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Structural Changes in the Bulgarian Economy and Their Impact on the Economic Growth

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Abstract: The aim of this piece of research is to carry out an assessment of the impact that the structural changes in Bulgaria's economy have on the economic growth achieved in the period before and after the country's accession to the European Union (EU). In order to assess the impact, what is first examined is the structural vector's role as both a criterion for the assessment of an economy's level of development and as a strategic factor for reaching specific economic growth rates.

To examine the correlation between structural changes in the economy and economic growth, the input-output model (The World Input-Output Database) has been utilized. The assessment of the impact of structural changes in the economy on the achieved economic growth is conducted on the basis of the multiplier factor analysis of the changes in the following variables: volume of gross output (ΔX_j), structure of gross output (S_{Xj}), the Leontief matrix (I-A), the Leontief inverse matrix $(I - A)^{-1}$, volume of final output (ΔY_i), and structure of final output (S_{Yi}).

Key words: economic development, growth, output

JEL: E1, O1, O4

Introduction

For 15 years now Bulgaria has been member of the most developed integrational community in the world – the European Union. Yet the issue of integration has preserved its topicality above all because of the formation of a qualitative assessment of the achieved results. In most studies of the integrational process, attention is directed at the assessment of the impact of one or another factor on a specific aspect of the social and economic development or at the implications of specific decisions, rules and procedures for some concrete economic sector (Ivanov, 2019). Little attention is paid to the issue pertaining to the changes in the economic structure that occurred as a result of the economy's integration into the EU.

It is well known and generally assumed that the structure of a national economy reflects its content and the changes in this content occurring over the course of time. The structure of a national economy by period in turn reflects the reached level of development of man, knowledge, the economy and society. The comparative analysis of the structure of the national economy through different periods of time outlines the most important qualitative changes in its development. For instance, every economic period is characterized by a specific structure of the national economy. The economy of the agrarian age is characterized by a specific structure, the economy of the Industrial Revolution is characterized by another structure, whereas the economy of the post-industrial age and the knowledge-driven

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economy of sustainable development are characterized by absolutely different structures (Manov, V., 2011).

The increased standard of living in a society depends on both the type of implemented economic activities and on the effectiveness with which they are carried out. For instance, if in the structure of an economy the predominant economic activities are of a simpler nature in technical and technological terms, that is to say that their performance does not require a high level of education and qualification, nor a complicated and complex technology, then the opportunity to achieve a growth of the added value are far more limited compared to another economic system in which the production is characterized by a high share of complex production and technological processes that form a long chain of direct and indirect links and presumably require a high level of education and qualification. From this perspective, the structure of an economy is also related to the way in which the useful result achieved in the economy is distributed. As research shows, the distribution of the created added value is significantly fairer in an economy, in the structure of which high-technological productions dominate, compared to an economy in which simpler in technical and technological terms productions have a high relative share.

In the structure of an economy, the results achieved from the interaction of the different factors of economic growth take shape in an integral form. Furthermore, the structure of an economy appears to be the most relevant factor determining its future development and growth. In this context, increasing importance with regard to full-fledged EU membership is acquiring the issue of how the integration process contributes to the formation of an effective and sustainable economic structure that is in line with the contemporary trends and standards in the social, economic, technological and ecological progress.

Literature review

The examination of the empirical studies of economic growth conducted during the last 60 years shows that the studies largely reflected the approach to economic development adopted during the respective period (neo-Keynesian, neo-classical, monetary, etc.). This is the reason why the focus in the utilized econometric models for the study of growth is placed on the impact of one factor or another (mainly labour force and capital). Originally the focus was the examination of the quantitative parameters of growth, i.e. the opportunities to achieve high economic growth rates. Gradually the focus was redirected towards the qualitative characteristics of growth – the investigation of the different variants of growth interpreted as expedient from a social, economic and ecological perspective.

There was a significant change in the utilized tools. Originally research was targeted at the examination of a single (autonomous) factor based on regression and correlation dependencies, whereas gradually research encompassed an increasing number of factors (economic and non-economic) and a transition was made towards the use of combined approaches of econometric models and surveys. Next, an increasingly important role in the study of growth was placed on globalization and regional economic integration, and government's growing role in the social and economic development.

