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## Article

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Ekkehard Ernst and Lisa Feist

## Tomorrow at Work: The Age of Shortages

Labour shortages have become pervasive, across occupations, sectors and countries (ILO, 2024). What was once dubbed the “global war for talent” has now affected large swaths of labour markets across advanced economies. This is a significant change in sentiment following high un- and under-employment during the pandemic years 2020-21. It does seem, however, to follow a trend that emerged in the second half of the 2010s in which employers increasingly hinted that it was becoming more difficult to find suitable workers, regardless of the sector or occupation.

Labour shortages do not only affect high-income countries. Their impact is also felt in countries that still have an abundance of labour, as indicated by high unemployment or informal employment, mostly in the Global South. For one, labour shortages in the Global North might induce further brain drain, a long-standing issue for sending countries. Moreover, supply bottlenecks due to labour shortages are likely to slow global growth and trade while also inducing higher global inflation. Together, this will affect developing and emerging countries more severely than advanced economies.

This article presents an assessment of the origins and extent of labour shortages, focusing on Organisation for Economic Co-operation and Development (OECD) countries. In particular, it distinguishes between three sources of labour shortages: first, demand-driven temporary shortages; second, supply-driven long-term shifts in the size and composition of the labour force; and third, shortages driven by ineffective labour market adjustments that result in skill or geographical mismatches. We start by

presenting our assessment before turning to some policy solutions to address the different sources of shortages.

### Labour shortages: Where and why

There is no commonly accepted definition of what constitutes labour shortages. Most analysis uses survey-based evidence (e.g. Gallup, 2023) or heuristics such as the number of (unfilled) vacancies or the vacancy-to-unemployment ratio. Others use a model-based assessment of inefficiently tight labour markets as a baseline for shortages (Michaillat and Saez, 2023). For our purposes, and considering that there is no internationally agreed upon definition of what constitutes a vacancy, we compare the evolution of national-level vacancy data to a 10-year moving average over the last two business cycles for countries with available data (see Figure 1).

As the figure illustrates, following the initial pandemic shock, during which vacancies collapsed as businesses faced the uncertainty of a dawning economic crisis, job openings recovered to levels above historical averages by 2021 and peaked in 2022. Afterwards, the curves show a steep recovery but remain elevated compared to the long-term average, and variation within the panel is larger than before the pandemic. Both the median and the 75th percentile curves remain well above their maxima of the decade preceding the pandemic.

Much of the short-term fluctuations over the last four years can be attributed to government support in reaction to the COVID-19 pandemic. Indeed, in most high-income countries, fiscal support packages were put in place to provide relief for lost economic activity due to lockdowns and other health-related measures (Ernst, 2020). What helped stabilise incomes and production also led to a booming labour demand, indicated by vacancy rates well above the historical average, including in sectors and occupations not directly affected by the pandemic. Four years later, even though many countries have moved to realign their public budgets, labour markets have started to cool down but remain supported by strong consumer demand as households continue spending their additional savings accumulated during the pandemic years.

With the cyclical boost to labour demand now fading, structural imbalances start playing a larger role, as sectoral shifts in demand persist and create bottlenecks in specific sectors and occupations. The health sector, for

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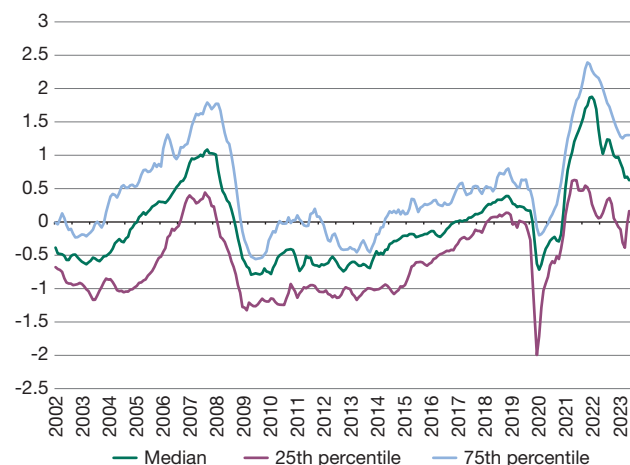
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**Figure 1**  
**Vacancies in high-income countries, January 2022 - May 2023**

