ECONOMIC THEMES (2023) 63(1): 45-58

DOI 10.2478/ethemes-2025-0003

GENDER EQUALITY IN EUROPE: DIFFERENCES AND CHALLENGES AMONG EUROPEAN COUNTRIES

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UDC
305:331.5

Original scientific paper

Abstract: The gender gap problem reflects persistent inequalities between men and women across economic participation, education, health, and political representation, driven by social, cultural, and institutional biases that restrict equal opportunities and outcomes. This paper explores the state of gender equality in Europe by constructing composite variables for each area through principal component analysis and applying cluster analysis to classify countries into four distinct groups. The first cluster includes Nordic countries with nearly complete gender equality; the second cluster consists of developed Western European countries with high educational and health outcomes, but lower political and economic opportunities for women. The third cluster comprises former socialist bloc countries with moderate educational and health indicators, but low economic and political inclusion of women, and finally the fourth cluster includes countries with significant challenges in achieving equality due to traditional norms and weak policies. The results indicate the need for tailored policies that would enhance economic opportunities and political participation for women, depending on the specific characteristics of each group of countries.

Received:
09.11.2024
Accepted:
28.03.2025

Keywords: Gender gap, gender inequality, economic participation, labour market, principal component, cluster analysis.

JEL classification: J16, C38, I14, I24.

1. Introduction

The issue of gender inequality is one of the most significant economic, social, and experiential challenges facing modern society. It serves not only as a measure of a society's level of democratisation but also as an indicator of its level of humanisation and a prerequisite for its growth and progress.

Gender inequality is rooted in differences arising from gender roles, manifesting in the labour market and throughout all sectors of society through various forms of discriminatory practices. This includes, first and foremost, gender-based division of labour, women's unpaid work within the family and household, the predominant presence of men in the public and/or political spheres, unequal rights to security, property, inheritance, differential media representation, and disparities in access to quality healthcare. These are merely examples of discriminatory practices, with the list growing continuously and its scope ever-expanding.

The need to model this phenomenon arises from the need to control it, with the aim of achieving full gender equality and bridging the gender gap in all spheres of life and work.

When it comes to the promotion of gender equality, Europe is often declared a leader in this area. Although progress in addressing gender disparities is increasingly evident year on year, it must be acknowledged that inequality persists as a tenacious and pronounced issue. According to the Zahidi, (2024)., Scandinavian countries (Iceland, Finland, Norway, and Sweden) are highly ranked in the global gender gap index, compared to the countries of Central and Southeastern Europe (Cyprus, Hungary, Czechia, and Turkey).

The Global Gender Gap Index, published by the World Economic Forum, is a comprehensive measure of gender equality that is used to compare the achievements of countries across four key areas: economic participation and opportunity, educational attainment, health and survival, and political empowerment. This index was introduced in 2006 and has since provided a detailed and consistent analysis to assess global progress in reducing the gender gap in over 140 countries. Its importance and strength are enhanced by its capacity to enable comparative analysis between different countries (economies) concerning their progress in gender equality.

As previously mentioned, this index comprises four fields, named according to the areas where achievements in gender equality are measured:

1. Economic Participation and Opportunity – measures gender differences in terms of workforce participation, wage disparities, and opportunities for career advancement. According to the latest Global Gender Gap Report (2024), it would take 152 years to achieve full equality in this area (-17 years compared to 2023).

2. Educational Attainment – measures differences between men and women regarding access to primary and higher education, as well as differences in educational achievements. According to the latest Global Gender Gap Report (2024), it would take 20 years to achieve full equality in this area (+4 years compared to 2023).

3. Health and Survival – measures gender differences in terms of life expectancy and health. According to the latest Global Gender Gap Report (2024), the time required to achieve full equality in this area remains undefined.

4. Political Empowerment – focuses on women's participation in political life and decision-making at the highest levels. According to the latest Global Gender Gap Report (2024), it would take 169 years to achieve full equality in this area (+7 years compared to 2023).

The Global Gender Gap Index assesses gender equality within a country over time, effectively identifying areas within an economy that are lagging and thus requiring appropriate action from decision-makers and/or authorities to mitigate and/or eliminate the existing gap (gender disparity). Each year, countries are ranked globally based on their overall performance, aggregated within the Global Gender Gap Index, facilitating cross-country comparisons and the tracking of global trends in this field.

