THE MEASUREMENT AND ANALYSIS OF ECONOMIC GROWTH DYNAMICS IN EUROPEAN COUNTRIES

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In this paper, the quantitative aspect of economic growth, i.e. its dynamics, is dealt with. Although it is common to observe the growth rate (intensity) when analyzing the growth dynamics of countries while neglecting growth variability, the fact that covering fluctuations in growth rates has clear motivation and practical significance is presented. On a sample of European countries, including Serbia, growth intensity and stability are analyzed in the paper in order to construct a growth dynamics indicator and an adjusted growth rate based upon these two components. Based upon the two constructed indicators, the position of each country in the sample and in the region (Western and Eastern Europe) which they belong to is analyzed. The detailed analysis and results indicate the importance of this approach when analyzing and comparing the economic growth of individual countries in the medium term and in the long term and when assessing effects on future economic growth and wellbeing.

Keywords: growth intensity, growth stability, growth dynamics, West Europe, East Europe, Serbia

INTRODUCTION

Economic growth is a complex and long-term process which can be observed from a quantitative aspect and a qualitative aspect. Both sides of economic growth are equally important and closely interlinked. The quantitative side of economic growth is most often reduced to the production increase rate, i.e. growth intensity expressed through an appropriate growth rate, which is motivated by data availability and the ease of analysis. However, this indicator is deficient and does not properly reflect the quantitative dimension of growth. In addition to the growth rate, its stability over time, i.e. its resistance to various shocks and uncertainty, is also important for understanding the quantitative side of economic growth. Together, these two components - growth intensity and stability - fully and comprehensively characterize the quantitative side of economic growth and are denoted by the term growth dynamics[1].

In this research study, the economic growth of individual countries is monitored using the Gross Domestic Product growth rates (growth intensity). The study also goes one step further to include growth variability or its opposite - growth stability. The goal

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pursued in this paper implies the demonstration of the importance of the inclusion of the growth rate variability (i.e. stability) when analyzing and assessing the growth dynamics of different countries. The idea behind the calculations made in the paper is that it is certainly important for an economy to record an increase in production in a certain period of time. If, however, this increase is without major oscillations (i.e. if it is stable) in a longer period of time, it may lead to many other beneficial effects, and *vice versa*.

Economic fluctuations adversely affect the wellbeing of the population and in particular represent a significant source of risk to the poor. In fact, variability in production and income affects the consumption growth rate. In doing so, particularly affected are the poor strata of society (Barlevy, 2004; Malik & Temple, 2009), who are unable to maintain balanced consumption due to a lack of liquidity (wealth or access to credit). The uncertainty associated with short–term variations in the output may also be replicated in smaller domestic and foreign investments in the country, thus leading to future lower economic growth as a source of increasing household welfare.

In comparison with the conventional approach that favors growth pace, i.e. growth intensity, monitoring growth dynamics enables a direct comparison of economic growth, i.e. its quantitative side, between the countries of the different levels of development, which is another advantage of such monitoring, which will be shown in the paper. A relatively higher growth rate in the countries with lower development levels is not an automatic indicator of their relative success in achieving economic growth. It is known that it is easier to achieve higher growth rates at a lower starting base, so the inclusion of another important component - growth stability - in considering this process is both desirable and useful, especially when considering that, as a rule, more developed economies have a greater potential for more stable growth. The intersection of the two components that determine the quantitative side of economic growth (the one being "more inclined" to less developed countries, and the other inclining to more developed economies) creates the necessary balance in the assessment of the growth performance of individual countries.

In the paper, a survey is conducted on a sample of a total of 30 European countries, including Serbia. The European countries significantly differ in the level of their economic development. In order to assess and compare their economic growth from the quantitative aspect, growth intensity (which shows growth strength, i.e. the rate of an increase in production), growth stability[2] (which reflects the continuity of the growth process) and growth dynamics (which combine growth intensity and growth stability) are used. In this way, the position of each country in the sample and also in the region (Western and Eastern Europe) which they belong to is analyzed. Finally, the original growth rates are adjusted at the end of the paper taking into account their variability, so that the original growth rates are reduced in the countries with higher growth variability (lower growth stability), on the one hand, or increased in case a country is characterized by stable growth, on the other. The empirical analysis is therefore conducted so as to quantitatively assess the growth dynamics of the European countries, which are based upon stability and growth intensity, and to obtain a more complete picture of growth performance in Europe based upon the adjusted growth rates.

The following research methods are used in the paper: the descriptive method, the comparative method, the method of analysis and synthesis and the statistical method (the creation of a composite index using the min-max method, the calculation of adjusted growth rates and correlation method).

Methodologically[3], the first step involves the calculation of the growth dynamics indicators based upon the appropriate indicators of growth intensity and growth stability. The first component (growth intensity) is measured by the average annual growth rate, whereas the growth stability component is inversely proportional to the growth rate variability during the period of observation, i.e. the same represents the reciprocal of the standard growth deviation. Growth intensity and growth stability are standardized in order to calculate the growth dynamics indicator based upon them. In fact, growth dynamics are obtained as a linear combination of growth intensity and growth stability, varying the weights having been assigned to them. Also, the

calculated values are used for the purpose of further calculation, i.e. for the construction of a customized growth rate value, where the original growth rate is increased or decreased by the variability level. Based upon such an adjusted growth rate, the extent to which the image of Europe changes when a new growth indicator is used instead of the usual real growth rate can be noticed.

In this paper, the importance of the applied approach is pointed out and the picture of Europe is presented from a different, somewhat changed perspective compared to the usual one. In our opinion, using the indicators of growth dynamics and the adjusted growth rates might improve the analysis of the quantitative side of economic growth. The idea presented in detail and the calculation performed in the paper open the way for understanding, calculating, monitoring and comparing the values of these indicators. The obtained indicators meet the basic requirements, which are valid for the broadly accepted indicators of economic growth (and development), namely to present reality as realistically as possible, to allow comparisons between individual countries and not to be particularly complex to calculate.

The following basic hypotheses are tested further in the paper:

H1: Growth dynamics and adjusted growth rates better reflect the quantitative side of economic growth than growth intensity (the level of economic growth rates), because they incorporate information on growth stability as an important component of the quantity of economic growth.

H2: The less developed European countries have relatively high growth intensity (rate), but low stability, whereas the European countries at a higher level of development are characterized by lower growth intensity (rate), yet relatively stable growth.

In the following Section 2, an overview of the literature is presented. In Section 3, the process of determining growth dynamics and their components (growth intensity and growth stability) is explained and the results for the European countries are presented.

A detailed analysis of the obtained results for the European countries is performed and shown, together with a special overview of the growth dynamics of the countries included in the sample and classified into the two groups (Western and Eastern Europe) for the entire time period and into subperiods. Here, the importance of adequately considering the growth dynamics of individual economies is emphasized as the key approach to analyzing the growth rate of the European countries. Section 4 presents the concluding remarks, where the results of the conducted research study are summarized, their implications for the economic policy are referenced and possible future lines of research in this area are indicated.

