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Institutions and economic growth: Comparative evidence from CEE and EU-16 countries

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Abstract. The study investigates the relationship between institutional quality and economic growth in 27 European Union countries over the period 2004–2022, with particular attention to the distinction between Central and Eastern European (CEE) countries and the EU-16. The analysis is guided by the premise that institutional development is deeply rooted in historical and socio-cultural conditions, which differentiates the trajectory of post-communist economies from that of Western Europe. Panel data econometric models were applied, using data from the World Bank and the Fraser Institute database. The modeling was performed with varying parameters for both groups of countries. Five different types of institutions that may influence growth rates were considered. Overall, the results indicate a positive impact of institutional quality on economic growth across the EU, although the effect is markedly stronger in Western Europe. Government size, regulatory quality, and trade freedom were identified as the most influential institutional dimensions in both groups of countries, while the legal system proved to be statistically insignificant – most likely due to EU-wide harmonization. The most notable divergence concerned monetary stability, which strongly supported growth in the EU-16 but did not yield significant effects in the CEE countries. These findings suggest that the rapid growth in the CEE

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region was primarily driven by the catching-up process rather than by institutional improvements, although the role of institutions is expected to strengthen with further convergence.

Keywords: economic growth, institutions, CEE countries, panel data models.

JEL Classification: O43, P20, C23

1. INTRODUCTION

The late 20th and early 21st centuries in economics marked a significant rise in research on institutions, particularly their role in economic growth. Although these studies have their roots in the history of economic thought, they began to develop more intensively only in the second half of the 20th century. Modern economics of institutions started to take shape after 1990, building on the contributions of de Soto (1989) and North (1991). The focus on institutional growth factors, referred to as 'soft' elements (Prohazka, 2015), stemmed from the unsatisfactory results of earlier research on economic growth factors, which primarily emphasized 'hard' elements such as physical capital, technology, or innovation.

Intensive studies on the importance of institutional factors for economic growth have led to a consensus that institutions matter. As Rodrik (2000) summarized: "The question before policymakers therefore is no longer 'Do institutions matter?' but which institutions matter and how does one acquire them?" Moreover, depending on other conditions, the impact of the same institutional factors on the economy may vary across different countries. Thus, there remains room for analysis concerning individual countries or groups of countries, which can help bring us closer to answering the question posed by Rodrik.

The 9th EU Cohesion Report (2024) confirmed that the Central and Eastern European Member States experienced impressive economic growth in the years 2001-2022. In the presented study, we verify whether this growth was related to the quality of institutions and their changes or whether it was rather the result of convergence processes and the path dependence. Following the 'Big Bang' EU enlargement, the economic and political systems – broadly defined as institutions – in the post-communist countries, underwent a rapid and exceptional transformation. Was this the key determinant of the observed catching-up process? We examine the relationship between the quality of institutions and economic growth by analysing 27 EU countries over a period of 19 years, from 2004 to 2022. It is believed that historical, political, and cultural factors play a crucial role in shaping institutions and their quality. We found it appropriate to distinguish between two groups of countries: the Central and Eastern European (CEE) countries, which underwent a transformation from a communist centrally planned economy to a market economy, and the Western European countries (EU-16). This could be a guideline for formulating policy implications for countries experiencing economic and political transformations.

The primary aim of our research was to determine whether the influence of institutions on economic growth differs between the EU-16 group and the CEE countries, keeping in mind that it is considered that the latter group is characterized by lower institutional quality (Quality of Government Index by University of Gothenburg). Additionally, we were interested in whether different types of institutions have a different of comparable impact on economic growth in each of the analysed country groups. Although economists researching this topic frequently adopt an approach that distinguishes between different groups of countries, to the best of our knowledge, no comparative study has yet been presented that includes both the group of old EU Member States and the Central and Eastern European countries.

As noted by many researchers (e.g., Acemoglu, 2005), institutions can generally be classified as either political or economic. Research findings suggest that political institutions (e.g., democracy, respect for

human rights) tend to have a weaker impact on economic growth, whereas such a relationship is found to be stronger in the case of economic institutions, such as a free market and the protection of property rights, including intellectual property rights (Zaucha et al., 2015). Furthermore, assuming that EU member states share a similar level of political institutions, our research primarily focuses on the significance of economic institutions that facilitate business operations. Given that the CEE countries underwent substantial changes in the quality of institutions during the period under consideration, the analysis employed a panel data approach, enabling the examination of relationships in a cross-sectional dimension and their dynamics over time.

In our study we used data obtained mainly from the annual reports of the Economic Freedom of the World (EFW) published by the Fraser Institute. We took into account not only the overall score of the EFW but also included the values of the sub-indices in the model, which allowed us to answer the question of what significance different types of institutions have for economic growth. To achieve the research objective, an econometric model for panel data was employed.

2. THE IMPORTANCE OF INSTITUTIONAL FACTORS FOR THE ECONOMY - THEORETICAL BACKGROUND

Institutions are identified as the 'rules of the game' for society, shaping formal and informal political, economic, and social constraints (North, 1990). The formal dimension of institutions connects to the legal order, including the creation and enforcement of laws that society must respect. Informal institutions, developed over long periods, relate to uncodified rules and behaviours deeply embedded in a society's culture, tradition, or religion. These informal practices can eventually lead to formal regulations and institutions. In the economy, trust is fundamental in informal regulations, especially important in interactions with business partners and public sector entities (Mickiewicz, 2010). Informal institutions, such as individual norms of conduct, customs, and attitudes, adapt to formalized regulations. According to Williamson (1999), the effectiveness of formal institutions depends on their alignment with informal institutions. North (1994) argued that while formal institutions can be changed quickly and easily, informal institutions, rooted in cultural conditions and established traditions, are difficult to modify and change slowly. The institutions in place today are the result of those that operated in the past.

