Assessment of Economic Growth in Romania. Is it a Sustainable One?

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Abstract

Sustainable economic growth assumes interdependencies among social, economic, and environmental dimensions of growth. For Romania, in particular, the sustainable economic growth is both a challenge and an opportunity for prosperity. This paper aims at assessing the sustainability of economic growth in Romania in the period 1995-2019 by identifying the social, economic, environmental, and institutional drivers of the process of economic growth. Multivariate time-series analysis was used to analyse if the Romanian economic growth in the period 1995-2019 is sustainable. We also estimated the GDP per capita growth rate based on the determinants with which we found significant relationships.

1. Introduction

With the Brundland Report in 1987, the concept of sustainability has gained more and more ground in academic debates and policymaking. Over time, the explanations have been refined, many indicators have emerged to capture quantitatively this concept, the concept itself has diversified through the emergence of new terms such as green economy, green growth, sustainable growth, green economy, etc. In this context, the pessimists speak about the limits of traditional economic growth while the optimists argue in its favour in order to reduce poverty.

The concept of economic growth has captured the attention of researchers from different fields, perhaps more than any other topics in economics. It has also been the target of the governments worldwide. At the same time, the new realities such as crises, poverty, inequalities, environmental degradation, etc. raise deeper issues related to the quality of growth and to its impact on social and environmental aspects. Thus, it is no longer only about the quantity but also the quality of the growth process. This aspect is supported by several international complex strategies which emphasize the need to "promote inclusive and sustainable economic growth, employment and decent work for all" which "require societies to create the conditions that allow people to have quality jobs that stimulate the economy while not harming the environment" (United Nations).

In this context, development can only be achieved in an integrated way, by reaching a

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dynamic balance between the objectives of creating wealth as a basis of any economic activity, on one side, and the social and environmental conditions, on the other (Carp 2013, 93); thus, economic growth gets a new characteristic: it has to be *sustainable* in order to lead to wellbeing and reduce environment degradation.

Even if sustainable economic growth is at the core of policy-making and strategies there is no widely consensus about how to measure it. When analysing its influencing factors, the existing literature still measures it with GDP per capita and concludes on factors such as expenditure per student in higher education and traditional 18–22 year-old students, total expenditure on research and development, and employment rates of recent graduates as positively linked with sustainable economic growth (Armeanu et al. 2018). At the same time, the official international strategies use annual growth rate of real GDP per capita, as a proxy indicator for sustainable economic growth (United Nations).

To sum up, it is widely acknowledged that economic wellbeing is an important component of wellbeing (OECD) and economic growth, measured with "traditional" indicators, is still seen as an indicator of economic sustainability. To overpass this limitation, the "sustainability" dimension of economic growth results from its influencing factors. That is, if economic growth is a sustained process and it is driven by factors related to a healthy economic evolution, to human development and to environmental protection, it can be considered sustainable.

The study of economic growth is a complex research topic, considering the multitude of factors associated to this phenomenon. Over the years, numerous theoretical and empirical studies have attempted to identify the determinants of growth.

The debates are still centred around neoclassical growth and endogenous growth theories: physical and human capital accumulation, on one side, and technological change, on the other (Rodrik and Subramanian 2004), or around the strand of thought coming from institutional economics, which considers institutions as drivers for economic performance. The existing literature varies, taking into consideration, as drivers of economic growth, the accumulation of physical capital and the development of human capital (Rodrik and Subramanian 2004; Solow 1967), the inclusion of productivity factors (Lucas 1988; Romer 1990; Grossman and Helpman 1994; Stokey 1995), as well as institutional, socioeconomic, demographic, geographic etc. factors (Stokey 1995; Barro 2003).

Based on a survey of previous empirical studies existing in literature, Chirwa and Odhiambo (2016) identify the top determinants of economic growth that are relevant for developing and developed countries. For the first group, their results show that economic growth is associated with "exogenous factors (…), fiscal policy, trade, physical capital, human capital, demographics, monetary policy, natural resources, and geographic, regional, political, and financial factors". For the developed countries, the study shows that "physical capital, fiscal policy, human capital, trade, demographics, monetary policy, and financial and technological factors" are the variables that influence economic growth.

Analysing economic growth in transition economies is even more complex, considering the novelty of the process and the specificity of these countries. When addressing this issue, Mervar (2002) provides a synthesis of the empirical studies on growth determinants on 25 countries, in the period 1990-2000, and identifies three main groups

that explain the results in the early stages of transition (the first decade): initial conditions, structural reforms and liberalization, and macroeconomic stability, measured by inflation and fiscal deficit. At the same time, the importance of these factors was expected to diminish in time and the economic growth in transition economies to become more and more influenced by the standard determinants of growth from neoclassical and endogenous growth theories (Mervar 2002). Among other countries with an economy in transition, Romania has an annual growth rate of GDP, on average, 3.06%, from 1996 to 2018.

This paper aims at assessing the sustainability of economic growth in Romania in the period 1995-2019, by identifying the social, economic, environmental, and institutional drivers of the process of economic growth. GDP per capita growth is used as a proxy for sustainable economic growth and, the following indicators are used as its drivers: exports, imports, investments, inflation, unemployment with advanced education, government consumption expenditures, research and development, greenhouse gas emissions, rule of law, age dependency ratio, life expectancy and school expectancy.

This study fills a gap in the existing literature on economic growth in Romania by proposing a holistic approach on the factors that influence this process. There are very few studies focused on Romania in different periods (1990-2000; 1995-2013; 1997-2011; 2001-2009; 2003-2011; 1996-2006), and most of them only deal with certain categories of growth determinants (Armeanu et al. 2015; Cristea et al. 2010; Moraru 2013; Burja and Burja 2013; Turturean and Jemna 2008) or include Romania in cross-countries analyses (EU, CEE) (Popescu 2014; Popa 2012; Prochniak 2011; Simionescu et al. 2017; Jambor and Leitão 2017).

First, the issue of economic growth in Romania is important because the evolution of the Romanian economy displays a certain originality derived from a difficult transition to a market economy, accompanied by several structural transformations and, consequently, by significant fluctuations. Apparently, its sinuous evolution does not qualify it for a sustainability analysis. At the same time, in 2003, the Romanian economy was acknowledged as a functional market-based economy by the US Senate and from January 2007, Romania is a member of the European Union. Consequently, we believe that we must move beyond path-dependence and consider Romania as any other European economy, bearing in mind the national circumstances.

Secondly, we consider this study as an important contribution because, when it comes to the rate of economic growth, the Romanian economy is the "tiger" of the European Union. That is, in several years (2008, 2016, and 2017) the rate of economic growth in Romania was the highest in European Union. On the other hand, Romania is among the poorest and the most corrupt EU member states. Besides, there are contradictory opinions on this issue: government officials firmly state that economic growth in Romania is sustainable while the representatives of the National Bank speak about the Romanian GDP in terms of "a surplus of speed and a deficit of sustainability" (Vasilescu 2017). The opinion about the unsustainability of economic growth in Romania is shared by the representatives of Moody's who consider that "Romania's above-potential growth of recent years is not sustainable" (Moody's 2018). All of these issues raise the question if the economic growth in Romania is sustainable.

