



Mariusz ZIELIŃSKI

BALANCE IN THE LABOUR MARKET IN POLAND AS A SUSTAINABLE DEVELOPMENT GOAL AND THE EFFECTS OF ACHIEVING IT

Mariusz Zieliński (ORCID: 0000-0002-2121-1339) – *Opole University of Technology, Faculty of Economics and Management*

Correspondence address:

Prószkowska Street 76, 45-758 Opole, Poland

e-mail: m.zielinski@po.edu.pl

ABSTRACT: The purpose of this article is to define the scale of changes on the supply side of the labour market in Poland over the past five years and to attempt a forecast for the next ten years. The hypothesis of the article is that demographic processes will lead to shortages in labour supply, which will impact the ability to achieve Sustainable Development Goals. This hypothesis has been confirmed using descriptive statistics based on index methods and time series analysis. Changes in the labour market, manifested in a surplus of demand, will be beneficial for the state and for households (employees). In contrast, businesses (employers) will face challenges. The practical implications of this article involve determining directions for changes in state policy and corporate HR policies aimed at reducing worker shortages. The originality of the article lies in the analysis of the labour market under conditions of increasing labour supply shortages.

KEYWORDS: Sustainable Development Goals, labour market equilibrium, demographic processes, labour supply shortage

Introduction

The Polish labour market is heading toward equilibrium due to ongoing economic growth generating demand for labour, combined with demographic changes that are limiting the supply of labour. The state and households benefit from this situation. For the state, a balanced labour market reduces social problems related to unemployment, broadens the tax base, and facilitates achieving one of the sustainable economic development goals, namely full and productive employment. From the perspective of households earning income from work, it becomes easier to find employment or switch to a job that better suits their skills and expectations. However, employers searching for candidates to fill vacancies face negative consequences of the equilibrium in the labour market. These effects will intensify as labour supply shortages grow.

The supply side of the labour market is determined by demographic changes and changes in the professional activity of the population. The decrease in the working-age population in the coming years is so significant that even an increase in professional activity will not meet the demands of enterprises.

The article aims to define the scale of changes on the supply side of the labour market in Poland over the last five years and to forecast the situation for the next decade. The hypothesis is that demographic processes which will impact the ability to achieve the Sustainable Development Goals.

The above hypothesis has been verified by analysing changes in economic variables characterising the labour market in Poland from 2018 to 2023, primarily using data published by Eurostat. These changes have been used to forecast the labour market situation over the next five and ten years.

The article consists of a literature review, a description of the methodology, a presentation of research results, a discussion, and conclusions.

The impact of changes in labour supply on the ability to achieve the Sustainable Development Goals

Sustainable development is considered to be the overarching goal of the European Union. Key ways to achieve it for achieving it include eradicating poverty and social exclusion, creating equal opportunities, fostering integration, protecting health, enhancing the quality of life and addressing demographic challenges (Kryk, 2017). In September 2015, the General Assembly of the United Nations adopted the 2030 Agenda for Sustainable Development, which outlines 17 Sustainable Development Goals (SDGs) and 169 sub-targets for the transition to sustainability (Nilsson et al., 2016; Firlej, 2021; Weiland et al., 2021). Among these goals, the eighth – “Decent Work and Economic Growth” – stands out as particularly relevant to the topic of this article. It comprises 12 sub-targets (United Nations, 2023), with the labour market’s ongoing transformations playing a crucial role in determining the possibility of achieving this goal.

The level and structure of labour supply are shaped by demographic processes. In recent decades, fertility rates have significantly declined in developed countries. Most OECD countries now report fertility rates below the generational replacement level (Fleckenstein et al., 2023; Boikos et al., 2023). From a labour market perspective, the large cohorts of workers reaching retirement age are not being replaced by equally large numbers of young people entering the workforce, which could become a barrier to economic growth (Jones, 2022). This trend is evident in Poland as well and is expected to intensify (Warwas & Sołtys, 2018; Kozera-Kowalska, 2024). One way to mitigate the decline in labour supply is to encourage workers to increase and extend their workforce participation (Marcaletti, 2014; Gajowiak & Libertowska, 2022; Bittschi & Wigger, 2023) and an appropriate migration policy (Schwabe, 2021).

The scale of current labour shortages also depends on the demand for labour reported by employers. In recent years, the growth in labour demand has been limited by economic downturns, first caused by the COVID-19 pandemic and later by the outbreak of the war in Ukraine. Lockdowns related to the pandemic led to decreased economic activity, resulting in disruptions to the labour market (Bas et al., 2024; Blundell, 2022; Privara, 2022; Hupkau et al., 2023; Gökten et al., 2024). The effects of the pandemic varied depending on the structure of individual economies, the vulnerability of dif-

ferent sectors and demographic groups to the pandemic, and the availability of measures to prevent its spread, including opportunities for remote work (Deole et al., 2023; Pizzinelli & Shibata, 2023; Burdett et al., 2024). The pandemic also had a negative impact on demographics, leading to a sharp decline in birth rates and a shrinking population (Wołkonowski, 2023). In response to the economic crisis, governments worldwide implemented economic stimulus spending aimed at recovery (Corfee-Morlot et al., 2021; Liu et al., 2021; Afonso, 2023) and introduced job retention programs (Ander-ton et al., 2021; Meriküll & Paulus, 2023), while central banks launched quantitative easing packages (Evgenidis & Fasianos, 2023).

The recovery of economic activity post-pandemic was further disrupted by the war in Ukraine, which caused another negative supply shock to the global economy (Goldthau & Youngs, 2023). A beneficial side effect of the war in Ukraine for Poland's labour market was the influx of war refugees, which bolstered the labour supply side.

Changes in the balance between labour supply and demand affect the structure of employment. According to the tradition of the dual labour market theory (Doeringer & Piore, 1971), there is a "primary" sector offering jobs with satisfactory pay and security and a "secondary" sector characterised by low wages and poor working conditions. Highly skilled and mobile workers can benefit from globalisation and digitalisation, while workers with insufficient skills are more vulnerable to worse working conditions, dismissal, or exclusion from the labour market (Rollnik-Sadowska, 2023).

