of 64,929 observations.

Source: Authors' calculations based on ESA administrative data.

Figure 12 shows labour shortages through the lens of the type of means of mediation or publication used. In most cases in which an advertisement was published through the ESA, labour shortages are apparent. These are probably ads that are entirely market-driven, in other words, they reflect a real need for workers. The next largest category covers instances in which no ad has been placed. The market pressure for such jobs is assessed as low, potentially reflecting the notion that hires had already been identified or were already working without an employment contract, making their subsequent employment only a formality. In two other market-based hiring types – mediation by the ESA and by other (private) employment agencies – the shortages have been estimated as medium to low.

Figure 12: Occupational labour shortages by type of mediation



Note: Bar labels refer to the sample size in each group. Job vacancies are aggregated at the level of establishment and occupation (at 6-digit ISCO-08 code), resulting in a total sample of 4,929 observations.

Source: Authors' calculations based on ESA administrative data.

► 5. Conclusions and policy relevance

This study aims to contribute to a better understanding of occupational labour shortages in North Macedonia by using a comprehensive administrative dataset of job vacancy advertisements from the Employment Service Agency. Job vacancy advertisements are defined mainly by the six-level ISCO-08 occupational codes for more than one million observations over the period 2017–2024. Through a principal component analysis, we captured the latent labour market pressure related to hard-to-fill job vacancies and created an index. We used the index value to understand labour shortages across years, occupations, sectors and regions. Similarly, we identified persistent labour shortages at the four-digit occupational level during the past eight years, as well as the occupations in most acute shortage in 2024.

The results suggest that labour shortages are substantial among the low-to-medium-skilled occupational groups, particularly for groups 7 - Craft and Related Trades Workers, 5 - Service and Sales Workers and 8 - Plant and Machine Operators and Assemblers. For these occupational groups, labour shortages presented a small but steady decline between 2017 and 2022, followed by a mild surge. The opposite holds for high-skilled occupational groups, in which an initially mild labour shortages slightly intensified over the same period.

These trajectories are linked to multiple factors, including wage increases, emergence of foreign labour in certain sectors, demographic changes due to ageing and emigration, and structural shifts prompted by non-economic events such as the Covid-19 pandemic, to name but a few.

The same general conclusion emerges when labour shortages are analysed at the four-digit ISCO-08 level, in order to identify specific occupations prone to intense labour shortages. The occupations that top the list of labour shortages over the years tend to fall in the same broad occupational groups, with some shortages from the elementary occupations also emerging. On the other hand, in 2024, other occupations from ISCO groups 1 - Managers, 2 - Professionals, and 3 - Technical and Associate Professionals started to appear alongside occupations from groups 5, 7 and 8. These results may point to a shift from labour shortages exclusively present in low- to medium-skilled occupations towards labour shortages occurring also in higher-skilled occupations. Results for 2024 reveal that the sectors with the largest number of job vacancies – accommodation, construction and manufacturing – also faced more intense labour shortages.

At sub-national level, labour shortages have been more intense in the Skopje region and less so in the Polog and Southwest regions. For the latter, a correlation could be established with the higher incidence of unemployment. No clear relationship could be established between the incidence of informal employment and the intensity of labour shortages. Occupations for which job vacancies truly correspond to employers' needs (that is, there was no prospective candidate for the job at the time of publishing the ad) are occupations in intense shortage.

Overall, the study provides valuable insights into the patterns and dynamics of labour imbalances and shortages in North Macedonia, shedding light on specific occupational groups, sectors and regions that are more affected and suggesting potential factors driving these shortages. These findings can help to inform policymaking and efforts to address and mitigate labour shortages in the country.

Addressing labour shortages requires a multi-faceted policy response across a wide range of relevant domains. The focus of this study, and thus of the policy recommendations, is on the supply side and labour market adjustment mechanisms as critical areas in which policy interventions are needed.⁹

As already indicated, the current policy debate in North Macedonia and in the other Western Balkan economies experiencing labour shortages tends to focus on the need for skills and, where they are

⁹ As correctly noted by Ekkehard Ernst and Lisa Feist, labour shortages resulting from excess demand are likely to be transitory, either because macroeconomic policies adjust over time or because households eventually return to their desired savings/consumption pattern.

deemed to be missing, on bringing in those skills through immigration. Most discussions ignore, for instance, the role of job quality, even though labour shortages have increased more significantly and are more intense in occupations associated with lower wages and relatively poorer working conditions.

