

Investigating employment patterns and determinants in the European Union through panel data insights

Research Article

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Abstract: Employment is an important element of inclusive and sustainable economic growth because it has powerful effects on society. At the individual level, employment is a prerequisite for economic independence, social development, and professional satisfaction. At the macroeconomic level, employment enhances consumption, which leads to businesses' progress, being considered the most meaningful factor for combating poverty and social exclusion. Although the goal is the same, countries can face different barriers and require different policies. This article investigates recent trends, patterns, and employment determinants in the European Union (EU) member states. We use cluster regression with fixed effects panel data models to group the countries into homogeneous clusters and obtain specific coefficients for each cluster. The clustering algorithm identified the heterogeneity of the countries, indicating an optimal number of three clusters for the grouping of EU states, considering the set of variables used. The selected indicators covered the economic, educational, and social dimensions, providing a complex vision of employment and how it can be improved. Our results indicated that social protection expenses, income, and gender inequalities negatively influence the employment rate. In contrast, educational, trade openness, and research and development expenditures increase employment in the EU. Moreover, the results obtained for each cluster allow the conclusions to be nuanced, indicating different patterns within the EU but still similarities between certain countries, providing an in-depth investigation of employment helpful in supporting the goal of inclusive economic growth of the EU member states.

Keywords: Employment rate • Income inequality • Inclusive growth • Panel data • Cluster regression

1. Introduction

The strategies, policies, and programmes of the European Union (EU) are aligned with the sustainable development goals (SDGs) of the United Nations. The 2023 monitoring report highlighted that the EU has made significant progress in terms of employment, decent work, and inclusive growth (SDG 8), as well as in reducing poverty (SDG 1) and narrowing gender inequality (SDG 5), while for the other SDGs, there was moderate progress or even worsening of the situation (Eurostat, 2023). It is not accidental that the progress of employment and inclusive growth goes hand

in hand with poverty and inequality reduction because there is a strong connection between them. Inequalities can affect economic growth, prevent effective fight against poverty, and worsen work opportunities for low-paid, low-educated workers (United Nations, 2019). Furthermore, sustainable and inclusive growth requires the mitigation of poverty and inequalities, with a particular focus on the labour market, arising from its role in fostering economic and individual prosperity by facilitating productive and qualitative employment with equal opportunities for all citizens (Ianchovichina, 2012; Vojinic, 2024). The impact of economic growth on the creation of productive jobs depends not only on the growth rate but also on the efficiency with which it is translated into increases in both the

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number of jobs and productivity, as well as labour income. Indicators that measure the ability of an economy to generate sufficient employment opportunities provide valuable information on the overall development performance of the economy. One of these key indicators is the employment rate (ILO, 2023).

Employment is extremely important and influences economic, social, and personal well-being. At the macroeconomic level, employment enhances consumption, leading to business progress, and, at the same time, it is considered the most meaningful factor for combating poverty and social exclusion (Bailey, 2017; Eurostat, 2023). At the individual level, employment is a prerequisite for economic independence, social development, and professional satisfaction (ILO, 2020). It is a subject of continuous interest for every citizen, company, and policymaker, considering the dynamics of the labour market and the changes induced by globalisation, the pandemic, the green transition, and technological progress (World Economic Forum, 2023a). The immigration phenomenon has also become important in the EU space (Nicolescu & Dragan, 2020), with more research needed on its influence on the structure of the labour force. Employment rates are sensitive to the economic cycle. However, in the long term, they are significantly influenced by government policies in higher education, income support, and policies that facilitate the employment of women and disadvantaged groups (OECD, 2023). Thus, political decision-makers face the permanent challenge of adapting employment strategies and policies to the latest contexts and identifying the most appropriate measures according to the specifics of the country, region, or group of people they target. Analysing the employment rate, both dynamically and by comparison with other states, brings insights into the socioeconomic climate of a country. In addition, it helps identify good practices and effective policies to stimulate employment growth.

In this context, the purpose of the article is to investigate the recent trends, patterns, and determinants of employment for the member states of the EU. In this rapidly changing world, it is utterly essential to monitor progress in employment, examine problematic and successful moments, identify the factors that can stimulate employment, and be constantly aware of the internal situation compared to other member states. The efficient functioning of the labour market requires synergy with education and the business environment, as well as institutional support (Ding et al., 2020; Mocanu et al., 2014). Therefore, to examine the determinants of employment comprehensively, we chose indicators that addressed economic, educational, and social dimensions. Regarding the economic characteristics, we included in the analysis

trade openness, remittances, and research and development expenditures, indicators that shed light on aspects of competitiveness, globalisation, innovation, and technological progress, all linked to employment dynamics (Jadhav & Arora, 2023; Piras, 2023; Shah et al., 2022). The impact of education on the labour market is well documented, so we investigated the effect of tertiary education on employment (OECD, 2023). From a social perspective, we emphasised how inequalities, both income and gender, affect the employment rate in the EU member states (ILO, 2021). Finally, we also considered the institutional effects by analysing the impact of social protection expenditure on employment. In this way, our study enhances the empirical understanding of employment dynamics within the EU, employing a broad spectrum of indicators to enable a nuanced and comprehensive analysis.

Although the EU member states pursue common goals, the progress and factors influencing employment may be different, and the most effective policies depend on good knowledge of the local and regional context. At the same time, identifying good practices proves valuable, particularly when comparable circumstances allow their adoption by other member states (European Commission, 2016). In this context, it is worth highlighting another contribution of our research, namely the use of a clustering algorithm for panel data that optimally groups the analysed countries and facilitates the application of fixed-effects (FE) regression models under conditions of homogeneity (Sarafidis & Weber, 2015). Therefore, the results deepen our understanding of employment determinants, highlight the best performers, and identify similar groups of countries. These insights provide robust scientific support for informed policy decisions regarding the labour market.

2. Literature review

The relationship between labour markets and income inequalities has been extensively debated in the scientific literature. As mentioned by the International Labour Organisation (2021), income inequalities are diverse. They can have various explanations, including unequal access to education and training, job polarisation, declining number of labour unions, public policies, and technological progress favouring the high-skilled. Kolluru and Semenenko (2021) conducted an exploratory analysis of income inequality across the EU. In their study of firm financing conditions in the United States, Doerr et al. (2022) found that as top income shares grow, this amplifies income disparities and discourages the creation of small companies and new entrants into the labour market. Through panel data models

for 143 countries and using channel variables, Topuz (2022) highlighted that income inequalities negatively impact human capital development at a general level, hindering economic growth and job creation, especially in low-income states. This finding is also confirmed in a report on G20 countries published by the International Labour Organisation *et al.* (2015), suggesting that income disparities can be alleviated by enforcing income redistribution policies.

