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THE LABOR MARKET DURING THE WAR IN UKRAINE

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Abstract This study analyzes the dynamics of the labor market in Ukraine during the full-scale russian invasion, emphasizing the need to account for profound structural changes in this market. We derive estimates of labor force participation and unemployment rates using survey data collected by Info Sapiens for the National Bank of Ukraine and controlling for sample composition. Participation fell by about nine percentage points between 2022 and 2025, while the unemployment rate peaked at 25 percent in May 2022 and gradually declined to 9 percent by December 2024. We corrected possible biases by including potentially omitted variables in our regressions. Regional and demographic disparities were pronounced during the war: Kyiv maintained lower unemployment, the east of the country was hardest hit, and the urban–rural gap narrowed after 2023. The gender gap in the labor market decreased but remained significant during the war. Education proved decisive for job retention, with university and vocational training significantly improving labor participation and employment outcomes. Our findings provide robust evidence of the adjustment of the labor market under extreme conditions and offer essential policy lessons for sustaining employment during the ongoing war.

JEL Codes J21, J64, O12, H56

Keywords labor market conditions, labor force participation, unemployment, war, Ukraine

1. INTRODUCTION

Since February 2022, further escalation of the war by russia has caused significant destruction and harmed the economy in Ukraine in general, and the labor market in particular. Many researchers have examined the effects of war and military conflicts on the labor market or its specific segments, thus we know from the relevant literature that wars and military conflicts considerably impact human well-being (Shemyakina and Plagnol, 2013; Coupe and Obrizan, 2016; Osiichuk and Shepotylo, 2020) and worsen labor market outcomes (Kondylis, 2010). More specifically, wars impair human capital directly by adversely affecting physical and mental health (Akbulut-Yuksel and Yuksel, 2015; Anastasia et al., 2023) and lowering labor productivity (Gorodnichenko et al., 2022).

Armed conflicts can also indirectly negatively impact the business environment, which deteriorates company performance, e.g., reducing exports, sales, and employment (Petracco and Schweiger, 2012). Such influence includes the relocation of businesses, forced migration, and refugee crises (Pham et al., 2023). Although the short-run negative impact of war tends to fade away relatively quickly, its effects tend to linger for the most vulnerable categories, like low-skilled women (Morales, 2018).

Most available research on the impact of wars is based on post-conflict data. Studying the ripple effects of long-lasting and ongoing military confrontations presents a greater challenge for researchers. In the

acute phase of the war, Ukraine provides a unique opportunity to investigate the labor market under active conflict conditions.

Before 2022, the State Statistics Service of Ukraine (SSSU) was the primary source of labor market data through official surveys. However, these surveys were suspended following russia's full-scale invasion. The introduction of martial law further limited data collection and restricted access to official statistics. This absence of conventionally collected data has compelled researchers and policymakers to seek alternative data sources.

Given the lack of official data, a critical research question with significant policy implications is to assess key labor market indicators, such as labor force participation and the unemployment rate, during the war.

To analyze labor market developments in Ukraine during the ongoing conflict, this study uses a unique dataset from a regular (quarterly) household survey conducted by Info Sapiens for the National Bank of Ukraine (NBU). While this survey cannot fully replace the official statistics previously provided by the SSSU, it is a valuable source for monitoring key labor market trends during the war. This paper details the structure and specific features of the Info Sapiens survey.

Contributing to the substantial body of literature on labor market outcomes, we analyze changes in labor force participation and unemployment dynamics before and after russia's full-scale invasion in February 2022. A key challenge is that the survey design was initially based on the pre-war labor market structure, which the war has dramatically reshaped. Ignoring these shifts would bias our estimates, so we explicitly account for changes in the sample composition to obtain more accurate measures of labor force participation and unemployment rates. We apply linear (and binary choice) models to the full sample to estimate the probability of a respondent being in the labor force. We then calculate unemployment rates for those identified as part of the labor force. This approach fills the gap left by unreliable official statistics during the war. Our methodology ensures that the estimates accurately reflect actual labor market activity while controlling for the structural transformations during the conflict.

Due to the regularity of the surveys, the available data allow for a continuous analysis of changes in various groups throughout the entire observation period of the ongoing war. Unlike many previous studies that used historical data, our quarterly updated survey data enable us to estimate near-real-time labor market developments during military disturbances. Thus, this study aims to show trends and changes in key labor force indicators, specifically labor force participation and unemployment rates. We also investigate whether these changes differ across various socio-economic groups (e.g., by gender, education status, and region), after controlling for shifts in the sample composition across survey waves.

Assessments of the current state of the economy and the unemployment rate are essential for macroeconomic forecasting and making informed economic and monetary policy decisions. These assessments are crucial for immediate reactions and mid- to long-term interventions, especially during times of uncertainty. The findings presented in this analysis, which are based on regularly updated data from a period of active hostilities, can help inform the design of economic policy under heightened uncertainty.

An essential result of this analysis is that we provide essential micro-level evidence on how education levels, gender, and financial support from economic migrants influence a person's labor outcomes during a military conflict. These findings contribute to the existing literature that examines the behavior of the most vulnerable labor force categories under wartime conditions and the causes and consequences of business relocation and forced migration (studied before by Kondylis, 2010).

We found significant regional and demographic disparities in employment. Although Kyiv did not show a significantly higher labor force participation rate, it did experience lower unemployment. In contrast, the country's eastern regions were the most severely affected. Additionally, the gap between urban and rural employment decreased after 2023, while the gender gap in labor market conditions, though narrowing, remained significant throughout the war. Education played a crucial role in job retention, as individuals with university degrees and vocational training demonstrated much better participation and employment rates. These findings provide strong evidence of how the labor market can adapt under extreme conditions and offer essential policy insights for maintaining employment during the ongoing war.

This paper is organized as follows. Section 2 briefly reviews the conditions and state of the Ukrainian labor market before russia's full-scale invasion in February 2022. Section 3 presents the dataset and primary variables used in the analysis. Section 4 introduces the methodology. Section 5 provides the estimation results on the labor force participation ratio during the war (5.1), explores changes in employment status (5.2), and summarizes the challenges for Ukrainian labor market predictions (5.3). Section 6 offers the conclusion.

2. LABOR MARKET ON THE EVE OF THE FULL-SCALE INVASION IN FEBRUARY 2022

Since the military aggression launched by russia in 2014, the so-called "hybrid war" has permanently affected the functioning of Ukraine's economy in general and reshaped the labor market in particular. During the hidden phase of the war (2014-2021), the Ukrainian labor market faced several serious problems and was somewhat depressed (Anastasia et al., 2023).

The long-term problems of the Ukrainian labor market are rooted in demography and history. Tragic events like the Great Famine and World War II resulted in a very uneven population pyramid for many consecutive years, and these past events still shape the labor market (Yaremko, 2023). The aging population, the relatively low pension age, and the joint pension system created constant trade-offs between low pensions, deficits in the state pension fund, and high social contributions on the wage bill (IMF, 2017). Such issues encouraged many businesses to minimize paying labor taxes and fees, contributing to a sizable unofficial economy that, according to MinEcon, was 32% of the official GDP in 2021. Along with the notable shadow employment, the aging population and low wages compared to larger neighbors (the EU and russia) were the main long-term problems that fueled economic migration (Nikolaets, 2018).

Furthermore, the labor force participation rate in Ukraine has dropped notably since russia's military aggression began in the south and east of the country. A substantial gender gap of more than 12% persisted from 2014 to 2021, with women's labor participation in Ukraine being slightly lower than in the EU, particularly for women over 30 (Table 1 in Appendix A). Anastasia et al. (2023) argue that this gender gap was caused by a deficit of stable, well-paid jobs, the necessity of caring for children, and extended absences from work, leading to a deterioration or mismatch of skills.

Unemployment rates increased from 7.3% to 9.3% in 2014 due to the initial shock of the war and remained relatively high compared to peer countries (Table 2 in Appendix A). Researchers view the destructive influence of the hybrid war, structural disproportions and the mismatch between supply and demand during that period as the main reasons for consistently high unemployment. Unemployment among youth was notably higher, averaging 19.6% for people aged 15-24 over 2013-2021. The

occupation of a part of the Donetsk and Luhansk oblasts led to even higher unemployment in these regions, and this situation persisted at least until 2021.[1]

The COVID-19 pandemic significantly reshaped the labor market. Quarantine measures and travel restrictions impacted various sectors, sharply decreasing demand in areas related to mass gatherings, like cinema and concerts, while increasing it in others, such as healthcare and delivery services. These shifts in demand required workers to acquire new skills. As a result, even as many quarantine restrictions were lifted in 2021 due to mass vaccinations, the unemployment rate decreased quite slowly while wages continued to grow. The unemployment rate peaked at 10.3% in the second quarter of 2020 but only fell to 9.8% by the fourth quarter of 2021 (both figures are seasonally adjusted).

It is crucial to note that the ongoing war in Ukraine causes a vast refugee crisis (Pham et al., 2023), and the demographic structure of the relocated differs from that of the general population (the latest estimates of UNHCR). The destruction of productive capacity, the loss of a significant number of jobs, a sharp fall in household incomes, and the exceptionally high levels of migration lead to a substantial and ongoing restructuring of the Ukrainian labor market. This study attempts to quantify these main changes using data collected by Info Sapiens for the National Bank of Ukraine.

3. DATA

Official statistics from the SSSU were the primary source of labor market data before russia's full-scale invasion in February 2022. The SSSU collected these observations through a monthly labor force survey, randomly polling about 16,000 households on economic activity. The SSSU used the International Labor Organization's (ILO) methodology, which allowed the data to be comparable across countries and provided highly accurate aggregate estimates of the workforce, employment, and unemployment, as well as more detailed breakdowns by age, gender, and region.

Since the full-scale invasion, data collection has been significantly restricted, and the SSSU surveys have been suspended under martial law for the duration of the war. This lack of conventionally collected statistics has forced researchers and policymakers to seek alternative data sources. Alternative sources for labor market information include the State Employment Center, various sociological surveys (such as those by Gradus and Rating), and internet job search platforms (Work.ua, Jooble.org, etc.). While this information is useful, it typically provides irregular data. It often focuses on narrow issues, making it difficult to calibrate or reconcile the results with data from the State Statistics Service of Ukraine (see Table 3).

Table 3. Alternative Labor Market Data Sources

Provider	Type of data	Regularity
Surveys by Gradus, Rating, KIIS, etc.	Surveys of people by phone may have relevant questions, such as "Has your employment status changed since February 2022?"	irregular
Surveys by EBA, IER, NBU, etc.	Surveys of businesses, questions related to the deficit/abundance of labor	regular
The State Employment Center's statistics	Data on the number of registered unemployed and available job offers by sector	regular
Internet job search platforms work.ua, robota.ua, jooble.org	Data on the aggregate number of resumes and job offers by region and economic activity	regular

[1] Labour Force of Ukraine, 2021. https://www.ukrstat.gov.ua/druk/publicat/kat_u/2022/zb/07/zb_RS_2021.pdf

To gather information on the state of the Ukrainian economy, the NBU commissions regular surveys of enterprises, banks, and households. A key point for this study is that these household surveys allow NBU experts to collect additional data on respondents' employment status, which is vital for labor market estimations. It is important to note that the data from these surveys are not fully compatible with information from the SSSU. This is due to several differences, including the data collection period (quarterly average based on all months for the SSSU survey vs. one month per quarter for the Info Sapiens survey), sample size and coverage of rural areas. In particular, the SSSU surveys report quarterly average indicators, while the Info Sapiens surveys show the same measures in the last month of each quarter.[2] It is also crucial to note that the Info Sapiens data only overlap with the SSSU data for 2021, and only four time points are available for comparison (see Figures 1 and 2). The similarity of the numbers from both official and non-official data sources in the period leading up to the major shocks of the active phase of the war supports the idea that the Info Sapiens survey dataset can be an acceptable substitute for official statistics now that official data collection has been suspended due to martial law.

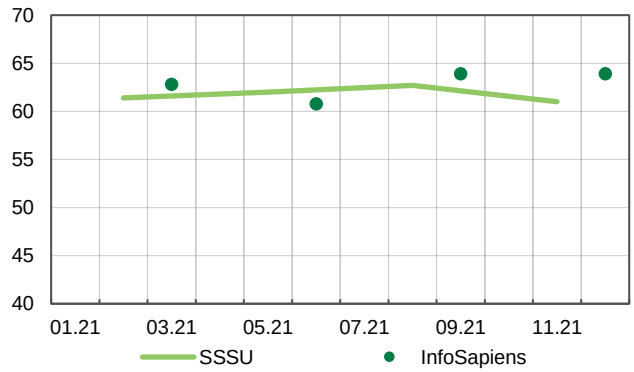


Figure 1. Labor Force Participation in Ukraine before the Full-Scale Invasion of Ukraine by russia: SSSU vs Info Sapiens

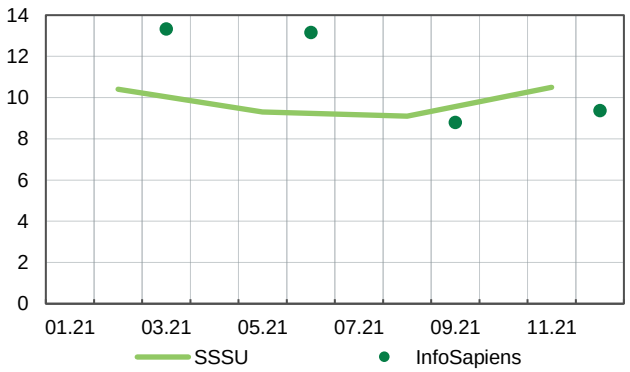


Figure 2. Unemployment Rate in Ukraine before the Full-Scale Invasion of Ukraine by russia: SSSU vs Info Sapiens

Since the Info Sapiens surveys do not have a panel structure, they cannot track the same individuals over time. Instead, the surveys use a new sample of interviewees at successive time points, asking the same questions to an independent sample in each wave. A full panel data analysis cannot be performed because the participants in one quarter may differ from those in earlier periods. However, this repeated cross-sectional data can still be used to trace labor market conditions during the war.

This survey was created to monitor the financial status of households and collects detailed socioeconomic data from respondents across all regions under Ukrainian control. Given its representativeness and regularity, the central bank considers it a viable temporary alternative to official statistics from the State Statistics Service of Ukraine, and the data are valuable for providing alternative estimations while official information remains unavailable. However, we cannot conduct a panel data analysis because the sample replaces respondents every quarter, and we do not have information on the same individuals over time.Info Sapiens conducts quarterly telephone surveys of over 1,000 people aged 16 and older using a random sample of mobile phone numbers. The sample's structure is designed to correspond with the population's demographics, including gender, age, settlement size, and region, based on the latest data available from the State Statistics Service of Ukraine before the full-scale invasion on February 24, 2022. The survey is not conducted in the Autonomous Republic of Crimea, the

[2] After the full-scale invasion in 2022 the regularity of the surveys provided by the Info Sapiens was shifted by about a month.

city of Sevastopol, or other territories of Ukraine temporarily occupied by russia, where Ukrainian mobile operators do not provide service. The reported margin of error does not exceed 3.1%.

The sociological agency provides the NBU with data from 1,000 respondents quarterly, selected from a slightly larger sample of about 1,100 people. For this analysis, the sample is reduced to exactly 1,000 units by dropping about 2% of the most extreme age observations each quarter. The structure of this sample mirrors the population's breakdown in terms of gender, age, settlement type and size, region, and other parameters observed by the SSSU just before the full-scale invasion.

