

## SPATIAL ANALYSIS OF THE PHENOMENON OF WOMEN'S UNEMPLOYMENT IN COUNTRIES OF THE EUROPEAN UNION

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**Purpose:** The main objective of this study is to analyze the spatial and temporal variation in female unemployment rates in the European Union between 2010 and 2024. The study will identify key factors influencing regional differences, assess the degree of spatial dependence, and examine whether female unemployment clusters at high or low levels in the EU labor market. Furthermore, it will examine whether spatial autocorrelation strengthens or weakens over time and what implications this has for labor market convergence.

**Design/methodology/approach:** Global Moran's I and Global Geary's C statistics were used to examine spatial autocorrelation. Panel data models (Pooled OLS, Fixed Effects, Random Effects) were then estimated, and the Hausman test was applied. Next, spatial panel models were used to account for spatial dependencies between neighboring EU countries. The data used in the study come from Eurostat databases and cover the period 2010–2024.

**Findings:** The study confirmed both spatial and temporal variation in female unemployment across EU countries. Moran's global coefficient values were positive and statistically significant throughout the study period, indicating persistent clusters of similar unemployment levels. However, a decline in these values over time suggests a gradual weakening of the spatial relationship. In turn, Geary's global coefficient values were increasing, indicating increasing local heterogeneity. The selected panel model, i.e., random effects, identified significant determinants of female unemployment, highlighting that labor market participation, educational attainment, and economic activity strongly influence cross-country variation.

**Research limitations/implications:** The study's limitations include data availability, which may not fully reflect individual countries' labor market policies. Future research should incorporate more detailed regional data to further examine, for example, the impact of policies in EU countries on women's employment. Additional research could uncover post-pandemic labor market changes and the impact of the armed conflict in Ukraine.

**Practical implications:** The results obtained may be helpful in guiding labor market policies in countries with high female unemployment, and may be used by policymakers to develop more effective interventions in education, childcare availability, and gender-sensitive employment programs.

**Originality/value:** This study is one of the few spatially oriented analyses of female unemployment in the EU in the post-pandemic period. It applies spatial econometrics to gender-sensitive labor market analysis, offering new insights into the dynamics of unemployment clusters and their evolution over time.

**Keywords:** female unemployment; European Union; panel model; Moran's I; labour market disparities.

**Category of the paper:** Research paper.

## 1. Introduction

For many years, changes in the European Union labor market, including the position of women in it, have been a major topic of economic, social, and demographic research. The observed developments in gender equality and the steadily increasing participation of women in the labor market have not translated into a reduction in the gaps between EU countries in terms of employment and unemployment rates. Publications on unemployment and the general situation of women in the EU reveal the numerous problems women face, such as occupational segregation, lower wages, difficulties reconciling work and family life, and limited access to childcare services (European Commission, 2023).

Research shows that women's unemployment rates vary significantly across countries and are more sensitive to macroeconomic shocks than men's. In many European countries, institutional factors such as labor market flexibility, tax systems, and access to professional activation programs play a significant role. Furthermore, publications include analyses of differences between Southern and Eastern European countries and Northern and Western European countries, which are shaped by, among other factors, different social policy models and historically rooted gender norms (Plantenga, Remery, 2010).

The COVID-19 pandemic has had a significant impact on women's situation in the labor market. The literature contains studies demonstrating how the restrictions introduced during this period affected women working in retail, hospitality, education, and care (Alon et al., 2020). Additionally, Hupkau and Petrongolo (2020) present the gender division of labor in the labor market and households during the pandemic and the potential consequences for inequality.

A growing body of research in spatial econometrics (Anselin, 1988; Elhorst, 2014; LeSage, Pace, 2009) provides analyses demonstrating that labor markets in EU countries are strongly interconnected. Unemployment is often characterized by spatial dependence, i.e., neighboring countries face similar structural, cyclical, and demographic challenges, as confirmed by positive values of the global Moran statistic. This implies that the analysis of female unemployment requires considering both temporal and spatial dimensions to accurately capture the underlying mechanisms and interdependencies.