In addition to income inequalities, gender inequalities are present in employment and various sectors and regions worldwide, as confirmed by the latest Global Gender Gap Report by the World Economic Forum (2023b). Regarding participation in the labour force, the parity between men and women was 64% in 2023, the second lowest value since the first edition of the WEF index. Women's representation in senior leadership remains low in key fields, such as infrastructure, agriculture, and the energy industry, while showing a somewhat higher presence in different areas (e.g. healthcare services, education, retail, and government). Regarding the proportion of women managers, some studies explored its influence on job creation, but most do not include econometric models. A recent survey study conducted by Joshi *et al.* (2023) emphasises that women face more barriers than men when accessing key positions in a company, thus increasing gender inequality. However, once they succeed, they act as role models for other women. In another analysis of advertising agencies in New York, Cohen and Broschak (2013) discovered that the more the women in manager positions, the higher the chances that newly created jobs are first filled by women, but this relationship was insignificant. However, it was stated that there was an inverted U-shaped relationship between the proportion of women managers and the number of new jobs.

Education is another explanatory factor that leaves a mark on employment. As the OECD (2012) stated, well-educated people have a better chance of finding a job. In addition, education is an excellent insurance against difficult economic times and the risk of unemployment. This statement aligns with Teichler (2015), who mentions that, according to OECD calculations, throughout their lifetime, Europeans with below upper secondary education have a 4-year risk of unemployment compared to those with upper secondary and tertiary education who present a more-than-2-year, respectively, more-than-1-year risk. Burlacu *et al.* (2021) have also investigated the population's education level in EU countries, concluding that individuals with a high level of education are more active in their economic and social life, thus increasing both their employability and life satisfaction.

In terms of econometric models, through their time series analysis of Nigeria's education and labour market,

Adejumo *et al.* (2021) found a negative relationship between tertiary education attainment and unemployment. On a short-term basis, tertiary education reduces unemployment by 0.84% and on a long-term basis by 0.02%. However, this finding was statistically insignificant. Şerifoğlu (2023) revealed a positive impact on employment among individuals who have attained at least an upper-secondary degree for 27 OECD member countries between 1998 and 2019, the results being significant.

The literature on social spending and its impact on the labour market presents mixed results. Lu (2022) found that social expenditure negatively affects both economic growth and employment in the USA on a short- and long-term basis. On average, increasing social expenditure by 1% would cause an increase in the unemployment rate by 0.12 percentage points. Also, Çelikay (2023) states that, despite its general role in bettering social welfare, high social spending discourages employment, especially in developed countries. However, active social investment in reemployment policies can tackle unemployment more efficiently, as stated by Escudero (2018). In her study of active labour market policies, it was emphasised that increasing the allocation of resources to social programmes, including training, boosts overall employment and employment of the low-skilled to a great degree.

Several studies have explored the influence of technology adoption on employment. Destefanis and Rehman (2023) analysed the impact of R&D expenditure on job creation across NUTS 2 regions from Europe using panel data models. They have found a significant positive relationship between R&D investments and employment stimulation in regions defined by medium to high levels of technological readiness, business sophistication, and innovation. Shah *et al.* (2022) also highlight the positive impact of R&D on employment in Japan's enterprises. Applying a random effect (RE) model, they obtained that a 1% increase in intramural and self-financed R&D expenditures leads to a 0.35%, respectively 0.36%, significant employment growth. However, external R&D funding contributed just 0.02% to the increase in job creation, probably because this type of investment is distributed to improve processes rather than develop new products. Furthermore, Ayhan and Elal (2023) tested the empirical relationship between R&D and employment for 30 OECD countries using a one-way FE model. Although the effects of technological development due to R&D investments were positively correlated with employment, the impact was statistically insignificant.

Regarding trade openness as an explanatory factor, Jadhav and Arora (2023) highlight the influence of trade liberalisation on employment patterns in India. Using a

panel model with FE, the impact of trade openness and other factors on employment in the manufacturing industry was analysed considering the overall data set and different categories, such as gender, regular or contract, and skilled or unskilled. In general, imports were found to have a significant positive relationship with employment, while exports negatively affected it. Furthermore, Greenaway et al. (1999), in their study of trade penetration in UK employment, emphasised that the impact of exports is negative and significant. However, when it came to imports, they found the opposite: an increase in trade inflows generated a decrease in employment. In another study of exports and regional employment levels in Türkiye, Tandoğan (2019) discovered that higher exports lead to a higher employment rate. Although trade openness should typically improve opportunities regarding the labour market, as stated by international organisations such as the OECD (2024) and the United Nations (2024), all these results from the literature review present a diverse picture of how it influences employment depending on the context.

In addition to all these influencing factors that might act individually or as a group, the pandemic has put additional pressure on the labour market. In the euro area, Botelho and Neves (2021) argue that the coronavirus crisis led to a fall in employment, with different magnitudes for women and men. More affected were the total hours worked than the general employment rate, suggesting that countries in the euro area have tried to protect the employees. Many EU countries have introduced different job retention schemes to address the effects on employment (IMF, 2022).

3. Methodology and data description

For this analysis, we chose to use panel data models because they provide greater precision of estimates by using a much larger number of observations compared to cross-sectional or time series data. Our first step involved conducting a descriptive analysis of the variables to understand the phenomenon under investigation and identify potential outliers. Subsequently, as a preliminary step prior to modelling, we checked for multicollinearity. Although a review of the literature guided the selection of explanatory variables, we tested the causality between these variables and the independent variable to strengthen the model specification using statistical evidence. For this purpose, we applied the causality test introduced by Dumitrescu and Hurlin (2012), which is tailored for panel data analysis.

The first step when estimating panel data models is identifying the most appropriate model. Therefore, we estimated the pooled ordinary least squares regression model (pooled OLS), FE, and RE panel data models. The pooled OLS approach provides efficient and consistent estimators, assuming the errors are uncorrelated with the explanatory variables. However, given the specific characteristics of panel data, this assumption is highly restrictive. Therefore, testing for individual effects is essential. The results of the *F*-test indicated the necessity of employing panel data-specific estimation methods (FE or RE models). Subsequently, the Hausman test suggested that the FE model is the most appropriate choice.

Traditional FE panel data models are constructed under the assumption of uniform slope coefficients across all statistical units, attributing variability only to individual-specific effects, an assumption that is seldom satisfied in empirical research. Therefore, we applied the Sarafidis and Weber (2015) clustering algorithm to investigate and address the assumption of slope heterogeneity. This technique groups countries into internally homogeneous clusters but with different slope coefficients across clusters. The great advantage of the method is the use of the whole panel dataset. The algorithm uses an iterative process to find the ideal number of clusters and cluster memberships. Once the clusters were identified, we estimated FE panel data models separately for each cluster.