The current labour market situation can be assessed through the lens of access for disadvantaged (discriminated) groups, which experience higher unemployment rates and lower wages. These groups include women, low-skilled and poorly educated individuals, the youngest and oldest workers, immigrants, and ethnic minorities (Montenovo et al., 2020; Moen et al., 2020; Kim et al., 2021; Bal-Domańska, 2022; Bluedorn et al., 2023). These groups are also more severely affected by the forced transition to part-time work as a method of reducing the scale of layoffs during times of recession (Fairlie et al., 2020; Groshen, 2020).

When employers have a negotiating advantage, they tend to increase the use of flexible forms of employment, which are cheaper from their perspective. During economic shocks, workers employed under flexible arrangements are more vulnerable to layoffs, as non-standard contracts are easier to terminate for employers (Mura et al., 2020; Mikołajczak, 2021; Cieślík & van Stel, 2024). The scale of use of non-standard forms (temporary, part-time and self-employment) in individual economies is limited by applicable legal regulations (Eamets & Jaakson, 2014; Taracha & Mirowski, 2022). From the perspective of workers, flexible employment may be a matter of choice if it helps to obtain additional income or if personal obligations prevent them from working full-time (e.g., caring for children or the elderly). More often, however, the acceptance of flexible employment results from the lack of standard job offers (Blundell et al., 2014; Eamets & Jaakson, 2014). A specific reaction of the labour markets of the Visegrad Group countries (Czechia, Hungary, Poland, Slovakia) in the case of self-employment was observed during the financial crisis. The rising unemployment coincided with an increase in self-employment, indicating that individuals were setting up businesses under pressure from their employers (Dvouletý, 2017; Zieliński, 2019).

Demographic changes that facilitate achieving balance in the labour market affect the ability to achieve the SDGs, especially the eighth one. Forecasts regarding changes in the situation in the labour market allow us to estimate, among others, the scale of labour supply shortages and, on their basis propose adjustment actions on the part of basic economic entities (states, enterprises and households). Based on the literature review, the following hypothesis was put forward: demographic processes will lead to shortages in labour supply, which will impact the ability to achieve Sustainable Development Goals.

Research methods

To verify the hypothesis presented in the article, data published by Eurostat for the age group 20-64 were used, broken down by socio-economic categories (gender, education level, age, and employment type). Exceptionally, data for the age groups 15-24 (for unemployment and employment rates) and 55-74 (for unemployment rates) were also used due to the absence of specific breakdowns in Eurostat statistics for the 20-24 and 55-64 age groups. The article also utilised publications of the

Social Insurance Institution (ZUS) on the employment level of foreigners to compare them with the level of unemployment.

The analysis period covers the years 2018–2023, from the last economic peak in the Polish economy to the most recent available reports. The data used allows for the identification of trends in employment and unemployment rates across different worker groups. The forecast is based on the most recent data (from 2023) and changes observed over the past five years. For the purposes of the projection, it was assumed that the growth rates of labour market activity, labour demand, and population change indicators in subsequent five-year periods would remain at the levels observed from 2018 to 2023.

The labour supply forecast includes the following steps (based on available data):

- determining the average cohort size across age groups to avoid random changes in the size of individual cohorts,
- determining the average population size within specific age brackets over five- and ten-year horizons, taking into account population change indicators resulting from migration and mortality processes. The following formula was used for calculations:

$$\begin{aligned} &\text{Average population size of cohort (X) =} \\ &= \text{Population size of cohort (X-1)} \times \text{Population change indicator} \end{aligned} \quad (1)$$

where:

(X) average population size of cohort – the average size of the cohort in the age bracket at the end of the five-year period,

(X-1) average population size of cohort – the average size of the cohort in the age bracket at the end of the previous five-year period (the 2023 baseline data comes from Eurostat),

population change indicator – the indicator reflecting the decline in the size of a given age group over the five-year period (based on 2018–2023 data). For the 40–64 age groups, population sizes for men and women were calculated separately due to gender differences in population decline indicators. The results of these calculations are provided in Appendix 1.

- determining the population size of groups within five-year age brackets over five- and ten-year horizons, calculated as five times the average cohort size in the age bracket (representing the five cohorts that make up the age group),
- determining the labour supply as the product of the projected population size (aged 20–64) for 2028 and 2033, and the labour activity growth rate indicator of 1.054 (a 5.4 percentage point increase observed from 2018–2023).

In terms of labour demand, it is assumed that its growth will continue at the rate characteristic of the 2018–2023 period. Labour demand was estimated as the product of the employment level at the end of the previous five-year period and the employment growth rate indicator of 1.057 (a 5.7 percentage point increase observed from 2018–2023).

Finally, labour supply shortages were estimated as the difference between labour demand and labour supply.

Results of the research

The current situation in the labour market depends on the phase of the economic cycle. The analysis begins in 2018, the year of the last economic peak before the COVID-19 pandemic. If we consider the last complete economic cycle from trough to trough (2013 to 2020), the average GDP growth rate in Poland during that period was 3.2 percentage points. In the period covered by the analysis (2018–2023), the arithmetic average GDP growth was 3.5 percentage points despite the recession (2020) and stagnation (2023) (Table 1). The last four years have seen an average economic growth rate of 2.7 percentage points, largely due to the strong economic rebound in 2021–2022.