Thirdly, we believe that such analyses are important since Romania, as an EU member, is

part of the EU sustainable development model and strategies and its specificity might contribute to or, on the contrary, might cause delays in achieving European targets. Moreover, the set of indicators and the methods used in the analysis are contributions to the specialized literature.

The research methodology includes the descriptive analysis of the selected indicators, the multivariate time series analysis, as well as the multiple regression analysis.

The remainder of this paper is structured as follows. The next section provides the background of the research by presenting a literature review of several studies, which have investigated factors influencing economic growth. Section 3 discusses the research design and data used in this paper. Section 4 presents and analyses the empirical results. The last section concludes and provides a discussion of the results obtained from the perspective of sustainability and their implications for policy measures and for the Romanian economy on its path to sustainability. The limits of this research and further directions to be exploited are also presented.

2. Literature Review

The ecological economist Herman Daly discusses the confusion that is made in the literature between the concept "sustainable growth" and the concept "sustainable development" and also about the haziness of their meanings (Daly 1990). Often enough, the term "sustainable growth" is used as a synonym for "sustainable development". According to Daly, the concept "sustainable growth" suggests that growth needs to be "environmentally friendly" (Daly 1996).

The work of Spangenberg et al. focuses on the benchmarks for economic growth to be sustainable developed from the four dimensions of the sustainable development, namely: environmental, social, economic, and institutional dimension (Spangenberg et al. 2002). The authors also tested the sustainable growth criteria by simulations of several scenarios applied on the German economy.

Some authors discuss about sustainability of the optimal economic growth (Islam et al. 2003). They used an ecological growth model that assesses the sustainable economic growth on the long run. The authors concluded that economic growth on long term is unsustainable "due to increasing environmental costs" (Islam et al. 2003). In his paper, Yanrui Wu, applied a panel data analysis and also a stochastic frontier analysis to 27 regions in China, in 1981-1995 period, in order to answer the question if China's economic growth is sustainable. He concludes that 15 years of economic growth in China do not indicate sustained growth in the long-run (Wu 2000).

The abundant literature on the drivers of growth provides a wide range of these factors. Economic factors such as international trade, investments, government expenditures, innovation, technological progress, etc. are all proved to play an important role in enhancing or, on the contrary, in hampering economic growth.

Adam Smith's arguments in favour of the benefits of free trade are as relevant today as they were in 1776 when *An Inquiry in the Nature and Causes of the Wealth of Nations* was published. However, there is no full consensus on the idea that greater trade openness stimulates growth. Several studies point to positive effects of trade openness to economic growth (Dollar and Kraay 2004; Freund and Bolaky 2008; Sakyi et al. 2015;

Keho 2017). Using cross-country data on a sample of 126 countries, Freund and Bolaky show that trade openness leads to a higher living standard (Freund and Bolaky 2008). For a sample of 115 developing countries for the period 1970–2009, Sakyi et al. point out a positive bi-directional relationship between trade openness and income level in the long-run (Sakyi et al. 2015). Other studies contradict the existence of such positive relationship (Musila and Yiheyis 2015; Ulaşan 2015), even proving that an increase in trade openness harms economic growth by increasing inflation (Cooke 2010). At the same time, there is a debate in literature on whether economic growth is export-led, as considered by most studies in the field, or import-led (Awokuse 2008). The results of several investigations, done for Argentina, Colombia, and Peru, in the period 1993-2002, show that there is empirical support for import-led growth hypothesis (Awokuse 2008). Other studies carried for selected countries in Southeast Asia, in the period 1960-1996, present empirical support as well as for import-led productivity growth hypothesis (Thangavelu and Rajaguru 2004).

Foreign direct investment (FDI) is another factor largely analysed in relation with economic growth, most of the existing studies showing mostly positive, but in some cases also negative or null, influences (Almfraji and Almsafir 2014). If considered as an "engine" of economic growth of the host country (Simionescu et al. 2017), the positive influence FDIs have on economic growth has been revealed by Campos and Kinoshita for 25 Central and Eastern European countries (2002), Damijan and Rojec for former socialist countries from Central, Eastern and South East Europe (2007), Mileva (2008) and Mehic et al. (2013), also for transition countries. Using panel data econometrics for the period between 1995 and 2014 in Central and Eastern Europe, Jambor and Leitão (2017) conclude on the same positive relationship between FDI and growth while, when analysing the role of FDI and exports on economic growth in CEE countries, Popescu (2014) stated that "FDI augments economic development and the level of living in CEE". Country-level analyses in Norway (Manuchehr and Ericsson 2001), Portugal (Leitão and Rasekhi 2013), Tunisia (Belloumi 2014), Iran (Yazdi et al. 2017), and Ghana (Sakyi et al. 2015) also confirm the significant relationship between FDI and economic growth.

However, the results presented in literature vary. For example, several studies have concluded on no causal relationship between the two variables for Finland and Denmark (Manuchehr and Ericsson 2001) and for Chile (Chowdhury and Mavrotas 2006). Using data on 80 countries from 1979 to 1998, Durham (2004) reveals that FDIs do not have an unmitigated and direct positive effect on economic growth.

There is research that show a negative impact of FDI on economic growth. When analysing the determinants of economic growth in V4 countries and Romania, for the period of 2003-2016, Simionescu et al (2017) found that FDI has a positive impact on GDP growth in all countries, except the Slovak Republic (where the effect is negative). The same negative relationship was pointed out in Bangladesh by Rahman (2015), using multiple regression analyses and time series data from 1999 to 2013.

Other studies identify several factors related to a specific economic environment (i.e. the absorptive capacity of the host country) which influence the positive relationship between FDI and growth (Moraru 2013). For the same level of FDI, higher levels of human capital are likely to lead to a higher rate of growth (Borenszstein et al. 1988; Li

and Liu 2005), higher income has the same effect (Blomstrom et al. 1994; De Mello 1997) and so do developed financial markets (Alfaro et al. 2006) and export- rather than import-oriented trade (Balasubramanyam et al. 1996).

The relationship between the public sector and economic growth has also drawn researchers' attention and this relationship is also a controversial one. The results of a study carried out at EU level during 1995-2015, using Granger causality testing; show a significant relationship between government spending and economic growth in eight EU countries (Dudzevičiūtė and Šimelytė 2018). The relationship between public spending and economic growth in Romania was analyzed by Nuta et al. (Nuta A. C. et. al. 2015)

On one side, the government may play a positive role for growth considering the development of infrastructure, provision of public services, regulating externalities etc. (Dalamagas 2000), but, on the other, government activity may turn into a burden through excessive taxation, for example. Some researchers discuss about a certain threshold for the size of the government in the context of economic growth (Slemrod 1995; Tanzi and Zee 1997). The threshold was set by Friedman (1997) between 15-50% of the national income. Others, aiming at identifying the optimal share of public sector for maximizing growth and testing the presence of a non-linear Armey Curve, as methodology, Altunç and Aydin (2013) show that the optimal level of government expenditure in GDP is of approximately 25% for Turkey, 20% for Romania and 22% for Bulgaria and conclude that these levels exceed optimal public expenditure in all analysed countries. Afonso and Jalles (2011) prove a negative effect of the size of government expenditures on economic growth and this effect is stronger in those countries with poorer quality of institutions.