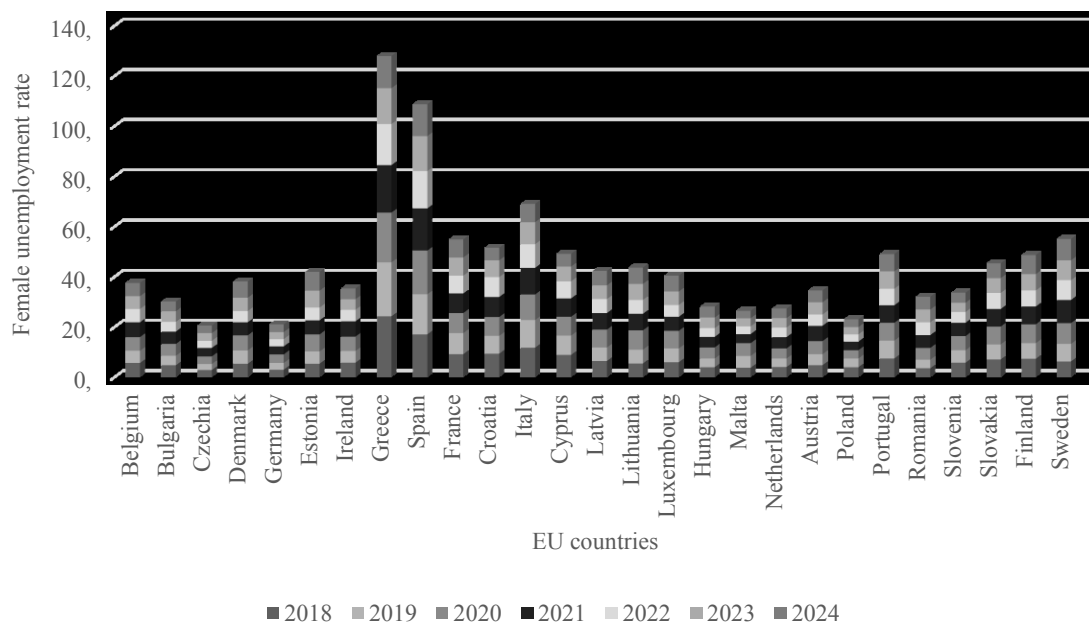
The main objective of this study is to conduct a comprehensive analysis of female unemployment in the European Union between 2010 and 2024, using panel econometric models and spatial autocorrelation tools. The study examines key macroeconomic and structural factors, such as the percentage of women with higher education, the gender pay gap, the percentage of women working part-time, public spending on childcare, and the level of

economic development. Additionally, spatial autocorrelation analysis allows for an assessment of the extent to which female unemployment is subject to spatial effects across EU countries and whether these trends are decreasing, increasing, or stabilizing over time.

## 2. Literature Review

The situation of women in the European Union's labor market is a central focus of contemporary socio-economic policy. It is directly linked to the achievement of the UN Sustainable Development Goals (SDGs), particularly those related to gender equality and decent work and economic growth. As the European Commission's (2024) report indicates, despite legislative progress, such as the Pay Transparency Directive, systemic gender employment gaps still require coordinated action at the regional level.

Research on female unemployment in the EU (Figure 1) reveals persistent differences between countries, which can be classified according to welfare state models (Rubery, 2015; Mandel, Shalev, 2009).



**Figure 1.** Female unemployment rate in EU countries in 2018-2024.

Source: own study based on Eurostat.

As Figure 1 indicates, Southern European countries such as Greece, Spain, and Italy consistently have the highest unemployment rates among women, while Nordic countries maintain relatively low rates.

The differences visible in Figure 1 can be attributed to specific institutional frameworks. The information presented in Table 1 illustrates how different welfare state models influence these rates.

**Table 1.**  
*Regional and Structural Differences in Female Unemployment Across EU Countries*

Welfare State Model	Example Countries	Average Female Unemployment Rate (2024)	Key Characteristics
<b>Nordic</b>	Sweden, Denmark, Finland	4-5%	High female labour force participation, flexible labour markets, extensive childcare provision
<b>Continental</b>	Germany, Austria, Netherlands, Belgium	5-6%	Strong family support policies, widespread part-time employment among women
<b>Southern</b>	Italy, Spain, Greece, Portugal	9-13%	Low female labour participation, limited institutional childcare, persistent traditional gender norms
<b>Post-socialist</b>	Poland, Czechia, Hungary, Romania	4-7%	High educational attainment among women, but persistent labour market inequalities and uneven access to public services

Source: own study based on Eurostat.