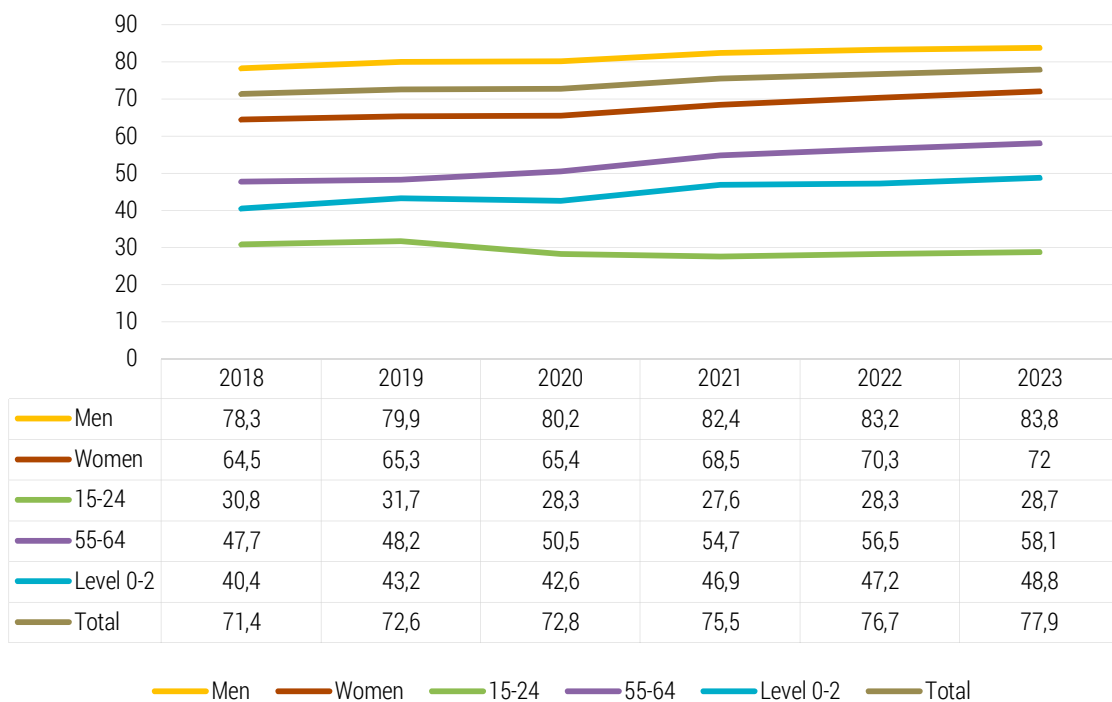
Table 1. Economic growth, employment and unemployment (age group 20-64), employment of foreigners in Poland in 2018-2023

Year	GDP growth (%)	Employment (thousand)	Unemployment (thousand)	Employment of foreigners (thousand)	
				Total	Ukraine
2018	5.9	15875	636	569.7	420.7
2019	4.5	16305	543	651.5	479.1
2020	-2.0	16288	533	725.2	532.5
2021	6.9	16672	580	875.1	627.0
2022	5.6	16735	488	1063.3	746.0
2023	0.2	16776	475	1127.7	759.4

Source: author's work based on Eurostat (2024, 2024a, 2024b, 2024c, 2024d, 2024f) and ZUS (2019, 2020, 2021, 2022, 2023, 2024).

During the analysed period, the 20-64 age group experienced an increase in employment and a decrease in unemployment. A slight decline in the number of employed persons was observed only in 2020 (by 17,000 people, or 0.1%). In 2023, despite economic growth of only 0.2 percentage points, employment still increased. This may be the result of filling vacancies that had emerged in the previous two years of high economic growth.

The number of unemployed people fell, except in 2021, which can be attributed to an increase in workforce participation following the pandemic under conditions of strong economic growth that created job opportunities. The unemployment rate dropped to 2.8%, which is considered frictional unemployment.

**Figure 1.** The employment rate of selected groups in Poland in 2018-2023

Source: author's work based on Eurostat (2024, 2024c, 2024d).

Data on the employment of foreign nationals, based on publications from the Social Insurance Institution (ZUS) regarding those registered in the social security system, show a 97.9% increase in the number of employed foreigners during the analysed period. Notably, the majority of these workers are Ukrainian citizens, with employment in this group increasing by 80.5% from 2018 to 2023.

The number of employed foreigners in Poland at the end of 2023 was higher than the number of unemployed by over 650 thousand people (this would be the shortage of labour supply in the event of a complete withdrawal of foreigners from the Polish labour market).

The extent of labour market imbalances is reflected in the employment rates of disadvantaged groups. Figure 1 presents available data on the employment rate of women (compared to men), extreme age groups and those with the lowest level of education.

Despite the absolute decline in the number of employed persons in 2020, the employment rate increased, which is a result of demographic processes (a decrease in the number of people of working age). In the pandemic year, the employment rate of men grew slightly faster, but over the entire analysed period, the employment rate for women grew by 7.5 percentage points, compared to 5.5 percentage points for men. Thus, the employment rate for women increased relatively faster compared to men, although the employment rate for men was already high at the start of the analysis period, reaching 83.8% in 2023.

Similar to the trend for women, individuals with the lowest level of education (level 0-2 – less than primary, primary, and lower secondary education) experienced a decline in their employment rate in 2020. However, from 2018 to 2023, the employment rate in this group increased by 8.4 percentage points. The only group that saw a significant decline in the employment rate in 2020, and a 2.1 percentage point decrease over the entire analysis period, was the youngest age group. The employment rate for individuals aged 55-64 grew the fastest and without interruption, increasing by 10.4 percentage points, partly due to the initially low base. This is a very favourable development for the labour market, as the large demographic cohorts are retiring and being replaced by smaller ones.

The comparison of unemployment rates (Figure 2) confirms most of the conclusions drawn from the employment rate analysis.

