Key Determinants of Economic Growth in Central and Eastern European Countries in 1995-2019

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Abstract: The single greatest enlargement of the European Union happened in 2004, when ten new countries joined, eight of which were from Central and Eastern Europe, known as CEE. Economic growth matters to all countries, but it is particularly important for those that have recently become members of the European Union. This study aims to research the economic growth of three Central and Eastern European countries: Poland, the Czech Republic and Hungary. Specifically, it investigates the relationship between economic growth and several key determinants, such as Foreign Direct Investment, Inflation, Research and Development and Unemployment. This paper identifies which of these issues are in fact the main determinants of economic growth, especially affecting gross domestic product. Time series annual data are used for the period from 1995 to 2019, OLS regression analysis is carried out for three CEE countries to test variables in each of the selected countries. The choice of the research period results from the reasons regarding the availability of data and the emergence of the global COVID-19 pandemic in 2020, which significantly influenced the international economic situation. The main conclusion is that inflation negatively impacted the economic growth of all three analysed countries. While, it is also noted that Hungarian economic growth was positively impacted by foreign direct investment, and economic growth in the Czech Republic was positively impacted by research and development. Also, in Poland the economic growth was negatively affected by a high rate of unemployment. This study contributes to the existing literature by identifying key determinants of economic growth in CEE countries. This research can be useful for policymakers who can observe CEE countries to see how specific determinants impact economic growth. The motivation to undertake the research resulted from the personal scientific interests of the authors and the revealed cognitive gap.

Keywords: Gross Domestic Product, Foreign Direct Investment, Inflation, Innovation, Research and Development, Unemployment

1. Introduction

For many countries, EU membership has supported economic growth, as noticed in most Central and Eastern European (CEE) states. However, the rise in economic growth across CEE countries has prompted a key question: did initial income levels increase due to higher economic growth, or were other factors responsible? Previous studies suggest that innovation influences research and development (R&D) expenditures, foreign direct investment (FDI), unemployment rate, and technological investment, all of which promote economic growth in CEE countries such as Poland, the Czech Republic, Hungary, the Slovak Republic and Romania Pece et al. (2015), Simionescu et al. (2017).This study focuses on Poland, the Czech Republic and Hungary, as both Bayar and Sasmaz (2019) and Rapacki and Prochniak (2009) argue that the 1990s transition period and the onset of globalisation coincided with high growth rates in CEE countries, and that EU enlargement significantly contributed to the economic growth of the ten CEE countries. This research aims to examine how determinants of economic growth affect Poland, the Czech Republic, and Hungary, and to identify which factors are most influential in each case. Specifically, the aim is to assess the individual impact of these determinants across the three countries. This study employs the Ordinary Least Squares (OLS) regression model using annual data for the period 1995-2019. Accordingly, this research analyses how foreign direct investment (FDI), inflation, research and development (R&D) and unemployment affect gross domestic product in the case of CEE countries. The purpose of this research is to offer a comparative assessment of how these economic determinants shape the growth trajectories of Poland, the Czech Republic, and Hungary.

2. Literature Review

2.1 Key Determinants of Economic Growth

Countries may pursue different growth trajectories. Ignatov (2022) observed that the effectiveness of the transformation through which the economies of Central and Eastern European countries passed varied, which influenced their economic situation. Bilenko (2024) emphasised that the dominant positive factor influencing the economic growth of the countries in question was the budget balance, while the impact of the exchange rate was relatively weak. Garncarz (2024) identified the positive impact of foreign trade on the economic growth of CEE countries. Tang (2024) highlighted the importance of banking sector efficiency for the economic development in CEE countries. Străchinaru (2023) concluded in his research that indicators such as inflation rates, real interest rates, domestic credit granted to the private sector, current account balances, and government spending have a negative and significant impact on economic growth, while trade openness has a positive impact. Peredy et al. (2022) found that strong domestic demand, foreign direct investment, and the dynamics of world trade have only a limited impact on the development of CEE countries. Petrakos (2008) analysed the determinants of economic growth across countries and regions worldwide. The results indicate that developed countries should focus on human capital, technology, knowledge, and innovation, whereas less developed countries should prioritise the institutional environment, socio-political framework, FDI, openness, and infrastructure. The quality of institutions is a strong reflection of a country's level of economic development. Therefore, well-designed policies can enhance economic growth, human capital, and other key determinants, according to Petrakos (2008). Furthermore, Boldeanu and Constantinescu (2015) argue that the main drivers of economic growth are public expenditure, openness, and FDI. Ioan et al. (2020) investigate the effects of imports, exports, FDI inflow and outflow. Additionally, Mazurek (2017) found that six factors – initial GDP level, economic openness, democracy index, human capital, physical capital, and FDI – are crucial for economic growth. To summarize the literature review, it is necessary to note the existing differences in the approach of individual authors as to the importance of individual factors shaping the economic development of the countries of Central and Eastern Europe. They often blame the differences in the economic transformation paths of individual countries.