LITERATURE REVIEW

The starting point of this empirical research study is the papers by R. Ginevičius, D. Gedvilaitė, A. Stasiukynas and J. Šliogerienė (2018) and R. Remeikienė, J. Belas, T. Kliestik and L. Smrcka (2020), but the approach presented and used in this study is fundamentally different from theirs. The mentioned authors use the term growth dynamics, which unites in itself both growth intensity and growth stability. However, they calculate growth intensity as a ratio of the GDP *per capita* at the end and at the beginning of the period of observation (the within-country approach) or by dividing each country's GDP *per capita* value at the end of the period by the minimum level of the GDP *per capita* of the countries included in the sample in the initial year of the period of observation (the so-called between-countries approach), with R. Remeikienė *et al* (2020) using standard values (from 0 to 1). Growth stability is calculated using the MDD (*Measuring of the Dynamics of Development*) method, essentially focused on the ratio of the values expressed as the total duration of the period under consideration according to the actual total length of the economic development path. Growth dynamics are obtained by having these indicators multiplied or as a linear combination of growth intensity and growth stability with the weights of 0.7 and 0.3, respectively (Ginevičius *et al*, 2018, alternatively using the weights of 0.6 and 0.4, respectively, and showing the obtained results).

The idea in this paper closely resembles the approach applied by A. Berg, J. D. Ostry, C. G. Tsangarides and Y. Yakhshilikov (2012), who pioneered research in growth sustainability and provided a detailed analysis of the determinants of sustained growth. A similar approach was used by M. J. D. Ostry, A. Berg and M. C. G Tsangarides (2014) and A. Berg *et al* (2018) to analyze the relationship between inequality and growth. S. Kar, L. Pritchett, S. Raihan and K. Sen (2013) presented the growth dynamics of 125 countries, emphasizing the fact that economic growth is dynamic and episodic, and that many countries had gone through very different growth phases. They underlined the fact that only focusing on one single growth rate for a particular country leads to neglecting the importance of changes in *per capita* income growth. The need to look beyond the current approaches to growth is not new and can be found in many relevant papers in the field (Helpman, 2004; Aguiar & Gopinath, 2007; Keola, Andersson & Hall, 2015).

Previous research in this topic shows that developing countries are characterized greater production instability. The following factors are the reason for this (Ploeg & Poelhekke, 2009)[4]:

- high dependence on natural resources,
- the instability of trade relations due to highly concentrated exports, which are largely primary products, and
- poorly developed financial systems.

Also, F. C. P. Cavalcanti, A. F. Galvao Jr, R. F. A. Gomes and P. S. de Abreu (2010) and S. H. K. Tang (2002) found a link between technical progress and production volatility reduction, which speaks in favor of the assumption expressed in this paper of ours that countries at a higher level of development also have lower production volatility.

Starting from the existing literature (Berg, Ostry & Zettelmeyer, 2012; Ginevičius *et al*, 2018; Remeikienė *et al*, 2020) on the example of European countries, there is an obvious relationship between growth intensity and growth volatility (stability).

In relation to previous research studies, the added value of this paper reflects in the applied methodology for calculating the growth dynamics composite index and the adjusted growth rate which are then applied to a sample of European countries.

METHODOLOGY AND RESULTS

At the beginning of this section, growth intensity and growth stability are first defined, these two indicators are calculated for the European countries in different periods. The focus then shifts to studying the connection between them, i.e. to the identification of possible interdependence in the observed sample. Furthermore, based upon the growth intensity and growth stability indicators, growth dynamics are calculated as a new indicator for the mutual comparison of the European countries. In the end, a "step back" is taken, i.e. the original growth rate is adjusted and the European countries are analyzed based upon a new, adjusted rate according to the growth dynamics value. This section is concluded by pointing out the practical importance of capturing growth volatility simultaneously considering its intensity. The conclusion reads that the implemented approach provides us with a more realistic assessment of economic growth and the position of each country in Europe, and that it should have a broader use in the empirical research that monitors the quantitative side of economic growth.

The methodology and data

When selecting the given sample, a decision was made that the EU countries, Serbia and the surrounding countries for which there are available, consistent data series at the Gross Domestic Product level which are used in further calculations in this paper will be referred to. The sample consists of 30 European countries[5], the 26 of which are EU members, whereas the remaining four are candidate countries: Serbia, Bosnia and Herzegovina, Northern Macedonia and Montenegro[6].

Eurostat (2021) is the data source and the data represent the real gross domestic product (GDP) denominated in the national currency[7].

The period from 2000 to 2019 is the subject matter of reference in this paper. Due to the COVID-19 pandemic effect on the level of the economic activity, the nonstandard years 2020 and 2021 may disrupt the long-term regularities and may lead to wrong conclusions. Also, the year 2009 was excluded in the analysis of the subperiods, which means that the variables of the second subperiod were calculated starting from the year 2010 (instead of 2009), taking the year 2009 (instead of 2008) as the base year. The reason for that lies in the fact that, in 2008, only few European countries had negative GDP growth rates, whereas all the countries included in the sample experienced a recession in 2009 due to the global financial crisis (except for Poland, which did not go through a recession induced by the crisis).

The countries included in the sample were observed throughout mentioned period from 2000 to 2019, as well as throughout the three subperiods. The division into these three subperiods is "natural", given the fact that the first subperiod represents an episode of rapid growth before the global economic crisis outbreak, the second subperiod is marked by stagnation, i.e. recovery from the crisis, whereas the third subperiod is characterized by return to growth. This is considered as an adequate division for reaching conclusions based upon the research conducted herein. Also, all the countries included in the sample are first subjected to observation, after which they are divided into the two European regions, namely Western Europe and Eastern Europe[8], all in order to analyze the position of the countries throughout the sample, as well as amongst the countries of the corresponding region. The division of the countries into Western European and Eastern European countries is shown in the appendix (Appendix, Table A1).

Growth intensity for the whole period and for the three mentioned subperiods was first calculated at the level of each country. This indicator represents the average annual GDP growth rate in the reference (sub)periods for the country j:

$$r_{Qjt} = \sqrt[t]{\frac{Q_{jt}}{Q_{j0}}} - 1 \qquad (1)$$

where Q_{jt} is the level of the GDP at the end of the observed interval of the country j, Q_{j0} is the level of the GDP in the base year of the country j, j = Belgium, Bulgaria, Czech Republic, t = 19 for the period from 2001 to 2019 (the base year 2000), t = 8 for the subperiod from 2001 to 2008 (the base year 2000), t = 5 for the subperiod from 2010 to 2014 (the base year 2009), and t = 5 for the subperiod from 2015 to 2019 (the base year 2014).

Unlike the first and third observed subperiods, the second subperiod is specific, which will be confirmed later when analyzing the results. After the global economic crisis (in the second subperiod), some European countries had been recording a decline in the GDP for a long time (Greece, Croatia, Italy, Spain, Portugal), others went through another recession (the Czech Republic, Slovenia, Hungary, Serbia, Finland, Montenegro), and there were also those that achieved growth at somewhat more modest rates, and for them real recovery from the crisis only began in the third subperiod - when they returned to the usual growth path. In the second subperiod (2010-2014), the data indicate that the six European countries (Greece, Spain, Croatia, Italy, Cyprus, Portugal) even recorded negative average annual growth rates.