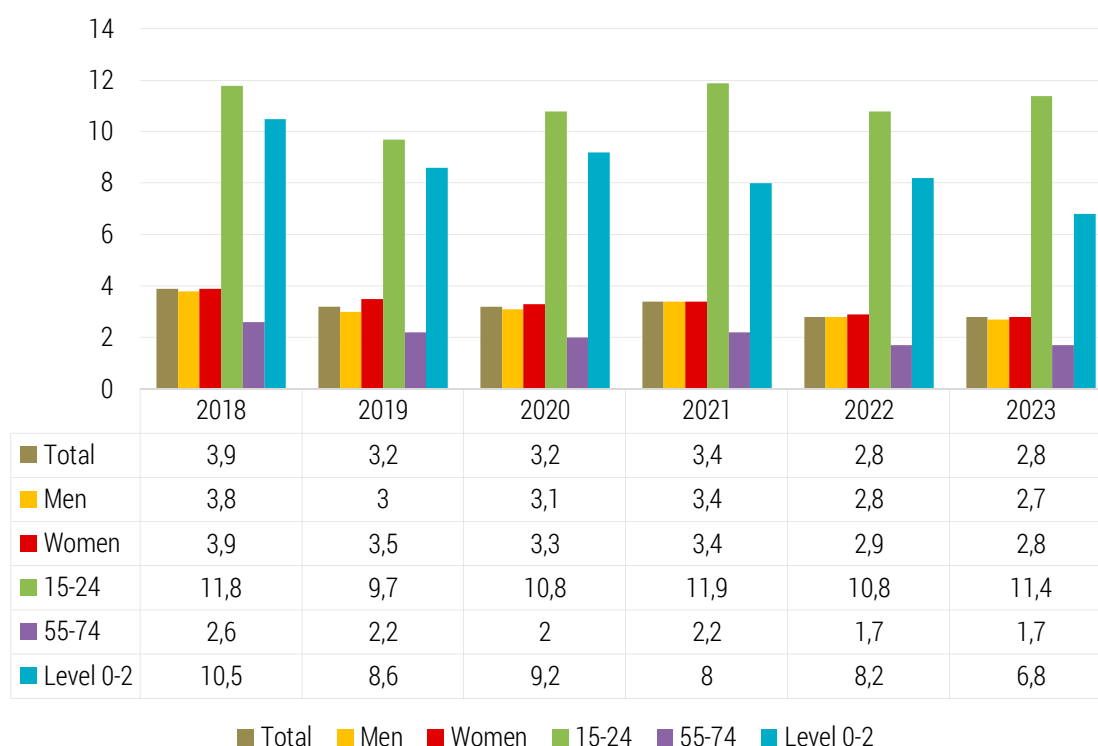


Figure 2. An unemployment rate of selected groups in Poland in 2018-2023

Source: author's work based on Eurostat (2024, 2024d, 2024g).

The unemployment rate for women is similar to that for men. The unemployment rate for those with the lowest level of education is declining relatively fast. Minor changes in the unemployment rate were recorded for the 15-24 age group, which, when compared with the employment rate, reveals an increasing level of inactivity among young people. Due to the lack of data for the 55-64 age group in Eurostat reports, the table includes data for the 55-74 age group. The very low and falling

unemployment rate in this group is noteworthy, which may indicate, on the one hand, easy access to work and, on the other hand, little interest in continuing to participate in the labour market among people from the oldest age groups.

The increase in the employment rate and the decrease in the unemployment rate for disadvantaged groups (except for the youngest age group) can be attributed to labour supply shortages. Employers are increasingly hiring these groups as they are available in the labour market.

The change in the employment structure from the perspective of the share of flexible forms of employment may also indicate that the Polish labour market is approaching a state of equilibrium (Figure 3).

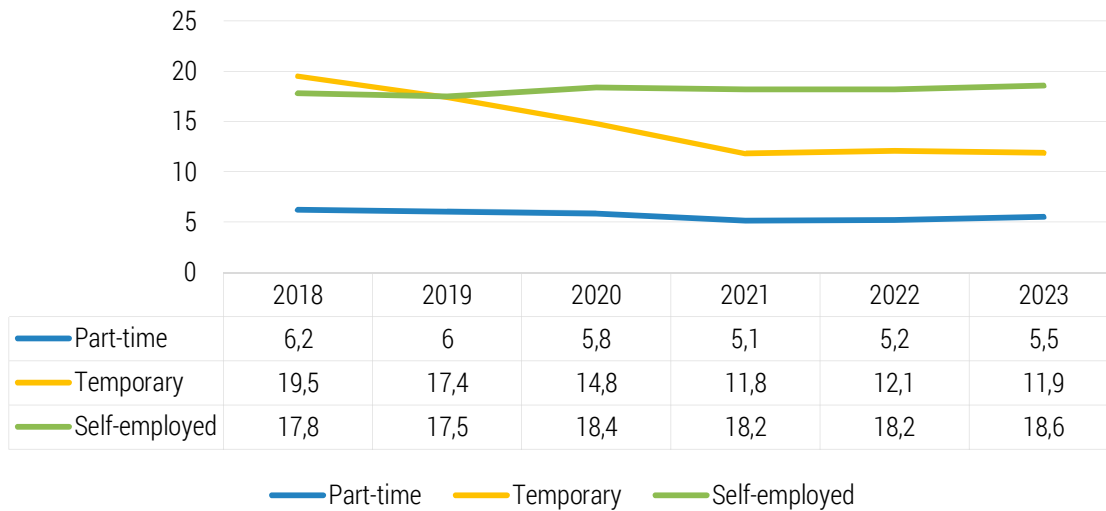


Figure 3. Share of employed in flexible forms in total employment in Poland in 2018-2023 (age group 20-64 years)

Source: author's work based on Eurostat (2024e, 2024g).

If we assume that flexible forms of employment are a secondary market, their share in total employment fell from 43.5% in 2018 to 36% in 2023. Data for 2020-2021 indicate that there were declines in part-time and temporary employment while self-employment increased (like during the financial crisis of 2008-2009). In absolute terms, between 2018 and 2023, there was a decrease in part-time employment by 65,000 people, temporary employment by 1093,000 people and an increase in the number of self-employed by 296,000 people (Eurostat, 2024g). In the case of part-time, the trend reversed in 2022, which may be the effect of employing groups of employees who, for various reasons, do not want (or cannot) take up full-time employment.

Forecast Attempt

The forecast began with an estimate of the average size of age groups in Poland using Eurostat data. The estimates include the indicator of the decrease in the size of groups resulting from emigration and deaths. The indicator was calculated as the quotient of the size of the same group in 2018 and 2023. For example, the quotient for the age group 25-29 in 2023 was 0.98, i.e. the size of age groups of the same group (in 2018, it was the age group 20-24) decreased by 2%. The corresponding indicators were calculated for all five-year age groups reaching the age of 64 in 2033. To increase the accuracy of the estimate, a distinction was made between the numbers of women and men for the age group 40-44 and older because the difference in population loss rates in the cross-section by sex increases. Estimates of the number of individuals in the age group 20-64 are presented in the table in Appendix 1.

The expected size of each age group is calculated as the product of five cohorts and their average sizes, as shown in Table 2. The expected size of the age groups is calculated as five times the average size of the age groups (Appendix 1), because each age group distinguished in Table 2 includes 5 age groups.