Nordic countries have the lowest unemployment rates, which is attributed to strong support for work-life balance. Conversely, southern countries face the highest unemployment rates, reflecting structural barriers and traditional gender norms (Table 1). In Germany, Austria, the Netherlands, and Belgium, moderate levels of female unemployment are observed. This situation is influenced by well-developed family policies and the prevalence of part-time employment, which may limit full integration into the labor market. The situation in post-socialist countries is more diverse. Although women in these countries often achieve high levels of education, structural differences in employment opportunities and unequal access to public services contribute to higher unemployment compared to Nordic countries.

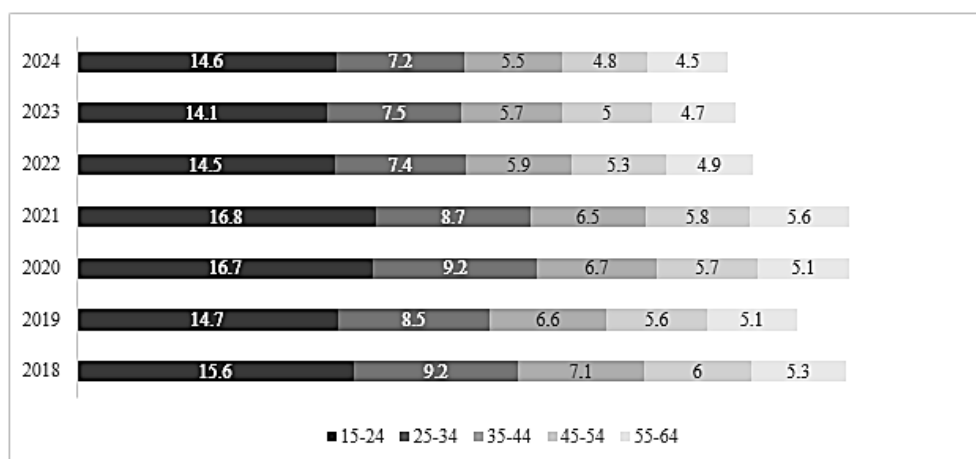
In summary, the results indicate that female unemployment in the EU is strongly influenced not only by economic conditions but also by the institutional framework, cultural norms, and the structure of social policy.

Other factors that differentiate women's situation include caregiving responsibilities, occupational segregation, and technological change. Regional analyses conducted by UNECE and UN Women (2021) show that women in Europe and Central Asia spend an average of five hours per day on household chores, while men only spend two, leading to a "double burden" phenomenon and often forcing women to take part-time work or leave the workforce altogether (Gornick, Meyers, 2003). The literature also points to the negative impact of motherhood on earnings and career advancement, which persists across various social welfare systems (Aisenbrey et al., 2009; Kleven et al., 2019).

Research demonstrates that the development of a knowledge-based economy and high-skilled science and technology (HRST) are contributing to the improvement of women's professional status in the EU (Bal-Domańska, 2022). In turn, women with lower education are more vulnerable to the effects of automation and AI (Autor, Dorn, 2013; Elson, 2017; Cortés, Pan, 2019).

Scientific literature highlights generational and sectoral differences as key factors influencing employment stability. Women aged 15–24 are significantly more likely to experience uncertainty and labor market segmentation (OECD, 2020; Scarpetta et al., 2010).

Research on youth unemployment demonstrates that the growth of the manufacturing sector is a key factor in reducing the unemployment rate among young women (Bal-Domańska, 2022). Conversely, the increased number of women employed in the service and care sectors increases their vulnerability to unemployment during periods of economic downturn (Blau, Kahn, 2017; Rubery, Rafferty, 2013). Statistical data confirm that it is the youngest cohort of women who are most vulnerable (Figure 2).



**Figure 2.** Unemployment rate of women in different age groups in the EU in 2018-2024.

Source: own study based on database of Eurostat.

As shown in Figure 2, the group of women aged 15-24 had the highest unemployment rate during the analyzed period. This situation is exacerbated by the fact that young women often work under fixed-term contracts, which is associated with lower employment security and the risk of long-term unemployment (Kalleberg, 2011; OECD, 2020).

Analysis cannot ignore groups that accumulate disadvantages in the labor market. Migrant backgrounds often mean that women face systemic barriers, such as lack of recognition of qualifications, language barriers, and discrimination (Kogan, 2017). Kogan (2017) also demonstrated how migrant women, women with disabilities, and older women face increasing disadvantages in the labor market, requiring targeted social policy interventions.