Standard deviations from the mean



Note: The figure shows the median, 25th and 75th percentiles of the three-month moving average of vacancies for 18 mostly advanced economies, expressed in standard deviations from a 10-year moving average. Countries included in the panel: Austria, Cyprus, Czechia, Estonia, Finland, France, Germany, Japan, New Zealand, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, Thailand, United Kingdom, United States.

Data source: tradingeconomics.com, calculations by the ILO.

example, experienced extraordinary strain during the pandemic, exacerbating already difficult working conditions. This added to existing hiring difficulties, as demand for health care services is on a constant rise in ageing societies while many practitioners reach the age of retirement (WHO, 2022). As a consequence, the health sector is one of the sectors with the most pressing shortages in the EU (European Labour Authority, 2023). Further sectors with widespread and severe shortages include the construction sector, IT, transportation, hospitality and manufacturing (ILO, 2024).

There are marked differences across countries regarding their labour force participation rates, but almost all countries saw a return to pre-pandemic participation overall, with the exception of the United States (see ILO, 2024; Feist, 2024). Depending on national contexts, pockets of lowered participation remain due to cultural and institutional differences, such as retirement ages and childcare provision systems. Moreover, health-related issues continue to linger in the background as regular waves of infections continue to depress labour force participation at least temporarily. In 2022, for example, the number of sick days in numerous advanced economies was still significantly higher than in 2019 (ILO, 2024; Colijn, 2023).

Even though labour force participation might have recovered, the labour supply is depressed as average hours worked continue to decline, especially in Europe, a long-term trend that is unlikely to reverse. Indeed, Astinova et al. (2024) find that this decline is, for the most part, driven by structural rather than cyclical factors and matches an alignment of actual towards desired working hours. They also conclude that the decline in average hours is driven by changes within worker groups rather than compositional changes. This would point towards changes in preferences and, to some extent, increased bargaining power for some worker groups. The current decline in working hours can thus likely be partly attributed to shifts in preferences and a one-time trigger towards less strenuous activities (Causa et al., 2022).<sup>1</sup>

This is reflected in the marked sectoral differences in the decline of hours worked. Figure 2 shows that between 2019 and 2022, average hours have decreased across all sectors, but not uniformly. Instead, they declined rather markedly in some of the very sectors beset by shortages, such as transportation and storage, accommodation and food service activities, and information and communication. Moreover, based on a comparison of average and total hours worked, different forms of shortages arise across sectors between those with rising total hours but falling average hours and those where both total and average hours fall, which suggests that workers are leaving these sectors, possibly due to working conditions.