Table 2. Estimates of the number of people aged 20-64 by age group

Age groups, gender	2018	2023	Forecast 2028		Forecast 2033	
			Number	Participation %	Number	Participation %
20-24	2016750	1713555	1850870	9.1	1803390	9.2
25-29	2492070	1977215	1679285	8.2	1813850	9.3
30-34	2825030	2382840	1890220	9.3	1605395	8.2
35-39	3160300	2700700	2277995	11.1	1807050	9.3
40-44	2960835	3056630	2611575	12.8	2202820	11.3
45-49	2565700	2877670	2970755	14.5	2538450	13.0
50-54	2228565	2478235	2779615	13.6	2869400	14.7
55-60	2368345	2125055	2362995	11.6	2650405	13.6
60-64	2844680	2220875	1992940	9.8	2215975	11.4
Sum	23462275	21532775	20416250	100	19506735	100

Source: author's work based on Table in Appendix 1.

The share of the 20-44 age group decreased from 57.3% in 2018 to 54.9% in 2023 and is projected to decline further to 50.5% by 2028 and 47.3% by 2033. Considering demographic trends, the decline in the number and share of individuals in the mobile age in the labour supply is expected to continue beyond 2033.

Table 3 presents the supply shortage forecast for 2028 and 2033. The estimates for labour demand and supply in 2028 and 2033 were based on the assumption that the growth trends observed between 2018 and 2023 would continue (an increase in demand by 5.7 p.p. and economic activity by 5.4 p.p. every 5 years).

Table 3. Forecast of labour market imbalance in 2028 and 2033

Characteristic	Year			
	2018	2023	2028	2033
Labour supply	16511	17251	17578	17849
Labour force participation rate	75.3	80.7	86.1	91,5
Demand for labour	15875	16776	17732	18742
The demand – supply gap in labour	636	475	-154	-893

Source: author's work based on Table 1 and Table 6.

With the adopted assumptions, by 2028, there will already be a labour supply shortage of 154,000 people (if we limit the analysis to the 20-64 age group). This shortage is projected to increase to 893,000 people in 2033. Such levels of shortages assume that the entire labour supply will find employment, meaning unemployment will be zero. The possibility that the actual labour supply shortages could be greater than predicted is supported by the optimistic assumption of a workforce participation increase to 91.5% by 2033. This assumption will be difficult to achieve, as the highest workforce participation rate in the 20-64 age group within the European Union was achieved by Sweden in 2023, at 88.4% (Eurostat, 2024c). Actual labour supply shortages could be limited by the employment of individuals in the 18-19 and 65+ age groups, as well as an increase in the employment of foreign workers.

Discussion

Between 2018 and 2023, the falling number of people of working age was offset by a sharp increase in labour force participation among the 20-64 age group, as well as by an increase in the employment of foreigners. The professional activity rate increased by 5.4 percentage points during this time, reaching 80.7.

The growing employment rates among disadvantaged groups and the declining use of flexible employment forms suggest that the Polish labour market is moving toward equilibrium. The change in the situation in the labour market means that workers are finding it increasingly easier to secure employment and transition to more favourable jobs. Employees are, therefore, the group that will have to strengthen bargaining power in the labour market both from a short-term and long-term perspective.

The state benefits in the short term from balancing the labour market, but in the long term, if labour supply shortages cause economic stagnation, there will be challenges with financing the social security system, especially the pension system, in an ageing society.

Employers are in the worst situation as they lose their bargaining power, which results in increasing wage pressure amidst a growing number of unfilled jobs.

Demographic processes causing shortages of labour supply in OECD countries (Fleckenstein et al., 2023; Boikos et al., 2023), including Poland (Warwas & Sołtys, 2018; Kozera-Kowalska, 2024), will, among other things, lead to a shift in scientific research focus on labour markets in developed countries. In the coming years, we can expect an increase in researchers' interest in the problems of increasing and extending professional activity and appropriate migration policy, which will replace studies on unemployment and counteracting it. Further research directions related to this article will focus on the above-mentioned areas, taking into account comparisons of Poland with other countries.

The generalisation of the results of this study is limited by the situation in the Polish labour market. The measures recommended in the last part of the article deal with countries which have low fertility rates and levels of unemployment.

Conclusions

The conclusions regarding the impact of changes in the labour market situation in Poland on achieving the eighth Sustainable Development Goal can be analysed through the perspective of the first eight tasks comprising this goal. Increasing labour supply shortages will facilitate the achievement of the following targets:

- Achieving higher levels of economic productivity through diversification, technological modernisation, and innovation, including a focus on high-value-added activities (Target 8.2),
- Promoting development-oriented policies that support productive activities, the creation of decent jobs, entrepreneurship, creativity, and innovation (Target 8.3),
- Improving resource efficiency in consumption and production and striving to decouple economic growth from environmental degradation (Target 8.4),
- Achieving full and productive employment and decent work for all women and men, including young people and persons with disabilities, and equal pay for work of equal value (Target 8.5),
- Reducing the proportion of youth not in employment, education, or training (Target 8.6),
- Taking immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking (Target 8.7),
- Protecting labour rights and promoting safe and secure working environments for all workers, including migrant workers (Target 8.8).

Employers will be compelled to reach out to problematic groups (individuals who typically face challenges in finding employment), and thus, the labour supply shortage in Poland will also partially contribute to achieving other Sustainable Development Goals, including Goal 1 (No Poverty), Goal 3 (Good Health and Well-being), Goal 5 (Gender Equality), Goal 10 (Reduced Inequalities), and Goal 16 (Peace, Justice, and Strong Institutions).

Labour supply shortages pose a threat to achieving two targets:

- Sustaining per capita economic growth (Target 8.1),
- Focusing on labour-intensive sectors (Target 8.2).

While the focus on labour-intensive sectors applies to countries with high unemployment and can be omitted in the case of Poland, without taking appropriate actions to mitigate the negative effects of labour supply shortages, the Polish economy is at risk of long-term stagnation. The decreasing resources of people aged 20-64 can be supplemented on the labour market by the age groups 18-19, 65+ and foreigners.

