WAR-DRIVEN INTERREGIONAL TRANSFORMATIONS OF THE UKRAINIAN LABOR MARKET

OKSANA DIAKONENKO

PhD in Economics, Senior Researcher, Senior Research Fellow
Department for problems of social capital formation
Institute for demography and life quality problems of the NAS of Ukraine
Kyiv, Ukraine
oksana.dyakonenko@gmail.com
ORCID ID: 0000-0003-4645-7471

OLENA SOVA

PhD in Economics, Associate Professor, Senior Research Fellow
Department for problems of social capital formation
Institute for demography and life quality problems of the NAS of Ukraine
Kyiv, Ukraine
sovy@ukr.net
ORCID ID: 0000-0001-6386-6432

TETIANA KOTENKO

PhD in Economics, Senior Researcher, Senior Research Fellow
Department for modeling socio-economic processes and structures
Institute for demography and life quality problems of the NAS of Ukraine
Kyiv, Ukraine
tatyanako@ukr.net
ORCID ID: 0000-0003-3237-8182

Abstract: The purpose of the article is to reveal the modern transformations of the labor market in the Ukraine's regions under the impact of the Russian-Ukrainian war. The subject of the study is transformational shifts in the regional labor markets of Ukraine caused by the ongoing war. The research was conducted using comparison of two labor supply structures in the Ukraine's regions based on the Spearman's rank correlation coefficient and the uneven distribution coefficient. The gender structure of the labor supply, as well as the structure of labor supply in terms of urban and rural unemployed populations, was analyzed using the J_R criterion for assessing the significance of differences between those two structures. It was found that there have been significant structural shifts in the regional labor supply structure, primarily due to alterations in the indicators of frontline communities and in the capital city with Kyiv region, which have experienced a substantial influx of internally displaced persons. A comparative analysis using the coefficient of inequality distribution revealed a growing asymmetry in unemployment rates between 2014 and 2023, driven by population displacement. Gender analysis of the labor supply indicated a high degree of similarity across two-thirds of the regions. There was no stark contrast between the datasets. An assessment of the labor supply structure disaggregated by urban and rural unemployment showed a growing disproportionality in the labor supply structure based on these parameters. The changes in the regional structure of labor demand, caused by military actions, have been revealed.
Keywords: labor market, labor supply, labor demand, transformation, Ukrainian population, wartime.
JEL Classification: D81, J21, J23, O15, R23.

Introduction

Modern transformational shifts in Ukraine's labor market are accompanied by radical institutional, territorial, sectoral, gender, age, and professional-qualification changes, which have taken on a spontaneous nature during the wartime period. Given the instability in the labor market and the increasing migration, it leads to a further exacerbation of the regional imbalance of labor supply and demand. In 2023, the number of applicants per vacancy ranged from 22 unemployed per one workplace in the Zaporizhzhia region to 2 vacancies per unemployed person in the Lviv region (State Employment Service, 2024). Under the conditions of significant wartime risks and the catastrophic reduction of human potential, disproportionate labor market transformations pose a threat to national security, particularly in terms of staffing critically important enterprises and upholding social standards and guarantees in the labor sphere.

The purpose of the article is to assess the contemporary transformation of the labor market in Ukrainian regions as influenced by the Russian-Ukrainian war. To achieve this goal we will analyze current trends in labor supply and demand in Ukrainian regions and substantiate the specific features of labor market transformations during the wartime period. The object of our research is regional labor markets, while the subject is the transformational shifts in Ukrainian regional labor markets during the war period.

