sciendo

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Simona Juhásová[1], Ján Buleca[2], Peter Tóth[3], Rajmund Mirdala[4]

The Impact of Gender Inequality on Gdp in Eu Countries

ABSTRACT: *In recent years, gender inequality has been considered the main characteristic of insufficient gross domestic product (GDP) growth. This paper discusses the evolution of GDP per capita in 21 countries of the European Union between 2015 and 2019. Using panel regression, we investigated the change in GDP per capita through five variables. The analysis results showed that female employment rate is the most statistically significant and positive variable on GDP. Gender Equality Index also appeared to be an essential variable. The second part of our analysis consisted of an explanatory spatial data analysis of all variables to examine the spatial dimension of the variables. To explain spatial econometrics, we used selected methods, namely, choropleth maps, Local Indicators of Spatial Association (LISA) cluster analysis, Moran's scatter plots, and Moran's I statistics. Based on the visualization of choropleth maps, GDP per capita did not change during the observed period, even though the values of the explanatory variables changed. For GDP per capita, the same applies in the case of LISA cluster analysis. At the end of the monitored period, the countries were included in the same cluster as at the beginning. When plotting Moran's scatter plot, it was found that GDP per capita did not tend to have positive or negative spatial autocorrelation or no spatial autocorrelation. Moran's I statistic showed that GDP per capita values were not randomly dispersed; they were grouped according to a specific formula into clusters.*

KEYWORDS: Gender inequality, gender policy, spatial econometrics, European Union

JEL CLASSIFICATION: J16

RECEIVED 17 May 2023; **ACCEPTED** 21 June 2023.

INTRODUCTION

Many unique gender equality measures have been developed worldwide and across various areas. Gender contents have been added to many gender-blind measures, and gender mainstreaming is presented as crucial for successful policy achievements. Therefore, public policymakers expect an improvement in the gender situation at the global level. The European Union (EU) activities and mechanisms in the field of public policy serve to create a unique European identity based on the diversity of national and cultural traditions. In the process of the creation of gender policy, public policy must reflect and take into account gender dynamics in the policy formulation processes, which can significantly influence the success of adoption and subsequent outputs of specific measures.

Gender equality is an important moment of the public policy of the EU and its member countries. The issue of gender equality applies to various areas of public policy. The indisputable advantage of public policy is that it can be implemented as a response to current developments in the country. Among the essential priorities of the public policy of almost every country nowadays is the solution to gender inequality, which, like any other economic or social factor, affects the country's economic growth. Despite the initial rejection of the impact of gender inequality on the financial situation in the country, the application of this issue is firmly anchored in the field of public policy, through which it offers a solution to the current problem. The EU public policy was shaped by

1 Technical University of Košice, Faculty of Economics, Department of Finance, Slovakia, ORCID: 0000-0003-2788-8006, simona.juhasova@tuke.sk

2 Technical University of Košice, Faculty of Economics, Department of Finance, Slovakia, ORCID: 0000-0002-6613-2167, jan.buleca@tuke.sk

3 Technical University of Košice, Faculty of Economics, Department of Finance, Slovakia, ORCID: 0000-0002-5616-5520, peter.toth@tuke.sk

4 Technical University of Košice, Faculty of Economics, Department of Economics, Slovakia, ORCID: 0000-0002-9949-3049, rajmund.mirdala@tuke.sk

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

other goals of gender equality policy, which eventually transformed into all EU policies in the international context. The goal was to incorporate the perspective of gender equality into mainstream politics.

To demonstrate the success of gender equality policy measures, reviewing them after they have been adopted is essential. For example, this policy can be built on a combination of different public policy instruments, a process of inclusive empowerment, or gender transformation as the final result. Implementing proper gender and political measures is crucial for successful political outcomes. The political process is complex, but engaging in gender politics can bring positive results in many areas (Engeli & Mazur, 2018).

In recent years, women and men have become increasingly alike regarding education (EDU), earnings, and employment. These changes impact the country's economic inequality, especially if partners within the household have similar levels of education and income. Increased equality within the household can create favorable as well as unfavorable situations. The results show that higher similarity between partners does not increase inequality to a relevant degree. The influx of women into employment contributes to reducing inequality between households. The increase in inequality is caused by increased polarization between low- and high-income families in the spread of income within family types (Grotti & Scherer, 2016).

Decades of continuous progress in reducing gender inequality in developed and developing countries appear to be only apparent as 2000 saw stagnation and regression in many countries in various areas of gender inequality. This decline is most visible in the labor market. The solution to gender inequality is to put together effective policies (Klasen, 2020). Gender mainstreaming is a commonly discussed field nowadays. It plays a role in many aspects of human life related to employment, social inclusion, and social protection policies (European Commission, 2019). Whatever aspects of human life are considered, the profession plays its role. Also, when aiming at the young population (PEP), youth work is a critical perspective (Council of Europe, 2019). However, this is important for more than just the young PEP; the policies also focus on the entire PEP (National Commission for the Promotion of Equality, 2008).

Many authors state a strong correlation between gender attitudes and the economic situation of each country. To avert negative consequences, it is essential to correctly determine which determinants affect them (Elveren et al., 2022).

The essential goal of the paper is to map the situation of core indicators, deliver quantitative analysis, and formulate policy recommendations in the EU member countries. The selected socioeconomic indicators demonstrate the explored field's statistical significance. The paper offers an overview of gender inequality through the selected socioeconomic determinants regarding the female aspect. Firstly, the theoretical background is offered to demonstrate recent research in the examined field. Secondly, the investigated data is described along with reasoning for the selected observed variables and the employed methodology. Thirdly, the analytical outcomes are shown, and subsequently, the discussion demonstrates the obtained findings from interpreting the desired outcomes and the policymaking process.

THEORETICAL BACKGROUND

The EU is committed to advancing gender equality and ensuring everyone has equal opportunities and rights. The EU has implemented various gender policy instruments to promote gender equality across member states. These instruments include directives, regulations, and recommendations for equal pay, work–life balance, and gender-based violence prevention. The EU also funds programs and initiatives supporting gender equality goals. Also, the European Institute for Gender Equality (EIGE) serves as a resource center for information and research on gender equality issues.

The EU policy aimed at eliminating gender inequality has made significant progress in recent years. The main tools for applying gender equality are legal regulations, including a gender perspective in all policies, and various measures to support women. The EU fulfills its commitment to achieving gender equality through multiple strategies. Within the framework of the strategy for gender equality for the years 2020–2025, it adopted binding measures to ensure the transparency of remuneration. As part of this strategy, the European Commission also adopted a new draft of the EU directive on combating violence against women and domestic violence. It started implementing a campaign to combat gender stereotypes (European Commission, 2023).

The EU is constantly creating anti-discrimination policies aimed at addressing multiple inequalities. However, not all of them achieve the desired results. Some mechanisms of the established legislation may cause resistance to introducing such an anti-discrimination directive due to institutionalization. It is also important to realize that each country may react differently to the specified demands, and not all will positively affect equality (Lombardo & Giorgio, 2013).

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Gender inequality and its impact on the economic performance of countries were researched by many authors with different purposes and conclusions. Various economic outcomes are influenced by trust, individualism, gender attitudes, human capital, or economic development, and the factors mentioned positively impact financial results (Dutta & Sobel, 2022). Despite various political initiatives to empower women, gender inequality remains (Mukorera, 2020). Examining the impact of perceptions of economic inequality with conspiracy thinking confirms that this thinking can reinforce it. This is because economic inequality is perceived as a form of crisis that affects the entire social structure of the society, which also increases the perception of anomie within the collective (Jetten et al., 2022).

In export-oriented economies, where women provide most of the labor force in the export sector, gender inequality contributes to relatively lower wages for women. Gross domestic product (GDP) growth positively affects gender wage inequality (Seguino, 2000). Gender inequality decreases as countries grow through different mechanisms. With the help of the development process, it is possible to explain the relationship between GDP and gender inequality, while not forgetting other specific factors of each society. For example, in some vulnerable countries, cultural norms that exacerbate gender inequality by favoring men persist (Jayachandran, 2015). Gender differences in many countries are unfair and reduce the country's economic performance. It is difficult to determine the effects of gender differences on GDP and to calculate how much GDP would be more significant if gender differences were eliminated. Results from different countries confirm that reducing the gender gap in EDU leads to higher economic performance in countries (Klasen, 2018). Reducing gender inequality contributes to social justice and human development. It also positively impacts various institutions' productivity, reducing GDP growth and poverty (Verdier-Chouchane, 2016). Globalization and gender equality significantly impact the economic growth of individual countries. The study shows that the ratio of women to men in the labor force positively affects economic growth (Farooq et al., 2020).

The impact of gender inequalities is seen in many sectors of the economies of the EU member countries. A proper policymaking process brings benefits for all the touched actors. For instance, the forestry sector aims at the rural policy. Female employment is considered necessary in every field and as well as area. Information communication technologies represent the sector where hiring women could be more obvious, even in the geographic part of the world where the female PEP does not have such a representation as in developed countries. Female gender inclusion has become a crucial point in the national policy to mitigate differentiation and enhance the development of particular economies (Asongu & Odhiambo, 2020). A supranational perspective, as seen in the EU, is missing in other parts of the world. As it is seen, this raises plenty of issues related to gender inequality. The developing countries demonstrate a lower consideration of diminishing this differentiation. Therefore, it is necessary to point to the international policies created by the international institutions that would play a role in supranational regulations. For instance, higher EDU in Kenya has problems with gender inequality. Ocean science is discussed to be one of the most touched fields.

Moreover, evaluating the performed national policies would bring an overview of the explored field to suggest further steps for enhancing the investigated field. The female PEP forms a minority in higher EDU in Kenya However, some study programs demonstrate its dominance also. It is the desired outcome of the focused national policy (Ojwala et al., 2022).

There is a close link between educational inequality and economic inequality (Blanden et al., 2023). When examining women's EDU in low- and middle-income countries, the factors that can eliminate gender inequalities in these countries are primarily sought. The effectiveness of national policies in promoting EDU and the overall progress achieved by individual countries are examined (Bennell, 2023). Gender equality and EDU are positively linked to economic growth (Minasyan et al., 2019). EDU is critical in increasing household income and wealth (Vo & Ho, 2022). EDU can have both direct and indirect effects on GDP per capita. The results indicate that an increase in the Gender Equality Index (GEI) in primary, secondary, and tertiary EDU increases GDP per capita.

In the same way, reducing gender inequalities in the educational attainment of different age groups positively affects GDP per capita. Therefore, it is in the interest of countries to implement policies that reduce gender inequality for sustainable economic growth (Assoumou-ella, 2019). Women's EDU positively benefits the economy of the state and society. In contrast, women's EDU level and its increase can affect the next generations' EDU level. A long-term relationship exists between gender inequality in EDU and a country's economic growth (Yumusak et al., 2013). Political institutions, culture, or even religion can be behind gender inequality in EDU. However, the study results indicate that even if political institutions have some influence, this influence is insignificant. On the contrary, culture and religion play a primary role in the emergence of gender inequality in EDU (Cooray & Potrafke, 2011).