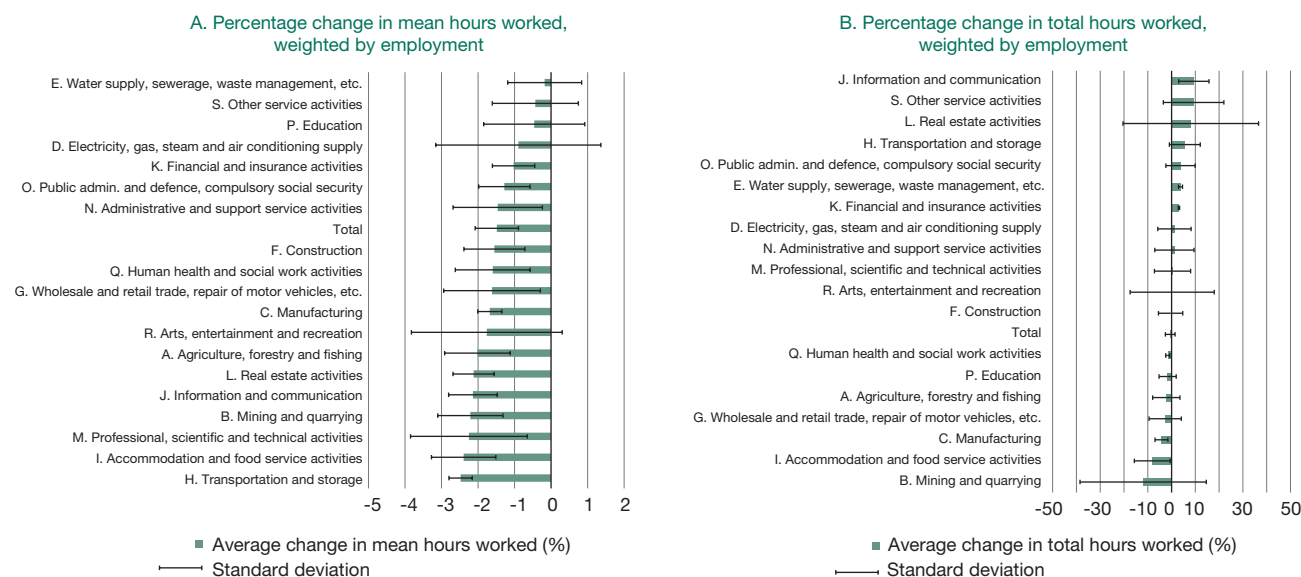
Labour shortages can also arise because of a failure of labour markets to adjust to sector- or occupation-specific shocks. Indeed, empirical studies show that young workers tend to be more mobile in terms of job-to-job transitions than prime-age workers (Causa et al., 2021). As the share of younger workers declines due to population ageing, job-to-job transitions, which are an important adjustment channel with respect to labour imbalances, are likely to decrease in the long run (Hyatt, 2015).<sup>2</sup> As a consequence, fewer job switchers will be available to fill open jobs than in the past. This also has implications for wage growth, as (voluntary) job-to-job transitions are empirically linked to salary increases (Faberman and Justitiano, 2015; Berson et al., 2020).

<sup>1</sup> Looking into the relationship between hours worked and productivity, Cette et al. (2023) find that both are negatively correlated in the long run – that is, an increase in productivity leads to a decrease in average hours worked over longer periods. This relationship can reverse in the short run for certain sub-periods and sets of countries.

<sup>2</sup> Job-to-job transitions are procyclical in nature but have been subject to a long-term decline since the beginning of the millennium, at least in the United States (Bosler and Petrosky-Nadeau, 2016).

Figure 2

## Changes in hours worked by economic activity, in selected countries, 2019-2022



Notes: Classification of economic activities is based on ISIC Rev. 4 (categories T, U and X are excluded). Countries included: Australia, France, Germany, Japan, United Kingdom, United States.

Source: ILOSTAT, authors' calculations.

Besides an ageing workforce, rising labour market concentration can also be blamed for slower labour market adjustment. Indeed, monopsony – the capacity of firms to set wages and working conditions – is widespread across OECD economies and has increased over the past decades (Araki et al., 2022). This matters because labour market concentration leads to worse labour market outcomes, such as lower wages and employment (Araki et al., 2022; Azar et al., 2022; Bassanini et al., 2024). Monopsonistic markets, in which employers have disproportionate wage-setting power, are also associated with lower labour mobility. When workers are unlikely to switch jobs as a response to worsening working conditions or low wage growth, employers are less compelled to compete for them by improving these elements (OECD, 2022; Manning, 2003). Bassanini et al. (2024) also find that labour market concentration is associated with lower job security, as it reduces the probability of being offered permanent employment.