"Inspired" by the pioneer work of Solow (1967) and his contributions to the importance of technology for economic growth, many researchers have provided useful insights into the relationship between technological progress, innovation, R&D investment, and economic growth. The existing literature points to a "complex and changing" relationship caused by the different environments and their efficiency (Liu and Xia 2018, 5). There are findings which prove that R&D investments increase productivity and promote growth (Guellec and De la Potterie 2001) and sustainable development (Armeanu et al. 2018) but it has also been shown that the positive effect of these investments is not unconditioned (Balcerzak and Pietrzak 2015). A negative influence of technology on growth has also been demonstrated (Acemoglu 2002; Noh and Yoo 2008).

Based on the previous presented researches, first research hypothesis is:

H1: there is a causal relationship between economic dimension of the sustainability and economic growth in Romania.

Another body of literature focuses on the role socio-demographic factors and human capital play in economic growth (Barro and Sala-i-Martin 1992; Bloom and Sachs 1998; Bloom et al. 2003; Acemoglu and Johnson 2007; Madsen 2012). The effects of population growth on economic growth are to be analysed from three main perspectives: the pessimistic theory (population growth negatively affects economic growth), the optimistic one (population growth is a catalyst for economic growth) and the neutralist one (there is no relationship between the two phenomena) (Bloom et al. 2003), each supported by strong arguments.

Studies on demographic factors' influence on the economic growth are few. Acemoglu and Johnson (2007) studied the implications of improved health on life expectancy, in the context of epidemiological transition in the mid-twenty century. These effects were studied for three groups of countries, namely, rich, middle-income, and poor, and for different periods in the interval 1940-2000. The authors found small, though not statistically significant effect of life expectancy on total GDP, and significant negative effect of life expectancy on GDP per capita and, respectively, on GDP per working age population specially in low- and middle-income countries.

Another study about the positive effect of an increased life expectancy (through improving health) on economic growth (measured with GNI per capita) (Ngangue and Manfred 2015) finds that the effect is not significant in the middle-income developing countries.

Sundman (2011) focused on the relationship between demographic changes and economic growth in Japan. Thus, the results have shown that the demographic transition has a negative impact on GDP per capita: the higher the national income, the lower the number of births. In addition, since technological progress has an impact on the living standards and medical care, an increase in the life expectancy determines an increase in the number of elderly people.

Barro (1991) studied the relationship between economic growth and human capital, the latter measured by school-enrolment rate. The analysis was done for a sample of 98 countries. The results demonstrate the correlation between a country's economic growth rate and the human capital indicator on education, namely school-enrolment rate. One of the conclusions of (Armeanu et al. 2015) paper on the drivers of sustainable economic growth in EU-28 countries is that "a sustainable nation cannot develop properly short of a minimum degree of literacy and knowledge from its citizens".

In a study conducted in 2013, Holmes (2013) analysed the role of different levels of population education on the economic growth. Thus, he concludes that there is no significant link between higher education and economic growth in the UK over the last 14 years. At the same time, the results of the study showed that there is a significant link between primary and secondary education, technical competence measures, research activity, and capital accumulation.

Contrary to the study by Holmes, Dragoescu (2015) considers that education, and especially high-level education can influence economic growth in various ways: education provides human resources with the possibility of acquiring knowledge and developing skills and, at the same time, facilitates technological progress and innovation. Thus, in the study conducted in 2015, Dragoescu analysed the relationship between education and economic growth in Romania for the period 1980-2012. The variables considered in the study were: GDP per capita, the number of students enrolled in higher education and public spending on education. The study showed that, for the period considered, there is a strong positive link between the number of students enrolled in higher education and economic growth.

In another approach, according to Hanushek (2010, 2016), individual gains are often dependent on the individual's skills. The distribution of competences in society is closely linked to the distribution of income. At the same time, perhaps most importantly, economic growth is strongly affected by the skills of the workforce.

Considering the literature, the second hypothesis is:

H2: there is a causal relationship between social dimension of the sustainability and economic growth in Romania.

Other researchers (Rodrik and Subramanian 2004) have identified three main explanations for economic growth: geography, international trade, and institutions. Out of the three, they conclude on the "primacy of institutions" in explaining economic performance. In 1994, the Nobel Prize Winner in Economic Sciences, Douglass North entitled one of his papers "Institutions matter" (North 1994).

The relationship between institutional quality or country-level governance and economic growth is also widely discussed, with some contradictory opinions among researchers (Boța-Avram et al. 2018). The positive role institutions have in economic development has been pointed out by numerous specialists. Veeman and Polityo (2003) consider institutions and mainly property rights and pricing systems for natural resources as "pivotal in achieving growth and improved distribution of income and wealth, in understanding environmental degradation, and in seeking improved policy". Sharing the same perspective, others argue that "sustainable development (…) is only possible in a legal system where property rights are well-defined, enforced, and transferable" (Anderson and Huggins 2003). Other authors point to the role of the rule of law, considered "the bedrock of sustainable development" (Ozanian 2015). The recent study of Boța-Avram et al. (2018) proves Granger causality from country-level governance to economic growth.

In light of the above-mentioned researches, the third and the fourth hypotheses are:

H3: there is a causal relationship between environmental dimension of the sustainability and economic growth in Romania.

and

H4: there is a positive relationship between institutional dimension of the sustainability and economic growth in Romania.

At the same time, several of the above-mentioned factors have been investigated as related to sustainability. Selecting several measures related to higher education, business environment, infrastructure, technology, communications, and media, population lifestyle and demographic changes from Sustainable Development Goals and using real GDP growth is employed as a proxy for sustainable economic growth, the study of Armeanu et al. (2018) points out that adult literacy rate, expenditure per student in higher education, traditional 18–22 year-old students, total expenditure on research and development, and employment rates of recent graduates are positively related to economic growth in EU-28 countries. Other factors analysed in the literature as related to sustainable economic growth are: social capital (Zak and Knack 2001), globalization (Capello and Perucca 2015), use of resources such as energy consumption (Kasperowicz and Streimikiene 2016), etc. The brief literature review presented above shows that there are numerous factors influencing economic growth. No matter the variables taken into account as determinants of this process, the existing studies provide complex and often contradictory evidence for the ways they influence the process of growth. The mixed results and contradictions may be determined by several factors: the sample of countries considered in the analysis, especially from their level of development; the indicators used to measure the influencing factor and economic growth; the period taken into

consideration; the econometric techniques employed in the study, etc.

The research hypotheses are: 1) there is a causal relationship between economic dimension of the sustainability and economic growth in Romania; 2) there is a causal relationship between social dimension of the sustainability and economic growth in Romania; 3) there is a causal relationship between environmental dimension of the sustainability and economic growth in Romania; 4) there is a positive relationship between institutional dimension of the sustainability and economic growth in Romania; 5) economic growth in Romania is unsustainable.

3. Data and Methods

The National Strategy for Sustainable Development in Romania includes as sustainable development indicators GDP per capita growth rate, research, and development expenditures, and administrative capacity and public services quality. The Index of sustainable economic growth is the better alternative, compared to GDP per capita growth rate, but there are no data available to calculate it for 22 years. Besides, due to their complexity, the distinction between the concepts of green growth, sustainable development, sustainable economic growth, etc. is difficult to make and is insufficiently argued on in the specialized literature. As Peter Bartelmus argued in his paper (Bartelmus 2013), the distinction that can be made is in terms of indicators.