Gender inequality is more pronounced in developing countries and arises due to insufficient measures in public administration and social and religious institutions. A study shows that gender equality and religious tensions influence gender inequality in the

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

neighboring countries. Increasing economic growth and reducing religious tension in a given country promote gender equality and positively impact neighboring countries (Iqbal et al., 2022). The market drives economic development, women's employment opportunities, and gender inequality in households (Matthews & Nee, 2000). The development of the female labor force positively impacts income inequality (Heathcote et al., 2017). The most important drivers of increasing female labor force participation are changes in preferences and growth in women's relative wages, and changes in marriage patterns have a similarly significant impact.

Since the beginning of the 21st century, trends in income inequality have undergone a significant shift, whether in developed or developing economies. Since then, it has started to have a downward tendency. Every country's challenge is reducing inequality despite unexpected situations and market developments (Anderson, 2022). The results show that economic growth improves subjective well-being in the long run when income inequality decreases (Mikucka, 2017). The main factors contributing to gender inequality are the increasing inequality in working hours and the growing covariance between working hours and wages (Beckmannshagen & Schröder, 2022). The difference in the remuneration between women and men, the difference in participation in employment, and also women's earnings are the problems in all countries (Anastasiou et al., 2015). Political support for basic income also affects gender inequality. Interest in the primary salary decreases with the increasing level of job qualifications of job seekers (Day, 2022). Examining wage inequality within a French firm showed that this difference relates to the firm itself and not to sectors or occupations. The cause of gender inequality is the automation of production (Domini et al., 2022).

One of the ways to allocate labor resources more efficiently, improve the economic performance of border regions, and also to reduce territorial and economic inequality is cross-border commuting. Cross-border commuting results from push and pull factors that affect employees differently. However, they generally react in the expected way to wages, job availability, unemployment, distance, and language. However, results that assess age, gender, EDU, and the occupational sector show that the reduction in inequality is minimal and may even be increasing (Edzes et al., 2022).

In managing inequalities, it is essential to analyze, among other factors, the role of financial development and the development of financial technologies (Frost et al., 2022). Technological change, the primary driver of long-term economic growth, can be positively related to women's political empowerment, and this relationship also applies vice versa. Women's political empowerment positively affects technological changes (Dahlum et al., 2022).

DATA AND RESEARCH METHODOLOGY

The panel data consists of annual observations from 2015 to 2019 for 21 countries of the EU, all available in the Eurostat and EIGE databases. The European Commission carries them out. The following 21 countries of the EU are distinguished – Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Latvia, Lithuania, Luxembourg, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. It is to be noted that six states were omitted from the analysis because of missing data.

A total of six variables are investigated in the analysis. Gross domestic product (GDP) represents the explained variable. The remaining five variables perform as the explanatory variables, and these are the Gender Equality Index (GEI), the Gender Pay Gap (GPG), the Employment Rate (ER), the Population (PEP), and the graduates in tertiary by educational level (women per 100 men) (EDU). We draw data on GPG, ER, PEP, and EDU according to females. The GDP variable is calculated as the ratio of real GDP to the average PEP of a particular year. The GEI variable is a composite metric using three dimensions: reproductive health, empowerment of women, and labor market. The GPG variable means unadjusted GPG. It represents the difference between male and female paid employees' average gross hourly earnings as a percentage of male paid employees' average gross hourly earnings. The ER variable represents the ER of women. It is calculated by dividing the number of women between the age of 20 and 64 in employment by the total female PEP of the same age group. The PEP variable includes all main labor market characteristics, such as the total PEP, employment, ER, full-time and part-time employment, and activity rates. The EDU variable covers indicators and statistics of the crucial aspects of EDU.

The research aims to test the state of gender inequality in selected EU countries in terms of GDP influenced by various indicators. Our research consists of two parts. In the first part, we use panel data regression analysis to explore the data set. We start with a model using longitudinal data represented by the following regression scheme:

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

$$GDP_{it} \sim \beta_{0it} + \beta_{1it}GEI_{it} + \beta_{2it}GPG_{it} + \beta_{3it}ER_{it} + \beta_{4it}PEP_{it} + \beta_{5it}EDU_{it} + u_{it} \quad (1)$$

To test the stationarity of our data set, we use augmented Dickey–Fuller (ADF) test (Dickey & Fuller, 1979). The F test is applied to obtain the overall significance of our linear regression model. The model is tested for potential errors. Autocorrelation is explored through the Durbin–Watson test. Heterogeneity is explored through the Breusch–Pagan test. The normal distribution of data is explored through the Jarque Bera test, and multicollinearity is tested using the Variance Inflation Factor (VIF). To differentiate between fixed effects and random effect models in panel analysis, we perform the Hausman test (Croissant & Millo, 2018).

Spatial econometrics is used to test the spatial dimension of the variables. Firstly, choropleth maps are created. A choropleth map is a thematic map where geopolitical areas are colored-shaded or patterned concerning a value. Visualization patterns depend on data distribution, sizes, classifications, and boundaries between classes (MacEachren, 1982; Tennekes, 2018). Secondly, to show the presence of spatial autocorrelation, we carried out Local Indicators of Spatial Association (LISA) cluster analysis. LISA analysis represents the extent of significant spatial clustering of similar values around this observation, with the LISA sum for all observations proportional to the global spatial association indicator (Anselin, 1995). The cluster analysis can reveal the inner relationships between the explored variables (Lipták et al., 2015; Gavurova et al., 2019). Below, Moran's scatter plots are shown.

The Moran scatter plot consists of a plot with the original variable on the x-axis and the spatially lagged variable on the y-axis. An essential aspect of visualization in the Moran scatter plot is the classification into four quadrants. Positive spatial autocorrelation corresponds to the upper-right and lower-left quadrants. Negative spatial autocorrelation corresponds to the upper-left and lower-right quadrants. It means that here we can find similar values at neighboring locations. Such a view demonstrates the territorial links between the examined objects (Gavurova et al., 2016).

On the contrary, we can find different values in these two quadrants at neighboring locations (Anselin, 1996). The last step in the second part of our analysis is a measure of spatial autocorrelation through Moran's *I* statistics. It is calculated as a randomly positioned test of the null hypothesis. Rejection of the null hypothesis increases the comprehension of the data set and its spatial structure. It measures the location of a spatially mean value and spatially weighted neighboring value of a variable. If *I* is greater than 0, we reject the null hypothesis. Positive spatial autocorrelation means the value of a variable in one location depends positively on the value of the same variable in neighboring locations (Anselin, 1995).

According to the mentioned methodologies and observed data, the following research questions are formulated:

1. Is there any link between GDP and selected gender-related indicators?
2. What are the values and geographic distribution of gender-related indicators in the EU?

RESEARCH RESULTS

The influence of gender-related indicators on GDP

In the first part of our analysis, we use panel data analysis, and the results of the tests are shown in Tab. 1. According to the ADF test, the panel data are stationary. The adequacy of fixed effects model, random effects model, and Pooled model is tested using the Hausman test. The result is the use of FEM model.

The results of the panel regression using fixed effects as a preferred specification based on the Hausman test show that an increase in GEI affects GDP per capita positively. The explanation might be tight to the claim that gender-balanced countries show better economic results. The negative sign of the beta estimate of GPG seems to be as expected. Many studies show a relationship between GDP per capita and income inequality (Barro, 2008; Scognamillo et al., 2016; Bilan et al., 2020). However, this variable is insignificant in our model, with no effect on GDP per capita. The female ER is the most significant influencing variable on GDP per capita. It confirms the results of many studies that point to the significant and positive impact of women's employment on the country's economic results and highlight the importance of supporting women's employment (Klasen & Lamanna, 2009; Lee et al., 2012; Kabeer & Natali, 2013). According to our results, the size of the female PEP does not directly affect GDP per capita. The negative sign of the beta estimate of the levels of women's EDU is unexpected. However, it is a tertiary EDU that is considered to be above standard, which may be why this variable in our model is shown to be statistically insignificant when evaluating the impact on GDP per capita.

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Tab. 1: Results of panel regression models

Model	**FEM**		**REM**		**Pooled**	
variable	**Estimate**	**significance (*p*–value)**	**Estimate**	**significance (*p*–value)**	**Estimate**	**significance (*p*–value)**
GEI	103.8315	* (0.0768)	134.9978	* (0.0438)	767.4512	*** (0.0002)
GPG	-35.1447	- (0.6136)	-51.2419	- (0.5193)	-828.2484	** (0.0077)
ER	312.0235	*** (<0.0001)	290.4494	*** (<0.0001)	598.8017	* (0.0456)
PEP	0.2875	- (0.6866)	0.1763	- (0.7297)	-0.8835	* (0.0174)
EDU	-8.6735	- (0.6576)	-18.6857	- (0.4093)	-389.8658	*** (<0.0001)
Panel diagnostics			**Collinearity diagnostics**			
Test		***p*-value**	VIF test	GEI		1.8806
F-test		<2.22e-16		GPG		1.2296
Jarque–Bera		0.5462		ER		1.9123
Durbin–Watson		0.0002		PEP		1.3320
Breusch–Pagan		0,1870		EDU		1.1288

Source: Own elaboration by the authors based on Eurostat and EIGE
Notes: *** denotes 0.01 significance level, ** denotes 0.05, and * denotes 0.1.

Factors that affect economic growth (GDP) are among the most discussed points in the field of country economics. According to Abdullah (2022), when using panel data examining the impact of various indicators (labor, capital, technological progress, institutions) on GDP per capita, it was found that the labor force participation rate negatively affected economic growth. The study further showed that economic growth and employment varied across countries based on income groups. Costantini and Paradiso (2018) confirm the relation between inequality and GDP per capita by studying panel data. Taş et al. (2013) analyze macroeconomic indicators of economic growth of the EU countries using panel data. The dependent variable is GDP, which is analyzed by 11 independent variables, including the unemployment rate, PEP level, and others. One of the main findings is the result of the model, which confirms that the PEP level positively affects economic growth. Rodríguez (2017) analyzes panel data, where she observes the relative increase in women's participation rate in the labor force and its effect on countries' economic growth. The result indicates that women's empowerment in the labor market has a positive effect on the economic growth (GDP) of countries. Here, space is being created for public policy, which should aim to increase the participation of women in the workforce.

Geographic distribution of gender-related indicators in the EU

In the second part of our analysis, we perform an explanatory spatial data analysis of all variables to examine the spatial dimension of the variables. Choropleth maps illustrate that some part of the EU is more developed than other parts. The choropleth maps reflect, in some cases, East–West inequalities among countries, but North–South differences are more visible.