In addition, labour market concentration leads to a skewed productivity distribution and the development of superstar firms (Fernández-Villaverde, 2021). This creates a scenario in which productivity gains are not shared widely throughout the economy, and job polarisation increases (ILO, 2023). Both have been observed in the current era of low productivity growth. Considering data from 15 OECD

countries, Araki et al. (2022) find that some of the occupations facing the most concentrated labour markets are handicraft and printing workers, health and health associate professionals. Incidentally, the occupations experiencing the lowest levels of labour market concentration, are ICT professionals, sales workers, business and administration professionals, cleaners and helpers, as well as mining, construction, manufacturing and transport labourers. Looking back at Figure 2, several of the latter occupations are considered shortage occupations and are located in sectors that have experienced a stronger-than-average decline in working hours.

Certain pandemic-related labour market policies might also have impaired labour market adjustment. Heavy duty employment retention and broadened unemployment benefit schemes during the pandemic helped smooth incomes and salvage livelihoods during the health crisis. At the same time, the strong policy responses likely helped keep firms afloat that would have otherwise gone insolvent as part of a normal process of creative destruction and productivity-enhancing reallocation. Andrews et al. (2021) find that productivity-enhancing reallocation continued to take place during the pandemic in Australia, but *not* in New Zealand where the policy response was more geared towards job retention.

Labour market shortages might also result endogenously from employers' reluctance to refrain from laying off workers as they fear a tiresome subsequent hiring process if additional personnel are needed again (Doornik, 2023). Indeed, labour hoarding appears to be more prevalent among firms in the EU since 2021 than before the pandemic (European Commission, 2023). While job retention usually adds resilience to labour markets during recessions and has helped smooth incomes during the pandemic in the form of subsidised labour retention schemes such as short-time work policies in the EU, it also tends to reduce labour productivity and, as a corollary, slow down the efficient allocation of workers to better-fitting jobs in persistent shocks (Giupponi and Landais, 2023).

Finally, macro-economic conditions prior to the pandemic – in particular highly accommodative monetary conditions – might have created additional labour market fragilities that contribute to current shortages. Indeed, research shows that credit booms, measured as domestic credit to the private sector in percent of GDP, tend to induce labour reallocation towards low-productivity growth sectors (Borio et al., 2015).<sup>3</sup> While the immense effort of governments to sustain their economies can hardly be called a credit “boom”, the vast credit support and forbearance programmes helped firms across all sectors access cash more easily, by relaxing lending conditions for borrowers (Hong and Lucas, 2023). Credit expansion in non-tradable sectors thus adds to sectoral imbalances by reallocating labour towards non-tradable sectors, hampering future productivity growth (Müller and Verner, 2023). Further research is needed to see whether such an inefficient reallocation towards lower-productivity sectors has indeed taken place in Europe. Apart from these cyclical developments, the long-term relationship between job reallocation and productivity has weakened in several countries (Decker et al., 2020; Andrews and Hansell, 2021).

### Policies to address imbalances

Labour shortages resulting from excess demand are likely to be transitory only, either because macroeconomic policies adjust over time or – as regards pent-up demand from additional savings that built up during the pandemic – households will eventually return to their desired savings-consumption pattern. Indeed, tighter monetary policy as a result of high and rising inflation rates has already shown effects, for instance as regards construc-

tion activity. Similarly, policymakers have started to focus their attention on bringing sovereign debt rates back to more sustainable levels by lowering fiscal spending and increasing taxes. This leaves the supply side and labour market adjustment mechanisms as the two main areas where policy interventions are needed. Our assessment points to three areas where policymakers should focus their attention: first, mobilising untapped potential of the labour supply, including through international migration; second, strengthening skill and competence development; and third, improving productivity, especially by accelerating digital and green transitions.

