Annals of "Dunarea de Jos" University of Galati
Fascicle I. Economics and Applied Informatics
Years XXXI – nº2/2025
ISSN-L 1584-0409 ISSN-Online 2344-441X
www.eia.feaa.ugal.ro

DOI https://doi.org/10.35219/eai15840409528

Economic Aspects of the Relationship between Government Expenditure, Employment, COVID-19 and GDP Growth in the European Union

Ioana Lăzărescu*, Alexandrina Brînză, Dragos-Sebastian Cristea*****

ARTICLE INFO

Article history:
Received July 15, 2025
Accepted August 22, 2025
Available online September 2025

JEL Classification
G20, H50, I31, F63

Keywords:
Gross Domestic Product (GDP), government expenditure, employment, competitiveness, well-being, COVID-19

ABSTRACT

Economic competitiveness and population well-being in the European Union emphasizes the identification of economic strategies aimed at facilitating sustainable and equitable growth. Gross Domestic Product (GDP) per capita, employment rate, labor productivity, and the level of technological innovation are key factors in determining an economy's ability to compete effectively in the international market and generate long-term prosperity. Developed infrastructure and a high level of education are important factors influencing economic competitiveness. Additionally, investments in research and development, macroeconomic stability, and transition policies contribute to the transformation of society. Using an econometric model, we analyzed the economic factors that influence GDP growth, during the period 2013-2023, noticing major fluctuations during the period 2020-2021 with a negative effect on GDP. One of the European Union's goals is to ensure and guarantee long term prosperity, which is why it emphasizes innovation, ecological transition, and the digitalization of the economy. The proposed strategies support the sustainable growth of both competitiveness and well-being.

1. Introduction

National competitiveness and the well-being of the population are those significant pillars that guarantee long-term sustainable economic growth in the contemporary global economic environment. Recent crises, the COVID-19 pan-demic have strongly influenced economic and social policies in Europe. They revealed signs of the structural vulnerabilities and adaptability of national economies.

It is a concept that tries to show economic competitiveness as an ability of the economy to provide goods and services that could resist international competition and simultaneously allow a constant growth of the living standard. A set of interdependent economic factors come into play, such as productivity, rate of unemployment, investment in hu-man capital, and government expenditure related to education and re-search and development. However, the concept of well-being in the population is not only good incomes but also access to high quality public services. For instance, policy analysts conducting research consider reducing inequalities a key component of im-proved wellbeing. This will depend on how the set policies have been implemented and combined with macroeconomic goals. In the post COVID-19 era, most European economies have recorded a huge slump in Gross Domestic Product. The European Council called for solutions, provided funds so that the economy of member countries could get restored. The government invested in identifying and developing key tasks for enhancing economic competitiveness by policies in concern with green transition and digital transition. For example, those member states able to invest highly in government spending on education, research, and innovation may enjoy economically resilient economies characterized by an especially speedy rebound of their GDP, with a diminished unemployment rate. Thus, analysis of the relationship between population well-being and economic competitiveness in Europe becomes useful to identify effective strategies for economic growth. Public spending on education and research, un-employment reduction policies, and strategies related to technological innovation support GDP growth but also contribute to enhancing long-term quality of life and social development of human capital.

These conditions mean the possibility not only of increasing economic competitiveness but also of ensuring inclusive and sustainable economic development.

*, **, ***Dunarea de Jos University of Galati, Romania. E-mail addresses: ioana.lupasc@ugal.ro (I. Lazarescu – Corresponding author), alexandrina.brinza@ugal.ro (A. Brinza), dragos.cristea@ugal.ro (D. S. Cristea).

Objectives:

O1: The multidimensional relationship between competitiveness and population well-being, at the level of the European Union.

O2: The impact of recent crises, especially Covid-19, on sustainable economic development.

O3: Identification of the main macroeconomic factors (labour productivity, unemployment rate, government spending on education), which influence the increase in competitiveness.

O4: Use of the econometric model to determine the impact of economic variables on GDP, in the period 2013-2023.