This study excludes military personnel from the labor force.[3] However, the inclusion of military personnel in labor market indicators is a controversial issue. On one hand, the ILO states that "employment should, in principle, include members of the armed forces, both regular army staff and temporary conscripts."[4] At the same time, the ILO notes in its documents that "national data on labor force participation rates may not be comparable owing to differences in concepts and methodologies." Therefore, the ILO leaves such decisions to the discretion of national statistical agencies. For example, labor surveys in the United States are conducted only with the "civilian labor force."[5]

According to comments from representatives of the SSSU at the start of the full-scale invasion, mobilized individuals should be treated as inaccessible for the survey, just like conscripts, because they are permanently located in barracks or trenches and have not typically signed contracts with security forces.[6] In contrast, individuals serving under contract and representatives of the Ministry of Defense of Ukraine and other law enforcement agencies (MIA, SBU, SES, etc.) are classified as employed and part of the labor force, as their institutions report them as full-time employees.

Table 4 (in Appendix A) reports the descriptive statistics for the variables used in this research. On average, alternative measures show that[7] about 58.7-60.1% of respondents in the sample belong to the labor force, while about 13.7-14% of the labor force is unemployed. These percentage differences arise from how military personnel are accounted for – either within the labor force or outside of it.

Figure 3, which traces the breakdown of the full sample by employment category over the entire period, shows that the onset of active war resulted in a considerable loss of jobs and a sharp increase in unemployment, thereby reshaping the structure of the labor force.

Employment data are classified into three categories: employed, unemployed, and actively seeking jobs, as well as the population outside the labor force (those unemployed and not actively seeking jobs). The sum of these three groups constitutes the working-age population. Additionally, the number of employed people is divided into two subgroups: hired and self-employed.

Table 5 (in Appendix) shows the dynamics of key variables used in the study. With the onset of active military actions, the share of metropolis inhabitants in the sample increased from 23.2% to 26.6%, while the share of the population in the countryside dropped from 33.9% to 24.1%. The sample's gender structure also changed over time, with the share of females increasing from 54.3% in December 2021 to 57.7% in December 2024. The average respondent in the sample became approximately four years older during the war. On average, a respondent has a college degree (equivalent to a bachelor's

[3] We analyze both types of labor market indicators, but report results only for the measures of labor force that the SSSU recommend.
[4] Key Indicators of Labor Market.
[5] Concepts and Definitions of Labor Force Statistics from the Current Population Survey.
[6] The Methodological Provisions of the State Statistical Survey "Labor Force Survey" approved by the Order of the State Statistics Service of Ukraine No. 324 of December 24, 2021, pp. 35 (In Ukrainian).
[7] The differences are in how to account for the military within the labor force, or outside of it.

degree). Ukrainians turned to debt financing to cope with the difficulties of the initial months of the war, while the role of remittances increased, providing additional support from abroad.

Figure 4 shows the structure of the population outside the labor force over the entire sample period. Following the escalation of the war in February 2022, the labor market was reshaped by war-related uncertainty, leading to an enlargement of the population outside the labor force. The number of people whose main unpaid activity was household chores gradually increased during the war, while the share of those not looking for a job and the share of students gradually decreased.[8] The share of pensioners varied throughout the sample period, but in 2024, this figure returned to a level close to the pre-war level.

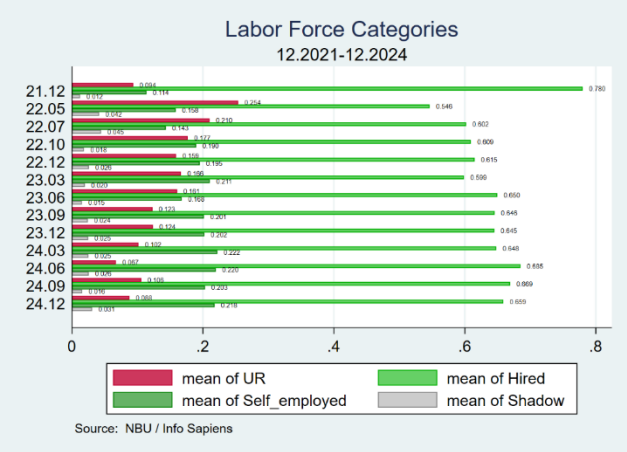


Figure 3. The Labor Force's Sample Share Narrowed During the Research Period

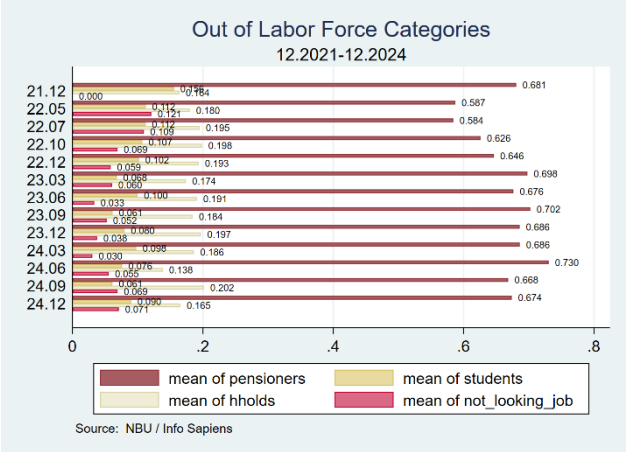


Figure 4. Out of Labor Force Categories

4. METHODOLOGY

Given the lack of official data, this research aims to estimate labor market conditions during the full-scale war, focusing on the key indicators of labor force participation rate (LFPR) and unemployment rate (UR).

We apply probabilistic regressions (linear and models with restricted dependent variables) to a sample prepared by Info Sapiens for the NBU's analytical purposes to estimate labor market developments during the war.

The initial regression for the labor market analysis is as follows:

$$\mathrm{Y_i} = \mathrm{const} + \beta_1 \mathrm{Male_i} + \beta_2 Mature_i + \beta_3 Education_i + \beta_4 \mathrm{F}Support_i + \beta_5 Settlement_i + \beta_6 \mathrm{Region_i} + \mathrm{error_{it}}, \quad (1)$$

$$\mathrm{Y} \in \{LFPR, UR\}$$

The coefficient const captures the average value of the labor force participation rate (and/or unemployment rate), controlling for the sample composition.[9] The labor force characteristics used in this study (X and Controls) include several categorical variables: gender (men vs. women), age (distinguishing

[8] Note that the category of those who do not look for a job was added and identified separately only in 2022.
[9] Unfortunately, we cannot test if average values for both SSSU and Info Sapiens datasets are statistically different due to the different time points of data collection.

between young and mature potential workers), education level (identifying respondents with general secondary education, vocational education, or a university diploma), financial support (debt and remittances), and type of settlement (metropolis or rural), and region of residence.

Our approach allows us to analyze trends in labor force participation and unemployment rates among various population groups – including those categorized by gender, education level, and region – while accounting for changes in the sample composition across survey waves.

To track the labor market developments, we extend the regression above into the following specification:

$$Y_i = \sum_{Dec\ 2021}^{Dec\ 2024} \alpha_j Swave_j + \sum_{Dec\ 2021}^{Dec\ 2024} \beta_j Swave_j \times X_i + \gamma_1 X_i + \sum \gamma_k C_k + error_{it} \mathrm{Y} \in \{LFPR, UR\} \quad (2)$$

$$Y \in \{LFPR, UR\}$$

so that for each survey wave, α_j summarizes the average value for a specific labor force category in that wave and enables following the trend. The alpha minus beta value summarizes the average value for the alternative group in this wave after accounting for other controls, such as gender (men vs. women) and settlement type (rural vs. urban).[10] The average values in each wave differ by specific labor force categories (showing how much lower/higher Y is for one category relative to the alternative one).[11]

Although ordinary least squares (OLS) regressions ignore the discrete nature of the dependent variable and do not ensure that predicted probabilities remain between zero and one, the differences in predicted probabilities obtained from linear and limited dependent variable regressions (such as logit or probit) are minor. This paper presents the OLS results because linear estimations offer clearer interpretations. The estimation results from other techniques are available upon request.

5. ESTIMATION RESULTS

5.1. Labor Force Participation during the Full-Scale War

There is significant evidence that labor market activity decreases and the structure of the available labor force changes under war conditions (Goldin and Olivetti, 2013; Boehnke &and Gay, 2022; Elveren et al., 2022). Therefore, our empirical analysis begins with estimations of labor force participation rate.

Figure 5 reports the predicted probability of being classified as “unemployed” in the labor force structure. Estimated outcomes show that Ukraine’s labor force participation rate has gradually declined throughout the war, falling by about 9 percentage points since the full-scale invasion (from 64% in December 2021 to 54.9% in December 2024).

We underline that the estimated probability for the pre-war period is very close to the official figure provided by the State Statistics Service of Ukraine for the fourth quarter of 2021. This close proximity increases our confidence in the usability of the data collected by Info Sapiens as a substitute for official labor market statistics while martial law is in effect and official data collection has ceased.

[10] Coefficients α_j and $\alpha_j - \beta_j$ can also be obtained by estimating the same regression separately. Still, such an approach would not allow us to observe if the trend difference for alternative groups is statistically significant.
[11] See George et al. (2023) for a similar approach based on panel data.

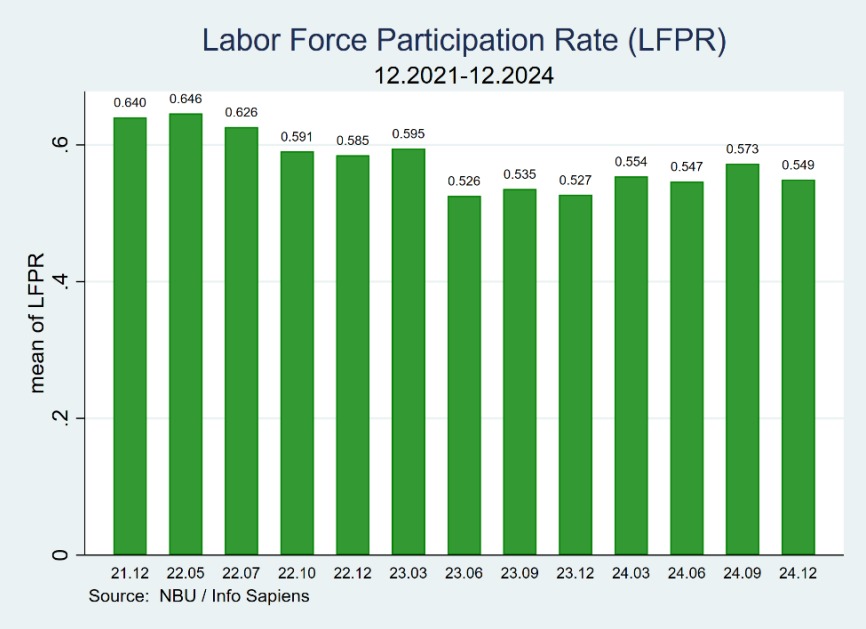


Figure 5. Labor Force Participation Rate

Figure 5T (in Appendix B) visualizes the estimation results for OLS regression (1) of the labor force participation rate for the full sample during the war. It shows that men, younger workers, those with vocational education or a university diploma, and urban inhabitants (including those in metropolises) demonstrated significantly higher labor participation rates than their peers. Furthermore, labor market conditions significantly deteriorated after July 2022 and remained notably worse in Ukraine's eastern and central regions.

To better understand labor market dynamics during wartime, we analyzed the role of key labor force characteristics using Model (2). For this, we estimated the α, β, and γ coefficients. The significant positive coefficients for interaction effects in our regressions for the labor force participation rate indicate a positive trend and improved labor market conditions for a specific characteristic. Conversely, significant negative coefficients for interactions confirm adverse changes for that labor force category's participation rate trend during the war.

It is important to recognize that ignoring the sample structure and the effects of control variables can lead to overestimating or underestimating the participation rate of a specific labor force category. To address these potential biases, we present both results: those without controls (a) and those with controls (b).

Figure 6T in Appendix B (a and b) shows a considerable gender gap in the labor force participation rate. The male participation rate is about 17.9 percentage points higher than the female rate and varies significantly throughout the full-scale war. The figure confirms that both men's and women's labor force participation rates declined after June 2022. While the gender gap narrowed significantly over time, it remained substantial by 2025.

Older workers are roughly 30.3 percentage points less likely to be in the labor market than younger ones. However, mature workers became notably more active, with their labor force participation rates increasing by 7.7 pp and 8.6 pp in the first two quarters of the full-scale war, respectively (Figure 7 and Figure 7T in Appendix B).

The regression outcomes demonstrate that education was a significant factor in the labor force participation rate during the war. By neglecting the sample structure, the participation rates for those with general secondary and, especially, vocational education are erroneously underestimated.

Workers with a complete secondary education (high school) were 6.7 percentage points (pp) less likely than their counterparts to remain in the labor market. However, their participation rate was 9.56 pp higher on the eve of the active phase of the war (Figure 8Tb in Appendix B). In contrast, workers with a vocational education had an 8.2% higher chance of being in the labor market, but this chance dropped by 9.7 percentage points with the start of hostilities (Figure 9Tb in Appendix B). The participation rate for employees with a university diploma was 22.6 pp higher than that of their peers without a higher education, but this rate fell by 10.5 pp in March 2023 (Figure 10Tb). It's worth noting that the higher the level of education, the less volatile the level of labor market participation was in wartime (see Figure 8).