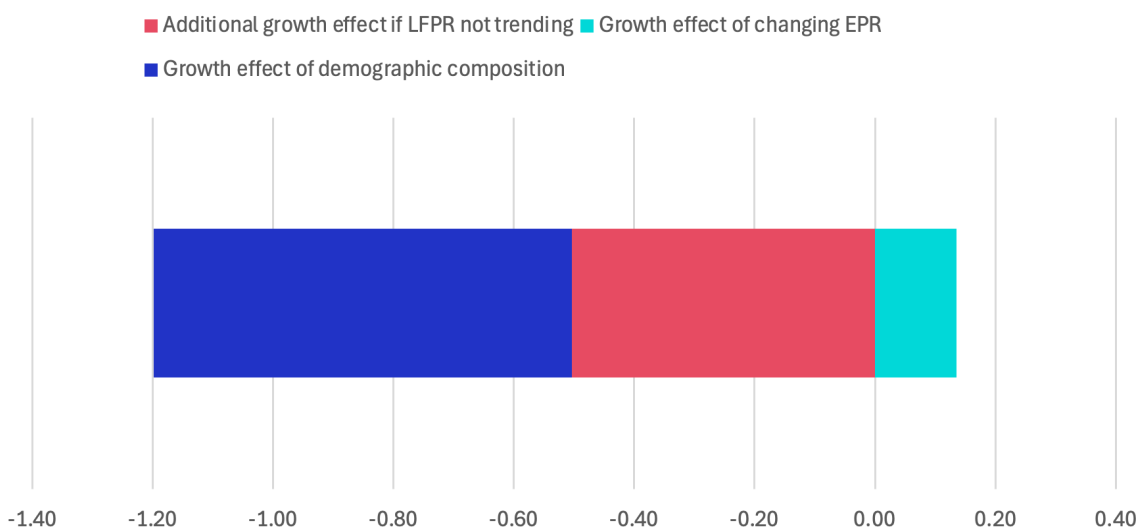
Moving forward, an adequate policy mix to address labour shortages should include a combination of policy interventions and levers from three broad and interconnected policy areas: **(1) activation strategies for the untapped domestic labour supply and retention of older workers; (2) productivity gains linked to skills and improved working conditions; and (3) labour mobility and international labour migration.**

While this may be reminiscent of a neoclassical approach, which leaves little space to accommodate heterogenous labour demand, it offers a pragmatic organizing framework for governments and social partners to dialogue and negotiate around alternative policy options.

Recent ILO research on the demographic transition in Europe and Central Asia also supports this approach. GDP growth can be decomposed into growth of the working age population (gWAP) plus growth in the employment rate (EPR), plus growth of output per employed (labour productivity). Figure 13 shows the average annual growth effect of the first two components between 2024 and 2050. The combined effect of the declining population (estimated at -0.7 percentage points per year, in green) and of the changes in employment (estimated at $+0.14$ pp per year, in orange) are projected to lower the average annual GDP growth between 2024 and 2050. The figure also shows the additional growth effect of a scenario in which labour force participation rates (LFPR) for certain population categories were to remain at their 2024 level, which would result in a lower overall LFPR by 2050 and affect average annual GDP growth by another 0.5 pp (in blue). The ultimate impact on GDP depends on the third component, namely future labour productivity growth, which is not shown in the figure, as it is unknown.

Hence, investments in activation policies and in productivity are important policy levers to counter the potential negative impacts of demographic change on economic growth. In the first case, the activation of certain population categories helps to maintain and increase labour force participation rates, while investments in productivity in the Western Balkan region are linked to a shift away from a business model based on cheap labour towards better working conditions and better-quality jobs.

Figure 13: Western Balkans: Understanding the impact of demographic change on average annual GDP growth, 2024–2050 (percentage points).



Source: ILO estimates. Special thanks to Stefan Kühn (ILO RESEARCH department) for modelling Western Balkan data.

The implementation of a comprehensive activation strategy for domestic labour supply requires an adequate understanding of the reasons for low labour force participation and the discouragement of certain population categories.

Successfully tapping underutilized talent pools includes creating pathways to keep older workers (55+) in the labour market,¹⁰ and enabling women to enter or return to the workforce, as well as young people not in employment, education or training (NEETs), the long-term unemployed and persons with disabilities, among others. While policies and regulations need to be aligned towards that objective, very often these pathways require individualized service delivery, in the sense of approaches tailored to the final beneficiary. This requires the involvement of public and private service providers.

