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Economic Growth Determinants in Old and New EU Countries

Summary: The aim of our paper was to construct a model of economic growth determinants for old and new EU and the EU28 countries. We used a strongly balanced panel in the period from 2000 to 2020 and regression equations. For the old EU group, our results showed a high level of statistical significance and a positive effect of gross fixed capital formation, trade openness, government consumption, and population on GDP growth during the observation period. In the new EU group, trade openness, political stability, and government consumption are significant and positively affect economic growth. When we included the moment of accession of new EU members in the analysis, our results showed that gross fixed capital formation, trade openness, political stability, and government consumption had a statistically significant and positive influence on the GDP growth rate. Interestingly, our results did not confirm the expected positive impact of foreign direct investments and renewable energy consumption on economic growth in our sample countries. We found that the crisis is statistically significant and negatively affected the GDP growth rate in both groups with a stronger impact in new EU countries. We conclude our article with policy implications and recommendations for future research.

Keywords: Economic growth, Panel analysis, Regression, Old EU countries, New EU countries.

JEL: C5, O5.

From an extensive literature review, we can conclude that economic growth has been the subject of constant interest, especially its determinants. However, a deeper analysis of the literature unequivocally suggests that, regarding the direction and impact strength of individual economic growth determinants, there is still no consensus. Therefore, research on this topic still has a deep meaning, with significant practical implications in the development of economic policies.

As the goal of our paper was to construct a model of economic growth determinants in EU countries, the following sections provide a detailed review of the relevant literature, focusing on the key results of theoretical and empirical research in terms of the impact of certain determinants on economic growth. Our model of economic growth determinants, in addition to economic variables, also includes non-economic variables. We prepared a model for three groups of countries - old, new, and the EU28 countries - covering the period of 2000-2020. Following the basic findings of previous relevant theoretical and empirical research, we formulated hypotheses that were tested,

and the results are detailed later in the article. In studies using this or a similar type of panel regression, cross-country and single-country analyses dominate in the methodological framework. In our research, we used three regression equations for old and new EU and the EU28 countries.

Our paper is divided into several sections. Section 1 details the empirical framework for selecting variables for our economic growth model. Section 2 presents the theoretical framework and research methodology. The first part of this section offers a review of the theoretical framework, while in the second part, the data and methodology are presented. Section 3 provides the empirical results of our research with a discussion. Finally, Section 4 provides the conclusions with implications for future policy and research.

1. Empirical Framework for Selected Variables

Numerous theoretical and empirical studies, conducted in the second half of the 20th century and during the 21st century, have identified numerous economic and non-economic determinants of economic growth that both positively and negatively correlated with GDP growth.

This section provides a detailed overview of the relevant literature with reference to the key results of empirical research and models for EU countries. As already explained, the goal of this research was to construct a model of the determinants of economic growth. In our model, we selected economic variables (gross fixed capital formation, trade openness, government consumption, FDI, and renewable energy consumption), as well as non-economic variables (political stability and population). In the rest of this section, we outline the empirical framework used to select these variables.

The results of empirical research have overwhelmingly confirmed the positive impact of gross fixed capital formation on economic growth. Ross Levine and David Renelt (1992) determined the direct and positive impact of gross fixed capital formation on economic growth, increasing physical capital stock in the domestic economy, and indirectly promoting technology. One of the later studies, using a multivariate autoregressive VAR model for Greece during the period of 1960-2002, showed that there is a unidirectional causal relationship from gross fixed capital formation to GDP; in addition, there was no causal relationship between GDP and gross fixed capital formation (Nikolaos Dritsakis, Erotokritos Varelas, and Antonios Adamopoulos 2006). Research conducted on a sample of EU member countries from Southeast Europe (SEE) with different development levels, in the period of 1996-2012, showed that gross fixed capital significantly and positively affects economic growth (Merale Fetahi-Vehapi, Luljeta Sadiku, and Mihail Petkovski 2015). Furthermore, a study conducted in individual Central and Eastern European countries, for the period from 2003 to 2009, showed a direct and strong relationship between gross fixed capital formation and economic growth with a high correlation coefficient, almost reaching 1 (Octavia Gibescu 2010). Furthermore, one of the most recent studies confirmed the hypothesis that gross fixed capital formation has a positive impact on GDP in the Eurozone during 2002-2017 (Elvina M. Lymonova 2019). Constantinos Alexiou (2009) demonstrated that in seven countries in Southeast Europe from 1995 to 2005, gross fixed capital

formation and trade openness had a positive impact on economic growth. Moreover, Florin-Marius Pavelescu (2008) concluded that gross fixed capital formation increases economic growth by 1% in old EU members, while it is much more significant for new EU members, where it has the power to increase economic growth by up to 5%.

In the literature, there is a stance that greater trade liberalization both accelerates and slows down economic growth. Some studies showed that trade openness is influencing economic growth through fostering growth and making countries more agile and capable of entering foreign markets. Halit Yanikkaya (2003) analyzed 120 countries between 1970 and 1997 and determined that trade had a positive effect on growth in both developed and developing countries. The indicator results obtained in Yanikkaya's study showed that trade restrictions accelerated the growth of GDP in developing countries. In his research, Stanley Fischer (1993) confirmed that openness allows companies to adopt new technologies, and thus achieve higher production at lower costs. A study covering a sample of 32 European countries (15 old EU members, 12 new EU members, and 5 potential members from the Balkans) in the period of 1995-2009 found that the economic and socio-political aspects of a country's openness are important determinants of economic growth (Lena Malešević Perović, Vladimir Šimić, and Vinko Muštra 2013). Similarly, Dritsakis and Pavlos Stamatiou (2018) confirmed the positive impact of trade openness on economic growth in both the long and short term for 13 new EU countries in the period of 1970-2015. The significant and positive impact of trade openness on economic growth was also found by Fetahi-Vehapi, Sadiku, and Petkoviski (2015) in EU member states from Southeast Europe. Neil Foster-McGregor, Robert Stehrer, and Marcel Timmer (2013) observed that the relationship between trade and economic growth is positive and significant and that the addition of members makes this relationship even more significant.

However, some research has found conflicting results for the relationship between trade openness and economic growth in different countries. Dong-Hyeon Kim (2011) confirmed that trade openness has a positive impact on economic growth and income in developed countries, while it has a negative impact in developing countries. Kim, Shu-Chin Lin, and Yu-Bo Suen (2012) found that trade depends on the level of financial development and inflation. Trade openness had a negative effect on growth in countries with low financial development, while its impact was not significant in countries with high financial development and in high-inflation countries.