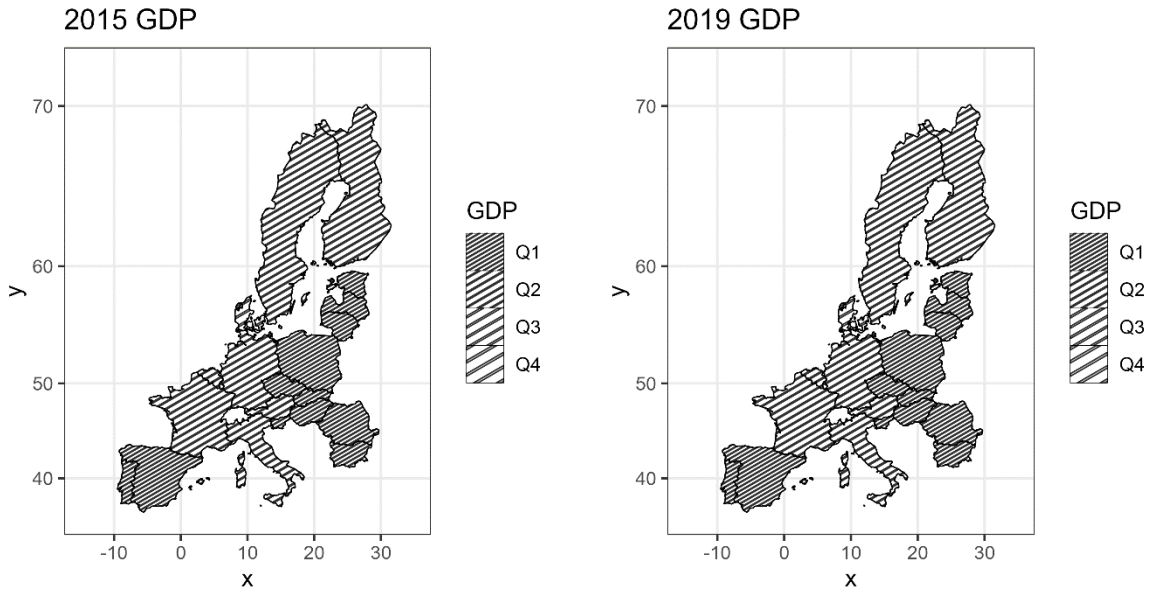
When we investigate our explained variable in Figure 1, GDP, in monitored countries through the EU, we can see no differences, enhancements, or deterioration in the GDP value during the period we monitored. GDP per capita ranges from 5.700 EUR in Bulgaria in 2015 to 83.590 EUR in Luxembourg in 2019. As the map shows, the countries with the lowest GDP per capita are in the southeastern part of the EU, where neighboring areas are in a similar shade. Quadrant Q1 includes the countries of the eastern EU (Romania, Bulgaria) and the countries of the Central EU (Estonia, Latvia, Lithuania, Poland, Slovakia, Hungary, and Slovenia). Other parts of the EU, mainly the Nordic countries, are among the countries with a higher amount of GDP per capita.

The second choropleth map in Figure 2 is about GEI and its score in individual EU countries. In 2015, the GEI scores ranged from 51.2 in Romania to 79.7 in Sweden. It means that this year, Romania was the least gender-balanced country. In 2019, the least gender-balanced country was Hungary, with a score of 51.9, and the highest score of 83.6 for this year was again shown by Sweden.

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

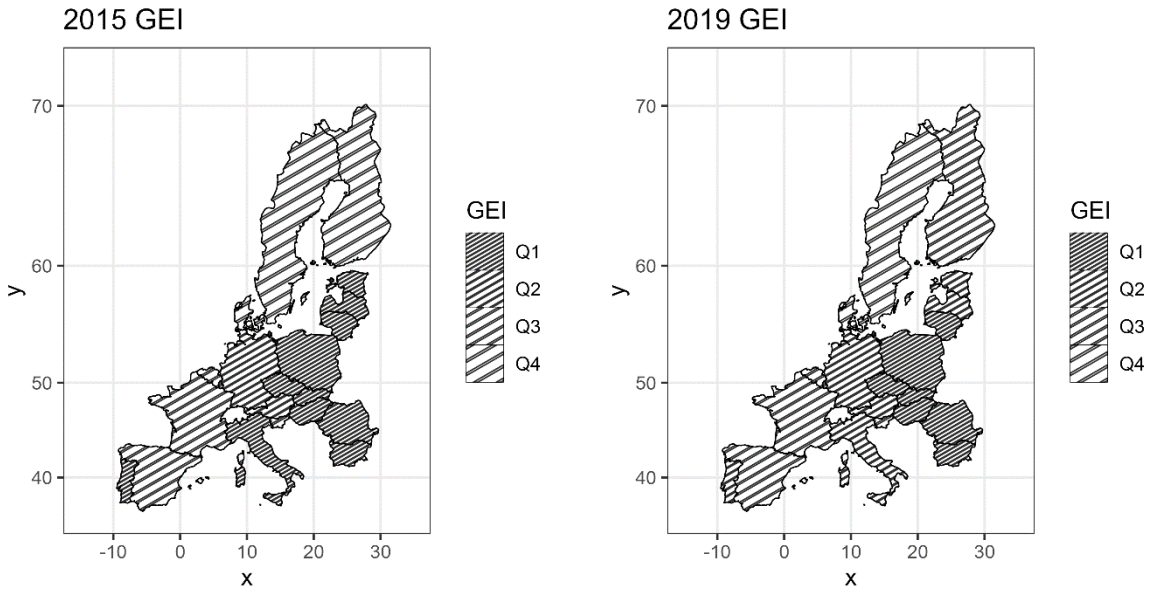
Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Fig. 1: GDP per capita for the years 2015 and 2019



Source: Own based on Eurostat and EIGE
Note: Q1: the quadrant with the lowest EUR value of GDP per capita; Q4: the quadrant with the highest EUR value of GDP per capita

Fig. 2: Gender Equality Index for the years 2015 and 2019



Note: Q1: countries with low scores; Q4: countries with high scores

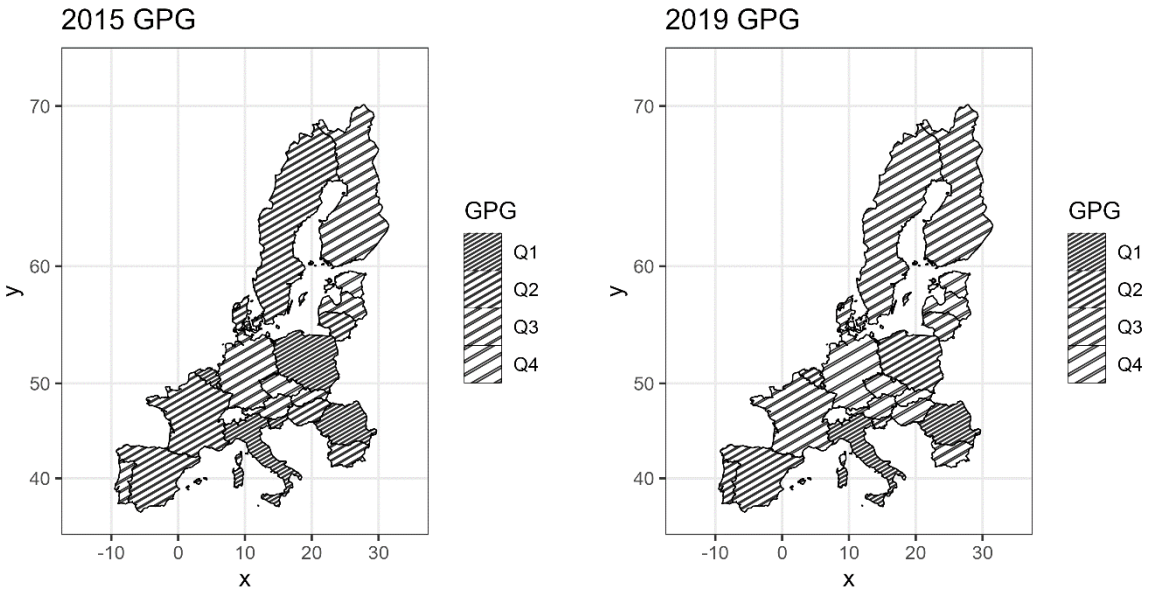
GEI data reflect a precise level of inequality through the EU countries. We can observe that Sweden holds the lead in achieving gender equality for the entire monitored period. Its GEI value is at the level of 80 (where a score of 100 means that the country achieves full equality between women and men).

Choropleth map in Figure 3 explains GPG. When looking at the difference in earnings between men and women, we can see only a small number of EU countries where the difference is up to 10% (Q1). Estonia has the highest wage gap rate during the

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Fig. 3: Gender Pay Gap for the years 2015 and 2019



Source: Own based on Eurostat and EIGE
Note: Q1: lowest wage differences expressed in %; Q4: the highest wage differences expressed in %.

observed period. In 2015, the lowest difference in remuneration between women and men, valued at 4.7%, was in Luxembourg. On the contrary, the highest difference, with a value of 26.7%, was in Estonia. In 2019, the lowest wage gap was again in Luxembourg, with a much lower value, only 1.3%, which means almost completely eliminating the gender wage gap in this country. This year, the highest difference was again in Estonia, but with 5% lower value than at the begging of the monitored period, that is, 21.7%.

The other choropleth map in Figure 4 is about ER of women. When we investigate ER of women in the EU countries during the entire observed period, this rate is found to be the lowest in Italy and Romania (Q1). We can also see North–South differences in the EU countries, and ER of women is higher in the northern part of the EU and, conversely, lower in the countries in the southern part of the EU.

Another variable, shown in the Figure 5, is PEP of women in individual EU countries. The size of the female PEP did not change during the monitored period, and it was the same for 2015 as for 2019. As can be seen on the map, the Nordic countries and some Central EU countries have fewer women. The highest number of women is in Germany.

EDU data in Figure 6 reflect evident level differences among monitored countries. Countries with the highest number of women completing tertiary EDU include Poland, Latvia, Estonia, and Lithuania. This situation is the same for both years, 2015 and 2019.

We bring out LISA cluster analysis to show the presence of spatial autocorrelation. The existence of heterogeneity is repealed in the distribution of LISA analysis. LISA indicates significant local clusters (high–high or low–low) or local spatial outliers (high–low or low–high). LISA analysis has two essential features. In addition to providing statistics for each location with a significance rating, it establishes a proportional relationship between the sum of the local statistics and the corresponding global statistic (Anselin, 1995). In Table 2, we can see the classification of countries into individual clusters 1–4, which are arrived at based on LISA cluster maps.