The foundation of the institutional approach in economics is rooted in the historical school, particularly the German school of thought. Veblen's (1899) concepts, developed from this school, emphasized the relationships and influence of institutions on the economy. The operation of institutions varies between countries, reflecting specific conditions such as customs, culture, and history. Therefore, analysing these relationships requires a focus on specific places and times (Landreth & Colander, 1998). The traditional institutional school emerged from concerns about the consequences of unregulated markets.

The institutional order affects the economy. However, it depends on the quality of institutions. It is one of the elements that can determine economic growth. The institutional system contributes to the realisation of sustainable economic development mainly by improving the quality of institutions, creating a balance between environmental, economic and social values (Staniek, 2023). Determinants of economic growth can be divided into 'hard' and 'soft' elements. The 'hard' elements include measurable factors such as production, investments, and technologies. The 'soft' elements pertain to the institutional framework and the conditions that foster economic growth (Prohazka & Cermakova, 2015). One of the assumptions of the institutional approach to economics is that institutions significantly influence the allocation of resources (Heckelmann & Powell, 2008). Researchers have attempted to explain how institutions affect economic choices by either expanding or narrowing preferences.

In Institutional Growth Theory, growth elements result from exogenous factors, with progress considered external (North, 1990). The state supports this by investing in research and development education, and motivational activities (Horodecka, 2001-2002; Aidt et al. 2008). Institutional changes are also viewed as exogenous to the socio-economic system. An organization's profit depends on accessing and acquiring new technology, creating new organizations, and finding an optimal institutional structure for more effective market exchange. The ability to develop effective institutions and organizational structures determines the economic development and wealth of individual countries, although this relationship is feedback in nature. A certain level of socio-economic development is required for institutions (especially economic ones) to form and function effectively. Once a country has reached this level of development, then we can ask whether institutions can generate effects that accelerate economic growth.

In the 1970s, New Institutional Economics (NIE) emerged, with key contributors including J.R. Commons, R. Coase, J.K. Galbraith, C.E. Ayres, A. Alchian, K. Arrow, O. Williamson, H. Demsetz, D. North, and J. Kornai. The transformation into NIE was driven by concerns about the dangers of over-regulating markets through institutional structures. This approach sought to explain factors such as property rights and governance structures (Rutherford, 2001). A well-formed institutional environment facilitates the flow of information and communication, especially when making complex decisions, as full rationality only applies in simple decision-making situations. A subjective approach to rationality under conditions of uncertainty, suboptimal allocation, and disordered property rights can lead to inefficiencies in economy (Ostrom et al., 1994).

NIE identifies several market inefficiencies that need to be addressed, such as market imperfections and incompleteness, information asymmetry and uncertainty, the problem of public goods and their social justification, externalities (primarily external costs), and barriers to entry and exit, as well as transaction costs. Good institutional order has been emphasized for a long time. Effective institutions which respect property rights and eliminate market imperfections, incompleteness and also transaction costs creating good conditions for economic growth (North, 1990; Moers, 1999). The quality of institutions is one of most important factor affecting the tendency to investing, which are the core of economic growth.

North (1971), together with Davis (1971), developed the theory of institutional change, addressing why some societies better utilize opportunities for dynamic economic growth. Their analysis of economic history suggested that economic success is not solely determined by new technologies but must be complemented by an appropriate institutional environment. When exogenous changes in economic conditions, such as technological changes, market expansion, or political system transformation, introduce opportunities for economic gains, market imperfections may prevent the realization of profits within the existing institutional structure. Economic entities identifying profit opportunities will attempt to create new organizations or change existing ones.

The institutional order is characterized by the investment climate, political stability, and the overall quality of governance, though objectively assessing governance quality is challenging. Key variables determining subjective assessments of governance quality are grouped into democratic control, political stability, state effectiveness, regulatory quality, rule of law, and control of corruption (Lambsdorff, 2007; Aidt et al., 2008). When verifying institutions, it is important to consider the traditions of the country, legal regulations, public interest mechanisms, and the role of civil society (Mehdipour, 2021).

Institutional analysis of individual countries should take into account cultural factors influenced by history and local specifics. Creating new institutions may involve leveraging existing institutional structures, which fosters credibility and socio-political stability. The institutional system allows for optimal management of dispersed knowledge by improving information flow between contracting entities. Incomplete contracts increase the risk of unforeseen situations not covered by the agreement. Thus, an effective institutional environment, comprised of entities that regulate transactions, is essential (Hardt, 2005).

It was found that economic growth result from institutional changes. The institutional conditions for economic growth are categorized into general, social, political, and economic groups. General conditions include factors shaping the economic system (market economy) such as dominant ideas, establish social views, culture, and historical heritage. Social conditions involve historically shaped and stable characteristics of the social system and the psychological traits of society, including national culture, worldview, mentality, and ethics of conduct. The synchronization of these factors forms the institutional foundation of the socio-economic system, creating unique social capital. Historical and cultural conditions shape institutions order. Successful development in countries relies on the industriousness of a society shaped by culture, mentality, social ethics, openness to consultation, consensus, and competition. Attention was drawn to the imperfection of traditional growth models, which did not take into account the importance of institutions, considering the role of labour, capital and technology. Institutions which reduce uncertainty in economic relations support economic growth based on investments and innovations. Attention was paid to the quality of institutions that determine economic growth (e.g. readability, elimination of corruption). Economic growth is supported by a combination of effective formal and informal institutions (Acemoglu & Robinson, 2010).

The institutional structure needs effective political conditions. The group of political conditions includes factors such as the quality of the constitution, established laws defining election rules and legitimacy of power, governance norms, principles of cooperation between the government and society, political culture, informal laws, and customs. Political stability and its predictability are crucial for economic entities. Economic factors involve clear competitive rules (selection of economic activities), defined property rights, an efficient capital market system (ensuring certainty and liquidity of economic transactions), an effective insurance system, a clear and stable tax system, predictability of public and business sector cooperation rules, a diversified and polycentric economic structure that promotes economic freedom, and distinct economic institutions that support long-term economic growth (Israel, 1989; Horodecka, 2001-2002).