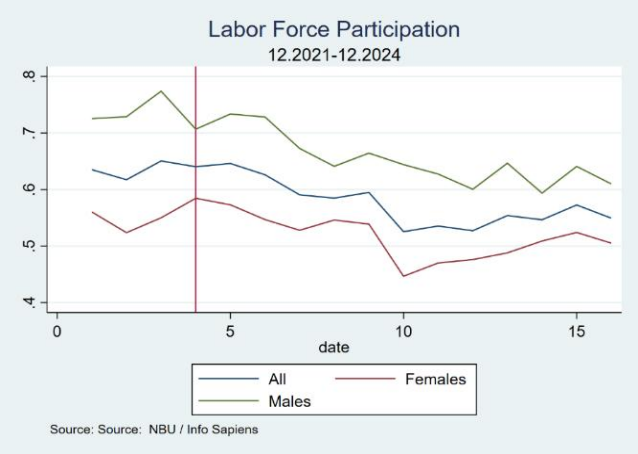


Figure 6. Gender Gap in Labor Force Participation Rate

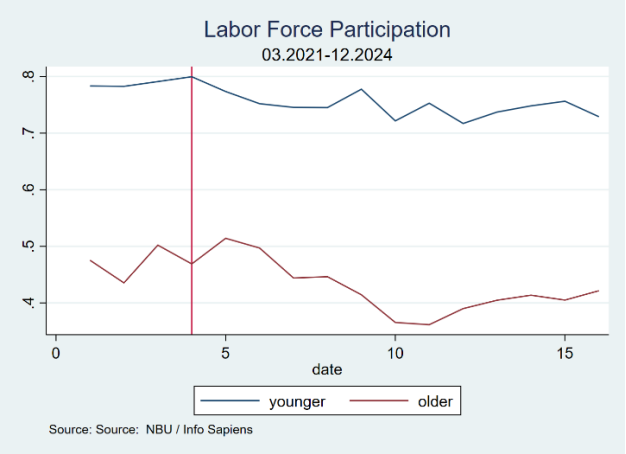


Figure 7. Workers in the Labor Force Participation Rate by Age

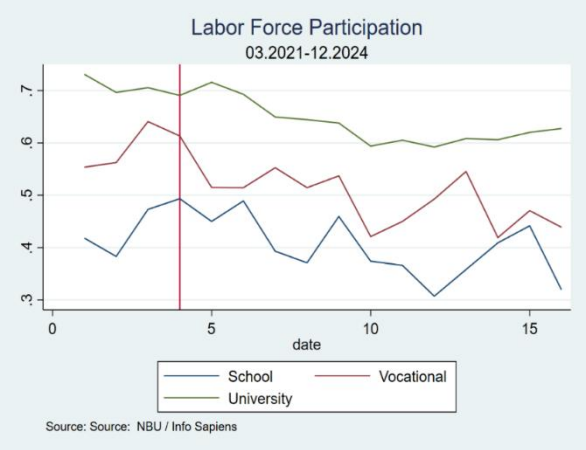


Figure 8. The Labor Force Participation Rate and Education Gap

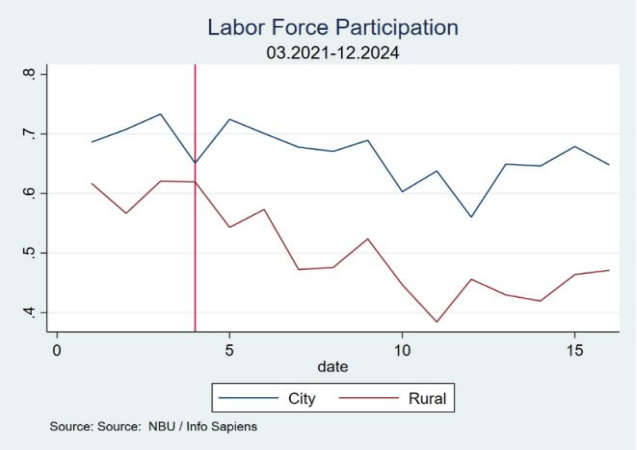


Figure 9. City-Rural Gap in Labor Force Participation

The overall macroeconomic situation during the war has negatively affected working conditions in both large urban and rural areas. However, the differences between these labor markets have widened, primarily because conditions in rural areas have deteriorated more significantly. Based on Figures 11Tb and 12Tb (in Appendix B), statistically significant declines in the labor force participation rate were periodically observed, which may be explained by seasonal activity differences. These drops occurred

only in the rural labor market in the fall of 2022 (by about 7.6 pp), the fall of 2023 (by about 2.3 pp), and since the beginning of 2024 (by 8.4-9.9 pp).

Before the large-scale military confrontation in February 2022, the South of Ukraine had the worst trends in labor market participation, while the Central part showed significantly better performance. During the war, however, the East of Central Ukraine consistently demonstrated substantially lower labor force participation rates, falling by approximately 4.7 and 7.2 percentage points, respectively.

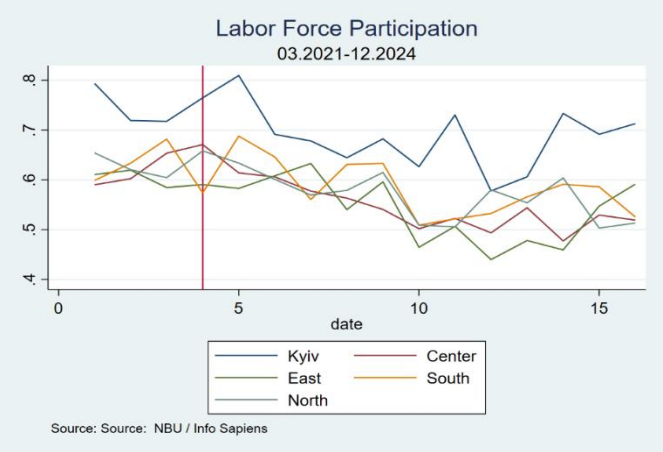


Figure 10. Regional Heterogeneity in Labor Force Participation

The capital of Ukraine, Kyiv, was the most active labor market during the war, although labor force participation rates were highly volatile (see Figure 5Tb in Appendix B).[12]

As can be seen in Maps 1-5, before the full-scale invasion, the South and East of Ukraine had the highest labor force participation rates. Overall, the differences between regions were slight, except for Kyiv. As the largest metropolis, Kyiv enjoyed a significantly higher labor force participation rate, as it offered higher wages, a large selection of jobs, and other synergistic benefits of a large city.

The first survey following the full-scale invasion, conducted in May 2022, showed that labor participation did not change significantly, exhibiting a degree of inertia. Participation rates remained relatively high even in partially occupied regions (East and South) and freshly liberated regions (North).[13]

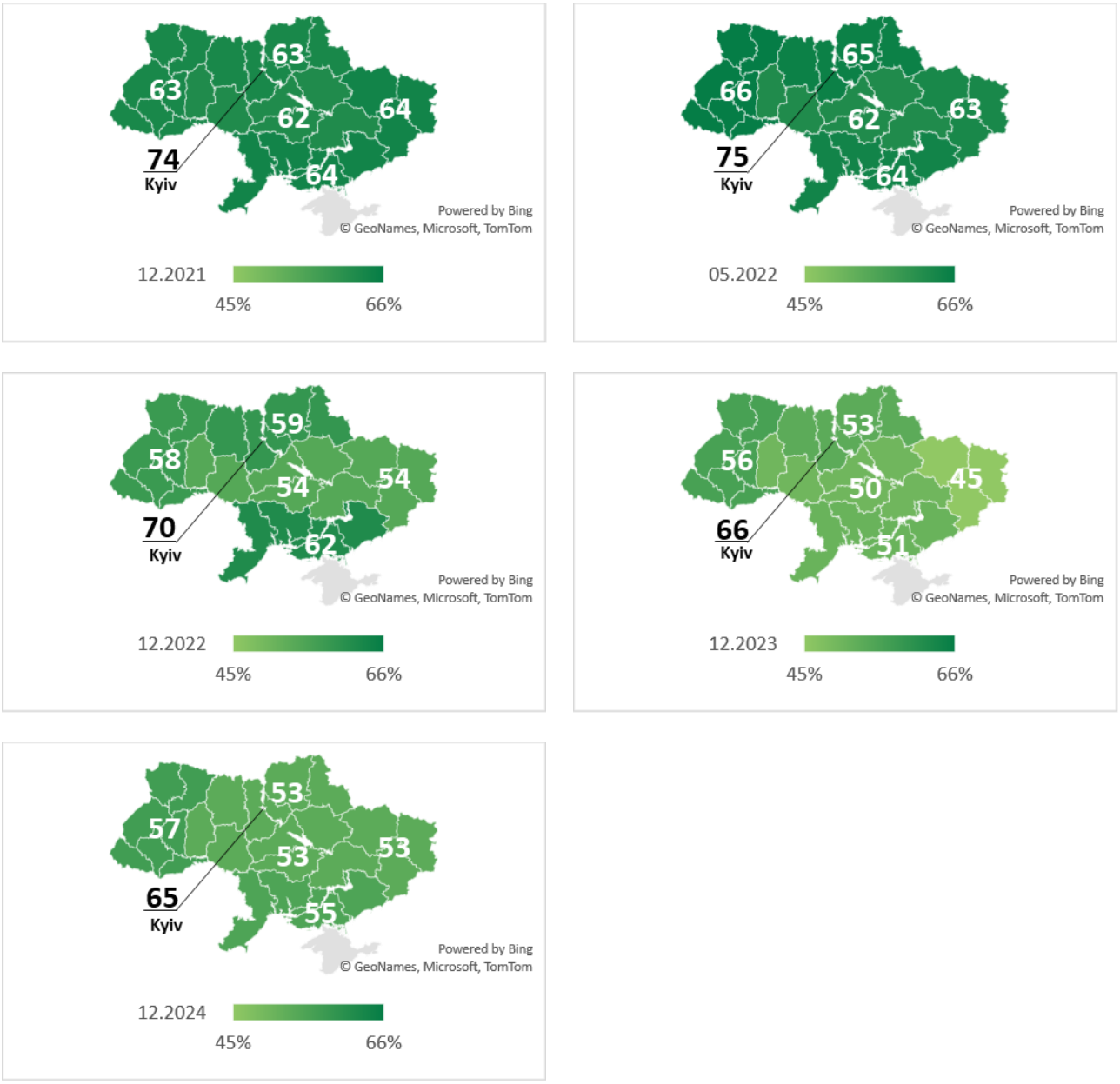
As the initial shock of the invasion dissipated, the number of respondents who were on pension or engaged in household activities – both considered "economically inactive" – increased. This trend lowered the overall labor participation rate even as the employment rate grew. This shift could be due to several factors, including internal displacement, people of retirement age preferring the stability of a pension (especially if they lost their previous job), concerns about security at the workplace, and mobilization rules. Unfortunately, the survey cannot distinguish between these or other possible motives.

As the war continued, labor participation rates decreased further in 2023 but began to recover in 2024. This recovery was at least partially due to a labor deficit, which stimulated wage growth (KSE Institute, 2025; NBU, 2025). There was also a clear redistribution of economic activity and labor participation from the East to the West, as people moved further from the frontlines.

During the war, we observed a heterogeneous deterioration in labor market participation rates across

[12] Here and further throughout the paper, West is the reference region.
[13] The labor market has serious seasonality, so comparing seasonally unadjusted data from December 2021 and May 2022 may also show some seasonality. Note that we add season dummies to our regressions to control for the effects.

regions, likely depending on their proximity to the frontline. Although the gender gap in the labor force narrowed, women, rural inhabitants, and individuals with lower education levels appeared to be the most vulnerable groups. An important finding is that the higher an individual's education level, the more likely they were to remain in the labor market during the upheavals of war.



Maps 1-5. Estimated Labor Force Participation Rate by Macro-Regions

5.1. Unemployment Rate during the Full-Scale War

Following the analysis of the labor force participation rate, we now trace the unemployment rate during the active war.

Figure 14 plots the predicted unemployment probability as reported by the base model (1). Estimated outcomes show that the unemployment rate in Ukraine increased sharply since the full-scale invasion,

from 9.4% in December 2021 to 25.4% in May 2022. It then gradually decreased to 9.3% of the labor force by December 2024.[14]

According to Figure 14 Tb (in Appendix B), which shows the estimated coefficients for key labor characteristics during the war, employment conditions significantly worsened until 2024. Regional characteristics in the East and South of Ukraine had an adverse effect on unemployment rates. There is also some evidence that remittances from abroad significantly assisted the Ukrainian unemployed, and it was found that males, mature workers, and individuals with vocational or university education or living in cities are significantly more likely to be employed.

The interpretations of the estimated parameters in unemployment regressions are the opposite of those in the labor force participation rate (LFPR) regressions. Significant positive coefficients indicate a deterioration of the situation, showing an increase in unemployment levels, while negative coefficients confirm favorable tendencies, showing a reduction in unemployment.

The significant interaction effects indicated that the differences between men's and women's unemployment rates were statistically significant, though the gender gap decreased starting in June 2022 (Figure 15Tb in Appendix B).

Before the full-scale war, unemployment was significantly higher among experienced workers than among younger workers. However, this trend reversed dramatically in the spring of 2022. As the war progressed, unemployment rates for both age categories decreased, and the age-based gap in unemployment became insignificant.

Skilled workers had significantly lower unemployment rates. Workers with vocational and university educations showed 11.3 and 12.9 percentage points lower rates than their unskilled peers. Figures 17Tb-19Tb (in Appendix B) provide evidence that at the start of the active phase of the war and throughout 2022, workers with various qualifications experienced a shortage of work. The pressure on the labor market eased somewhat over the following three quarters, as seen in the changing unemployment rates for workers with vocational and university degrees. Significant coefficients for the interaction terms of different education levels and survey waves indicate spikes in the demand for workers with specific qualifications, linked to the situation at the front. Ultimately, the unemployment rates for different education groups converged to approximately 9-10%.

The unemployment rate in rural areas was 10.3 percentage points higher than in urban settlements. Because of a significant decrease in labor market activity levels, unemployment did not return to pre-war levels until 2023.

Immediately following the full-scale invasion, unemployment rates naturally rose, with the country's east showing the worst figures. In May 2022, the unemployment rate in that region exceeded an unprecedented 33%.

[14] The regressions are run on the subsample of the respondents who represent the labor force.

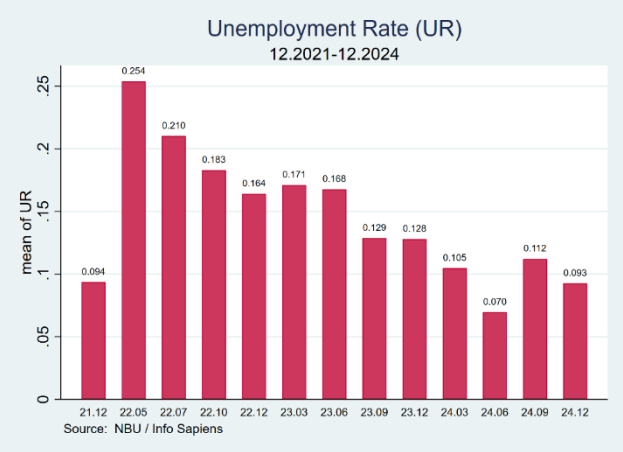


Figure 14. Unemployment Rate.