The most important actions for the state in this regard seem to be: educational policy, ensuring an appropriate level of education for pupils and students, and support for extending workforce participation of the oldest age groups (Marcaletti, 2014; Gajowiak & Libertowska, 2022; Bittschi & Wigger, 2023), migration policy, facilitating the inflow of economic immigrants (Schwabe, 2021).

The most important actions for employers in the context of deepening labour supply shortages are: extending age management policies to cover both the oldest and youngest age groups, exerting pressure on political decision-makers to simplify the process of employing labour immigrants, and automating production processes to replace simple, repetitive human work.

Acknowledgements

This research has been supported by Statutory research (Faculty of Economics and Management of Opole University of Technology).

References

- Afonso, O. (2023). Losers and losses of COVID-19: a directed technical change analysis with fiscal and monetary policies. *Economic Change and Restructuring*, 56, 1777-1821. <https://doi.org/10.1007/s10644-023-09486-9>
- Anderton, R., Botelho, V., Consolo, A., Da Silva, A. D., Foroni, C., Mohr, M., & Vivian, L. (2021). The impact of the COVID-19 pandemic on the euro area labour market. *Economic Bulletin Articles*, 8. <https://ideas.repec.org/a/ecb/ecbart/202100082.html>
- Bal-Domańska, B. (2022). The impact of macroeconomic and structural factors on the unemployment of young women and men. *Economic Change and Restructuring*, 55, 1141-1172. <https://doi.org/10.1007/s10644-021-09341-9>
- Bas, M., Fernandes, A. M., & Paunov, C. (2024). How Resilient Was Trade to COVID-19? *Economics Letters*, 240(C), 1-6. <https://doi.org/10.1016/j.econlet.2023.111080>
- Bittschi, B., & Wigger, B. U. (2023). Who wants (them) to work longer? *Economics Letters*, 227(C), 1-5. <https://doi.org/10.1016/j.econlet.2023.111122>
- Bluedorn, J., Caselli, F., Hansen, N.-J., Shibata, I., & Tavares, M. M. (2023). Gender and employment in the COVID-19 recession: Cross-Country evidence on "She-Cessions". *Labour Economics*, 81(C), 1-10. <https://doi.org/10.1016/j.labeco.2022.102308>
- Blundell, R. (2022). Inequality, Redistribution and Wage Progression. *Economica*, 89(S1), 160-177. <https://doi.org/10.1111/ecca.12425>
- Blundell, R., Crawford, C., & Jin, W. (2014). What Can Wages and Employment Tell Us About the UK's Productivity Puzzle. *The Economic Journal*, 124(576), 377-407. <http://doi.org/10.1111/eoj.12138>
- Boikos, S., Bucci, A., & Sequeira, T. N. (2023). May human capital rescue the Empty Planet? *Economics Letters*, 232(C), 1-4. <https://doi.org/10.1016/j.econlet.2023.111352>
- Burdett, A., Etheridge, B., Tang, L., & Wang, Y. (2024). Worker productivity during Covid-19 and adaptation to working from home. *European Economic Review*, 167, 104788. <https://doi.org/10.1016/j.euroecorev.2024.104788>
- Cieślak, J., & van Stel, A. (2024). Solo self-employment – Key policy challenges. *Journal of Economic Surveys*, 38, 759-792. <https://doi.org/10.1111/joes.12559>
- Corfee-Morlot, J., Depledge, J., & Winkler, H. (2021). Covid-19 recovery and climate policy. *Climate Policy*, 21(10), 1249-1256. <https://doi.org/10.1080/14693062.2021.2001148>
- Deole, S. S., Deter, M., & Huang, Y. (2023). Home sweet home: Working from home and employee performance during the COVID-19 pandemic in the UK. *Labour Economics*, 80, 102295. <https://doi.org/10.1016/j.labeco.2022.102295>
- Doeringer, P. B., & Piore, M. J. (1971). *Internal labour markets and manpower analysis*. New York: M.E. Sharpe.
- Dvouletý, O. (2017). What is the Relationship between Entrepreneurship and Unemployment in Visegrad Countries? *Central European Business Review*, 6(2), 42-53. <https://doi.org/10.18267/j.cebr.179>
- Eamets, R., & Jaakson, K. (2014). Labour market flexibility and spatial mobility. *International Journal of Manpower*, 35(6), 746-752. <http://doi.org/10.1108/IJM-05-2014-0123>

