# Economic growth and structural changes in Romania in the context of European integration

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***Abstract****. The paper studies the features of the dynamics of the Romanian economy and the changes of the sectoral structure over the period 2005-2022. The period is characterised by the intensive integration into the European Union covering the period after the second transition to the market economy, and adverse economic shocks up to, and including the 2020 Covid-19 pandemic. All member-states were affected in varying degrees and, at first view, the expansion of GDP consolidated the services' sector as main contributor to the creation of gross value added. The objectives are centred on assessing the impact of gross domestic product dynamics on the sectoral structure of Romania's economy, analysing Romania's economic growth rate in the EU economic context, and the impact on narrowing the development gap at EU-level with the most developed member-states. The methodology is based on a mixed-methods approach, on one hand analysing the features of the dynamics of the gross domestic product, and identifying Kitchin-type short economic cycles. On the other side is identified the intensity and direction of the sectoral change, and additional arguments are brought based on EU-level comparisons. The results show that the rate of economic growth in Romania was higher than in the European Union as a whole. The strengthening of the service economy in Romania is highlighted, along with the convergence of Romania with the European Union. It is noticeable that despite aligned evolutions with trends displayed by most member-states, a gap is still identifiable regarding the share of the tertiary sector. The paper is original in that it allows to identify the rate and trajectory of Romania's economic growth while emphasising the features of structural changes and the structural convergence over this period.*

***Keywords****: economic growth rate, Kitchin cycles, service economy, structural change intensity, structural changes direction, structural convergence*
***JEL classification****: E30, E32, F43, F44, O10, O11, O47*

## 1. Introduction

The aim of integrating within the European Union (EU), from both convergence and cohesion perspective, has meant for Central and Eastern-European countries (CEE) undergoing sometimes difficult processes aimed to transitioning to market economy, while at the same time entering into competition not only with the European Union, but also inside the entire region. Moreover, it implied accepting an economic model that had some similar features, and laid emphasis on convergence and cohesion as measurable benchmarks. It had considerable economic and social costs over the 1990s and, at the same time, it allowed for capturing how economic growth unfolds in countries with heighted catch-up needs, that continue to remain relevant also in the first decades of the 2000s. Structural changes and reforms are regarded over the 2000s as continuous processes due to the imperatives of sustainability

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and resilience, and measurements thereof in terms of gross value added show that divergences continue to persist as regards economic growth patterns within the EU-27.

The main issues and questions are related to GDP dynamics, changes in the gross value-added contributions on economic activities, and the economic growth potential and rate, for the EU as a whole and for the Eurozone, as the past experience might assist in designing suitable measures and policies for the future in the current context characterized by multiple uncertainties and high volatility.

Based on this, the paper has as main focus Romania's economic growth, and the structural changes it underwent during the period of EU pre-accession and after the accession and integration in the EU-27, against the background of developments at the EU-27 and Eurozone level. The period considered is from 2005 to 2022, as it is the most intense regarding patterns of economic growth, structural changes in the national economy, while the other EU-27 economies underwent similar processes as result of technological progress and pressures, of increasing concerns related to the climate change, and the growing outspread of the digital economy as a whole. In fact, this process was accelerated at global level over the Covid-19 pandemic period. The same period is also marked by high volatility and uncertainty resulting from the opportunities and challenges posed by the EU enlargement in the two waves of 2004 and 2007, followed by the Great Recession in the late 2000s and early 2010s, and by the Covid-19 outbreak in 2020. More recently, the risks triggered by the war in Ukraine (2022) added another dimension which makes the more important paying attention to how economic growth is achieved in conditions of uncertainty, and demands for more sustainable and resilient economies.

Hence, the objectives set by the paper aim to underscore some features of Romania's economic growth patterns over the period 2005-2022 against the overall trend within the European Union, and the Eurozone, considering that gaps might still be identified in both convergence and cohesion processes.

The results obtained during the favourable periods of fast economic growth impacted and triggered changes in the sectoral structure of gross value-added, as the country registered a transformation signalling the tertiarization of the economy.

The core issue is how economic growth can be maintained and improved, considering the challenges of the present by taking account of past experience.

## 2. Literature review

Economic literature considers economic growth as one of the core topics, especially in the case of countries that undergo transformative processes as was and is the case for Romania. The most debated issues are centred around the dimensions and determinants of economic growth which over time led to the division into several theories, respectively the classical theory, Schumpeter's theory and the Keynesian and post-Keynesian theories. All these have in common the lack of consensus regarding factors that increase or diminish economic growth and economic growth potential.

The contemporary period is characterised by the imprint of neoclassical growth theories and endogenous growth theories, both having as focus physical capital, human capital and technological capital (Solow, 1956; Romer, 1986; Lucas, 1988), to which are added considerations related to the impact of efficiency factors (Barro, 1990; Easterly et al., 1989 or Barro et al., 1992), as all of them are reflected in most considerations attempting to analyse and explain economic growth. Post 1990, and especially in the context of accelerated changes triggered by the current transition to the green and digitalised economy other considerations were added as relevant for economic growth, such as institutions, legal, demographic, geographic, social and political factors (Barro, 1999; Sachs & Warner, 1997; Acemoglu, 2010), while comprehensive studies can be found for various groups of countries, especially developing countries and countries of central and eastern Europe (Prochniak, 2011; Botrić & Slijepčević, 2008; Pääkönen, 2010).

The literature dedicated to economic growth, economic growth models, endogenous and exogenous determinants of economic growth and implications for economic and social policies, and for the overall development and modernization of countries is vast, and the topic is extensively covered. Therefore, we propose, another perspective related to the literature dedicated to economic growth based on two major dimensions that capture all relevant determinants and facets related to sources, enabling

or hindering factors of economic growth, not from a qualitative, but from a quantitative perspective, as it might also indicate the predominant trends for the current period and for the foreseeable future.

The first dimension is the one of institutions, institutional economics and economic growth and the empirical investigations and theories substantiating the validity of the approach, and the second dimension is the one of macroeconomic analysis and policy implications related to economic growth. Both dimensions cover some important determinants related to the role of the state/government and economic institutions related to factors of economic growth (investments, either foreign direct investments or domestic investments, human capital, productivity, but also rule of law, transparency, cluster and cooperation development capacities between businesses and other stakeholders, socioeconomic components, etc.), or revealing the major macroeconomic trends, some of which are currently regarded as contemporary megatrends in efficiency, productivity increases, trade, energy, tourism, etc.