We focused the analysis on the EU member states with data covering 2011–2023. The sources of our data were the Eurostat and UNCTAD online databases. The synthetic description of the selected indicators is presented in Table 1.

A standard tool for characterising income inequality is the Gini coefficient. The Gini coefficient in our analysis measures how the distribution of equivalised disposable income before social transfers with pensions included in social transfers (in other words, the pensions are extracted from the income) deviates from a perfectly equal distribution. This coefficient takes values between 0 and 100: a Gini coefficient equal to 0 indicates perfect income equality, whereas a Gini coefficient equal to 100 would mean that all income earned in the economy goes to a single household, indicating perfect income inequality.

An inequality-related indicator is the share of women occupying senior management positions. The indicator measures the share of women directors (or on the boards of directors) of the largest companies listed on the stock exchange. The “largest companies” refers to the first 50 largest companies listed on the stock exchange, according to the capitalisation of the stock market or the transactions of the market. This indicator monitors progress towards

Indicator	Description	Period
Employment rate	The percentage of employed persons, 15–64 years (% of total population)	2011–2023
Gini Coefficient	Gini Coefficient for disposable income before social transfers (pensions included in social transfers) (takes values between 0 and 100)	2011–2023
Women managers	Share of women holding senior management positions (%)	2012–2023
Tertiary education	Share of the population aged 25–34 who have completed tertiary education, ISCED level 5–8 (%)	2011–2023
Social protection expenses	Social protection expenditure (% of GDP)	2011–2022
R&D expenditures	Gross domestic expenditure on research and experimental development – GERD (% of GDP)	2011–2022
Trade openness	The sum of imports and exports (% of GDP)	2011–2023
Remittances	Personal remittances received (% of GDP)	2011–2022

Table 1. Indicator description.

Source: Author's contribution.

SDG 5 on gender equality, part of the European Commission's priorities. Companies that put women on their boards of directors have been shown to perform financially better than those with low female representation. Better financial performance of companies leads to better employment opportunities and higher productivity, thus contributing to economic growth and societal development (Joshi *et al.*, 2023).

Education is one of the most powerful tools for poverty reduction, as it is acknowledged that people with higher education have higher employment rates, better paying, and more stable jobs. Additionally, education is fundamental for sustainable economic growth, contributing to increases in productivity and creativity and stimulating entrepreneurship and technological advances. We considered tertiary education, which measures the share of the population aged 25–34 who completed higher education (e.g. university, higher technical institution, etc. – ISCED level 5–8).

Social protection policies can reduce vulnerability risk and steer to increased long-term investment in human capital. First, social protection programmes support sick, disabled, and vulnerable people, helping them maintain a basic standard of living and lessen the impact of external shocks. Second, they generate employment opportunities by preserving the demand for goods and services. Therefore, social protection policies can stimulate economic growth while reducing poverty (Waqas *et al.*, 2022). Within the econometric model, we included social protection expenses as % of GDP, including social benefits (e.g. transfers, in cash or in-kind, to households and individuals; administration costs and other expenditures).

Gross domestic expenditure on research and development (GERD) can be considered an engine of technological advancement with multiple positive and negative economic effects. Thus, we decided to include this indicator

in the analysis to investigate its effects on employment, considering the perspective of the diverse impact it can have on the labour market.

Trade openness stimulates economic growth and investment and has beneficial effects at the level of the labour market through increased employment, higher wages, and better working conditions. At the level of society, trade openness induces an improvement in living conditions, increased prosperity, and higher social stability (OECD, 2015).

We also included the remittances to test their impact at the macroeconomic level. From a theoretical perspective, there can be a positive impact through the financial support offered to families or a negative one through the motivation to work and the creation of a culture of dependency.

4. Results

We first analysed the employment rate, both dynamically and by comparison with other states. In 2023, the highest employment rate was recorded in the Netherlands (82.4%), while the lowest was in Italy (61.5%). The difference between the two countries is 20.9 percentage points, with the employment rate in the Netherlands being 12 percentage points above the EU average, while Italy is 8.9 percentage points below. It is worth noting that the Netherlands recorded the highest employment rate during 2011–2023. The second place in the hierarchy of EU member states was held in 2023 by Malta, with an employment rate of 77.8%. This performance happened after a period in which the employment rate had grown a lot, with almost 20 percentage points, the highest increase of all the analysed countries. Therefore, in 2023, the employment rate in Malta was 7.4 percentage points above the EU

average, compared to 2011, when it was 4.9 percentage points below the average.

In 2023, Italy occupied the last position in terms of employment rate after a very long period in which Greece occupied that final position. Although all countries recorded increases in the employment rate, Italy recorded a value of only 5.2 percentage points above the value of 2011, being among the states with the lowest increases in the employment rate. Greece, Romania, Croatia, and Spain also recorded low employment rates during this period. The lowest increase in the employment rate during the period 2011–2023 was recorded in Austria (3.0 percentage points). However, the country has always had a high employment rate, above the EU average. From the point of view of territorial distribution, it can be seen in Figure 1 that the countries in the central and northern parts of the EU register higher employment rates, while the states in the south and southeast show lower rates.

The econometric analysis aims to identify the factors influencing the employment rate, focusing on examining the impact of inequalities on this indicator. Therefore, a panel data model was built for 2011–2022 for the 27 EU member states. The dependent variable was the employment rate (15–64 years). The set of explanatory variables was more extensive than presented in Table 1, which comprises only the variables that proved statistically significant, namely the Gini coefficient, the share of women in

management positions, trade openness, expenditure on R&D, the share of people with higher education, remittances, and social protection expenditures (from the social insurance system). All indicators included in the econometric model were in logarithmic form. Due to data availability, the econometric analysis was carried out for 2012–2022.

To examine the causal relationship between the employment rate and the explanatory variables, we used the Dumitrescu and Hurlin (2012) test to determine Granger's causality in panel data. The results, presented in the first column of Table 2, reveal that all the independent variables considered in the regression models exhibit Granger causality in relation to the employment rate.

To identify the most appropriate model for our analysis, we estimated a pooled OLS regression, an FE model and an RE model using the entire dataset. The coefficients estimated for each model are presented in Table 2. Additionally, the *F*-test result (42.57 at 5% significance) indicated that the individual effects are significant, and the panel data model is more suitable for our data. Also, the Hausman test indicated that the FE model provides the best fit at the expense of the RE model (the Hausman test was 16.79 at 5% significance).