In the next step, the calculated average annual growth rates are normalized to the values ranging between 0 and 1, using the so-called min-max approach, i.e. by applying the following formula:

$$I_{jt} = \frac{r_{Qjt} - \min_j r_{Qt}}{\max_j r_{Qt} - \min_j r_{Qt}} \qquad (2)$$

Our standardization is based upon the maximum and minimum values that were registered as the threshold values for the countries included in the sample in the reference periods. In equation (2), r_{Qjt} is the average annual growth rate obtained for the country j based upon the equation (1) for the time interval t, $\min_j r_{Qt}$ and $\max_j r_{Qt}$ are the minimum and maximum average annual growth rates of the countries included in the sample in each observed interval t.

In the entire period of observation, the fastest growth (4.1%) was recorded in Lithuania, and the slowest was registered in Greece (0.1%). In the first subperiod

(2001-2008), the highest average annual growth rate was that of Lithuania (7.4%) and the lowest was found in Italy (0.9%); in the second subperiod (2010-2014), the highest rate was recorded in the case of Malta (4.6%), whereas the largest decline was noticed in the case of Greece (-5.0%); in the third subperiod (2015-2019), Malta also had the fastest growth (6.5%) and Greece's was the slowest (0.8%).

Applying the formula (2), the growth intensity indicator with the values of the average annual growth rate ranging from 0 (min) to 1 (max) was calculated.

When the countries were classified as per their affiliation to the region of either Western or Eastern Europe, it became obvious that the Western European countries had on average lower growth intensity than the countries belonging to the Eastern European region (Table 1). This was to be expected as the Eastern European group of countries consist of the EU transition countries (especially the countries that became members of the European Union after 2000) and the Western Balkans' countries, which are at a lower level of development and characterized by rapid growth, thanks to which they have strongly converged at the income level towards the old EU members (Petrović and Gligorić Matić, 2021)[9]. On the other hand, the Western European group consist mainly of the countries with a higher development level characterized by relatively slower growth.

Table 1 The average values of the growth intensity indicators for the Western European and Eastern European countries for the entire period and for each of the subperiods

European Region	2001-2019	2001-2008	2010-2014	2015-2019
Western Europe	0.38	0.22	0.59	0.31
Eastern Europe	0.77	0.68	0.69	0.49

Note: The indicator values are reduced to a range between 0 and 1.

Source: Authors

The variability of the growth rate, i.e. its reciprocal value - growth stability, was calculated for the entire period and the selected subperiods as well. In fact, the standard deviation was taken as the variability measure, so that the measure of growth stability as the reciprocal value of the standard deviation[10] was obtained:

$$\frac{1}{\sigma_t} = \frac{1}{\frac{1}{N-1} \times \sum_{j=1}^{N} (r_{Qjt} - \overline{r_{Qt}})^2} \tag{3}$$

where N is the number of the countries included in the sample, r_{Qjt} the average annual growth rate obtained based upon the equation (1) for the country j, for time interval t, and $\overline{r_{Qt}}$ the arithmetic mean of the average annual growth rates in each observed interval t.

Based upon the calculated values, the maximum and minimum values of this measure were determined. A higher value indicates greater stability (lesser variability), whereas a lower value indicates lesser stability (greater variability).

Throughout the period, Belgium was the country with the most stable growth, and observed by the first, second and third subperiods, those were Cyprus, Denmark and Belgium, respectively. In contrast, Latvia recorded the most pronounced growth variations, i.e. the lowest stability in the observed period, whereas Latvia, Greece and Malta, exactly in said order, had the lowest stability during the three subperiods.

Also, the growth stability indicator was calculated using the min-max approach, reducing the actual values to the 0-to-1 range:

$$S_{jt} = \frac{\frac{1}{\sigma_{jt}} - \min_j \frac{1}{\sigma_t}}{\max_j \frac{1}{\sigma_t} - \min_j \frac{1}{\sigma_t}} \tag{4}$$

where $\frac{1}{\sigma_{jt}}$ is the reciprocal value of the standard deviation of the country j, calculated based upon the

equation (3) in a given time interval t, $\min_j \dfrac{1}{\sigma_t}$ and

$\max_j \dfrac{1}{\sigma_t}$ are the minimum and maximum reciprocal

values of the standard deviations of the countries included in the sample in each observed interval t.

The data (Table 2) indicate a regularity that the Western European countries had on average greater growth stability (lesser growth variability) than the countries belonging to the Eastern European regions, which is characteristic of both the whole of the period and the subperiods and is especially pronounced in the first (precrisis) subperiod and throughout the period.

Table 2 The average values of growth stability for the Western European and Eastern European countries throughout the period and for each of the subperiods

European Region	2001-2019	2001-2008	2010-2014	2015-2019
Western Europe	0.51	0.60	0.32	0.35
Eastern Europe	0.25	0.34	0.27	0.27

Note: The indicator values are reduced to a range between 0 and 1.

Source: Authors

The regularity (Table 1 and Table 2) reading that the Western European countries are characterized by lower growth intensity and lower variability and that the Eastern European countries are characterized
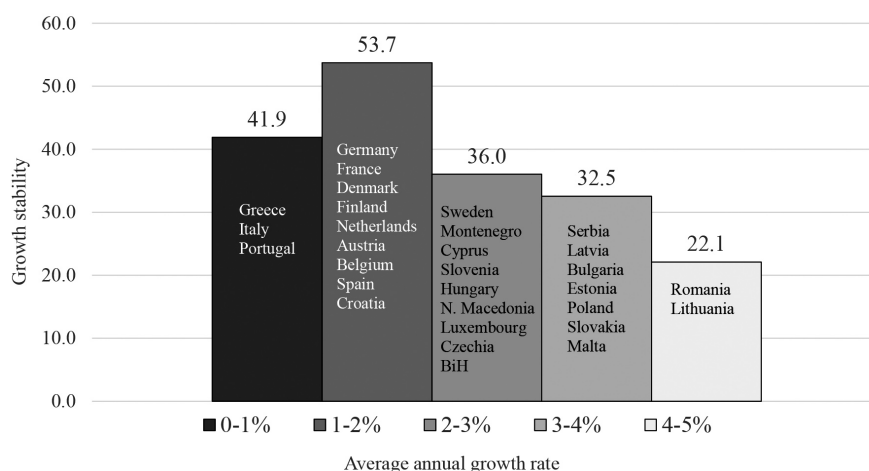
Figure 1 The average growth intensity and growth stability of the European countries, 2001-2019

Note:
a) on the y-axis, there are the values of the reciprocal values of the standard deviation before the normalization of the values
b) the x-axis shows the intervals of the average annual growth rates before the normalization of values
c) each rectangle lists the countries that recorded an average annual growth rate in the given range (0-1, 1-2, 2-3, 3-4, 4-5%)
d) growth stability represents the arithmetic mean of the reciprocal level of the standard deviation (growth stability) for the European countries that had an average annual growth rate in a certain range of 0-1, 1-2, 2-3, 3-4, 4-5%
e) for Montenegro, the average annual growth rate for the period 2008-2019 given the data availability

Source: Authors

by higher growth intensity and higher variability further leads to studying in more detail the strength of the relationship between these two indicators. In addition, another review of the whole period (Figure 1) suggests that the countries with a higher average annual growth rate in the period of observation (2001-2019) had lower stability (a lower reciprocal value of variability), with the exception of the countries that had average annual growth of 0-1%, and which belong to the group of specific countries - Greece, Italy and Portugal (Petrović and Gligorić Matić, 2021). A clear regularity between growth intensity and growth stability can be observed - as growth intensity increases, growth stability decreases, which is especially pronounced for the countries that had an average annual growth rate above 1%. The strength of the connection throughout the period and by the subperiods is measured below.