A key element of recent research is the shift from analyzing unemployment as a geographically isolated phenomenon to a spatial analysis. Studies at the level of NUTS 2 regions demonstrate that the gender employment gap (GEG) exhibits strong spatial

autocorrelation (Matuszewska-Janica, Fernández-Avilés, 2025). Of particular importance is the spillover effect associated with education – higher levels of education among women in one region contribute to reducing the GEG in neighboring regions as well (Matuszewska-Janica, Fernández-Avilés, 2025).

In terms of wages, analyses at the macroregional level (NUTS 1) indicate the existence of local spatial clusters, especially in Western Europe, where geographic proximity determines similar wage gap levels (Matuszewska-Janica, 2025).

The dynamics of spatial phenomena in the labor market were put to the test during the COVID-19 pandemic. Research confirms that although strong spatial interdependencies are persistent, they temporarily weakened during periods of the most severe pandemic restrictions (Wleklińska, 2024). The pandemic also intensified the burden of unpaid work on women, deepening pre-existing inequalities (European Commission, 2024).

It is also worth mentioning that the 2008 financial crisis and the COVID-19 pandemic caused a significant decline in women's employment due to sectoral concentration and increased caregiving burdens (Del Boca et al., 2020). In the face of these challenges, the literature suggests specific mechanisms for addressing them.

Research shows that in countries with equal access to parental leave, it improves job quality and significantly reduces gender inequalities (Thévenon, 2011; Kleven et al., 2019). EU countries are using various strategies to mitigate gender inequalities in the labor market (European Commission, 2021). Research indicates that combining childcare development with skills development and labor force activation policies is most effective (OECD, 2020).

The literature indicates the need for a multidimensional approach to female unemployment, combining the analysis of structural barriers (unpaid work), macroeconomic barriers (sectoral structure) and spatial regional interactions.

### **3. Research methodology**

#### **3.1. Panel Data Models**

Econometric panel data models constitute a sophisticated group of tools that enable the simultaneous analysis of variability across units, such as countries, and changes over time. The structure of panel data, combining cross-sectional and time-series data, allows analysts to capture individual heterogeneity as well as the dynamics of socioeconomic processes (Baltagi, 2021; Wooldridge, 2010, 2019). Using a cross-sectional or time-series approach alone increases the risk of omitted variable error and reduces estimation efficiency.

The general form of a panel data model can be expressed as:

$$y_{it} = \alpha_i + \lambda_t + \beta X_{it} + \mu_{it}, \quad (1)$$

where:

$y_{it}$  – the value of the dependent variable for unit  $i$  in period  $t$ ,

$X_{it}$  – the vector of explanatory variables,

$\alpha_i$  – unobserved individual heterogeneity (a fixed or random effect),

$\lambda_t$  – the time effect representing shocks common to all units (such as business cycles or institutional changes),

$\mu_{it}$  – the random error term.

Introducing both components into the model (Hsiao, 2014; Arellano, 2003) allows for controlling for persistent structural differences between individuals as well as time-varying trends. This approach is particularly important in the analysis of EU countries differing in their institutional settings, labor market structures, and socio-demographic patterns.

The most commonly used panel models are fixed-effects (FE) and random-effects (RE) models. In the FE model, it is assumed (Greene, 2018) that unobserved individual characteristics remain constant over time and can be correlated with explanatory variables. Estimation is based on an "in-neighborhood" transformation, which eliminates time-invariant heterogeneity and mitigates the omitted variable problem.

In the RE model, it is assumed (Baltagi, 2021) that unobserved individual-specific effects are random and uncorrelated with the regressors, which allows for more efficient GLS estimation.

The selection of the appropriate model is made based on the Hausman test (Hausman, 1978), which assesses the consistency of the RE estimator with respect to the FE.

The use of panel data models in the analysis of female unemployment in EU countries allows for the isolation of the impact of different economic conditions or social, while taking into account persistent differences between countries and changes over time.