For the purposes of the present paper, we used from within each of the two proposed dimensions a number of 10 key words based on the strength of their links to the concept of economic growth, based on the data supplied by OpenAlex for the time period 2000-2022. In the analysis are included, based on the frequency of key-words mentioned in articles, books, and book chapters from both open and closed sources, all the determinants indicated as of major interest in current analyses related to economic growth in both developed and developing countries, including countries from central and eastern Europe.

The total number of identified key-words on the "institutions and economic growth dimension" related to concerns discussed in institutional economics allowed for selecting the following essential key words: governance, cluster development, administrative capacity, economic policy, institutional quality, tariffs, contracts, taxation, official economic communication, labour market institutions.

The total number of key words chosen selectively for the dimension "macroeconomic analysis and policy implications" were: productivity; inflation dynamics, business cycle, business cycle synchronization, growth models, trade, panel data analysis, regional convergence, industry dynamics, econometric evidence.

This linguistic estimation of key-words on the two suggested dimensions related to economic growth was codified by estimating their co-occurrence in the most relevant papers and books related to economic growth in relation to macroeconomic and institutional-economic analyses, according to suggestions made for such assessments by Dahlsrud (2008), Kageura & Umino (1996)).

Moreover, the analysis had two distinct periods – the long-term period covering the time-interval 2000-2019, and a shorter period pursuing to assess the impact of the Covid-19 pandemic on papers related to economic growth during, and in the post-pandemic period. For estimating the co-occurrence frequency of the key-terms selected, the application Biblioshiny was used, while for computing frequency, the model suggested by Dahlsrud (2008) was used.

The model consists of two equations, one for determining the frequency of the two dimensions in total identified papers dedicated to economic growth, by dividing the total score of the dimensions to the number of papers that included these two dimensions, including here the co-occurrence of selected key words:

$$SD_i = \sum_{j=t}^{x} FConc_{ji} \quad (1)$$

Where SD: is the score for the dimension i, included in the paper j, respectively FConc is the concept/key-word co-occurrence, attributed to the dimension i, and x is the total number of papers subsumed to category i.

For determining the share of each of the two dimensions, and establishing the frequency of each in the published open and closed-access papers, we calculated the representativeness share of the respective dimension ($DR_i$), by dividing the total score of the dimension to the total frequency number for all concepts, by using the following equation:

$$DR_i = \frac{SD_i}{\sum_{k=1}^{y} FConc_k} \text{ x } 100\% \quad (2)$$

Where DR is the share of the dimension for the dimension i, SD is the score of the dimension I, and FConc is the frequency for concept k, and y represents the total number of papers containing the two dimensions by also including co-occurrence key-words.

The total number of papers validated based on citation frequency, and co-occurrence of key words between the two selected dimensions (macroeconomic analysis and institutional economics) for economic growth has shown that the highest number of citations was by 1252 and the inclusion of the dimension was different from one published paper to another. It is also interesting, when looking at the time-interval 2000-2019, that the peak of published papers included into our analysis and relevant for economic growth based on the two selected dimensions has registered a peak over the period 2014-2016, and the number was on increase up to that year, and maintaining an increasing trend until 2016. Post-2016, the number registered constant decrease, and for the time-interval 2020-2022, the smallest number of papers dealing with economic growth could be selected for inclusion into the analysis.

We underpin that this quantitative analysis is intended only to show basic trends and possible new pathways in exploring economic growth, based on mainstream theories.

The results, presented in Table 1 show the following trends for the two dimensions:

**Table 1. Dimension score and share of each dimension (economic growth, institutional and macroeconomic modelling factors, over the period 2000-2022)**

| Dimension | Dimension score | Dimension share (%) |
|---|---|---|
| Macroeconomic analysis &policy implications | 2450 | 93 |
| Institutions, institutional economics and economic growth | 2450 | 65 |

Source: authors' own calculations based on OpenAlex data, VOSviewer and Biblioshiny.

Macroeconomic analysis and policy implications gained in relevance, especially for the period 2016-2019, and 2020-2022, when most approaches based on the co-occurrence of the key words for each dimension insisted on the need of identifying other ways for estimating economic growth. This is explainable by the fact that the context became characterised by high volatility levels, uncertainty and imbalances already before the Covid-19 pandemic while after it, such considerations were reinforced by the beginning of the year 2022. At the same time, while the institutions and institutional economics dimension has a lower share in the total number of papers, it is interesting to notice that, overall, since 2020, the institutional dimension becomes increasingly more relevant, in the context triggered by the Covid-19 pandemic, the post-pandemic effects, associated with the accelerated development of the digital economy at European and world level.

Though not included in the analysis, after the same year more concerns were present related to identifying the right mix between geoeconomics and geopolitics, especially after the war in Ukraine began, and increasingly more so as a conflictual world-level state is continued up to the present.

Next, we analysed the number of instances in which concepts, key-words co-occurrence were included in papers dedicated to economic growth, and their share based on computing their frequency.

It is interesting to notice that most were concerned with institutional and macroeconomic analysis, business cycles and business cycles synchronicity, economic policy, taxes, growth model and panel data analysis, institutional quality, governance, administrative capacity, Therefore, for better visualisation in identifying the trends in the literature about economic growth, we set a maximum threshold of 6 times for the dimensions, or key-words from each of them that showed co-occurrence in total number of published papers, and their share after computing frequency:

**Table 2. The two dimensions included in papers, number of papers and their share post-frequency computation**

| Number of the 2 dimensions co-occurrence in papers | Number of papers | % total frequency computed based on VOSviewer and Biblioshiny |
|---|---|---|
| =6 | 32 | 21 |
| =5 | 45 | 67 |
| ≥4 | 121 | 88 |
| ≥3 | 27 | 99 |
| ≥2 | 8 | 99 |
| ≥1 | 46 | 100 |

Source: authors' own calculations based on OpenAlex data, VOSviewer and Biblioshiny.

Some of the insights gained while gathering these data show that at world and European level the search for the right determinants contributing to sustainable and resilient economic growth, based on building analytical frameworks for identifying the most common co-occurring determinants continue to remain in a grey area, while detecting the key drivers of economic growth is still rather undecided, at the level of governments, but also in the academic and experts' analyses addressing their economies. Especially with respect to central and eastern-European countries, the investigations were focused on the association of banking sector efficiency and economic growth (Botrić & Slijepčević, 2008), while other analyses focused on the impact of the exchange rate stability on economic growth (De Grauwe, 2008), supply- and demand-side determinants (Prochniak, 2011), or trade openness related to economic growth (Fetahi-Vehapi et al., 2015), fiscal policy, administrative capacity and effectiveness of economic policy as regards the institutional determinants of economic growth (Burnside & Dollar, 2000; Bleaney et al., 2001; Nijkamp & Poot, 2004; Efendic et al., 2011).