An effective institutional structure operates through the implementation of specific policies, influenced by election cycles, and relies on long-term regulations such as legal contract enforcement, property rights protection, political structures, constitutional provisions, and the roles of interest groups and approaches to monopolistic practices (Olson, 1996). In underdeveloped countries, residents benefit from individual transactions but do not fully reap the benefits of trade and specialization due to the lack of institutions ensuring effective contract enforcement (Hall & Soskice, 2003). The absence or inadequacy of such institutions results in a loss of potential income. According to Olson (1996), countries with effective economic policies and efficient institutions achieve higher income per capita, with diminishing returns to labour.

The consideration of institutional issues in post-communist economies is particularly noteworthy. After World War II, Central and Eastern European countries were strongly influenced by the Soviet Union, which imposed a communist governance model. This totalitarian regime, characterized by single-party rule, lack of democracy, central planning, and state monopoly, eradicated the institutional order typical of democratic and market economies (Ćwikliński, 2004). The economic inefficiency of this system highlighted the weakness of the institutional order in communist states (Kornai, 1985). Following the collapse of the communist system in the late 1980s and early 1990s, these countries underwent significant economic and political transformations, including the reconstruction of institutional systems to restore market economy principles. The pace and form of institutional changes varied among post-communist countries, influencing their economic growth rates. Institutional changes impact the economy over time, as the adjustment and adaptation of economic participants is a gradual process. This delay can sometimes lead to less-than-immediate positive economic results.

3. LITERATURE REVIEW

Since the 1990s, a diverse range of empirical studies on economic growth utilizing institutions as an explanatory variable have been developed. The vast majority of studies have allowed for the conclusion that institutions play a positive role in economic growth (Scully, 1988; Hall & Jones, 1999; Easterly & Levine, 2000; Acemoglu et al., 2002; Henisz, 2003; Acemoglu et al., 2003; Dollar & Kraay, 2003; Assane & Grammy, 2003; Rodrik, 2004; Chousa et al., 2005 a,b; Redek & Susjan, 2005; Khalil et al., 2007; Ketterer & Rodríguez-Pose, 2018; Campos et al., 2019). The empirical consensus has been that institutions matter. As a Rodrik (2000) summarized "The question before policy makers therefore is no longer do institutions matter? but which institutions matter and how one acquire them?"

Institutions evolve and change over time. Their quality and efficiency differ from one region to another, and even within countries. Institutions do not operate in isolation; they are interconnected with each other and are influenced by various internal and external factors (Zaheer & Khalid, 2021). Many reform programs promoted by the IMF, the World Bank, and numerous governments since the 1980s have clearly ignored institutional differences between countries, advocating uniform policies. This approach has come to be known as the 'one-size-fits-all' method in economic policy (Chang, 2007). Today we know that this is not true anymore. Determining which institutions and to what extent influence economic growth is a complex task. The models used in research are sensitive to the assumptions made, the dependent and independent variables used, and the period considered for the study. Even assuming that the variables used in the model have similar values, we may obtain different results depending on the country being studied. Therefore, formulating universal conclusions for all economies is not possible.

The discrepancies in research findings on the impact of institutions on economic growth are largely attributed to the selection of variables describing institutional factors. As databases on these factors become more accessible, researchers can obtain more precise and solid results, allowing for the formulation of more valuable conclusions. In many research most of indicators are related to economic freedom, property rights, level of democracy and political stability and size or quality of government (Lyulyov et al., 2023; Kuzior et al., 2024). For example, Vijayaraghavan and Ward (2001), using the framework of the neoclassical growth model, examined the relationship between economic growth and institutions in 43 nations for the period 1975 to 1990. They used four measures of institutions: governance, security of property rights, political freedom and government consumption. Findings strongly support historical evidence presented by scholars such as North and Thomas (1973), Rosenberg and Birdzell (1986), and North (1990), indicating that secure property rights play a pivotal role in stimulating economic growth and fostering efficient investment allocation. The results also imply that smaller government sizes may be associated with better economic outcomes. However, it's important to exercise caution in interpreting the variable related to government size, given the predominance of developing countries in the sample, which mainly lie in the upward trajectory of growth. Additionally, the dynamic global economy has shifted the role of the state from merely a provider to that of a facilitator and regulator, further complicating the assessment of government size's impact on economic growth.

IMF (Growth and Institutions, 2002) decided to renew the attention to focus on 'perceptions and assessments' of public institutions particularly regarding their effectiveness and the influence they have on private sector behaviour. They used in the research three measures of institutions: the quality of governance, including the degree of corruption, political rights, public sector efficiency, and regulatory burdens; then, the extent of legal protection of private property and how well such laws are enforced; and finally, the level of institutional and other limits placed on political leaders. Authors firmly claim that the perceptions of the political, economic, and policy climate reflected in the institutional measures are likely to play a crucial role in shaping the overall conditions for investment and growth. The research results indicate that each of the

institutions measures has a statistically significant positive impact on GDP per capita as well as on GDP growth. In addition to the impact of institutions on these growth indicators, the researchers also tested the significance of institutions on the volatility of growth, which is relatively uncommon so far. They adopted the assumption that weak institutions might encourage unfavorable policies and undercut the resilience of economies to exogenous shocks consequently, lead to more unstable, crisis-prone economies. The findings confirmed a robust effect of institutions on volatility. The results of IMF are in line with Easterly and Levine (2003) and Rodrik et al. (2004).