It can be observed that, across all EU member states, the employment rate is negatively influenced by income inequality, indicating that higher inequality may limit job opportunities or labour market participation. In contrast,

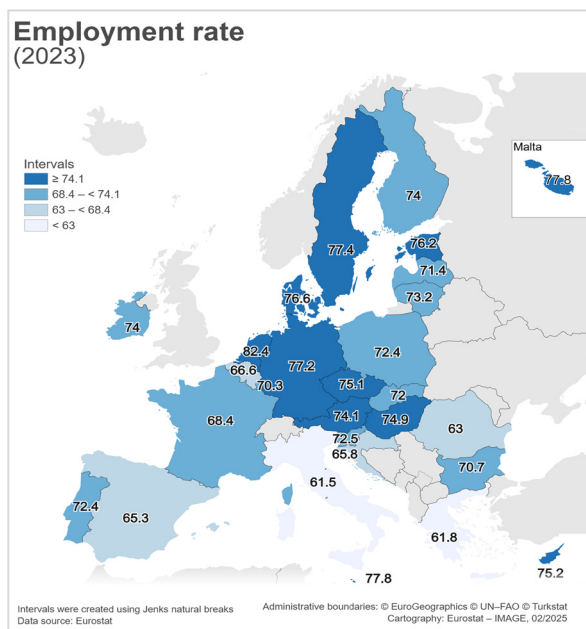


Figure 1. Employment rate (%), EU member states in 2023.

Source: Author's estimation, based on the Eurostat Database.

Explanatory variable	Granger causality	Pooled OLS	FE	RE
Gini coefficient	11.76* ¹	-0.129*	-0.210**	-0.201*
Women managers	5.91* ¹	0.039*	0.050*	0.049*
Trade openness	7.64* ¹	0.059*	0.118*	0.075*
Research and Development expenditures	5.23* ¹	0.137*	0.030	0.064*
Tertiary education	23.08* ¹	0.064*	0.201*	0.189*
Remittances	14.05* ¹	0.006	0.008	0.004
Social protection expenses	9.31* ²	-0.045	-0.028	-0.036
Constant	–	4.348*	3.657*	3.883*

Table 2. Causality testing and model identification for panel data analysis.

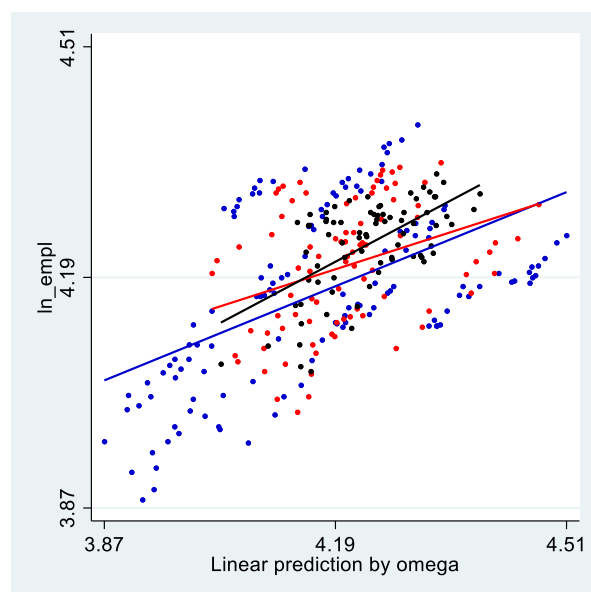
Source: Author's estimations in STATA16, based on the Eurostat and UNCTAD data.

Note: *statistical significance at 5%, **statistical significance at 10%, ¹first lag, ²second lag.

the proportion of women in management positions has a positive impact, highlighting the value of gender diversity and women in leadership roles as drivers of employment growth. Trade openness also positively influences employment, reflecting the role of international trade in creating jobs and enhancing economic activity. Similarly, higher tertiary education participation leads to an increase in the employment rate, indicating the importance of education in providing the skills needed in the labour market.

Next, we applied the algorithm developed by Sarafidis and Weber (2015). The findings revealed a lack of homogeneity among the statistical units in the dataset, thereby justifying the determination of an optimal partition into three clusters. Within these clusters, the assumption of homogeneity in slope parameters necessary for panel regression models is adequately satisfied. The variation in slopes is illustrated in Figure 2, while the distribution of EU Member States across the three identified clusters is presented in Figure 3.

The countries in Cluster 1 are Belgium, Croatia, Cyprus, Denmark, France, Germany, Greece, Italy, Luxembourg, Netherlands, Romania, and Slovenia. They are best described by relatively low increases in the employment rate in 2022 compared to 2011, with an oscillated trend throughout the period. Among these countries, the Gini coefficient registered values below the EU27 average, with relatively small reductions compared to 2011. Regarding the share of women holding management positions, the trend was predominantly upward, but with relatively small increases and even with oscillations. The states in this cluster recorded growth rates of trade openness above or around the average in 2022 compared to 2011, with the overall evolution oscillating. Many countries in the first cluster had around-average shares of people with higher education graduates (in 2022). The level of remittances these

**Figure 2.** The heterogeneous slopes for the three clusters.

Source: Author's estimation, using Stata 16.

states receive is relatively low, with values around 1% of GDP.

Cluster 2 countries (Bulgaria, Czech Republic, Ireland, Malta, Portugal, Slovakia, Spain, and Sweden) share similar features: the employment rate generally registers values around the EU27 average; the Gini coefficient has values slightly above countries in other clusters, with a generalised downward trend. Regarding the share of women holding senior management positions, the countries in this cluster present below-average values and an oscillating trend during 2012–2022. For the share of the population aged 25–34 who completed tertiary studies (ISCED level 5–8), the countries in this cluster recorded above-average

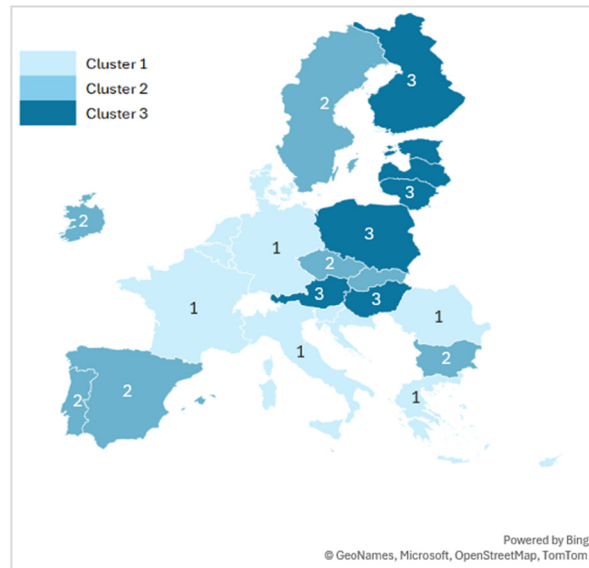


Figure 3. Country clusters, based on employment rate and its influencing factors.