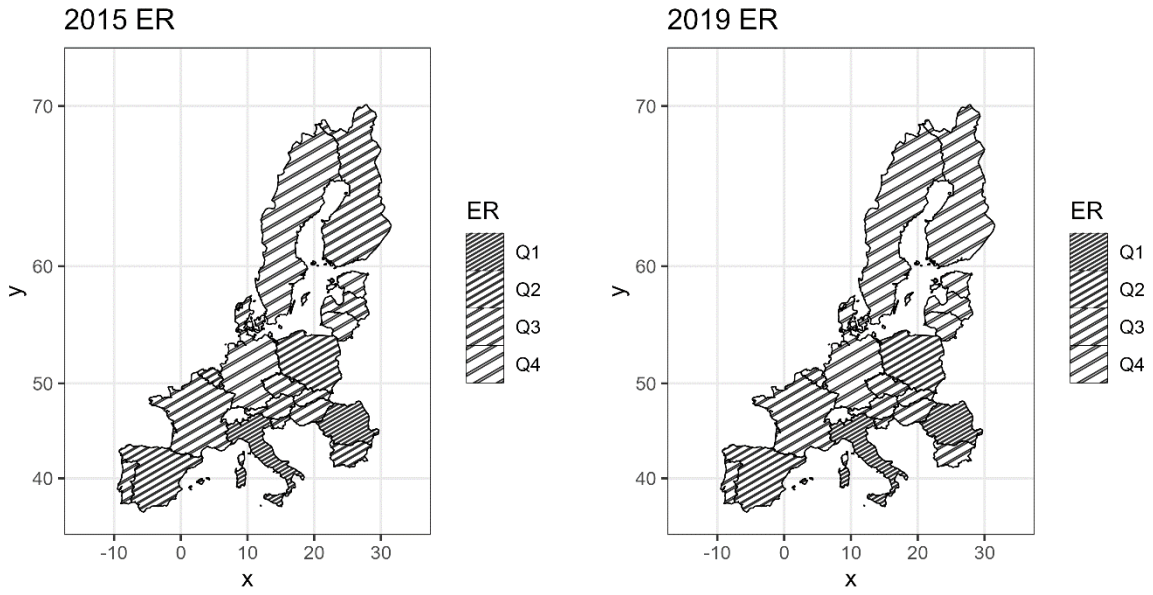
Our first LISA cluster is about GDP in individual EU countries. Based on LISA cluster analysis, we have 12 countries in the Low-Low area, located in the east and west of the EU. The rest of the EU is in the High-High area with a significant global spatial autocorrelation (8 countries), except Austria as a spatial outlier in the High-Low area. This situation is the same at the beginning and end of our monitoring period.

The second LISA cluster is for GEI and the value of its score for individual EU countries. The situation at the end of the monitored period is similar to the case at the beginning. We can see that the whole eastern part of the EU is in the low–low area and the northern part of the EU and some countries of Western Europe are in the high–high area, which means that a significant global spatial autocorrelation is present.

© 2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

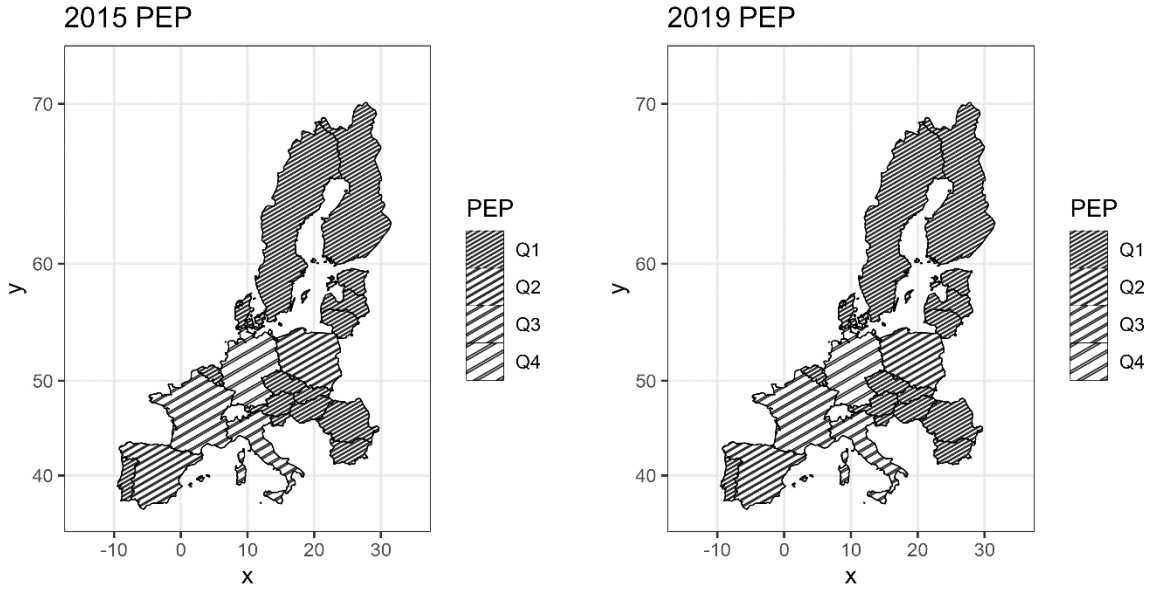
Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Fig. 4: Female employment rate for the years 2015 and 2019



Source: Own based on Eurostat and EIGE
Note: Q1: low female employment rate in %; Q4: high female employment rate in %.

Fig. 5: Population of women for the years 2015 and 2019

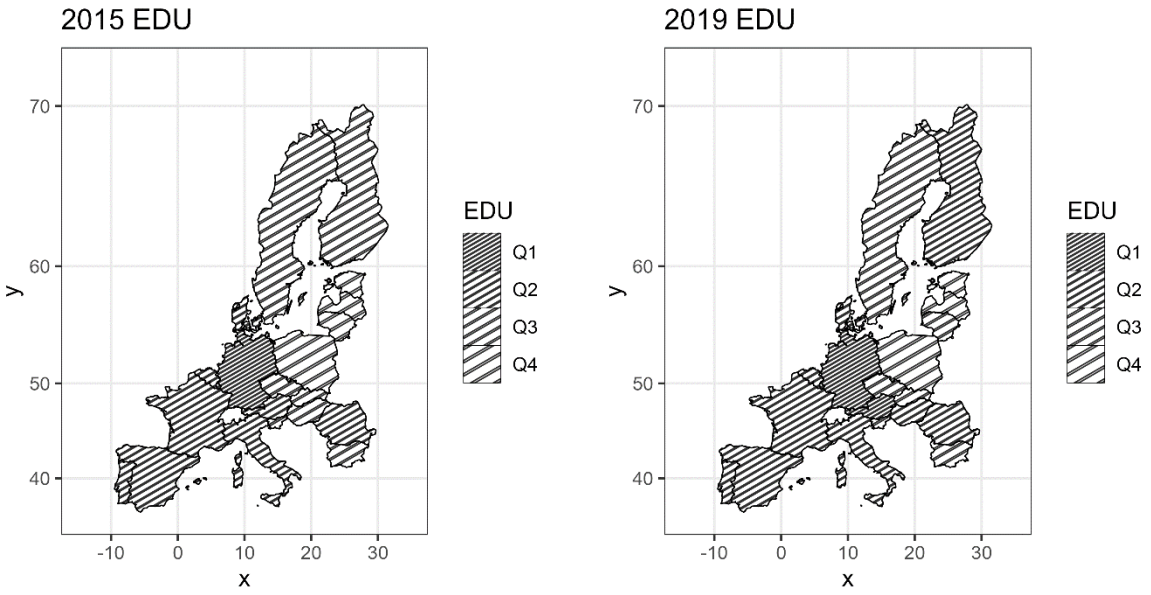


Source: Own based on Eurostat and EIGE
Note: Q1: the lower number of the female population (1000); Q4: the higher number of the female population (1000).

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Fig. 6: Graduates in tertiary education by education level for the years 2015 and 2019



Source: own based on Eurostat and EIGE
Note: Q1: the lowest number of women with tertiary education (women per 100 men); Q4: the highest number of women with tertiary EDU (women per 100 men).

LISA cluster map, which is about GPG, shows a very high disparity. Almost all EU countries are included in the high-low or low-high area, which means they are located as spatial outliers without significant spatial location. When evaluating this variable, only a few countries are included in the high-high area, and the same applies to 2015 and 2019.

The distribution of female ER values changed during the monitored period. Some countries (Spain, Romania) in the low–low area at the beginning of the monitored period were already in the low–high area at its end or vice versa. The Nordic countries were in the high–high area all along, and the situation in other countries changed over time.

As regards the size of the female PEP in individual EU countries, the situation at the LISA cluster did not change in the monitored period. A lower number of countries represents countries belonging to the high–high areas, and the north of the EU and countries in the southeast are in the low–low area.

The last LISA cluster is about the graduates in tertiary EDU by EDU level (women per 100 men) in the EU countries. Countries in high–high areas with a significant spatial location are mainly in the Central EU, and Western countries are entirely in the low–low area. The number of female tertiary EDU graduates did not change significantly during the monitored period. There was no change in Western EU countries during the monitored period. The cluster change occurred only in four cases (Czechia, Hungary, Austria, and Bulgaria). Czechia and Hungary moved from cluster 1, that is, from a cluster with a high spatial autocorrelation, to a cluster representing spatial outliers.

Moran's scatter plots show the spatially lagged variable on the y-axis and the original variable on the x-axis. We can find the data points in four quadrants. Positive spatial autocorrelation of values that are higher or lower than the mean of our sample is indicated by the data points in the upper right (or high–high) and lower left (or low–low). Observations that exhibit negative spatial autocorrelation, which means that these values carry little similarity to their neighboring ones, are shown in the upper left (or low–high) and the lower right (or high–low).

Firstly, when we investigate GDP using Moran's scatter plot in Figure 7, data points do not reflect clear positive or negative autocorrelation. Points are almost evenly dispersed in each quadrant. Therefore, we cannot unequivocally confirm which of the quadrants is dominant. Also, we cannot determine the tendency toward positive or negative spatial autocorrelation or no spatial autocorrelation of this variable.