A distinct and original perspective was offered by Acemoglu et al. (2005), in their influential essay. They argued convincingly that economic prosperity is driven by institutions. Economic institutions shape incentives and constraints for economic actors, affecting economic outcomes. The institutions are the result of social decisions made with consideration of their consequences and often leading to conflicts as different groups benefit differently. These conflicts are resolved in favour of those with greater political power, which is influenced by both political institutions (de jure power) and the distribution of resources (de facto power). Over time, political and economic institutions interact dynamically, as groups with de facto power seek to change political institutions to increase their formal power. Economic growth is fostered when political institutions support broad property rights, constrain power-holders, and limit rent-seeking. Historical examples illustrate this framework.

Some authors in their research distinguished economies based on the development degree and considered whether institutions play the same role regardless of the adopted criterion. A case in point is the research conducted by Valeriani and Peluso (2011) investigated the impact of institutional quality on economic growth over sixty years (1950-2009) among 181 countries at different stages of development. They used three institutional indicators that are: civil liberties, quality of government and number of veto players. The overall evidence showed by the regressions is in line with the hypothesis that institutional quality has a significant positive impact on economic growth. An important conclusion drawn from the research is the fact that institutions play a substantial role regardless of the level of economic development. A more advanced study aimed at estimating the extent to which the quality of institutions explains the differentiation in economic growth between countries worldwide was conducted by Próchniak (2013). The author formulates the research objective in detail as follows: "what part of the variance in economic development can be attributed to a different institutional environment". In the research, he uses six qualitative indicators that represent: democracy, the governance, economic freedom and the ease of doing business. His study covers 153 countries confirms a positive relationship between the level of development and the quality of the local institutions. The strength and the shape of this link is (of course) different, but the correlation is evidently positive regardless of the indicator. More democratic countries are on average better developed; the countries with better governance tend to be richer; the countries that are more economically free enjoy clearly higher income levels; lastly, a high GDP per capita implies a large scope for the ease of doing business. The empirical analysis confirms a large positive impact of the quality of the institutional environment on the level of economic development, which is measured by the 2005-2009 GDP per capita at PPP.

New insight into research related to the impact of institutions on economic growth was provided in the studies of Acquah et al. (2023). They introduced new indices to capture the multidimensional nature of a country's institutional framework, using Fraser Institute (2018) data. Analyzing 80 countries from 1980 to 2015, they assessed the impact of institutions on per capita GDP levels and growth rates with the Generalized Propensity Score method. Their findings showed that institutions were crucial in low- and middle-income countries, with varying effects on economic development. The most interesting conclusion from the research is that unlike much of the literature, which examines linear links between institutional indices and GDP, the authors' analysis highlights and identifies non-linear causal effects. Threshold effects,

which support the existence of non-linearities, were documented. The institutions matter for those countries which are below the estimates threshold.

One of the significant aspects of research on institutions and their role in the economy, which has emerged in the literature relatively recently and still need exploration, is the attempt to identify channels through which institutions might indirectly influence economic growth. Some empirical studies suggest that institutions exert their strongest impact by shaping factor productivity (Eicher et al., 2006). The quality of institutions substantially determines level of human and physical capital, incentives for investment, and the productivity of resources (Gwartney et al., 2004). Among other channels through which institutions may impact economic performance are also mentioned: foreign direct investment, domestic investment, the entry of new firms to the market, innovation and others (Silve & Plekhanov, 2018).

However, one of the strongest stream of research appears to be the one in which academics seek answers to the question of how institutional factors influence economic growth through entrepreneurship. An compelling meta-analysis in this field was conducted by Urbano et al. (2019) in which they suggest that we still do not fully understand the role that the institutional environment plays in economic growth through its impact on entrepreneurship. Authors base their analysis on the ideas of Acemoglu et al. (2014), Baumol (1990), Bjørnskov and Foss (2016), North and Thomas (1973), Sobel 2008, and Rodrik (2003) regarding entrepreneurship as a means through which institutions can facilitate economic growth. The impact of institutions on entrepreneurship has been well documented in numerous academic publications, the results of which indicate that both formal and informal factors significantly influence the development of entrepreneurship, either positively or negatively. Informal factors tend to have a stronger and more positive effect on entrepreneurship than formal factors (Thornton et al., 2011). A somewhat more complex issue is examining how institutions influence economic growth through the channel of entrepreneurship. As Audretsch et al. (2008) notes, institutional variables can provide relevant frameworks in which entrepreneurship and economic growth interrelate. Research in this area leads to the conclusion that legal institutions (procedures or the time to create a new business) as well as culture, beliefs, and social values have a vital influence on the growth and innovation in economy (Bjørnskov & Foss, 2013; Nissan et al., 2011; Baumol & Strom, 2007; Audretsch & Keilbach, 2004 a, b).

The final significant aspect of the discussed issues worth noting is the interactions between institutions. Bolen and Sobel (2020) emphasize in their work that, so far, the existing empirical literature has completely ignored that aspect assuming total independence and substitutability between institutional factors. Using The Economic Freedom of the World based on scores in five major subareas, most economists implement the overall score of the country which is the mean of the component area scores. Although the subcomponents of the EFW are analysed, they are treated as independent and linearly substitutable, which Bolen & Sobel consider a serious problem. Their research has demonstrated that the institutional dimensions within these indices are interconnected rather than independent. Consequently, weakness in one area cannot be offset by strengthening others which is strong implication for policy makers.

As we can see by analysing the research of other authors, the practice of classifying countries into relatively homogeneous groups, most often based on the level of socio-economic development, is a commonly used approach. In our research, we also decided to distinguish two groups of countries (CEE countries and EU-16), which, despite their diversity, are at a similar level of development and are classified by the World Bank as high-income economies (Only Bulgaria was classified as an Upper-middle-income economy in 2021, but in 2023 it was classified as a high-income economy. World Bank, 2025). However, for us, unlike other researchers, it was not so much the level of economic development that was significant, but the historical development path as the criterion for dividing countries into two groups. Furthermore, it is important to remember that as Member States, the analysed countries are obligated to adhere to the rule of law and regulatory frameworks, resulting in a comparable level of political institutions across these

countries. Therefore, we assume, in line with the literature review, that it is primarily economic institutions that play a crucial role.