The empirical research has been very broad in this field and is generally classified into four groups. Alberto Alesina et al. (1996) demonstrated that political instability has a negative impact on economic growth, with no causality in the opposite direction. On the other hand, Silvio Borner, Michael Kaser, and Martin Paldam (1998) found that economic growth causes political stability, but not *vice versa*. The third group considers the relationship between political instability and economic growth to be bi-directional (Edgardo E. Zablotsky 1996). And the last and least group has found no relationship between these variables (Nauro F. Campos and Jeffrey B. Nugent 2002).

The empirical evidence has strongly confirmed that political stability homogeneously influences real GDP growth. Therefore, Stephen Knack and Philip Keefer (1995) confirmed that different institutional measures, predominantly efficient

bureaucracy, strong property rights, and political stability of the country, have a positive and statistically significant impact on the growth of the country. They showed that countries with political stability are generally strong economies, which grow faster compared to unstable economies.

A detailed review of the literature over the last 20 years suggests that not many studies on this topic have been conducted specifically for EU countries. Henryk Gurgul and Łukasz Lach (2013) tested the economic growth in most of the new EU countries over the period of 1990-2009, during which, these countries committed to wide reforms when joining the EU. They showed that the relationship between political instability and economic growth was positive and very strong in these countries. The results of the latest empirical research in EU countries for the period of 2000-2017 indicate a positive and significant relationship between political stability and GDP growth (Emilia A. Corovei and Adela Socol 2019). Furthermore, an analysis using a statistical and econometric approach on a sample from Romania for the period of 1990-2012 demonstrated that political stability plays a significant role in the country's economic growth and its sustainable development (Mădălina Radu 2015).

The relationship between political stability and economic growth cannot be observed without an analysis of democracy (which depends on political stability) and its impact on growth. Jakob de Haan, Susanna Lundström, and Jan Egbert Sturm (2006) found a positive impact of democracy on economic growth. In contrast, some studies have shown that democracy does not always contribute to growth, but these studies often lack rigorous stability analyses of their results. A negative relationship was generally claimed to occur due to government changes. Furthermore, Nedra Baklouti and Younes Boujelbene (2018) showed that there is a two-way causal link between democracy and economic growth. Their results also indicate that there is significant complementarity between political stability and democracy.

In the economic literature, there is no consensus on the impact of government spending on economic growth. Most researchers believe that a larger government at the optimal level hampers economic growth. Edmund J. Sheehey (1993) claims that when the government size is smaller than 15% of the GDP, its effect on economic growth is positive, while the effect is negative when the size is larger than 15%. On the other hand, Dimitar Chobanov and Adriana Mladenova (2009) confirmed that the optimal government spending within the EU should be between 17 and 40% of GDP. Generally, a larger government is more likely to reduce economic growth.

Within the EU28 countries, there are clearly some interesting variations in the share of government expenditure in GDP and economic growth. Chobanov and Mladenova (2009) have found that in the EU, countries can be classified in four groups according to their government spending: old EU countries that are high spenders (Scandinavian countries, France, Austria, Belgium, Germany) and old EU countries that are lower spenders (Ireland, the Netherlands, UK, Luxembourg, Greece). Within the new EU countries, some are also high spenders (Hungary, Croatia, Slovenia) and lower spenders (Poland, Slovakia, Baltic countries, Romania, Bulgaria). Marta Pascual Sáez, Santiago lvarez-Garca, and Daniela Castaeda Rodrguez (2017) argue that policymakers have different stances on whether government consumption positively or negatively influences economic growth. In research covering the period of 1994-2012

in old EU countries, there is evidence of the impact of government spending on economic growth, with a positive relationship for some old EU countries (Portugal and the United Kingdom), negative for others (Austria, Finland, Italy, and Sweden), or even no significant correlation (Belgium, France, Greece, Ireland, Luxembourg, the Netherlands, and Spain). However, considering the EU as a whole, they confirmed a negative relationship. Alexiou (2009) determined the existence of a positive relationship between growth in government spending and GDP growth in Greece for the period of 1970-2001. Similarly, Marius S. Dincă and Gheorghița Dincă (2013) noted a statistically significant and positive relationship in ten new EU countries between GDP per capita and safety expenditures and economic action expenses, and negative relationships between GDP per capita and national defense and general public services. In a related article, Dan Lupu et al. (2018) proved that education and health care expenditures have a positive impact on GDP, while expenditures on defense, economic affairs, general public services, and social welfare have a negative impact in new EU member countries. Gitana Dudzevičiūtė, Agnė Šimelytė, and Aušra Liučvaitienė (2017) found that many governments tried to stimulate growth by increasing government spending, while Mario Larch and Wolfgang Lechthaler (2013) found that some EU members have strongly criticized this approach.

Reviewing the empirical literature on the relationship between FDI and economic growth, we can draw two basic conclusions. First, not many studies have been conducted to examine the impact of FDI on the economic growth of EU countries, as was performed for developing countries. Second, studies focused primarily on the strong growth of FDI in the 1980s did not unambiguously confirm the impact of FDI on economic growth.

Although it is well known that technical innovation and advanced technologies, which usually accompany FDI, are indisputable factors of economic growth, the evidence for FDI's impact on economic growth is mixed (Johan Ericsson and Manuchehr Irandoust 2001) and ranges from positive, through neutral, to negative. Interestingly, some research has indicated a greater effect of economic growth on FDI than *vice versa* (Jong Il. Choe 2003). The literature suggests that interest in the impact of FDI on economic growth has moved in the direction of exploring the determinants of FDI (Jan Hunady and Marta Orviska 2014), as well as in the direction of the impact of EU membership on FDI (Randolph L. Bruno, Campos, and Saul Estrin 2021). Xiaoying Li and Xiaming Liu (2005), using a sample of developed and developing countries, found a strong complementary relationship between FDI and economic growth in both groups of countries. Furthermore, a study including over 100 countries with different development levels found that the relationship between the countries' income levels and the size of FDI's impact on growth was in the shape of an inverted U. The impact of FDI on economic growth in the middle-income group of countries was higher than in high-income and low-income countries.

There are conflicting research results on the impact of FDI on economic growth in EU countries. One study, conducted by Argiro Moudatsou (2003), identified undeniable positive direct and indirect effects of FDI on economic growth in EU countries. Recently, Mihaela Simionescu et al. (2017), using a sample of Central European countries, confirmed the positive impact of FDI on economic growth. However, Donny

Tang (2015), using a sample of EU countries and data from 1987 to 2012, did not prove that higher FDI and portfolio investments contributed to the economic growth of these countries. Another analysis, for the period of 2005-2015, even showed an inverse relationship between FDI and GDP and no positive impact of FDI on GDP in the EU in this 11-year period (Sonja Milutinović and Tanja Stanišić 2016).