- Eurostat. (2024, January 1). *Population and social conditions*. https://ec.europa.eu/eurostat/statistics-explained/index.php/Population_and_social_conditions
- Eurostat. (2024a). *Annual national accounts*. <https://ec.europa.eu/eurostat/web/euro-indicators/information-data/national-accounts>
- Eurostat. (2024b). *Economy and finance*. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Economy_and_finance
- Eurostat. (2024c). *Employment and activity by sex and age*. https://ec.europa.eu/eurostat/databrowser/product/view/LFSI_EMP_A
- Eurostat. (2024d). *Labour market*. <https://ec.europa.eu/eurostat/web/euro-indicators/information-data/labour-market>
- Eurostat. (2024e). *Part-time employment and temporary contracts*. https://ec.europa.eu/eurostat/databrowser/product/view/LFSI_PT_A
- Eurostat. (2024f). *Real GDP growth rate*. <https://ec.europa.eu/eurostat/databrowser/view/tec00115/default/table?lang=en>
- Eurostat. (2024g). *Self-employment by sex, age and educational attainment level*. https://ec.europa.eu/eurostat/product?mode=view&code=lfsa_esgaed
- Evgenidis, A., & Fasianos, A. (2023). Modelling monetary policy's impact on labour markets under Covid-19. *Economics Letters*, 230(C), 1-6. <http://doi.org/10.1016/j.econlet.2023.111241>
- Fairlie, R. W., Couch, K., & Xu, H. (2020). *The Impacts of COVID-19 on Minority Unemployment: First Evidence from April 2020 CPS Microdata*. <https://www.nber.org/papers/w27246>
- Firlej, K. A. (2021). Społeczna odpowiedzialność biznesu w Polsce w świetle celów zrównoważonego rozwoju. *Problems of Economics and Law*, 6(6), 33-49. https://www.researchgate.net/publication/357448567_Spoleczna_odpowiedzialnosc_biznesu_w_Polsce_w_swietle_celow_zrownowazonego_rozwoju (in Polish).
- Fleckenstein, T., Lee, S. C., & Mohun Himmelweit, S. (2023). Labour market dualization, permanent insecurity and fertility: The case of ultra-low fertility in South Korea. *Economy and Society*, 52(2), 298-324. <http://doi.org/10.1080/03085147.2023.2175449>
- Gajowiak, M., & Libertowska, A. (2022). Age management in the context of demographic crisis – selected survey findings concerning the SME population in the Poznań country. *Polityka Społeczna*, 18((eng)01), 31-36. <http://doi.org/10.5604/01.3001.0016.1391>
- Gökten, M., Heimberger, P., & Lichtenberger, A. (2024). How far from full employment? The European unemployment problem revisited. *European Economic Review*, 164, 104725. <https://doi.org/10.1016/j.eurocorev.2024.104725>
- Goldthau, A. C., & Youngs, R. (2023). The EU Energy Crisis and a New Geopolitics of Climate Transition. *Journal of Common Market Studies*, 61(S1), 115-124. <https://doi.org/10.1111/jcms.13539>
- Groshen, E. L. (2020). COVID-19's impact on the U.S. labour market as of September 2020. *Business Economics*, 55, 213-228. <https://doi.org/10.1057/s11369-020-00193-1>
- Hupkau, C., Ruiz-Valenzuela, J., Isphording, I., & Machin, S. (2023). Labour Market Shocks and Parental Investments during the Covid-19 Pandemic. *Labour Economics*, 82, 102341. <https://doi.org/10.1016/j.labeco.2023.102341>
- Jones, C. I. (2022). The end of economic growth? Unintended consequences of a declining population. *American Economic Review*, 112(11), 3489-3527. <https://doi.org/10.1257/aer.20201605>
- Kim, A. T., Kim, C. H., Tuttle, S. E., & Zhang, Y. (2021). Covid-19 and the decline in Asian American employment. *Research in Social Stratification and Mobility*, 71, 100563. <https://doi.org/10.1016/j.rssm.2020.100563>
- Kozera-Kowalska, M. (2024). Human capital for the green economy. *Economics and Environment*, 88(1), 1-11. <https://doi.org/10.34659/eis.2024.88.1.674>
- Kryk, B. (2017). Cele społeczne zrównoważonego rozwoju. Polska na tle UE. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 465, 87-95. <https://doi.org/10.15611/pn.2017.465.09> (in Polish).
- Liu, N., Xu, Z., & Skare, M. (2021). The research on COVID-19 and economy from 2019 to 2020: analysis from the perspective of bibliometrics. *Oeconomia Copernicana*, 12(2), 217-268. <https://doi.org/10.24136/oc.2021.009>
- Marcaletti, F. (2014). Age Management and Sustainable Careers for the Improvement of the Quality of Ageing at Work. In G. Riva, P.A. Marsan & C. Grassi (Eds.), *Active Ageing and Healthy Living* (pp. 134-144). IOS Press. <https://doi.org/10.3233/978-1-61499-425-1-134>
- Meriküll, J., & Paulus, A. (2023). The impact of the Covid-19 job retention support on employment. *Economics Letters*, 222(C), 1-3. <https://doi.org/10.1016/j.econlet.2022.110963>
- Mikołajczak, P. (2021). What affects employment by NGOs? Counteraction to precarious employment in the Polish non-profit sector in the perspective of COVID-19 pandemic crises. *Oeconomia Copernicana*, 12(3), 761-788. <https://doi.org/10.24136/oc.2021.025>
- Moen, P., Pedtke, J. H., & Flood, S. (2020). Disparate Disruptions: Intersectional COVID-19 Employment Effects by Age, Gender, Education, and Race/Ethnicity. *Work Aging Retire*, 6(4), 207-228. <https://doi.org/10.1093/workar/waaa013>