2. Literature review

The first major concepts of national competitiveness were established by (Porter, 1990), as described in his book, "The Competitive Advantage of Nations." (Craig & Porter, 2003) argument is that a nation's competitive advantage is not only determined by costs and prices. Emphasizing the role of innovation—especially in the context of major economic and social transformations—scholars such as (Aghion & Howitt, 2008) have expounded these key concepts in the understanding of contemporary economic competitiveness. More recent work has paid much attention to green competitiveness and the green economy. (*(PDF) Rethinking National Competitiveness for Europe 2050: The Case of EU Countries*, n.d.) examine the green competitiveness policies of European countries in relation to the EU's climate neutrality objective for 2050. Their study shows that the evolution of green competitiveness is not experienced equally by all Member States, as the levels of progress are quite uneven depending on the individual economic and social situation of each state. (Magrini, 1999) and (Huggins & Izushi, 2015) attest to this reality by highlighting how difficult it is for European industry to evolve with new environmental regulations. (Philippon, 2019) also highlights the need for industrial policy and market regulation in promoting the competitiveness of European economies. The specialized literature equally considers social inclusion and the reduction of inequality as new ideas. Research by (Bruno et al., 2023) and (*Development Co-Operation Report 2014 | OECD*, n.d.) shows that people's living standards do not necessarily increase with economic growth or GDP per capita.

(Darvas & Wolff, 2016) emphasizes in his study that inclusive growth must be ensured for social well-being and recommends that European governments focus more on reducing inequalities through spending on education, health, and social security. Studies on globalization and changes in the European social model by (Milanovic, 2016) and highlight the link between competitiveness and well-being. (Cappelen, 2004) argues that while globalization has increased inequality, it has also opened doors for developing countries to participate in global value chains and thus increase their competitiveness. Other recent studies highlight the effect of the COVID-19 pandemic on the European economy. Even though EU efforts, such as the Recovery and Resilience Plan, have contributed greatly to stimulating economic recovery, the (Anghel, 2017) report argues that the pandemic has severely affected economic competitiveness. To ensure long-term sustainable growth (Aghion & Howitt, 2008), the report states that the EU needs to set priorities in advance for investments in innovation, digitalization, and the green transition. (Malecki, 2017) end (Anghel, 2017) suggests dynamic factor analysis at the methodological level to estimate the correlation between well-being and competitiveness. This method can be applied to estimate the correlations of various social and economic indicators, such as GDP per capita, labor productivity, education expenditure, and the level of innovation.

We conducted a bibliometric study using the VOSviewer program to create an overview of the trend in research on labor productivity and competitiveness. The study was based on the co-occurrence of keywords in 140 academic publications.

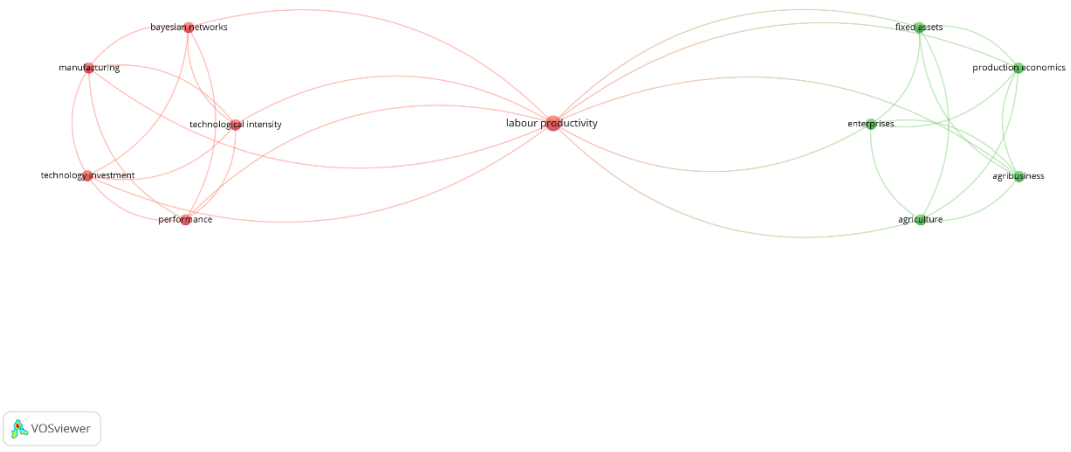

Figure 1. VOSviewer network visualization

Source: VOSviewer output

The central node that connects the two clusters is labor productivity. The red cluster focuses on the technological and industrial domain, along with the term's technical intensity, technology investment, production, Bayesian networks, and performance. This cluster takes an advanced analytical approach, suggesting that much research examines how technical investment and innovation affect productivity growth in the industrial sector(Brynjolfsson et al., 2014).

The green cluster emphasizes the interaction between labor productivity and sectors such as agriculture and agribusiness. It covers words such as agriculture (Antonescu, 2012), fixed assets, production economics, business, and agribusiness. The literature related to this cluster addresses how economic efficiency is supported by the optimal use of fixed assets and the efficient use of company management.

This thematic division indicates that labor productivity is a cross-cutting topic examined from the perspective of both technological modernization and sectoral economic efficiency (Novotná & Volek, 2015). Therefore, the specialized literature provides a solid basis for the formulation of various public policies that simultaneously promote innovation, competitiveness, and sustainable development.