4. MODEL AND METHODOLOGY

In our empirical analysis we explore the link between institutions and GDP dynamics, aiming to quantitatively assess the causal effect of the institutional indices derived above on GDP levels and growth rates. Furthermore, we are interested in examining whether the impact of institutions on economic growth differs between Central and Eastern Europe (CEE), mostly post-communist countries and the old EU member states (EU-16). To achieve this, an econometric model for panel data was employed.

The regression formula for this model is based on an augmented version of the Solow growth model, which has been extended to incorporate the influence of institutions. As in many studies (e.g. Acquah et al., 2023), the starting point is a production function assuming homogeneity across countries. Additionally, it is assumed that the labour force and technology grow at the exogenously given rates n and g, respectively. It is also assumed that both forms of capital depreciate at the same constant rate δ. The econometric modelling in presented study was conducted on statistical data for the 27 EU countries from 2004 to 2022, meaning we are dealing with two-dimensional data known as panel data. Therefore, following the approach used by Mankiw, Romer and Weil (1992) and replicated by many subsequent researchers, the final production function for panel data set can be written in per capita terms and in logarithmic form:

$$\ln\left(\frac{Y_{it}}{L_{it}}\right) = \ln A_{i0} + g_{it} + \left(\frac{\alpha}{1-\alpha-\beta}\right)\ln(s_k)_{it} + \left(\frac{\beta}{1-\alpha-\beta}\right)\ln(s_h)_{it} - \left(\frac{\alpha+\beta}{1-\alpha-\beta}\right)\ln(n+g+\delta)_{it}, \quad i = 1,\dots,N; t = 1,\dots,T \tag{1}$$

where Y is the level of real GDP, L is the labour force, A is the Harrod-neutral technological progress, while s_k and s_k represent the exogenously determined proportions of total output allocated to physical capital investment and human capital investment, respectively. When using panel data, it is necessary to control for unobserved individual effects characterizing individual countries and period-specific effects (Baltagi, 2021). In our study, where the sample consists of a wide variety of countries, as confirmed by statistical tests, it was necessary to include individual effects and period effects for selected atypical years. Such effects can be included in panel models either as fixed effects (FE) in the form of artificial variables or as random effects, i.e., components of a confounding factor. The selection of the appropriate model is most often based on the Hausman specification test, the results of which are presented alongside the model parameter estimates.

It can be assumed that A is not a country-specific fixed effect but is a function of changing institutions (Dawson,1998), then the following formula for the annual growth of GDP per capita can be defined:

$$\ln\left(\frac{(Y/L)_{it}}{(Y/L)_{it-1}}\right) = \beta_0 + \beta_1 INST_{it} + \beta_3\ln(Y/L)_{it-1} + \beta_4\ln(s_k)_{it} + \beta_5\ln(s_h)_{it} + \beta_6\ln(n+g+\delta)_{it} + u_{it}, \tag{2}$$

where $INST_{it}$ is a variable reflecting the quality of institutions in country i in period t. This factor is represented in the study both by the synthetic overall Economic Freedom Index and by individual sub-indexes in subsequent specifications of the model and the term $\beta_3\ln(Y/L)_{it-1}$ reflects the convergence phenomenon, while u_{it} represents random disturbances. However, the above specification implies that differences in institutions have a homogeneous effect on the level of productivity across countries.

The aim of our analysis is not to show that the quality of institutions has a significant impact on the level and growth of GDP, because it has already been described, but rather to show that the impact of the quality of institutions may be different in countries with different histories. And in this case, it is about the heterogeneity of the EU, especially when we take into account the division into the countries of the so-called old Union and post-communist countries. Therefore, we propose an econometric model in which the impact of institutions in these two clusters is varied. While in our study it is crucial to check whether the

impact of institutions is different in the group EU-16 compared to the CEE countries. Therefore, we sought the answer to this question by estimating a panel regression of the form:

$$\ln\left(\frac{(Y/L)_{it}}{(Y/L)_{it-1}}\right) = \beta_0 + \beta_1 INST_{it} + \beta_2 INST_{it} * D_{POST.COM_i} + \beta_3 \ln(Y/L)_{it-1} + \beta_4 \ln(s_k)_{it} + \beta_5 \ln(s_h)_{it} + \\ + \beta_6 \ln(n + g + \delta)_{it} + u_{it}, \quad (3)$$

assuming that $D_{POST.COM_i}$ is the dummy variable equal one for the eleven CEE countries and zero for other countries. We split the group of all EU countries into two separate clusters: CEE countries (11 countries) and other EU countries (EU-16) (CEE countries: Bulgaria, Czech Republic, Estonia, Croatia, Hungary, Lithuania, Latvia, Poland, Romania, Slovakia, Slovenia. EU-16: Austria, Belgium, Cyprus, Denmark, Spain, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Sweden). By doing this we investigate heterogeneous effects of institutions among this two clusters.

The econometric model defined by formula (3) was estimated as a panel model for 27 units over 19 years. For each model specification, a Hausman test was conducted to assess whether the individual effects for the units (in this case, countries) should be considered fixed effects (FE) or random effects (RE). The results of the test indicated that fixed effects should be applied to the analysed data; therefore, each model was estimated as the FE model. During the analysed 19-year period, significant socio-economic shocks occurred, which may have influenced the examined relationship. These primarily include the global financial crisis, which peaked in 2009, the COVID-19 pandemic, which primarily affected the years 2020 as well as 2021, and finally, the war caused by Russia's aggression against Ukraine in 2022. Therefore, in model (3), alongside the individual effects, period-specific effects for the $year2009$, $year2020$, $year2021$, and $year2022$ were also included. The significance of these effects was confirmed through statistical tests. Additionally, diagnostic tests for the distribution of the error term revealed a violation of the stochastic assumptions. Consequently, robust standard errors were estimated using the approach proposed by Beck and Katz (1995), which allowed for unbiased conclusions regarding the significance of the explanatory variables' impact on the dependent variable.