As previously mentioned, in the absence of an indicator to capture the complexity of sustainable economic growth the existing literature (Armeanu et al. 2018) and strategies (United Nations) measure it with GDP per capita. Spangenberg states that "economic growth is often seen as one indicator for economic sustainability" (Soubbotina 2004, 434). However, we have to consider that measuring economic growth with GDP does not necessary reflect the sustainability path of an economy (Armeanu et al. 2018; Boța-Avram et al. 2018) and economic wellbeing is "much broader than economic measures such as GDP" (OECD).

GDP per capita might provide a better image of the level of development but still has numerous limitations when it comes to measuring actual well-being. It says little about the real environment and conditions people live in since it says nothing about the equality of income distribution and it does not account for environmental issues such as degradation or resource depletion. In addition, GDP per capita does not take into account the unpaid or the shadow work (Soubbotina 2004, 14).

Therefore, in the absence of another measure and despite its limits as a measure for sustainable growth, we also use GDP per capita growth rate as a measure for sustainable economic growth and we capture more accurate the "sustainability" dimension with the influencing factors we take into account in our analysis. We have selected the indicators according to the four dimensions of the sustainability: economic, social, environmental, and institutional dimensions. Based on specialized literature (Armeanu et al. 2018; Rodrik and Subramanian 2004; Stokey 1995; Chirwa and Odhiambo 2016; Moraru 2013; Simionescu et al. 2017; Dollar and Kraay 2004; Thangavelu and Rajaguru 2004; Chowdhury and Mavrotas 2006; Gagea 2014; Dudzevičiūtė and Šimelytė 2018; Dalamagas 2000; Ngangue and Manfred 2015; Holmes 2013; Dragoescu 2015; Anderson and Huggings 2003), we have considered the following indicators for economic

dimension: exports, imports, investments, inflation, unemployment with advanced education, government consumption expenditures, research and development expenditures. The social dimension is covered by age dependency ratio, life expectancy, and school expectancy. For the environmental and institutional dimensions, we used greenhouse gas emissions, and rule of law, respectively. Data used are from Eurostat, UNDP, and World Bank databases (Table 1). The period analysed is 1995-2019. It starts with 1995 because the rule of law data are available beginning with this year.

Table 1. Variables' notations and sources

Indicator	Notation	Source
GDP per capita growth (annual %)	GDP_CAP_GR	World Bank (https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG)
Exports of goods and services (% of GDP)	EXPORT	World Bank (https://data.worldbank.org/indicator/NE.EXP.GNFS.ZS)
Imports of goods and services (% of GDP)	IMPORT	World Bank (https://data.worldbank.org/indicator/NE.IMP.GNFS.ZS)
Foreign direct investment, net inflows (% of GDP)	FDI_INFL	World Bank (https://data.worldbank.org/indicator/BX.KLT.DINV.WD.GD.ZS)
Inflation, consumer prices (annual %)	INFLATION	World Bank (https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG)
Unemployment with advanced education (% of total labour force with advanced education)	UNEMPL_ADV_ED	World Bank (https://data.worldbank.org/indicator/SL.UEM.ADVN.ZS)
General government final consumption expenditure (% of GDP)	GOV_FIN_EXP	World Bank (https://data.worldbank.org/indicator/NE.CON.GOVT.ZS)
Research and development expenditure (% of GDP)	R_D_EXP	World Bank (https://data.worldbank.org/indicator/gb.xpd.rsdv.gd.zs)
Rule of Law	RULE_OF_LAW	Worldwide Governance Indicators (www.govindicators.org)
Age dependency ratio	AGE_GDP	World Bank (https://data.worldbank.org/indicator/SP.POP.DPND)
Life expectancy at birth (years)	LIFE_EXP	Human Development Reports (http://hdr.undp.org/en/data)
Expected years of schooling	EXP_SCH	Human Development Reports (http://hdr.undp.org/en/data)
Greenhouse gas emissions (tonnes per capita)	GREENHOUSE_G_E	EUROSTAT (https://ec.europa.eu/eurostat/tgm/refreshTableAction.do;jsessionid=jRE7V-VvvnUPoNYiAMIsP4Jm0hkBNVCh5KThLfZQNdaro6xpWNUk!1742705336?tab=table&plugin=1&pcode=sdg_13_10&language=en)

Source: Authors' presentation

The analysis of the indicators of sustainability for Romania, in the studied period was done using descriptive methods, correlation analysis, and Granger causalities tests. We used statistical methods appropriate to the research hypotheses. Therefore, to observe the changes taken place over time and to describe the annual increase or decrease of the selected indicators relative measures of change were applied. The annual percentage changes for two consecutive years shows how much an indicator has increased or decreased in one year compared to the previous one. These relative measures are used to observe the size and the sense of the relative changes of the studied indicators in time. These measures bring further information regarding the evolution of indicators of sustainable development in Romania in the period under analysis: the level of increase or decrease on a yearly basis.

Multivariate time-series analysis is used to study the dynamics of the set of selected indicators, and to assess the sustainability of Romanian economic growth in relationship with economic, social, environmental, and institutional indicators, in the period 1995-2019. We have analysed the evolution of the social, economic, environmental, and institutional indicators in the period 1995-2019, on an annual basis, and we have identified the existence of a trend. The identification of the trend is important to obtain accurate estimates and stationary time series (Pecican 2003, 96) in order to draw causal inference using time series data (Wooldridge 2002, 331). In order to test the stationarity, we performed the Augmented Dickey-Fuller test based on the autocorrelation function. Trend analysis for determining the tendency was done using different multiple regression models, that depend on time. To analyse the relationship between GDP per capita growth and its determinants for Romania in the period 1995-2019, we verified the stationarity of the time series included in the study by using the Augmented Dickey-Fuller test with the Dickey-Pantula strategy (Maddala and Kim 1998).

The Granger causality test can be applied if the analysed time series have the same order of integration, otherwise, the Toda Yamamoto procedure should be used. The latter is an advanced Granger causality test (Granger 2004, Toda Yamamoto, 1995). Taking into consideration the orders of integration for our time series, Toda Yamamoto was the appropriate method to use in order to verify the causal relationships between GDP per capita growth and the selected indicators. This procedure consists of three steps: (1) establish the maximum order of integration d_{max} for each of the X_t-Y_t pairs, (2) determine the optimal lag lengths h and k for X_t and Y_t, and (3) estimation of a VAR model for each of the X_t-Y_t pairs based on the equations (1) and (2).

$$Y_t = \alpha + \sum_{i=1}^{h+d_{max}} \beta_i Y_{t-i} + \sum_{j=1}^{k+d_{max}} \gamma_j X_{t-j} + u_{yt} \qquad (1)$$

$$X_t = \alpha + \sum_{i=1}^{h+d_{max}} \theta_i X_{t-i} + \sum_{j=1}^{k+d_{max}} \delta_j Y_{t-j} + u_{xt} \qquad (2)$$

where u_{yt} and u_{xt} are the error terms. The null hypothesis for equation (1) assumes that X_t does not cause Y_t, while that for equation (2) assumes that Y_t does not cause X_t.