The aim of this study is to perform a cluster analysis based on the most recent values of the Global Gender Gap indicators for European countries. To capture key variations within each category, principal component analysis was used to extract the most significant dimension for each category, leading to the definition of four clusters. Further analyses confirmed statistically significant differences among indicators between clusters, supporting the robustness of this approach.

2. Literature review

We are witnessing a time in which the issue of gender equality and the reduction of gender disparities is more in focus than ever across all spheres of activity and existence. Under such conditions, it is no surprise that literature dedicated to this research field has become increasingly popular and diverse, especially over the past decade. Contributing to this trend, among other things, is the development of the Global Gender Gap Index, which has facilitated easier tracking of progress in gender inequality.

Cluster analysis, as a method of multivariate statistical analysis, is frequently applied by authors in research studies, especially when examining the gender gap and its indicators. This statistical method aids researchers in classifying countries (regions) into groups with similar characteristics while simultaneously highlighting patterns indicating similarities and differences between them. Based on these identified similarities and differences, policies and interventions tailored to each group's specifics can be designed, thus ensuring greater effectiveness.

Torres-Olave (2019) focused on labour segmentation in STEM fields (science, technology, engineering, and mathematics). He applied a two-step cluster analysis to examine the impact of this segmentation on women, assessing factors like wages, working conditions, and health and retirement benefits. The study highlights how labour segmentation in STEM often places women in lower-paid and less secure positions. Koca (2022) employed hierarchical cluster analysis to classify countries based on the global gender gap index, examining dimensions such as economic participation, education, health, and women's political empowerment. Analysing data from 144 countries, Koca's study divided them into two groups based on women's economic and educational involvement, aiming to identify regional differences in gender equality levels.

López-Martínez et al. (2022) used cluster analysis to explore gender equality models within the European Union countries. They classified countries based on similarities in gender equality across areas like work, income, knowledge, power, and health, revealing varying equality models among the EU countries. Heinz et al. (2020) applied cluster analysis to study gender-related health inequality patterns across 45 countries. Analysing ten health indicators among over 71,000 adolescents, they found that countries could be grouped based on gender inequality patterns. Additionally, they observed that higher gender equality often correlated with specific health challenges for girls, such as school pressure, lower life satisfaction, and more frequent health complaints.

Braunstein (2017) argues that economic inequalities, such as lower female employment rates and unequal pay, can significantly limit countries' comparative advantages, particularly in labour-intensive industries. The author reached this conclusion by conducting a study encompassing 92 countries, which explored the bidirectional causal relationship between gender equality on one hand and economic growth on the other. The study revealed that economic growth can positively impact gender equality, just as gender equality can positively influence macroeconomic outcomes (trade, inflation, growth). Economic policies and strategies aimed at promoting gender equality can substantially affect the overall productivity growth and consequently the economic stability of a country.

The link between gender equality and life expectancy was the focus of a Pinho-Gomes et al. (2023) study. This study utilised a modified Global Gender Gap Index (GGGI) and its sub-indices to monitor the impact of changes on male and female

life expectancy. The study included 156 countries and tracked life expectancy for men and women from 2010 to 2020. The authors aimed to determine how gender equality affects life expectancy differences across genders. The analysis results showed that greater gender equality could increase life expectancy for both genders but may also widen life expectancy disparities, depending on the region and economic development of the country.

Ferrant (2014) highlights that gender inequality is multidimensional, manifesting across various spheres of existence (education, health, political participation, economic status). Ferrant conducted a study on the Multidimensional Gender Inequality Index (MGII), identifying and ranking different forms of gender inequality in developed and developing countries. For this purpose, he calculated the gender inequality index using Multiple Correspondence Analysis and applied hierarchical cluster analysis to classify countries into six different classes according to MGII results and sub-indices. MGII is a method that helps researchers uncover gender inequality patterns depending on the region and development level of a country. This is crucial as it provides a clearer picture of the obstacles and challenges in gender inequality faced by countries of varying development levels, allowing for the suggestion of appropriate policies to improve equality and reduce the existing gap. In other words, it focuses on a specific, country-tailored approach in addressing gender inequality, rather than a one-size-fits-all solution. According to Picatoste et al. (2023), the quality of earnings and the width of the gender pay gap, observed in Europe, are strongly influenced by the digital gender divide. The authors applied cluster analysis to classify the EU countries based on their digital gender divide characteristics, using data from Eurostat and OECD databases. Digital skills (alongside educational attainment) and access to technology determine the gender pay gap, with such disparities particularly evident in later stages of working life. The study highlights that greater gender equality in digital skills can enhance women's positions in the labour market in terms of pay quality and job stability.