The value of the correlation coefficient throughout the period, as well as in the subperiods, indicates a weak to medium-strong linear interdependence of the growth intensity and growth stability of the European countries. The correlation coefficient (Table 3) confirms the fact that there is a negative relationship between growth intensity and growth stability, i.e. higher growth rates mean lesser stability (greater variability) and *vice versa* lower growth rates mean greater stability (lesser variability). The exception is the second period, in which the correlation coefficient indicates that, immediately after the global economic crisis, there is no interdependence between growth intensity and growth stability. This result can be related to the fact that the second period is specific, because it represents an interval immediately following the global economic crisis, when many countries recorded a way out and recovery from the recession.

Additionally, when all the six countries that recorded negative average annual growth in this period are excluded from the sample (i.e. when the min-max transformation of growth intensity and growth stability is performed without those six countries), the correlation coefficient totals -0.36.

Table 3 The correlation coefficient between the growth intensity and growth stability of the European countries

The correlation coefficient between growth intensity and growth stability	2001-2019	2001-2008	2010-2014	2015-2019
	-0.46	-0.51	0.04	-0.41

Source: Authors

The growth dynamics indicator

The growth dynamics index was calculated as follows:

$$D_{jt} = w_{it} \times I_{jt} + w_{st} \times S_{jt} \tag{5}$$

where I_{jt} represents the growth intensity index obtained based upon the equation (2), and S_{jt} the growth stability index calculated based upon the equation (4), whereas w_{it} and w_{st} are the corresponding weights attributed to growth intensity and growth stability, respectively. The values were calculated for each particular country j included in the sample in each of the observed time intervals *t*.

Two different indicators of growth dynamics (D_{jt}, D_{jt}') were calculated based upon the given formula by varying the weights. The indicator D_{jt} represents the growth dynamics index obtained when the weights in the equation (5) are equal: w_{it} = 0.5, w_{st} = 0.5 (i.e. when the simple arithmetic mean of growth intensity and growth stability was applied). The symbol D_{jt}' denotes the growth dynamics index obtained in the case when different weights were attributed to growth intensity and growth stability, in favor of the growth intensity in the equation (5): w_{it} = 0.7, w_{st} = 0.3. The results for the indicator of growth intensity, growth stability and for both variants of the growth dynamics indicator in the observed subperiods are given in the appendix (Appendix, Table A2). Table A2 provides a comprehensive insight into the differences present in

the relative position of the countries when its growth dynamics and growth stability are concerned and shows whether these values change by subperiods.

The standard approach assumes that an equal weight belongs to growth intensity and growth stability. This means that the growth dynamics are obtained as the simple arithmetic mean of its components, in this case growth intensity and growth stability. Many complex composite indices are often calculated as the simple arithmetic mean of individual components. For example, this approach was being used for a long time in the calculation of the Human Development Index (HDI), all up until 2010, since when the geometric mean of the individual components has been used to calculate the HDI. According to expert research, growth intensity should however be assigned a greater weight in relation to growth stability. There are authors who claim that the importance of the economic growth intensity of a country is 70 percent, and that of its economic growth stability is 30 percent in this equation[11]. A greater weight is given to growth intensity, which as a rule produces significant long-term effects on the overall economy and society as a whole. Therefore, if pursuing it in the long run, which is usually the case when researching the economic growth process, growth intensity deserves a greater weight than growth stability.

In the first and third subperiods, an interesting result is obtained when growth intensity is subtracted from growth dynamics (Appendix, Table A3). In the Western European countries, the growth dynamics index is generally higher than the growth intensity index, which means the GDP growth stability is greater in these countries although they had a relatively more modest increase in the GDP. The opposite is in the case of the Eastern European countries, where growth dynamics are lower than growth intensity due to greater growth variability (lower stability). In the second subperiod, the growth dynamics index is lower in the largest number of all the countries included in the sample than the growth intensity index, which indicates the fact that the years immediately following the crisis were characterized by lower growth stability throughout Europe. This once again confirms the specificity of the second

observed subperiod, characterized by the countries' recovery from the recession having been caused by the global economic crisis - and greater growth instability.

The results for the whole period show that all the Eastern European countries and some Western European countries (Finland, Sweden, Cyprus, Luxembourg and Malta) are characterized by lesser dynamics than growth intensity. In fact, a detailed look at the results for the whole period clearly suggests that all the European countries that had an average annual growth equal to or greater than 1.9% (including Finland, which recorded the growth of 1.4%), were characterized by higher growth variability (Table 4). The only exception in this group of countries with a relatively higher average annual growth rate was Finland, which had a specific development path. In the precrisis period, this country had recorded the very high growth rates of *per capita* income and was considered to be an extremely successful economy. After the outbreak of the world economic crisis, a large drop in income and a very slow recovery were registered in this country. As a result of those trends, Finland achieved a relatively low and volatile growth rate throughout the period under review.

For the entire period of observation, it is also possible to classify the economies of the observed countries into the three categories according to the growth dynamics index level: the countries with the highest growth dynamics (the growth dynamics index being between 0.61 and 1), the countries with medium growth dynamics (the index being between 0.41 and 0.6), and the countries with lower growth dynamics (the index being between 0 and 0.4). It can be noticed that only four countries (Belgium, France, Malta and Poland) are rank as more dynamic economies if, when calculating their growth dynamics, equal weights are used for growth intensity and growth stability. However, if a greater emphasis is placed on growth intensity than on growth stability, this category includes a significantly larger number of countries (B&H, Bulgaria, Denmark, Estonia, Latvia, Lithuania, Malta, Poland, Romania, Serbia and Slovakia; Appendix, Table A4).