2.2 EU Membership and Economic Growth in CEE Countries

According to Bayar and Sasmaz (2019), globalisation intensified in the 1980s, marked by increase in the flow of goods, services, and capital. Developing and emerging economies experienced greater inflows of foreign direct investment (FDI) and foreign loans, which represent an important source of financing for developing countries. Central and Eastern European countries are advised to allocate FDI funds towards productive investments yielding higher returns, to offer incentives for attracting greenfield investments, and to ensure the competitiveness and survival of domestic enterprises in comparison with foreign companies operating in the same sector. EU membership accelerated economic growth in eleven CEE countries between 1995 and 2015 Rapacki and Prochniak (2019). The authors analysed the determinants of economic growth, including the progress of market reforms, economic freedom, foreign aid and FDI inflows. Furthermore, Gilbert and Muchova (2018) analyse changes in export share and export competitiveness following the fifth EU enlargement in 2004, when eight CEE countries joined the EU - the largest single enlargement to date. They found that while export competitiveness increased among CEE countries, the growth in market share was not statistically significant. The authors also examined the impact of EU membership on gross domestic product gross domestic product (GDP) levels. However, it is important to note that EU financial assistance to its poorer members – although the specific mechanisms are not detailed – has contributed to long-term economic growth. EU membership enables greater access to Western European markets. This integration has shifted emphasis from primary exports to industrial exports, which correlates with higher economic growth in developing countries. Still, although exports positively affect economic growth, most developing countries do not distinguish between export types and their respective impacts, as confirmed by Tang (2020). The convergence process is generally faster in less developed countries than in developed economies Glodowska and Pera (2019). Some CEE countries continue to exhibit lower levels of economic development relative to other EU Member States.

2.3 Determinants of Economic Growth in Selected Countries

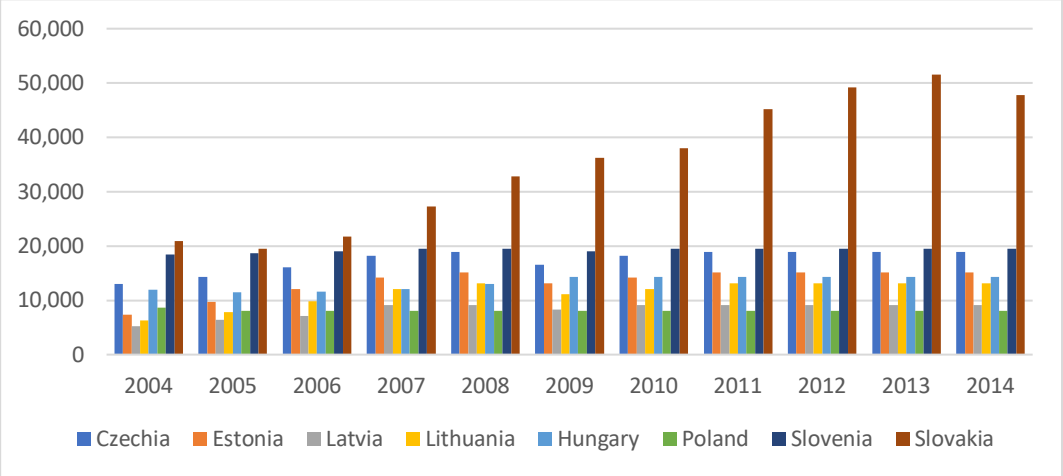
An interesting finding by Škare et al. (2019) is that policymakers should consider the structure of bank loans and financial development in relation to economic growth and credit growth. The authors distinguish between the significance of loan types – loans to households versus loans to companies – within the financial sector. The