3. Results

National competitiveness is the ability of a nation to thrive in competitive global economic circumstances. Creating a competitive advantage can be determined by a competent and creative workforce. Economic efficiency is influenced by transportation, communications and other infrastructure tools. Competitiveness is determined by the adoption of leading technologies and the encouragement of creativity. Prerequisites include business-friendly policies, effective regulations and strong governance. Globalization causes nations to compete for natural resources, export markets, human resources, external financing and more. Important measures for assessing economic performance and competitiveness are GDP, GDP growth rate and labor productivity.

3.1 The evolution of GDP in the member states of the European Union from 2013 to 2023

From 2013 to 2023, the historical expansion of GDP of the member countries of the European Union is remarkable. The well-being of the population means a better life for everyone, who have an average income and an adequate standard of living, without living below the poverty line. People's well-being is affected by difficult access to education and healthcare, as well as a better employment rate. Improving well-being is about balancing social inequalities and the equitable distribution of the benefits of economic development.

There is an emphasis on economic growth that respects the environment and ensures long-term prosperity. A competitive economy should contribute to increased well-being by creating jobs, raising incomes, and investing in public services. National competitiveness and improving the population's well-being are interconnected concepts. A competitive country should aim not only for economic growth but also to ensure that this growth translates into a significant improvement in the lives of its citizens. The constant growth of GDP indicates economic efficiency and the ability to produce competitive goods and services, reflecting the level of innovation and modernization in infrastructure. This can enhance competitiveness, demonstrate increased confidence in the economy, and lead to a high quality of life. Sustainable and equitable economic growth can strengthen long-term competitiveness, ensuring social inclusion and environmental respect.

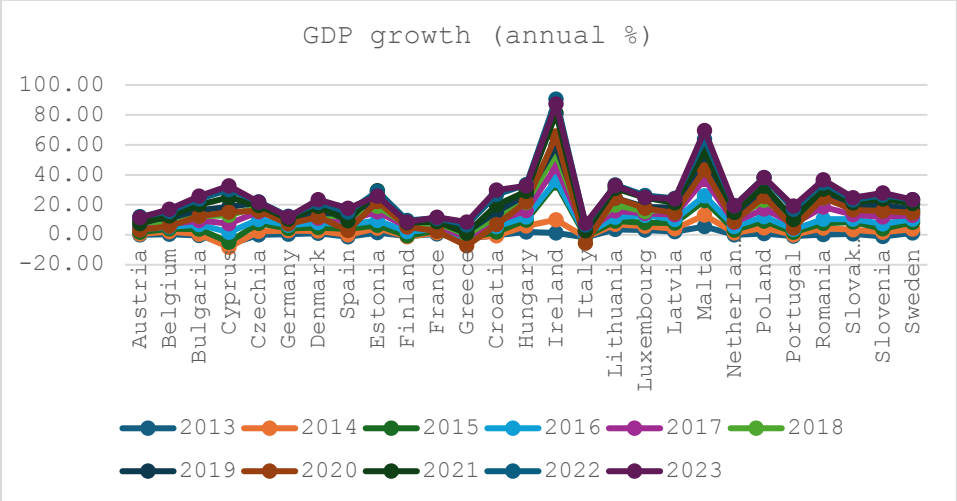

Figure 2. GDP of the European Union, 2013-2023

Source: Author's own compilation based on data from the World Bank Group, Government expenditure on education, total (% of GDP), available at: https://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS?locations=EU&name_desc=false

Figure 2 represents the variation of GDP for the member states of the European Union (UE) during the period 2013-2023. We are observing major economic dynamics that impact economic competitiveness and population well-being. Following the evolution analysis, we can easily observe the rise or fall of the population's standard of living, the capacity for innovation in national economies, and the long-term development strategies in Europe from an economic standpoint.

The European countries recorded stable and steady economic growth in 2013–2019, with moderate expansion rates, indicating a strengthening of economic competitiveness. Some European countries have benefited from robust economic growth, such as Ireland, Lithuania, and Cyprus. Strong investments in infrastructure and innovation supported them. These increases have highlighted the strengthening of national competitiveness, in accordance with Michael Porter's thesis, which outlines the im-portance of innovation and digitalization for long-term competitiveness. Ireland's gross domestic product reached very high levels in 2015, growing by 24.48% compared to 2016. This is due to favorable economic policies for investments and strong integration into global value chains. However, like in the other 26 European countries, the COVID-19 pandemic marked a decline in economic dynamics. Italy and France, although they are two economic powers, recorded a slower recovery with growth rates of 8.31% and 6.44%, respectively, in 2021. In the years 2022–2023, there was a significant slowdown. Despite their resilience, they are facing structural issues that hinder economic growth. These challenges include an excessive dependence on traditional economic sectors, rigidity in the labor market, and a slow adaptation to digitalization and the green transition. Malta, Ireland, and Lithuania are countries with a stable and growing economy. They managed to improve the quality of life for citizens and increase incomes.