According to Barnat et al. (2019), economic participation and empowerment, alongside labour force participation, must be included in the gender equality index as they are significant determinants. Additionally, these authors argue that existing and future composite gender equality indices should also include international trade when measuring gender equality, as it is a crucial factor in a country's economic development. Their study compared the following gender inequality indices: Global Gender Gap Index (GGI), Gender Inequality Index (GII), and the Social Institutions and Gender Index (SIGI). Their research aimed to answer how and to what extent different economic conditions influence variations in the indices. To this end, they applied the principal component method. The research conducted by Iwasaki & Satogami (2021), titled "Gender wage gap in European emerging markets: a meta-analytic perspective," represents a meta-analytic approach used by the authors to summarise the results of various studies, thus demystifying the scope and causes of

gender wage disparities in the labour markets of European countries. The study serves as a repository of available data and research on gender wage disparities.

Savić & Dakić (2012) examined the position of women and youth in the labour markets of Southeast European (SEE) countries, analysing various indicators to identify the main characteristics of these regional labour markets since the onset of the 2008 economic crisis. The study discusses the primary consequences and challenges that recent economic development poses for the female and youth labour force in the SEE region. This paper builds upon previous research on national labour markets, with a focus on the conditions facing women and young people across Southeast Europe. Ivanović-Đukić & Lepojević (2017) demonstrated that the most significant and statistically impactful factors influencing the gender gap in entrepreneurial preferences among the Serbian population include: unequal access to startup capital for women and men, differing employment opportunities between genders, variations in risk tolerance, and the heavier family responsibilities by women. Stanković et al. (2015) found that wage differences between groups of mainly male and mainly female companies are not statistically significant; however, there is a statistically significant difference in the quality of the labour force as perceived by employers. The study also reveals that an increase in the proportion of women in a company's workforce leads to an improvement in the perceived quality of the labour force. Despite employers' higher quality assessments of female employees, women are still paid less than their male counterparts. Specifically, wages are negatively correlated with both labour force quality ratings and the percentage of female employees.

3. Methodology and results

The data for European countries from publication Global Gender Gap 2024 was analysed to reveal similarities and differences between countries from gender gap perspective. We used Statistica 14 to conduct the analysis. The data is organized into four sections, regarding the construction of Global Gender Gap: 1. Economic Participation and Opportunity, 2. Educational Attainment, 3. Health and Survival and 4. Political Empowerment. Each of them is founded on several indicators, as shown in Table 1. Our initial analysis reveals varying degrees of variability across different indicators. For instance, the variable *Enrolment in tertiary education (%)* remains constant, while other indicators within 'Educational Attainment' and 'Health and Survival' exhibit very low values of standard deviation (≤ 0.02). The most significant variations appear within *Political Empowerment*, where all indicators have a standard deviation exceeding 0.2.

Data for Turkey was identified as outliers across multiple economic indicator variables, while data for Albania was classified as outliers within several educational indicators. Consequently, both were excluded from further analysis, as well as variable Enrolment in tertiary education.

Table 1. Main indicators of the gender gap

Indicators	count	min	mean	max	s.d.
Economic Participation and Opportunity					
Labour-force participation rate (%)	40	0,49	0,82	0,98	0,09
Wage equality for similar work	40	0,50	0,67	0,86	0,07
Estimated earned income (int'l $ 1,000)	40	0,45	0,67	0,86	0,08
Legislators, senior officials and managers (%)	40	0,23	0,54	0,86	0,15
Professional and technical workers (%)	40	0,74	0,98	1,00	0,05
Educational Attainment					
Literacy rate (%)	40	0,95	1,00	1,00	0,01
Enrolment in primary education (%)	40	0,95	0,99	1,00	0,01
Enrolment in secondary education (%)	40	0,92	0,99	1,00	0,02
Enrolment in tertiary education (%)	40	1,00	1,00	1,00	0,00
Health and Survival					
Sex ratio at birth (%)	40	0,93	0,94	0,94	0,01
Healthy life expectancy (years)	40	1,00	1,04	1,06	0,02
Political Empowerment					
Women in parliament (%)	40	0,17	0,51	0,91	0,21
Women in ministerial positions (%)	40	0,00	0,52	1,00	0,33
Years with female/male head of state (last 50)	40	0,00	0,17	1,00	0,23

Source: Authors' calculation.