structure of lending was also further analysed by comparing investments in machinery and equipment (associated with business loans) to mortgage loans (associated with households). The comparison of lending thus determines the impact of financial development on economic growth in both short and long term. According to Kołodziejczyk (2016), a decade of EU membership has contributed to increased economic growth and the modernisation of Poland's legal, institutional, economic, political, and social reforms. Poland is currently narrowing the gap with the developed EU Member States, achieving income levels two to three times higher than the EU average. Structural funds have transformed Poland's road, agricultural, industrial, environmental, and cultural infrastructure. However, a significant challenge remains: Poland ranks low on innovation indicators Global Innovation Index (2025). Improving the situation requires reforms in market research, development, innovation financing, technical capacity, taxation, education, economic activity, and political discipline Chesbrough et al. (2024). Another important issue is the availability of mineral resources. While Poland possesses substantial reserve of hard coal, lignite, copper, zinc, lead ores, rock salt and other raw materials Scheyder (2024), it lacks strategic resources necessary for modern technologies and green energy. Poland must therefore transition away from non-renewable resources and increase reliance on renewable energy. The Czech Republic experienced a temporary recession and rising inflation in the 1990s Koyame-Marsh (2011). The transition period was also marked by increased income inequality. A second wave of reform policies introduced in the mid-1990s led to sustained economic growth, although the 2008 global crisis posed challenges. These policies focuses on GDP growth, inflation control, employment, and income inequality. According to Šlosarčík (2011), post-1990s efforts aimed to integrate the Czech Republic into the EU's internal market. EU membership transformed the Czech Republic's political, economic, and regulatory environment. Obešlo (2017) noted that trade—particularly import and export of goods—is a critical contributor to the country's economic growth. Among the most influential variables in import analysis were real exports and real effective exchange rates deflated by the PPI index. While real import growth has short-term benefits, it does not sustain long-term growth. Since joining the EU, the Czech Republic—a small, open economy in the centre of Europe—has seen a substantial increase in international trade. Exports and imports constitute a significant share of Czech GDP. According to the Global Innovation Index, the Czech Republic exhibits the highest level of innovation among the three countries discussed, nearing the EU average. This can be attributed to cyclical R&D expenditure, a high level of education, and a strong focus on knowledge-based production and innovative technologies. The Czech Republic also holds important mineral resources such as uranium, gold, tin, graphite, and kaolin, which are considered the most valuable among the three countries in terms of their role in economic development. Torrisi (2015) argued that the size of the domestic market in smaller economies like Hungary may be less relevant to foreign investors. Instead, wage levels, trade openness, and economic liberalisation are key in attracting FDI. According to Matolcsy and Palotai (2019), Hungary has achieved significant economic progress by reducing unemployment, increasing employment, improving its budget balance, lowering public debt, and restoring external balance. The employment rate and wage levels in Hungary are now in line with the EU average. Higher household incomes have stimulated both consumption and savings. Although strong economic growth continued until 2013, Hungary remains financially stable Matolcsy and Palotai (2019). The government reformed its tax system to improve both employment and public finances, with support from the Central Bank. According to Pinter (2018), EU membership has influenced Hungary's economy through increased foreign trade and capital flows. Hegedüs and Kiss (2014) examined the impact of EU membership on Hungary's agricultural trade with the 27 EU Member States, noting a decade of consistent growth from 2003 to 2013. The EU market remains essential for Hungarian exports, accounting for 80% of total exports. Hungary ranks between Poland and the Czech Republic in terms of innovation, as indicated by the Global Innovation Index. While Hungary possesses mineral resources such as bauxite, oil, natural gas, and various industrial raw materials, these resources play a relatively minor role in its economic development.