Through a review of the literature, we concluded that the impact of renewable energy consumption on economic growth has been found to be positive, neutral, and negative (Adeolu Adewuyi and Olabanji Awodumi 2017). Perry Sadorsky (2009a, b) was the first researcher to investigate the relationship between renewable energy and domestic production growth. Later, considering the classical factors of GDP growth, Nicholas Apergis et al. (2010) confirmed the positive impact of renewable energy consumption on long-term economic growth in a sample of OECD countries. Yusuf Bayraktutan, Metehan Yılgör, and Sefer Uçak (2011), using a sample of OECD countries and data from the period of 1980-2007, indicated that the increase in energy consumption from renewable sources was a strong support for sustainable economic growth, without jeopardizing the potential domestic output and that there was bidirectional causality between real GDP growth and renewable energy consumption. Katsuya Ito (2017) reached similar results, concluding that an increase in energy consumption from renewable sources has a positive effect on economic growth, while an increase in conventional sources has no positive effect on GDP. On the contrary, Tiago L. Afonso, António C. Marques, and José A. Fuinhas (2017) concluded that renewable energy had no impact on economic growth, while non-renewable energy did influence growth. Tsangyao Chang et al. (2015), using a sample of G7 countries and data from the period of 1990-2011, confirmed the existence of a bidirectional causality between real GDP growth and renewable energy consumption, which was also confirmed in other studies, for other groups of countries (Apergis and Dan Constantin Dănuleţiu 2014; Melike E. Bildirici 2014). Maamar Sebri (2015) conducted the first meta-analysis of the research on the link between renewable energy consumption and economic growth and concluded that a neutral relationship is more likely in the short run than in the long run.

Angeliki N. Menegaki (2011) was the first to analyze the impact of renewable energy consumption on economic growth in EU member states and concluded that in the period of 1997-2007, there was no statistically significant impact on economic growth. A little later, Georgeta Soava et al. (2018) confirmed a positive impact in a study covering the EU28 countries over the period of 1995-2015. Similarly, analyzing the impact of renewable energy consumption in Germany, in the period of 1971-2013, Abdulkadir Abdulrashid Rafindadi and Ilhan Ozturk (2017) determined that a 1% increase in this consumption increases economic growth by about 0.2%. Applying the ARDL approach in the EU28 countries, Seyi Saint Akadiri et al. (2019) observed a positive and significant long-term relationship between environmental sustainability, renewable energy consumption, and economic growth in the period of 1995-2015. Furthermore, Adrienne Ohler and Ian Fetters (2014) confirmed a long-term positive connection in a study conducted for the period from 1990 to 2008 on a sample of OECD countries, 12 of which belong to the old EU group. Aslan Alper and Ocan Oguz (2016), using a sample of new EU member states, only confirmed a statistically significant impact of renewable energy consumption on domestic production for a small number

of countries. Emrah Koçak and Aykut Şarkgüneşi (2017), using a sample of Balkan and Black Sea countries, also confirmed that there is a significant impact of renewable energy consumption on economic growth.

Contrary to the results of previous studies, Susana Silva, Isabel Soares, and Carlos Pinho (2012) indicate that renewable energy can negatively affect economic growth in the initial period. Similarly, Chaoyi Chen, Mehmet Pinar, and Thanasis Stengos (2020) suggest that developing countries and countries that are not OECD members and only when overcoming a certain threshold of renewable energy consumption, the impact of energy consumption from renewable sources on economic growth is significant and positive. Until a certain threshold is reached, this influence is negative. Recently, Marius-Corneliu Marinaş et al. (2018), using a sample of 10 EU member states (from Central and Eastern Europe) and data from the period of 1990-2014, showed that in a number of countries, the GDP dynamics were independent of the dynamics of energy consumption from renewable sources, while in other countries in the sample, the growth in consumption exceeded the economic growth rate.

The empirical evidence shows that there are debates about the impact of population on economic growth, particularly on population size and growth, and age structure. David E. Bloom, David Canning, and Jaypee Sevilla (2001) suggest the existence of three theories: population change limits (pessimistic theory), stimulates (optimistic theory), or has no impact (neutralist theory) on economic growth. Economists predict that GDP growth in developed countries, the group to which the majority of old EU countries belong, is likely to stagnate in the future as the population growth in these countries is not showing a significant increase (Dean Baker, Bradford J. Delong, and Paul R. Krugman 2005). On the other side, there are strong views (Steven W. Sinding 2009) that the current population growth will continue to be problematic as the population consumes the finite available resources, which will hamper long-term growth. Allen C. Kelley (2000) suggested that the effect of population on economic growth differs in countries with different development levels. E. Wesley F. Peterson (2017) believes that in developed countries, low population growth causes social and economic problems, while in developing countries, high population growth hampers economic growth.

In a study conducted in the EU from 1950 to 2005, Alexia Prskawetz et al. (2007) found that countries with a higher proportion of youths in the overall population tend to implement technological changes that contribute to economic growth. Similarly, Miroslav Verbič and Rok Spruk (2014) confirmed in 33 countries (of which 22 are from the EU), in the period of 1998-2008, that countries with a higher proportion of older people have a significant burden on public finances, which in the long run, slows economic growth. However, Thomas Lindh and Bo Malmberg (2009) proved that in the European context, population growth can positively impact economic growth with the rise in life expectancy.

2. Theoretical Framework and Research Methodology

In this section, we present the theoretical framework for the variables covered by our model. There is no theoretical consensus among economists and researchers on the

effect of certain determinants of economic growth. The data and methodology used for our model are presented in detail in the second part of this section.

2.1 Theoretical Foundation for Selected Variables

In this section, we present the theoretical framework for our research. In general, we can conclude that there is no theoretical consensus regarding the impact of the variables included in our model on economic growth.

An increase in gross fixed capital formation is expected to induce higher economic growth rates. Keynes claimed that the increase in aggregate demand in the economy is the result of increased investment in fixed capital. Theoretically, employment growth is stimulated by increased investment, which accelerates economic growth. On the other hand, economic growth is the basis for investment growth, and there is indisputably a bidirectional causality between investment and economic growth. However, technical and technological progress, as a result of new investments, can increase unemployment so that new investments may not always result in economic growth.

