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GREEN GROWTH ASSESSMENT DISCOURSE ON EVALUATION INDICES IN THE EUROPEAN UNION

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Abstract. Investigating green growth is a continuing scientific concern within academia, governments, and international organizations in recent years. This paper analyzes the discourse on green growth assessment methods. There are three primary aims of this study: 1. To identify factors influencing or stimulating green growth. 2. To analyze sets, frameworks, and indices of green growth indicators designed by international organizations and scientists. 3. To develop the Green Growth evaluation Index and to validate it on the assessment of green growth status of the European Union countries. The methodological approach taken in this study is a mixed methodology based on data analysis, generalization, and index assessment. The study offers important insights into the discourse on green growth evaluation, analyzes green growth measurement tools, and provides the Green Growth Index which can be applied to evaluate green growth in developing and developed countries. Secondary data have been collected from Eurostat, the World Bank databases, and UNDP Human Development Reports for the year 2018. The results show that green growth is uneven in the European countries; the Green Growth Index and all three pillars vary between countries due to the fact that several countries lag behind all the indicators included in the Green Growth Index.

Keywords: green economy; green growth; assessment methods; economic evaluation; green growth index; European Union

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JEL Classifications: O44, O47, Q56, Q57

1. Introduction

With an emphasis on climate change, interest in green economy and green growth is increasing. It is agreed on the need to replace traditional economic models in a more environmentally friendly manner. Green growth is indicated as one of the ways to replace the existing models. It should be noted that there is used a variety of terms related to green economy (smart economy, sustainable economy, circular economy, low-carbon economy, blue economy, etc.). Besides, the boundaries of each term are not clearly explored (Pieroni et al., 2019). UNEP (2011), Popa et al. (2011), Pahle et al. (2016), He et al. (2019), Lin and Zhu (2019) propose their own concepts for understanding the concept of green economy. Green growth can be seen as a new source of capital accumulation and job creation (Gibbs, O'Neill, 2017). Factors influencing green growth are analyzed in the works of Guo et al. (2020), Capasso et al. (2019), Du et al. (2019), Adeel-Farooq et al. (2018) and others. Capasso et al. (2019) indicate economic and social barriers to green growth. Song et al. (2019) emphasize that green economic growth is the direction of future economic growth in the world. Kasztelan (2017) states that the concepts of green growth and green economy are linked and that differences between them have become unclear; moreover, they are used almost interchangeably. The aim of green economy and green growth is almost the same, i.e. to identify the ways of improving the results of economic activity taking into account the existing climate problems and increasing deficiency in natural resources (Kasztelan, 2017). However, the concept of green economy is more related to economic transformation in order to improve social welfare and justice and to reduce environmental threats and ecological deficiencies. Meanwhile, green growth is strictly connected with the idea of green economy (UNEP, 2011)

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in order to achieve continuing economic growth, at the same time recognizing the role of natural capital and ensuring climatic and environmental sustainability.

Literature search has helped to reveal a few studies which attempt to evaluate green growth (Pan et al., 2019; Kararach et al. 2016). It is agreed that GDP or GDP per capita are not appropriate indicators to analyze green growth of a country. First attempts to propose sets or frameworks of green growth indicators have been made by OECD (2011), UNEP (2012), and other international institutions. Although some research (Pan et al., 2019; Kararach et al. 2018) has been carried out on the evaluation of the green growth index, there is still very little scientific understanding of the possibilities of green growth evaluation. Quantitative analyses of green growth have been conducted by Lyytimäki et al. (2018), Kararach et al. (2018), Yang et al. (2019), but it should be noted that these studies are based on the investigation of various indicators. Furthermore, the application of scientists' designed green growth indices differs. Therefore, the *scientific problem* can be formulated as follows: what methodologies can be used to evaluate the green growth parameters and results of a country.

The *purpose of this article* is to evaluate the European Union countries according to the developed Green Growth Index.

The *object* of the paper is the evaluation of green growth.

Three primary aims of this study are determined as follows:

1. To identify factors influencing or stimulating green growth.
2. To analyze sets, frameworks, and indices of green growth indicators designed by international organizations and scientists.
3. To develop an index and to evaluate green growth in the European Union countries.