The main conclusion is that the mix of traditional macroeconomic analyses including considerations about policy impacts, and assessments of economic-institutional determinants and their overall quality seem to become more and more interspersed in the current context of geoeconomic and geopolitical uncertainty at both world- and European level, irrespective of the fact that the share of considerations regarding the two dimensions analysed quantitatively lead to different findings from one paper to another. It is a certainty that the current panel data analysis methods need further improvement, perhaps on the lines suggested by by making use of meta-regression analyses.

Nevertheless, the expansion in the number of studies regarding aspects related to the modelling factors of economic growth, that is either the emergence of new ones, or changes in the intensity and direction of some of them, should not neglect taking into account traditional topics such as comparisons between the economic growth rates in the context of economic cycles and the intensity of structural changes.

## 3. Methodology and data

Economic growth is reflected traditionally in the dynamics of GDP, one relevant dimension being investigating it from the perspective of output, considering the evolutions of gross value added on economic activities. Thus, the economic growth rate is captured in the framework of the dynamics and structural changes in GDP increase, and by discussing this increase based on the Kitchin cycles identified at the level of the Romanian economy.

In analysing economic growth, key-indicator is the gross domestic product, and the features of its dynamics, for which the concepts of Kitchin and Juglar cycles are very useful. The Juglar cycle usually lasts about ten years and is marked by two successive recessions. As a rule, it is found that over the respective cycle we deal with a recession and a boom. Pavelescu (2021) argues that a Juglar Cycle can be viewed as a group of Kitchin Cycles, that are limited usually to a period of 3 to 5 years. Implicitly, a Juglar Cycle includes in it about 2 to 3 Kitchin cycles. Another difference between the two most used cycles in analysing economic growth is the fact that the Juglar cycles, first defined by Juglar (1863) are determined by the features of the investments dedicated to the renewal of fixed capital, while the Kitchin ones, postulated in Kitchin (1923) are seen as consequence of the stocks of raw materials and finished goods fluctuations.

In this context, at the level of the national economy, we distinguish several types of Kitchin Cycles, respectively:

a) A pure recessionist Kitchin cycle, when the economy is faced with recession, and the gross domestic products enters a decreasing path;
b) An unstable Kitchin cycle, whenever the decrease of the gross domestic product in a given year is followed by increases over the subsequent years, without reaching however the levels recorded in the pre-recession period;
c) A recovery Kitchin cycle beginning by the end of the recession and continuing up to the time when the pre-recession gross domestic product level is achieved, or even exceeded, and
d) The expansion Kitchin cycle, when the gross domestic product is on a constant increasing trend, and is constantly higher than the level reached before the last recession.

For obtaining a clear image, as regards GDP trends based on the Kitchin cycles, these are grouped so as to detect the features pertaining to each cycle either of recession or recovery.

By investigating the dynamics of GDP considering both the evolution of value added on economic activities, we also determine the intensity of the sectoral structural changes of gross value added (GVA), the two predominant types of recoveries are detected, respectively a recovery in V, when we deal with a combination of a pure recession cycle, and a recovery cycle, and the recovery in W, where we capture a succession of unstable Kitchin cycles.

In this context, it is important to take into account also the form of the dynamics of gross domestic product, based on the comparison between the average and the representative rate of GDP. The average rate in this case is computed by considering the simple geometric mean of the annual indices of the gross domestic product.

The representative rate, defined first by Pavelescu (1986) is defined as a weighted geometrical mean by considering the number of years included in the analysis. The basic assumptions of the analysis in this context are: (i) we are faced with concave dynamics of the GDP if the respective rates have the same sign, and the absolute size of the average rate is lower than the absolute size of the representative rate. (ii) we deal with convex dynamics of GDP whenever the respective rates have the same sign, and the absolute size of the average rate is higher than the absolute size of the representative rate and, finally (iii) we are in the presence of unstable dynamics of GDP if the respective rates have different signs.

The evolution of economic growth determines not only the expansion of GDP, but also the structural changes occurring in the economies. Some of the most relevant structural changes are those related to changes occurring in the sectoral distribution of gross value-added (GVA).

Based on the assumption of Clark (1940) according to which the economy is structured on three sectors, in fact the economic architecture adopted at international level as standard, we have a primary sector representing agriculture, forestry and fishing, a secondary sector grouping industries in the broad sense and constructions, and the tertiary sector represented by service activities. In this context, any analysis of the structural changes has to consider and assess both intensity and direction of the structural changes taking place in the economy.

For the study of structural changes features, we can use the coefficient of intensity of structural changes (CISC), defined by the formula:

$$CISC = \sqrt{(g_1 - g_0)^2} \qquad (3),$$

where:

$g_{1=}$ the share of the analysed sector (economic activity) in the gross domestic product in the last year of the considered period

$g_{0=}$ the share of the analysed sector (economic activity) in the gross domestic product in the initial year of the considered period

Pavelescu (1997) shows that the size of CISC is dependent on the transfer of weights and the distribution of the respective transfer, as it allows to be estimated for both sectoral and economic activities' level. If we deal with a three-sector economy, we are able to detect the main and secondary direction of the structural change by considering the absolute values of the sectoral shares' changes. Theoretically, there are six possible types of sectoral changes. i.e.: de-aggrarization, re-aggrarization, tertialization, de-tertialization.

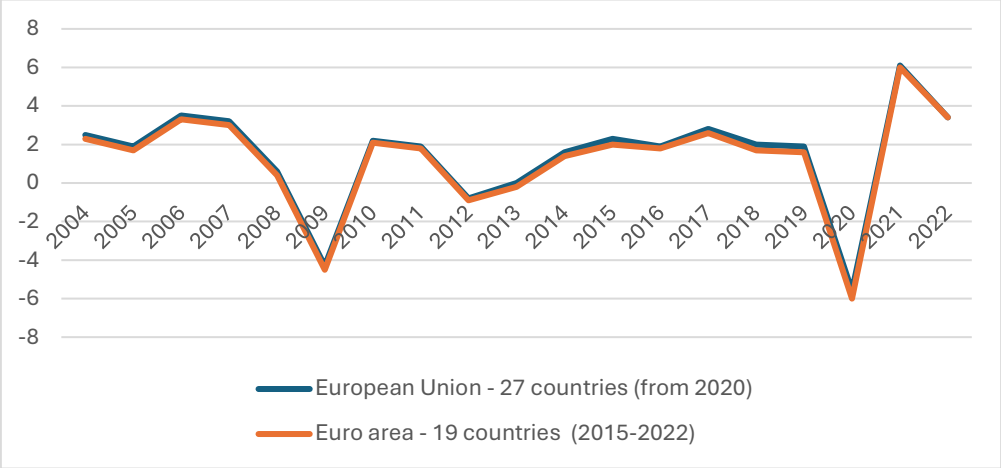
However, for determining how Romania's economy evolves in this context, it is necessary to compare the rate of the domestic economic growth to the trends developed for the considered period of analysis at European Union level. In order to perform this comparison, it is necessary to compute the average and representative rate of the gross domestic product in Romania, for the EU-27, and for the Eurozone over the period 2005-2022, by including observations based on the Kitchin cycles, while also comparing the behaviour of the Romanian and EU-27 economies in the periods that were impacted by major external shocks. At the same time, the structural changes are identified, from the viewpoint of their size and direction, which in turn assists in concluding whether structural convergence exists between Romania, the European Union and the Eurozone.