Research Methods

The study was conducted using a systemic approach, dialectical methods (analysis and synthesis, recognition of contradictions as internal driving forces, trial and error method), techniques of abstraction and generalization, functional and comparative analysis, statistical methods and data analysis. For instance, a comparison of two labor supply structures in Ukrainian regions in 2014 and 2023 was conducted using Spearman's rank correlation coefficient and the coefficient of inequality. Analysis of the gender structure of labor supply was carried out using the J_R criterion scale to assess the significance of differences between the two structures (Formula 1). The calculation of the significance indicator of structural differences using this formula is based on the ratio of the actual measure of discrepancies in the values of the elements of the two structures to their maximum possible value. This formula not only allows us to assess structural shifts but also the degree of disproportionality of the gender structure of labor supply.

$$J_R = \sqrt{\frac{\sum_{i=1}^{n}\left(d_{2_i} - d_{1_i}\right)^2}{\sum_{i=1}^{n}\left(d_{2_i} + d_{1_i}\right)^2}} \tag{1}$$

where d_{1_i} – specific weight of the *i*-th element of the structure of the first aggregate;

d_{2_i} – specific weight of the *i*-th element of the structure of the second aggregate;

n – population size;

i – number of the population's element.

Spatial transformations of labor demand were analyzed using methods of analysis and synthesis, abstract-logical methods, the comparative method, and the graphical method. The

assessment of transformational shifts in regional labor markets in Ukraine was conducted based on the State Employment Service data, which allowed for the study of the structure of labor supply from 2014 (the beginning of the military conflict) to 2023 and the analysis of the regional structure of labor demand (State Employment Service, 2024; State Statistics Service of Ukraine, 2015).

Results and Discussion

The ongoing war within the country's communities has significantly weakened previously established social connections in local labor markets due to changes in the structure of labor supply and demand. Current transformational shifts are characterized by radical changes that exacerbate interregional disparities in this area. In the context of acute wartime risks and a catastrophic decline in human potential, these disparities threaten national security in terms of staffing critical enterprises and the ability to maintain social standards and guarantees. The Russian-Ukrainian war has led to fundamental transformations of the labor market in Ukrainian regions, driven by:

−   transformations in the economy structure, which have heightened imbalances in labor demand; the destruction and relocation of enterprises and the reduction of production volumes due to the blockade of transport routes, have narrowed the scope of employment while simultaneously contributing to the creation of jobs in safer regions. 3.5 million jobs were lost in the first year of the war (Government portal, 2024), and according to the International Labor Organization, this figure could reach 43.5% of all jobs during the war (The impact of the Ukraine, 2022);

−   an increase in mortality rates, a decline in birth rates, and intensified external migration have significantly weakened the country's labor potential and exacerbated the imbalance in the age structure of the workforce. As of January 1, 2024, 6.3 million Ukrainians had migrated, with women and children comprising 87% of this figure. Notably, 70% of Ukrainian women migrants in the EU are highly educated, representing a significant potential labor force. However, the risk of losing this valuable human capital is high, given that a quarter of migrants don't plan to return (Institute for Demography and Life Quality Problems, 2024; Yehorova, 2023);

−   intensified internal migration, which has complicated the balanced development of local labor markets, causing a redistribution of labor resources and a shortage of skilled workers. As of January 1, 2024, 4.9 million internally displaced persons (IDPs) were registered in Ukraine, mainly citizens from frontline and border areas; the largest number of them were received by the territorial communities of Dnipropetrovsk, Kyiv, Kharkiv, Poltava regions, and Kyiv;

−   demand for military-liable citizens by the Armed Forces of Ukraine, which has increased the imbalance in the gender structure of the workforce. In 2023, the share of men in the unemployed population was 28.0%, which is 17.4 percentage points less compared to 2014.

In 2023, the unemployment rate in Ukraine was 21.1% of the population according to the International Labour Organization methodology, which is due to disproportions in the demand for labor force and its supply, uneven economic recovery of territorial communities, the scale of losses and damages. A comparison of the labor supply structures in communities of

Ukrainian regions between 2014 and 2023 based on Spearman's rank correlation coefficient (0.178) confirmed the presence of significant shifts (Table 1), which occurred mainly due to changes in the indicators of frontline communities (Luhansk, Donetsk, Sumy regions), as well as in Kyiv and Kyiv region communities as areas hosting a large number of IDPs, against the background of minor changes in communities of Zakarpattia, Chernivtsi and Ivano-Frankivsk regions.