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Tab. 2: Results of LISA cluster analysis

Country	2015						2019					
	GDP	GEI	GPG	ER	PEP	EDU	GDP	GEI	GPG	ER	PEP	EDU
Belgium	1	1	4	3	3	4	1	1	4	3	3	4
France	1	1	2	2	1	4	1	1	2	4	1	4
Germany	1	1	2	1	2	4	1	1	2	2	2	4
Italy	1	3	4	3	2	4	1	3	3	3	2	4
Luxembourg	1	1	4	3	3	4	1	1	4	3	3	4
Denmark	1	1	1	1	3	4	1	1	1	1	3	4
Portugal	4	3	2	3	3	4	4	3	4	2	3	4
Spain	4	2	3	4	1	4	4	1	4	3	1	4
Austria	2	4	1	2	3	2	2	2	1	2	3	4
Finland	1	1	2	1	4	3	1	1	2	1	4	3
Sweden	1	1	3	1	4	1	1	1	3	1	4	1
Czechia	4	4	1	1	3	1	4	4	1	1	3	2
Estonia	4	4	1	1	4	1	4	4	1	1	4	1
Hungary	4	4	4	2	4	1	4	4	2	2	4	3
Latvia	4	4	1	1	4	1	4	4	1	1	4	1
Lithuania	4	4	4	2	4	1	4	4	2	2	4	1
Poland	4	4	3	4	1	1	4	4	3	3	1	1
Slovakia	4	4	1	4	4	1	4	4	1	1	4	1
Slovenia	4	2	4	4	4	2	4	2	3	2	4	2
Bulgaria	4	4	2	4	4	2	4	4	2	4	4	1
Romania	4	4	4	4	4	3	4	4	3	3	4	3

Source: Own elaboration by the authors
Note: 1 – high–high area; 2 – high–low area; 3 – low–high area; 4 – low–low area; 2015: GDP: 1 – (25,860–82,820); 2 – (36,140); 4 – (5700–23,090); GEI: 1 – (64.9–79.7); 2 – (66.1–67.4); 3 – (54.4–56.5); 4 – (51.2–61.3); GPG: 1 – (15.1–26.7); 2 – (15.5–21.8); 3 – (7.3–14.1); 4 – (4.7–14.2); ER: 1 – (66.4–77.6); 2 – (66.2–72.2); 3 – (50.5–65); 4 – (50.3–64.6); PEP: 1 – (6688.6–11,693); 2 – (8895.8–16,588.9); 3 – (106.1–2037.1); 4 – (272.1–3326.1); EDU: 1 – (153.32–193.7); 2 – (123.92–156.38); 3 – (139.85–149.66); 4 – (100.6–147); 2019: GDP: 1 – (27,230–83,590); 2 – (38,090); 4 – (6630–25,180); GEI: 1 – (66.9–83.6); 2 – (65.3–68.3); 3 – (59.9–63); 4 – (51.9–59.8); GPG: 1 – (14–21.7); 2 – (13.3–19.2); 3 – (3.3–11.8); 4 – (1.3–10.9); ER: 1 – (71.7–78.9); 2 – (72.1–77.4); 3 – (53.9–68.1); 4 – (69.4–70.2); PEP: 1 – (6730.7–11,937.4); 2 – (9231–17,398.1); 3 – (122.9–2174.3); 4 – (278.2–3387.7); EDU: 1 – (151.02–192.75); 2 – (150.04–157.57); 3 – (144.12–144.88); 4 – (98.24–144).

In the case of GEI in Figure 8, we can confirm the presence of positive spatial autocorrelation. In 2015 and 2019, data points were concentrated in the upper right and lower left quadrants.

Moran's scatter plot showing the interrelationships of the GPG variable displays data points in all four quadrants in Figure 9. Therefore, we cannot confirm positive or negative spatial autocorrelation.

Similar to the display of the relationship between GDP and GPG, we cannot confirm a positive or negative correlation in this Moran's scatter plot, which shows the relationship between ER of women and the average value of its neighbors for ER of women in Figure 10. Data points are scattered in all four quadrants. In 2019, we can observe the dominance of these data points in the two quadrants, but one confirms the presence of a positive and the other a negative spatial autocorrelation.

Moran's scatter plot of the female PEP centers data points in the lower left part, which we can see in Figure 11. Since the data points already dominate in the mentioned quadrant, we can confirm the positive spatial autocorrelation.

Moran's scatter plot about EDU in Figure 12, has data points concentrated in the upper right and lower left quadrants. Based on this dominance of points, we can confirm that this variable shows positive spatial autocorrelation.

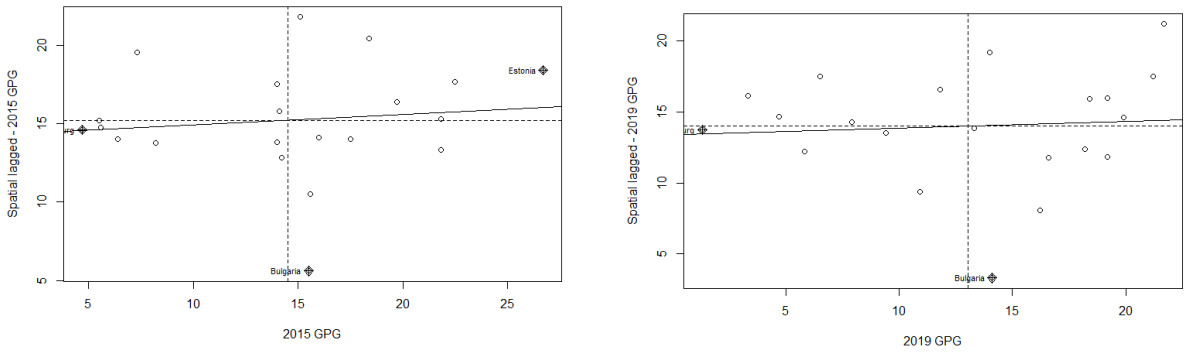
We can determine whether the data is randomly dispersed based on the *p*-value corresponding to Moran's *I*. Table 3 provides an overview of the results for Moran's *I* statistics.

If we look at the variables in 2015, we can say that GDP, GEI, and EDU variables are not randomly dispersed. It means that values are spatially clustered in noticeable patterns. Contrarily, GPG, ER, and PEP are the variables whose values are randomly dispersed. The same is found in 2019.

© 2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

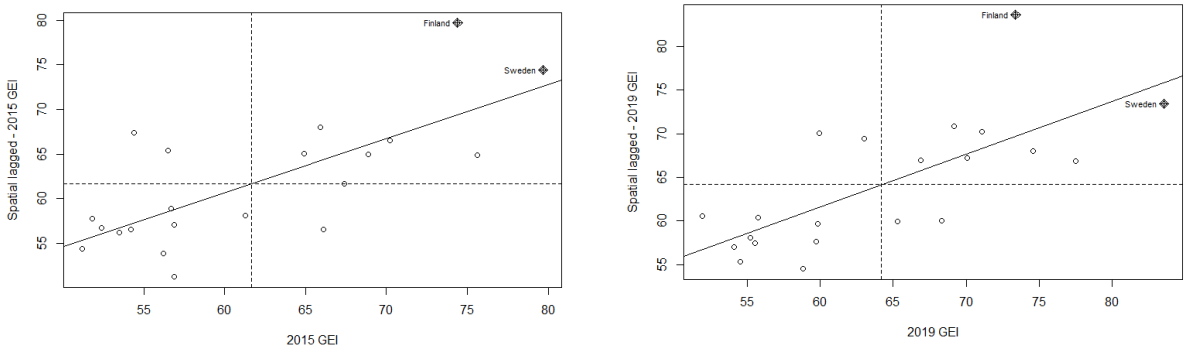
Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Fig. 7: Moran's scatter plot: GDP



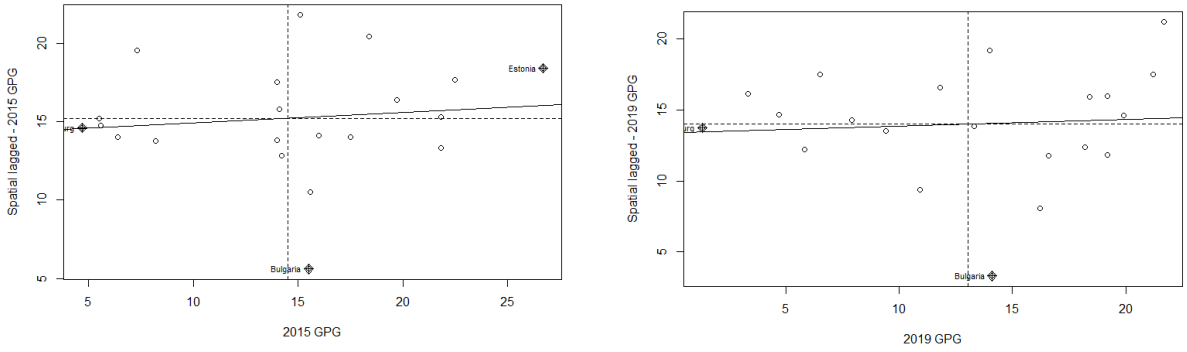
Source: Own based on Eurostat and EIGE

Fig. 8: Moran's scatter plot: Gender Equality Index



Source: own based on Eurostat and EIGE

Fig. 9: Moran's scatter plot: Gender Pay Gap

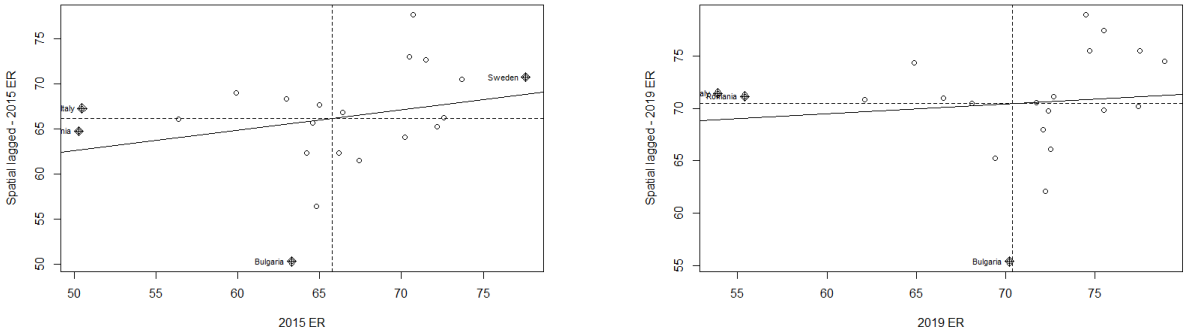


Source: Own based on Eurostat and EIGE

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

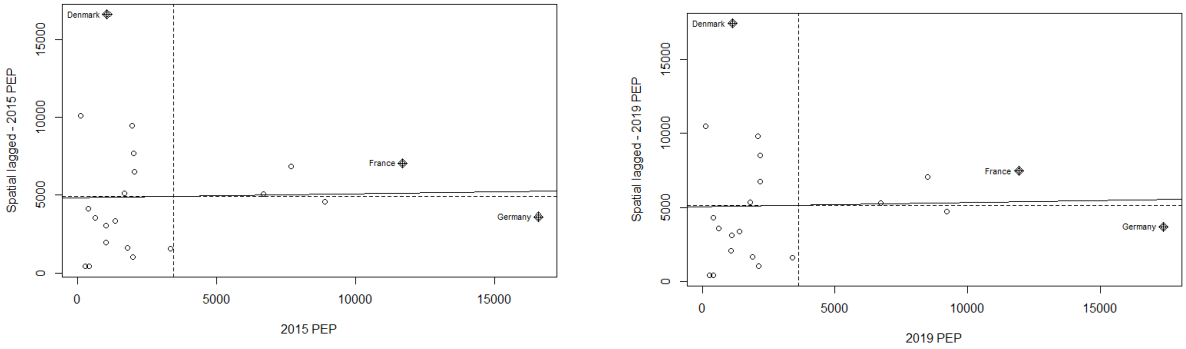
Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Fig. 10: Moran's scatter plot: Employment rate