To examine variations within each group, a principal component analysis (PCA) was conducted for each indicator group using correlation matrices. Since the first principal component captures the most significant portion of data variation, cluster analysis was performed using the first components of each group. Specifically, further analysis was based on factor scores of the first principal components for each indicator group. By applying k-means cluster analysis, we established a model of four clusters, with country groupings listed in Table 2.

Table 2. Cluster memberships

Cluster	Countries
1	Finland, Iceland, Norway, Sweden
2	Austria, Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Portugal, Spain, Switzerland, United Kingdom
3	Belarus, Bulgaria, Estonia, Latvia, Lithuania, Moldova, Montenegro, Poland, Serbia, Slovakia, Slovenia, Ukraine
4	Bosnia and Herzegovina, Croatia, Cyprus, Czech Republic, Greece, Hungary, Italy, Malta, North Macedonia, Romania

Source: Authors

Table 3 shows average indicator values that reflect the level of equality achieved in the countries examined. The averages are calculated within the clusters. The analysis of variance revealed statistically significant differences among clusters for most economic, and all health and political indicators (all with $p<0.05$). In contrast, educational indicators showed no statistical significance. The exact p-values are presented in last column of Table 3.

Table 3. Average indicator values per cluster and p-values of ANOVA test

Mean indicator values	Clusters				p-values
	1	2	3	4	
Economic Participation and Opportunity					
Labour-force participation rate (%)	0,903	0,862	0,830	0,749	0,000*
Wage equality for similar work	0,774	0,670	0,665	0,603	0,000*
Estimated earned income (int'l $ 1,000)	0,761	0,660	0,704	0,618	0,000*
Legislators, senior officials and managers (%)	0,609	0,508	0,680	0,415	0,001*
Professional and technical workers %	1,000	0,994	1,000	0,967	0,000*
Educational Attainment					
Literacy rate (%)	1,000	0,998	0,998	0,996	0,073
Enrolment in primary education (%)	1,000	0,997	0,993	0,994	0,695
Enrolment in secondary education (%)	0,983	0,990	0,991	0,994	0,733
Enrolment in tertiary education (%)	1,000	1,000	1,000	1,000	0,657
Health and Survival					
Sex ratio at birth %	0,943	0,944	0,941	0,940	0,046*
Healthy life expectancy (years)	1,013	1,019	1,058	1,039	0,000*
Political Empowerment					
Women in parliament (%)	0,859	0,613	0,452	0,358	0,000*
Women in ministerial positions (%)	0,979	0,723	0,367	0,259	0,000*
Years with female/male head of state (last 50)	0,522	0,177	0,129	0,094	0,008*

Source: Authors' calculation

Note: Significant differences are marked with *

4. Discussion

In this section we will provide the insights of clusters and discuss main similarities of countries inside clusters and differences between them. Note that the average of educational indicators is constant through clusters and equals 0,996.

Cluster 1 includes Nordic countries known as leaders in gender equality in Europe. These countries have long tradition of implementing policies that advocate and promote gender equality at all levels and in all segments of society. They are characterized by nearly perfect gender equality in education and health segments, a high degree of political engagement of women, and a strong social protection system that includes widespread availability of maternity and parental leave (equally available to both genders). The average value of the political empowerment group of indicators (0.787) in this cluster is the highest, indicating countries where women's representation in politics (in parliament and high political positions) is significant, and the implementation of gender-equal policies has been successfully carried out. This cluster has almost perfect results in the health segment (0,978), which supports a minimal gap between genders regarding individual life expectancy and access to health services.

Cluster 2 includes countries characterized by a high index of gender equality in education and health but not in the remaining two segments - economic opportunities and political empowerment. Although these countries belong to the group with a developed support system for women, women (although present in political life) are still not highly positioned within companies and need to be more involved in making economic and political decisions. The average value of the political empowerment indicators is 0.504, which classifies them as countries with a medium degree of political empowerment. This leads us to conclude that these are developed countries that actively support gender equality, but social norms and political culture prevent women from being represented more equally. The health indicators average is 0.982, indicating a well-achieved balance between genders regarding life expectancy and health status. High values of these segments are a consequence of efficient educational systems and well-developed health services in these countries.