Table 4 The results for growth intensity, growth stability, growth dynamics and the difference in growth dynamics and growth intensity, 2001-2019

Country	Average annual growth rate	I_{jt}	S_{jt}	D_{jt}	$D_{jt}{}'$	$D_{jt}\text{-}I_{jt}$	$D_{jt}{}'\text{-}I_{jt}$	Region
Greece	0.1%	0.00	0.10	0.05	0.03	0.05	0.03	Western Europe
Italy	0.2%	0.04	0.60	0.32	0.21	0.28	0.17	Western Europe
Portugal	0.7%	0.17	0.52	0.34	0.27	0.18	0.11	Western Europe
Germany	1.2%	0.30	0.47	0.38	0.35	0.09	0.05	Western Europe
France	1.3%	0.31	1.00	0.65	0.52	0.34	0.21	Western Europe
Denmark	1.3%	0.32	0.57	0.44	0.39	0.13	0.08	Western Europe
Finland	1.4%	0.33	0.29	0.31	0.32	(0.02)	(0.01)	Western Europe
Netherlands	1.4%	0.34	0.66	0.50	0.43	0.16	0.10	Western Europe
Austria	1.5%	0.37	0.72	0.54	0.47	0.18	0.11	Western Europe
Belgium	1.6%	0.38	1.00	0.69	0.57	0.31	0.19	Western Europe
Spain	1.6%	0.40	0.41	0.40	0.40	0.01	0.00	Western Europe
Croatia	1.9%	0.47	0.22	0.35	0.39	(0.12)	(0.07)	Eastern Europe
Sweden	2.2%	0.53	0.44	0.49	0.50	(0.04)	(0.03)	Western Europe
Montenegro	2.3%	0.56	0.18	0.37	0.45	(0.19)	(0.12)	Eastern Europe
Cyprus	2.3%	0.56	0.20	0.38	0.45	(0.18)	(0.11)	Western Europe
Slovenia	2.3%	0.57	0.23	0.40	0.47	(0.17)	(0.10)	Eastern Europe
Hungary	2.5%	0.61	0.29	0.45	0.52	(0.16)	(0.10)	Eastern Europe
N. Macedonia	2.7%	0.67	0.43	0.55	0.60	(0.12)	(0.07)	Eastern Europe
Luxembourg	2.8%	0.68	0.33	0.51	0.58	(0.18)	(0.11)	Western Europe
Czechia	2.8%	0.69	0.32	0.50	0.58	(0.18)	(0.11)	Eastern Europe
BiH	2.9%	0.71	0.41	0.56	0.62	(0.15)	(0.09)	Eastern Europe
R. Serbia	3.4%	0.84	0.26	0.55	0.67	(0.29)	(0.17)	Eastern Europe
Latvia	3.5%	0.87	0.00	0.43	0.61	(0.43)	(0.26)	Eastern Europe
Bulgaria	3.6%	0.87	0.32	0.59	0.70	(0.28)	(0.17)	Eastern Europe
Estonia	3.6%	0.89	0.03	0.46	0.63	(0.43)	(0.26)	Eastern Europe
Poland	3.8%	0.93	0.72	0.82	0.86	(0.10)	(0.06)	Eastern Europe
Slovakia	3.9%	0.95	0.22	0.58	0.73	(0.37)	(0.22)	Eastern Europe
Malta	3.9%	0.96	0.27	0.62	0.75	(0.34)	(0.20)	Western Europe
Romania	4.1%	0.99	0.15	0.57	0.74	(0.42)	(0.25)	Eastern Europe
Lithuania	4.1%	1.00	0.04	0.52	0.71	(0.48)	(0.29)	Eastern Europe

Note:
  a) negative numbers in parentheses
  b) the GDP for Montenegro has been available since 2007, so the indices were calculated for the 2008-2019 period.
  c) I_{jt} is the growth intensity indicator, S_{jt} is the growth stability indicator, D_{jt} is the growth dynamics indicator when equal weights (0.5) are assigned to growth intensity and growth stability, $D_{jt}{}'$ is the growth dynamics indicator, when different weights (0.7 and 0.3, respectively) are assigned to growth intensity and growth stability.

Source: Authors

The picture of Europe with the adjusted growth rates

Finally, the calculated growth dynamics values were used and the existing average annual growth rate was corrected so that the newly calculated rate contained the "information" about growth stability. In fact, "reverse" standardization was applied as follows:

$$r'_{Qjt}=D_{jt} \times (\max_j r_{Qt} - \min_j r_{Qt}) + \min_j r_{Qt} \qquad (6)$$

$$r''_{Qjt}=D'_{jt} \times (\max_j r_{Qt} - \min_j r_{Qt}) + \min_j r_{Qt} \qquad (7)$$

where r_{Qjt} is the original (recorded) growth rate obtained from the equation (1), r'_{Qjt} is the adjusted average annual growth rate when equal weights (0.5) are assigned to growth intensity and growth stability when calculating the growth dynamics

D_{jt} in the equation (5) and r''_{Qjt} the adjusted average annual growth rate when different weights (0.7 and 0.3, respectively) are assigned to growth intensity and growth stability when calculating the growth dynamics D'_{jt} in the equation (5). The values were calculated for each individual country from the sample j in each of the observed time intervals t.

The average annual growth rates and their "adjusted" levels are given (Table 5) for the entire period of observation (for the subperiods, those rates are contained in the Appendix, Table A5):

Based on the data, it can be seen that some relatively stable countries, such as Germany, had a higher adjusted growth rate than the original rate. From 2001 to 2019, Germany recorded the GDP growth at an average annual rate of 1.24%. If the fact that this

Table 5 The average annual growth rates of the European countries and their values adjusted for growth stability. 2001-2019

Western Europe				Eastern Europe			
Country	r_{Qjt}	r'_{Qjt}	r''_{Qjt}	Country	r_{Qjt}	r'_{Qjt}	r''_{Qjt}
Greece	0.05%	0.26%	0.18%	Croatia	1.93%	1.44%	1.64%
Italy	0.20%	1.34%	0.88%	Montenegro	2.32%	1.54%	1.85%
Portugal	0.73%	1.44%	1.15%	Slovenia	2.35%	1.66%	1.94%
Germany	1.24%	1.60%	1.45%	Hungary	2.52%	1.87%	2.13%
France	1.30%	2.68%	2.13%	N. Macedonia	2.73%	2.26%	2.45%
Denmark	1.33%	1.84%	1.64%	Czechia	2.82%	2.08%	2.38%
Finland	1.40%	1.32%	1.35%	BiH	2.91%	2.31%	2.55%
Netherlands	1.41%	2.07%	1.80%	R. Serbia	3.43%	2.26%	2.73%
Austria	1.53%	2.25%	1.96%	Latvia	3.55%	1.80%	2.50%
Belgium	1.58%	2.83%	2.33%	Bulgaria	3.55%	2.44%	2.88%
Spain	1.65%	1.67%	1.66%	Estonia	3.63%	1.89%	2.59%
Sweden	2.18%	2.01%	2.08%	Poland	3.78%	3.36%	3.53%
Cyprus	2.33%	1.59%	1.88%	Slovakia	3.88%	2.40%	2.99%
Luxembourg	2.79%	2.09%	2.37%	Romania	4.06%	2.35%	3.03%
Malta	3.90%	2.53%	3.08%	Lithuania	4.08%	2.15%	2.92%

Note:
   a) r_{Qjt} is the original (recorded) growth rate in the reference period 2001-2019; r'_{Qjt} is the adjusted average annual growth rate when equal weights (0.5) are assigned to growth intensity and growth stability, r''_{Qjt} is the adjusted average annual growth rate when different weights (0.7 and 0.3, respectively) are assigned to growth intensity and growth stability.
   b) The GDP for Montenegro has been available since 2007, so the data for the period 2008-2019 were calculated.