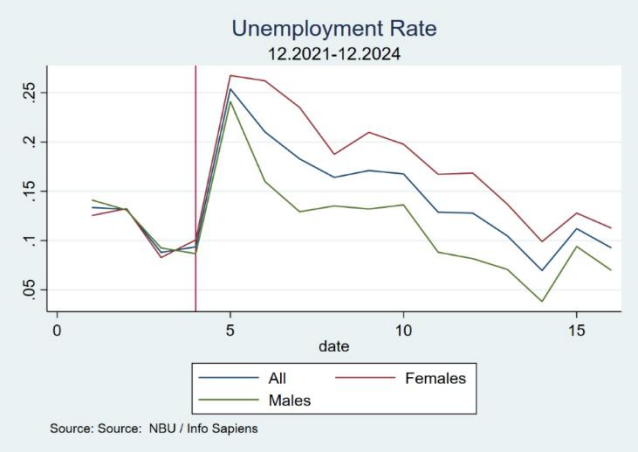


Figure 15. Gender Gap in Unemployment Rate

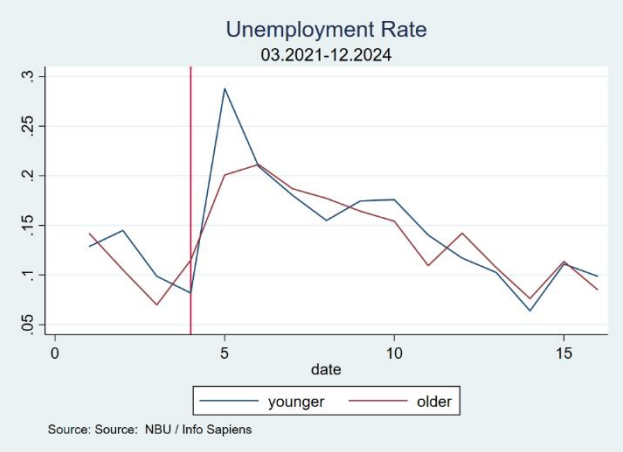


Figure 16. Unemployment Rate and Mature Workers

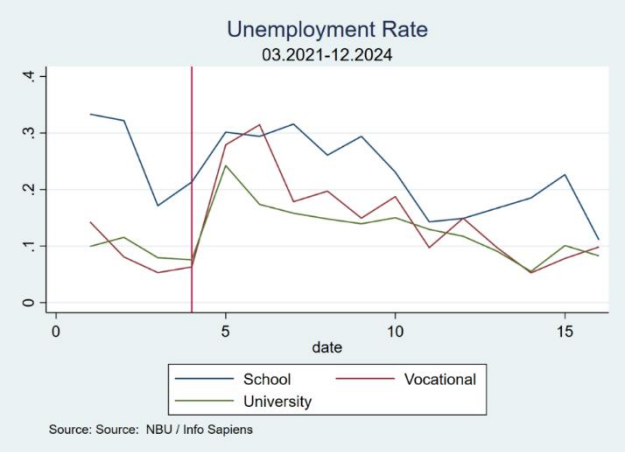


Figure 17. Education Gap in the Unemployment Rate

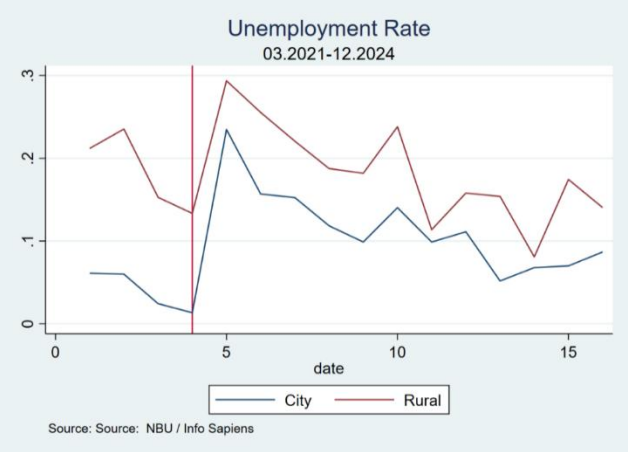


Figure 18. City-Rural Gap in Unemployment Rate

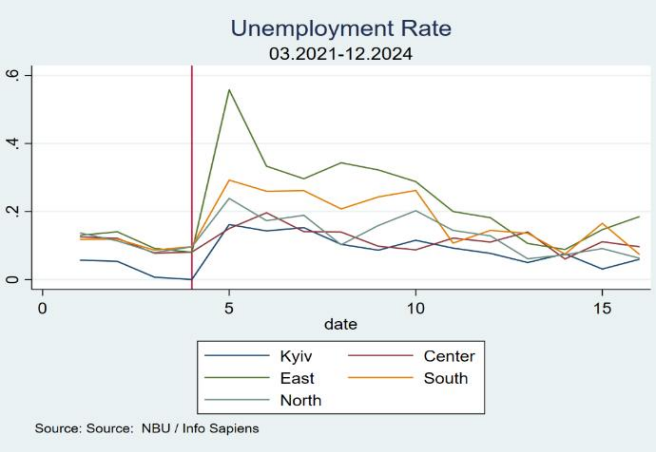
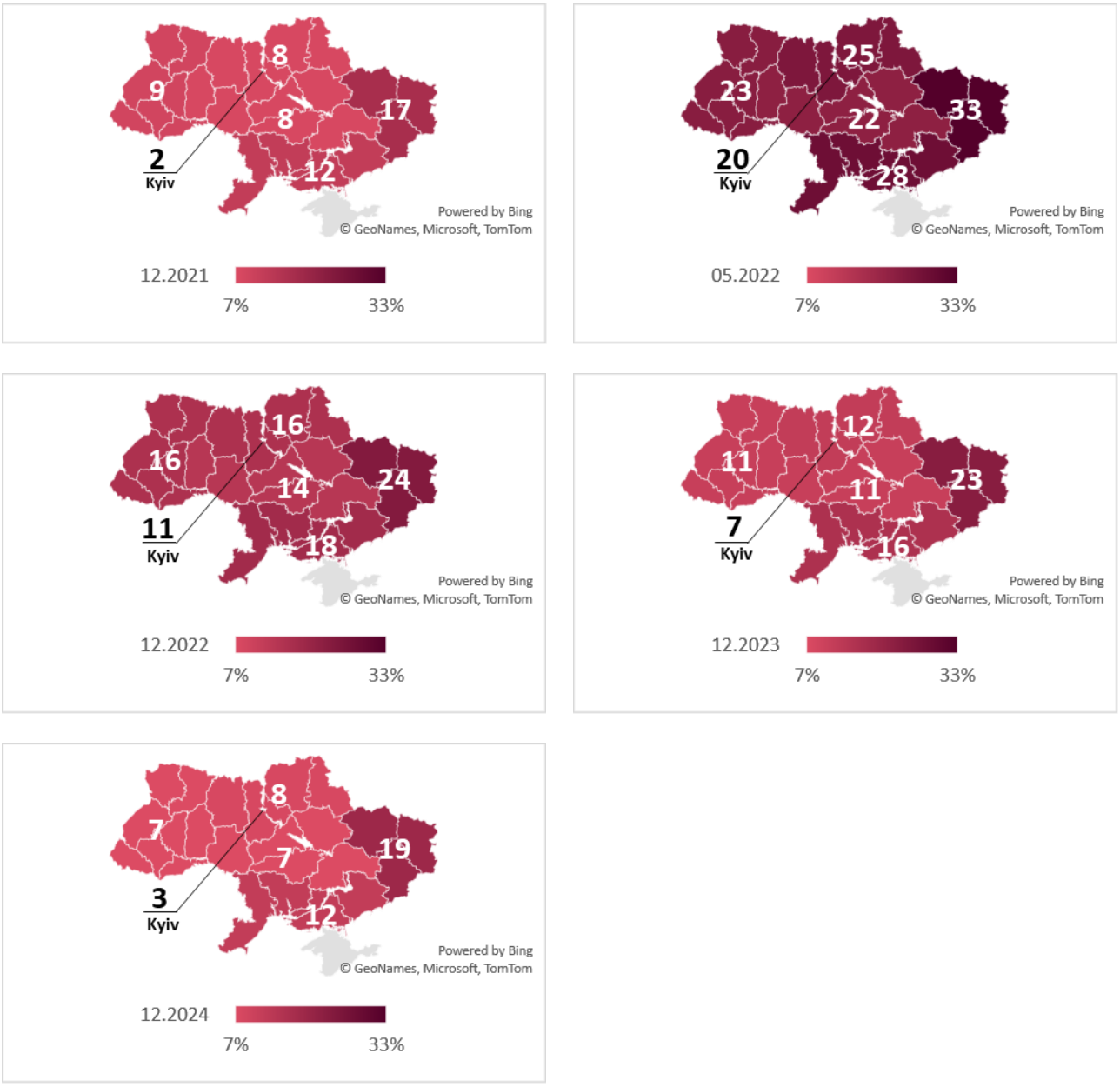


Figure 19. Regional Heterogeneity in Unemployment Rate

Maps 6-10, which present Info Sapiens data, show that unemployment rates were highest in the East and South of Ukraine before the full-scale invasion. In contrast, the lowest rate was in the city of Kyiv. This regional distribution is similar to the data the SSSU reported.



Maps 6-10. Estimated Unemployment Rate by Macro-Regions

In May 2022, unemployment rates rose sharply nationwide, reflecting an economy-wide shock. The highest unemployment rates were experienced in the partially occupied regions of the East and South, as well as the freshly liberated North. However, even the Western region, which had no frontlines, experienced a sizable increase in unemployment. Weekly statistics from job search sites showed a significant initial drop in available job offers, forcing most businesses to seriously review their production plans. For example, an IER survey of businesses in 2022 revealed that their main problems were all direct effects of the full-scale invasion (IER, 2022). These included rising prices for inputs, difficulties with the transportation of inputs and outputs, a decrease in demand for products and services, a deficit of fuel, and blackouts at the end of the year after air strikes on Ukraine's electricity generation and distribution network.

However, by the end of 2022, unemployment rates had already decreased, especially in the macroregions further away from the frontlines. The unemployment rate in Kyiv had almost halved by May. Despite these improvements, unemployment rates across the country remained at high levels, higher than in any crisis before the full-scale invasion.

By December 2023, unemployment rates in regions not on the frontline were already close to their December 2021 levels. This indicates the economy's resilience and reflects growing labor shortages caused by external and internal migration and mobilization.

As of the end of 2024, unemployment remained at high levels in partially occupied areas, where the safety of daily work is constantly in danger. In fact, a survey by Institute for Economic Research and Policy Consulting (IER, 2024) indicated that "It is dangerous to work" was the second most crucial problem for Ukrainian businesses in Q4 of 2024, surpassed only by a lack of personnel. Data on air raid alarms and explosions confirms that the highest numbers are in Eastern and Southern Ukraine. In contrast, the unemployment rates in the Center and West regions were even below 2021 levels, a sign of labor market tightness that may have been caused by a supply-side deficit or a local labor market mismatch.[15] In contrast, the unemployment rates in the Center and West regions were even below 2021 levels. This indicates labor market tightness that could have been caused by a supply-side deficit or a local labor market mismatch.[16]

Throughout the war, a statistically significant difference in unemployment rates persisted between men and women. Experienced workers had a higher employment rate compared to their younger peers, although the dynamics of this relationship deteriorated during the war. People with better education had a better chance of getting a job, though the dynamics of this relationship also deteriorated. Residents of metropolises had a significant advantage in employment levels (demonstrating lower unemployment rates) but lost this advantage at the end of 2024. Unlike urban settlements, rural regions have significantly higher unemployment rates, although, surprisingly, the situation improved somewhat during the war. It is also worth noting that the country's capital, Kyiv, was characterized by much better working conditions and demonstrated significantly lower unemployment rates.

5.3. Labor Force Participation Rate and Unemployment Rate during the Active War in Ukraine

Table 6 summarizes the estimated outcomes of the study. It documents whether statistically significant coefficients were obtained for the relationship between specific labor force characteristics and the labor force participation (unemployment) rate or its trend changes (interaction effects) during the war.

Having obtained the estimates for key indicators of the labor market in Ukraine in the period of active war, we can finally calculate the number of people in the labor force with an unemployment status. The Mykhailo Ptukha Institute for Demography and Quality of Life Studies estimated the population aged 15-69 in Ukraine to be 25.5 million people at the end of 2024. Given a labor force participation rate of 54.9% and an unemployment rate of 9.3%, the number of unemployed people can be calculated as follows: 25.5 million × 0.549 × 0.093 = 1.3 million.

A potential problem with the estimations is that the findings may underestimate unemployment rates due to war-related migration. The sample reflects the population structure before russia's full-scale invasion

[15] https://air-alarms.in.ua/en?from=2022-02-24&to=2025-08-12#statistic
[16] To be further tested.

on 24 February 2022. This makes it difficult to perfectly identify individuals exposed to the war, as the sample structure and migration processes may have changed.

Since the start of the full-scale invasion, most government agencies and private companies have not provided public estimates of labor force participation and unemployment in Ukraine. For example, among the 25 companies that provided forecasts for the Ukrainian economy to FocusEconomics[17], only seven agreed to share their estimates of unemployment rates for 2023-2024 FocusEconomics reports that the consensus forecast is 20.4% for 2023 (average for the year) and 15.3% for 2024. Estimates of the unemployment rate made by the IMF[18] are 19.367% in 2023 and 10.633% in 2024, respectively. As can be seen, our estimates are generally consistent with those obtained by professional forecasters.

Table 6. Labor Force Participation Rate, Unemployment Rate, and Labor Force Characteristics

	LFPR		UR	
	b	Δ trend	b	Δ trend
Male	+	-	0	-
Mature	-	+	-	0
School	-	+	0	-
Vocational	+	-	-	+
University	+	-	-	+
Metropolis	0	0	-	+
Rural	0	-	+	-
Kyiv	0	0	-	+
Center	-	+	--	-
East	-	0	0	+
North	0	0	-	0
South	0	-	0	+

6. CONCLUDING REMARKS

This paper investigates labor market developments in Ukraine during the full-scale russian invasion that started in February 2022. Due to the absence of official statistics during wartime, we employed an alternative data source: survey data collected by Info Sapiens for the NBU. We performed various tests to validate this data, confirming it is a reliable source for estimating key labor market indicators in wartime conditions.

Extensive literature on the consequences of wars and military conflicts shows that these shocks primarily have adverse effects on labor market activity. Our research confirms and extends these findings. Our estimation outcomes confirm that labor market conditions significantly worsened during the active war. Specifically, Ukraine's labor force participation rate has fallen by 9 percentage points since the full-scale invasion, from 64% in December 2021 to 54.9% as of December 2024. At the start of the war, the unemployment rate sharply increased to approximately 25.4% and even 33% for the East region in May 2022. This was followed by an improvement in labor market conditions, reflected in a drop in the unemployment rate to about 9.3% in December 2024.

Adverse labor market conditions varied significantly across regions, likely depending on their proximity to the frontline and gradually improved as territories were liberated. Moreover, while the country's capital, Kyiv, had a significantly lower unemployment rate, its labor force participation rate was not significantly different from western Ukraine's.

[17] https://www.focus-economics.com/
[18] https://www.imf.org/en/Publications/WEO/weo-database/2023/October/weo-report?c=926,&s=LUR,&sy=2021&ey=2028&ssm=0&scsm=1&scc=0&ssd=1&ssc=0&sic=0&sort=country&ds=.&br=1

Residents of metropolises had a significant advantage in employment levels, demonstrating lower unemployment rates, but this advantage was lost by the end of 2024. Unlike urban settlements, rural regions had significantly higher unemployment rates, although, surprisingly, the situation improved somewhat compared to their urban counterparts during the war.

Although the gender and urban-rural gaps in the labor force narrowed during the war, a statistically significant difference in unemployment rates remained between men and women throughout the conflict. Despite these trends, women and rural inhabitants remained the most vulnerable categories of the labor force.

Our study finds that the higher the level of education attained, the significantly higher the chances of both getting and keeping a job during the upheavals of war. This supports the beneficial role of education in labor force participation. However, the dynamics of this relationship deteriorated during the war.

The conclusions of this research complement the findings of Kondylis (2010), Morales (2017), and Anastasia et al. (2023). This study contributes to the literature by assessing labor market conditions during an extreme shock – the war – in the absence of official state statistics and with a variable sample structure due to significant internal and external migration and changes in the economy. Furthermore, it tracks labor market dynamics across many characteristics, including region, gender, and education, both before and during the war.

The regularly updated survey data provided by Info Sapiens is a valuable alternative source of information for assessing key indicators of labor market performance in wartime. This research corrects for possible biases by including potentially omitted variables in its regressions and controlling the sample structure to ensure a more reliable interpretation of the results. The estimates of labor force participation and unemployment rates obtained, and the conclusions drawn, could be of great practical importance for economic and monetary policy decision-making, particularly when access to official statistics from the SSSU is suspended. Furthermore, using data on internal and external migration to make more precise estimates regarding labor market conditions during the war seems promising.