Trade represents the basis of the European economic model and is its most attractive attribute. The EU economies are among the most open in the world with a trade ratio for goods and services of 21.5% of the EU GDP (Eurostat 2021, 2022, 2023). The EU is the world's largest exporter with a 31% share of total exports (International Monetary Fund 2019). In general, economies with a higher degree of openness can grow faster than less open ones if there is a sufficiently high external demand. However, more open economies are more exposed to external shocks (Mona Haddad et al. 2013; Thomas Conefrey, Gerard O'Reilly, and Graeme Walsh 2018). In the 1960s, economists and policymakers began to explore the relationship between economic openness and economic growth. The dilemma of choosing the right trade policy is a topic that has occupied the attention of economists since the end of World War II. The results showed that trade openness significantly and positively affects economic growth. In their research, Alan A. Bevan and Estrin (2000) found that countries with liberal economies tend to export more and attract a large number of foreign companies, which ultimately has a positive effect on economic growth.

Political stability is an important precondition for the country's economic growth and development that ensures the inflow of foreign direct investment. In general, multinational corporations avoid investing in countries with a high risk of political instability and will move to lower-risk countries. Back in 1996, Kuznets concluded that there must be a minimum level of political stability in order to ensure a relatively stable relationship between the expectations of the bearer of economic activity and economic growth (Rudolph C. Blitz 1968). At least two explanations for the negative impact of political instability on economic growth can be identified. The first negative impact relates to the reduction in productivity, as political instability affects labor relations and market developments (Roberto Perotti 1996; Dimitri Landa and Ethan B. Kapstein 2001). A lower investment level, as a consequence of political instability, manifests itself as another negative impact (Robert J. Barro 1991; Jakob Svensson 1998).

Theoretical observations on the impact of FDI on economic growth are mainly included in the neoclassical and endogenous models of economic growth. According

to the neoclassical model of economic growth by Robert M. Solow (1956), FDI, through increased investment volume and/or efficiency, leads to economic growth and represents a perfect alternative to domestic capital. Contrary to the neoclassical model, in the endogenous growth model, FDI generates technological diffusion and the effect of knowledge transfer from a developed economy to less developed economies affects GDP growth in the long run (Eduardo Borensztein, Jose De Gregorio, and Jong-Wha Lee 1998).

Economic theory shows mixed results when attempting to link government expenditure to economic growth. Wagner's law categorizes government expenditures as an endogenous product, while not considering it a driver of economic development. Moreover, in the Keynesian hypothesis, the rise in government consumption leads to higher economic growth rates. Therefore, John Loizides and George Vamvoukas (2005) claim that government spending is an exogenous factor that impacts aggregate output. In his endogenous growth model, Barro (1995) argued that GDP growth is negatively related to government consumption expenditure and that expenditures in the form of investments should positively contribute to growth. However, in empirical studies, it is difficult to determine which expenditures are investments and which are consumption.

As a factor of production, energy plays a key role in economic growth. Throughout history, many theories of economic growth have been developed with the aim of exploring and defining the path of stable and sustainable growth and the role of energy on that path. The neoclassical models of growth and convergence cannot explain the main determinant of economic growth, namely, the rate of technological progress, which was considered an exogenous factor in those models. The basic omission of neoclassical economic theory is that the market will determine the dynamics of the transition from fossil fuels to adequate substitutes through the mechanism of prices and innovation capacity. In the mid-1980s, it became clear that the standard neoclassical model of growth was not satisfactory, and many theorists (Robert E. Lucas 1973, 1988; Paul M. Romer 1986) began to emphasize that economic growth is an endogenous product of the economic system, rather than a force acting outside of it. However, even endogenous growth theories missed the fact that endogenous technological changes, aimed at the rational use of energy and improving energy efficiency, are necessary for long-term economic growth. Over time, alternative views on economic growth have emerged that emphasize the importance of energy in production and growth. The important role of energy in the economic system was first highlighted by Nicholas Georgescu-Roegen (1971), who argued that standard economic theory does not recognize the fact that, on the one hand, energy and material resources are irreversibly consumed, while, on the other hand, harmful effects on the environment continue to accumulate. Proponents of ecological economics believe that energy is the only primary factor of production (Cutler J. Cleveland et al. 1984). Solow (1997) pointed out that substitutions with different energy sources is the most important aspect, especially the substitution of non-renewable sources with renewable ones. Olli Tahvonen and Seppo Salo (2001) developed an economic growth model that includes renewable and non-renewable energy sources. David I. Stern (2011) indicated that economists who

deal with environmental issues prioritize energy over all other growth factors. There are many challenges that the EU is facing today in the field of energy.

The goal of the EU is to achieve a transition towards a sustainable and competitive economy in which growth is achieved with low GHG emissions. The transition to a low-carbon economy is an opportunity to achieve economic growth and development, increasing the security of the energy supply and reducing dependence on imports. By increasing the use of low-carbon solutions, we can stimulate the growth and development of the market and the transformation of the energy sector. At the same time, this transition represents a huge challenge, given that significant capital is needed to transform economies that depend on fossil fuels. The challenge is even greater if the benefits of today's investments are only visible in the future. A successful transition requires close coordination between policy, technology, and capital, underpinned by public-private partnerships, as well as opportunities for partnerships between countries around the world (Goldman Sachs 2010).

A theoretical explanation for the negative relationship between population growth and growth per capita is contained in the neoclassical growth model by Solow (1956). However, it should be borne in mind that, for most economic growth models, the population growth rate represents a measure of workforce growth. Modern economic models consider the structure and quality of the workforce in addition to its size. The opinions on the impact of population on economic growth are divided, and some authors claim that it accelerates growth (Holger Strulik 2005), while others believe it hinders it (Alberto Bucci 2015). However, most economists consider the population to be an important determinant of economic growth. Interestingly, certain studies did not show a relationship between these two variables (Tai-Hsin Huang and Zixiong Xie 2013).

Based on this theoretical and empirical background, we proposed the following hypotheses:

H1. Gross fixed capital formation, trade openness, and political stability are positively correlated with GDP growth in the EU28 sample (old EU group throughout the entire observation period and new EU group from the moment they joined the EU);

H2. FDI and government consumption positively influence the GDP growth rate, while the global financial crisis had a negative impact on the old and new EU groups and the EU28 as a whole;

H3. Renewable energy consumption and population growth are statistically significant and positively correlated with GDP throughout the observation period on the old and new EU groups and the EU28 as a whole.

2.2 Data and Methodology

In this study, we used a strongly balanced panel of 28 EU countries in the period from 2000 to 2020. The data were obtained from the World Bank database and are detailed in Table 1.

In Table 1, we provide a definition of all the variables used and an explanation of how they are measured. All variables are expressed as rates of change except for

political stability, which is presented on an ordinal scale. The last variable (Table 1) is a dummy variable with binary values of 0 and 1.

Table 2 lists some basic descriptive statistics for the variables.