4. Results and Discussions

A comparative overview of the evolution of the considered variables in Romania and EU average over the period of 1995-2019 is presented in Figure 1.
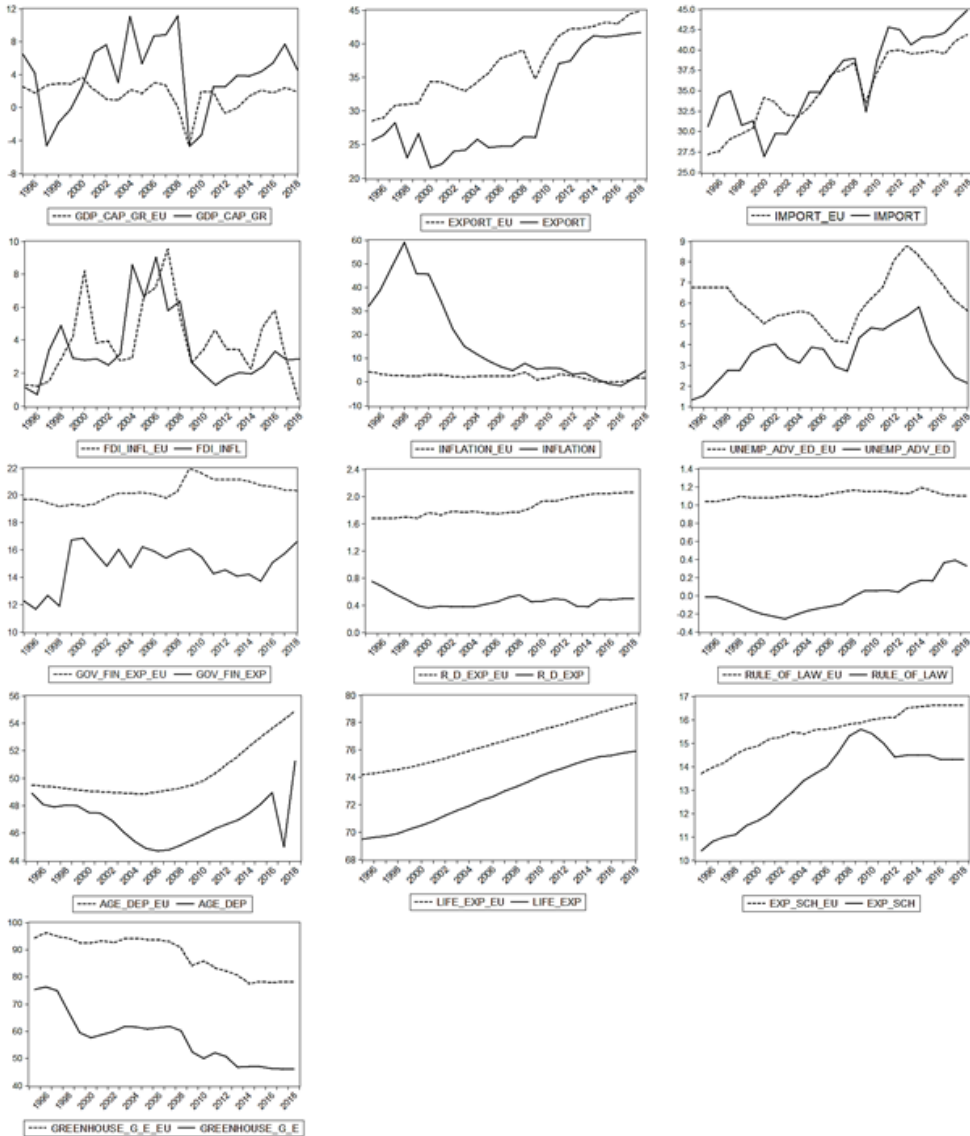
Figure 1. The evolution of considered indicators related to GDP/capita growth rate, in Romania, compared to EU average, 1995-2019

For an in-depth analysis of the evolution, measures of change are calculated to describe the annual increase or decrease of the selected indicators. The change ratio shows how much an indicator has increased or decreased from one year to the previous one. The changes are calculated in percentages. The percentage of change refers to the annual percentage change of an indicator between two consecutive years.

From one year to another, we can observe that there are various changes, most of the indicators increasing (Figure 2).
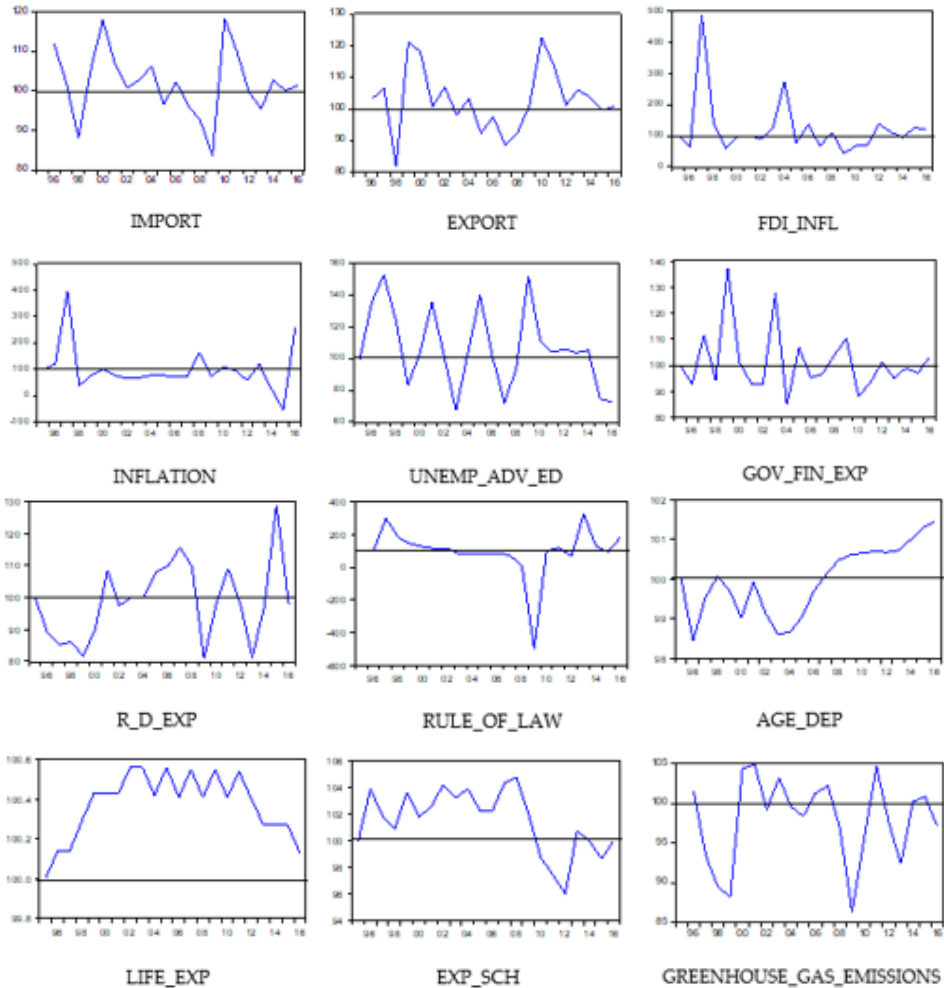
Figure 2. Annual percentage changes