Source: Author's estimation, based on the Eurostat Database.

values in 2022. Social protection expenses among the countries in cluster 2 are mainly below the EU27 average. Many countries recorded remittances of around 2–3% of GDP, with minor fluctuations.

The countries in Cluster 3 generally recorded above-average values for the employment rate (Austria, Estonia, Finland, Hungary, Latvia, Lithuania, and Poland). However, significant fluctuations were observed during the analysis period. The Gini coefficient recorded values slightly below the EU average. During the analysed time, the oscillations recorded were not pronounced. Regarding the share of women holding management positions, relatively significant increases were observed for this group of countries (in 2022 compared to 2012); the trend is generally upward, with few oscillations. The share of young people (25–34 years of age) with higher education registered relatively low growth rates in 2022 compared to 2011, with an increasing trend for the entire period. The countries in this cluster registered an oscillating evolution for social protection expenditures, with relatively significant differences from year to year. Regarding the remittances received, a characteristic of the states in Cluster 3 is the negative growth rates of this indicator in 2022 compared to 2011.

In the following, we present the estimation of the model parameters for each of the three clusters. The estimates were obtained using FE panel data models, and the results are presented in Figure 2 and Table 3. The graphical representation of the models for the three clusters

shows that the slopes are heterogeneous, indicating that different models can better describe our data set, highlighting the specificities of each group of countries.

The results indicate a significant negative impact of the Gini coefficient on the employment rate for countries in Cluster 1, with the increase in inequalities leading to decreased employment. For the countries in Cluster 3,

Explanatory variable	Cluster 1	Cluster 2	Cluster 3
Gini coefficient	−0.181*	0.180*	−0.366*
Women managers	−0.0003	0.036*	0.086*
Trade openness	0.203*	0.045	0.006
Research and Development expenditures	0.054*	−0.005	−0.003
Tertiary education	0.157*	0.413*	−0.036
Remittances	0.043*	0.015	−0.075*
Social protection expenses	−0.045	−0.140*	−0.079**
Constant	3.169*	2.104*	5.797*
No. of countries	12	8	7
No of observations	132	88	77
R ² within	0.79	0.85	0.84

Table 3. Estimation results.

Source: Author's estimations in STATA16, based on the Eurostat and UNCTAD data.

Note: *statistical significance at 5%, **statistical significance at 10%.

the effect is similar but more powerful, with a 1% increase in the Gini coefficient leading to a decrease in the employment rate by 0.37% when all other variables are kept constant. Conversely, for countries in Cluster 2, the findings indicate a positive relationship between income inequality and employment rate. During the analysed period, the countries in Cluster 2 experienced significant increases in their employment rates, accompanied by inequality increases or negligible decreases.

Regarding the share of women holding management positions, the estimates highlight a positive impact on the employment rate for countries in Clusters 2 and 3, more pronounced for the latter, and an insignificant impact for Cluster 1. Trade openness positively impacts the employment rate for the states in Cluster 1, with no statistically significant impact for those in Clusters 2 and 3. The results of our estimates highlight a positive impact of R&D expenditure on the employment rate for Cluster 1 and a negative impact, but statistically insignificant, for Clusters 2 and 3.

Another influential indicator considered is education, quantified in our econometric model through the share of the population aged 25–34 who successfully completed tertiary education. The results indicate a significant favourable influence of the share of people with higher education on the employment rate for states in Clusters 1 and 2. Interesting results were obtained for the relationship between remittances and the employment rate. For the countries in the first cluster, the econometric estimates indicated a positive impact of remittances on employment; for the countries in Cluster 3, the influence is negative, while for Cluster 2, the effect is statistically insignificant. Expenditure with social protection decreases the employment rate in the states grouped in Clusters 2 and 3; for Cluster 1, the relationship is statistically insignificant.

5. Discussions

For countries such as Belgium, Croatia, Cyprus (Clusters 1) and Austria, Estonia, and Finland (Cluster 3), an increase in the Gini coefficient is related to the reduction in employment rate, results that are consistent with similar studies (Doerr *et al.*, 2022; ILO *et al.*, 2015; Topuz, 2022). On the contrary, for countries such as Bulgaria, the Czech Republic, and Ireland (Cluster 2), the employment rate and Gini coefficient have evolved in the same direction. According to the “natural rate theory,” if the wage system in a country is flexible enough, the repercussions on employment are minor. Considering this theory, a less regulated labour market, which might cause inequality increases, might also generate an increase in employment (Schettkat, 2012).

For countries in Clusters 2 and 3, the share of women in management positively impacts the employment rate (similar to the findings of Cohen & Broschak, 2013). This result can be interpreted from two perspectives. On the one hand, the reduced access of women to management positions is also a form of inequality (Huffman, 2016), thus highlighting the relationship between inequality and employment, which can manifest through different economic channels. On the other hand, a higher share of women in management positions indicates a more inclusive society in terms of gender, being able to be seen as role models, thus stimulating the participation of women in the labour market and becoming important drivers of change within companies that are gendered (Cotton *et al.*, 2021). Also, when the board of directors is gender-based, firms are almost 20% more likely to improve their business results, as pointed out in the ILO Enterprise Survey 2018 (ILO, 2019). For countries in Cluster 1 (e.g. France, Germany, and Greece), the impact of women in management positions on employment is not statistically significant.

Greater trade openness in a country stimulates economic growth and investment, leading to increased employment. Additionally, it can influence national occupational structures and modify business patterns, resulting in changes in labour demand. This happens by creating jobs directly in the export sector and indirectly in its supplying sectors (Winkler *et al.*, 2023). Our results show that trade openness stimulates employment in Belgium, Croatia, Cyprus, Denmark, France, Germany, Greece, Italy, Luxembourg, Netherlands, Romania, and Slovenia (Cluster 1).

Research and development expenditures were included in the econometric model as a proxy for technological progress, an aspect frequently debated in the literature through the prism of the effects on employment, which can be both positive – by stimulating economic development and global competitiveness (Almeida & Amoedo, 2020; Piva & Vivarelli, 2017), as well as negative, through the destructive effect on the workforce coming from the fact that technology can replace manual or low-skilled workers as automation and artificial intelligence become more widespread (Ayhan & Elal, 2023). Research and development expenditures play an important role in increasing the employment rate for countries in Cluster 1 (Belgium, Croatia, Cyprus, Denmark, France, Germany, Greece, Italy, Luxembourg, Netherlands, Romania, and Slovenia). Our result is similar to the work of Destefanis and Rehman (2023) and that of Shah *et al.* (2022).