## 4. Research results and comments

The methodology employed, allowed for a good characterisation of the gross domestic product dynamics in Romania over the period 2005-2022, as it is the period marked by two major external shocks, respectively the 2007-2008 financial crisis which spread at world level from the USA, and the 2020 Covid-19 pandemic, as both triggered recessions.

Overall, the entire period 2004 to 2022 was one of economic growth within the European Union as a whole, but registering quite a volatile evolution of the GDP growth. For instance, between 2000 and 2008, the annual GDP growth rate varied between +1% and +4%. This might be regarded as a first period, before the financial crisis was strongly felt also within the EU, when as result GDP dropped by more than 4% in 2009 and, after an uncertain small recovery, it dropped again slightly in 2012. The recovery period from 2014 to 2019 registered annual growth rates around +2%. However, the outbreak of the Covid-19 pandemic triggered a drop of about 6%, as a result of the economic downturns due to the mandatory lock-in and the subsequent break in the supply chains all over the world. In 2021, the economy began recovering fast, and annual GDP increased by over 5% This trend is rather comparable for the EU as a whole and for the Eurozone, including for the periods included in the present analysis, respectively the period 2005-2008, 2009-2014, 2015-2019, and the 2020-2022 period, as regards to comparing developments with evolutions in Romania (Figure 1).

**Figure 1. GDP annual growth rate in the EU-27 and Euro Area 2004-2022 (%)**




Source: Eurostat, 2024 [NAMA_10_GDP__custom_12430158].

It is worth mentioning that the pattern is relevant and consistent also from the perspective of investment and consumption trends, as they overlap almost entirely the 5 periods identified regarding the evolution of GDP, both investment and consumption recording constant increases, varying between 3% and 5% mostly over the period 2015-2019 (investments) and about 2% (consumption), but both were reversed as the pandemic spread within the EU and the downturn consisted of declines by 8% and 5% respectively (Eurostat, 2024).

As can be observed in Figure 1, in 2009 almost all member-states, whether included in the Euro Area or not, entered into recession. It was a prolonged period, as despite the slow increases in GDP, the level of the gross domestic product was higher against the year 2008 only by 2014. In 2020, the outbreak of the Covid-19 pandemic triggered a new recession, followed by a rather quick recovery in the period 2021-2022.

### 4.1 Dynamics of Romania's GDP in the European context over the period 2005-2022

The results are in agreement with the generalised observation that developing countries involved in the catch-up processes tend to have a faster growth rate than advanced countries, despite the fact that sometimes the measurement of their economies is contested because of changes in methodology, or in data sources. Among the reasons substantiating this perspective are ones related to

weaker institutions and lower administrative capacity, governance still needing improvement, the existence and sometimes persistence of larger informal sectors, or of the 'grey economy', and the fact that the primary sector (agriculture) continues to be a large part of the economy, hence triggering a more volatile growth (Angrist et al., 2021).

Romania, after the conclusion of the second transition to the free market economy in 2004, has considerably changed its economic structure, and this again was a sign of the country's convergence with the European Union, and the Eurozone in the pre- and post-accession period.

For understanding the similarities and dissimilarities regarding GDP dynamics in Romania in the European context over the period 2005-2022, the period of analysis was divided into several distinct periods, so as to emphasise the dynamics of the GDP at national level, in the EU, and in the Eurozone.

### *4.1.1 The period 2005-2008*

The analysed period continues the trend from the period 2000 to 2004 when, after readjusting production capacities, GDP entered on an increasing trend, thereby stimulating the demand for capital goods, as well as registering higher levels in the stock of raw materials required for expanding activities. At the same time, investment was stimulated by the income increases for large categories of the population. Another favourable factor was the improved absorption capacity of pre-accession funds granted by the European Union as of 2000. Hence, the acceleration of the average annual growth rate of the GDP was maintained over the period, but it was obtained in the conditions of continued worsening in the external trade deficit. The average annual GDP growth rate was 5.18%, while the trajectory was convex, with a representative rate of 4.34%, over the period 2000-2004. This trajectory was maintained during 2005-2008 interval in Romania, while in the EU and Eurozone, the GDP trajectory was concave. However, in both instances GDP increased more slowly in the EU and Eurozone, as compared with Romania. Another fact worth mentioning is that the increase in the EU was slightly higher than the one for the Eurozone (Table 3).

**Table 3. GDP growth dynamics in Romania, the European Union and Eurozone over the period 2005-2008**

| GDP growth dynamics | Romania | European Union | Eurozone |
|---|---|---|---|
| Average rate | 7.29 | 2.27 | 2.07 |
| Representative rate | 6.64 | 2.49 | 2.28 |

Source: authors' own calculations.

For Romania, this period regarding GDP dynamics is characterised by the same features of increasing foreign trade balance deficit from 10.29% in the previous period to 12.86%, respectively higher by 2.57 p.p, on the background of an increase in the share of gross capital formation from 22.93% to 33.09%, respectively by 10.16 p,p. The sensible increase of the share of the gross capital formation was an outcome of both differentiation of the population incomes, and the liberalization of the land market and the sensible expansion of real estate activities.

At the same time, the share of private consumption diminished by 5.73 p.p., from 78.14% to 71.41%, while the weight of governmental consumption decreased by 1.78 p.p,, from 9.22% to 8.36%.

### *4.1.2 The period 2009-2014*

The period is characterized for the EU and the Eurozone as a period of unstable dynamics as regards GDP dynamics triggered by the recession which affected to various degrees all member-states, including here Romania. Romania, is a particular case, as it accessed the EU in 2007, leaving little room for actual adjustment to the new condition of member-state and the new requirements imposed by this status. At the same time, it is noticeable that the national recovery shows some dissimilarities in comparison with the EU and the Eurozone.