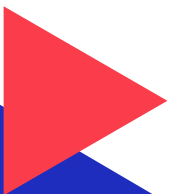
For instance, starting in 2018, North Macedonia was the first country outside the European Union to implement a Youth Guarantee scheme, targeting young NEETs. With around 20,000 young people, on average, registering every year, the performance of the Youth Guarantee in North Macedonia is mostly in line with its performance at EU level.¹¹ These schemes have shown some promising results (or at least some promise), particularly in terms of enabling longer-term structural reform aimed at fundamentally improving the school-to-work transition process and the overall participation of young people in the labour market. The Employment Service Agency (ESA) is doing the heavy lifting with regard to the delivery of this activation policy. However, performance data collected by the ILO indicate that, as the number of young NEETs entering the Youth Guarantee system increases, the capacity of the ESA to provide positive and timely offers declines. This is partly because of the still limited allocation of funds to labour market integration programmes, but first and foremost the lack of human resources available to manage the additional workflow in ESA local offices.

Thus, the successful pursuit of activation strategies in response to labour shortages requires a strong ESA, capable of implementing well-modulated active and passive labour market policies, including skills development programmes for the existing pool of registered unemployed, who, in large part, have at most a primary education and could fill some of the vacancies in sectors experiencing labour shortages (most notably accommodation, construction and manufacturing).

Support for the successful full-time participation of specific population groups requires tailored interventions based on an assessment of what works in the given context. For instance, ILO interventions to support women's labour market participation in Central and Eastern Europe indicate that access to affordable childcare tends to generate better results with women with care responsibilities than the provision of financial support. With regard to persons with disabilities, EU practice suggests that public policy interventions aimed at supporting both employers (through the provision of decent accommodation) and workers with disabilities (by enabling access to flexible working arrangements and assistive technology) increases their labour market participation and employment, including when their disability does not allow them to work full-time. With regard to older workers, the ILO promotes the idea of a universal entitlement to lifelong learning, correcting perceptions of older people, offering financial incentives to hire and retain older workers, adapting public employment services to multi-stage working lives, and supporting enterprises to adapt the workplace to the needs of older workers.

¹⁰ Eiffe, Franz, Weber, Tina and Muller, Jessye (2024) *Keeping older workers engaged: policies, practices and mechanisms*. Eurofound.

¹¹ In 2020, which was the most challenging year for the Youth Guarantee, with more than 25,000 entries, the proportion of young people who had been waiting more than four months for an offer was 61.3 per cent (62.3 per cent at the EU level). The rate of positive and timely exits reached 34.2 per cent in the same year (34.8 per cent at EU level). The distribution of timely offers shows that young men are more likely than women to exit within the established timeframe (41.1 and 39 per cent, respectively), as are younger people compared with the cohort 25–29 (41 and 36.2 per cent, respectively). Youth Guarantee coverage was lower than that achieved at EU level (24.5 and 36.9 per cent, respectively), but this difference can be explained largely by the higher capacity of the EU Public Employment Services in terms of financial and human resources dedicated to the Youth Guarantee, compared with North Macedonia.



Clearly, there are limits to the effectiveness of such policies, particularly if implemented in isolation. Thus, it is essential that evidence-based activation strategies, tailored to the specific circumstances of different population categories, are an integral part of a comprehensive employment policy, in which macroeconomic, sectoral, institutional and labour market dimensions are considered in the round. Thus, it may be relevant for North Macedonia to include tackling labour imbalances as a key policy objective in the next national employment strategy cycle, starting in 2028.

In sectors facing chronic labour shortages, improving working conditions and enhancing the quality of employment, including safety and health at work, is crucial for attracting and retaining workers. In a number of sectors, employers are under pressure to adapt to changing worker expectations on pay, flexible hours, remote working, parental leave or work–life balance. Some, if not all of these are available in Macedonian legislation, but they are significantly underutilized. More awareness and facilitation in the implementation of a supportive policy and regulatory environment is necessary to enable enterprises to adapt and enhance job quality. If investments are made in bringing underrepresented categories closer to the labour market, it is critical that they be activated into better quality jobs or the process may eventually fail.