People with higher levels of education have better employment prospects, higher productivity, and greater life satisfaction (European Commission, 2024; Şerifoğlu, 2023). Moreover, education is one of the best protections

against economic risks (OECD, 2022). These results support our findings that countries with a higher share of people with tertiary education have higher employment rates, especially for countries in Clusters 1 and 2.

Our study shows that the relationship between remittances and employment is ambivalent. While in some countries such as Croatia, Cyprus, Denmark, France, Germany, Greece, Italy, Luxembourg, and the Netherlands, the remittances stimulate employment, in other countries (Cluster 3), they curb employment. These results follow economic theory and similar findings, in the sense that a positive relationship is determined by the stimulating effect of remittances on investments and entrepreneurship, while the negative impact is due to the reduction of labour force participation based on the financial support received in the form of remittances (Wu et al., 2023).

In countries such as Bulgaria, Czech Republic, Ireland, Malta, Portugal, Slovakia, Spain, Sweden (Cluster 2) and Austria, Estonia, Finland, Hungary, Latvia, Lithuania, and Poland (Cluster 3), higher expenditure with social protection trigger lower employment rates, as also stated by Çelikay (2023) and Lu (2022). The result is meaningful from a public policy perspective, highlighting the need for carefully designed interventions that target only vulnerable populations requiring support. Rigorous impact assessments should accompany such policies to identify potential adverse effects, such as disincentivising work.

6. Conclusions

Employment has strong effects, both at the individual level, as a premise for economic independence, social development, and professional satisfaction, and at the macroeconomic level, being considered the most significant factor for combating poverty and social exclusion.

In 2023, the employment rate at the EU level was 70.4%. The highest employment rate was recorded in the Netherlands, with a value of 82.4%, and the lowest in Italy, with a value of 61.5%. Also, the Netherlands recorded the highest employment rate during 2011–2023. The second place in the hierarchy of EU member states was held in 2023 by Malta, with an employment rate of 77.8%. Greece, Romania, Croatia, and Spain also recorded low employment rates during the period. The lowest increase in the employment rate during 2011–2022 was recorded in Austria (3 percentage points), but the country has always had a high employment rate, well above the EU average.

Our objective was to investigate recent trends, patterns, and determinants of employment in EU countries. Our results indicated that along with the Gini coefficient,

the share of women in management positions, trade openness, R&D expenditures, the share of people with higher education, remittances, and social protection expenses also play important roles in employment development.

We obtained an optimal number of three clusters for the grouping of EU states, considering the set of indicators used: Cluster 1 includes Belgium, Croatia, Cyprus, Denmark, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Romania, and Slovenia; Cluster 2 contains Bulgaria, the Czech Republic, Ireland, Malta, Portugal, Slovakia, Spain, and Sweden; Cluster 3 consists of Austria, Estonia, Finland, Hungary, Latvia, Lithuania, Poland.

The econometric results generally indicated a negative impact of income inequality on employment and a positive influence on the share of women in management positions, trade openness, tertiary education, and research and development expenditures. However, the results differ amongst clusters regarding both the intensity influences and their meaning. For Cluster 1, a strong influence of tertiary education on employment growth was identified. Also, trade openness, R&D expenditures, and remittances stimulate employment, while inequality lowers employment. For Cluster 2, a positive impact of inequalities on employment was obtained, with favourable influences from the higher share of women in management positions and tertiary education. For countries in Cluster 3, inequalities, remittances, and social protection expenses negatively affect employment. The only positive impact on employment comes from the share of women in management positions.

Our research highlighted different patterns among member states regarding the determinants of employment. Mitigating inequalities could act as a positive driver for increasing employment; however, the specific nature of these inequalities is of great importance. Income inequality varies across countries, and the variation is determined by different policy regimes. It is argued that the Nordic countries (Finland and Sweden) are among the most equal countries in Europe. Nonetheless, inequality across the EU has declined in recent years (Zwysen, 2024). Our results showed that countries in Cluster 3 are performing better regarding inequalities, especially Poland, Austria, and Finland.

Furthermore, we observed a mixed effect of remittances: for the countries in Cluster 1, they lead to an increase in employment, whereas in Cluster 3, their influence is adverse, suggesting a decrease in labour force participation attributable to the financial aid received through remittances. For countries in Cluster 1, it might be beneficial to implement financial literacy initiatives that encourage investment in local firms, entrepreneurship, and skill development to maximise the use of remittances for economic

growth. For Cluster 3 countries, policies should encourage labour market participation by providing targeted employment incentives and tying social benefits to job-seeking activities. Measures should also be taken to ensure that remittances complement earned income rather than replace it.

It should be noted that R&D expenditures generate employment growth in countries from Cluster 1, including Belgium, Croatia, Cyprus, and Romania. The relationship between technological development and employment is debated since, on the one hand, it can result in technological unemployment, and on the other hand, it can trigger an increase in employment through process innovation; however, studies on EU countries (Bogliacino & Vivarelli, 2010) reveal the job-creating effect of R&D. The results should be of particular importance from less developed countries such as Romania and Cyprus, that have the lowest R&D expenditures among the EU member states, and that could generate economic and employment growth through R&D. Trade openness and research and development expenditures do not have a significant impact on the employment rate in Cluster 3 or Cluster 2 countries. Social protection expenses influence employment only in countries from Cluster 2 and 3. Developing countries should encourage innovation to achieve technological progress and industrial upgrading, increasing their trade openness and benefiting the labour market. However, policy in other areas is also needed to fully exploit the benefits: increasing skills and supporting people changing professions, sectors, or places or improving the movement of trade goods and services.

Regarding social protection expenses, we should remember that reforming social schemes requires a comprehensive approach. The changes need to be carefully implemented, considering stricter eligibility criteria, to offer these social protection instruments to those needing them the most. Another aspect that might be worth considering is related to the fact that passive and active labour market policies analysed individually seem to have adverse effects on employment (Pignatti & Van Belle, 2021), while the intersection between the two proves to be efficient in increasing employment and labour force participation and decreasing unemployment. Therefore, countries could benefit from relying on a mix of social and labour market policies to improve labour market outcomes, including employment. In conclusion, based on our results, to boost employment in countries from Cluster 1, one should focus on increasing trade and research and development expenditures, as well as remittances. Also, increasing the share of the population aged 25–34 who successfully completed tertiary education would help more people in this age group to

improve their employability. In addition, mitigating the inequalities may also be a channel through which the labour market may benefit.