### 3.2. Spatial statistics

The Moran statistics (Moran, 1950) is one of the most widely used measures in the study of spatial autocorrelation. The global Moran's  $I$  is defined as follows:

$$I = \frac{n \sum_{i=1}^n \sum_{j=1}^n w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^n \sum_{j=1}^n w_{ij} \cdot \sum_{i=1}^n (x_i - \bar{x})^2} = \frac{n}{S_0} \cdot \frac{z^T W z}{z^T z}, \quad (2)$$

where:

$x_i, x_j$  are the values of variables in the spatial unit  $i$  and  $j$ ,

$\bar{x}$  is the mean of the variable for all units,

$n$  is the total number of spatial units that are included in the study,

$S_0$  is the sum of all elements of a spatial weight matrix,

$z$  is a column vector of elements  $z_i = x_i - \bar{x}$ ,

$W$  is the spatial weight matrix degree  $n$ , defining the structure of the neighbourhood,  $w_{ij}$  is an element of weights matrix  $W$  (Kopczewska, 2020).

This statistic takes values ranging from  $[-1, 1]$ : positive, when tested objects are similar, negative, when there is no similarity between them, and approximately equal to 0 for a random distribution of objects.

If the Moran statistic has a value  $I \approx -(n-1)^{-1}$ , it indicates a random spatial pattern. However, when  $I > -(n-1)^{-1}$ , the spatial autocorrelation is positive, and if  $I < -(n-1)^{-1}$ , the spatial autocorrelation is negative.

Another global measure of spatial autocorrelation is global Geary's  $C$  (Geary, 1954). This statistic, is given by

$$C = \frac{(n-1) \sum_{i=1}^n \sum_{j=1}^n w_{ij} \cdot (x_i - x_j)^2}{2 \sum_{i=1}^n \sum_{j=1}^n w_{ij} \cdot \sum_{i=1}^n (x_i - \bar{x})^2} = \frac{n}{n-1} \left[ \frac{n}{S_0} \cdot \frac{z^T \text{diag}(w_i) z}{z^T z} - I \right], \quad (3)$$

where all elements of the formula are defined as in statistic  $I$ .

The above formula shows that the Geary measure can be expressed by the Moran statistic (2). Although Moran and Geary measures give similar results, the Moran statistic is more effective. This is due to greater sensitivity of the variance of the Geary statistic to the distribution of a sample. Values of this statistic can be impaired when the matrix of weights is asymmetrical.

The value of Global Geary's  $C$  is always positive and takes values ranging from  $[0, 2]$ . In the case of:  $1 < C < 2$ , the spatial autocorrelation is negative; when  $0 < C < 1$ , the spatial autocorrelation is positive; finally, when  $C \approx 1$ , there is no spatial autocorrelation.

#### 4. Empirical analysis

This study examines the determinants of female unemployment in European Union countries, taking into account temporal and spatial variation within individual countries. Data used in the study came from Eurostat databases and covered the period 2010-2024. Analyzing the situation of women in the labor market has long been a key socioeconomic challenge in EU countries (European Commission, 2023a). The literature review in Chapter 2 indicates that women's employment is sensitive to institutional, structural, demographic, and cultural factors, as well as various types of crises (Klasen, Pieters, 2015; Blau, Kahn, 2017).

Additionally, spatial analyses show that female unemployment can form regional clusters, resulting from similar economies or the spread of the phenomenon to neighboring areas, for example, as a result of warfare. Therefore, combining panel models and spatial correlation in the study provides a more comprehensive analysis of the topic.

To further explore this topic, the following research questions were posed:

1. What economic and social factors influence the female unemployment rate in EU countries?
2. Is it possible to observe a stable level of female unemployment over the selected period?
3. When analyzing the phenomenon of female unemployment, can spatial autocorrelation be observed, creating clusters of countries within the EU?

The empirical research covered the 27 EU Member States. The female unemployment rate was selected as the dependent variable  $Y$ , while the selection of explanatory variables ( $X_1$ ,  $X_2$ ,  $X_3$ , and  $X_4$ ) was based on the labor market literature:

- $X_1$  – percentage of women with higher education (Becker, 1993),
- $X_2$  – gender pay gap (Olivetti, Petrongolo, 2016),
- $X_3$  – percentage of women employed part-time,
- $X_4$  – logarithm of GDP per capita,
- time effects ( $dt$ ) – reflecting typical macroeconomic shocks and time trends in all EU countries.

The study used econometric models based on panel data (Table 2). Standard diagnostic tests were performed to determine the appropriate model specification:

- the Breusch–Pagan LM test, which confirmed that the pooled least squares (OLS) method was inappropriate and that a panel model should be used,
- the Hausman test, which showed no significant difference between the FE and RE estimators ( $p > 0.238$ ), allowing the selection of a random effects (RE) model,
- the Wooldridge test, which revealed first-order autocorrelation in the panel residuals, consistent with unemployment dynamics.