The first policy area follows naturally from our assessment of a quantitative lack of workers in certain occupations and sectors. In many countries, labour force participation rates for specific groups, women in particular, continue to trail behind partly as a result of inadequate support to integrate the labour market. Even in those countries where labour force participation has increased, the number of working hours often fall short of a full-time occupation. Here, support for successful and full-time participation should be ramped up, either in the form of additional care facilities to elevate participation of women with care responsibilities or by strengthening workplace regulations that help, for instance, people with disabilities to participate fully. Moreover, many countries have high tax burdens for second earners or discouraging implicit tax rates for low-income earners. Smoothing out these disincentives to work by making the tax-benefit system more neutral would also help encourage an increase in participation and hours worked. Finally, as longevity is set to increase further, with many people staying healthy late in life, mandatory retirement ages and other barriers to participation for older workers should be removed or phased out. In this regard, limiting the use of early retirement schemes and raising mandatory retirement ages has provided encouraging evidence on the impact of labour force participation and employment rates of older workers. Quite naturally, the effectiveness of such policies face a natural limit as average hours worked (and participation rates) follow a long-term declining trend as households become richer and can afford to lower their labour supply (Astinova et al., 2024).

Where national labour resources have been exhausted, countries might want to consider increasing the number of international labour migrants. Such policies do require, however, a careful balancing act regarding the domestic capacity to absorb an additional inflow of people as pressure on housing markets and the use of (public) infrastructure can quickly eliminate the benefits of international migration. Moreover, except for very few occupations, most do require that migrants have a minimum of language and

3 In several advanced economies the size of domestic credit to the private sector has increased during the pandemic. See the development of the indicator in the World Bank Database: <https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS>.



technical competences before they move. In this sense, current Global Skills Partnerships such as those set up by Germany or Belgium could provide interesting avenues for a win-win situation; so far, the evidence is scarce, and these programmes should be closely evaluated to provide policy insights (ILO, 2024).

Second, skills shortages should be addressed with a range of policy initiatives, not only targeting young people. School-to-work transition rates have improved in recent years in advanced economies and youth unemployment rates have significantly declined since the peaks observed during the mid-2010s, especially among European countries (Schmid et al., 2023). Nevertheless, there are still around 10% of young adults not in employment, education or training (NEET). Moreover, adult and continued education has still proven to be challenging, and life-long learning continues to be more of an aspiration than a concrete policy tool. As a consequence, large parts of the adult workforce remain at the skill level inherited from their young school years without continuous upgrading. This has become particularly visible with the digital transition where digital literacy is significantly lacking among older workers, preventing them from successfully transitioning to alternative occupations or re-integrating employment in case of job loss (Keslairi and Paccagnella, 2020).

Our assessment also identified that not only are skills lacking, but there is a significant mismatch of skills across sectors and occupations. This calls for additional support for employees to transition to new areas where their competences are in high demand. Occupational mapping such as that provided by Skills Future Singapore can be a good first step. In this case, public employment services not only provide support for re-integration but also essential information to help workers navigate an increasingly complex web of occupations. Tools such as those suggested by NESTA can fine-tune such mapping by providing granular information regarding the overlap of skills and competences across occupations and suggesting appropriate pathways for transitions. Such information is also relevant for employers as it can indicate to them new pockets of labour supply outside traditional pipelines for candidates. Occupational mobility can be further enhanced through proper certification schemes. Indeed, on-the-job learning is rarely properly documented despite the fact that it often offers valuable competences that are relevant across a number of jobs (McKinsey, 2022). This type of implicit life-long learning grows with a person's career, but the lack of proper documentation and certification often makes it less valuable for job transitions. In this regard, micro-certification schemes are an important step in helping experienced workers to document their competences for the next transition.

A third area concerns the slowdown in productivity growth, which in our sense is a key indication of failing labour market adjustment and the most important policy lever to improve upon labour shortages. Indeed, as discussed by Cette et al. (2023), traditionally falling hours worked go hand-in-hand with increasing labour productivity. The fact that this time seems to be different requires particular policy attention. For one, low and skewed productivity growth is preventing a large swath of companies from being able to offer more attractive pay and working conditions. Part of it is a direct consequence of slowing business dynamics (Bundesbank, 2024).<sup>4</sup> Another, related reason lies with the rising concentration of market power, resulting to a large extent from concentration tendencies in the digital economy and the prevention of faster diffusion of new technologies through the market (Eeckhout, 2021; Ernst, 2022).