Table 1 Variables and Their Definition

Variable	Abbreviation	Definition (from the official statistics)
GDP growth rate	gdpgrowth	Annual percentage growth rate of GDP at market prices, based on constant local currency.
Gross fixed capital formation	investment	Includes land improvements; plant, machinery, and equipment purchases; construction of roads, railways, schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. It is expressed as annual growth rate.
Trade openness	openness	Trade is the sum of exports and imports of goods and services, measured as a share of GDP and is expressed as the annual change in the ratio of imports and exports to GDP.
Political stability	stability	Measures perceptions of the likelihood of political instability and/or politically motivated violence.
Foreign direct investments	fdi	Foreign direct investment represents net inflows into the economy from foreign investors and is divided by GDP. It is expressed as the rate of change of FDI/GDP.
Government consumption	govconsumption	Final general government consumption expenditure including all current government expenditures for purchases of goods and services (including compensation to employees and most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation). It is expressed as the rate of change of consumption/GDP.
Renewable energy consumption	renewables	Ratio between the consumption of energy from renewable sources and the total (primary) energy consumption.
Population	popul	Annual population growth rate which includes all residents of a country.
Crisis	crisis	Refers to the global financial and sovereign debt crisis. It takes a value of 1 when referring to years 2008 to 2012; otherwise, it takes a value of 0.
New EU countries	newold	Refers to the new EU member countries. It takes a value of 1 when referring to new EU countries; otherwise, it takes a value of 0.
EU membership	eumember	Refers to the EU membership year. For years since the countries became EU members, it takes a value of 1; otherwise, it takes a value of 0.

Source: World Bank (2021)[1].

Table 2 Descriptive Statistics

Variable	Level and rate of change	Obs	Mean	Std. dev.	Min*	Max**
gdpgrowth	Rate of GDP growth change	588	2.207	3.835	-14.839	24.37
investment	Rate of change of investment/GDP	587	2.935	10.936	-38.903	100.938
openness	Rate of change of openness/GDP	588	0.017	0.067	-0.257	0.423
stability	Rate of change	588	73.683	15.113	30.290	100
fdi	Rate of change of FDI/GDP	585	1.219	22.820	-47.949	544.262
govconsumption	Rate of change of govconsumption/GDP	587	1.800	2.943	-12.385	15.672
popul	Rate of change of population	588	.245	.836	-3.848	3.931
renewables	Rate of change of renewables in total energy consumption	584	11.385	10.163	0	51.059

Notes: * The highest negative rates of change for all variables are given in the min column except for political stability, for which, the highest negative value is presented on an ordinal scale. ** The highest positive rates of change for all variables are given in the max column except for political stability, for which, the highest positive value is presented on an ordinal scale.

Source: Authors' calculation.

[1] **World Bank.** 2021. Indicators. https://data.worldbank.org/indicator?tab=all (accessed May 09, 2021).

Our paper used a multiple linear regression model for identities i = 1,..., *N* (countries in our case) observed at time periods t = 1,…, *T*. This model can be represented by Equation (1):

$$Y_{it} = \alpha + \beta X'_{it} + \gamma Z'_{it} + u_i + \varepsilon_{it}. \quad (1)$$

In this model, *Y_it* represents the dependent variable, while *X_it'* is a K-dimensional row vector of the time-varying explanatory variables and *Z_it'* is an M-dimensional row vector of the time-invariant explanatory variables which excludes the constant term; α represents the intercept, β stands for a K-dimensional column vector of the parameters, and γ defines an M-dimensional column vector of the parameters with *u_i* as an identity-specific effect and *ε_it* as the error term. The main characteristic of a balanced panel is the presumption that each identity is observed in all time periods. First, we estimated our model with the pooled OLS estimator, fixed effects estimator, and random effects estimator.

The aim of our paper was to determine the direction and strength of the influence of our selected variables on economic growth at the level groups of countries (old and new EU members), as well as at the level the EU as a whole. During the analysis of the EU as a whole, we used the data for the old EU countries throughout the entire projection period, and for the new EU group, we used the data starting from the moment of their entry into the EU. After the largest ever growth in membership in 2004, the economic environment changed significantly, not only in the new EU but also in the old EU group of countries. There are obvious differences in the economic environment between the old EU and new EU countries, and it is important to point out that the new members had to adapt to the environment that already existed among the old EU countries. The old EU countries have developed, diverse, and stable economies with high living standards. On the other hand, new EU countries, which joined after 2004, often face economic challenges, including lower levels of GDP per capita, high unemployment, poverty, and labor migration abroad. The old EU countries usually have larger markets, a stable business environment, a developed regulatory framework, and good infrastructure, and attract FDI in high-tech sectors. New EU countries usually attract FDI in sectors such as manufacturing, tourism, and services. In terms of infrastructure, the old EU countries have developed infrastructure, including modern roads, railways, airports, and communication networks. In some new EU countries, the infrastructure may be less developed, with limited access to modern transport networks and communication technologies. The old EU countries have a longer tradition of open trade and a higher level of trade liberalization. In addition, the old EU countries have a long democratic tradition and established political, legal, and administrative systems. New EU countries often face challenges in building efficient and transparent state institutions, fighting corruption, and strengthening the rule of law. These countries generally face risks such as political instability, higher economic volatility, or less developed financial sectors, which can affect investment decisions and the volume of investments in fixed capital. Despite these differences, the EU promotes policies and mechanisms that support convergence and more balanced economic development between old and new member states, including funds and programs that support investments in fixed capital and strengthen economic competition. The old EU countries

often have an older demographic structure compared to new EU countries, i.e., a higher proportion of the elderly population compared to the working-age population, which can affect population growth. The potential for renewable energy sources in old and new EU countries can vary, so some old EU countries (such as those in northern Europe) have a high potential for adopting renewable sources, such as wind energy, biomass, and geothermal energy, while new EU countries (such as those in southern Europe) have a high potential for adopting hydro and solar energy. Although the EU has common goals for increasing the share of renewable energy sources in total energy consumption, the old EU countries have set more ambitious goals and have more developed policies and regulations in the field of renewable energy sources. On the other hand, new EU countries are in the process of adapting and implementing these policies. Technological development, energy infrastructure, and incentive systems for the production and consumption of renewable energy are also an advantage of the old EU countries.