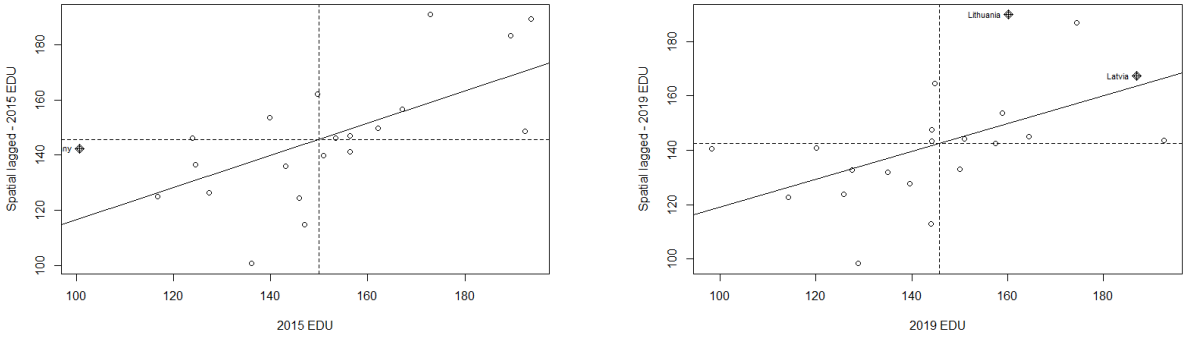
Source: Own based on Eurostat and EIGE

Fig. 11: Moran's scatter plot: Population of women



Source: Own based on Eurostat and EIGE

Fig. 12: Moran's scatter plot: Education



Source: Own based on Eurostat ad EIGE

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Tab. 3: Moran's *I* statistics

Year/variable	GDP	GEI	GPG	ER	PEP	EDU
2015	0.4398	0.6058	0.0676	0.2252	0.0249	0.5838
	(0.0029)	(0.0006)	(0.2805)	(0.0806)	(0.3415)	(0.0007)
2017	0.4420	0.5816	0.0760	0.1243	0.0223	0.4948
	(0.0029)	(0.0316)	(0.2673)	(0.1857)	(0.3463)	(0.0033)
2019	0.4451	0.6035	0.0462	0.0940	0.0262	0.5125
	(0.0029)	(0.0006)	(0.3184)	(0.2277)	(0.3385)	(0.0023)

Source: Own elaboration by the authors based on Eurostat and EIGE
Note: *p*-values are in parentheses; significance level α = 0.05.

Perugini and Martino (2008) examine income inequality in Europe and its impact on growth using spatial econometrics. The result is the demonstration of regional income inequality not only within Europe, but also within individual countries. The methodology also reveals spatial inequality patterns across regions that are not clearly captured by national borders. Gender inequalities persist in the labor market in almost all countries. Women are rewarded with lower wages, and these inequalities are not only demonstrated at the EU level, but even within individual countries. Castellano and Rocca (2019) analyze the aspects of spatial differences as well as the influence of EDU. While the difference in EDU appears to be a stable variable within countries, there is a large variability in results within differences in the labor market. Adapting national policies to regional aspects could be an effective strategy in the fight against gender inequality. Understanding the geographic context and perspective in explaining the development of countries is one of the most significant issues. For example, when examining well-being across regions of Europe, Pierewan and Tampubolon (2014) argue that it can be explained using a geographic dimension. Well-being is a spatially dependent variable, where regions with higher levels of well-being are surrounded by higher levels of well-being, confirming spatial dependence. One of the main consequences of public policy, which follows from the previous statement, is that introducing measures can bring development within the given region and in the surrounding regions.

DISCUSSION AND CONCLUSIONS

Gender inequality has received much attention in the past decades. A distinct feature of such discussion is women's employment, educational inequality, or wage gap in GDP results (e.g., Klasen & Lamanna, 2009; Falk & Leoni, 2010). Many studies confirm the mutual causality between gender inequality and the economic performance of countries. Economic progress empowers women, and thus promotes equality for both sexes.

On the other hand, there are developing countries that, based on gender equality, use human capital more effectively, and there is significant economic progress (Ghost & Ramanayake, 2020). Gender inequality is a phenomenon that is often the result of insufficient measures on the part of public institutions. Due to the influence of globalization, unequal status can also be transferred to neighboring countries. In the same way, increasing economic growth, which is supported by gender equality, can have a positive effect on neighboring countries due to globalization. EDU level only affects outputs within the home country and does not affect neighboring countries (Iqbal et al., 2022).

The result of the LISA cluster analysis brings an exciting conclusion about GDP per capita. At the beginning and end of the observed period, all countries belonged to the same clusters, even though the explanatory variables moved within the clusters over time. The clustering process is based on the factors that have arisen previously from the processed research. In their study, Klasen and Lamanna (2009) claim that gender inequalities in EDU and employment considerably reduce economic growth because such gender inequality reduces human capital in the society. It is also aimed at the EU policies focused on the equality of sexes. Such outcomes serve policymakers to prepare suitable regulations in this field to mitigate the differentiation in each field of the sexes inequality. The EU member countries' national policies should reflect these regulations' supranational aims. Hence, individual countries modify their national and regional policies to offer as many potential benefits as possible.

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

When monitoring GEI, we observe that the northern and eastern EU countries maintained their position in the monitored period. However, there are also countries where the change occurred, for example, Spain, which moved from the original high–low cluster to the high–high cluster. It means that it was positively influenced by the neighboring outcome values, improving the score and moving toward a gender-balanced country. Austria also moved within the clusters, but remained in the position of an outlier, that is, without positive spatial autocorrelation. According to EIGE (2019), with 70.1 out of 100 points, Spain was the ninth in the EU, and its score was even 2.7 points higher than the score for the whole EU. Since 2005, it has progressed toward gender equality faster than other EU countries. Austria has 65.3 out of 100 and ranks 13 in the EU ranking according to achieved GEI score and its score is 2.1 points lower than the score for the EU.

When examining GPG, there was a change in the classification into individual clusters in several cases. The total number of countries included in a different cluster at the end of the observation is seven, representing up to one-third of the examined countries. The GPG shows many countries that are not spatially autocorrelated with each other. Based on this, the level of wages of women in a given country does not affect neighboring countries. Falk and Leoni (2010) claim that decreasing GPG increases the female participation ratio in the labor market. Ilić (2022), in his study, focused on the Balkan countries and confirmed that the wage gap between women and men can have adverse economic consequences, which include, for example, a decrease in the rate of employment or economic activity. This results in a significant drop in GDP per capita. A GPG can also be understood very specifically. Various fields are not directly associated with such an issue.

Nevertheless, undoubted ties can be found. Orthopedics as a medical specialization offers an interesting perspective as women earn significantly less than men here. The suggested fee code should prepare a compromise to make the wages more similar. It needs to be a proper policy proposal, but as it makes a consensus between two or more sides, this would be perceived as a guideline or a protocol for practice (Halim et al., 2023). Gender wage inequality is lowest in public institutions, followed by public and private enterprises. These findings can significantly contribute to understanding and addressing gender inequality in earnings, primarily through policies to promote gender equality (He & Wu, 2017).

As for the ER variable, there was also a movement of countries between clusters in most cases. During the observed period, ER of women was mainly maintained by the Nordic countries (Sweden, Finland, Denmark, Estonia, Latvia), which also belong to the cluster with a high spatial autocorrelation. The biggest jump was recorded for Slovakia, which moved from the original cluster four to cluster one, but was always in the cluster with a positive spatial autocorrelation. Women hold high management positions much more rarely than men. It is an obvious fact. Nonetheless, it is not related to their responsibility, performance, or labor productivity. This fact is understood as a historical phenomenon. Usually, there are no rules or policies to diminish this state. On the one hand, it is not required in private enterprises. On the other hand, the state, regional, or local authorities are not in a situation where such a policy would play a role. National gender-related policies are associated with differences in corporate governance outcomes. The gender-related topics represent the critical inputs to organizational and individual selection (Thams et al., 2018).

Participation of women in employment still varies widely within the EU, but female employment is increasing rapidly in Europe. A key factor for improving employment and earnings is women's increasing EDU. This fact leads to overall higher efficiency and support of economic growth (Gudrun, 2007). The participation of women in the labor market is improving due to the policy. The proof is, for example, the family policy focused on the labor market, the positive effect of which has been manifested in recent years. However, it is again essential to correctly set and verify the given measures because sometimes, alongside effective policies, some have the opposite effect and strengthen the existing gender inequality in the labor market (Seo, 2023). GDP per capita, labor force participation, EDU, and PEP share are among the primary sources where gender inequality can be identified. The regression model results show a positive relationship between GDP per capita and female labor force participation (Acar & Dogruel, 2012). Constraints to female labor force participation can result in lower economic growth (Alonso et al., 2019). Getting the policy right is very important.

For example, the EU's pension policy appears gender neutral, but ultimately harms most women. Its goal was to reduce the state's responsibility and increase individual responsibility, but this reform favors male work models, thereby disadvantaging women and their work engagement (Earles, 2013). The EU also has a range of equal opportunity policies and higher EDU programs (Bourabain & Verhaeghe, 2022). Female employment also plays a substantial role in mitigating a pay gap. Increasing EDU brings a new aspect to this area. It is reflected in the focus of the national and regional policies and at the international level. The EU pays attention to many measures that describe the position of women in society. One of the incomes of the female PEP should be bound to the benefits of employing women. Altogether, this brings many perspectives to be investigated in further research.

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

The discussed indicators possess a very close relation to the policymaking processes. It is indisputable that the gender inequality index, GPG, ER, PEP, and the tertiary EDU graduates influence many policy fields of each country's economy. Without proper analytical processing, the policymaking process would lack a statistical basement with fundamental backing. Hence, a deep investigation should be carried out before constructing a national policy related to a field of the national economy. Generally, a pay gap introduces a pay system distortion. It causes more unwanted points followingly. For instance, women are subsequently paid lower pensions at retirement age. Although they can retire earlier than men, it is not enough to make the arisen gap cleared away. The People's Republic of China retirement policy includes strict restrictions for potential pensioners. One of the main issues is the industry heterogeneity. Several factors cause this. For instance, an aspect of the explored ones is the ownership of the enterprises (Liu & Xu, 2023).