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APPENDECIES

APPENDIX A. TABLES

Table 1. Labor Participation Rates in Ukraine and CEE EU Countries by Sex*

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
All	European Union – 27 countries (from 2020)	71.3	71.6	71.9	72.3	72.7	73.1	73.4	72.7	73.6	74.5
	Czechia	72.9	73.5	74.0	75.0	75.9	76.6	76.7	76.4	76.6	77.2
	Poland	67.0	67.9	68.1	68.8	69.6	70.1	70.6	71.0	72.8	73.5
	Hungary	64.7	67.0	68.6	70.1	71.2	71.9	72.6	72.8	76.2	77.2
	Latvia	74.0	74.6	75.7	76.3	77.0	77.7	77.3	78.2	75.8	76.8
	Lithuania	72.4	73.7	74.1	75.5	75.9	77.3	78.0	78.5	78.2	78.6
	Ukraine	**65.0**	**62.4**	**62.4**	**62.2**	**62.0**	**61.9**	**63.4**	**62.1**	**61.8**	-
Women	European Union – 27 countries (from 2020)	57.2	57.4	57.6	57.9	58.2	58.4	58.7	57.9	58.7	59.6
	Czechia	56.3	56.3	56.8	57.6	58.2	59.1	59.1	58.4	58.7	59.5
	Poland	53.5	54.0	53.9	54.0	54.1	54.1	53.7	53.3	55.0	55.8
	Hungary	50.5	52.1	53.2	54.1	54.6	55.1	55.2	55.1	59.8	60.7
	Latvia	62.2	62.1	63.2	64.6	65.1	65.9	65.8	66.3	63.6	65
	Lithuania	61.1	62.3	63.3	64.6	65.2	66.3	67.3	67.3	67.3	68.3
	Ukraine	**58.9**	**56.1**	**56.2**	**55.9**	**55.7**	**56.4**	**57.5**	**56.3**	**56.1**	-
Men	European Union – 27 countries (from 2020)	69.4	69.4	69.4	69.6	69.8	70.0	70.1	69.3	69.5	70.2
	Czechia	72.4	72.5	72.5	73.1	73.4	73.7	73.7	73.4	73.4	73.5
	Poland	68.3	68.6	68.5	69	69.4	69.2	69.4	69.4	69.9	69.9
	Hungary	63.9	65.7	67.2	68.6	69.6	70.3	71.1	71.1	71.8	72.5
	Latvia	70.4	71.2	72.4	72.2	73.2	73.8	73.4	74.0	72.1	72.7
	Lithuania	68.5	69.7	69.7	70.9	71.3	72.7	73.0	74.0	73.0	72.6
	Ukraine	**71.6**	**70.0**	**69.2**	**69.9**	**69.0**	**68.1**	**69.9**	**68.5**	**68.1**	-

*All countries except Ukraine for 15-75 years, for Ukraine 15-70 years.

Table 2. Unemployment Rates in Ukraine by Sex, 2013-2021*

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
All	European Union – 27 countries (from 2020)	11.4	10.9	10.1	9.1	8.2	7.3	6.7	7.1	7.1	6.2
	Czechia	7.0	6.1	5.1	4.0	2.9	2.2	2.0	2.6	2.8	2.2
	Poland	10.3	9.0	7.5	6.2	4.9	3.9	3.3	3.2	3.4	2.9
	Hungary	10.2	7.7	6.8	5.1	4.2	3.7	3.4	4.3	4.1	3.6
	Latvia	11.9	10.8	9.9	9.6	8.7	7.4	6.3	8.1	7.6	6.9
	Lithuania	11.8	10.7	9.1	7.9	7.1	6.2	6.3	8.5	7.1	6.0
	Ukraine	**7.3**	**9.3**	**9.1**	**9.3**	**9.5**	**8.8**	**8.2**	**9.5**	**9.9**	-
Women	European Union – 27 countries (from 2020)	11.5	11.1	10.2	9.4	8.5	7.6	7.1	7.4	7.4	6.5
	Czechia	8.3	7.4	6.1	4.7	3.6	2.8	2.4	3.0	3.4	2.8
	Poland	11.1	9.6	7.7	6.2	4.9	3.9	3.6	3.3	3.4	2.9
	Hungary	10.1	7.9	7.0	5.1	4.6	4.0	3.5	4.5	4.2	3.5
	Latvia	11.1	9.8	8.6	8.4	7.7	6.4	5.4	7.1	6.6	5.6
	Lithuania	10.5	9.2	8.2	6.7	5.7	5.4	5.5	7.7	6.6	5.5
	Ukraine	**6.3**	**7.5**	**8.1**	**7.7**	**7.7**	**7.4**	**7.9**	**9.1**	**10.2**	-
Men	European Union – 27 countries (from 2020)	11.2	10.7	9.9	8.9	7.9	7.0	6.4	6.8	6.8	5.9
	Czechia	5.9	5.1	4.2	3.4	2.3	1.8	1.7	2.2	2.3	1.8
	Poland	9.7	8.5	7.3	6.1	4.9	3.9	3.0	3.1	3.4	2.9
	Hungary	10.2	7.6	6.6	5.1	3.8	3.5	3.4	4.1	3.9	3.7
	Latvia	12.6	11.8	11.1	10.9	9.8	8.4	7.2	9.1	8.5	8.1
	Lithuania	13.1	12.2	10.1	9.1	8.6	6.9	7.1	9.3	7.6	6.5
	Ukraine	**8.1**	**10.8**	**10.1**	**10.8**	**11.1**	**10.0**	**8.5**	**9.9**	**9.6**	-

*All countries except Ukraine for 15-75 years, for Ukraine 15-70 years.

Table 4. Descriptive Statistics: December 2021 – December 2024

Variable	Mean	Std. Dev.	Min	Max
HH Size	2.169	1.442	1	15
LF_a	0.587	0.492	0	1
LFP	0.601	0.490	0	1
UR_a	0.140	0.048	0.070	0.254
UR	0.137	0.048	0.067	0.254
Age	47.189	16.025	16	80
School	0.134	0.341	0	1
Vocational	0.160	0.366	0	1
University	0.658	0.474	0	1
Male	0.432	0.495	0	1
Married	0.618	0.486	0	1
City	0.255	0.436	0	1
Rural	0.268	0.443	0	1
N				16,043

LFP denotes the labor force participation calculated following the methodology by the SSSU (military personnel do not belong to the labor force). LFP+ denotes labor force participation (military personnel are viewed as a part of the labor force). UR is the unemployment rate calculated following the methodology used by the SSSU (military personnel do not belong to the labor force). UR is the unemployment rate (military personnel are viewed as a part of the labor force). *age* is the age of the respondent. *School* is a dummy variable, which equals 1 if the respondent completes a secondary school or zero otherwise. *Vocational* is a dummy variable, which equals 1 if the respondent has obtained a vocational education or zero otherwise. *University* is a dummy variable, which equals 1 if the respondent has a university (a bachelor's \ specialist's \ or master's) degree or zero otherwise. Male takes the value of 1 if the respondent is male or takes the value of zero if the respondent is female. *Married has the value of 1 for married respondents or zero otherwise. City* is a dummy variable, which identifies the respondent who lives in a big city (more than 700,000 inhabitants). Rural denotes the inhabitants of the countryside.

Table 5. Descriptive Statistics: December 2021 – December 2024

	Dec 2021		May 2022		Dec 2022		Dec 2023		Dec 2024	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
LFP	**0.640**	0.480	**0.646**	0.478	**0.585**	0.493	**0.527**	0.500	**0.549**	0.498
LFP+	**0.640**	0.480	**0.646**	0.478	**0.603**	0.490	**0.545**	0.498	**0.578**	0.494
UR	**0.094**	0.000	**0.254**	0.000	**0.164**	0.000	**0.128**	0.000	**0.093**	0.000
UR+	**0.094**	0.000	**0.254**	0.000	**0.159**	0.000	**0.124**	0.000	**0.088**	0.000
Age	**45.381**	16.638	**45.670**	15.104	**47.384**	15.470	**49.084**	15.841	**49.393**	15.853
School	**0.152**	0.359	**0.139**	0.346	**0.125**	0.331	**0.154**	0.361	**0.141**	0.348
Vocational	**0.181**	0.385	**0.166**	0.372	**0.139**	0.347	**0.137**	0.344	**0.139**	0.346
University	**0.649**	0.477	**0.647**	0.478	**0.699**	0.459	**0.666**	0.472	**0.653**	0.476
Male	**0.457**	0.498	**0.455**	0.498	**0.408**	0.492	**0.410**	0.492	**0.422**	0.494
Married	**0.679**	0.467	**0.590**	0.492	**0.602**	0.490	**0.611**	0.488	**0.569**	0.495
City	**0.232**	0.422	**0.292**	0.455	**0.255**	0.436	**0.259**	0.438	**0.266**	0.442
Rural	**0.339**	0.473	**0.231**	0.421	**0.272**	0.445	**0.252**	0.434	**0.241**	0.428
N	1,001		1,006		990		994		1,003	

LFP denotes the labor force participation calculated following the methodology by the SSSU (military personnel do not belong to the labor force). LFP+ denotes labor force participation (military personnel are viewed as a part of the labor force). UR is the unemployment rate calculated following the methodology used by the SSSU (military personnel do not belong to the labor force). UR is the unemployment rate (military personnel are viewed as a part of the labor force). Age is the age of the respondent. School is a dummy variable, which equals 1 if the respondent completes a secondary school or zero otherwise. Vocational is a dummy variable, which equals 1 if the respondent has obtained a vocational education or zero otherwise. University is a dummy variable, which equals 1 if the respondent has a university (a bachelor's \ specialist's \ or master's) degree or zero otherwise. Male takes the value of 1 if the respondent is male or takes the value of zero if the respondent is female. Married has the value of 1 for married respondents or zero otherwise. City is a dummy variable, which identifies the respondent who lives in a big city (more than 700,000 inhabitants). Rural denotes the inhabitants of the countryside.

APPENDIX A. FIGURES

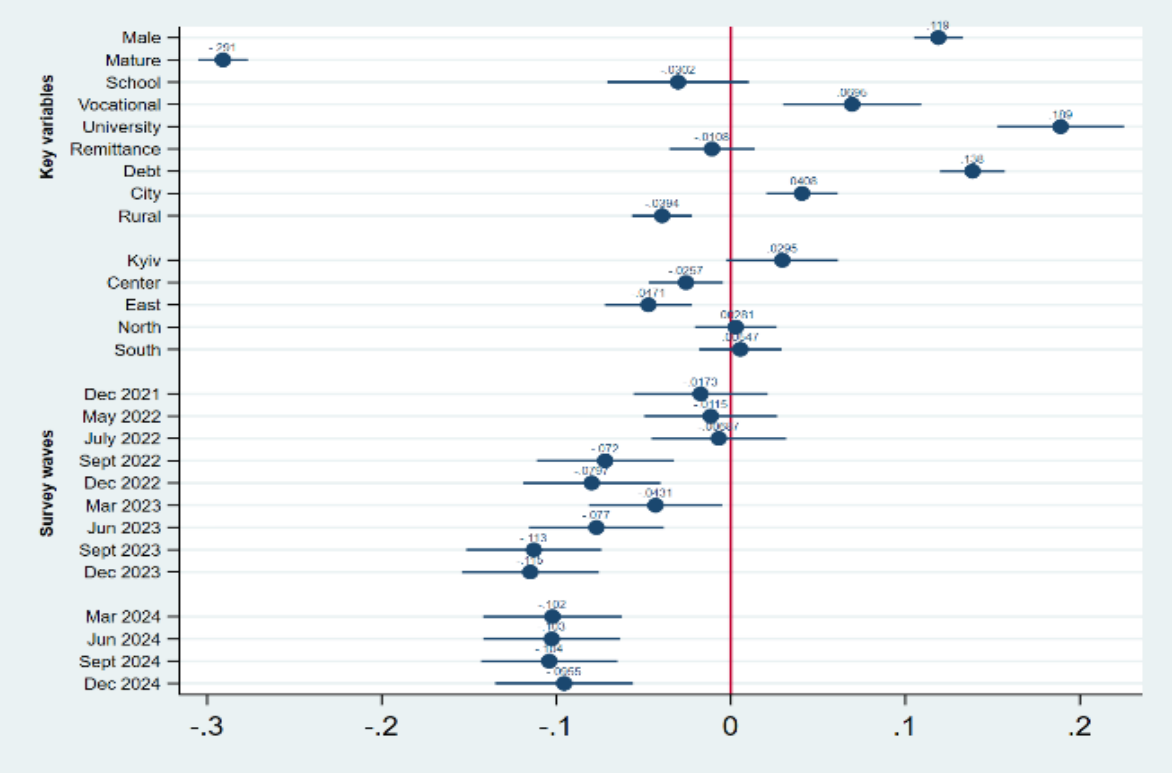
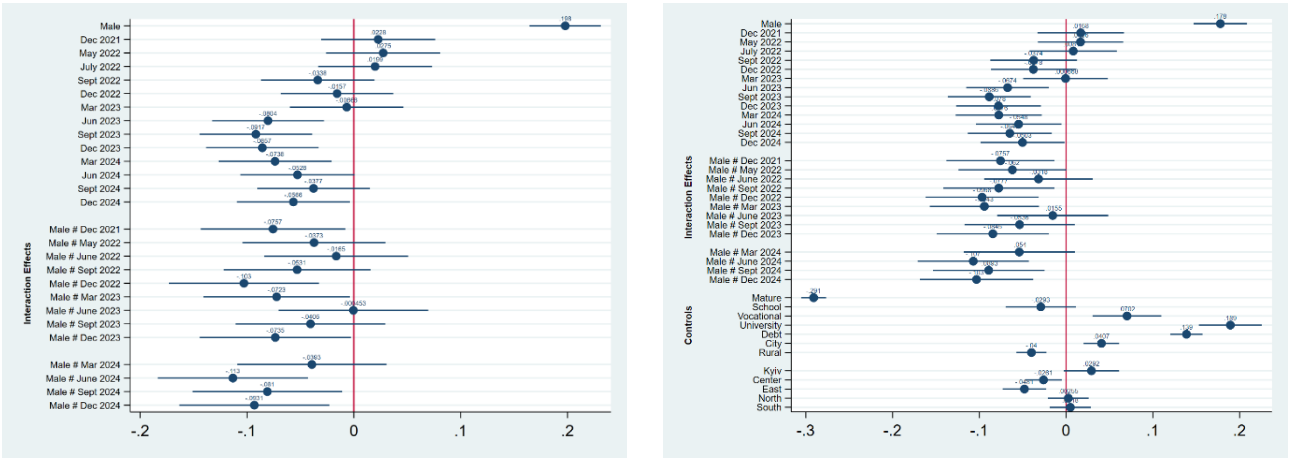
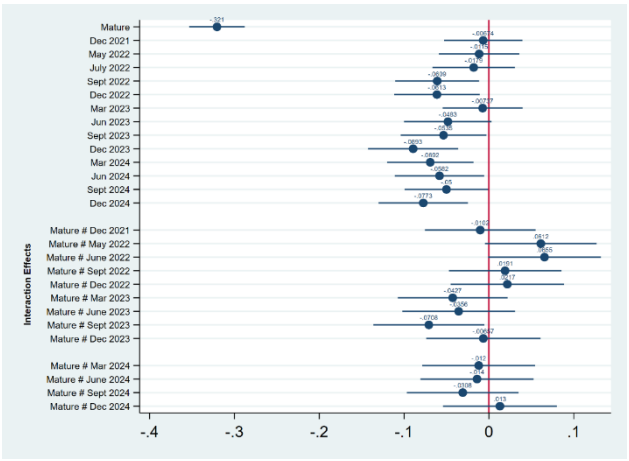