Countries in Cluster 2 should focus on stimulating individuals aged 25–34 to complete tertiary education, increasing their chances of finding a job more easily. Increasing the share of women holding management positions in these countries could also boost employment. The positive relation between inequality and employment in these countries could emerge from a less regulated labour market, and further research may be necessary. The negative influence of the social protection expenses suggests the need for a more effective social scheme that integrates beneficiaries into active labour market initiatives, ensuring a well-balanced approach between social and labour market policies.

For the countries in Cluster 3, the only positive relation with employment was the share of women holding management positions. As mentioned above, these countries benefit from this development through the leading role these women exert on other women, empowering them to enter the labour market. Therefore, targeted policies should focus on mentorship programs, leadership training, and workplace inclusion initiatives to encourage women's employment and career advancement. Remittances negatively impact employment, suggesting that these countries need to find a way to stimulate individuals to rely on other sources of income, primarily by encouraging them to enter the labour market and by entrepreneurial support programs that promote self-employment and business creation. Social protection reforms should also balance financial assistance with active labour market policies, such as training, reskilling, and job placement, to reduce welfare dependency and enhance labour market participation.

The limitations of our study primarily stem from the availability of data for the analysis. Employing a more extensive data set would enhance the robustness of the results. Regarding future research, we consider incorporating a broader spectrum of indicators to characterise the employment rate better and possibly some variables to capture the effects of external shocks. Additionally, it could be beneficial to use principal component analysis before applying the clustering algorithm and FE panel data regression models.

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Author contributions

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Conflict of interest statement

Authors state no conflicts of interest.

Data availability statement

The data are publicly available on Eurostat and UNCTAD pages.

References

- Adejumo, O. O., Asongu, S. A., & Adejumo, A. V. (2021). Education enrolment rate vs. employment rate: Implications for sustainable human capital development in Nigeria. *International Journal of Educational Development*, 83, 102385.
- Almeida, F., & Amoedo, N. (2020). Exploring the association between R&D expenditure and the job quality in the European Union. *Studies and Scientific Researches. Economics Edition*, 32, 6–32. <https://arxiv.org/pdf/2101.03214>.
- Ayhan, F., & Elal, O. (2023). The IMPACTS of technological change on employment: Evidence from OECD countries with panel data analysis. *Technological Forecasting and Social Change*, 190, 122439.
- Bailey, N. (2017). Employment, poverty and social exclusion. In *Poverty and social exclusion in the UK* (pp. 159–178). Policy Press, imprint of Bristol University Press. doi: 10.56687/9781447334262-011.
- Bogliacino, F., & Vivarelli, M. (2010). The job creation effect of R&D expenditures. In *JRC Working Papers on Corporate R&D and Innovation 2010-04*, Joint Research Centre. Publications Office of the European Union.
- Botelho, V., & Neves, P. (2021). The impact of the COVID-19 crisis on the euro area labour market for men and women. *ECB Economic Bulletin*, Issue 4/2021. https://www.ecb.europa.eu/press/economic-bulletin/focus/2021/html/ecb.ebbox202104_04~686c89e9bb.en.html.
- Burlacu, S., Anghelută, S. P., Oancea Negescu, M. D., & Platagea Gombos, S. (2021). Level of adult education in the European Union. In: R. Pamfilie, V. Dinu, L. Tăchiciu, D. Pleșea, & C. Vasiliu (Eds.), *7th BASIQ International Conference on New Trends in Sustainable Business and Consumption*. ASE. https://www.researchgate.net/publication/354610072_Level_of_Adult_Education_in_the_European_Union.
- Çelikay, F. (2023). Social spending and chronic unemployment: Evidence from OECD countries. *Review of Economics and Political Science*, 8(2), 86–107.
- Cohen, L. E., & Broschak, J. P. (2013). Whose jobs are these? The impact of the proportion of female managers on the number of new management jobs filled by women versus men. *Administrative Science Quarterly*, 58(4), 509–541.
- Cotton E., Beauregard, T. A., & Keles, J. Y. (2021). Gender equalities: What lies ahead. *Work, Employment and Society*, 35(4), 615–620. <https://journals.sagepub.com/doi/epub/10.1177/09500170211034659>.
- Destefanis, S., & Rehman, N. U. (2023). Investment, innovation activities and employment across European regions. *Structural Change and Economic Dynamics*, 65, 474–490.
- Ding, Y., Li, Z., Ge, X., & Hu, Y. (2020). Empirical analysis of the synergy of the three sectors' development and labor employment. *Technological Forecasting and Social Change*, 160, 120223, doi: 10.1016/j.techfore.2020.120223.
- Doerr, S., Drechsel, T., & Lee, D. (2022). *Income inequality and job creation* (1021; Staff reports). Federal Reserve Bank of New York.
- Dumitrescu, E. I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling*, 29, 1450–1460.
- Escudero, V. (2018). Are active labour market policies effective in activating and integrating low-skilled individuals? An international comparison. *IZA Journal of Labor Policy*, 7(4), 1–26.