3. Data and Methodology

The data selected for this study were obtained from Eurostat and the World Bank. The variables included in the model are gross domestic product (GDP), foreign direct investment (FDI), inflation, research and development (R&D), and unemployment. Annual data were collected for 25 years, covering the period from 1995 to 2019, and analysed for Poland, the Czech Republic, and Hungary. The year 1995 was selected as the starting point because it is the earliest year for which complete data are available. The year 2019 was chosen as the final year of analysis primarily due to the COVID-19 pandemic, which lasted from 11 March 2020 to 5 May 2023, according to the World Health Organisation. Furthermore, the inclusion of data during the pandemic could have altered the actual results, as the economic indicators for the years 2020, 2021, and 2022 were likely affected by exceptional circumstances and were therefore excluded from the study. Graph 1 illustrates the GDP per capita

of CCE countries and period, reflecting economic output on a per-person basis. It is observed that Slovenia and Slovakia consistently had the highest GDP per capita values, whereas Latvia and Lithuania exhibited the lowest throughout the period. Fluctuations in GDP per capita are visible, particularly during the years affected by the global financial crisis of 2008–2009. Graph 1 presents GDP per Capita of CEE countries for the period 2004–2014.



Figuer 1: GDP per Capita of CEE countries, 2004–2014 (in USD)

Source(s): Author's own creation based on Eurostat data

In this research, the following four hypotheses were developed:

H1: Foreign direct investment (FDI) has a statistically significant impact on gross domestic product (GDP) in Poland, the Czech Republic, and Hungary.

H2: Inflation has a statistically significant impact on GDP in Poland, the Czech Republic, and Hungary.

H3: Research and development (R&D) has a statistically significant impact on GDP in Poland, the Czech Republic, and Hungary.

H4: Unemployment has a statistically significant impact on GPD in Poland, the Czech Republic, and Hungary.

The Ordinary Least Squares (OLS) regression model is used in this study, based on annual time series data. OLS minimises the sum of the squares of the residuals, where residuals represent the difference between the actual observed values and the values estimated by the model. Regression analysis is applied in this article to examine how four independent variables influence GDP. This study shares similarities with the model developed by Pece et al. (2015), in which the authors conducted an empirical analysis of economic growth in Poland, the Czech Republic, and Hungary. Their research tested the relationship between economic growth and key determinants for each country during the period 2000–2013**.** The OLS model in this study includes one dependent variable (GDP) and four independent variables: foreign direct investment (FDI), inflation, research and development (R&D), and unemployment. The period under analysis spans 1995-2019. The regression model is specified as follows: log (GDP) = a + β1 (FDI) + β2 (INF) + β3 (R&D) + β4 (UEM) + ε where: GDP = Gross Domestic Product (million euro, current prices), FDI = Foreign Direct Investment (% of GDP), INF = Inflation rate (annual %), R&D = Research and Development (% of GDP), UEM = Unemployment rate (annual %) and ε = error term.

3.1 Key Variables

The dependent variable in this study is GDP for Poland, the Czech Republic, and Hungary. GDP data were collected annually from Eurostat and are measured in million euros at current market prices. The first independent variable is foreign direct investment, measured in net inflows (% of GDP), with data collected annually from World Bank. The second independent variable is inflation, based on consumer prices (annual %), also obtained from World Bank. The third independent variable is research and development for all sectors, expressed as a percentage of GDP, with annual data sourced from Eurostat. The fourth independent variable is unemployment, measured as the percentage of the total labour force, collected annually from World Bank. Several academic studies have examined economic growth in CEE countries, with a particular focus on Poland, the Czech Republic, and Hungary. Pece et al. (2015) included these three countries in their analysis of economic growth during the period 2000–2013, using GDP, R&D, FDI, and unemployment as explanatory variables. In

contrast, Simionescu et al. (2017) extended their analysis to include Romania, covering the years 2003–2016. Similarly, (Petrariu et al. (2013) examined economic growth across CEE countries, with a research period spanning 1996–2010.

3.2 Descriptive Statistics

Summary statistics for Poland, the Czech Republic, and Hungary are presented in three separate tables and were calculated using EViews.

Table 1: Summary statistics for Poland

Specify	GDP	FDI	Inflation	R&D	Unemployment
Mean	12.515	3.348	5.303	0.751	11.337
Median	12.657	3.153	2.581	0.660	10.090
Maximum	13.187	6.231	27.951	1.320	19.900
Minimum	11.598	0.153	-0.874	0.540	3.280
Std. Dev.	0.466	1.368	6.823	0.218	4.909
Observations	25	25	25	25	25