Some researchers suggest that the impact of institutions on economic growth may be non-monotonic, i.e. within a certain range of values, a higher level of institutions leads to improved growth, but after reaching a certain value, the direction of the impact changes and further increase in quality of institutions may lead to a slowdown in economic growth. Such a relationship is sometimes called an 'reversed U shape' relationship and is verified using quadratic regression. The results of such a study can be found, for example, in the work of Acquah et al. (2023). In our analysis, we also attempted to check whether such a phenomenon occurred in the EU countries in the period 2004-2022. It turned out that the parameters of the quadratic function were statistically insignificant, i.e. a non-monotonic relationship was not observed. We believe that, this is due to the low level of dispersion of measures reflecting the quality of institutions in the entire sample (both over time and across the cross-section). The coefficient of variation of institutional quality ranged from 5% (for Freedom to trade) to 14% (for Size of government). Therefore, in this range of variability, the entire 'reversed U shape' curve, which would allow for confirmation of a possible non-monotonic relationship, could not be observed.

5. DATA AND VARIABLES

In the model described by formula (3), the dependent variable is the annual growth of real GDP per capita in PPP ($Growth$), obtain from the World Bank (2025). The crucial explanatory variable is designed to reflect the quality of institutions and is represented by the Economic Freedom Index, proposed by the Fraser Institute (2025). This is synthetic measure that evaluates the overall quality of institutions based on 44 variables characterizing the political and economic systems of each country. The aggregate Economic

Freedom Index is composed of five sub-indices (also synthetic measures): Size of government, Legal system and property rights, Sound money, Freedom to trade internationally, Regulation. This index is increasingly employed in academic research as a measure of institutional quality across countries worldwide. The value of all indices and sub-indices is determined in a comparable way for 165 countries for the years 2003-2022. In 2023, the index was cited more than 280 times. In the first model specification, the summary index was taken into account ($Z0$), while in the next five specifications the influence of institutional spheres assessed by subsequent sub-indices was examined: $Z1$ – Size of government; $Z2$ – Legal system & Property rights; $Z3$ – Sound money; $Z4$ – Freedom to trade internationally; $Z5$ – Regulation.

We refer to the MRW model, therefore in the regression analysis, in addition to the institutional variables, we also include control factors derived from this model. To account for the convergence process among EU countries, the first control variable included is the logarithm of GDP per capita from the previous year ($lnGDPpc_{t-1}$). Subsequently, were utilized: s_k, representing the investment rate in physical capital, calculated using gross fixed capital formation (as a percentage of GDP) based on data from the World Bank (2025), $(n + g + \delta)$ defined as the sum of population growth and a constant value of 0.05, which assumes a 3% rate of technological progress and a 2% depreciation rate equal across all countries, and s_h, reflecting human capital accumulation, proxied by the average years of schooling, as reported in the Penn World Table (PWT, 2025) and described by Feenstra et al. (2015). Since data for this variable for 2022 were not yet available at the time of the analysis, we assumed the same values for 2022 as for 2021. We expect that this approximation should not be significant, as average years of schooling do not change rapidly over time.

The most significant explanatory factor in the context of the present study is institutional quality, with particular emphasis on its differences between CEE countries and other EU member states.

Table 1

Differences in the average rating of institutions in CEE and EU-16 countries in 2004-2022

Index	year	EU-16	CEE countries	difference significance t-test
Economic Freedom Summary Index	2004	7.93	7.33	3.06 (0.005)***
	2022	7.63	7.32	2.84 (0.005)***
	% change	-3.71	-0.24	-
Size of Government	2004	5.81	6.32	1.43 (0.084)*
	2022	5.53	6.40	3.54 (0.001)***
	% change	-4.74	1.37	-
Legal System & Property Rights	2004	7.78	6.39	4.29 (0.000)***
	2022	7.76	6.85	3.13 (0.002)***
	% change	-0.19	7.12	-
Sound Money	2004	9.57	8.68	3.30 (0.004)***
	2022	8.49	7.57	4.90 (0.000)***
	% change	-11.27	-12.77	-
Freedom to trade internationally	2004	9.12	8.31	1.44 (0.003)***
	2022	8.85	8.63	3.03 (0.003)***
	% change	-2.93	3.91	-
Regulation	2004	7.36	6.98	1.66 (0.055)*
	2022	7.53	7.13	2.07 (0.025)**
	% change	2.31	2.19	-

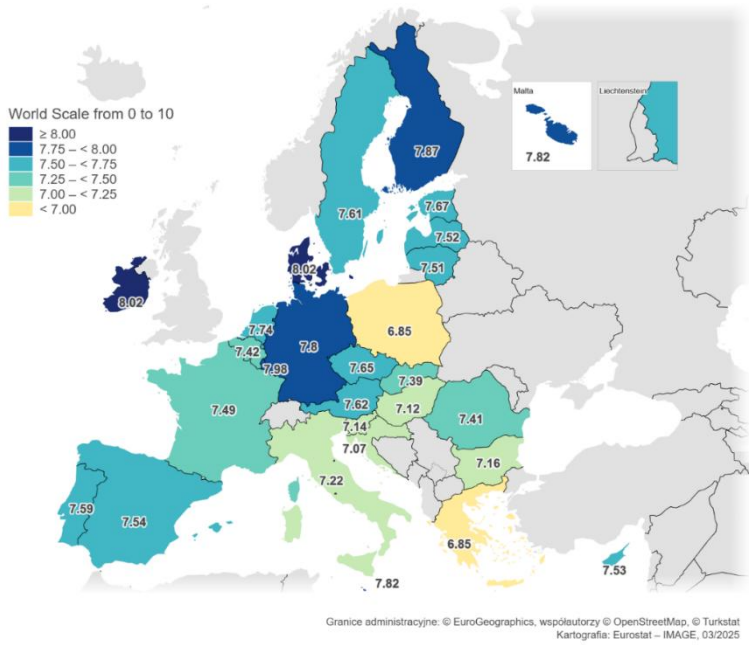
Source: Elaborations based on data from Economic Freedom of the World (2025). Fraser Institute. https://www.fraserinstitute.org/economic-freedom/dataset