Cluster 3 contains countries with a similar historical background (mostly former socialist countries). These countries are characterized by a lower degree of women's representation in the management structures within institutions, weaker economic opportunities, and political empowerment. The level of political empowerment is particularly low (0.316) compared to Western European countries and indicates insufficient support for empowering women in politics. A solid level of equality has been achieved in the fields of education and health. The reasons for a high index in the field of education should be sought in the inherited, solid, education systems from the socialist period. The health average is also high (0.989), meaning that men and women have similar access to health services and expected lifespan.

Cluster 4 includes countries which face serious challenges in achieving gender equality. The cause should be sought, among other things, in the social and cultural norms that exist in these countries, which hinder women's progress in economic and political terms. Gender inequalities in these countries are a result not only of

traditional family services that are very pronounced and dominant but also of weak legal frameworks and insufficient implementation of existing legal regulations that regulate this area, and insufficient state engagement in terms of initiatives and incentives. This cluster has the lowest average value of political empowerment (0.237). The average value of the economic participation and opportunities is also the lowest (0.67) compared to the remaining 3 clusters. Differences between genders in terms of health status and life expectancy are negligible, as seen from the high average value of the health indicators (0.989).

Some additional indicators, not used for cluster analysis, can be used to make additional insight in differences among them. Clusters 1 and 2 have the higher GDP per capita ($56,878 and $62,857), indicating that these countries are at a high level of economic development and/or have efficient economic policies. The lower values of this indicator are found in Clusters 3 ($27,972) and 4 ($34,671), suggesting that these are developing countries facing certain economic challenges and crises, as well as underdeveloped infrastructure.

Cluster 3 has the highest average gender ratio in the population (1.097), measured through the ratio of men to women, which can further cause problems in social dynamics and family planning (inability to find a marital partner), as well as source accompanying economic (labour market, pension systems, productivity), and social and demographic consequences. A higher number of men relative to women is most often a consequence of the preference for male children, frequent migration of men, or higher mortality rates of women in the country. Other clusters have a more balanced average ratio of men and women.

Clusters 3, and 4 have a larger difference in earnings between men and women (13.84% and 11.656%), which is a clear indicator of the presence of gender inequality in the labour market. In contrast, Clusters 1 and 2 (8.855% and 8.538%) have the smaller average gender wage gap, indicating better gender equality and better legal regulations and policies in the countries of this group.

Higher participation of women on boards is evident in Clusters 1 (39.83%) and 2 (36.37%), which can be interpreted because of effective legal regulations and/or corporate policies that promote gender equality, implemented in the countries that make up these two clusters. On the other hand, low rates of women's participation on boards, which pertain to Clusters 3 (20.89%) and 4 (21.1%), can be a consequence of the presence of institutional or even cultural barriers to women's participation in the business sector.

Female unemployment is relatively low in Clusters 1 and 2 (5.315% and 5.667%), likely reflecting stronger labour markets and support systems for female employment. In contrast, Clusters 3 and 4 show higher female unemployment rates (6.29% and 8.201%), possibly due to limited job opportunities, weaker labour protections, and socio-cultural factors restricting women’s participation.

The labour force participation rate, measured through the ratio of active persons in the labour market (employed and unemployed actively seeking work) and the working-age population, is highest in the countries of Cluster 3 (0.935), indicating more efficient and healthy labour markets. Countries in Cluster 4 (0.796) face many inactive populations and problems with high unemployment and employment issues (low supply of free jobs), which may be a cause of the lower labour force participation rate and an indicator of structural problems in the labour market, and even a symptom of economic recession.

The maternal mortality rate, measured as the average number of maternal deaths (during pregnancy, childbirth, or within 42 days of the end of pregnancy) per 100,000 live births, is worryingly high in countries of Cluster 4 (12,600 deaths per 100,000 live births). Since this is an indicator that clearly reflects the health status of women and the efficiency of a country's health system, such a high value in Cluster 4 indicates that these are countries characterized by a low level of health standards, poor living conditions for women, and inadequate health service. Cluster 1 (4,500 deaths per 100,000 live births) has the lowest rate of maternal mortality, which is expected since the Nordic countries that make up this cluster are known for their high health and social standards, and widespread access to quality medical care.