Source: The author's own calculation

Table 2: Summary statistics for the Czech Republic

Specify	GDP	FDI	Inflation	R&D	Unemployment
Mean	11.643	4.945	3.357	1.374	5.908
Median	11.842	4.517	2.451	1.230	6.660
Maximum	12.326	10.337	10.698	1.960	8.760
Minimum	10.737	0.904	0.119	0.880	2.010
Std. Dev.	0.486	2.660	2.983	0.364	1.986
Observations	25	25	25	25	25

Source: The author's own calculation

Table 3: Summary statistics for Hungary

Specify	GDP	FDI	Inflation	R&D	Unemployment
Mean	11.301	10.731	7.214	1.038	7.551
Median	11.458	7.049	4.856	0.980	7.410
Maximum	11.892	56.361	28.305	1.510	11.170
Minimum	10.476	-40.291	-0.228	0.630	3.420
Std. Dev.	0.423	21.929	7.087	0,269	2.344
Observations	25	25	25	25	25

Source: The author's own calculation

The mean GDP for Poland is 12.515, which is higher than that of the Czech Republic (11.643) and Hungary (11.301). This difference is primarily attributed to Poland's larger economy, whereas the Czech Republic and Hungary have similar GDP levels. The standard deviations for GDP across the three countries show minimal variation, indicating that all three experienced stable economic growth over the period 1995–2019. In terms of FDI as a percentage of GDP, there are substantial differences in the maximum and minimum values across the countries. Hungary recorded the highest maximum value at 56.361, suggesting a strong reliance on FDI.

However, the minimum value for Hungary is –40.291, which may indicate efforts to reduce FDI dependency or large disinvestments during certain periods. The FDI values for Poland and the Czech Republic were less extreme. In Poland, the maximum FDI value was 6.231 and the minimum 0.153, suggesting that Poland was the least dependent on FDI among the three countries. The Czech Republic recorded a maximum FDI of 10.337 and a minimum of 0.904, positioning it between the other two. Inflation data indicate that Hungary had the highest average inflation rate, at 7.214, followed by Poland (5.303) and the Czech Republic (3.357). This range of 3% to 7% reflects a relatively high inflation rate across the period. In terms of inflation volatility, the Czech Republic had the lowest standard deviation (2.983), indicating more stable inflation. In contrast, Hungary and Poland experienced greater fluctuations, with standard deviations of 7.087 and 6.823, respectively. These higher values suggest that inflation exerted a greater impact on GDP in these two countries. Research and development (R&D) is a key factor for economies in transition. However, R&D expenditure remains relatively low in all three countries. The Czech Republic recorded the highest maximum R&D value, reaching 1.960, which indicates a comparatively stronger emphasis on innovation. In terms of unemployment, Poland had the highest maximum rate at 19.900, followed by Hungary at 11.170, and the Czech Republic at 8.760. The lowest recorded unemployment rates were 3.280% in Poland, 2.010 in the Czech Republic, and 3.420 in Hungary. These figures suggest that all three countries have made notable progress in reducing unemployment, which may be partly attributed to increased FDI inflows associated with EU membership. Despite receiving substantial FDI, all three countries report relatively low R&D values and have historically faced high unemployment levels. A comparison of the mean and median values reveals that in Poland, inflation data show slightly larger deviations, while the Czech Republic presents the most consistent results, with the smallest differences between mean and median values. In Hungary, however, the situation is more variable: the mean FDI is 10.731, compared to a median of 7.049; and the mean inflation is 7.214, while the median is 4.856, suggesting a right-skewed distribution for both variables.

3.3 Correlation Analysis

Multicollinearity in the regression model may pose a problem when the independent variables are strongly correlated with one another. In such cases, standard errors tend to increase, which can affect the precision of the estimated coefficients, even though the overall reliability of the model may appear unchanged. This issue can result in variables appearing statistically significant when they are not, or conversely, masking significance where it exists. Tables 4, 5, and 6 present the correlation matrices for the variables included in the model, allowing for an assessment of potential multicollinearity.