Notes: ** p<0.01, ** p<0.05, * p<0.1

Table 1 presents the average values of the overall Economic Freedom Index and its individual sub-indices at the beginning and the end of the analysed period, separately for the group of CEE countries and the remaining EU countries. It can be observed that the average of the overall indicator in the post-communist countries remained the same, while in the old EU member states a decrease was recorded. In terms of sub-index ratings, changes in the group of post-communist countries were in most cases more favourable than in the group of other EU countries, except for Sound Money (a significant drop in ratings in 2022 was noted in both groups). In seeking an explanation for this phenomenon, one can hypothesize that it may be a consequence of the ongoing transition from a centrally planned economy to a market economy or the result of the caution shown by these countries to avoid returning to a poorly rated institutional framework. Additionally, Figure 1 presents the value of the Economic Freedom Summary Index in 2022.

Figure 1

Cartogram of Economic Freedom Summary Index in EU countries in 2022

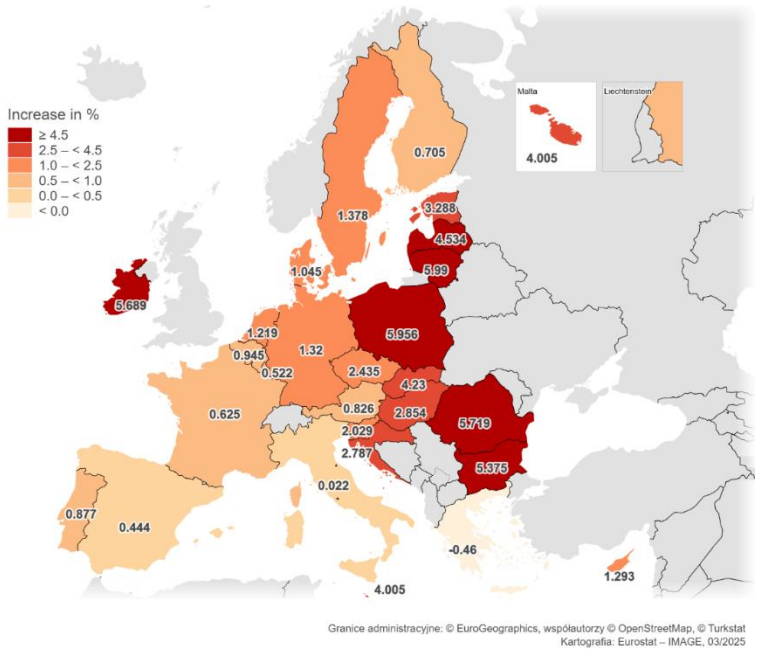


Source: Authors' preparation on the Fraser Institute data

As observed, the country ratings for institutional quality in 2022 exhibit differences; however, these differences are not particularly substantial. The lowest rating is 6.85 for Greece and Poland, while the highest is 8.02 for Ireland, with neither country belonging to the group of post-communist states.

Figure 2

Cartogram of average annual growth of real GDP per capita in EU in 2004-2022 (%)



Source: Authors' preparation on the Eurostat data

For comparison, Figure 2 presents a cartogram illustrating the variation in the average growth rate during the analysed period across EU countries. As can be observed, in some cases, countries with low institutional quality ratings experienced rapid growth (e.g., Poland), while there were also countries with highly rated institutions and similarly high growth rates (e.g., Ireland). Therefore, to identify a general pattern across the entire group of countries and the entire period, econometric modelling was necessary, the results of which are presented in the subsequent sections of the article.

6. RESULTS

The model described earlier in formula (3) was estimated as a panel model for 27 EU countries over 19 years. Six variants of the model were estimated, each using a different index reflecting institutional quality: the overall EFI and five sub-indices. Furthermore, using binary variables, separate coefficients for the impact of institutions on growth in CEE countries and EU-16 countries were estimated. The estimation results for all model specifications, along with the corresponding statistical test outcomes, are presented in the subsequent columns of Table 2.

Based on the results of the Hausman test, in which the null hypothesis indicates the use of random individual effects (RE), it was concluded that because the p-value in each specification is lower than the standard significance level, the null hypothesis should be rejected in favour of the fixed-effects model (FE). Therefore, this model variant was estimated in each case. The goodness of fit of each specification was assessed using the coefficient of determination calculated for the model including individual effects dummy variables (LSDV R-squared). It was found that the included variables explain approximately 60% of the total variation in the annual growth of GDP per capita.

Table 2

Estimation of growth regressions with institutional factor for EU countries in 2004-2022