Table 1 Distribution of territorial communities of
Ukrainian regions by shifts in the labor supply structure, 2014-2023

Intervals of values	Characteristics of structural differences	Territorial communities of regions
0.1 – 50.0	Minor shifts	Cherkasy, Chernihiv, Chernivtsi, Dnipropetrovsk, Ivano-Frankivsk, Kharkiv, Kherson, Khmelnytskyi, Kirovohrad, Lviv, Mykolaiv, Odesa, Poltava, Rivne, Ternopil, Vinnytsia, Volyn, Zakarpattia, Zhytomyr
50.1 – 98.0	Moderate shifts	Sumy, Zaporizhzhia
98.1 – 147.0	Substantial shifts	Kyiv, the city of Kyiv
147.1 – 196.0	Significant shifts	Donetsk, Luhansk

Source: authors own study based on the SES data (State Employment Service, 2024)

A comparative analysis of the labor supply structure for 2014 and 2023, conducted using the uneven distribution coefficient, indicates an increase in the asymmetry of the distribution of the unemployed population. However, calculations based on statistical data on officially registered unemployment show the dominance of the opposite trend, i.e., an even distribution of labor supply across Ukraine, which does not correspond to actual trends in this field. It is important to note that the indicators of officially registered unemployed individuals do not fully reflect labor market trends for various reasons, mainly due to the distrust of employment centers as an institution for job placement, especially among the male population. Between 2014 and 2023, the number of men with officially registered unemployed status decreased fivefold; their share among the unemployed during this period dropped from 45.4% to 28.0% by the end of the study period, primarily due to the impact of the war. In 2023, the labor supply of women exceeded that of men by 2.6 times.

When evaluating the gender structure of labor supply using the J_R criterion scale to assess the degree of significance of differences between two structures, it is important to note the existing regional differences. The results of the assessment of calculated values indicate complete identity in values for two-thirds of the regions and the absence of complete structural opposition. The distribution of regions by value ranges allowed the formation of three groups: 0.000–0.030; 0.031–0.090; 0.091 and above (Table 2).

Table 2 Distribution of Ukraine's regions by the criterion of differences in the regional structure of labor supply by gender, 2023

Intervals of values J_R	Characteristics of structural differences	Region
0.000 – 0.030	Identity of structures	Vinnytsia (0.024), Lviv (0.023), Chernihiv (0.021), Ternopil (0.021), Cherkasy (0.020), Volyn (0.019), Ivano-Frankivsk (0.017), the city of Kyiv (0.015), Poltava (0.014), Kyiv (0.013), Chernivtsi (0.009), Kharkiv (0.008), Zhytomyr (0.008), Rivne (0.005), Dnipropetrovsk (0.004), Sumy (0.004), Khmelnytskyi (0.003), Mykolaiv (0.000)
0.031 – 0.090	Low level of differences	Odesa (0.042), Kirovohrad (0.041), Donetsk (0.040), Zakarpattia (0.032)
0.091 – and above	Significant level of differences	Kherson (0.158), Zaporizhzhia (0.111), Luhansk (0.093)

Source: authors own study based on the SES data (State Employment Service, 2024)

The value range with an interval of 0.000–0.030 forms the first group, which includes 18 regions characterized by structural identity with the national average indicator. The regions in this group are distinguished by labor market flexibility, a mobile workforce, adaptability to crisis conditions, and developed infrastructure. The development priorities for this group of regions include the productive utilization of business relocation potential and IDPs, the development of the entrepreneurial sector, and social interaction to mitigate the risks of the wartime period.