**Table 2.**

*Panel model estimation results (Two-way Random Effects, GLS)*

Variable	$\beta$	Std. Err	t-stat	p-value
const	11.54	2.28	5.06	<0.0001
$X_1$	0.084	0.022	3.75	0.0002
$X_2$	-0.067	0.027	-2.45	0.014
$X_3$	0.059	0.02	3.02	0.0026
$X_4$	-2.706	0.439	-6.16	<0.0001
$dt$	0.45–3.21	different	all statistically significant	<0.05

Source: own study.

Table 2 presents the results of estimating the coefficients of the random effects model using GLS with a quasi-degrading effect, which improves efficiency while preserving information between countries. The obtained results indicate that economic development, measured by the logarithm of GDP per capita ( $\beta = -2.706$ ,  $p < 0.001$ ), has the greatest impact on the female unemployment rate in the EU. A negative value of this variable confirms that countries with

a higher GDP per capita are characterized by lower female unemployment. This may be due to greater diversity in female employment, better access to care services, or higher productivity.

Another variable, the percentage of women with higher education, shows a positive impact on the female unemployment rate ( $\beta = 0.084$ ,  $p = 0.0002$ ). This variable indicates that increasing women's education level does not necessarily translate into better employment prospects. This may be related, for example, to difficulties in returning to the labor market after maternity leave, or to women with higher qualifications taking jobs below their qualifications or being unable to find work.

Another explanatory variable, X3—part-time work among women—also influences the increase in unemployment among women ( $\beta = 0.059$ ,  $p = 0.0026$ ). Part-time work may represent a flexible form of employment that facilitates the balance of work and family responsibilities, but it may also imply partial participation in the labor market and may limit career mobility.

Variable X2—the gender pay gap—shows a slight negative impact ( $\beta = -0.067$ ,  $p = 0.0143$ ). The negative effect of this variable suggests that in countries with a lower pay gap, women are more economically active.

Time effects ( $dt_1 - dt_{11}$ ) represent changes in female unemployment from 2010 to 2024. The significance of time effects confirms that female unemployment has changed over time.

To verify spatial dependencies in female unemployment in selected EU countries, global spatial autocorrelation measures were used (Table 3).

**Table 3.**

*Global statistics estimation results*

<b>Global Statistics</b>	<b>2018</b>	<b>2021</b>	<b>2024</b>
Moran	0.6269	0.5703	0.5419
Geary	0.3106	0.3395	0.4383

Source: own study.

Table 3 presents the results of estimating the global Moran and Geary statistics for 2018, 2021, and 2024. The results show a decline in the global Moran coefficient, indicating that the female unemployment rate is becoming less homogeneous across EU countries. At the same time, the observed increase in the global Geary coefficient indicates increasing local differences between neighboring countries, which may indicate that some countries are becoming more diverse in terms of female unemployment.

## 5. Discussion

The results of the panel study conducted for 27 European Union countries in the years 2010-2024 allow for a multidimensional interpretation of the situation of women in the labor market, combining hard economic data with the institutional and spatial context.

The random-effects model estimation showed that the strongest factor reducing female unemployment in the EU is the level of economic development, measured by the logarithm of GDP per capita, which is consistent with the general economic literature. As Bal-Domańska (2022) points out, economic development, and in particular the dynamics of the industrial processing sector, is a key factor stimulating demand for women's labor and reducing their unemployment, which is particularly visible in the 15-24 age group.

A surprising result of research, however, is the positive correlation between the percentage of women with higher education and the unemployment rate. Although theoretically, the development of a knowledge-based economy should foster an improvement in women's professional position (Bal-Domańska, 2022), the obtained parameter suggests the occurrence of a structural mismatch or difficulties in professional reintegration after interruptions related to motherhood. This may support the thesis that women's higher education generates positive effects and reduces the employment gap primarily when combined with an appropriate demand structure and positive spillover effects in neighboring regions (Matuszewska-Janica, Fernández-Avilés, 2025).