Research methods: scientific analysis, systemizing and generalization, analysis of green growth measurement possibilities proposed by international organizations and scientists during the period of 2012-2019, secondary data analysis, estimation of green growth in the European Union countries in 2018 on the basis of the designed index.

This scientific theoretic paper provides with an overview of the discourse on green growth assessment methods, the existing green growth measurement tools, the design of the Green Growth Index and its application for the European Union countries.

2. Discourse of Green Economy and Green Growth

In recent years, interest in green economy and green growth has been growing. There is a need to replace the traditional economic models in order to address various environmental issues and key economic challenges. Moreover, several policy initiatives have been suggested and implemented for transitioning to a green economy (Lindman, Söderholm, 2016). A concept of green economy has been introduced by Pearce et al. (1989) in response to the undervaluation of environmental and social costs in the current price system. Since then, it has been expanded (see Table 1).

Table 1. Alteration of the definition of Green Economy

Variations of the definition of Green Economy	Author(s)	Year
A way to substitute renewable energy and low-carbon technologies for fossil fuels, and to improve resource and energy efficiency.	UNEP	2011
An economic development based on the sustainable development model and knowledge of ecological economics.	Popa et al.	2011
A term for the growth of the entire economy.	Jänicke	2012
A concept is that low-carbon energy technologies have considerable potential to achieve socio-economic objectives alongside environmental ones.	Pahle et al.	2016
An "umbrella" concept that encompasses different implications with regard to growth and well-being, or efficiency and risk reduction in the use of natural resources.	Loiseau et al.	2016
An integrated, economy-wide framework contrasts with many previous sustainable development initiatives that have been more sector or site focused.	Swainson, Mahanty	2018
A broad concept that includes different interpretations, definitions and practices ranging from the greening of current neoliberal economies to radical transformations of these economies.	Bergius et al.	2018
A way for solving environmental problems that shows confidence in human ingenuity and technological advancements.	Gazzola et al.	2019
A resource-saving and environment-friendly economy.	He et al.	2019
A socially inclusive and economically beneficial yet environmentally sustainable alternative.	Laibach et al.	2019
An efficient way for sustainability, which focuses on economic growth, resource conservation, and environmental friendliness.	Lin, Zhu	2019

Source: developed by the authors according to the mentioned scientists

As it can be seen in Table 1, almost all definitions of green economy include economic growth. In order to meet climate and energy targets, participation of disparate agents should be involved (Paroussos, Fragkiadakis, Fragkos, 2019). Green economy is seen as a new source of capital accumulation and job creation (Gibbs, O'Neill, 2017), a way to achieve sustainable development (Lin, Zhu, 2019), direct valuation of natural capital and nature's services (Popa et al., 2011). Moreover, the expansion of green economy is related to energy generation, resource use and environmental management (Popa et al., 2011). Li et al. (2015) indicate a need to encapsulate three sectors (industry, people, and government) in order to create green economy. Meanwhile, Gibbs, O'Neill (2017) indicate that there is a spectrum of interpretations of the green economy, from

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market-led, business-as-usual to proposals for more radical changes such as a steady-state economy and degrowth. Governments in countries across the world increasingly adopt the green growth discourse to underline their ambition for the greening of their economies (Capasso et al., 2019). Notwithstanding, Wanner (2015) emphasizes that in the green growth discourse there is no 'one-size-fits-all' prescription for green growth strategies. This can be explained by differences in contexts of policy and institutional frameworks, economic and political circumstances, levels of development, and economic and environmental interdependencies. Furthermore, advanced, emerging, and developing countries face different challenges and opportunities (OECD, 2011). According to Hickel and Kallis (2020), the notion of green growth emerged as a central theme at the Rio+20 Conference on Sustainable Development in 2012. Since then, green growth is seen as a response to climate change and ecological breakdown and one of key elements in achieving sustainable development (Capsasso et al., 2019; Hichel, Kallis, 2020). "Green growth is about fostering growth and development while ensuring that the natural assets continue to provide resources and environmental services on which our well-being relies" (OECD, 2011, p. 18). The World Bank (2012) relates green growth with an efficiency in using natural resources, minimization of pollution and environmental impact, and resilience of natural capital. Meanwhile, UNEP (2011) emphasizes its role in income growth and improvement of human well-being at the same time reducing environmental risks and ecological scarcities. It should be noted that, according to Hickel and Kallis (2020), the concept of green growth is still new and infinite. According to Song et al. (2019), green economic growth must achieve the following goals: economic growth, job creation, and environmental impact reduction. Paroussos et al. (2019) emphasize that green growth requires that GHG emission reduction takes place at such rate that allows clean energy technologies to become market competitive.