Source: Authors

Figure 2 The map of Europe after the "correction" of economic growth intensity for growth stability

Source: Authors

growth was relatively stable is taken into account, that will mean that Germany actually experienced growth at an average annual rate of 1.6% (or 1.45%, if a greater weight is assigned to growth intensity relative to growth stability). Certainly, this is an important piece of information not only for Germany's economic policymakers, but also for a comparative view of the progress of other economies compared to Germany's.

The Serbian economy grew on average by 3.43% annually from 2001 to 2019. When the observed fluctuations in that growth are taken into account, the growth rate should be adjusted downwards, and should be 2.26% (or 2.73%, if a greater weight is attributed to growth intensity). This means that, in addition to achieving high growth rates in order to bring the economy closer to more developed European economies, economic policymakers should focus their attention to growth stability. Stable growth further sheds light on its quantitative side and indicates the possibility of the continuous improvement of the population's welfare as the ultimate goal of economic

growth and development. Serbia is not the only country with such a result. The situation is similar in other European countries, especially in the latest EU members and the neighboring countries, so achieving the uniformity of growth in order to generate long-term prosperity is imperative for them as well.

The use of the recalculated values of the growth rates for the period from 2001 to 2019 revealed the changes made in the map of Europe when growth stability is also taken into consideration in addition to the average annual growth rate. An important result is that the countries belonging to the Western European region are those with more stable growth, and their growth rates after the adjustment are above the original rate. Thus, some countries such as Greece, Italy, Spain, Portugal, Germany, France, Denmark, the Netherlands, Austria and Belgium (Figure 2) appear to have a higher adjusted growth rate than the original one after taking into account the fact that the same recorded stable growth. There are the Eastern European countries and the remaining Western

European countries (Finland, Croatia, Sweden, Montenegro, Cyprus, Slovenia, Hungary, North Macedonia, Luxembourg, Czech Republic, B&H, Serbia, Latvia, Bulgaria, Estonia, Poland, Slovakia, Malta, Romania and Lithuania) on the other side characterized by relatively high, but unstable growth (the only exception being Finland, which attention has already been drawn to). Due to higher oscillations in growth, these countries have a lower adjusted growth rate than the original rate.

Based upon the obtained results, the justification for calculating growth dynamics and the adjusted growth rate incorporating the information about growth stability is subjected to consideration. As has already been pointed out in the paper, the fluctuations in the GDP movement undermine the potential for future growth and adversely affect the wellbeing of the population, posing a particular threat to the poorest sections of society.

Therefore, the offered measures for growth dynamics and the adjusted growth rates can be of exceptional practical importance in creating an economic policy, especially so when making a development policy.

CONCLUSION

The paper draws attention to the insufficiency of the growth rate as an indicator of growth dynamics and introduces the growth stability indicator in the analysis, that indicator indicating the steadiness of the growth process. A complex growth dynamics indicator was constructed, and the adjusted growth rate taking into account the fluctuations in the GDP trends was derived. Based upon the calculation of the growth intensity and growth stability indicators, as well as the growth dynamics index, an additional and improved perspective of the position of the European countries in terms of the economic activity growth is given. Comparing the original growth rates of different countries is useful, yet insufficient to express the quantitative side of economic growth. When these growth rates are modified (the so-called "adjusted" growth rate is calculated) so that growth stability is included in a certain time interval, the

picture of Europe changes and more realistic and comprehensive findings are obtained. This supports the first hypothesis of the paper.

The results of the empirical analysis reveal that the less developed European countries have (a) relatively high growth intensity (rate), and high growth variability (low growth stability), whereas the European countries at a higher development level are characterized by a lower growth rate, yet relatively stable growth, which confirms the second hypothesis of the paper.

The new growth dynamics measuring indicator and the adjusted growth rate are the relatively simple indicators based upon which it is possible to compare countries characterized by different development levels. There is no justification for a direct comparison of growth rates in such cases because, due to their lower starting positions, less developed countries can achieve higher growth rates more easily.

The use of growth dynamics indicators and adjusted growth rates in the analysis of the growth process at the national level is both useful and desirable, which points to possible economic policy directions intended to improve growth dynamics, i.e. growth intensity and growth stability, and opens perspectives for the country's economic prosperity, simultaneously continuously improving the population's welfare. For less developed economies, in addition to growth-favoring policies, it is especially important that an emphasis should be put on managing fluctuations in the GDP movements in order to ensure sustainable and stable growth rates.

The current methodological limitation is arbitrariness in the choice of the weights attributed to the growth dynamics index components (namely growth intensity and growth stability), which is the common objective limitation that the authors have encountered when constructing composite indices.

The idea and the calculation presented in detail in the paper pertaining to growth dynamics and the adjusted growth rate can serve as the starting point for their application to the other countries outside the European space and for more complete research at the national level as well. This paper can be referred to as

the first step towards constructing a composite index that would include not only the quantitative side, but also the qualitative side of economic growth.

ENDNOTES

1 The term growth dynamics is used by R. Ginevičius *et al* (2018), as well as R. Remeikienė *et al* (2020) in a similar context.

2 In the literature, the following terms are alternatively used for growth stability: homogeneity, persistence, uniformity, continuity, growth consistency.

3 R. Ginevičius *et al* (2018), R. Remeikienė *et al* (2020), M. Lisiński *et al* (2020) are the starting point of this research study.

4 M. M. Mlachila and M. M. Martinez (2013), 6

5 Of the EU countries, Ireland was/is not included in light of the data inconsistency due to change in the methodologz since 2015.

6 No data are available for Albania.

7 Chain-linked volumes (2010).

8 The countries included in the sample are/were divided into the Western European (WE) and the Eastern European (EE) countries based upon the report by the Legatum Institute (2020).

9 Convergence in prosperity is also confirmed in Europe, where prosperity is measured by the Legatum prosperity index (LPI), with different convergence speed regarding the LPI and its segments for the total sample of the countries, as well as the Eastern and Western European countries, M. Gligorić Matić, B. Jovanović Gavrilović i N. Stanišić (2020).

10 Also, P. Collier and J. Dehn (2001), and J. Cariolle, M. Goujon and P. Guillaumont (2016).

11 The growth intensity weight of 0.7 and the growth stability weight of 0.3 were taken from R. Ginevičius *et al* (2018) and R. Remeikienė *et al* (2020).