The second group (range 0.031–0.060) consists of four regions with a low level of deviation from the national average indicator. These are mostly regions with the lowest proportion of men among the unemployed population in the country (Odesa region – 23.3%, Kirovohrad – 23.5%, Zakarpattia – 24.4%) and a pronounced territorial or economic specificity. The development priorities for the territorial communities in these regions include enhancing financial capacity, restoring production and infrastructure facilities, and developing the entrepreneurial sector (Sova, 2023). A balanced local policy based on cohesion, solidarity, and mutual trust should counteract the fragmented social capital that is formed by closed networks, deepening the social divide among community members (Zvonar et al., 2023).

The third group (range 0.091 and above) includes Zaporizhzhia, Luhansk, and Kherson regions, which differ significantly from the national average and are characterized by a shrinking labor market due to their proximity to the frontline. According to data from the State Employment Service of Ukraine, the number of applicants per vacancy in the Zaporizhzhia and Kherson regions on January 1, 2024, was the highest among the country's regions, at 22 and 20 job seekers per vacancy, respectively. This is due to the limited employment opportunities for the unemployed population resulting from the closure of several enterprises and the high risks of conducting entrepreneurial activities. The development priorities for this group of communities are the restoration and revitalization of entrepreneurial activity to revive the community economy and labor market, ensure safe living conditions, preserve the community's human potential, and reduce social tension (Zaiats et al., 2024).

When evaluating the labor supply structure in terms of urban and rural unemployed populations using the J_R criterion scale for assessing the significance of differences between the two structures, we can observe an increase in the disproportionality of the labor supply structure by these parameters (Figure 1). As a result of the analysis, four groups were formed, with the first group (range 0.000–0.030) consisting of 5 regions (Kyiv, Kirovohrad, Lviv, Mykolaiv, and Poltava), which are characterized by structural identity with the national average indicator, meaning that the proportion of urban and rural unemployed populations is close to the national average – 59.9% and 40.1%, respectively. The main priorities of local development policy for the first group are increasing the capacity of territorial community labor markets to accumulate and productively utilize the labor potential of economically active local populations and IDPs. The second group (range 0.031–0.070) consists of seven regions, whose level of deviation from the national average is very low. The communities in these regions are characterized by a predominance of urban unemployed populations over rural ones, with all regions being border areas, and four of them (Zaporizhzhia, Luhansk, Kharkiv, and Kherson) are active combat zones. This situation restricts employment opportunities and narrows the labor market. The local development priorities for this group include supporting the social adaptation of IDPs, enabling the realization of their labor potential in recipient communities, creating economic opportunities to improve the living standards of socially vulnerable categories of the economically active population, and developing housing markets and transportation to enhance labor mobility.
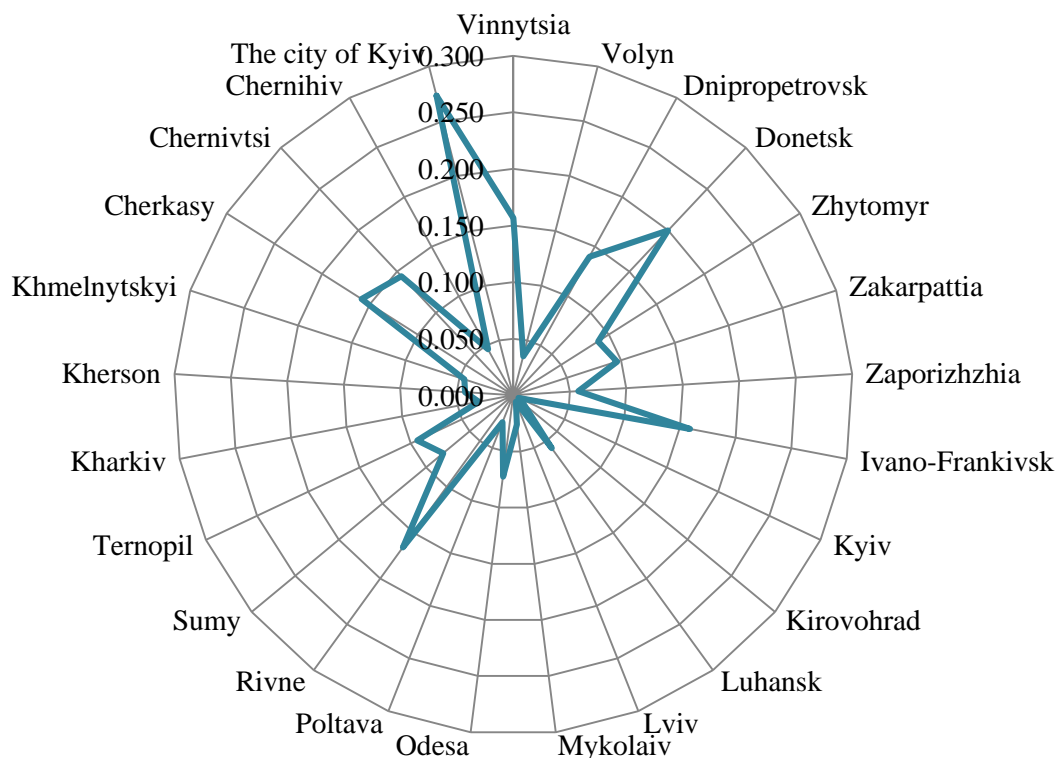