3. Empirical Results and Discussion

The econometric model we used to assess the effects of the determinants explained in Table 1 on economic growth for EU countries is specified in Equation (2):

$$\begin{aligned} \text{GDPgrowth}_{it} = {} & \alpha_0 + \beta_1 \text{investment}_{it} + \beta_2 \text{openness}_{it} + \beta_3 \text{stability}_{it} + \beta_4 \text{fdi}_{it} \\ & + \beta_5 \text{govconsumption}_{it} + \beta_6 \text{renewables}_{it} + \beta_7 \text{popul}_{it} \\ & + \beta_8 \text{crisis}_{it} + \beta_9 \text{eumember}_{it} + \beta_{10} \text{newold}_{i} + \varepsilon_{it}. \end{aligned} \quad (2)$$

In our paper, we evaluated multicollinearity using the variance inflation factor (VIF) for each variable. These test results (Table 3) indicate that all VIF values are significantly less than 5 and all 1/VIF values are greater than 0.2. The average VIF value was 2.61 and is considerably less than 5. Therefore, we concluded that the determinants of our model are independent and affect the dependent variable.

Table 3 Results of the Multicollinearity Test

Variable	VIF	1/VIF
eumember	2.85	0.420098
newold	2.67	0.577707
renewables	2.38	0.420098
govconsumption	1.73	0.637630
popul	1.57	0.809610
crisis	1.56	0.835845
investment	1.37	0.837898
openness	1.21	0.975646
stability	1.03	0.987632
fdi	1.01	0.989688
Mean VIF	2.61	

Source: Authors' calculation.

The global financial crisis from 2008 to 2012 represents a dummy variable in our model which impacted both the old and new EU groups for period after 2004. Adding dummy variables to the model is justified due to the statistical significance of

the added variables, as well as the statistical significance of the lagged value of the dependent variable.

As previously emphasized, at the beginning of the econometric process, we checked the pooled OLS regression. This process included evaluating the performance of the individual effects' F test, which defines the null hypothesis that there is no evidence of significant differences across countries and that simple OLS can be applied. Our results indicate that the null hypothesis can be rejected and random effects have to be considered.

The following phase in our econometric process was the estimation of cross-section check and time-fixed and random effects. We performed the redundant fixed effect test to estimate the fixed effect specification with the results for the F-test (59.37, p-value ≤ 0.001) suggesting that the independent variables reliably predict the dependent variable, GDP growth, in our model.

In the next phase, we applied the Hausman test to test the random effects. The Hausman test is a useful tool in choosing between a fixed-effects model and random-effects model for panel data. The null hypothesis of this test preferred the random-effects model, contrary to the alternative hypothesis, which favors the fixed-effects model. The Hausman test unequivocally suggested the rejection of the null hypothesis due to there being no correlation between errors in the model and regressors, and therefore, the preferred model was the fixed-effects model.

In Table 4, we present the regression results for the old and new EU groups, while in Table 5, we present the results for the EU28 countries, i.e., for the old EU countries throughout the entire observation period, and for the new EU group after their entry into the EU.

Table 4 Regression Results for Old EU and New EU Groups

Variable	Coefficient (statistical significance)	
	Old EU group	New EU group
investment	0.110 (0.088*)	0.081 (0.103)
openness	20.754 (0.000***)	13.803 (0.000***)
stability	0.650 (0.580)	0.033 (0.044**)
fdi	-0.002 (0.054*)	0.001 (0.971)
govconsumption	0.410 (0.000***)	0.231 (0.072*)
renewables	0.006 (0.549)	-0.051 (0.059*)
popul	0.533 (0.028**)	-0.358 (0.273)
crisis	-1.395 (0.001***)	-2.482 (0.000***)

Notes: For the specification tests, the p-values are reported. *, **, and *** indicate that the coefficients are significant at the 10%, 5%, and 1% level of significance, respectively.

Source: Authors' calculation.

Table 5 Regression Results for EU28 Countries (for the Old EU for the Entire Observation Period and for the New EU Group after Their Entry into the EU)

Variable	Coefficient (statistical significance)
investment	0.192 (0.000***)
openness	10.419 (0.000***)
stability	3.611 (0.005***)
fdi	-0.002 (0.004**)
govconsumption	0.164 (0.023**)
renewables	-0.070 (0.000***)
popul	-0.113 (0.537)

Notes: For the specification tests, the p-values are reported. *, **, and *** indicate that the coefficients are significant at the 10%, 5%, and 1% level of significance, respectively.

Source: Authors' calculation.

Based on the findings in Tables 4 and 5, we offer a comparative analysis of our results with the results of other studies:

- When we analyzed both groups of countries together, the old EU group throughout the entire observation period and the new EU group from the moment of their EU accession, gross fixed capital formation, openness index, and political stability were found to significantly and positively influence GDP growth. Specifically, a 1 percentage point increase in the rate of change of gross fixed capital formation and openness index was associated with a 0.19 and 10.41 percentage point increase in GDP, respectively. Additionally, a one-tenth unit increase in political stability produced a 3.61 percentage point increase in GDP growth. Therefore, we confirmed H1.

Comparing the two groups of countries, we noted that the influence of gross fixed capital formation was positive and significant for the old EU group, i.e., a 1 percentage point increase in the rate of change of gross fixed capital formation was associated with a 0.11 percentage point increase in GDP growth rate. On the other hand, this determinant had a statistically insignificant impact on economic growth in the new EU group. Furthermore, our results indicated a statistically significant and positive influence of trade openness in both groups of countries during the entire observation period. Specifically, a 1-percent increase in the rate of change of openness index was associated with a 20.75-percent and 13.8-percent increase in GDP in the old and new EU groups, respectively. The impact of political stability on economic growth was observed in the two groups of countries, but it was not surprising that political stability lost its significance over time in the old EU group; however, its impact in the new EU group was statistically significant and positive during the total observation period. Specifically, a one-tenth unit increase in political stability in the new EU group produced a 0.03 percentage point increase in GDP growth.

The strong influence of gross fixed capital formation on economic growth was confirmed by our results for the old EU members during the entire observation period, while for the new EU countries, this influence was confirmed after their entry into the EU. Dritsakis, Varelas, and Adamopoulos (2006), using the example of Greece as an old EU country, showed that there is a unidirectional causal relationship from gross fixed capital formation to GDP. Similar to our results, Pavelescu (2008) confirmed a stronger influence of gross fixed capital formation on economic growth in the new EU members compared to the old EU countries. A strong connection between gross fixed capital formation and economic growth, with a high correlation coefficient, was confirmed for the new EU members from the group of CEE countries, after their entry into the EU (Gibescu 2010). Furthermore, Lymonova (2019) in a recent study on a sample of Euro Area countries confirmed the positive impact of the formation of gross fixed capital on GDP in both groups of countries in the period after the entry of the new EU member countries. Similar to our results, Foster-McGregor, Stehrer, and Timmer (2013) in their research showed an indisputable positive impact of internationalization and trade openness for old and new EU countries. Furthermore, Shariff Hossain and Rajarshi Mitra (2013) showed that in their sample of countries (including both old and new EU countries), trade openness, as well as financial openness, were important determinants of growth that positively influenced economic growth before and after 2004. It is interesting that research conducted on a sample of Southeast European countries, including EU countries, indicated a stronger positive effect of trade openness in countries with a higher initial income per capita as well as higher gross fixed capital formation and FDI (Fetahi-Vehapi, Sadiku, and Petkovski 2015). The negative impact of political instability under the influence of intense and turbulent flows on the political and economic sphere of life during the transition period was recognized by Gurgul and Lach (2013) in their study on the new EU group. However, since these countries opted for more democracy and stability by joining the EU, this had an indirect positive impact on their economic growth.