Table 4: Correlation matrix for Poland

Specify	FDI	Inflation	R&D	Unemployment
FDI	1***	--	--	--
Inflation	-0.040	1***	--	--
R&D	-0.367*	-0.318	1***	--
Unemployment	0.189	0.175	-0.769	1***

Source: The author's own calculation

Table 5: Correlation matrix for the Czech Republic

Specify	FDI	Inflation	R&D	Unemployment
FDI	1***	--	--	--
Inflation	-0.059	1***	--	--
R&D	-0.328	-0.572	1***	--
Unemployment	0.441**	-0.262	-0.372*	1***

Source: The author's own calculation

Table 6: Correlation matrix for Hungary

Specify	FDI	Inflation	R&D	Unemployment
FDI	1***	--	--	--
Inflation	-0.013	1***	--	--
R&D	-0.110	-0.756	1***	--
Unemployment	-0.145	0.366*	-0.255	1***

Source: The author's own calculation

There is evidence of collinearity among the independent variables, particularly in the cases of Hungary and Poland; however, this does not represent a serious issue requiring corrective measures. In this study, if any variable exhibits a correlation coefficient of 0.85 or higher, it will be substituted with an alternative variable to mitigate the potential effects of multicollinearity.

4. Results

The OLS model consists of three separate regressions, based on 75 observations drawn from Poland, the Czech Republic, and Hungary over a 25-year period (1995–2019). Variables exhibiting correlation coefficients greater than 0.77 were excluded from the analysis to minimise the risk of multicollinearity. The results of the OLS estimations are presented in Table 7, based on outputs generated using EViews software.

Table 7: Empirical results

Variable	Poland's GDP	Czech Republic's GDP	Hungary's GDP
Constant	12.998*	11.157*	10.503*
	(0.348)	(0.540)	(0.223)
FDI	-0.022*	-0.002*	0.003**
	(0.026)	(0.021)	(0.001)
Inflation	-0.045***	-0.065**	-0.026***
	(0.005)	(0.026)	(0.006)
R&D	0.355*	0.736***	0.918***
	(0.263)	(0.222)	(0.160)
Unemployment	-0.039***	-0.050*	-0.001*
	(0.010)	(0.034)	(0.013)
Adjusted R-squared	0.886	0.763	0.897
F-statistic	47.483***	20.269***	53.477***
Total number of observations	25	25	25

Note: Standard errors are in parentheses. *, **, *** Significant at 10%, 5% and 1% respectively.

Source: The author's own calculation

Based on the results presented in Table 7, the following hypotheses can be summarised as follows:

H1: This hypothesis is partially confirmed, indicating that foreign direct investment (FDI) has a positive and statistically significant impact on gross domestic product (GDP) in Hungary only. In contrast, FDI does not have a significant effect on GDP in Poland or the Czech Republic.

H2: This hypothesis is confirmed, showing that inflation has a negative and statistically significant impact on GDP in all three countries—Poland, the Czech Republic, and Hungary. This implies that lower inflation rates are associated with higher levels of GDP.

H3: This hypothesis is partially confirmed, as research and development (R&D) exerts a positive and statistically significant influence on GDP in the Czech Republic and Hungary. However, R&D does not have a statistically significant impact on GDP in Poland.

H4: This hypothesis is partially confirmed, indicating that unemployment has a negative and statistically significant impact on GDP in Poland. This suggests that a lower unemployment rate contributes to higher GDP. However, unemployment does not have a significant effect on GDP in the Czech Republic or Hungary.

4.1 Poland

Inflation and unemployment have a significant negative impact on GDP in Poland, particularly in the context of economic growth. While inflation is often associated with economic booms that may temporarily boost GDP, it can also lead to macroeconomic instability when it exceeds sustainable levels. As such, inflation serves as a key indicator of broader economic dynamics. Daniela et al.(2014) used monthly data from 1996 to 2012 to analyse the effects on inflation in the Czech Republic, Poland, Hungary, Romania, and Turkey, concluding that inflation can generate production uncertainty and reduce overall welfare. These findings align with the present study, which also explores the relationship between inflation, GDP, and welfare. Given that GDP is closely linked to national welfare, a decline in GDP caused by inflation implies a corresponding reduction in societal well-being. The longer time frame covered by this study further strengthens the conclusion that inflation exerts a significant negative influence on Poland's GDP. This is empirically supported by the estimated coefficient of –0.045, which confirms the negative impact of inflation during the selected period. In addition, Kliber (2021) focuses on the impact of unemployment using Okun's coefficient. Although this is a different methodological approach, the findings support the existence of both positive and negative effects of unemployment on GDP in the Polish context. Since the 1990s, Poland has undergone a major economic transformation, yet certain regions continue to suffer from persistently high unemployment rates. A one-percentage-point increase in economic growth has been shown to reduce the unemployment rate by a range of 0.0 to 0.46 percentage points, depending on the region. In particular, agricultural regions in Poland face higher structural unemployment. This has important implications for economic policymakers, who must prioritise regional employment strategies to address this persistent challenge. The regression result for unemployment in this study –0.039, reinforces earlier findings and confirms that unemployment has a negative and statistically significant effect on GDP in Poland, consistent with previous literature.