Romania was faced with a period of deep recession, in which GDP decreased by 9.2% during the years 2009 and 2010, with an average rate by 4.70%, while the representative rate was by -4.97%. Hence, we deal with a decrease under a concave trajectory.

In 2011, a slight improvement occurred, initiating a recovery trend that continued, for the rest of the period, until 2014. The average growth rate of the period is by 2.69%, while the representative growth rate is by 2.83% This means that, after the period of contraction, the GDP dynamics took a concave shape gain, even though, over the entire period 2009-2014, the average rate was by 0.16%, while the representative rate was by -1.23%, which characterises the GDP dynamics as unstable throughout the period. The conclusion is that this period represented a V-shaped recovery for the Romanian economy, based on the alternance between recession and recovery.

During the 2009–2014-time interval, the deficit of the foreign trade balance decreased by 12.44 p.p., from -12.86% to -0.42% of the gross domestic product. At the same time, the share of gross capital formation diminished by 8.32 p.p. from 33.09% to 24.77%. The share of private consumption diminished by 3.66 p.p. from 71.41% to 67.75%, while the share of the governmental consumption grew by 0.63 p.p., from 7.27% to 7.90%.

The EU and the Eurozone were subjected to GDP decreases in three years of the analysed period: 2009, 2012 and 2013. Therefore, the shared similarity is the unstable dynamics for two of the sub-periods, respectively 2009-2011, and 2012-2014.

In the first sub-period (2009-2011), the average rate was -0.11% in the European Union, and the representative rate was -1.15%, while in the Eurozone the respective indicators were -0.28%, and -1.32%. The second sub-period, 2012-2014, the European Union had an average rate of 0.12%, and the representative rate was -0.12%. In the Eurozone, the respective indicators were: average rate 0.10%, and representative rate -0.29%. If we consider the period 2009-2014, as a whole, for the European Union and the Eurozone, the average rate was 0.07%, and the representative rate was -0.41% for the entire EU, while for the Eurozone the average rate was -0.41%, and the representative rate -0.58%. Thus, the recovery dynamics were W-shaped. The Eurozone was faced with a recessionist climate which can be seen by analysing the negative values for the average rate (-0.09%), and the representative rate (-0.58%).

#### *4.1.3 The period 2015-2019*

This period represents the moment when economic growth was relaunched in Romania, in the EU, and in the Eurozone, as the average annual growth rate was 5.05% in Romania, 2.02% in the European Union and 1.98% in the Eurozone. The representative growth rate was by 4.52% in Romania, 2.26% in the European Union, and 2.04% for the Eurozone. The difference between Romania, the European Union and the Eurozone is that while in Romania we deal with convex dynamics, in the European Union, and in the Eurozone, the dynamics were concave over this time interval.

In the case of Romania, the fast economic growth was obtained at the price of the increase of the foreign trade deficit balance, from -0.42% in 2014 to -4.12% in 2019. We also note the decrease of the share of gross capital formation from 24.77% to 23.63%. Hence, both consumption components increased their shares in the gross domestic product: the share of private consumption grew from 67.75% in 2014 to 70.74% in 2019, while governmental consumption share increased from 7.90% to 9.76%.

#### *4.1.4 The period 2020-2022*

During the period 2020-2022, we deal with an unstable dynamic of GDP for the entire European Union, as the Covid-19 pandemic brought with it a global recession in 2020. It implied a decrease of the GDP in Romania by 3.7%, in the European Union by 5.6%, and by 6.1% in the Eurozone. However, due to measures taken over the year 2020, in Romania, in the EU, and in the Eurozone, growth resumed as early as 2021. It is noticeable that in the case of Romania the recovery was faster, because the rate of economic growth was 5.8% in 2021, and 4.7% in 2022. In the European Union the recovery was relatively slower, as the rate of economic growth was 5.4% in 2021, and 3.5% in 2022. In the case of the Eurozone, the growth rate was 5.1% in 2021, and 3.5% in 2022. According to these findings, the GDP level registered in 2019 was overpassed by Romania in the year 2021, while for the European Union and the Eurozone, the level recorded in 2019 was overpassed in the year 2022.

We notice that the relatively faster recovery of Romania's economy after the pandemic shock was obtained in the context of the increase of the foreign balance deficit from -4.12% in 2019 to -6.68% in 2022. Also, the share of gross capital formation grew from 23.63% to 27.06%. At the same time, the

share of private consumption diminished from 70.74% to 70.32%, while the share of governmental consumption decreased from 9.76% to 9.30%.

#### *4.1.5 Characterisation of the entire analysed period*

Over the entire period 2005-2022 the average annual rate of GDP was by 3.34% in Romania, 1.30% in the European Union, and 1.09% in the Eurozone. For the same period, the representative rate was 3.46% in Romania, 1.22% in the European Union, and 1.03% in the Eurozone. It is noticeable, that if we consider this entire time-interval, the dynamics of GDP growth were concave for Romania, but convex in the case of the European Union and the Eurozone.

It is obvious that Romania registered one of the fastest economic growth rates in the European Union, and as a whole the economic growth was faster when compared with the European Union and the Eurozone.

By analysing the situation of the country against the economic growth rate averages for some of the other EU member-states, Romania ranked fourth among the others, over the analysed period, after Ireland (5.3%), Malta (4.6%), and Poland (3.9%). These developments for the entire EU also show that the economic growth was faster than in the Eurozone. This trend is actually the outcome of the convergence registered between the member-states, confirming that the member-states still in need of catching-up have faster growth rates than the advanced economies included in the Eurozone.

These developments also allowed for reducing gaps in the GDP/per inhabitant (in PPS), related to the average of the European Union. When compared, the Romania/European Union ratio of the respective indicator was 36% in 2005, 53% in 2010, 57% in 2015, 70% in 2019, and 77% in 2022.

### 4.2 Sectoral structural change of gross added-value in the context of the Kitchin cycles

The fast economic growth registered in Romania over the period 2005-2022 occurred due to the important changes brought to the sectoral structure of value-added. The sensible increase of the GDP was obtained in the context of the tertiarization of the economy, which meant an increase in the significance of the services' sector in the total value-added. At the beginning of the period of analysis, the weight of services in total value-added was 54%, and by the end of the interval it was 63.3% in 2022. The coefficient of the intensity of sectoral structural change (CISSC) was 11.39 p.p.