Figure 1 Distribution of Ukraine's regions according to the structure of labor supply (urban and rural unemployed population), 2023

Source: authors own study based on the SES data (State Employment Service, 2024)

The third group (range 0.071–0.150) includes seven regions, which have a low level of deviation from the national average and are characterized by a higher proportion of urban population among the unemployed. In Dnipropetrovsk region, for example, the share of the urban population is 74.7%, while in Sumy it is 68.2%. The key development policy priorities for this group include attracting the necessary qualified labor force to territorial communities, reducing long-term unemployment and informal employment, and staffing social sector institutions, particularly in healthcare and education.

The fourth group (range 0.151–0.300) consists of six regions with a significant deviation from the national average. Four of them (Vinnytsia, Ivano-Frankivsk, Rivne, and Cherkasy) have a higher proportion of rural population among the unemployed than the national average, while the other two – Kyiv and Donetsk regions – exceed the national average urban unemployment rate by 1.5 and 1.4 times, respectively. The development priorities for this group focus on creating productive jobs, fostering the growth of small and medium-sized businesses, and legalizing informal employment.

The regional structure of labor demand has changed dramatically under the influence of military actions, the destruction of production and infrastructure facilities, the intensification of migration processes, and significant human losses. A regional polarization of the labor market has essentially occurred: top regions in the growth of their share of labor demand are concentrated predominantly in the right-bank part of the country, while the leaders in declining shares are mainly on the left-bank side (Figure 2).
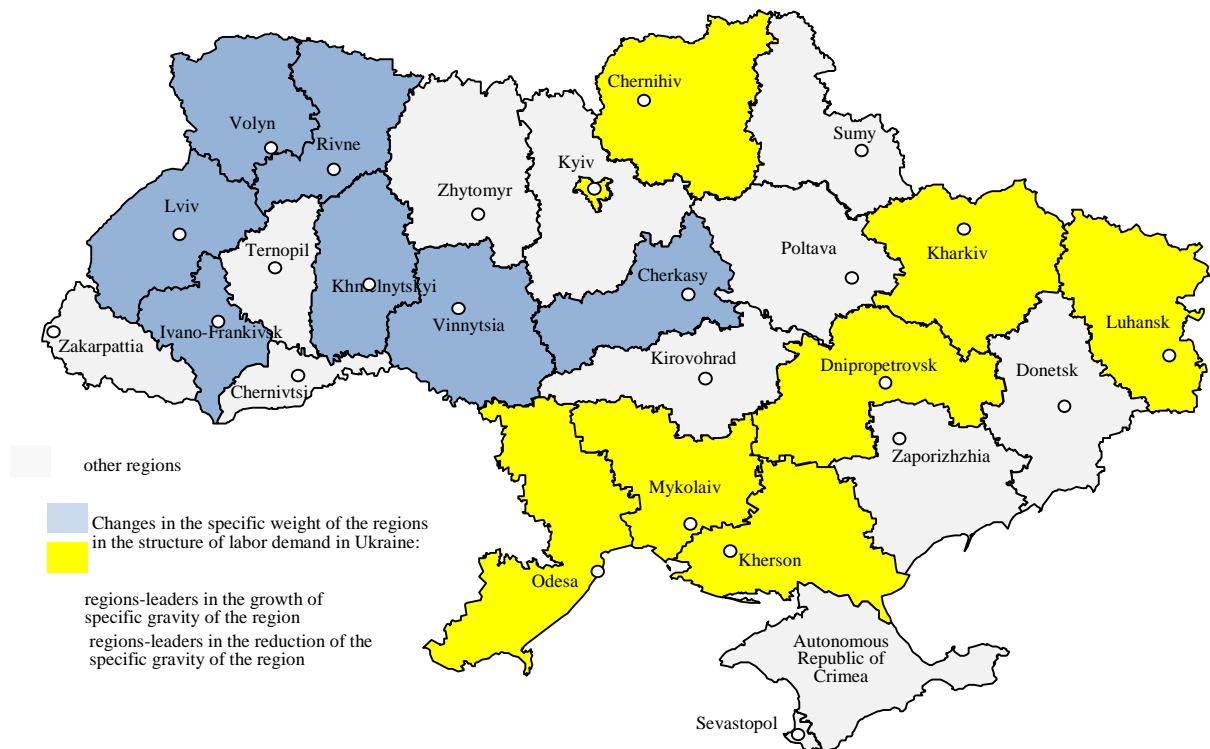

Figure 2 Transformation of the labor demand regional structure in Ukraine, 2014-2023

Source: adapted by the authors based on the SES data (State Employment Service, 2024)