When analysing the evolution of the variables considered in this paper, we should take into account that Romanian economy experienced a difficult transition to a market economy, naturally accompanied by several structural transformations and, consequently, it has shown significant volatility during 1995-2019 (Armeanu et al. 2015). Thus, the analysis of the economic growth in Romania during the period 1995-2019 is inevitably connected, at least in the first stage, with the transition to the market economy and the reforms adopted in this direction: price liberalization, privatization of state-owned enterprises, exchange rate liberalization, trade openness, and openness to foreign investments. Countries in transition, including Romania, suffered a severe economic downturn in the early 1990s. After the initial shock, the evolution of these countries was different and the results obtained in the transformation were heterogeneous. Romania is one of the countries that have lagged behind in the development race. As shown in both

figures above, at the beginning of the analysed period, the Romanian economy experienced a period of hyperinflationary growth. In a remarkable book, *Romania si Uniunea Europeana* (Engl. transl. *Romania and the European Union)*, two Romanian economists, Daianu and Vranceanu (2000), provide a comprehensive analysis of the Romanian reforms and their results in the first 11 years of transition. When analysing inflation (Daianu and Vranceanu 2000, 32-33), the two authors point out that two main macroeconomic stabilization efforts have left their mark on the evolution of inflation: one was that between 1994-1996 and the other between 1997-2000. The first major effort to stabilize the economy meant the introduction of real positive interest rates and its result was a better control of the money supply by the National Bank of Romania. The lowest inflation rate of the first 11 years of transition was recorded in 1995 and was obtained through the control of key prices (including the official exchange rate) and the strong monetization of the economy. The second stabilization effort began in the first quarter of 1997. It included a new price liberalization, including the exchange rate. The exchange rate exploded from 4000 Romanian lei/USD in December 1996 to 9000 Romanian lei/ USD in February 1997. The consequence was a huge increase in prices, inflation rate reaching the maximum level of the whole period, of over 150% in 1997. The period 1997-1999 meant a very severe contraction of production as a result of strong shocks on the side of demand and supply and of the rigidities in the economy.

Until 2004, all indicators recorded low values, caused by the weak competitiveness and productivity. In 2005, the National Bank introduced an inflation-targeting regime. Also, in 2005 flat taxation of 16% was introduced, leading to a decrease in shadow economy. The progress achieved in the analysed period was enhanced by the so-much desired integration in the EU which took place on January 1st, 2007 and, prior to this, by the need to fulfil the adhesion criteria. The Romanian economy and its growth potential were also severely affected by the global crisis at the end of 2008.

The *GDP per capita growth rate* in Romania significantly declined from 2008 to 2009, in the context of the global economic crisis. In the post crisis period the evolution is a sustained positive one but still has not reached the pre-crisis level. The evolutions of *exports* and of *imports* are, to a certain extent, similar.

Romania's success in attracting FDIs was far below expectations, both in relation to the real needs of the Romanian economy and to the achievements of the other countries in transition. The FDI flows that have been directed towards the Romanian economy since 1990 have been characterized by large fluctuations from one year to another.

Romania had a share below 6% of the total stock of FDIs of about 50 billion dollars existing at the end of 1997 in the seven East European candidate countries (Czech Republic, Bulgaria, Hungary, Poland, Romania, Slovakia and Slovenia), while 3 countries - Hungary (35.2%), Poland (30.7%) and the Czech Republic (13.6%) absorbed almost 80% of this total (Hunya 1998; Ghibutiu 2000, 319). If we consider the share of FDI stock in GDP, an indicator commonly used to highlight the progress of the countries in the process of transformation and globalization, at the level of the same group of countries, Romania was, with an 8.1% share at the end of 1997, considerably below Hungary (39.3%), Slovenia (13.7%), the Czech Republic (13%), Poland (11.5%) and Bulgaria (12.5%) (Grossman 1994; Ghibutiu 2000, 319).

The modest performances in the field of reforms – reflected in poor economic results,

delays in the privatization process and structural adjustment, the slow pace of institutional transformation, the lack of efficient infrastructure, the frequent changes, the lack of coherence and inconsistencies in the legal framework of FDIs, associated with high bureaucracy and corruption explain the reduced volume of FDI inflows in Romania during transition (Ghibutiu 2000, 319). At the same time, *investments* recorded an increase of 485.71% in 1997 compared to 1996. Between 2003-2008, there was a positive steady growth in the level of the net inflows of FDI due to the large privatizations in the Romanian banking and industrial sectors. A major decrease was in 2009 compared to 2008. The net inflows of FDI were also affected by the global crisis, significantly decreasing from 6.6% of GDP in 2008 to 2.8% in 2009, 1.9% in 2010 and 1.3% in 2011. After this period, the trend is positive but, as in the case of GDP per capita growth, still far from the pre-crisis level.

With a maximum of 0.75% of GDP in 1995, *R&D expenditure* in Romania is far from the level of 3% of GDP, as targeted by the Europe 2020 Strategy. After reaching its minimum value in 2000, 0.36% of GDP, the indicator shows a positive trend, around 0.4-0.5% of GDP, with slight variations from one year to the next in the analysed period. The evolution of the *Rule of law*, employed as a proxy for institutional quality, points out negative values in the first period (1995-2008) and positive values in the 2009-2019 period. Since 1997, Rule of law has been officially recognized as one of the principles of the European Union. The Amsterdam Treaty clearly states that "The Union is founded on the principles of liberty, democracy, respect for human rights and fundamental freedoms, and the rule of law, principles which are common to the Member States." (Amsterdam treaty).

First as a candidate and then as a member of the EU, Romania was monitored and advised to respect the rule of law and independence of the judiciary. The different European Commission Reports on progress in Romania under the Cooperation and Verification Mechanism have often drawn attention to the political slippages, to the issues regarding the judicial system, and to the need of fighting corruption and made recommendations which contribute to the improvement of rule of law in Romania. However, the low values registered by this indicator suggest that there is still much to be done with respect to institutional framework in Romania.

Age dependency ratio (AGE_DEP) is calculated as the ratio between the number of people aged less than 15 and the people older than 64 on the numerator, and the people aged 15 to 64 (working-age population) as denominator. Data are used as the number of inactive people corresponding to 100 working-age people. The data source for this indicator is World Bank. Age dependency ratio is an indicator that reflects the burden of the inactive population (people of nonworking age) on the active population (working age population). The higher the value of this measure, the higher the pressure on the working population. The changing of the population age structure in favour of older ages leads to greater values of the age-dependency ratio, which is also a measure of an ageing population. The evolution of dependency ratios is strongly related to the long-term sustainability of pension systems (Wöss 2011). Most of the European countries are facing the challenge of an ageing population. In Romania, the value of age-dependency ratio has fluctuated between 48.93% in 1995 and 48.65% in 2016. The lowest value, 45.08%, was registered in 2006. A great concern is that this indicator will have a high

value in Romania when the people born in 1967 and in 1968 will retire. This indicator is also affected by migration. In the last years, the number of out-migrant people increased and the young people's intentions to leave the country are also increasing. These two demographic phenomena will lead to an increased pressure on the remaining working-age people around 2030.