The Eurozone's advanced economies are regarded as service economies, and considering the increases registered by the services' sector, Romania is on a structural convergence path with the other economies of the European Union and the Eurozone. For the whole European Union, the weight of services in the total value-added increased from 71% to 72%, and from 71.5% to 72.7% in the case of the Eurozone. If we analyse the sectoral structural stability, based on the CISSC, for the European Union the coefficient was 1.35 p.p., and 1.63 p.p. in the Eurozone, for the entire analysed period (2005-2022).

Over the period 2005-2019, as shown above, we deal with intense structural changes in the Romanian economy, coinciding with five Kitchin-type cycles (2005-2008; 2009-2014; 2015-2019)), from which four were characterised by economic growth, save for the cycle coinciding with the 2009-2010 Recession.

GDP growth was accompanied by the increases in the gross value-added (GVA) depending on the domestic and international conditions, but also on the stages corresponding to the pre-accession, and the accession period to the European Union. It is found that, during the entire period, the annual growth rate of the gross value added had considerable fluctuations.

The period 2005-2008 was marked by an acceleration of economic growth, a fact reflected also by the increase of annual average rate of gross value added, which was by 7.23%, and of the representative rate, which was by 6.48%, on a convex evolution trajectory.

The differentiation in the increases of the gross value added is notable at the level of economic activities, which indicate that structural changes are occurring in the economy: in agriculture, the trend is of decrease for this indicator, and the trajectory is concave. In industry, the increase of gross value added occurred on a convex trajectory, but much slower compared with the domestic average. It is also the period of expansion for real estate, and of higher differences in the incomes of the population. This fact contributed to a boom related to the gross value added in the construction activities. In this case the average annual rate was over 23% on a convex trajectory.

The services' sector had much quicker increases in the gross value added against the national average, as the average annual rates were over 11% and recorded in wholesale and retail trade, in transports-warehousing, hotel-restaurants (11.41%), and in the information and communication technology (14.63%). The difference is found in the trajectories, as the increase was convex for retail and wholesale trade, while it was concave for information and communication technologies.

Swifter increases against the relevant dynamics for the entire Romanian economy were recorded from the viewpoint of the average annual rate also in real estate (6.64%, and for entertainment and recreational activities (5.73%). In both cases, the representative rates were superior to the one recorded at national level, a fact also shown by their concave evolution.

The professional, administrative and support activities were also increasing quicker as compared with the national average, with an annual average rate by 9.09% on a concave trajectory, just like for financial intermediation and insurances, where the annual average rate was by 8.52% on a convex trajectory.

Nevertheless, a concerning fact is that in this period, decreases were registered in the case of activities related to public administration, defence and education, where gross value added diminished in real terms. The annual average rate was -1.88%, and the trajectory was concave.

The recession of the period 2009-2010 was accompanied by the diminishment of the gross value added for the entire economy, the decrease having an annual average rate by -4.80% on a convex trajectory. The representative rate was -4.67%. Compared with the national average, more intense drops in the activity on a convex trajectory were recorded in agriculture (annual average rate -8.36%, representative rate -6.32%), and constructions (annual average rate -14.72%, representative rate -13.72%). In industry, the dynamics was unstable, a fact also shown by the positive value of the annual average rate (0.22%), and the negative value of the representative rate (-0.36%). Indirectly, this reveals the drop in the industry production volume during the first year of the recession, and the relaunch of the activity during the year 2010. For the services' sector, several typologies of gross value-added dynamics can be noticed, respectively: (i) more intense decreases than the ones recorded at the level of the national economy, on a convex trajectory in real estate (-14.72% annual average rate), entertainment and leisure activities (-11.33% annual average rate), professional, administrative and support services , with an annual average rate by -9.86%, for wholesale and retail trade, transport-warehousing, and hotel-restaurants (-9.05% annual average rate); (ii) slower decreases as compared with the dynamics for the entire economy on a concave trajectory in information and communication technologies (-2.17% annual average rate), in financial intermediation and insurances (-4.30% annual average rate); (iii) a sensible increase on a concave trajectory in public administration and defence with an annual average rate by 12.94%.

These typologies of value-added dynamics within the tertiary sector highlight, in the recessionist context, the services exposed to market fluctuations that were significantly affected by the decrease in consumption, and by the bottlenecks in real estate activities. At the same time, services related to information processing and communications, the development of the financial market had much lower setbacks. The intervention of the public authorities in weakening the effects of the recession triggered a slight increase on a concave trajectory of the gross value-added generated by activities related to public administration and defence.

The economy resumed a **s**low relaunch over the 2011-2014 period, with an annual average rate by 2.71% and a representative rate by 2.82% on a concave trajectory. A marked differentiation was displayed for the growth rates within the main economic activities, with considerable contributions to resuming economic growth of the activities grouped within the tertiary sector, but also in the primary sector, where the gross value-added had an annual average rate by 6.21% on a convex trajectory, with a representative rate by 4.36%. This development compensated to a large extent the drastic agricultural production drop during the period of the recession. In turn, the components of the secondary sector continued to record stagnation in their activities, as shown by the negative rates of the gross value-added. In industry, the annual average rate was -0.52%, and the representative rate was -0.60%, while in constructions the annual average rate was -4.77%, and the representative rate -10.18%.

The strongest of the dynamics of gross added-value was registered in the tertiary sector, with a representative rate higher than 10% in professional, administrative and support services (15.98%), wholesale and retail trade , transports-warehousing and hotel-restaurants (15.09%), financial

intermediation and insurances (12.28%), information and communication technologies (10.10%) the annual average rates were lower than the representative rates, hence we might assume that the development trajectory was concave. Exceptions were recorded by real estate transactions where the annual average rate (3.08%) was smaller against the national average, and the representative rate (2.77) indicating a convex trajectory. Trends of dropping gross value-added were registered also in public administration and defence on a concave trajectory (annual average rate -1.31%, and representative rate -2.44%), in entertainment and leisure activities on a convex trajectory (annual average rate -3.61%, and representative rage -0.63%).

The period 2015-2019 had a slower dynamic of the gross value-added for the entire economy, as compared with the previous period. The average annual rate was 2.72% (representative rate 1.52%), in agriculture, forestry and fishing, 3.65% in industry (representative rate 6.01%) and 2.31% in constructions (representative rate 5.01%). In the services' sector, all activities had a concave development trajectory, because the absolute values of the representative rates were higher than the annual average rates.