Figure 5T. Labor Market Force Participation Rate and Its Determinants during December 2021 – December 2024



a) b)

Figure 6T. Labor Market Force Participation Rate and Gender Gap



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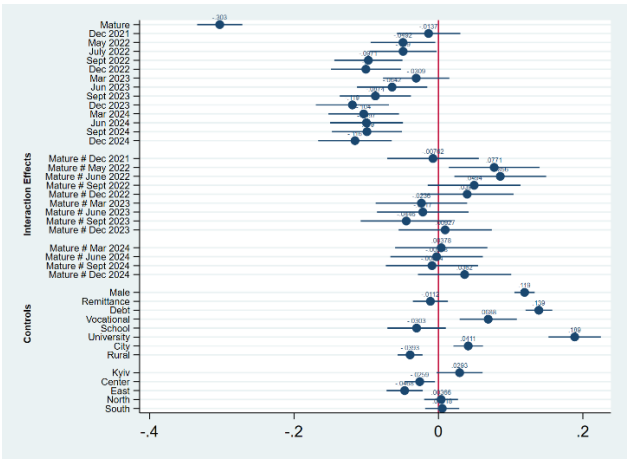

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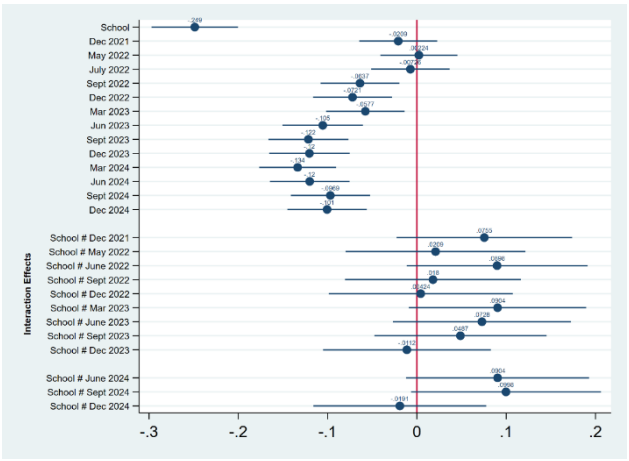
Figure 7T. Labor Market Force Participation Rate and Mature Workers



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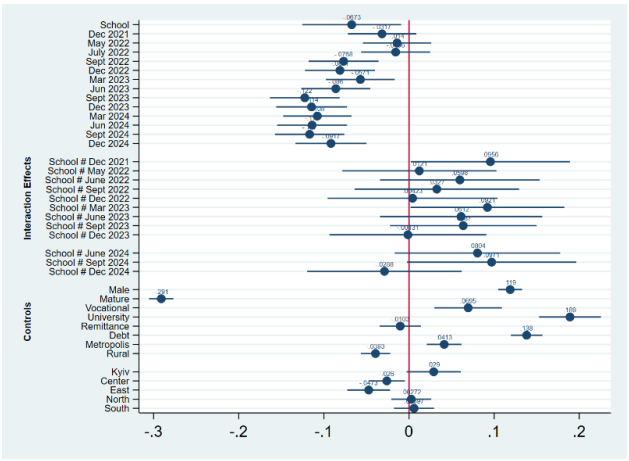
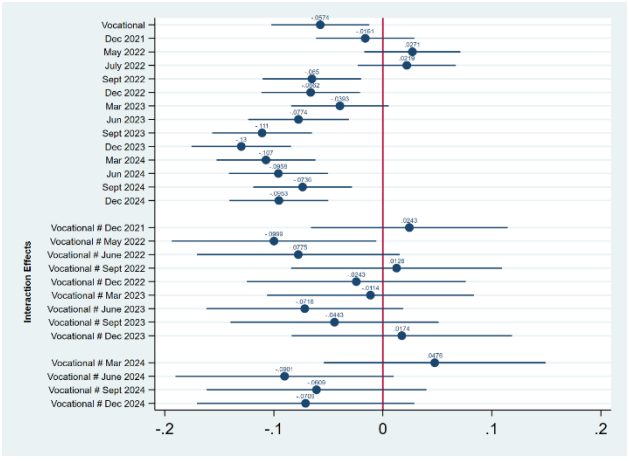


b)

Figure 8T. Labor Market Force Participation Rate and Education: School



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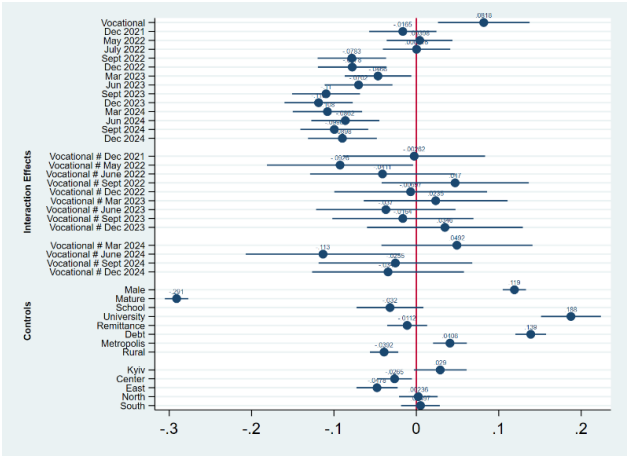

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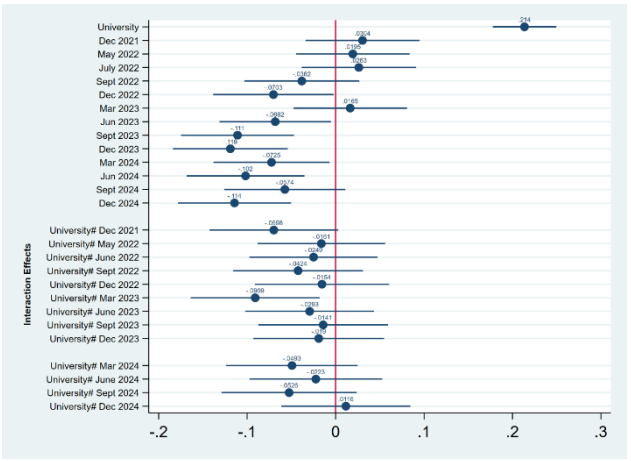
Figure 9T. Labor Market Force Participation Rate and Education: Vocational



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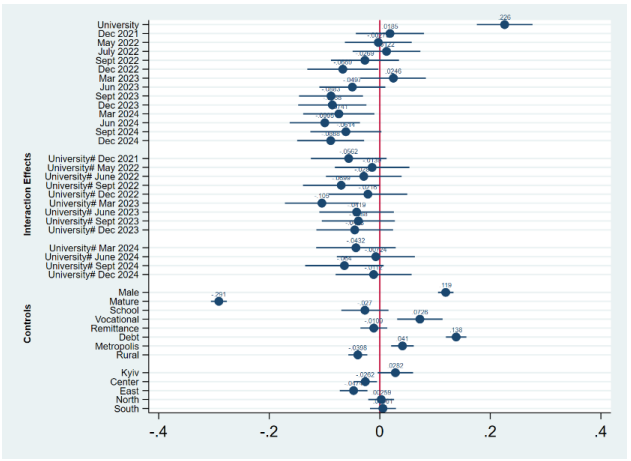

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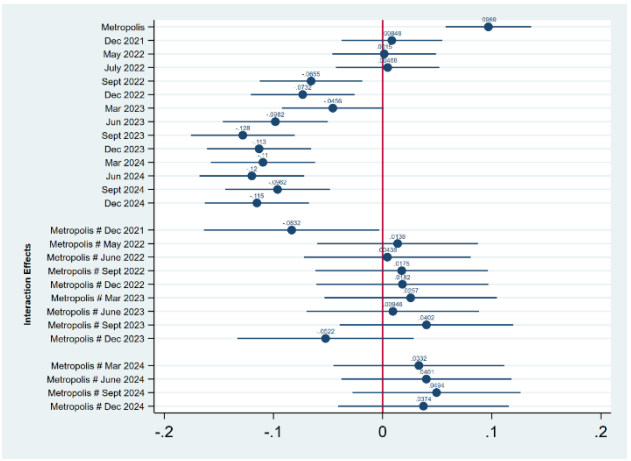
Figure 10T. Labor Market Force Participation Rate and Education: University



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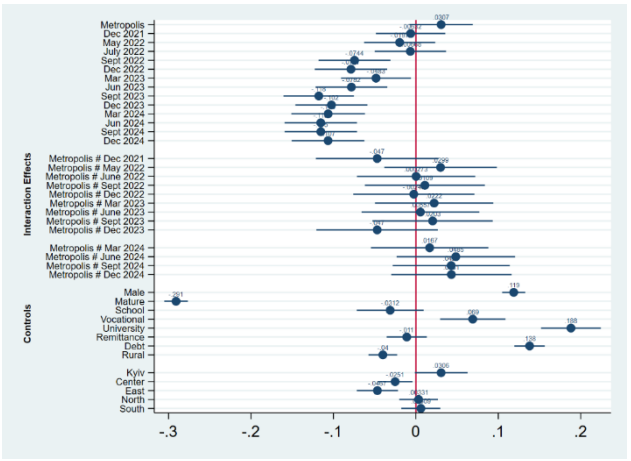

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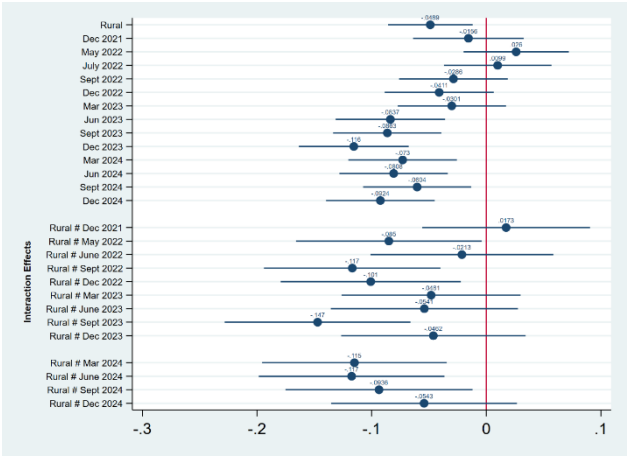
Figure 11T. Labor Market Force Participation Rate in Metropolises



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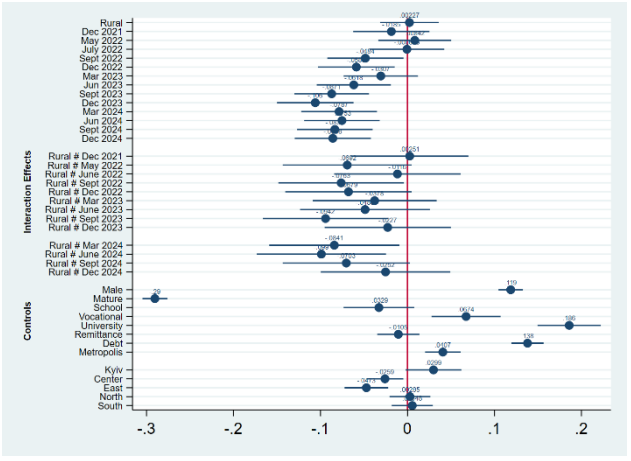

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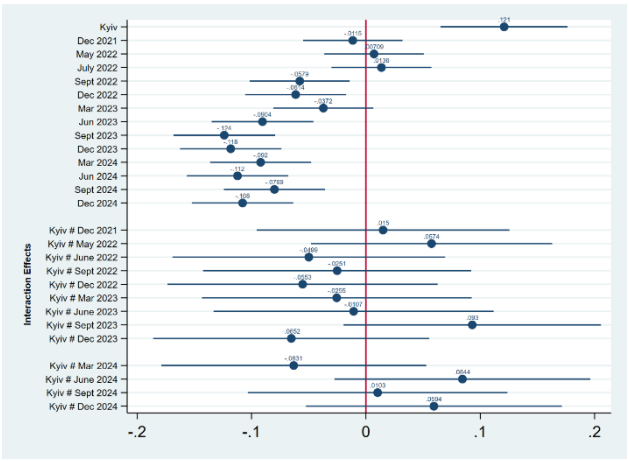
Figure 12T. Labor Market Force Participation Rate in the Countryside



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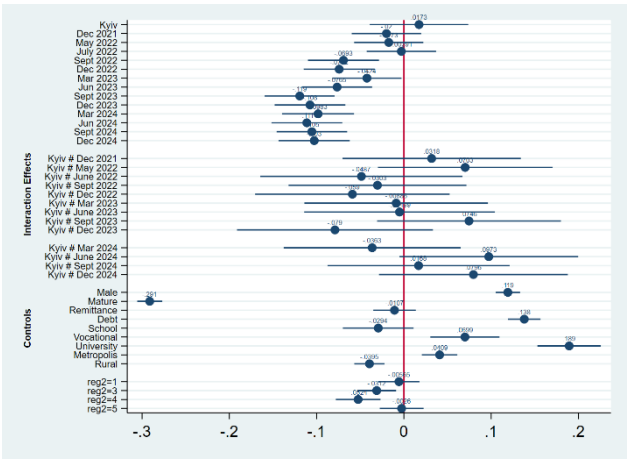

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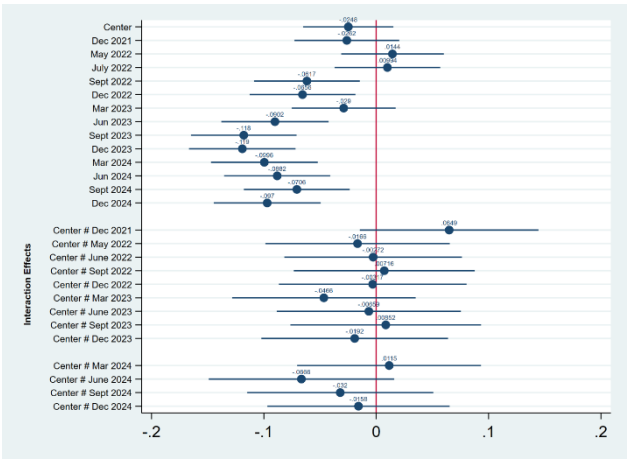

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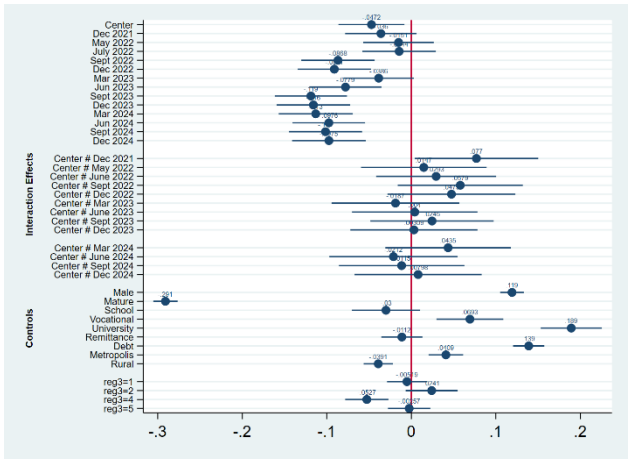