- European Commission. (2016). *Good practices for employment in Europe, Erasmus + Project*. <https://ec.europa.eu/programmes/erasmus-plus/project-result-content/722088c5-c45f-4968-9a0f-bec2624880e2/Guide%20for%20Employment%20in%20Europe.pdf>.
- European Commission. (2024). *Employment rates of recent graduates*. https://ec.europa.eu/eurostat/statistics-explained/index.php/Employment_rates_of_recent_graduates.
- Eurostat. (2023). *Sustainable development in the European Union Monitoring report on progress towards the SDGs in an EU context*. <https://ec.europa.eu/eurostat/web/products-flagship-publications/w/ks-04-23-184>.
- Greenaway, D., Hine, R. C., & Wright, P. (1999). An empirical assessment of the impact of trade on employment in the United Kingdom. *European Journal of Political Economy*, 15(3), 485–500.
- Huffman, M. (2016). Does the presence of women in management impact gender inequality? In M. L. Connerley & J. Wu (Eds.). *Handbook on well-being of working women* (pp. 175–187). Springer Dordrecht. doi: 10.1007/978-94-017-9897-6.
- Ianchovichina, E. (2012). Chapter 8. What is inclusive growth? In *Commodity price volatility and inclusive growth in low-income countries*. International Monetary Fund. doi: 10.5089/9781616353797.071.ch008.
- International Labour Organisation. (2019). *Women in business and management. A global survey of enterprises*. International Labour Office. ISBN 978-92-2-132138-5 (web pdf).
- International Labour Organisation. (2020). Promoting employment and decent work in a changing landscape. In *International Labour Conference, 109th Session, Geneva*, ISBN 978-92-2-132386-0.
- International Labour Organisation. (2021). *Inequalities and the world of work (IV; International Labour Conference, 109th Session)*. International Labour Organisation.
- International Labour Organization. (2023). *World Employment and Social Outlook: Trends 2023*. ILO. <https://www.ilo.org/publications/flagship-reports/world-employment-and-social-outlook-trends-2023>.
- International Labour Organisation, International Monetary Fund, OECD, & World Bank Group. (2015). *Income inequality and labour income share in G20 countries: Trends, Impacts and Causes (G20 Labour and Employment Ministers Meeting and Joint)*. International Labour Organisation.
- International Monetary Fund. (2022). *European labor markets and the Covid-19 pandemic: Fallout and the path ahead*. Departmental paper series DP/2022/004. <https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2022/03/02/European-Labor-Markets-and-the-COVID-19-Pandemic-Fallout-and-the-Path-Ahead-512327>.
- Jadhav, K., & Arora, K. (2023). Impact of trade liberalisation on employment patterns: The experience of India's organised manufacturing. *Transnational Corporations Review*, 15(4), 1–12.
- Joshi, N., Poojary, B., & Pathak, D. (2023). Role of women in top management and its impact on leadership. *International Research Journal of Modernization in Engineering Technology and Science*, 5(2), 307–320.
- Kolluru, M., & Semenenko, T. (2021). Income inequalities in EU countries: Gini indicator analysis. *Economics*, 9(1), 125–142. doi: 10.2478/eoik-2021-0007.
- Lu, J. (2022). *On the impact of social spending on long-term economic performance in the USA*. (Undergraduate Honors Theses). William & Mary College.
- Mocanu, C., Zamfir, A. M., & Pirciog, S. (2014). Matching curricula with labour market needs for higher education: State of art, obstacles and facilitating factors. *Procedia – Social and Behavioral Sciences*, 149, 602–606. doi: 10.1016/j.sbspro.2014.08.234.
- Niculescu, A. F., & Dragan, G. (2020). Integrating the non-EU immigrants into the EU labour market. An econometric analysis of some of the specific factors. *Management & Marketing. Challenges for the Knowledge Society*, 15(3), 364–380. doi: 10.2478/mmcks-2020-0021.
- OECD. (2012). *Education at a glance 2012: Highlights*. OECD Publishing.
- OECD. (2015). *OECD Economic Outlook* (Vol. 2015, Issue 1). OECD Publishing. doi: 10.1787/eco_outlook-v2015-1-en.
- OECD. (2022). *Education at a Glance 2022: OECD Indicators*. OECD Publishing. doi: 10.1787/3197152b-en.
- OECD. (2023). *Education at a glance 2023: OECD indicators*. OECD Publishing. doi: 10.1787/e13bef63-en.
- OECD. (2024). *Trade and jobs*. OECD. <https://www.oecd.org/trade/topics/trade-and-jobs/>.
- Pignatti, C., & Van Belle, E. (2021). Better together: Active and passive labor market policies in developed and developing economies. *IZA Journal of Development and Migration*, 12(1), 1–27. doi: 10.2478/izajodm-2021-0009.
- Piras, R. (2023). Remittances, economic complexity, and new firms' creation: Empirical evidence from a large sample of countries. *Economic Change and Restructuring*, 56, 2557–2600. doi: 10.1007/s10644-023-09525-5.
- Piva, M., & Vivarelli, M. (2017). *R&D expenditures and employment: Evidence from Europe*. GLO Discussion Paper, No. 18, Global Labor Organization (GLO).
- Sarafidis, V., & Weber, N. (2015). A partially heterogeneous framework for analyzing panel data. *Oxford Bulletin of Economics and Statistics*, 77, 274–296.

- Schettkat, R. (2012). Inequality and employment. *Intereconomics*, 47(5), 282–291. doi: 10.1007/s10272-012-0429-4.
- Şerifoğlu, M. M. (2023). Education and employment: Evidence from selected OECD countries. *Prague Economic Papers*, 32(5), 569–588.
- Shah, I. H., Kollydas, K., Lee, P. Y., Malki, I., & Chu, C. (2022). Does R&D investment drive employment growth? Empirical evidence at industry level from Japan. *International Journal of Finance & Economics*, 29(1), 102–118.
- Tandoğan, D. (2019). The impact of export on employment: Panel data analysis for regional Base in Turkey. *Bingöl University Journal of Social Sciences Institute*, 9(18), 799–814.
- Teichler, U. (2015). Education and employment. In *International encyclopedia of the social & behavioral sciences* (pp. 127–131). Elsevier.
- Topuz, S. G. (2022). The relationship between income inequality and economic growth: Are transmission channels effective? *Social Indicators Research*, 162(3), 1177–1231.
- United Nations. (2019). *A guide to inequality and the SDGs*, Social Development Division of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). United Nations. https://www.unescap.org/sites/default/d8files/knowledge-products/A_Guide_to_Inequality_and_the_SDGs.pdf.
- United Nations. (2024). *Trade, employment and development*. UNCTAD. <https://unctad.org/es/isar/topic/trade-agreements/trade-employment-and-development>.
- Vojinic, P. (2024). SDG8 - Analysis of selected EU countries. *Proceedings of the 109th International Scientific Conference on Economic and Social Development – “Green Economy & Sustainable Development”*.
- Waqas, M., Awan, M. S., & Sánchez-Juárez, I. (2022). Social protection expenditures, poverty, inequality, and economic growth in Pakistan. *Paradigma Económico*, 14(1), 57–75. doi: 10.36677/paradigmaeconomico.v14i1.16747.
- Winkler, D., Kruse, H., Luna, L. A., & Maliszewska, M. (2023). Linking trade to jobs, incomes, and activities. New stylized facts for low- and middle-income countries. *Policy Research Working Paper*, 10635. <https://documents1.worldbank.org/curated/en/099813412112341111/pdf/IDU09e34c9d205fd6043190a05b0f0e02335a74b.pdf>.
- World Economic Forum. (2023a). *The future of jobs report 2023*. <https://www.weforum.org/publications/the-future-of-jobs-report-2023/in-full/1-introduction-the-global-labour-market-landscape-in-2023/>.
- World Economic Forum. (2023b). Global Gender Gap Report 2023 (Insight Report). *World Economic Forum*.
- Wu, W., Hon-Wei, L., Yang, S., Muda, I., & Xu, Z. (2023). Nexus between financial inclusion, workers' remittances, and unemployment rate in Asian economies. *Humanities and Social Sciences Communications*, 10(1), 1–10.
- Zwysen, W. (2024). *Wage inequality in Europe: The institutional and economic factors supporting workers (ETUI Working Paper 2024.05)*. European Trade Union Institute. doi: 10.2139/ssrn.4751153.