- FDI had a statistically significant but negative impact on economic growth in the old EU group, i.e., a 1 percentage point increase in the rate of change of foreign direct investment was associated with a 0.002 percentage point decrease in GDP. Interestingly, FDI in the new EU group of countries did not have a statistically significant impact on economic growth. Moreover, we noted that when we analyze both groups of countries together, the old EU group throughout the entire observation period, and the new EU group from the moment of their EU accession, the impact of FDI on GDP growth was statistically significant and led to a slight decline in the GDP growth rate. In contrast, the impact of government consumption on economic growth was statistically significant and positive in the old and new EU groups and all EU countries combined. Specifically, a one percentage point increase in the rate of change of government consumption was associated with a 0.41 and 0.23 percentage point increase in economic growth in the old and new EU groups, respectively. When we analyze the results at the level of all EU countries, a 1-percent increase in the rate of change of government consumption was associated with a 0.16-percent increase in GDP

growth. Our results showed that the impact of our dummy variable, i.e., the global financial crisis from 2008 to 2012, was statistically significant and negative in the two groups and the EU as a whole. Specifically, in the period of this crisis, the GDP growth rate decreased by 1.32% in the old and 1.47% in the new EU countries. Therefore, we partially confirm H2.

Our results did not confirm the expected positive impact of FDI on economic growth in our sample of countries. However, looking at the literature, it can be concluded that the results of earlier empirical research on the impact of FDI on economic growth are not uniform, i.e., they are mixed (Ericsson and Irandoust 2001). In a recent study, Bruno, Campos, and Estrin (2021) showed that membership in the EU leads to an increase in FDI, whether it is investments from outside or inside the EU. However, Tang (2015), using a sample of EU countries, did not confirm that high FDI contributes to economic growth. Similar to the results of our study, Milutinović and Stanišić (2016) showed negative independencies between FDI and GDP in a sample of EU countries.

In the economic literature, there is no consensus on the impact of government spending on economic growth. However, researchers agree that a larger government size from optimal level hampers economic growth, and economic theory offers mixed results on the relationship between these variables. The optimal level differs from study to study. For instance, Chobanov and Mladenova (2009) claim that the optimal government level in the EU should be between 17 and 40% of GDP. Sheehey (1993) estimated that when the government size is smaller than 15% of the GDP, its relationship with economic growth is positive, but negative when the optimal level is larger than 15% of GDP.

Our results on the positive impact of government consumption on economic growth were confirmed by some previous empirical research. Similarly, Dincă and Dincă (2013), in ten new EU countries, confirmed a positive relationship between certain components of government consumption and GDP growth. On the other hand, Lupu et al. (2018) produced similar findings which confirmed a positive impact of education and healthcare expenditure as government consumption components on economic growth, while a negative impact was shown for other components in new EU countries. Contrary to our results, one of the recent studies (Dudzevičiūtė, Šimelytė, and Liučvaitienė 2017) produced mixed results on the relationship between government consumption and GDP growth, ranging from positive, through neutral, to negative correlation for different EU countries.

The global financial crisis, which refers to the period from 2008 to 2012, represented a dummy variable in our model. The creation of this variable was justified due to its statistical significance. The global financial and European sovereign debt crisis from 2008 to 2012 had serious consequences on economic growth in most of Europe. The crisis in Europe primarily started as a financial one, but its nature changed afterwards. Moreover, Europe was facing a political crisis, especially in the integration process. The whole EU was affected by the crisis which severely jeopardized economic growth. Although the crisis in both groups of selected countries harmed economic growth, the effect was slightly stronger in the new EU countries.

- Our results indicated that renewable sources were not a factor in the old EU group, whereas in the new EU group, they manifest a statistically significant and negative impact on GDP growth. Specifically, a 1 percentage point increase in the rate of change of renewable energy consumption was related to a 0.05 percentage point decrease in the GDP growth rate. Similarly, we observed a statistically significant and negative impact of this determinant on economic growth when we observe both groups of countries together, the old EU group throughout the entire observation period, and the new EU group from the moment of their EU accession. Therefore, our results indicate that a 1-percent increase in the rate of change in renewable energy consumption was related to a 0.07 percentage point decrease in the GDP growth rate. In the new and old EU groups, the impact of population on economic growth was statistically significant and positive in the old EU group and insignificant in the new EU group. Our results demonstrated that a 1 percentage point increase in the rate of change of population was associated with a 0.53 percentage point increase in the GDP growth rate in the old EU group. There was also no significant effect at the EU28 level. Therefore, our results partially confirmed H3.

Although the "100% renewable energy" approach is of essential importance for sustainable economic growth, it is obvious that the results of the empirical research on the impact of renewable energy consumption on economic growth are not uniform and include positive, neutral, and negative impacts (Adewuyi and Awodumi 2017). Similarly, Afonso, Marques, and Fuinhas (2017) concluded that renewable energy had no impact on economic growth, i.e., they confirmed that it has a neutral impact. Similarly, Sebri (2015) pointed to a possible neutral relationship between renewable energy consumption and economic growth in the short run. Menegaki (2011), who was the first to analyze the impact of renewable energy consumption on economic growth in EU countries, did not find a statistically significant impact on economic growth. In the period of 1997-2007, Alper and Oguz (2016), using a sample of new EU countries, only confirmed a statistically significant impact of renewable energy consumption on domestic output for a small number of countries. However, Silva, Soares, and Pinho (2012) warned that renewable energy can negatively affect economic growth in the initial period. Recently, Marinaș et al. (2018) showed that, for the period of 1990-2014 in a number of EU member states, the GDP dynamics was independent of the dynamics of energy consumption from renewable sources. Contrary to our results, several studies covering EU countries confirmed the positive impact of consumption of energy from renewable sources on economic growth (Soava et al. 2018).

Our results confirm the findings of some previous empirical studies on the relationship between population and economic growth. Similarly, Lindh and Malmberg (2009) suggested that population growth can positively affect economic growth in the old EU countries. Peterson (2017) argued that in high-income countries, a low population growth can cause social and economic problems, while population growth can slow down economic growth in low-income countries. Additionally, Baker, Delong, and Krugman (2005) estimated that in the old EU countries, GDP growth will stagnate due to insufficient population growth.