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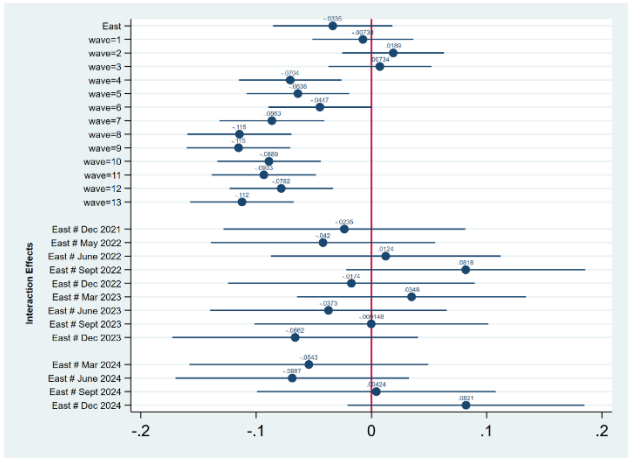

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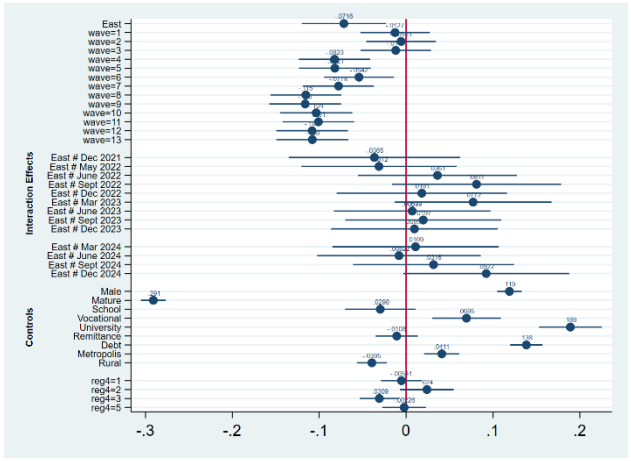

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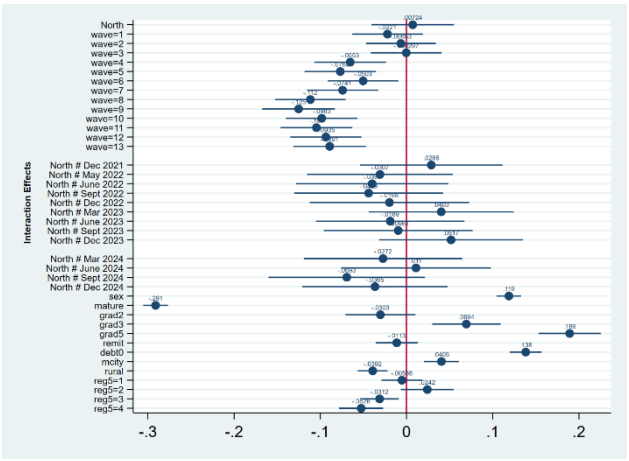
Figure 13T. Regional Heterogeneity in Labor Force Participation Rate



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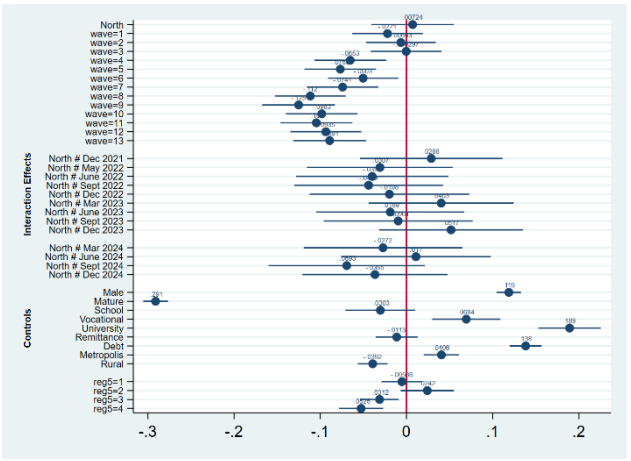

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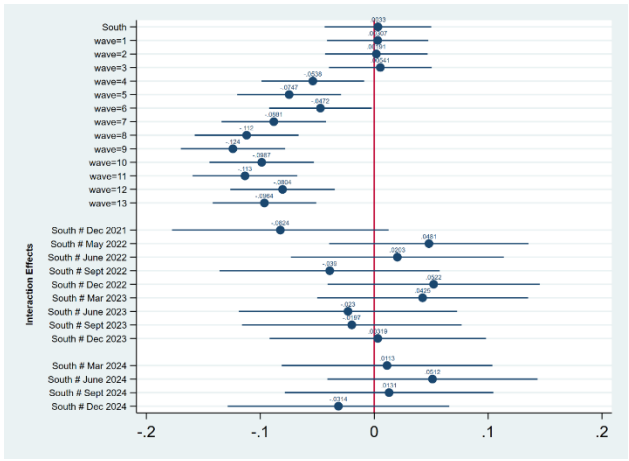

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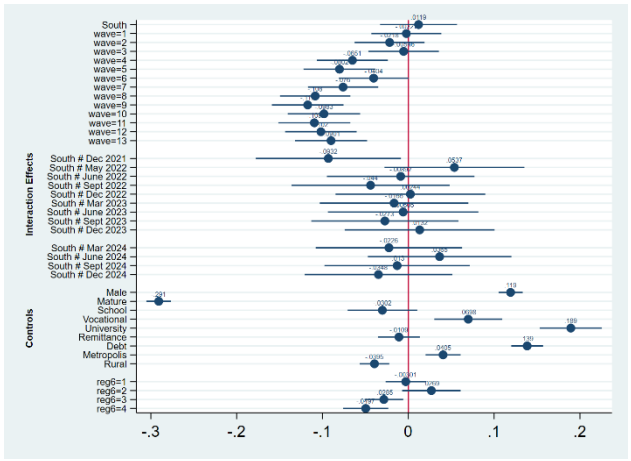


j)

Figure 13T (continued). Regional Heterogeneity in Labor Force Participation Rate

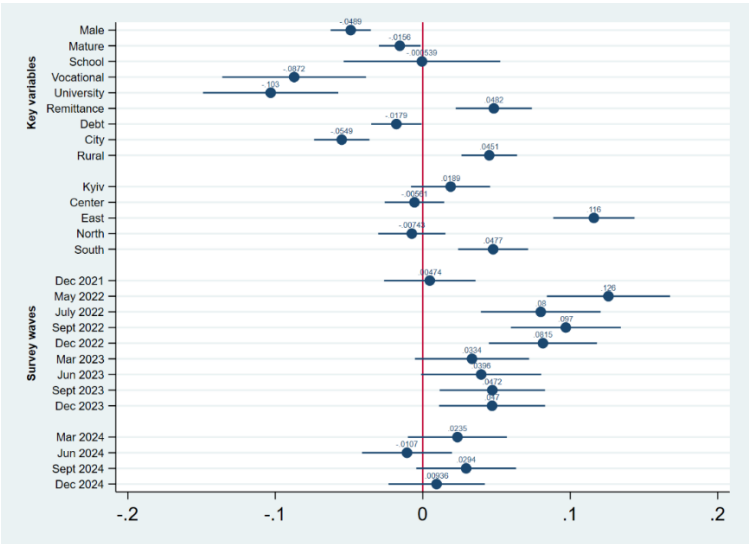
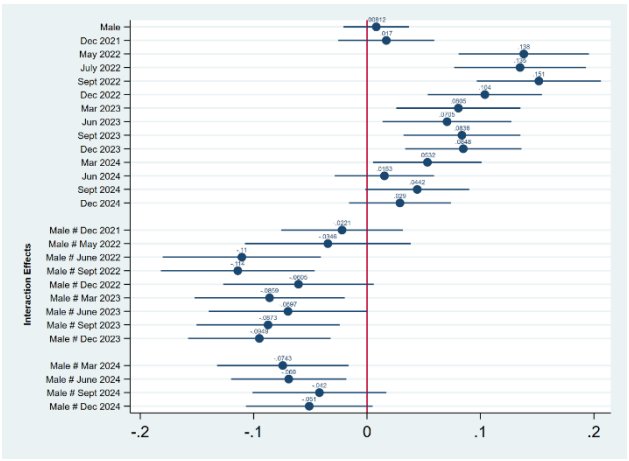


Figure 14T. Unemployment Rate and Its Determinants During December 2021 – December 2024



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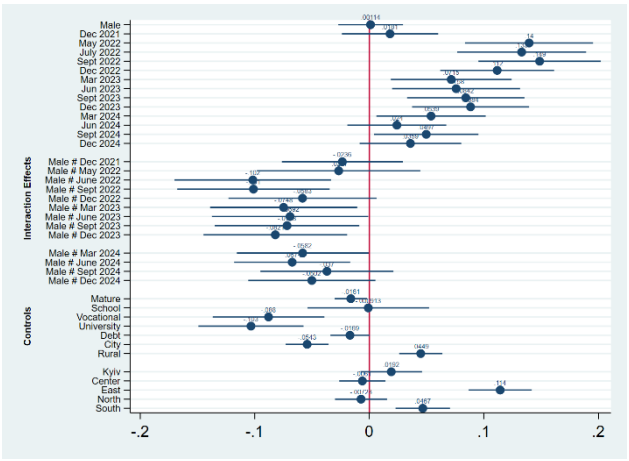
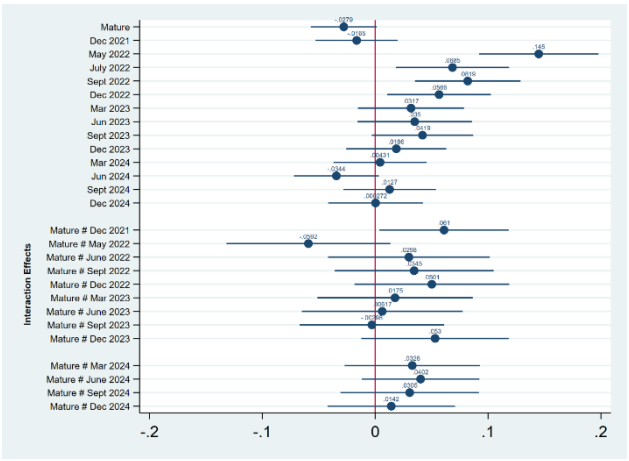
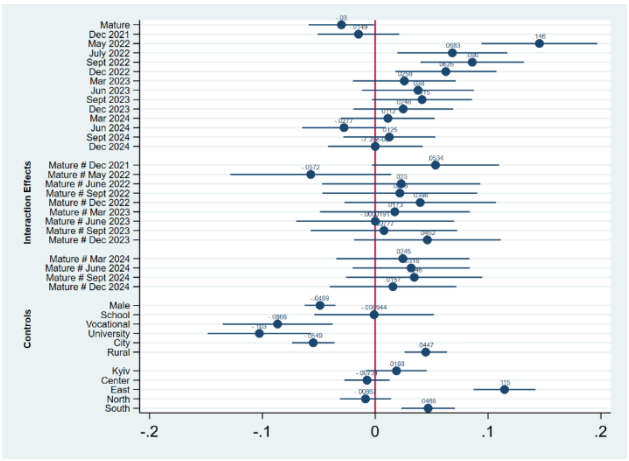


b)

Figure 15T. Unemployment Rate and Gender Gap

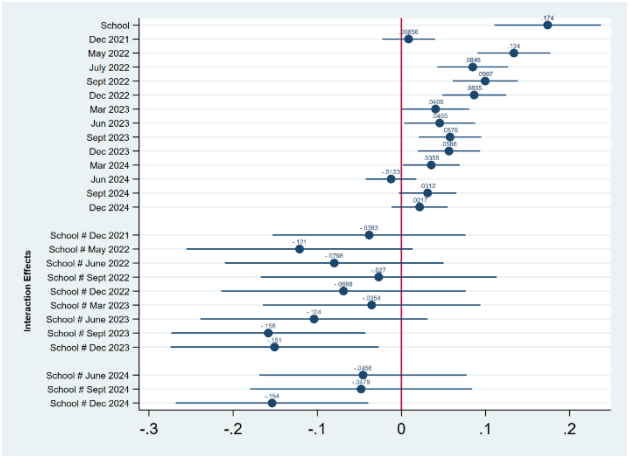


a)



b)

Figure 16T. Unemployment Rate and Mature Workers



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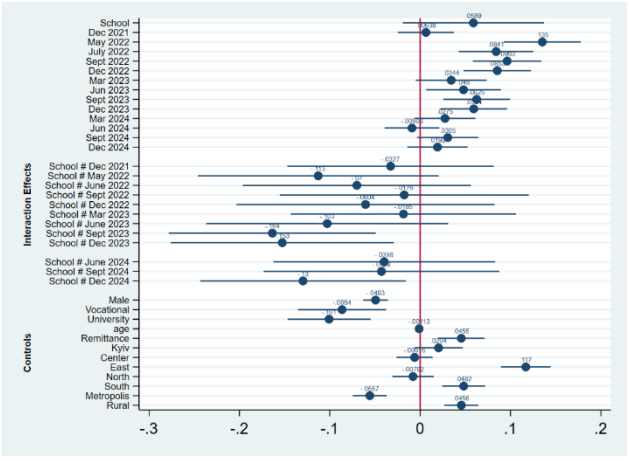
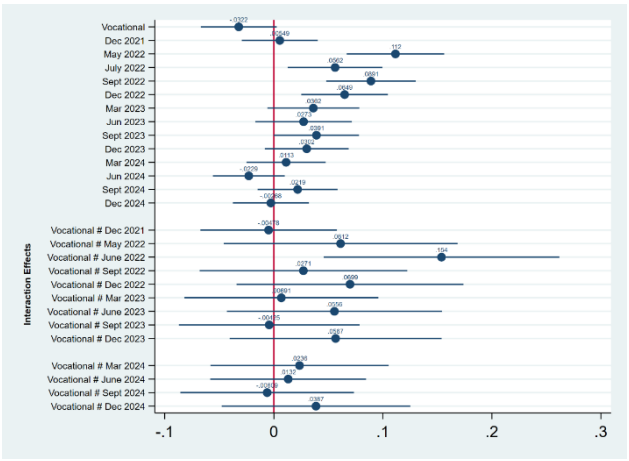


b)

Figure 17T. Unemployment Rate and Education: School



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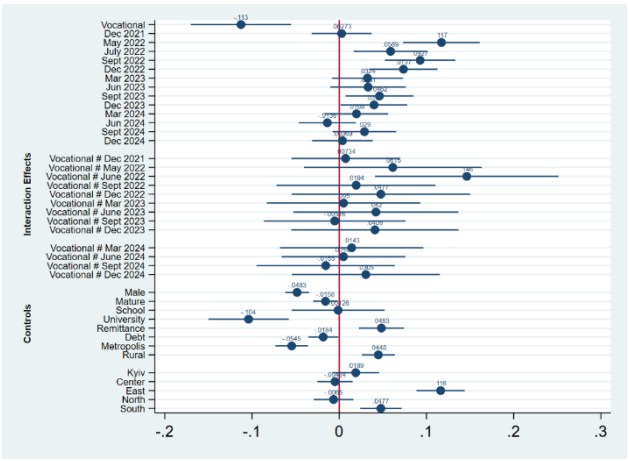