Green growth can be stimulated by increased fiscal spending on public goods, government expenditures on education, increased spending on R&D and innovation process (Lin, Zhu, 2019), substantial financial resources (Mohamed et al., 2014), environmental regulations, support for technology policies and consumer-awareness programs (Holroyd, 2014), market building and the effective workings of the market system (Wanner, 2015), development of infrastructure (Li et al., 2015), fossil fuel scarcity (De Cian et al., 2016), increased technological innovation and efficiency accompanied by foreign direct investments (Nasir et al., 2019), adoption of environmentally friendly technologies (Hille et al., 2019), creation of new, environmentally friendly industries (Dornan et al. 2018), local capabilities (including technologies, institutions, skills) or single sector (Capasso et al., 2019), subsidies and tax incentive policies (Chang et al., 2020), creation of a favourable environment for long-term green investment (Guo et al., 2018; Adeel-Farooq et al., 2018; Geisendorf, Klippert, 2017), building a green finance system (Zhang, Wang, 2019), economic openness and R&D scale (Song et al., 2019), growth of a green bond market (Elliott, Zhang, 2019; Ngwenya, Simatele, 2020).

It should be noted that in this context, economic efficiency and environmental benefits are opposite to each other. But they are related when green growth is analyzed. Pan et al. (2019) raise two questions: what influence has green economic system of a country and how to identify the factors influencing green economy? Different regions vary in their level of socio-economic development and environmental challenges (Guo et al., 2020), thus, countries with the same level of green economy can make different policy choice (Pan et al., 2019) in order to ensure green economic growth. Moreover, there is no obvious evidence about the interactions and dynamics relationships among those factors (Pan et al., 2019). Factors influencing green economy are analyzed in the works of Guo et al. (2020), Capasso et al. (2019), Du et al. (2019). Guo et al. (2020) indicate that green investment banks can leverage the power of private investment to support green infrastructure and technological innovation. Furthermore, Du et al. (2019) emphasize that political factors have high relationship with green investment and these investments reflect the government's emphasis on environmental improvement. GDP, GDP per capita, and fixed assets of investments play important roles in the development of green investments (Du et al., 2019). Adeel-Farooq et al. (2018) find out that economic growth has positive impact on the environmental performance. On the other hand, green growth can also encounter barriers. Capasso et al. (2019) indicate the following barriers to green growth: negative externalities associated with investments in a public good like knowledge; uncertainty of investments; market failure. All these obstacles can slow down growth in developing or economically well-developed countries. Özbuğday et al. (2020) highlight an impact of increased resource efficiency of small and medium-sized enterprises for boosting their productivity, competitiveness and growth generation. Song et al. (2019) emphasize that green economic growth is the direction of future economic growth in the world.

3. Analysis of Green Growth measurement tools

Attempts to evaluate green growth can be found in the scientific literature (Pan et al., 2019; Kararach et al. 2016). According to Pan et al. (2019), green growth asserts that continued economic expansion – measured by GDP – is or can be made to be compatible with planet's ecology. Yaduma (2018) criticizes the use of GDP measures in resource investigations because of the two main reasons. Firstly, it treats the depreciation of physical capital as a positive contribution to national income. Secondly, GDP measures of output do not reflect real incomes of resource-intensive economies as green accounting procedures are not

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incorporated. Song et al. (2019) emphasize that in order to calculate green GDP, net natural capital consumption is required (including resource consumptions, environmental damage, and environmental protection and restoration initiatives). Therefore, some attempts have been made to adjust GDP. For example, GDP adjusted for social and environmental costs is in the Index of Sustainable and Economic Welfare, the Measure of Economic Welfare, and the Genuine Progress Indicator. Nahman et al. (2016) indicate other indices: the Human Development Index, the Ecological Footprint and the Environmental Performance Index, Ecological Footprint and the System of Environmental–Economic Accounting. But it should be noted, that in all those indices only a few indicators (2-4 units) are evaluated. Hickel and Kallis (2020) note that many governments have adopted the practice of dividing GDP by domestic material consumption, which measures the efficiency of resource use by an economy. It should be noted that DMC is a problematic indicator because it does not include the material impact involved in the production and transport of imported goods, outsourced production has been shifted off balance sheet (Hickel, Kallis, 2020). Meanwhile, Zhu et al. (2020) indicate that energy consumption is one of the basic indicators to measure the level of economic development of a country. First attempt to propose sets or a framework of green economy/growth indicator has been made by OECD (2011) – this institution proposed green growth measurement framework. Other attempts by international institutions to set up sets or frameworks of green growth indicator are shown in Figure 1.