The differentiated dynamics of gross value-added had considerable implications on the sectoral structure and on activities, in evaluating the characteristics of sectoral structural changes of gross-value added for the analysed period (2005-2022) it should be taken into account that Romania was regarded as an economy where the tertiary sector generated over 50% of the gross value-added for the entire economy. At the beginning of the 2000s, the weight of the primary sector was 14.11%, of the secondary sector 28.19%, and of the tertiary sector 51.98%. The weight of the tertiary sector had a constant increasing trend, from 51.98% in 1999 to 64.61% in 2019.

Overall, we might conclude that the intensity and direction of the sectoral structural change for gross value-added differed from one economic cycle to another. By analysing them, a certain instability can be noticed, but with the dominating trend of economy tertiarization, which became the main direction over the cycle 2015-2019.

For the analysed period, the distribution of gross value added across economic activities in Romania is resumed on main economic activities that show how the economic structure of the economy has changed, in agreement with developments that occurred in the other EU economies, as well (Table 4). Noticeable, for the entire period, is that within the services' sector, the fastest dynamics were recorded in the field of information and communication activities, followed by the scientific, technical and professional services. This fact has several implications: on one hand it highlights the advances registered in the use of information-communication technologies along with the decentralization of economic and social activities. On the other hand, it proves that structural changes within the activities of the three economic sectors occurred during a period of relative stability for the weight of industry over the period 1999-2008, continued by a lower intensity setback during the 2009-2010 Recession, and a decrease in the context of economic relaunch (2011-2019).

During the 2020–2022 interval in Romania, we notice that the weights of the primary sector and of constructions experienced no major changes. The weight of industry grew from 23.5% in 2019 to 24.8% in 2022, while the relative importance of the tertiary sector diminished from 65.6% to 63.3%. In this context, CISC was 1.84 p.p. Within the tertiary sector we observe the increase of the weights in the case of wholesale, retail trade, tourism and transports from 19.3% to 20.5%, of information-communication technologies from 6.4% to 7.0%, and of financial intermediation and insurances from 2.6% to 2.9%. The decrease in the weight of the tertiary sector in the gross added-value was caused by the slow dynamics registered by real estate, professional and scientific services, social services and cultural and other services. If we consider all economic activities, the transfer of weights is 3.7 p.p. and the coefficient of intensity of structural change is 2.85 p.p.

The respective structural change is an outcome of the particular conditions mainly created by the pandemic shock. Thus, the new economic environment favoured the extension of the use of information-communication technologies, and impeded the growth of the services related to real estate, technical and support activities, or cultural activities.

Over the whole period 2005-2022, almost all service activities have registered increases of their weights in the total gross added-value. The exceptions from the rule were represented by wholesale and retail trade, tourism and transports, and by real estate (Table 4).

**Table 4. The distribution of value-added across economic activities in Romania in 2005 and 2022**

| Economic activity | 2005 | 2022 |
|---|---|---|
| Primary sector | 9.6 | 4.9 |
| Industry | 28.5 | 24.8 |
| Constructions | 7.9 | 7.0 |
| Wholesale, retail trade, tourism and transports | 21.2 | 20.5 |
| Information-communication technologies | 4.5 | 7.3 |
| Financial intermediation-Insurances | 2.3 | 2.9 |
| Real estate | 8.5 | 8.0 |
| Professional and scientific services, | 3.4 | 7.8 |
| Social services (education, health, national defence) | 11.7 | 13.9 |
| Cultural and other services | 2.4 | 2.9 |

Source: authors' own calculations based on EUROSTAT Statistics explained, GDP and national accounts, June 2023.

These evolutions allowed for attenuating Romania's structural divergences of the value-added against the European Union, as this index decreased from 20.36 pp. to 10.82 p.p., while compared with the Eurozone it diminished from 21.48 p.p. to 11.73 p.p. In 2022, the structural divergence of Romania against the European Union as a whole was not determined only by the weights of the primary and secondary sectors, but also by the distribution of the gross added value within the tertiary sector. We notice that the weights for wholesale and retail trade, tourism and transports and respectively information-communication technologies are higher in Romania (Table 5).

In Romania's case, the lower weight of the tertiary sector in the added-value, compared to the average of the European Union, is caused by the services related to financial and firms' activities (insurances, real estate, professional and scientific activities), and social services.

**Table 5. Structural divergence of sectoral added-value distribution between Romania, EU and the Eurozone in 2022 (%)**

| Economic activity | Romania | EU | Eurozone |
|---|---|---|---|
| Primary sector | 4.9 | 1.9 | 1.8 |
| Industry | 24.8 | 20.5 | 20.0 |
| Constructions | 7.0 | 5.6 | 5.5 |
| Wholesale, retail, tourism, transports | 20.5 | 19.4 | 19.2 |
| Information-communication | 7.3 | 5.3 | 5.2 |
| Insurances | 2.9 | 4.3 | 4.3 |
| Real estate | 8.0 | 10.4 | 10.8 |
| Professional and scientific services | 7.8 | 11.2 | 11.5 |
| Social services (education, health, defence) | 13.9 | 18.4 | 18.7 |
| Cultural and other services | 2.9 | 3.0 | 3.0 |

Source: authors' own calculations based on accounts, June EUROSTAT Statistics explained, GDP and national accounts, June 2023.

### 4.3 Brief overlook of Romania's convergence at regional level

As shown above, the entire period between 2000-2019 shows that Romania achieved progress also regarding convergence with the EU-27, but continues to display a series of asymmetries and gaps against the typology of the post-industrial economy in the advanced countries. This finding correlates with some findings of analyses realised in the past years, regarding the dynamics of GDP not only for the EU as a whole, but also more specifically addressing the economies of Central and Eastern-Europe.

In the regional context of central and eastern Europe, it is incontestable that the New Member-States located in this region were all counted among the countries with best economic performances from both the perspective of the global economy, and at EU level.

The dynamics of the gross domestic product for all countries in the region show that all registered accelerated growth in the time interval 2000-2007 when their annual average rates were often higher than the ones for the European 'growth engines' (Grieveson et al., 2021).

For the purposes of analysing Romania's convergence at regional level, and implicitly at EU-27 level, we considered six of the member-states (Bulgaria, Czechia, Slovakia, Hungary, Poland, and Romania) based on considerations related to the immediate proximity of Romania.

It is noticeable that, from this group, the countries considered as representative for Central Europe (Czechia, Poland, Hungary and Slovakia) have an evolution based on the development of the manufacturing industry, which determined their inclusion amongst the 30 top-performers in this economic activity, with Czechia and Poland among the first 20 performers over the time interval 2000-2019, in the field of technology. In 2019, Czechia ranked 11$^{th}$, and Poland 20$^{th}$. Based on the technological potential, according to the analyses and methodology of the Economic Complexity Observatory, also included are Hungary ranking 14$^{th}$, and Slovakia. This fact contributes to showing that Romania is still on catch-up regarding exports of technological-intensive goods, where it ranks among the first 30 performs, on the 26$^{th}$ position in 2019 (Observatory of Economic Complexity, 2019).