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APPENDIX

Table A1 The European countries classified by regions

Western Europe	Eastern Europe
Belgium	Bulgaria
Denmark	Czechia
Germany	Estonia
Greece	Croatia
Spain	Latvia
France	Lithuania
Italy	Hungary
Cyprus	Poland
Luxembourg	Romania
Malta	Slovenia
Netherlands	Slovakia
Austria	Montenegro
Portugal	North Macedonia
Finland	R. Serbia
Sweden	Bosnia and Herzegovina

Source: Legatum Institut

Table A2 The values of the growth intensity, growth stability and growth dynamics indicators for the European countries by the subperiods

	2001-2008				2010-2014				2015-2019			
	Growth intensity	Growth stability	Growth dynamics, $W_{it}=0.5$, $W_{st}=0.5$	Growth dynamics, $W_{it}=0.7$, $W_{st}=0.3$	Growth intensity	Growth stability	Growth dynamics, $W_{it}=0.5$, $W_{st}=0.5$	Growth dynamics, $W_{it}=0.7$, $W_{st}=0.3$	Growth intensity	Growth stability	Growth dynamics, $W_{it}=0.5$, $W_{st}=0.5$	Growth dynamics, $W_{it}=0.7$, $W_{st}=0.3$
Belgium	0.18	0.67	0.43	0.33	0.67	0.63	0.65	0.66	0.16	1.00	0.58	0.41
Bulgaria	0.79	0.77	0.78	0.78	0.63	0.62	0.63	0.63	0.50	0.81	0.65	0.59
Czechia	0.53	0.33	0.43	0.47	0.64	0.34	0.49	0.55	0.51	0.09	0.30	0.39
Denmark	0.08	0.50	0.29	0.21	0.64	1.00	0.82	0.75	0.34	0.62	0.48	0.42
Germany	0.07	0.48	0.27	0.19	0.75	0.24	0.49	0.60	0.15	0.27	0.21	0.19
Estonia	0.79	0.00	0.40	0.55	0.88	0.15	0.52	0.66	0.56	0.09	0.32	0.42
Greece	0.40	0.24	0.32	0.36	0.00	0.00	0.00	0.00	0.00	0.16	0.08	0.05
Spain	0.35	0.81	0.58	0.49	0.44	0.28	0.36	0.40	0.36	0.32	0.34	0.35
France	0.13	0.96	0.54	0.38	0.64	0.73	0.69	0.67	0.15	0.49	0.32	0.25
Croatia	0.53	0.57	0.55	0.54	0.42	0.64	0.53	0.49	0.39	0.58	0.49	0.45
Italy	0.00	0.84	0.42	0.25	0.47	0.22	0.34	0.39	0.04	0.49	0.26	0.17
Cyprus	0.51	1.00	0.76	0.66	0.32	0.04	0.18	0.24	0.67	0.09	0.38	0.50
Latvia	1.00	0.00	0.50	0.70	0.72	0.00	0.36	0.50	0.41	0.22	0.32	0.36
Lithuania	1.00	0.18	0.59	0.75	0.91	0.31	0.61	0.73	0.46	0.17	0.32	0.37
Luxembourg	0.38	0.16	0.27	0.31	0.83	0.19	0.51	0.64	0.43	0.14	0.28	0.34
Hungary	0.39	0.38	0.39	0.39	0.68	0.20	0.44	0.53	0.57	0.13	0.35	0.44
Malta	0.25	0.30	0.27	0.26	1.00	0.10	0.55	0.73	1.00	0.00	0.50	0.70
Netherlands	0.18	0.59	0.38	0.30	0.59	0.48	0.53	0.55	0.26	0.69	0.48	0.39
Austria	0.20	0.80	0.50	0.38	0.65	0.48	0.56	0.60	0.20	0.36	0.28	0.24
Poland	0.49	0.32	0.41	0.44	0.82	0.30	0.56	0.66	0.64	0.25	0.45	0.53
Portugal	0.04	0.75	0.39	0.25	0.43	0.15	0.29	0.35	0.31	0.34	0.33	0.32
Romania	0.88	0.18	0.53	0.67	0.67	0.06	0.37	0.49	0.69	0.07	0.38	0.50
Slovenia	0.52	0.53	0.53	0.52	0.55	0.18	0.36	0.44	0.49	0.18	0.33	0.39
Slovakia	0.82	0.22	0.52	0.64	0.81	0.21	0.51	0.63	0.43	0.17	0.30	0.35
Finland	0.31	0.50	0.41	0.37	0.58	0.18	0.38	0.46	0.19	0.16	0.17	0.18
Sweden	0.27	0.42	0.34	0.31	0.78	0.13	0.45	0.58	0.32	0.17	0.25	0.28
Montenegro	-	-	-	-	0.70	0.11	0.40	0.52	0.57	0.18	0.38	0.45
N. Macedonia	0.38	0.12	0.25	0.30	0.76	0.28	0.52	0.62	0.35	0.18	0.27	0.30
R. Serbia	0.81	0.53	0.67	0.73	0.59	0.23	0.41	0.48	0.42	0.13	0.28	0.34
B&H	0.60	0.60	0.60	0.60	0.61	0.49	0.55	0.58	0.42	0.84	0.63	0.55

Source: Authors

Table A3 The difference between growth dynamics and growth intensity

Country	Region	2001-2008		2010-2014		2015-2019	
		$D_{jt} - I_{jt}$	$D'_{jt} - I_{jt}$	$D_{jt} - I_{jt}$	$D'_{jt} - I_{jt}$	$D_{jt} - I_{jt}$	$D'_{jt} - I_{jt}$
Belgium	Western Europe	0.24	0.15	(0.02)	(0.01)	0.42	0.25
Denmark	Western Europe	0.21	0.13	0.18	0.11	0.14	0.09
Germany	Western Europe	0.21	0.12	(0.26)	(0.15)	0.06	0.04
Greece	Western Europe	(0.08)	(0.05)	0.00	0.00	0.08	0.05
Spain	Western Europe	0.23	0.14	(0.08)	(0.05)	(0.02)	(0.01)
France	Western Europe	0.42	0.25	0.04	0.03	0.17	0.10
Italy	Western Europe	0.42	0.25	(0.13)	(0.08)	0.22	0.13
Cyprus	Western Europe	0.24	0.15	(0.14)	(0.08)	(0.29)	(0.17)
Luxembourg	Western Europe	(0.11)	(0.07)	(0.32)	(0.19)	(0.15)	(0.09)
Malta	Western Europe	0.02	0.01	(0.45)	(0.27)	(0.50)	(0.30)
Netherlands	Western Europe	0.21	0.12	(0.05)	(0.03)	0.21	0.13
Austria	Western Europe	0.30	0.18	(0.08)	(0.05)	0.08	0.05
Portugal	Western Europe	0.35	0.21	(0.14)	(0.08)	0.02	0.01
Finland	Western Europe	0.09	0.06	(0.20)	(0.12)	(0.01)	(0.01)
Sweden	Western Europe	0.08	0.05	(0.32)	(0.19)	(0.08)	(0.05)
Bulgaria	Eastern Europe	(0.01)	(0.00)	(0.01)	(0.01)	0.15	0.09
Czechia	Eastern Europe	(0.10)	(0.06)	(0.15)	(0.09)	(0.21)	(0.13)
Estonia	Eastern Europe	(0.39)	(0.24)	(0.37)	(0.22)	(0.23)	(0.14)
Croatia	Eastern Europe	0.02	0.01	0.11	0.07	0.10	0.06
Latvia	Eastern Europe	(0.50)	(0.30)	(0.36)	(0.21)	(0.10)	(0.06)
Lithuania	Eastern Europe	(0.41)	(0.25)	(0.30)	(0.18)	(0.15)	(0.09)
Hungary	Eastern Europe	(0.00)	(0.00)	(0.24)	(0.15)	(0.22)	(0.13)
Poland	Eastern Europe	(0.09)	(0.05)	(0.26)	(0.16)	(0.19)	(0.12)
Romania	Eastern Europe	(0.35)	(0.21)	(0.31)	(0.18)	(0.31)	(0.18)
Slovenia	Eastern Europe	0.01	0.00	(0.18)	(0.11)	(0.15)	(0.09)
Slovakia	Eastern Europe	(0.30)	(0.18)	(0.30)	(0.18)	(0.13)	(0.08)
Montenegro	Eastern Europe	-	-	(0.29)	(0.17)	(0.19)	(0.12)
N. Macedonia	Eastern Europe	(0.13)	(0.08)	(0.24)	(0.15)	(0.08)	(0.05)
R. Serbia	Eastern Europe	(0.14)	(0.08)	(0.18)	(0.11)	(0.14)	(0.09)
B&H	Eastern Europe	(0.00)	(0.00)	(0.06)	(0.04)	0.21	0.12