4.2 The Czech Republic

The Czech Republic is negatively affected by inflation, as confirmed by Daniela et al. (2014) and consistent with the findings of this study. Inflation in the Czech Republic is higher than in Poland, reinforcing its negative influence on GDP. On the other hand, research and development (R&D) in the Czech Republic has a positive and statistically significant impact on GDP, highlighting the importance of innovation-driven growth in the country. Simionescu et al. (2017) sought to identify and examine the determinants of economic growth in five countries - the Czech Republic, Slovakia, Hungary, Poland, and Romania – during the period 2003-2016. Their findings indicate a positive correlated between R&D and economic growth in Romania, Hungary, and the Czech Republic. Nevertheless, the authors stress the need for policy measures aimed at strengthening the R&D sector, in order to support long-term sustainable growth. Similarly, Pece et al. (2015) explored the relationship between GDP and R&D over a shorter time frame (2000 -2013) for Poland, the Czech Republic, and Hungary. Their model focused on three variables – the number of patents, the number of trademarks, and R&D expenditure – to evaluate their impact on economic growth. The results suggest that education, labour force participation, and investment levels are key drivers that contribute to increase R&D capacity to levels conductive to economic development.

4.3 Hungary

In the case of Hungary, the impact of FDI on GDP is positive, and it is more pronounced than in Poland and the Czech Republic, according to the results of this study. Simionescu et al. (2017) also found that FDI supported economic growth in Hungary during the period 2003-2016. However, for FDI to have a lasting and effective influence on economic development, an attractive economic environment, productive investment opportunities, and the capacity to absorb foreign capital are essential. Furthermore, knowledge transfer and technological progress positively influence the effectiveness of FDI, as noted by Pece et al. (2015). Inflation in Hungary is found to have a statistically significant negative impact on GDP in this study, a result that is consistent

with the findings of Daniela et al. (2014). Conversely, R&D has a positive and significant effect on Hungary's economic growth. This finding is further supported by the results of Simionescu et al. (2017), who report a similar relationship between R&D and GDP in Hungary.

5. Conclusions

This study examined economic growth in Poland, the Czech Republic, and Hungary during a period of 25 years (1995–2019), describing a longer time frame than many previous studies. The research specifically considered the period following the accession of these countries to the European Union, highlighting the associated economic benefits. The results are country-specific, reflecting unique economic dynamics in each case. Inflation was found to have a negative impact on economic growth in all three CEE countries. Research and development (R&D) had a positive and statistically significant effect on economic growth in the Czech Republic and Hungary, while foreign direct investment (FDI) contributed positively to Hungary's economic performance. Unemployment had the most pronounced negative impact on Poland's GDP, compared to the other two countries. In the case of Poland and Hungary, the findings suggest a need to intensify efforts to enhance innovation, which is a key driver of sustainable economic growth. Overall, the study concluded that FDI, inflation, R&D, and unemployment each exert either a positive or negative influence on economic growth across the three countries. One notable limitation of the study is the exclusion of data beyond 2019, due to the onset of the COVID-19 pandemic in 2020, which lasted until 2023. The years 2020 to 2023 were omitted because of the extraordinary and unpredictable nature of the pandemic, which caused substantial fluctuations in economic activity across Europe. Excluding this period ensured that the analysis was not distorted by external shocks beyond policymakers' control. Other significant methodological constraints are marked differences in the population and size of the economies of individual countries, as well as the changing economic situation. It is recommended that future studies incorporate data covering both the pandemic years (2020–2023) and the post-pandemic period (from 2024 onwards), enabling a comparative assessment of economic recovery. Such research could help determine which countries have been more successful in navigating the crisis and returning to stable growth trajectories.

Ethics Declaration

The authors declare that no ethical nclearence was required for the research.

AI Declaration

The autors declare that no AI tools were used the creation of the paper.

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