Figure 1. Green growth measurement frameworks or sets proposed by international organizations
Source: developed by the authors

As it can be seen in Figure 1, OECD, UNEP, Global Green Growth Institute, and the Asian Development Bank have proposed a few sets or frameworks of green economy indicator. In these frameworks and sets, different amounts of indicators are included. For example, GGGI (2019) Green Growth Index analyzes 36 indicators of 115 countries in four dimensions: efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. Meanwhile, the Asian Development Bank (2018) proposes a set of 28 indicators that cover economic growth, social equity, and environmental sustainability. It must be emphasized that the index proposed by the Asian Development Bank (2018) has been applied only for calculation of the integrated green growth index in Asian countries.

In practice, some examples of green growth and/or green economy measurement indicators can be also found: the Global Green Economy Index (GGEI), the Green Economy Benchmark Index (QGREEN), the Low Carbon Competitiveness Index (LCCI), the Climate Change Performance Index (CCPI), the Green Economy Index (GEI). It should be noted that all these indicators are more suitable to evaluate companies or cities according to the issues of green growth. Moreover, their application is based only on one dimension or on a few sectors. Thus, Nahman et al. (2016), Kararach et al. (2018), Pan et al. (2019) and others have conducted models for green growth evaluation.

Lyytimäki et al. (2018) emphasize that the indicators of green growth have high expectations to live up to. There is a need for giving of a comprehensive and reliable view of the key socio-economic trends and serving for easy-to-understand and effective tools. Indicators should be: acceptable, comparable, measurable, relevant, and internationally used (Lyytimäki et al., 2018). In Table 2, scientists' attempts to analyze green growth are proposed.

Table 2. Attempts to analyze green growth

Model name	Methodology	Dimensions	Nb. of key indicators	Application	Authors
Green economy index	Index assessment	Economic Social Environmental	26 indicators	193 countries	Nahman et al. (2016)
Key indicators for green growth	Index assessment	Human well-being Ecosystems Economy	19 indicators	Finland	Lyytimäki et al. (2018)
Environmental Performance Index	Econometric model	Green field investment Energy consumption	4 indicators	9 Asian developing countries	Adeel-Farooq et al. (2018)

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		Economic growth Urbanization			
Green growth index (GGI)	Index assessment	The socioeconomic context and characteristics of growth Environmental and resource productivity Monitoring the natural asset base Gender Governance	48 indicators	22 African countries	Kararach et al. (2018)
Global productivity index (GPI)	Econometric model	Global Malmquist-Luenberger productivity index	5 indicators	30 provinces in China	Pan et al. (2019)
Green development level	Index assessment	Environment Economy Society	19 indicators	109 cities in China	Yang et al. (2019)

Source: developed by the authors

As it can be seen in Table 2, there are differences in dimensions covered by green growth indices. The majority of indices related to green growth are based on index assessment and include more indicators (from 19 to 48) than the ones that are based on econometric analysis. Moreover, some indices (for example, Lyytimäki et al., 2018) are designed to evaluate only environmental impact on country's economy. Nahman's et al. (2016) proposed Green Economy Index is based not only on statistical data or indices such as Human Development Index, but also on survey on self-reported overall life satisfaction.

Comparing green growth indices proposed by international organizations with those composed by scientists, it should be noted that indices proposed by organizations are applied more widely than the ones proposed by the scientists. Furthermore, some scientists' proposed indices can be applicable only to developing countries, for example, Kararach et al. (2018). In the index designed by these authors, some specific indicators are integrated, for example, HIV/AIDS prevalence (age 15-49). Yang's et al. (2019) proposed Green development level model is suitable for index assessment in cities, because some indicators are relevant only to cities, for example: green area per capita or percentage of green coverage in built-up areas.