Institutional conditions remain a significant barrier, as reflected in the model by the variable for part-time work. The positive impact of this variable suggests that flexible employment arrangements, although facilitating role reconciliation, may contribute to market segmentation and increase the risk of long-term unemployment. The literature emphasizes that this form of work often results from the "double burden" of unpaid care and domestic work for women, to which they devote an average of five hours per day in Europe, compared to only two hours for men (UNECE & UN Women, 2021; Gornick, Meyers, 2003). At the same time, the coefficient for the pay gap indicates that reduced pay discrimination promotes the stabilization of women's professional activity, which is consistent with the EU's gender equality strategy and the UN Sustainable Development Goals, which view reducing the pay gap as the foundation for decent work and economic growth (European Commission, 2024).

Analysis of spatial dependence over time using Moran and Geary statistics provides evidence of the evolution of unemployment patterns in Europe. The observed decline in the global Moran coefficient, coupled with an increase in the Geary statistic, suggests that the EU labor market is becoming less homogeneous across the continent, with deepening local differences between neighboring countries. Studies at the NUTS 2 and NUTS 1 regional levels confirm that while strong spatial autocorrelation is a persistent feature of the European labor market (Matuszewska-Janica, Fernández-Avilés, 2025), local regimes and specific national

policies are becoming increasingly important determinants (Matuszewska-Janica, 2025). These processes are strongly influenced by temporal factors and crisis situations. Crises such as the COVID-19 pandemic can temporarily weaken spatial dependencies by “freezing” local markets and restricting mobility (Wleklińska, 2024), while also hitting the service and care sectors where women are overrepresented, increasing their vulnerability to unemployment during periods of slowdown (Blau, Kahn, 2017; Del Boca et al., 2020).

In summary, the obtained results indicate the need for a multidimensional approach to labor market policy, combining the analysis of structural, macroeconomic, and spatial barriers within regional interactions. Simply improving women's qualifications is insufficient without accompanying changes to the social welfare system. The most effective solution remains combining the development of institutional childcare with professional activation policies and equal access to parental leave, which allows for a lasting reduction in gender inequalities (OECD, 2020; Kleven et al., 2019; Thévenon, 2011). In future research, we plan to consider the impact of digitalization and automation, which pose new challenges for women with lower professional qualifications.

## 6. Summary

The analysis conducted provides a critical assessment of the determinants of female unemployment in the European Union, highlighting the complexity of this phenomenon between 2010 and 2024. Evaluation of previous research and the results of the panel model reveal certain limitations of the traditional view of education as the primary factor protecting against unemployment. A weakness of the current market system is the paradoxical, positive correlation between higher education and the unemployment rate, suggesting the existence of structural barriers, such as skill mismatches and difficulties in professional reintegration after career interruptions due to family reasons. This finding highlights the significant limitations of policies focused solely on improving qualifications, which, without concomitant institutional support (e.g., in the area of childcare), fail to guarantee women's professional stability.

The new insights provided by this study focus on the dynamic evolution of spatial dependencies. It shows that the EU labor market is becoming increasingly differentiated locally, as evidenced by a decline in homogeneity measured by Moran's statistic and a simultaneous increase in neighborhood differentiation measured by Geary's statistic. A key finding from this dynamic is that local national specificities and national social policies are becoming more important determinants than geographic location alone. The study also provides evidence that crises such as the COVID-19 pandemic act as catalysts for inequality, temporarily weakening spatial dependencies and increasing the vulnerability of women employed in the service and care sectors to unemployment.

The significance of this study for the discipline of economics and social policy lies in demonstrating that female unemployment is the result of a combination of macroeconomic and non-economic factors. The demonstrated strong impact of GDP per capita and the negative effects of part-time work shed new light on the problem of the "double burden". This information is crucial for achieving the UN Sustainable Development Goals, indicating to policymakers that combating unemployment must be integrated with reducing the wage gap and addressing barriers related to unpaid domestic work, which in Europe is still predominantly performed by women.

The obtained results can provide guidance for developing intervention projects in regions with low female labor force participation, particularly by combining the development of institutional care with professional activation policies. These findings provide a solid foundation for further research, which should focus on the impact of digitization and automation on particularly vulnerable groups, such as older women, migrants, and people with disabilities, who face additional systemic and discriminatory barriers in the modern labor market.

## Acknowledgements

This article is financed from funds allocated for the project "Prospects and Challenges of the Labor Market in the Age of Digitalization and AI Development Against the Background of Integration, Demographic, and Migration Processes". The project will be carried out in 2025-2027 at the University of Economics in Katowice. The project is financed by the Minister of Science under the "Regional Excellence Initiative", a program of scientific, research, and educational excellence at the University of Economics in Katowice.

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