4. Conclusions

As could be noted from the theoretical and empirical background presented, economic growth and its determinants have been a subject of constant interest in economics. There were many motives for conducting this study, including the following: (a) the absence of a theoretical and empirical consensus on the influence of certain determinants on economic growth in EU countries, (b) the scarcity of studies that differentiate between the impact of certain economic growth determinants in the old and new EU countries, and (c) the potential for our results to aid in economic decisions by policymakers in the EU and especially candidate countries.

Using regression analyses in this study, we estimated the significance and impact strength of 10 selected variables on economic growth in the old and new EU members and at the EU28 level. We analyzed the effects of selected variables on the GDP growth rate in the two groups as it is obvious that both groups experienced significant changes after the entry of new EU countries. In examining the model and the relationship between the independent variables and the economic growth rate, we made some interesting findings. For the EU28, we concluded that gross fixed capital formation, trade openness, and political stability significantly and positively influenced GDP growth. On the other hand, for the two groups of countries, we concluded that the influence of gross fixed capital formation on economic growth was significant only for the old EU group, while the influence of the openness index was significant and positive for both groups of countries. We noticed that the influence of political stability on GDP growth was statistically significant and positive for the new EU group. Contrary to expectations, FDI had a statistically significant and negative impact on economic growth in the old EU group and for the EU28, while in the remaining period of observation, this influence was statistically insignificant. A statistically significant and positive effect of government consumption on economic growth was noted in both the old EU and new EU groups, as well as in the EU as a whole. Although the green economy is in full swing nowadays, the results of our model did not confirm the positive impact of renewable energy consumption on economic growth during the observation period. Population had a statistically significant and positive influence on the GDP growth rate in the old EU group, but its impact was insignificant for the other two samples.

Although the long-term impact of the pandemic on gross fixed capital formation cannot yet be reliably assessed, it is recovering at a much faster pace than expected due to the maintenance of strong demand, favorable financing conditions, and stimulating public finances at the national and EU level. A strong monetary policy response and various government credit guarantee and financial incentive programs supported access to finance for investments. Certainly, there are still some risks associated with the recent pandemic, which could affect the slowdown of gross fixed capital formation in the future. Therefore, much will depend on how successful the national and EU administrations are in suppressing these risks.

The EU manages not only trade relations within its borders, but also relations with other parts of the world, and has a significant weight in international trade relations. Trade liberalization improves opportunities for innovation, new technologies, and productivity growth. Although its foreign trade policy is often criticized, the EU

declares itself as a persistent fighter against protectionism, as the official position is that it would lose more than it would gain by introducing protectionist measures. Therefore, the EU is formally committed to an open and fair world trade system. In 2021, the European Commission established a "Trade Policy Review" (TPR), whose aim is to establish a trade policy that is ready to respond to the challenges related to green and digital transitions. Due to the war between Russia and Ukraine, the EU is coordinating measures and seeking solutions to the issue of rising prices and supply shortages. It is certain that international trade will have to reduce its carbon footprint and CO2 emissions to combat climate change as a priority of the EU in the future.

Faced with the new world order, it can be stated that on the EU level, the time of large political parties has passed and coalitions of a larger number of parties are becoming the norm. Such fragmentation and instability have certain consequences for the future of the EU and its geopolitical role. This makes it much more difficult to build long-term trust relationships between EU countries, which is of key importance for cohesion and making complex decisions at the level of EU umbrella institutions. Governments in politically fragmented countries, with a certain degree of political instability, should consider the root causes of the political instability, in order to mitigate its negative effects on the creation and implementation of economic policy and, therefore, on economic growth. This problem should be continuously monitored with appropriate solutions to overcome situations in which political factors have a negative effect, instead of a stimulating one, on economic flows.

In the period after the global financial crisis, the EU was generally open to direct investments, which is why FDI in the EU from other countries recorded a significant growth. The COVID-19 pandemic increased the fear of inward FDI. As a consequence, the number of EU member states regulating the control of internal FDI has increased, the number of sectors in which verification is carried out has also increased, and the verification procedure is taking on a regular character. It is expected that the EU countries will skilfully direct the internal FDI policy in the future, in order to successfully balance the positive effects of FDI while minimizing the potential risks and dangers that its carries for the host country.

To allow EU member states to count on the positive impact of government consumption, it is necessary, to the extent possible, to give importance to the productive components. EU member states should count on the long-term positive impact of education expenditures, social protection, and health expenditures, which do not directly affect economic growth. The focus of EU members on increasing public expenditures for economic activities and environmental protection should provide the conditions for stable and sustainable economic growth in the future. As the relationship between government consumption and economic growth is very complex, EU member states should carefully consider the level of public expenditures, their structure, and their efficiency.

Renewable energy sources are intensively promoted in the EU as a substitute for fossil fuels because this approach contributes to reductions in greenhouse gas emissions, diversification of the energy supply, and a reduced dependence on unreliable and unstable fossil fuel markets, especially oil and gas. As a consequence of the war between Russia and Ukraine, an energy crisis occurred in the EU, which the Union is

trying to overcome by reducing its dependence on fossil fuels and accelerating the transition to clean energy. In the new amendment, an increase in the binding target for the share of renewable energy sources in the energy consumption structure of the EU was proposed as 45% by 2030. This would increase the total capacity for energy production from renewable sources in the EU to 1,236 GW by 2030.

Population trends, i.e., demographic changes, represent a major challenge for EU member states. Although the consequences of COVID-19 are not yet fully known, it is a realistic assumption that the pandemic will significantly affect birth and mortality rates, as well as migration flows in the EU. The current aging trend of the EU population has significant economic and social consequences, such as higher dependency ratios, a slowing labor force growth, pressures on fiscal sustainability, and the sustainability of the social security system, as well as a greater pressure on health and social care services. Certainly, with a coordinated and holistic approach to the principles of sustainability, greening, and digitization, the EU should ensure the mitigation of negative demographic trends. As Eurostat's forecasts indicate the depopulation of rural and urban regions in the EU, it is expected that along with climate issues and the digital transition, demographic issues will be the EU's priority.

In addition, a recommendation for future research is the preparation of a similar analysis for groups of countries with similar income levels, since the differences in development are evident within the groups analyzed in this study. Future research may include the entire COVID-19 and post-COVID-19 period, which could affect the results. It would be interesting to consider the spatial dimension of the grouping of countries, since individual countries are not isolated units and there are numerous and diverse connections between them. It is certainly expected that more similar research is needed in order for it to serve as a basis for policymakers in the process of creating policies that encourage the economic growth and development of their country.

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