In order to give comprehensive and reliable insights, indices should be composed in an easy-to-understand and effective way; indicators included in index calculation should be widely used, measurable, comparable, and relevant. Only then it would be possible to measure green growth of different countries (developed and developing) all around the world. As all indices, proposed by international institutions and scientists, differ, there new has been developed a new index – Green Growth Index.

4. Green Growth Index in the European Union

This study seeks to obtain data which will help to address the gaps of green growth evaluation. For this purpose, an integrative index to evaluate green growth patterns has been developed. This index is based on the Inclusive Green Growth Index (IGGI) proposed by the Asian Development Bank (2018) and is supplemented with some economic indicators included in indices proposed by Nahman et al. (2016), Kararach et al. (2018), and Yang et al. (2019). The design of the Green Growth Index combines the strengths of the existing indices and frameworks into one composite index with a wider coverage of indicators. Besides, these indicators are related to economic, environmental and social dimensions of growth. This index can be applicable for developed and developing countries throughout the world. The proposed index and its pillars are shown in Figure 2.

The following steps have been taken in designing the Green Growth Index:

- Three pillars of the Green Growth Index (Economy, Society and Environment) and 32 indicators are expressed in different units (per cent, euro, number), thus the indicators have been given to scores ranking from 0 to 1, by using the min-max approach. This method assigns the indicators by dividing the difference between a country's indicator performance and the sample minimum value by the difference between the sample minimum and the sample maximum values of indicators of 27 countries (see Equation 1).

$$New\ variable = \frac{variable - min_x}{max_x - min_x} \quad (1)$$

- Indicators where a higher value implies a worse outcome or where the impact direction is negative (for example, gross general government debt or air pollution) are expressed by using Equation 2.

$$New\ variable = \frac{max_x - variable}{max_x - min_x} \quad (2)$$

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- The indicators for each pillar are assigned by equal weights, because, in our opinion, all three pillars are equally important. Therefore, the average of the normalized scores is calculated. As indicators vary widely between the European Union countries, values of each pillar are also in wide range.
- Countries are ranked according to each pillar group.
- The scores of each of the three pillars are further assigned equal weights and aggregated to compute the score for the Green Growth Index (see Equation 3).

$$GGI = \frac{1}{3}*(\text{average economy}) + \frac{1}{3}*(\text{average society}) + \frac{1}{3}*(\text{average environment}) \quad (3)$$