Romania's population is expected to decrease from 23.48 million in 1990 and 20.44 million in 2010 to 16.93 million by 2050. As a consequence, the available labour force is expected to decrease and the elderly will become a larger share of the population. The baby boom generations (1967 and 1968) will be at retirement age in the 2020 – 2030, putting a huge pressure on the economy and raising social and economic challenges. Romania is in the situation of facing "the problem of an aging society, where an increased cohort of elderly relies on a reduced working-age population" (Bloom et al. 2003, 50).

Regarding environmental issues, if considering *Greenhouse gas emissions*, Romania is a small polluter among the EU countries, managing to constantly decrease its level of greenhouse gas emissions. However, there is much to be done for a clean environment, considering the other types of pollution in Romania, especially air pollution and water pollution caused by the chemical and electric power plants based on burning fossil fuels. Bucharest, the capital, is one the most polluted cities in Europe. At the same time, Romania has the advantage of a rich biodiversity and also investments in clean energy were started and are encouraged in the future.

Life expectancy (LIFE_EXP) measures the average life expectancy in years and shows how many years an individual of a certain age is expected to live. According to Eurostat, life expectancy at birth measures the "number of years a new-born infant could expect to live if prevailing patterns of age-specific mortality rates at the time of birth stay the same throughout the infant's life". Life expectancy at birth plays the role of synthetic mortality indicator of a generation. This indicator is interpreted in terms of intensity: the higher the life expectancy, the lower the mortality. Overall, life expectancy in Romania has a positive evolution, from 69.5 years in 1995 to 75.4 in 2019, showing progress in human development.

Education, measured in our study by expected years of schooling, defined as the "number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrolment rates persist throughout the child's life" (United Nations), is also an important issue when it comes to sustainable economic growth in Romania. The *expectancy schooling* had increases from one year to the next one in the period analysed, except for the 2010-2012 period and 2015.

The results of the correlation analysis (Table 2) revealed that *GDP per capita growth rate* is significantly positively correlated with *foreign direct investment, net inflows* and *inflation.* Therefore, the hypothesis H1, on the relation of economic dimension of the sustainability and economic growth, has not been confirmed.

Table 2. Correlations between GDP per capita growth rate and the factors of influence

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. GDP_CAP_GR	1.000												
	-----												
2. AGE_DEP	-0.243[a]	1.000											
	0.251[b]	-----											
3. EXP_SCH	0.120	-0.422	1.000										
	0.574	0.039	-----										
4. EXPORT	-0.026	0.305	0.523	1.000									
	0.901	0.146	0.008	-----									
5. FDI_INFL	0.454	-0.521	0.146	-0.387	1.000								
	0.025	0.009	0.495	0.061	-----								
6. GOV_FIN_EXP	0.163	-0.298	0.449	-0.052	0.292	1.000							
	0.445	0.156	0.027	0.807	0.166	-----							
7. IMPORT	0.156	0.019	0.700	0.876	-0.070	0.024	1.000						
	0.464	0.928	0.000	0.000	0.744	0.909	-----						
8. INFLATION	-0.351	0.327	-0.895	-0.617	-0.104	-0.345	-0.755	1.000					
	0.092	0.117	0.000	0.001	0.628	0.097	0.000	-----					
9. LIFE_EXP	0.131	-0.063	0.869	0.846	-0.086	0.307	0.873	-0.883	1.000				
	0.539	0.769	0.000	0.000	0.687	0.143	0.000	0.000	-----				
10. R_D_EXP	0.006	0.272	-0.290	0.028	-0.246	-0.614	0.113	0.163	-0.210	1.000			
	0.976	0.197	0.168	0.896	0.246	0.001	0.597	0.444	0.324	-----			
11. RULE_OF_LAW	-0.029	0.299	0.492	0.895	-0.316	-0.044	0.818	-0.563	0.788	0.250	1.000		
	0.889	0.155	0.014	0.000	0.132	0.835	0.000	0.004	0.000	0.237	-----		
12. UNEMP_ADV_ED	-0.161	-0.305	0.585	0.315	-0.115	0.226	0.253	-0.475	0.499	-0.640	0.033	1.000	
	0.449	0.146	0.002	0.133	0.590	0.286	0.232	0.019	0.013	0.000	0.875	-----	
13. GREEN-HOUSE_G_E	-0.014	0.002	-0.771	-0.745	0.164	-0.486	-0.647	0.715	-0.905	0.501	-0.632	-0.627	1.000
	0.945	0.991	0.000	0.000	0.441	0.015	0.000	0.000	0.000	0.012	0.000	0.001	-----

Notes: a represents the Pearson correlation coefficient; b represents the significance level.

To evaluate the causal relationships between the four dimensions of the sustainability and the economic growth of Romania, we used Toda-Yamamoto procedure. This procedure can be applied after the verifying the stationary of the time series considered. In order to identify the order of integration for each time series, we performed the Augmented Dickey-Fuller test (Table 3).

Table 3. Augmented-Dickey Fuller test results

Time series	Test for unit test in:	Trend and intercept			Intercept		None	Order of int.
		ϕ	C	Trend	ϕ	C	ϕ	
GDP_CAP_GR	Levels	-3.138	1.313	0.096	-3.107**	2.391*	-2.230**	I(0)
AGE_DEP	Levels	-0.942	7.941	0.072*				I(0)
EXP_SCH	Levels	-1.220	1.076	0.008	-1.675	0.838*		I(1)
	1st diff.	-2.354	0.202	-0.011	-2.031	0.041	-1.966**	
EXPORT	Levels	-1.828	4.123	0.277**				I(0)
FDI_INFL	Levels	-2.393	2.327*	-0.046				I(1)
	1st diff.	-2.573	0.190	-0.017	-2.658*	-0.035	-2.749***	
GOV_FIN_EXP	Levels	-2.505	6.564**	0.018				I(1)
	1st diff.	-5.649***	0.602	-0.027	-5.711***	0.262	-5.664***	
IMPORT	Levels	-2.808	16.243**	0.383**				I(0)
INFLATION	Levels	-1.392	7.540	-0.441	-0.809	-0.216	-1.271	I(1)
	1st diff.	-3.228	-2.874	0.142	-3.286**	-1.095	-3.186***	
LIFE_EXP	Levels	-0.747	6.973	0.029*				I(0)

R_D_EXP	Levels	-3.188	0.112*	0.002	-3.662**	0.162**		I(1)
	1st diff.	-3.426*	-0.036	0.002	-3.291**	-0.002	-3.411***	
RULE_OF_LAW	Levels	-2.013	-0.077**	0.007***				I(0)
UNEMP_ADV_ ED	Levels	-1.812	1.192**	0.003				I(1)
	1st diff.	-3.722**	0.503	-0.038	-3.288**	0.013	-3.370***	
GREENHOUSE _G_E	Levels	-3.426*	47.180***	-0.728***				I(0)

In order to identify the existence of the trend, we estimated a regression model between each time series and time. The results indicated that school expectancy, investments, government expenditure, inflation, research and development expenditures, and unemployment with advanced education do not have any trend; life expectancy and greenhouse emissions indicator presented a linear trend; age-dependency ratio has a squared trend; the exports, imports and rule of law indicator have a cubic trend. The residual series created were tested for stationarity with the Augmented Dickey Fuller test. The next step of the analysis consisted in studying the causality between GDP per capita growth rate and the other indicators using the Toda Yamamoto procedure. The values of Fisher statistic test and the probabilities associated with it are presented in Table 4.