Faltering business dynamics have long been a concern for policymakers but remedies often focused exclusively on financing support for start-ups. However, it is not so much a lack of investment but rather the type of investment and the specific sectors that should concern policymakers. Indeed, since the end of the last decade, total investment rates have increased almost everywhere – or remained high where they had been strong before, such as in East Asia (ILO, 2024; IMF, 2024). Much of this investment, however, went into residential buildings, in part financed through ultra-low interest rates that allowed larger household segments to access ownership. Low interest rates might also have prevented unproductive firms from exiting the market, leading them to stay in business longer than necessary (Banerjee and Hofmann, 2022). Indeed, as part of the response to the global financial crisis, central banks were required to keep interest rates low for a long period of time to prevent financial markets from drying out. While this might have been necessary from a financial stability point of view, it did have a negative consequence: many firms that would have been unprofitable at higher capital costs continued to operate, thereby preventing the shifting of resources to other, potentially more productive uses. The current increase in interest rates might indeed bring about a reallocation of resources to more productive uses, in particular the high investment in residential housing triggered by high house prices that is partly to blame for sluggish and falling productivity growth.<sup>5</sup>

4 <https://publikationen.bundesbank.de/publikationen-de/berichte-studien/monatsberichte/monatsbericht-maerz-2024-926690?article=zur-entwicklung-der-unternehmensdynamik-im-euroraum-926696>.

5 <https://www.economicsobservatory.com/how-might-house-prices-affect-workers-productivity-in-oecd-economies>.

There is great hope that artificial intelligence (AI) as a new general-purpose technology can help lift falling productivity growth. Indeed, many current applications seem to specifically target those occupations that are in high demand and where shortages are particularly pressing (Pizzinelli et al., 2023; Gmyrek et al., 2023; Septiandri et al., 2023). Nevertheless, productivity continues to slide despite the significant potential to both automate and augment jobs, both of which should be expected to accelerate productivity growth. A key factor preventing AI from playing a bigger role in this process and thereby relieving labour shortages is the large concentration of market power that the industry has experienced (Bessen, 2020; Ernst, 2022). On the one hand, this reduces the number of potential applications being developed, as newcomers will have difficulties entering a market facing higher entry barriers and the potential threat of being priced out or bought off the market. On the other hand, and more importantly, diffusion processes will take much longer, preventing new, productivity-enhancing tools from becoming widespread quickly. Taken together, rapid technological progress in AI goes hand in hand with low and decelerating productivity growth, thereby preventing labour shortages from being absorbed. Policymakers, therefore, need to focus on both innovation and competition policies in order to allow the full potential of AI to materialise.

One way of addressing this puzzle is to support the digital transformation through appropriate public (digital) infrastructure investment, public procurement and industrial policies to stimulate new, productivity-enhancing digital applications. In particular, applications in low-productivity sectors such as construction and personal care as well as utilities such as energy production and waste management can help to generate major social returns while addressing labour shortages (Ernst, 2019).

## Conclusions

Labour shortages will continue to affect labour markets, in particular in countries in the Global North. Trend headwinds are unlikely to disappear, as populations age, skilled migration remains insufficient and education levels have likely maxed out. Policymakers need to focus on those measures that are likely to provide more effective relief, in particular with a renewed focus on productivity growth. In contrast, a unique focus on stimulating labour supply is unlikely to mobilise additional sources of labour given that labour force participation rates have reached historic levels, in particular among European countries, and that hours worked are likely to continue to fall in line with the long-term trend. Productivity growth is expected to accelerate somewhat as the macroeconomic environment has started to normalise following the end of a low-

interest rate environment. In addition, productivity-enhancing policies need to address the specific challenges resulting from the current digital transformation. Considering the long-term drop in the working-age population in advanced economies, for which higher migration rates will only be a partial answer, productivity policies need to be the central focus of economic policymaking for the foreseeable future.

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