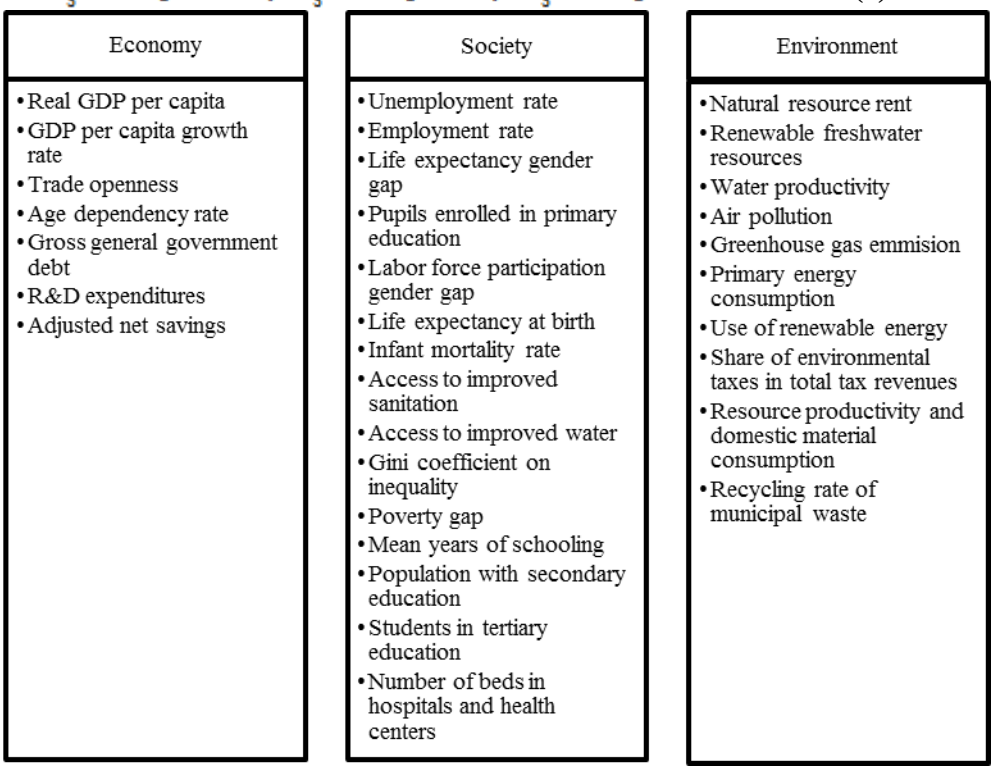

Figure 2. Pillars and Indicators of the designed Green Growth Index
Source: Adopted from the Asian Development Bank (2018), Nahman et al. (2016), Kararach et al. (2018), Yang et al. (2019).

Sample countries and data collection. Secondary data on the thematic area of Green Growth have been collected for all 27 European Union countries. Data have been collected from Eurostat, the World Bank databases and UNDP Human Development Reports for the year 2018. The European Union countries have been selected for the evaluation of the Green Growth Index due to uniform regulation of goals set for the implementation and achievement of green growth, as well as data availability for all the selected countries.

Results. According to the designed Green Growth Index (GGI), all three pillars have been evaluated for the European Union countries in 2018. In Figure 3, the average each country's economy pillar and the average of the EU-27 countries are shown. Luxembourg's indicators included in the economic pillar calculations have been above average or the highest ones. After the calculation of all indicators and estimation of average of country's economic pillar according to included rates, Luxembourg's economic pillar has exceeded 1, i.e. it was 1.41.

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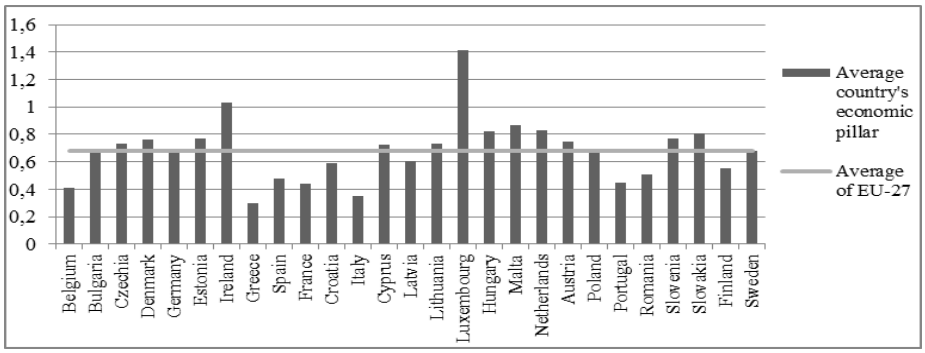

Figure 3. Economy pillar of the Green Growth Index, 2018
Source: developed by the authors

As it can be seen in Figure 3, according to data of 2018, 13 countries of the European Union have exceeded the average of the Economy pillar. The European Union countries according to the Economy pillar of the Green Growth Index are distributed between 0.3 and 1.41. The highest score (1.41) is for Luxembourg. This result has been achieved due to high level of GDP per capita and trade openness indicators and low rates of age dependency and governmental debt. Meanwhile, the lowest score (0.3) is in Greece. Government debt rate is the highest and adjusted net savings are the lowest ones in Greece.
The average each country's Society pillar and the average of the EU-27 countries are represented in Figure 4. The indicators included in the calculation of the Society pillar vary widely between the European Union countries and, therefore, average country's Society pillar has not reached 1.

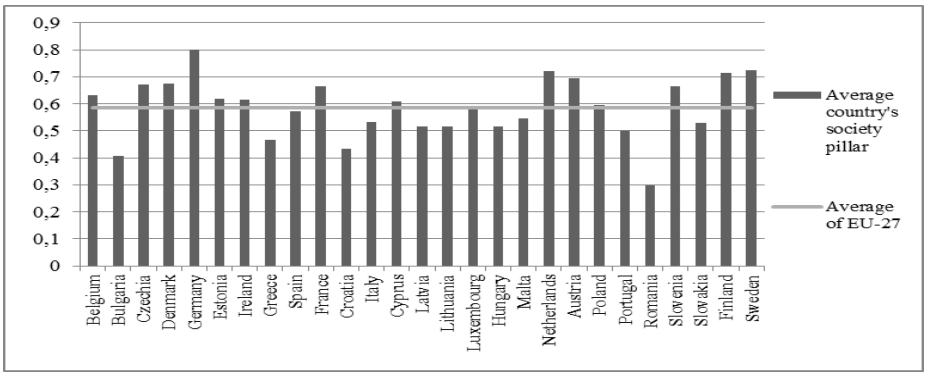

Figure 4. Society pillar of the Green Growth Index, 2018
Source: developed by the authors