Table 4. The results of Granger causality test

Indicator (X_i)	H_0: X_i does not cause GDP_CAP_GR		H_0: GDP_CAP_GR does not cause X_i	
	F-statistic	Probability	F-statistic	Probability
AGE_DEP	0.096	0.908	1.413	0.270
EXP_SCH	0.398	0.577	3.183	0.066*
EXPORT	0.294	0.748	0.420	0.663
FDI_INFL	0.481	0.626	2.185	0.143
GOV_FIN_EXP	2.049	0.159	1.780	0.198
IMPORT	0.115	0.891	0.498	0.616
INFLATION	2.344	0.126	1.707	0.211
LIFE_EXP	1.345	0.286	0.656	0.531
R_D_EXP	7.923	0.003***	0.616	0.551
RULE_OF_LAW	0.424	0.660	1.042	0.374
UNEMP_ADV_ED	2.097	0.153	0.372	0.694
GREENHOUSE_G_E	1.595	0.231	0.017	0.983

*Note: The values accompanied by symbol * represent the significant causal relationships for a level of 10% significance. The values accompanied by symbol *** represent the significant causal relationships for a level of 1% significance.*

According to the results of causality test, there are unidirectional causal effects between research and development and GDP per capita growth rate. In other words, the GDP per capita growth rate is influenced by the variation of the research and development in Romania in the period 1995-2019. Moreover, GDP per capita has a positive and significant effect on the school expectancy in the studied period. The results revealed that the hypotheses H3 and H4 are not confirmed, the environmental and institutional indicators do not have significant effects on the economic growth in Romania.

5. Conclusions

The issue of the drivers of economic growth has been widely discussed in the literature over the years. Even though there is a long way from growth to sustainability, and economic growth cannot be seen as an end in itself, "growth creates the resources needed for better education, health, and security, and for higher incomes" (World Economic Forum, 1). As is widely acknowledged, "although growth does not guarantee human development", it "remains a precondition for enhancing human welfare" (World Economic Forum, v). Besides, "there are no examples of countries improving the welfare of their populations without growth" (World Economic Forum, 1).

We firmly believe that Romania, a developing country in a transition stage from efficiency driven to innovation driven, currently situated on the upward part of the U-inverted Kuznets curve, needs a real, robust and sustained economic growth to achieve sustainable development goals. Without the proper resources generated by growth, human and environmental wellbeing remain just targets comprised in development strategies, to be fulfilled sometime in the future.

In the case of Romania, there are very few studies conducted on this topic. This is the reason this paper aimed at identifying the socio-economic and institutional factors influencing economic growth in Romania in the period 1995-2019 and at assessing the sustainability of this process. Our findings contribute to the empirical literature on the determinants of growth, particularly to the range of studies developed at country-level and using time-series analysis.

We used GDP per capita growth rate as a proxy for sustainable economic growth and, based on the existing literature in the field, we have considered as its determinants the following indicators: exports, imports, investments, inflation, unemployment with advanced education, government consumption expenditures, research and development, greenhouse gas emissions, rule of law, age dependency ratio, life expectancy, and school expectancy.

Our findings show an overall positive evolution of the considered variables in Romania in the period of 1995-2019, corresponding to the trend of their European average values Using correlation analysis, we found that in Romania GDP per capita growth rate is significantly positively correlated with export and import and negatively with the variables expected years of schooling and rule of law. The positive correlation between foreign trade and economic growth can be explained since one of the main reforms in Romania was trade liberalization and, with the EU accession in 2007, Romania has benefited from the EU market access, which has led to both increased exports and imports and an increase in export performance (Damijan and Rojec 2007).

The negative correlation between the expected years of schooling and GDP per capita growth rate contradicts the results obtained by Popa (2014) who, aiming at analysing the social factors which influence economic growth in Romania between 2005 and 2009, showed a positive correlation between the expected years of schooling and economic growth, measured with real GDP per capita.

Contrary to expectations, we found no relationship between FDIs and economic growth in Romania. Most of the existing studies on this issue conclude on a positive impact of FDIs on the Romanian economic growth. In an empirical analysis conducted for the

period of 2003-2016 and employing Bayesian generalized ridge regression, Simionescu et al. (2017) show this positive impact. Using a VAR model, Misztal (2010) proved FDIs as one of the main factors which substantially influenced GDP growth in Romania during 2000-2009. Roman and Padureanu (2012) also showed that economic growth in Romania was positively influenced by FDIs. There are also studies which show a negative correlation between FDI inflows and real rate of economic growth in Romania (Bacic et al. 2004).

The contradictory statistical results may be explained by the differences in the employed dependent variables and the period of time taken into consideration. From the economic point of view, at least in the first part of the analysed period, the FDIs did not contribute significantly to capital formation but they were rather brownfield investments.

The results of the Granger causality test show that there is a bidirectional causality relationship between economic growth and life expectancy and also that GDP per capita growth rate is influenced by the variation of school expectancy, imports, research and development, rule of law and unemployment with advanced education.

We consider all these results should be interpreted in terms of the transformations Romania, as a former communist country, has underwent through the years and also in the context of the institutional environment. At the same time, the results should be considered from the perspective of the four dimensions of sustainability, namely economic, social, environmental, and institutional, as considered in Agenda 21. All these dimensions must be related to achieve sustainable growth. In the case of Romania, they are not related. The relationships between economic growth and the social, economic, environmental, and institutional dimensions are not all significant, therefore, we consider that Romania has no sustainable economic growth.

Even if the economic growth rates are positive in Romania, at this moment the process itself is not sustainable. Economic growth in Romania is mainly based on private and public consumption and, most important, because of the institutional issues, the results are not properly and efficiently distributed to population and to those in need. Consequently, issues such as poverty, huge inequalities, and low access to medical services and to education, in some cases threaten the social dimension of Romanian sustainability. The Romanian society must find a balance between the level of growth and its quality in order not to just accumulate GDP but to increase wellbeing and this depends on the country's political, social, economic ,etc. climate (Vasilescu 2017).

These findings point out to several directions to be followed in order to enhance economic growth and make it a sustainable process. Besides adding a certain contribution to the existing scarce literature on the drivers of sustainable economic growth in Romania, our study has one main limitation coming from the small set of data (we only took into consideration the 1995-2019 period) caused by the fact that the indicator Rule of law has no recorded values for previous years. Another limitation of our research is that we used GDP per capita growth rate. Starting from the Bartelmus' opinion that "the selection of indicators for sustainable development will remain selective and judgmental" (Bartelmus 2013), we consider that the selection of the indicators for assessing the sustainable economic growth is judgmental and affects the results of the analyses.

Future research includes the comparative study of the sustainable economic growth in

European countries using the sustainable economic growth index with panel data.

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