While digitalization and automation may displace some jobs, they can also boost productivity and create new roles. Clearly, as in any transition, this needs to be managed thoughtfully and with adequate tools. Prioritizing human capital development to take advantage of the productivity gains linked to innovation and digitalization is essential, especially in view of the demographic changes going on in many middle-income countries, which are at risk of “growing old before becoming rich”, as the saying goes. Increasing productivity is also a way of addressing labour shortages by being able to maintain production with fewer workers. New technologies, by augmenting workers’ capacities, can boost productivity.¹²

Another way to reduce labour shortages is to adopt labour migration and geographical mobility policies. Internal and regional (Western Balkan) mobility offers important entry-points for targeting policies because there are regions with more pronounced labour shortages, such as the Skopje region. Investments in infrastructure, education and job creation initiatives need to be better coordinated in order to reduce regional disparities and attract workers to regions with the highest demand.

Tripartite dialogue around the issue of importing foreign labour is critical and deserves special attention with no need to rush yes/no answers. Carefully crafted immigration policies can help to address specific skill shortages while benefiting both sending and receiving countries. Integrating migrants and refugees through streamlined qualification assessment and targeted training could help employers to overcome acute labour shortages. However, the 2023 EURES Report on Labour Shortages and Surpluses warns that existing migratory flows can worsen shortages in the countries of origin in the more widespread shortage occupations, for example in the health sector. Interestingly, the care economy appears to be a cross-cutting dimension when it comes to addressing labour shortages, connecting both the activation of population categories with traditionally low labour force participation rates (such as women with care responsibilities and persons with disabilities who would benefit from additional investments in care support) and migration issues. A considerable portion of the migrant workforce often fill unmet needs for labour in the care economy, specifically long-term care needs in ageing societies. Women often migrate under temporary migration schemes, leaving their own families behind in the care of other family members or domestic workers, creating what is known as “global care chains” and, in many cases, contributing to care crises in the countries of origin.

Investments in education and training are in fact critical across all three policy areas. Beyond the support offered to young people, lifelong learning initiatives underpin all efforts to address labour shortages. Employers are interested in tools that provide useful information on the overlap of skills and competences across occupations and on appropriate pathways for transitions across occupations for the domestic workforce or integration of migrant workers. Such information can direct employers towards new pockets of labour supply outside traditional pipelines for candidates. The ESA can play a

¹² To better understand the concept of ‘augmentation’, please see the seminal work: Gmyrek, P., J. Berg and D. Bescond (2023) “Generative AI and Jobs: A global analysis of potential effects on job quantity and quality”, ILO Working Paper, 96.

role not only in providing support for (re-)integration but also essential information to help employers and workers (non-foreign born and migrant) navigate an increasingly complex web of occupations.

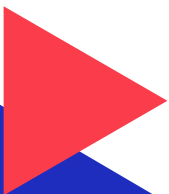
Given the complexities outlined above, solving the looming labour shortage crisis requires collaboration between governments, businesses and their representative organizations, as well as workers and their organizations. Educational institutions, public and private employment agencies, and myriad other stakeholders are of course involved, but the starting point is robust social dialogue around key policy options and related trade-offs, whether they concern investments in human capital development, policies that promote labour market flexibility and mobility, or a renewed focus on creating quality jobs with growth potential. Such dialogue requires solid evidence. The ESA needs to cooperate more closely with the Skills Observatory within the Ministry of Education and Science. The Skills Observatory, together with the State Statistical Office, should also continuously monitor demographic shifts, including migration patterns and population trends, to anticipate changes in labour market dynamics and emerging shortages. Additionally, it may well be that social dialogue needs to take place at sectoral level, combining options from the three policy levers (activation of the domestic labour supply, workers' mobility, productivity) into sectoral pacts based on the specificities of the sector, the root causes of persistent occupational shortages, and the future prospects of the sectors in a context of structural transformation and the green and digital transitions.

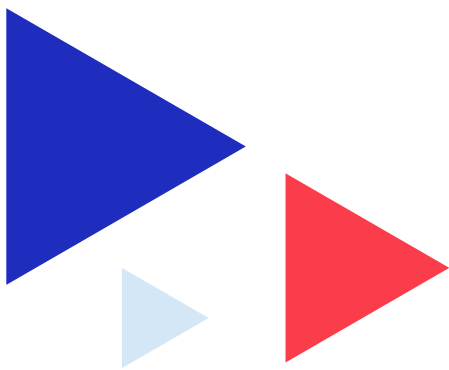


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