As it can be seen in Figure 4, Belgium, Czechia, Denmark, Germany, Estonia, Ireland, France, Cyprus, Netherlands, Austria, Slovenia, Finland, and Sweden exceed the average of the Society pillar. The European Union countries are distributed between 0.3 and 0.8 according to the Society pillar of the Green Growth Index. The highest value (0.8) is in Germany; main factors for this achievement are related to low unemployment rate, high employment rate, high level of pupils enrolled in primary education rate, good healthcare and educational systems. The lowest society pillar value (0.3) is indicated in Romania. The highest rate of infant mortality, the biggest poverty gap and the lowest rate of access to improved water have led to such poor performance of Romania according to the Social pillar of the Green Growth Index.

In Figure 5, the average each country's Environment pillar and the average of the EU-27 countries are shown. The indicators included in the calculation of the Environment pillar vary widely between the European Union countries and, therefore, none of the countries have reached the Environment pillar value of 1. 16 European Union countries are above the average rate which accounts for 0.49. The European Union countries according to the Environment pillar of the Green Growth Index are distributed between 0.29 and 0.64. It should be noted that Belgium, Bulgaria, Czechia, Estonia, Cyprus, Latvia, Luxembourg, Hungary, Poland, Romania, and Slovakia did not reach the average of the environmental rate in 2018. The highest value (0.64) is in Lithuania, and the lowest (0.29) in Poland. The highest level of air pollution, low level of renewable resource use and low recycling rate of municipal waste are the main reasons why Poland is lagging behind the EU-27 average according to the Environmental pillar.

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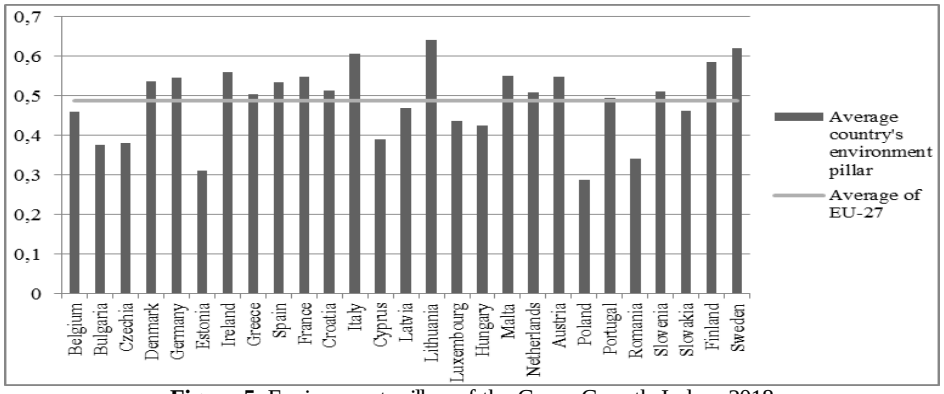

Figure 5. Environment pillar of the Green Growth Index, 2018
Source: developed by the authors

In overall measurement, the results of separate three pillars of each country have been accumulated. In Figure 6, the overall Green Growth Index for the European Union countries shows the main results of Green Growth evaluation of data of 2018.