Governments should apply a holistic approach to gender inequality in their policies and legislation and, in this way, regulate the state of equality (Ovadia, 2022). Examining political support for basic income from the point of view of income inequality indicates that the correct setting of income taxation is significant, which affects the effects of gender inequality (Day, 2022). Disclosure of gender equality policies and their impact is essential for subsequent evaluation of such interventions (Escamilla-Solano et al., 2022). Researches show that countries with a more favorable status of gender equality have developed better approaches in the field of gender policy, especially at the level of institutions (Reidl et al., 2020). All these aspects can be considered in the political–economic models of the particular countries (Tkáčová et al., 2018).

A policymaking process at every authority level, from national through regional to local, is based on many inputs. It is not possible to simulate all these inputs. Hence, policymakers not only consider the obtained findings from the processed studies, but also concentrate on the ways of their achievement. From a perspective of gender inequality, the policy at a local level does not have such ruling power as a higher-positioned policy. This is a naked fact that should be considered when analyzing the policymaking process. Therefore, it is important to push on policymakers at the highest national level to make a national policy as practical as possible, and thus, it becomes a crucial point in each process related to the explored field, that is, the gender inequality issue. Besides the policy construction recommendations, the outcomes are also interesting for academia. The values of the statistical outcomes demonstrate the statistical significance of the applied gender-related indicators, and hence, these numbers show the strength of the employed methodology in the explored field.

All the particular policies are aimed at the main points of the gender inequality field. These aspects represent the key areas to which the policymaking authorities should pay attention to diminish the differences for all the indicators related to the discussed topic – from a pay gap issue through female employment to tertiary EDU of the female PEP. It is necessary to set the national policies of the EU member states, so that these crucial perspectives come to the forefront. Therefore, this should be performed in all the analytical models associated with the discussed fields. Successively, the desired outcomes are brought by the appropriate aim of the ratified EU policies and the other norms for mitigating gender inequalities.

Gender inequality is a fundamental and multidimensional problem not only for the EU countries, but for the whole world. The biggest problem is that countries strive for fast economic growth when equal opportunities are forgotten, and gender inequality deepens in all areas, ultimately harming economic development. Understanding the determinants of gender differences in the economic field and subsequently dealing with their impacts is a matter of interest for policymakers who try to establish a balance through various measures. Tracking gender differences, especially in economic areas, is important when explaining economic results. Reducing gender inequality is a long-term political commitment of the EU. The situation is gradually improving, although public policies are expected to have a more substantial impact. However, inequalities persist in almost all areas where there is a reduction in economic opportunities for women, ultimately affecting the global economy.

Regarding the limitation of the analysis, the data comes from the Eurostat and EIGE databases. These offer a large amount of data, but the observed data before 2015 are unavailable. Hence, such a shorter period is explored. Nevertheless, this does not lower the quality of the analytical outcome as the other authors applied the time series very similarly. The explained variable through regression analysis is in the form of the most applied macroeconomic indicator, that is, GDP. This is selected by inspiration from the other referenced studies in the paper, as many of them examined it as the explanatory variable. Hence, this indicator has been considered from the other perspective to bring a novel approach to deal with the socioeconomic and sociodemographic indicators in the field of gender inequality.

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

ACKNOWLEDGMENT

The paper is published with the support of the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of Slovakia and the Slovak Academy of Sciences within project 1/0646/2023.

REFERENCES

Abdullah, N.B. (2022). A Panel Data Approach of Determining Factors of Economic Growth for Different Income Groups of Countries. *Digitala Vetenskapliga Arkivet*. Retrieved June 17, 2023, from http://www.diva-portal.org/smash/get/diva2:1634939/FULLTEXT01.pdf

Acar, S., & Dogruel, F. (2012). Sources of inequality in selected MENA countries. *Structural Change and Economic Dynamics*, 23(3), 276–285. https://doi.org/10.1016/j.strueco.2012.03.004

Alonso, C., Brussevich, M., Dabla-Norris, E., Kinoshita, Y., & Kochhar, K., (2019). Reducing and Redistributing Unpaid Work: Stronger Policies to Support Gender Equality. *IMF Working Paper*, Washington, D. C. https://doi.org/10.5089/9781513514536.001.A001

Anastasiou, S., Filippidis, K., & Stergiou, K. (2015). Economic Recession, Austerity ad Gender Inequality at Work. Evidence from Greece and Other Balkan Countries. *Procedia Economics and Finance*, 24, 41–49. https://doi.org/10.1016/S2212-5671(15)00610-3

Anderson, E. (2022). The correlates of declining income inequality among emerging and developing economies during the 2000s. *World Development*, 152, 105785. https://doi.org/10.1016/j.worlddev.2021.105785

Anselin, L. (1995). Local Indicators of Spatial Association–LISA. *Geographical Analysis*, 27(2), 93–184. https://doi.org/10.1111/j.1538-4632.1995.tb00338.x

Anselin, L. (1996). The Moran Scatterplot as an ESDA Tool to Assess Local Instability in Spatial Association. *Spatial Analytical Perspective on GIS in Environmental and Soci-Economic Sciences*, Taylor; Francis, 111–25.

Asongu, S. A., & Odhiambo, N. M. (2020). Inequality and gender inclusion: Minimum ICT policy thresholds for promoting female employment in Sub-Saharan Africa. *Telecommunications Policy*, 44, 4, 101900. https://doi.org/10.1016/j.telpol.2019.101900

Assoumou-ella, G. (2019). Gender Inequality in Education and per capita GDP: the case of CEMAC Countries. *Economics Bulletin*, 39(2), 1154–1164. http://dx.doi.org/10.2139/ssrn.3391773

Barro, R. J. (2008). Inequality and Growth Revisited. *ADB Working Paper Series on Regional Economic Integration*, 11. http://hdl.handle.net/10419/109529

Beckmannshagen, M., & Schröder, C. (2022). Earnings inequality and working hours mismatch. *Labour Economics*, 76, 102184. https://doi.org/10.1016/j.labeco.2022.102184

Bennell, P. (2023). The attainment of gender education equality: A preliminary assessment of country performance in sub-Saharan Africa. *International Journal of Educational Development*, 98, 102722. https://doi.org/10.1016/j.ijedudev.2022.102722

Bilan, Y., Mishchuk, H., Samoliuk, N., & Yurchyk, H., (2020). Impact of Income Distribution on Social and Economic Well-Being of the State. *Sustainability*, 12(1), 429. https://doi.org/10.3390/su12010429

Blanden, J., Doepke, M., & Stuhler, J. (2023). Chapter 6: Educational inequality. *Handbook of the Economics of Education*, 6, 405–497. https://doi.org/10.1016/bs.hesedu.2022.11.003

Bourabain, D., & Verhaehe, P. P. (2022). Equality for all? Support for equal opportunity among professors in Europe. *Sociology Compass*, 17(1). https://doi.org/10.1111/soc4.13039

Castellano, R., & Rocca, A. (2019). Analyzing the gender gap in European labour markets at the NUTS-1 level. *Cogent Social Sciences*, 5(1). https://doi.org/10.1080/23311886.2019.1595294

Costantini, M., & Paradiso, A. (2018). What do panel data say on inequality and GDP? New evidence at US state-level. *Economics Letters*, 168, 115–117. https://doi.org/10.1016/j.econlet.2018.04.019

Council of Europe. (2019). Gender Matters: A manual on addressing gender-based violence affecting young people. Second edition. ISBN: 978-92-871-8958-5

Cooray, A., & Potrafke, N. (2011). Gender inequality in education: Political institutions or culture and religion? *European Journal of Political Economy*, 27(2), 268–280. https://doi.org/10.1016/j.ejpoleco.2010.08.004

Croissant, Y., & Millo, G. (2008). Panel Data Econometrics in R: The plm Package. *Journal of Statistical Software*, 27(2), 1–43. https://doi.org/10.18637/jss.v027.i02

Dahlum, S., Knutsen, C. H., & Mechkova, V. (2022). Women's political empowerment and economic growth. *World Development*, 156, 105822. https://doi.org/10.1016/j.worlddev.2022.105822

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Day, C. (2022). Increasing inequality and voting for basic income: Could gender inequality worsen? *Economic Analysis and Policy*, 76, 476–487. https://doi.org/10.1016/j.eap.2022.08.012

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, 74(366), 427–431. https://doi.org/10.2307/2286348

Domini, G., Grazzi, M., Moschella, D., & Treibich, T. (2022). For whom the bell tolls: The firm-level effect of automation on wage and gender inequality. *Research Policy*, 51(7). https://doi.org/10.1016/j.respol.2022.104533

Dutta, N., & Sobel, R. S. (2022). Trust and attitudes toward income inequality: Does individualism matter? *European Journal of Political Economy*, 102351. https://doi.org/10.1016/j.ejpoleco.2022.102351

Earles, K. (2013). The gendered consequences of the European Union's pension policy. *Women's Studies International Forum*, 38, 75–82. https://doi.org/10.1016/j.wsif.2013.02.013

Edzes, A. J. E., Dijk, J., & Broersma, L. (2022). Does cross-border commuting between EU countries reduce inequality? *Applied Geography*, 139, 102639. https://doi.org/10.1016/j.apgeog.2022.102639

EIGE. (2019). Gender Equality Index 2019: Spain. https://doi.org/10.2839/64883

EIGE. (2019). Gender Equality Index 2019: Spain. https://doi.org/10.2839/667035

Elveren, A. Y., Moghadam, V. M., & Dudu, S. (2022). Militarization, women's labour force participation, and gender inequality: Evidence from global data. *Women's Studies International Forum*, 94, 102621. https://doi.org/10.1016/j.wsif.2022.102621

Engeli, I., & Mazur, A. (2018). Taking implementation seriously in assessing success: the politics of gender equality policy. *European Journal of Politics and Gender*, 1(1-2), 111–29. https://doi.org/10.1332/251510818X15282097548558

Escamilla-Solano, S., Paule-Vianez, J., & Blanco-González, A. (2022). Disclosure of gender policies: do they affect business performance? *Heliyon*, 8(1). https://doi.org/10.1016/j.heliyon.2022.e08791

European Commission. (2008). Directorate-General for Employment, Social Affairs and Inclusion, *Manual for gender mainstreaming: employment, social inclusion and social protection policies*, Publications Office, 2019. https://data.europa.eu/doi/10.2767/19842

European Commission. (2023). Strategy for gender equality. Achievements and key areas of activity. https://commission.europa.eu/strategy-and-policy/policies/justice-and-fundamental-rights/gender-equality/gender-equality-strategy_sk