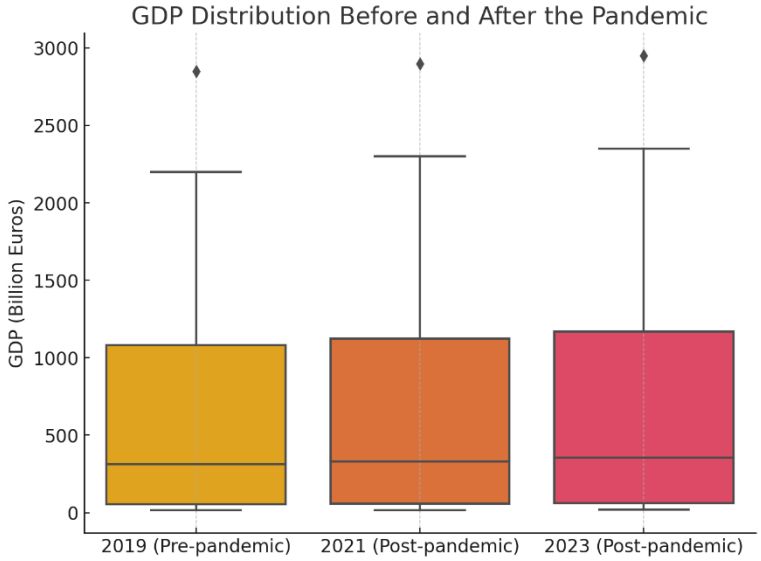

Figure 3. GDP Distribution before and after the pandemic

Source: Author's own compilation based on data from the World Bank Group, available at: https://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS?locations=EU&name_desc=false

Figure 3 illustrates the considerable decline in GDP in 2020 at the European Union level. The post-pandemic recovery is due to economic resilience strategies, which played an essential role in development.

3.2 The impact of economic factors on GDP Growth - econometric model

We will analyze the impact of economic factors that influence GDP growth through the econometric model. Following the analysis performed, we observe that EU countries suffered decreases in GDP during the period 2020-2021. For this reason, the European Union focused on post-pandemic recovery. To capture the influences of the pandemic and the economic recovery, the model uses two dummy variables, the unemployment rate and government spending on education.

$$GDPgrowth_{it} = \beta_0 + \beta_1 Unemployment\_rate_{it} + \beta_2\ Government\_expenditure\_education_{it} + \beta_3 pandemic\_dummy_{it} + \beta_4 post\_pandemic\_dummy_{it} + \varepsilon_{it}$$

Where:

- GDP_growth $_{it}$: Economic growth of GDP for country i in year t.
- Unemployment_rate $_{it}$: The unemployment rate in country i in year t.
- Government_expenditure_education: Government expenditure on education, expressed as a percentage of GDP in country i.
- dummy_pandemic: A dummy variable that indicates 1 for the year 2020 (pan-demic) and 0 for the other years.

- dummy_post_pandemic: A dummy variable that indicates 1 for the years 2021-2023 (post-pandemic) and 0 for the other years.

Table 1. Descriptive statistics of variables used in the econometric model

Variable	Mean	Standard Deviation	Minimum	Maximum
GDP Growth (%)	2,34	4,29	-9,32	8,38
Unemployment Rate (%)	7,45	5,38	2,02	23,51
Government Spending on Education (%)	4,92	1,07	3,07	7,62
Pandemic Dummy	0,14	0,35	0	1
Post-Pandemic Dummy	0,43	0,50	0	1

Source: Author's calculations using Stata.

Examining Table 1, we see that the unemployment rate negatively affects GDP growth as high unemployment lowers consumer demand and productivity. Government investing on education helps to build human capital and boost long-term production, hence benefiting it. While the post-epidemic rebound should positively influence GDP, the impact of the pandemic—measured by the pandemic dummy variable—is anticipated to be negative.

Table 2. Regression results: Impact of economic factors on GDP Growth

Variable	Coefficient (β)	t-statistic	p-value
Unemployment Rate (β1)	-0,345	-3,21	0,002
Government Spending on Education (β2)	0,245	2,45	0,015
COVID-19 Pandemic (β3)	-4,857	-5,78	0,000
Post-Pandemic Recovery (β4)	2,367	4,12	0,001
Constant (β0)	1,102	1,98	0,053

Source: Author's calculations using Stata.