Dependent variable: Annual growth of GDP per capita							
		Institutional factor represented as:					
		Economic freedom index	Size of government	Legal system & property rights	Sound money	Trade freedom	Regulation
Inst.	EU-16	0.082*** (0.013)	0.019*** (0.006)	-0.011 (0.010)	0.023*** (0.006)	0.029** (0.011)	0.031*** (0.007)
	Post-comunist	0.037** (0.015)	0.024*** (0.007)	0.010 (0.009)	0.008 (0.006)	0.025** (0.012)	0.027** (0.010)
ln_gdp_pc(t-1)		-0.099*** (0.021)	-0.090*** (0.021)	-0.089*** (0.022)	-0.096*** (0.021)	-0.092*** (0.023)	-0.086*** (0.021)
ln_s_k		0.065*** (0.016)	0.051*** (0.017)	0.069*** (0.017)	0.069*** (0.017)	0.068*** (0.017)	0.077*** (0.016)
ln_s_h		0.057 (0.068)	0.058 (0.077)	0.043 (0.083)	0.096 (0.079)	0.057 (0.077)	-0.048 (0.074)
ln_ngd		-0.041*** (0.011)	-0.038*** (0.011)	-0.039*** (0.011)	-0.038*** (0.011)	-0.034*** (0.012)	-0.050*** (0.010)
year_2009		-0.064*** (0.010)	-0.063*** (0.012)	-0.062*** (0.013)	-0.067*** (0.012)	-0.064*** (0.011)	-0.058*** (0.011)
year_2020		-0.039*** (0.009)	-0.038*** (0.011)	-0.043*** (0.012)	-0.045*** (0.012)	-0.040*** (0.011)	-0.040*** (0.011)
year_2021		0.069*** (0.009)	0.070*** (0.011)	0.068*** (0.012)	0.066*** (0.012)	0.071*** (0.011)	0.067*** (0.011)
year_2022		0.049*** (0.009)	0.042*** (0.011)	0.043*** (0.012)	0.056*** (0.012)	0.035*** (0.011)	0.045*** (0.011)
Constant		0.142 (0.190)	0.463** (0.218)	0.562** (0.240)	0.389* (0211)	0.341 (0229)	0.336 (0215)
LSDV R-squared		0.639	0.613	0.592	0.608	0.611	0.622
AIC		−2262.5	−2223.9	−2199.5	−2220.3	−2224.7	−2239.4
Hausman test p-value		97.949 [0.000]	82.717 [0.000]	53.146 [0.000]	81.004 [0.000]	62.688 [0.000]	76.719 [0.000]
Obser.		513	513	513	513	513	513
Countries		27	27	27	27	27	27

Source: Authors' estimates in STATA 18 package.

Notes: Models estimated as fixed effects panels (FE) with a few time effects. Robust Beck-Katz standard errors in parentheses. ** p<0.01, ** p<0.05, * p<0.1

The highest level of explanation, nearly 64%, was obtained in the model including the overall EFI. Also, based on the Akaike Information Criterion (AIC), which allows for model comparison, it was noted that the lowest value was obtained for the model with the overall index, while the highest for the specification including the Legal System & Property Rights assessment. Regarding control variables, the results indicate the occurrence of a significant convergence process within the European Union between 2004 and 2022. This suggests that initially poorer countries experienced faster economic growth (conditional convergence), irrespective of the economic fluctuations that occurred during the analysed period. Investments in physical capital were shown to have a significant positive effect on growth, while investments in human capital, as measured by years of education, proved to be statistically insignificant. The proxy used for human capital investment may therefore not fully capture the variation among EU countries. Moreover, population growth (the only variable component of $n+g+\delta$) did not have a significant impact on economic growth.

The period-specific effects confirmed that, on average, across all EU countries, economic growth in 2009 was significantly lower than predicted by the model, reflecting the global financial crisis. Similarly, 2020 (the onset of the COVID-19 pandemic) was associated with a significant reduction in growth, while 2021 and 2022 recorded higher-than-expected GDP per capita growth.

7. DISCUSSION

The analysis of institutional quality revealed that, when assessed using the overall Economic Freedom Index, institutions had a significantly positive impact on the GDP growth rate per capita. Importantly, the strength of this impact was lower in post-communist countries compared to Western European states. This may suggest that in CEE countries, other factors have been stronger drivers of growth, while institutions play a more substantial role in Western Europe. This finding aligns with research demonstrating that the dimension of public intervention and the quality of public governance have a significant impact on economic resilience and recovery, particularly during business cycle fluctuations (Paun et al., 2021).

The disaggregation of institutional quality into sub-indices provides further insights. Government size and regulations positively influenced growth in both groups of countries, with regulations exerting the stronger effect. International trade freedom also proved beneficial for economic performance, though its impact was somewhat stronger in the EU-16. By contrast, the legal system and property rights were not significant, which may be attributable to the legal harmonization processes within the EU.

The most pronounced divergence between the groups of countries concerned monetary stability. While sound money strongly supported growth in the EU-16, its role was statistically insignificant in CEE states. The absence of a significant impact of monetary stability in CEE countries may reflect the predominance of catching-up dynamics, EU integration effects, and structural transformations that overshadowed the role of monetary factors. In this group of countries, rapid growth was largely driven by capital inflows, technology transfer, and productivity improvements, which may have reduced the relative importance of monetary stability as a growth determinant. Additionally, in several CEE economies monetary frameworks were strongly linked to the euro, limiting the scope of independent monetary policy and, consequently, the observable influence of monetary stability indicators. By contrast, in the more advanced EU-16 countries, where long-term investment decisions rely heavily on predictable macroeconomic conditions, monetary stability plays a decisive role in sustaining growth. This divergence highlights the possibility that the impact of monetary institutions becomes more pronounced at higher stages of development and points to the importance of analysing how convergence dynamics interact with institutional effectiveness. Moreover, following Bolen and Sobel (2020), it is important to recognize that institutions are interconnected rather than independent, which raises the question of whether interactions between different institutional dimensions may play a crucial role in shaping growth outcomes.

8. CONCLUSIONS

The study demonstrated that the impact of institutions on economic growth is significantly stronger in the EU-16 countries than in CEE countries. This indicates that the impressive growth observed in the latter group over the past two decades was driven primarily by the catching-up process rather than by improvements in institutional quality.

Among institutional dimensions, the most influential were regulations, government size, and trade freedom. In turn, monetary stability emerged as a key factor only for Western European countries. These findings imply that with further convergence and ongoing improvements in institutional quality, the role of institutions in driving growth in CEE countries is likely to increase. At the same time, the observed decline

in institutional quality in many Western economies highlights the importance of maintaining strong institutions as a precondition for sustaining long-term growth.

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