Falk, M., & Leoni, T. (2010). Regional Female Labour Force Participation: An Empirical Application with Spatial Effects. *AIEL Series in Labour Economics*, 5, 309–326. 10.1007/978-3-7908-2164-2_12

Farooq, F., Yusop, Z., Chaudhry, I. S., & Iram, R. (2020). Assessing the impacts of globalization and gender parity on economic growth: empirical evidence from OIC countries. *Environmental Science and Pollution Research*, 27(7), 6904–6917. https://doi.org/10.1007/s11356-019-07289-y

Frost, J., Gambacorta, L., & Gambacorta, R. (2022). On the nexus between wealth inequality, financial development and financial technology. *Journal of Economic Behavior & Organization*, 202, 429–451. https://doi.org/10.1016/j.jebo.2022.08.011

Gavurova, B., Kováč, V., & Rusnáková, J. (2016). Skúmanie vzťahu priestorového rozloženia rómskej populácie a dojčenskej úmrtnosti v Slovenskej republike. *Geografický časopis*, 68(4), 319–332

Gavurova B, Tucek D, & Kovac V. Investigation of Relationship Between Spatial Distribution of Medical Equipment and Preventable Mortality. *International Journal of Environmental Research and Public Health*, 16, 2913. https://doi.org/10.3390/ijerph16162913

Ghost, T., & Ramanayake, S. S. (2020). The macroeconomics of gender equality. *International Journal of Finance & Economics*, 26(2), 1955–1977. https://doi.org/10.1002/ijfe.1888

Grotti, R., & Scherer, S. (2016). Does gender equality increase economic inequality? Evidence from five countries. *Research in Social Stratification and Mobility*, 45, 13–26. https://doi.org/10.1016/j.rssm.2016.06.001

Gudrun, B. (2007). The Employment of Women in the European Union. *WIFO Working Papers*, 297, Australian Institute of Economic Research, Vienna. http://hdl.handle.net/10419/128837

Halim, U. A., Qureshi, A., Dayaji, S., Ahmad, S., Qureshi, M. K., Hadi, S., & Younis, F. (2023). Orthopaedics and the gender pay gap: A systematic review. *The Surgeon*. https://doi.org/10.1016/j.surge.2023.02.003

He, G., & Wu, X. (2017). Marketization, Occupational segregation, and gender earnings inequality in urban China. *Social Science Research*, 65, 96–111. https://doi.org/10.1016/j.ssresearch.2016.12.001

Heathcote, J., Storesletten, K., & Violante, G. L. (2017). The macroeconomics of the quiet revolution: Understanding the implications of the rise in women's participation for economic growth and inequality. *Research in Economics*, 71(3), 521–539. https://doi.org/10.1016/j.rie.2017.03.002

Iqbal, A., Hassan, S., Mahmood, H., & Tanveer, M. (2022). Gender equality, education, economic growth and religious tensions nexus in developing countries: A spatial analysis approach. *Heliyon*, 8(11), e11394. https://doi.org/10.1016/j.heliyon.2022.e11394

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Ilić, N. (2022). Gender Pay Gap in Western Balkans: Why Do Women Earn Less Than Men? *Gender Competent Public Law and Policies*, 2, 69–90. https://doi.org/10.1007/978-3-031-14706-7_4

Jayachandran, S. (2015). The Roots of Gender Inequality in Developing Countries. *Annual Review of Economics*, 7, 63–88. https://doi.org/10.1146/annurev-economics-080614-115404

Jetten, J., Peters, K., & Casara, B. G. S. (2022). Economic inequality and conspiracy theories. *Current Opinion in Psychology*, 47, 101358. https://doi.org/10.1016/j.copsyc.2022.101358

Kabeer, N., & Natali, L. (2013). Gender Equality and Economic Growth: Is there a Win-Win? *IDS Working Paper*, 2013(417), 1–58. https://doi.org/10.1111/j.2040-0209.2013.00417.x

Klasen, S., & Lamanna, F. (2009). The Impact of Gender Inequality in Education and Employment on Economic Growth: New Evidence for a Panel of Countries. *Feminist Economics*, 15(3), 91–132. https://doi.org/10.1080/13545700902893106

Klasen, S. (2018). The Impact of Gender Inequality on Economic Performance in Developing Countries. *Annual Review of Resource Economics*, 10, 279–298. https://doi.org/10.1146/annurev-resource-100517-023429

Klasen, S. (2020). From ‚MeToo' to Boko Haram: A survey of levels and trends of gender inequality in the world. *World Development*, 128, 104862. https://doi.org/10.1016/j.worlddev.2019.104862

Lee, J. H., Lim, E. S., & Hwang, J. (2012). Panel SVAR model of women's employment, fertility, and economic growth: A comparative study of East Asian and EU countries. *The Social Science Journal*, 49(3), 386–389. https://doi.org/10.1016/j.soscij.2012.01.006

Lipták, F., Klasová, S., & Kováč, V. (2015). Special Economic Zone Constitution According to Cluster

Analysis. Procedia Economics and Finance, 27, 186–193. https://doi.org/10.1016/S2212-5671(15)00988-0.

Liu, J. & Xu, S. (2023). Retirement policy, employment status, and gender pay gap in urban China. *Journal of Asian Economics*, 85, 101587. https://doi.org/10.1016/j.asieco.2023.101587

Lombardo, E., & Giorgio, E. (2013). EU antidiscrimination policy and its unintended domestic consequences: The institutionalization of multiple equalities in Italy. *Women's Studies International Forum*, 39, 12–21. https://doi.org/10.1016/j.wsif.2011.10.005

MacEachren, A. M. (1982). Map Complexity: Comparison and Measurement. *The American Cartographer*, 9(1), 31–46. doi:10.1559/152304082783948286

Matthews, R., & Nee, V. (2000). Gender Inequality and Economic Growth in Rural China. *Social Science Research*, 29(4), 606–632. https://doi.org/10.1006/ssre.2000.0684

Mikucka, M., Sarracino, F., & Dubrow, J. K. (2017). When Does Economic Growth Improve Life Satisfaction? Multilevel Analysis of the Roles of Social Trust and Income Inequality in 46 Countries, 1981-2012. *World Development*, 93, 447–459. https://doi.org/10.1016/j.worlddev.2017.01.002

Minasyan, A., Zenker, J., Klasen, S., & Vollmer, S. (2019). Educational gender gaps and economic growth: A systematic review and meta-regression analysis. *World Development*, 122, 199–217. https://doi.org/10.1016/j.worlddev.2019.05.006

Mukorera, S. Z. (2020). Is entrepreneurship the solution for female empowerment in South Africa? *Journal of Developmental Entrepreneurship*, 25(1). https://doi.org/10.1142/S108494672050003X

National Commission for the Promotion of Equality. (2008). A Gender Sensitivity Manual. ISBN: 978-99909-89-23-6

Ojwala, R. A., Kitada, M., Neat, F., & Buckingham, S. (2022). Effectiveness of gender policies in achieving gender equality in ocean science programmes in public universities in Kenya. *Marine Policy*, 144, 105237. https://doi.org/10.1016/j.marpol.2022.105237

Ovadia, J. S. (2022). Addressing gender inequality through employment and procurement: Local content in Tanzania's emerging gas industry. *The Extractive Industries and Society*, 9, 101028. https://doi.org/10.1016/j.exis.2021.101028

Perugini, C., & Martino, G. (2008). Income inequality within European regions: determinants and effects on growth. *Review of Income and Wealth*, 54(3), 373–406. https://doi.org/10.1111/j.1475-4991.2008.00280.x

Pierewan, A.C., & Tampubolon, G. (2014). Spatial dependence multilevel model of well-being across regions in Europe. *Applied Geography*, 47, 168–176. https://doi.org/10.1016/j.apgeog.2013.12.005

Reidl, S., Beranek, S., Holzinger, F., & Streicher, J. (2020). Gender equality regimes and evaluation regimes in Europe and their implications for policy design and evaluation. *Evaluation and Program Planning*, 83, 101860. https://doi.org/10.1016/j.evalprogplan.2020.101860

Rodríguez, A.V. (2017). Economic growth and gender inequality: an analysis of panel data for five Latin American countries. *CEPAL Review*, 2017(122), 79–106. https://doi.org/10.18356/73d010ed-en

Scognamillo, A., Mele, G., & Sensini, L. (2016). Nonrenewable Resources, Income Inequality and Per Capita GDP: An Empirical Analysis. *World Bank Policy Research Working Paper*, 7831. https://ssrn.com/abstract=2849132

Seguino, S. (2000). Gender inequality and economic growth: A cross-country analysis. *World Development*, 28(7), 1211–1230. https://doi.org/10.1016/S0305-750X(00)00018-8

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.

Cent. Eur. J. Public Policy 2023; 17(2): 13–32
DOI: 10.2478/cejpp-2023-0011

Seo, H. (2023). Gendered labour market patterns across Europe: Does family policy mitigate feminization of outsiders? *Journal of European Social Policy*, 33(1). https://doi.org/10.1177/09589287221148916

Taş, N., Hepsen, A., & Önder, E. (2013). Analyzing Macroeconomic Indicators of Economic Growth Using Panel Data. *Journal of Finance and Investment Analysis*, 2(3), 41–53. http://dx.doi.org/10.2139/ssrn.2264388

Tennekes, M. (2018). tmap: Thematic Maps in R. *Journal of Statistical Software*, 84(6). 10.18637/jss.v084.i06

Thams, Y., Bendell, B. L., & Terjesen, S. (2018). Explaining women's presence on corporate boards: The institutionalization of progressive gender-related policies. *Journal of Business Research*, 86, 130–140. https://doi.org/10.1016/j.jbusres.2018.01.043

Tkáčová, A., Gavurová, B., & Kováč, V. (2018). Political-economic cycle models of economy of Greece. *Journal of Business Economics and Management*, 19(5), 742–758. https://doi.org/10.3846/jbem.2018.7068

Verdier-Chouchane, A. (2016). Women in inclusive development: An overview. *Region et Developpement*, 44, 43–60. ISSN: 1267-5059

Vo, D. H., & Ho, Ch. M. (2022). Does educational attainment and gender inequalities affect wealth accumulation? Evidence from Vietnam. Heliyon, 8(12), e12502. https://doi.org/10.1016/j.heliyon.2022.e12502

Yumusak, I. G., Bilen, M., & Ates, H. (2013). The Impact of Gender Inequality in Education on Economic Growth in Turkey. *Procedia Social and Behavioral Science*, 103, 1093–1103. https://doi.org/10.1016/j.sbspro.2013.10.437

2023 licensee Simona Juhásová et al. This work is licensed under the Creative Commons Attribution 4.0 International License.