5. Conclusions

This study provides a comprehensive insight into the state of gender equality in Europe using the key gender gap indicators and cluster analysis to identify key characteristics and differences among countries. The results indicate that European countries generally achieve high equality in the areas of education and health, while the greatest challenges remain in women's economic participation and political empowerment.

Nordic countries, which make up the first cluster, show almost perfect balance across all aspects of gender equality, which can be attributed to long-standing efforts in implementing inclusive policies and legislative frameworks that support equal opportunities for both women and men in all spheres of society. The second cluster, which includes developed Western European countries, records high equality in education and health, but weaker results in political and economic empowerment highlight the presence of social and cultural barriers that limit greater female participation in political and economic processes.

Eastern European and former socialist countries, comprising the third cluster, have solid results in education and health, due to inherited educational systems and healthcare infrastructure from the socialist period. However, these countries show low levels of political participation and economic inclusion of women, indicating a need for further reforms and institutional incentives to encourage women to take a

more active role in public life. The fourth cluster includes countries facing significant challenges in achieving gender equality, where traditional social norms and weak legal frameworks present major obstacles. In these countries, the limited political and economic participation of women is further hampered by the lack of adequate institutional support and policies actively promoting gender equality.

Gender inequality is a complex, multidimensional issue that requires a comprehensive approach in future research. Several promising directions could be explored.

Evaluating policy effectiveness across clusters. Future studies could assess the effectiveness of specific gender equality policies within each identified cluster. This might include comparative analyses of how policy frameworks in Nordic countries could be adapted to other clusters, particularly to address gaps in economic participation and political empowerment. Understanding the adaptability of successful policies could provide valuable insights for tailoring interventions in varying socio-political contexts.

Longitudinal Tracking of Gender Equality Indicators. A longitudinal study examining changes in gender equality indicators across European countries over several years could yield insights into the pace and consistency of progress. This approach could also help pinpoint any periods of stagnation or regression, especially in the areas of political empowerment and economic participation, providing a basis for identifying underlying causes and effective countermeasures.

Intersectional Analysis for Targeted Insights. To offer a more nuanced understanding of gender inequality, future studies could integrate an intersectional analysis. By exploring how factors such as race, age, socioeconomic status, and regional differences interact with gender, researchers could better understand the diverse experiences and outcomes within the gender gap framework. This approach would support the development of more precise and targeted policy recommendations for addressing specific vulnerable groups.

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RODNA RAVNOPRAVNOST U EVROPI: RAZLIKE I IZAZOVI MEĐU EVROPSKIM ZEMLJAMA

Apstrakt: Problem rodnog jaza odražava postojane nejednakosti između muškaraca i žena u oblastima ekonomske participacije, obrazovanja, zdravlja i političke zastupljenosti, koje su podstaknute društvenim, kulturnim i institucionalnim pristrasnostima koje ograničavaju jednake šanse i ishode. Ovaj rad ispituje stanje rodne ravnopravnosti u Evropi konstruišući kompozitne varijable za svaku oblast primenom analize glavnih komponenti, a zatim klasifikuje zemlje u četiri različite grupe korišćenjem klaster analize. Prvi klaster obuhvata nordijske zemlje sa gotovo potpunom rodnom ravnopravnošću; drugi klaster čine razvijene zemlje Zapadne Evrope sa visokim obrazovnim i zdravstvenim ishodima, ali nižim mogućnostima žena u političkoj i ekonomskoj sferi. Treći klaster obuhvata zemlje bivšeg socijalističkog bloka sa umerenim obrazovnim i zdravstvenim pokazateljima, ali niskim stepenom ekonomske i političke uključenosti žena, dok četvrti klaster obuhvata zemlje koje se suočavaju sa značajnim izazovima u postizanju ravnopravnosti zbog tradicionalnih normi i slabih javnih politika. Rezultati ukazuju na potrebu za ciljno usmerenim politikama koje bi unapredile ekonomske mogućnosti i političko učešće žena, u skladu sa specifičnim karakteristikama svake grupe zemalja.

Ključne reči: rodni jaz, rodna nejednakost, ekonomska participacija, tržište rada, glavna komponenta, klaster analiza

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