- Montenovo, L., Jiang, X., Rojas, F. L., Schmutte, I. M., Simon, K. I., Weinberg, B. A., & Wing, C. (2020). Determinants of Disparities in COVID-19 Job Losses. NBER Working Paper Series, 27132. <https://doi.org/10.3386/w27132>
- Mura, L., Zsigmond, T., Kovács, A., & Baloghová, É. (2020). Unemployment and GDP relationship analysis in the Visegrad four countries. *On-line Journal Modelling the New Europe*, 34, 118-134. <http://doi.org/10.24193/OJMNE.2020.34.06>
- Nilsson, M., Griggs, D., & Visbeck, M. (2016). Policy: Map the interactions between Sustainable Development Goals. *Nature*, 534, 320-322. <http://doi.org/10.1038/534320a>
- Pizzinelli, C., & Shibata, I. (2023). Has COVID-19 induced labour market mismatch? Evidence from the US and the UK. *Labour Economics*, 81, 102329. <https://doi.org/10.1016/j.labeco.2023.102329>
- Privara, A. (2022). Economic growth and labour market in the European Union: lessons from COVID-19. *Oeconomia Copernicana*, 13(2), 355-377. <https://doi.org/10.24136/oc.2022.011>
- Rollnik-Sadowska, E. (2023). Labour market in sustainability transitions: a systematic literature review. *Economics and Environment*, 87(4), 681. <https://doi.org/10.34659/eis.2023.87.4.681>
- Schwabe, M. (2021). GDP Growth and Unsaturated Demand on Labour Markets: Is the Visegrad Group Ready for an Increased Immigration? *Ekonomista*, 4, 482-507. <https://doi.org/10.52335/dvqigjyfff24>
- Taracha, M., & Mirowski, K. (2022). Polityki rynku pracy i inne determinanty elastyczności zatrudnienia. *Gospodarka Narodowa*, 310(2), 88-104. <https://doi.org/10.33119/GN/149197> (in Polish).
- United Nations. (2023). *Promote inclusive and sustainable economic growth, employment and decent work for all*. <https://www.un.org/sustainabledevelopment/economic-growth/>
- Warwas, I., & Sołtys, A. (2018). Koncepcje i praktyki zarządzania wiekiem jako obszar zarządzania różnorodnością. *Zarządzanie Zasobami Ludzkimi*, 2(121), 9-22. <https://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.desklight-63efb53d-157e-4b80-b5d3-ab49c8d3af82> (in Polish).
- Weiland, S., Hickmann, T., Lederer, M., Marquardt, J., & Schwindenhammer, S. (2021). The 2030 Agenda for Sustainable Development: Transformative Change through Sustainable Development Goals? *Politics and Governance*, 9(1), 90-95. <https://doi.org/10.17645/pag.v9i1.4191>
- Wołkonowski, J. (2023). Wpływ pandemii covid-19 na demografię i rynek pracy krajów Europy środkowo-wschodniej. *Optimum. Economic Studies*, 1(111), 69-88. <https://doi.org/10.15290/oes.2023.01.111.05> (in Polish).
- Zieliński, M. (2019). Impact of the employment and unemployment level on the use of flexible forms of employment in the EU countries. *Prace Naukowe UE we Wrocławiu*, 63(6), 127-136. <http://doi.org/10.15611/pn.2019.6.10>
- ZUS. (2019). *Cudzoziemcy w polskim systemie ubezpieczeń społecznych*. <https://www.zus.pl/documents/10182/2322024/Cudzoziemcy+w+polskim+systemie+ubezpiecze%C5%84+spo%C5%82ecznych.pdf/4498fca6-981d-a37c-3742-8e4e74e20a32> (in Polish).
- ZUS. (2020). *Cudzoziemcy w polskim systemie ubezpieczeń społecznych*. <https://www.zus.pl/documents/10182/2322024/Cudzoziemcy+w+polskim+systemie+ubezpiecze%C5%84+spo%C5%82ecznych+2020.pdf/8a693717-9b66-3e70-737b-28fe827ea41e?t=1696936795131> (in Polish).
- ZUS. (2021). *Cudzoziemcy w polskim systemie ubezpieczeń społecznych*. https://www.zus.pl/documents/10182/2322024/Cudzoziemcy+w+polskim+systemie+ubezpiecze%C5%84+spo%C5%82ecznych+-+wydanie+2021_v2.pdf (in Polish).
- ZUS. (2022). *Cudzoziemcy w polskim systemie ubezpieczeń społecznych*. <https://www.zus.pl/documents/10182/2322024/Cudzoziemcy+w+polskim+systemie+ubezpiecze%C5%84+spo%C5%82ecznych+-+XII.2021.pdf/cd231552-e7eb-264f-ece6-a63a834cf458?t=1655991180351#:~:text=W%20grudniu%202021%20roku%20liczba,1%25%20og%C3%B3%C5%82u%20ubezpieczonych%20w%20ZUS> (in Polish).
- ZUS. (2023). *Cudzoziemcy w polskim systemie ubezpieczeń społecznych*. https://www.zus.pl/documents/10182/2322024/Cudzoziemcy+w+polskim+systemie+ubezpiecze%C5%84+spo%C5%82ecznych_2022.pdf/b457fe14-91e8-c030-40bc-67c3eb92af17?t=1696931209042 (in Polish).
- ZUS. (2024). *Cudzoziemcy w polskim systemie ubezpieczeń społecznych*. https://www.zus.pl/documents/10182/2322024/Cudzoziemcy+w+polskim+systemie+ubezpiecze%C5%84+spo%C5%82ecznych_2023.pdf (in Polish).

Appendix 1. Average cohort sizes by age group in the years 2018-2033

Age groups, gender	2018	2023	Population loss rate	Forecast 2028	Forecast 2033
10-14	398865	388599			
15-19	350653	378888	0.95	369169	
20-24	403350	342711	0.977	370174	360678
25-29	498414	395443	0.98	335857	362770
30-34	565006	476568	0.956	378044	321079
35-39	632060	540140	0.956	455599	361410
40-44 (women) (men)	592167 (292110) (300057)	611326 (299996) (311330)	0.967	522315	440564
45-49 (women) (men)	513140 (254292) (258848)	575534 (285429) (290105)	0.972 (0.977) (0.967)	293096 301056	507690
50-54 (women) (men)	445713 (223327) (222386)	495647 (247822) (247825)	0.966 (0.975) (0.957)	278293 277630	285769 288111
55-60 (women) (men)	473669 (241451) (232218)	425011 (215757) (209254)	0.954 (0.966) (0.941)	239396 233203	268831 261250
60-64 (women) (men)	568936 (299046) (269890)	444175 (231453) (212722)	0.938 (0.959) (0.916)	206911 191677	229581 213614

Source: author's estimates based on the Eurostat (2024).

Mariusz ZIELIŃSKI

RÓWNOWAGA NA RYNKU PRACY W POLSCE JAKO CEL ZRÓWNOWAŻONEGO ROZWOJU I EFEKTY JEJ OSIĄGNIĘCIA

STRESZCZENIE: Celem artykułu jest określenie skali zmian po stronie podaży rynku pracy w Polsce w ciągu ostatnich pięciu lat oraz próba prognozy na kolejne dziesięć lat. Hipotezą artykułu jest twierdzenie, że procesy demograficzne doprowadzą do niedoborów podaży pracy, co będzie miało wpływ na możliwości osiągnięcia celów zrównoważonego rozwoju. Hipotezę tę potwierdzono za pomocą statystyki opisowej opartej na metodach indeksowych i analizie szeregów czasowych. Zmiany na rynku pracy, objawiające się nadwyżką popytu, będą korzystne dla państwa i gospodarstw domowych (pracowników). Natomiast przedsiębiorstwa (pracodawcy) staną przed poważnymi wyzwaniami. Praktyczne implikacje tego artykułu obejmują określenie kierunków zmian w polityce państwa i korporacyjnej polityce kadrowej ukierunkowanej na redukcję niedoborów pracowników. Oryginalność artykułu polega na analizie rynku pracy w warunkach narastających niedoborów podaży pracy.

SŁOWA KLUCZOWE: cele zrównoważonego rozwoju, równowaga na rynku pracy, procesy demograficzne, niedobór podaży pracy