Note:
  a) negative numbers in parentheses
  b) the GDP for Montenegro has been available since 2007, so the indices were not calculated for the first subperiod
  c) I_{jt} is the growth intensity indicator, D_{jt} is the growth dynamics indicator when equal weights (0.5) are assigned to growth intensity and growth stability, D'_{jt} is the growth dynamics indicator when different weights (0.7 and 0.3, respectively) are assigned to growth intensity and growth stability.

Source: Authors

Table A4 The European countries classified as per growth dynamics, 2001-2019

Growth dynamics index D_{jt}			Growth dynamics index D'_{jt}		
Countries with the highest growth dynamics	Countries with medium growth dynamics	Countries with lower growth dynamics	Countries with the highest growth dynamics	Countries with medium growth dynamics	Countries with lower growth dynamics
0.61-1	0.41-0.6	0-0.4	0.61-1	0.41-0.6	0-0.4
Belgium	Austria	Croatia	B&H	Austria	Croatia
France	B&H	Cyprus	Bulgaria	Belgium	Denmark
Malta	Bulgaria	Finland	Denmark	Cyprus	Finland
Poland	Czechia	Germany	Estonia	Czechia	Germany
	Denmark	Greece	Latvia	France	Greece
	Estonia	Italy	Lithuania	Hungary	Italy
	Hungary	Montenegro	Malta	Luxembourg	Portugal
	Latvia	Portugal	Poland	Montenegro	Spain
	Lithuania	Slovenia	Romania	N. Macedonia	
	Luxembourg	Spain	R. Serbia	Netherlands	
	N. Macedonia		Slovakia	Slovenia	
	Netherlands			Sweden	
	Romania				
	Serbia				
	Slovakia				
	Sweden				

Note: The GDP for Montenegro has been available since 2007, so the indices were calculated for the 2008-2019 period.

Source: Authors

Table A5 The average annual growth rates in the European countries and their adjusted values for growth stability by subperiods

Country	2001-2008			2010-2014			2015-2019		
	r_{Qjt}	r'_{Qjt}	r''_{Qjt}	r_{Qjt}	r'_{Qjt}	r''_{Qjt}	r_{Qjt}	r'_{Qjt}	r''_{Qjt}
Belgium	2.0%	3.6%	3.0%	1.5%	1.2%	1.3%	1.7%	4.1%	3.1%
Bulgaria	6.0%	5.9%	6.0%	1.1%	1.0%	1.0%	3.6%	4.5%	4.2%
Czechia	4.3%	3.7%	3.9%	1.1%	-0.3%	0.3%	3.7%	2.5%	3.0%
Denmark	1.4%	2.8%	2.2%	1.2%	2.9%	2.2%	2.7%	3.5%	3.2%
Germany	1.3%	2.6%	2.1%	2.2%	-0.3%	0.7%	1.6%	2.0%	1.8%
Estonia	6.0%	3.4%	4.5%	3.5%	-0.1%	1.4%	4.0%	2.6%	3.2%
Greece	3.5%	3.0%	3.2%	-5.0%	-5.0%	-5.0%	0.8%	1.2%	1.0%
Spain	3.1%	4.6%	4.0%	-0.7%	-1.5%	-1.2%	2.8%	2.7%	2.8%
France	1.7%	4.4%	3.3%	1.2%	1.6%	1.4%	1.6%	2.6%	2.2%
Croatia	4.3%	4.5%	4.4%	-0.9%	0.1%	-0.3%	3.0%	3.6%	3.3%
Italy	0.9%	3.6%	2.5%	-0.5%	-1.7%	-1.2%	1.0%	2.3%	1.8%
Cyprus	4.2%	5.8%	5.2%	-1.9%	-3.3%	-2.7%	4.6%	3.0%	3.6%
Latvia	7.4%	4.1%	5.4%	1.9%	-1.6%	-0.2%	3.1%	2.6%	2.8%
Lithuania	7.4%	4.7%	5.8%	3.7%	0.8%	2.0%	3.4%	2.6%	2.9%
Luxembourg	3.3%	2.6%	2.9%	3.0%	-0.1%	1.1%	3.2%	2.4%	2.7%
Hungary	3.4%	3.4%	3.4%	1.5%	-0.8%	0.1%	4.1%	2.8%	3.3%
Malta	2.5%	2.6%	2.6%	4.6%	0.3%	2.0%	6.5%	3.6%	4.8%
Netherlands	2.0%	3.3%	2.8%	0.6%	0.1%	0.3%	2.3%	3.5%	3.0%
Austria	2.2%	4.1%	3.4%	1.2%	0.4%	0.7%	1.9%	2.4%	2.2%
Poland	4.1%	3.5%	3.7%	2.9%	0.4%	1.4%	4.5%	3.3%	3.8%
Portugal	1.1%	3.4%	2.5%	-0.8%	-2.2%	-1.7%	2.5%	2.6%	2.6%
Romania	6.6%	4.3%	5.2%	1.4%	-1.5%	-0.3%	4.7%	2.9%	3.6%
Slovenia	4.3%	4.3%	4.3%	0.2%	-1.5%	-0.8%	3.5%	2.7%	3.0%
Slovakia	6.2%	4.3%	5.1%	2.8%	-0.1%	1.0%	3.2%	2.5%	2.8%
Finland	2.9%	3.5%	3.3%	0.6%	-1.3%	-0.6%	1.8%	1.7%	1.8%
Sweden	2.6%	3.1%	2.9%	2.5%	-0.7%	0.6%	2.6%	2.2%	2.3%
Montenegro	-	-	-	1.7%	-1.1%	0.0%	4.0%	2.9%	3.4%
N. Macedonia	3.3%	2.5%	2.8%	2.3%	0.0%	0.9%	2.8%	2.3%	2.5%
R. Serbia	6.2%	5.3%	5.6%	0.7%	-1.1%	-0.4%	3.2%	2.4%	2.7%
B&H	4.8%	4.8%	4.8%	0.9%	0.3%	0.5%	3.2%	4.4%	3.9%

Note:

a) r_{Qjt} is the original (recorded) growth rate in the reference subperiods; r'_{Qjt} is the adjusted average annual growth rate when equal weights (0.5) are assigned to growth intensity and growth stability, r''_{Qjt} is the adjusted average annual growth rate when different weights (0.7 and 0.3, respectively) are assigned to growth intensity and growth stability.

b) The GDP for Montenegro has been available since 2007, so the data for the first subperiod were not calculated.

Source: Authors