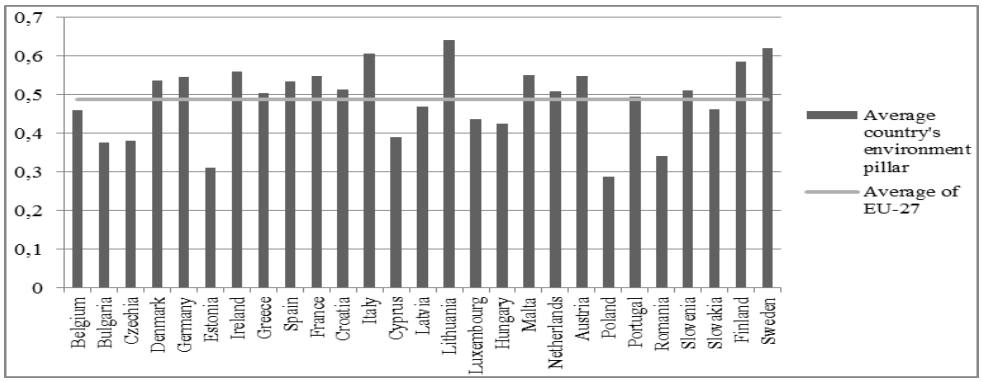

Figure 6. The Green Growth Index in the European Union countries, 2018
Source: developed by the authors

Among the countries in the sample of 2018, the lowest Green Growth Index is (0.38) in Romania and the highest (0.81) in Luxembourg. In order to provide the most comprehensive analysis of Green Growth Index, countries have been ranked on the basis of each pillar and overall index (see Table 3).

Table 3. Ranking of he European Union countries according to the pillars of Green Growth Index and the overall index

Country	Society pillar	Society pillar	Environment pillar	Overall GGI	Country	Society pillar	Society pillar	Environment pillar	Overall GGI
Belgium	25	10	19	22	**Lithuania**	12	21	1	10
Bulgaria	16	26	24	24	**Luxembourg**	1	15	20	1
Czechia	11	7	23	13	**Hungary**	5	22	21	14
Denmark	9	6	10	7	**Malta**	3	17	6	8
Germany	17	1	9	5	**Netherlands**	4	3	14	3
Estonia	8	11	26	16	**Austria**	10	5	8	6
Ireland	2	12	5	2	**Poland**	14	14	27	20
Greece	27	24	15	26	**Portugal**	23	23	16	25
Spain	22	16	11	19	**Romania**	21	27	25	27
France	24	8	7	17	**Slovenia**	7	9	13	9
Croatia	19	25	12	21	**Slovakia**	6	19	18	12
Italy	26	18	3	23	**Finland**	20	4	4	11
Cyprus	13	13	22	15	**Sweden**	15	2	2	4
Latvia	18	20	17	18					

Source: developed by the authors

As it is provided in Table 3, Luxembourg, Ireland, Netherlands, Sweden, and Germany perform the best according to Green Growth Index. Meanwhile, Romania, Greece, Portugal, Bulgaria, and Italy are among the worst according to this index. This is due to the fact that these countries underperform according to all three pillars of Green Growth Index.

To summarize, countries in regard to Green growth pillars – Economy, Society and Environment – differ according to Green Growth Index. Main reasons are: low economic growth and poor rates of environmental sustainability. It should be noted that countries' managing bodies should pay more attention to improve lagging indicators in order to achieve higher results in green growth ranking and evaluation.

Conclusions

The concept of green growth encompases different notable variables, listed by various scientists and methodologies. The main reasons are: different context of country's policy, different level of country's socio-economic development, the existence of economic and environmental interdependencies.

Green growth can be stimulated by increased fiscal spending on public goods, government expenditures on education, increased spending on R&D and innovation process, environmental regulations, support for technology policies and consumer-awareness programs, fossil fuel scarcity, subsidies and tax incentive policies, building a green-finance system, economic openness and R&D scale, and other measures.

OECD, UNEP, Global Green Growth Institute and the Asian Development Bank have proposed a few frameworks for the evaluation of Green Growth indicator, however they include different indicators. The majority of scientists' proposed indices created to evaluate green growth are based on the principle of index assessment. It should be noted that international organizations' proposed indices are applied more widely than those that are proposed by scientists. In order to give a comprehensive and reliable insight, indices should be composed in an easy-to-understand and effective way; indicators included in index calculation should be widely used, measurable, comparable, and relevant.

The results of the Green Growth Index assessment show that green growth is uneven in the European countries; the Green Growth Index and all three pillars vary between countries due to the fact that several countries (Romania, Greece, Bulgaria, Portugal, and Poland) lag behind all the indicators included in the Green Growth Index. Meanwhile, Luxembourg, Ireland, Sweden, Malta, and Netherlands have achieved the highest level of green growth. The Green Growth Index can be widely applied to evaluate green growth in developing and developed countries and to compare the countries.

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