The primary cause of this regional transformation is the closure of numerous enterprises in frontline and occupied territories, and their relocation to safer communities in right-bank Ukraine. Additionally, the labor resource potential has decreased due to population emigration and the migration of IDPs to territorial communities with better employment opportunities and safer living conditions. From the perspective of regional economics, these changes must be viewed as critical, as they signify the exacerbation of labor market shortages and the challenge of maintaining regional labor market equilibrium.

Conclusions

Transformations in Ukraine's labor market, driven by the impact of the Russian-Ukrainian war, pose a threat to national security in terms of workforce reduction and increasing disparities. The study of modern transformations in Ukraine's regional labor markets has revealed substantial spatial shifts in labor demand and supply. In particular, a comparison of two labor supply structures in Ukraine's regions for 2014 and 2023, using Spearman's rank correlation coefficient, revealed significant structural shifts primarily in frontline regions (Luhansk, Donetsk, and Sumy regions), as well as in Kyiv and Kyiv region. A comparative analysis of the labor supply structure, using the uneven distribution coefficient, demonstrated an increase in the asymmetry of the distribution of the unemployed population under the pressure of citizen displacement processes. The assessment of the gender structure of labor supply, conducted using the J_R criterion scale for assessing the degree of significance of differences between two structures, indicated complete identity in values for two-thirds of the country's regions and the absence of complete structural opposition. A comparative analysis of the labor supply structure in terms of urban and rural unemployed populations showed an increase in the disproportionality of labor supply structure by these parameters.

The regional structure of labor demand has also undergone significant changes. There has been a regional polarization of the labor market: a shortage of jobs is observed in the southeastern regions of Ukraine, while a shortage of labor force is noted in the western regions. The reasons for regional disproportionality include the closure of several enterprises in frontline and occupied territories and their relocation to safer communities in the country, as well as the reduction of labor resources due to population emigration.

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