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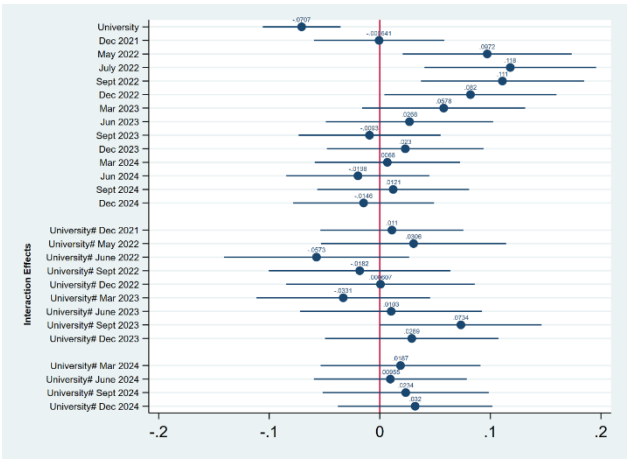
Figure 18T. Unemployment Rate and Education: Vocational



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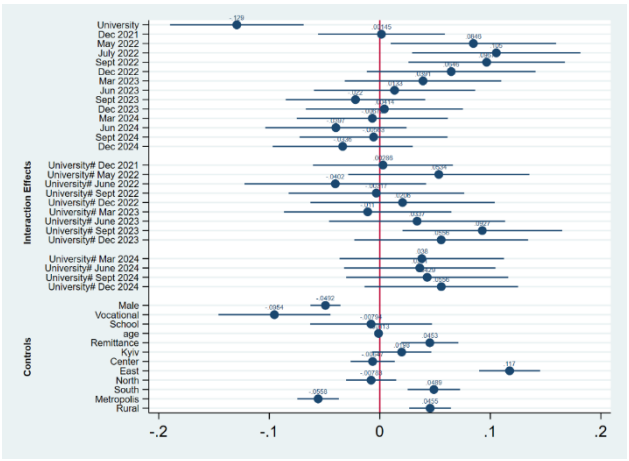

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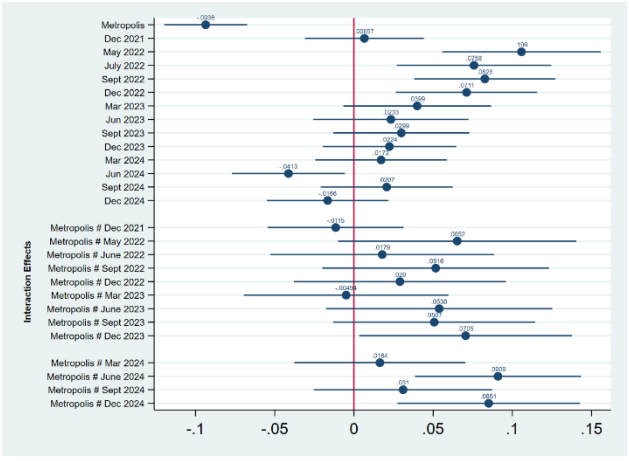
Figure 19T. Unemployment Rate and Education: University



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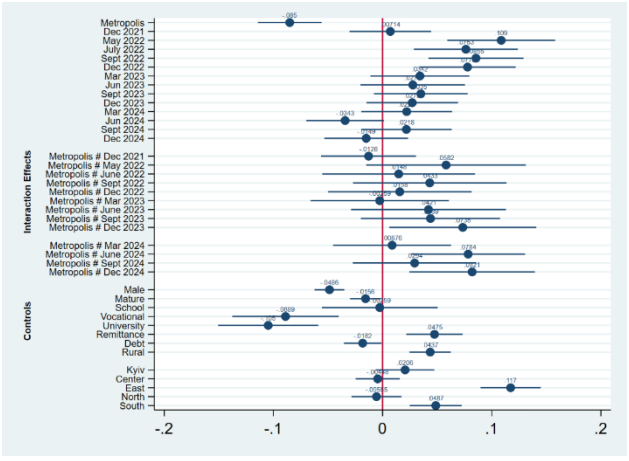
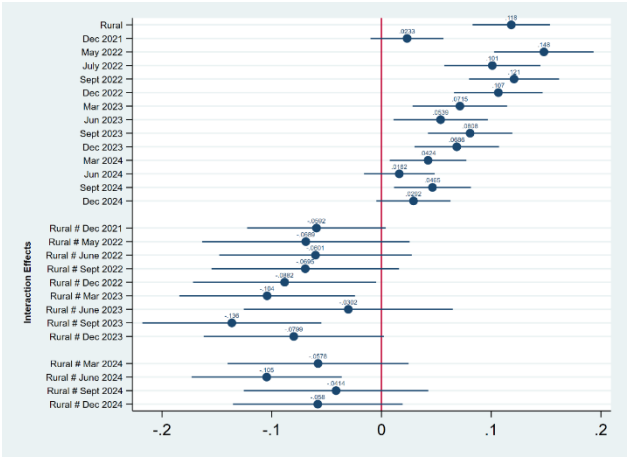


b)

Figure 20T. Unemployment Rate in Metropolises



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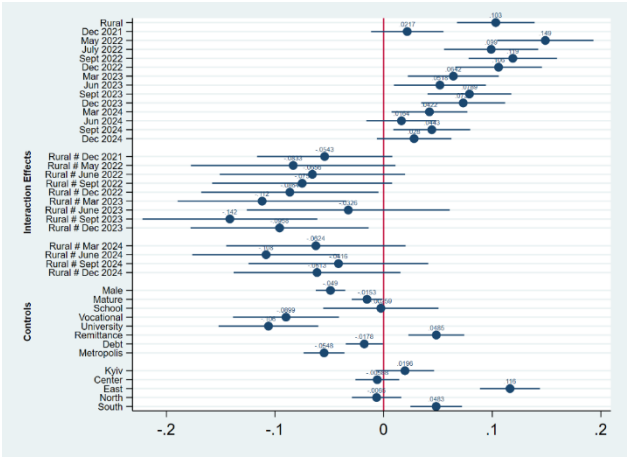

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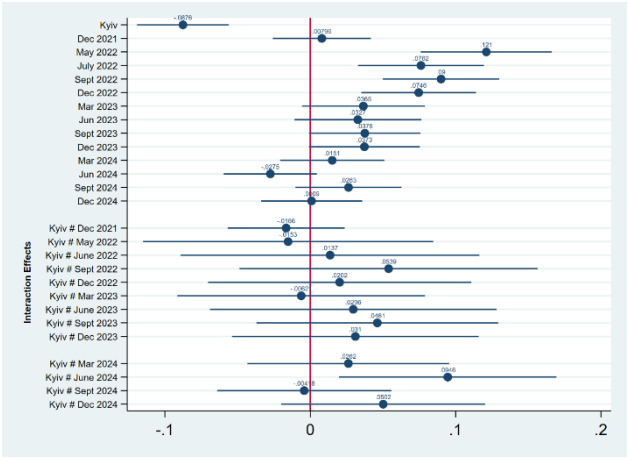
Figure 21T. Unemployment Rate in the Countryside



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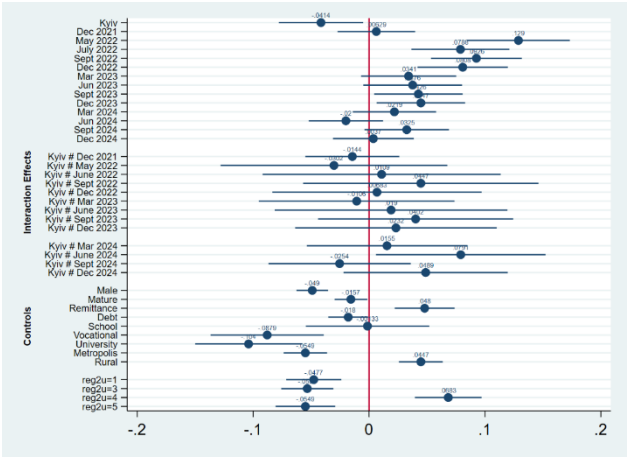

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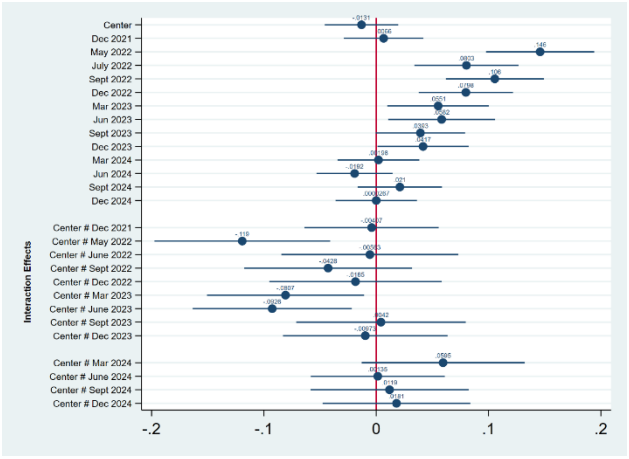

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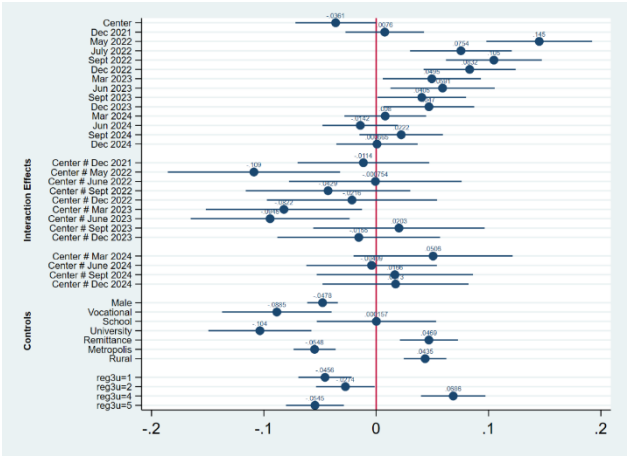

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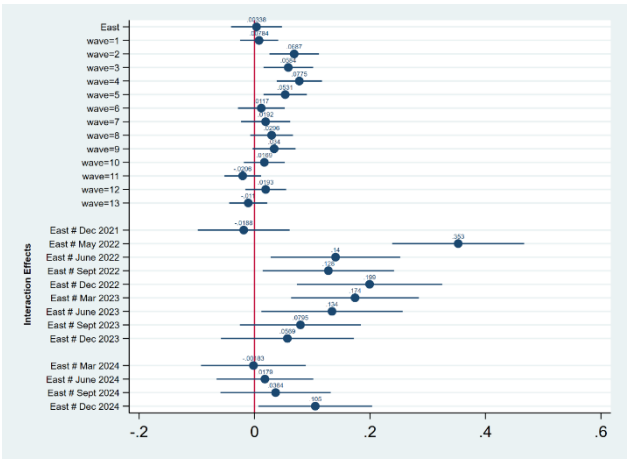
Figure 22T. Regional Heterogeneity in Unemployment Rate



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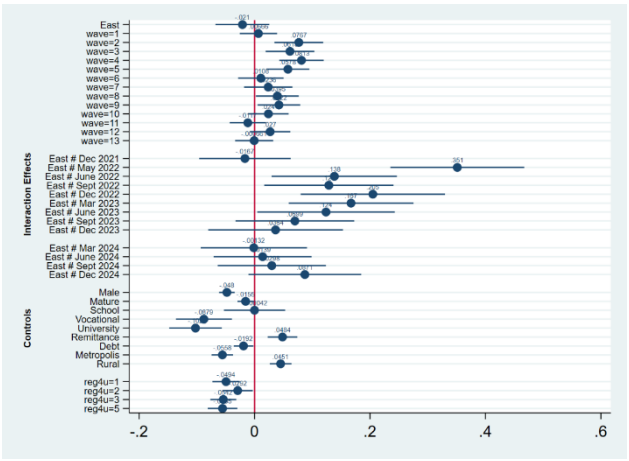
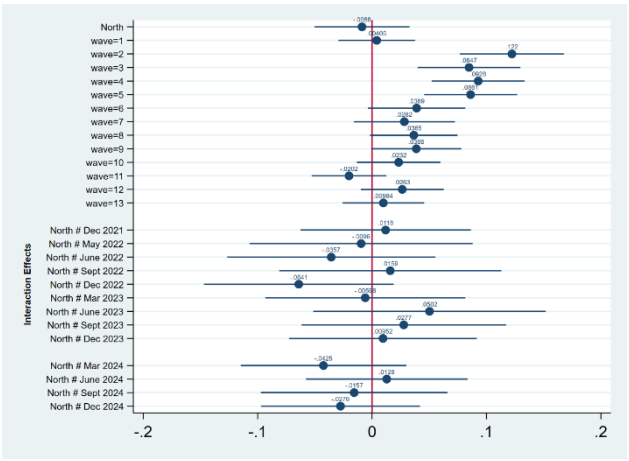


f)



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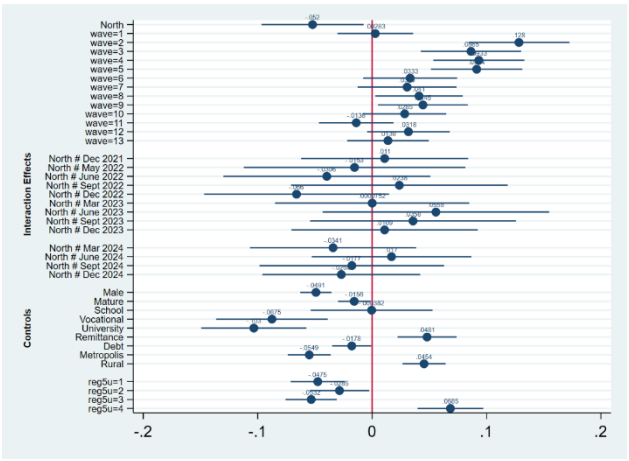

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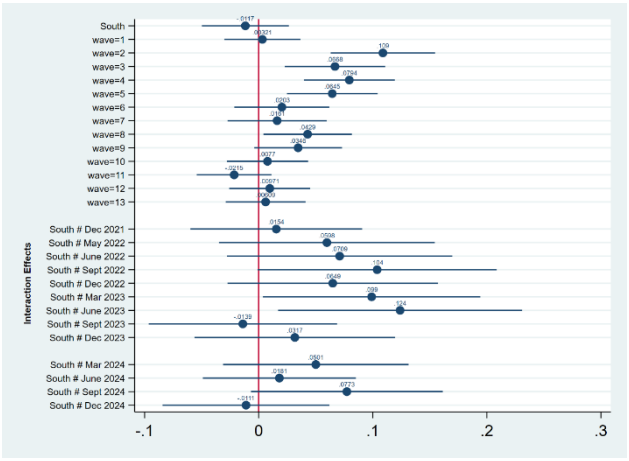

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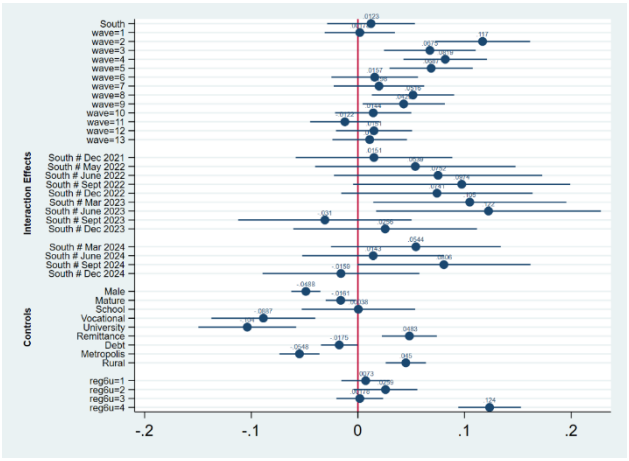

j)

Figure 22T (continued). Regional Heterogeneity in Unemployment Rate