At the same time, with slight convergence asymmetries between these NMS, the emphasis on manufacturing industry is showing signs of over-specialisation in their production models, a fact that might hinder in the future the capacities of improvement by including or adding some other activities with a higher level of sophistication on the value-chains, the effect being reflected in the "trap of verage" (Grieveson et al., 2021, Fidrmuc et al., 2020). The 'trap' is generated by the overspecialisation in particular in the automotive and electronics industry, including here Romania as belonging to this core, for various car goods and accessories, including electronic components.

All analysed NMS countries, over the period 2005-2022 have shown significant differences regarding economic activities, policies and measures dedicated to improving their economic growth model based on scientific activities, research-development and innovation, and entrepreneurship. This is relevant, as it shows that the economic model for all of these member-states needs to be overhauled for ensuring sustainability and resilience given the current context of inflationary pressures, and successive crises of the period 2020-2022, the impact of which expands also beyond this timeframe, to the present.

Moreover, if we consider convergence on its 4 main dimensions (economic, social, institutional and environmental), all these countries have comparable issues in the banking sector, green transition, education and health services, all the while being faced with multiple challenges from the institutional perspective as regards quality of governance, transparency, and trust in official economic communication.

## 5. Conclusion

The analysed time framework 2005-2022 overall, was the one in which Romania, just like other New Member-States of central and eastern Europe entered the path leading to EU-accession in the first decade of the years 2000. It was a period of constant challenges, as all countries of the region were affected by comparable issues related to infrastructures, industrial capacities and policies, capacity of attracting foreign direct investments, and the institutional-legislative framework.

The rate of economic growth registered by Romania was one of the highest among the member-states of the European Union. This performance was obtained due to some specific conditions. Firstly, it was a result of accessing to and becoming a member of the European Union. In the context of the integration in a large single market, the perspectives of economic growth have improved sensibly. Especially the complete liberalization of all components in the markets building the economic system favoured the intensification of economic activities. At the same time, another favouring factor of fast economic growth was the continuous increase of the incomes of individuals, and their differentiation based on the single taxation rate of salary incomes.

Under the above-mentioned conditions, there were many stimuli for an accelerated increase in consumption, but at the price of worsening the foreign trade balance deficit. Nevertheless, these incentives for achieving economic growth favoured the considerable expansion of imports, as well. Thus, during the analysed period, we deal with a continuous deficit of the foreign trade balance. The respective deficit has tended to worsen when the economic growth accelerated, and tended to improve when Romania's economy entered recession or faced slow economic growth. The exception from the rule occurred during the 2020-2022 period, when the deficit of the foreign trade balance increased in

the context of the pandemic recession, and the V-type relaunch. We should not neglect the fact that the behaviour of the above-mentioned deficit was favoured to a relevant extent by the pro- cyclical economic policy.

It is important to bear in mind that Romania's fast economic growth has determined important sectoral changes, their direction being the tertiarization of the economic structure, in other words the consolidation of the service economy. The evolution is in line with the trends displayed by other developed states. The decrease in the shares of the primary and secondary sectors happened in the context of the sensible development of economic activities included in the third sector, but were also caused by the hampered development of agriculture and industry.

The tertiarization trend was strengthened, as the contribution of the digital technologies in generating gross-value added was on constant increase. Nevertheless, even in these conditions a series of gaps against developed member-states are maintained in the degree of tertiarization of the gross value-added, which continues to be under two-thirds. In developed EU member-states, the respective weight is higher than 70%. We notice that the differences related to the structure in the distribution of value added for the services' sector reveals the important development of the information, communication, and distributive activities, revealed by their higher share compared to the whole European Union. The gaps concerning the shares of the services' activities are generated by the financial and social services, revealing a relatively lower stage of development compared to the most developed member-states.

By the end of the analysed period (2022), we might conclude that the tertiarization of the Romanian economy is an ongoing process, which in the context of the digital economy is expected to continue.

Nonetheless, despite the positive developments recorded over the last decade, it is necessary to maintain a fast rate of expansion as regards information-communication technologies, along with improving measures, and policies for strengthening scientific-technical activities, especially regarding research-development and innovation capacities, and initiatives at national level. A sustained rate of increase is also necessary for other services related to the financial ones, including here investments in critical economic activities.

The present stage of development requires an in-depth analysis for the main trends of structural change that should avoid the obstruction of agricultural and industrial activities, while considering improved economic growth models that would support for a better correlation of the economic growth rate with the other indicators related to the resilience and sustainability of the economic structure, by taking into account the direction of the technological progress

The economic growth recorded by Romania in the analysed periods shows that the structural changes occurring at sector and economic activities' level might be indicative for the need of entering a new stage of reconfiguring economic policies, so as to change the economic growth model. Policies in this respect should be considered for turning the domestic economy more competitive and attractive for current foreign direct investment flows. At the same time, it would allow for answering to the recent needs of the industries that are competitive on the entire value chain, for instance in microelectronics, the chip and microchips industry, and for digitalised solutions as post-2020 this became an imperative, next to the required improvements of the energy sector for which Romania receives about 1.1 billion Euros from the EU allotted for improving the natural gas infrastructure. It is also important to bear in mind that the sectoral structure of the gross domestic product is modelled also by the industrial and fiscal policy. In this context it would be very useful to promote a coherent industrial policy in line with the recommendations of the European Commission, in order to sensibly increase the competitiveness of Romanian goods and services supplied for the external markets. Another change is needed for the fiscal policy, which would have to consider a multi-annual vision in order to avoid its pro-cyclical behaviour.

One of the limitations of this research is that the economic growth of the Romanian economy during the considered period is analysed only from the output-side perspective. We have mentioned that the sensible expansion of the gross domestic product, in real terms, was obtained in the context of the persistent deficit of the foreign trade balance. This evolution hampers the sustainability of economic and social development. Hence, a possible way to develop the analysis of the features of Romania's growth in the middle and long run is the study of the relationship between the dynamics of the deficit

of the foreign trade balance, the flows and stocks of foreign direct investments, and the dynamics of the gross domestic product.

***Authors' contribution**: Introduction, FMP, CD.; Literature review, CD; Methodology and data, FMP; Research results and comments, FMP, CD.; Conclusion, FMP, CD.*

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