The unemployment rate coefficient (β1) registers a negative value of -0.345, indicating an inverse proportional relationship between unemployment and GDP growth. Each 1% increase in the unemployment rate leads to a reduction in GDP of approximately 0.345%. This negative relationship is statistically significant at a 99% confidence level, according to the p-value of 0.002. This result is consistent with economic theory, which states that high unemployment reduces consumption and production, negatively impacting economic activity.

Government spending on education (β2 = 0.245) indicates a positive value; for this reason, it follows that investments in education have a beneficial impact on economic growth. A 1% increase in government spending on education leads to a 0.245% increase in GDP. This reflects the importance of investing in education for economic growth. Education plays an important role in the growth of human capital, leading to greater productivity and long-term innovation. This result underscores the importance of continuing government investments in education to support economic competitiveness and long-term well-being.

The dummy variable for the pandemic has a negative coefficient (β3 = -4.857). The COVID-19 pandemic had a strong negative impact on European economies, reducing GDP growth by approximately 4.86%. It represents the devastating effects that the pandemic had on economic growth in 2020. Most European countries have recorded a severe contraction in GDP this year, and the model confirms the widespread decline in economic output during the pandemic. The coefficient of the dummy variable for the post-pandemic period is positive, recording a value of β4 = 2.367, indicating an economic recovery starting in 2021. In the period from 2021 to 2023, European economies began to recover, with a GDP growth of approximately 2.37%, indicating a strong rebound after the crisis. This suggests that the economic recovery measures and stimulus packages implemented by the European Union have had a positive effect on national economies, facilitating GDP growth in the years following the pandemic.

Using the econometric model to analyze the table's data, we observe that factors like the unemployment rate and government spending on education, which are crucial for population well-being, directly influence the economic competitiveness of European countries as measured by GDP growth. The COVID-19 epidemic has highlighted disparities in economic performance among nations, hence underlining the need for sound policies to assist social well-being and economic recovery in the post-crisis era.

4. Conclusions

In Europe, there is a close link between government spending, unemployment, and economic competitiveness, particularly in the post-pandemic period. The results suggest that, in general, an increase in the unemployment rate has a negative effect on GDP, demonstrating the vulnerability of economies that failed

to maintain employment during the pandemic crisis. Greece and Romania recorded significant GDP de-clines of -9.32% and -3.68% in 2020, respectively, against the backdrop of a moderate increase in unemployment. These developments affecting states' economies highlight the fact that unemployment directly impacts productivity and economic competitiveness. In contrast, the countries that invested in maintaining and developing the workforce experienced a faster economic recovery. In this regard, Poland is the best example, as after a decline of -2.02% in 2020, it managed to revitalize its economy in 2021 with a GDP growth of 6.93%. It also achieved a decrease in unemployment to 3.36%. This reflects the importance of adopting economic policies that stimulate employment and create favourable conditions for a rapid recovery. Government spending on education plays an important role in economic growth and strengthening competitiveness.

Countries like Sweden and Belgium, whose educational expenditure accounted for 6.65% and 6.21% of GDP in the year 2021, respectively, have shown remarkable economic performance in the post-pandemic era with 6.15% and 6.93% GDP growth rates. The above findings prove that sustained investment in education is the reason behind the development of a stock of qualified manpower that can easily adapt to new technologies and changing economic challenges. In the course period, the COVID-19 pandemic catastrophe negatively impacted the European Union's economy. Countries which reacted quickly with economic recovery policies have shown drastic results. Ireland is one of them, which recorded a remarkable economic growth of 15.13% in 2021. The advent of new policies of green transition and digitization led to this drastic increase. Further, in a significant setback in 2020, both Malta and Croatia have shown a lot of economic resilience with respective GDP growth rates of 13.04% and 12.51% in the year 2021. Outcomes of the given research confirm that in the contexts of economic competitiveness and the overall well-being of European populations, decreasing unemployment percentage, increasing investments in education, and expediting economic recovery policy implementations into place have proved very significant. Those countries that effectively applied well-guided public policies maintained their GDP and strengthened their long-term competitive edge. In the era of global economic downturns, they have proved that the best recipe for success is a holistic well-crafted, adaptive approach.

Likewise, for European growth to be sustainable, it must keep striving to enhance its economic competitiveness through investment in education as a strategic effort, lowering unemployment, and adopting technological innovations, all of which are necessary to enhance the welfare of citizens and achieve a robust economy in the context of global challenges.

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