In post-1990 Bulgaria, the topic of economic growth was actively examined mainly by utilizing regression and correlation dependencies in the development of various scenarios of expected economic growth. After 2000, the research focus was directed at the impact of the separate factors and phenomena on economic growth – investments; human capital; domestic economic ties; competitiveness; finance sector; convergence, corruption; natural resources, total factor

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productivity. In most cases the research results were unsatisfactory and controversial. One of the major reasons for the unsatisfactory results achieved in utilizing econometric models based on the output function lies in the original assumption about the strict independence of all included variables. Obtaining reliable information from a specific econometric model depends largely on the validity of the basic assumptions made in the model's construction. The more adequately the included variables reflect the logic behind and the laws regulating the system's development, the more useful will the information obtained from the model's application in the examination of a specific process be.

The contemporary interpretations of economic growth are based on the assumption that in essence economic growth is the result of the interaction of a number complex phenomena (economic, social, natural, cultural, political, etc.). Hence economic growth cannot possibly be embraced and represented by a single factor. On the other hand, as a result of the increased number of factors, the links between them are seriously complicated, hence the opportunities to examine their interaction are restricted. This complication stems mainly from the fact that the research object is the **interactions of different qualitative states of the factors.**

The understanding is increasingly gaining ground that the action of one factor or another depends on both the specific conditions and the specific characteristics of the environment within which the respective factor operates and on the stage of the life cycle at which the respective factor finds itself in. A significant drawback of the studies on this topic is that attention is drawn only to the achievement of the possible growth. In research, little attention is paid to identifying the favorable changes that should presumably take place in the state of the separate factors and conditions so that the desired growth is reached. Nor is the due attention given to the follow-up development that can be expected in the respective factor under one or another scenario of economic growth.

In recent years, the process of structural changes in the Bulgarian economy has been studied actively by Kalinkova (2019) and Raleva (2020). But their research is primarily aimed at establishing convergence in economic structures in the process of integration. The question of the role of the economic structure in achieving one or another type of economic growth is less affected.

Methodology

The focus of this piece of research is the assessment of the impact of the structural changes in Bulgaria's economy that occurred before and after the country's EU accession on the achieved economic growth. In the selection of the appropriate research tools for the issues under investigation, first the major theoretical and methodological approaches to the study of economic growth were examined and their applicability in the assessment of the impact of the integration process on economic development and growth.

A basic research tool used to study the link between structural changes in the economy and their impact on economic growth is the **input-output model**. The major advantages of this model are connected with the fact that it allows for an in-depth analysis of the various aspects of the economic structure, and of the link and interaction between the different structures and aspects of the structures. Next, this model encompasses the national economic system in its integrity, which in turn opens up the opportunity to simultaneously examine the way of creating the useful result (in this case the GDP), as well as the way in which this useful result is utilized in the economic and demographic systems. In the third place, this model provides for

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encompassing the various types of links and dependencies within the national economic system (direct and indirect, straight and reverse, horizontal and vertical). Thus it provides for the examination in terms of content of both the changes in the economic structure and their impact on economic growth.

For the construction of the symmetric input-output tables (SIOT), the World Input-Output Database (WIOD) has been used. The data is presented in 56 industry aggregation for the period 2000-2014, which allows for the establishment under a uniform methodology of the dynamic order in the periods both prior to Bulgaria's EU accession and during the first seven post-accession years.

In order to establish the structural changes that occurred in Bulgaria's economy before and after the country's EU accession, the following parameters were sequentially calculated by year:

- The volume, structure and dynamics of the gross output;
- The volume, structure and dynamics of the gross added value;
- The volume, structure and dynamics of the output for final consumption;
- The volume, structure and dynamics of the intermediate consumption;
- The volume, structure and dynamics of the production expenditures;
- The volume, structure and dynamics of the output intended for consumption by households;
- The volume, structure and dynamics of export;
- The volume, structure and dynamics of import;
- The volume, structure and dynamics of the gross capital formation;
- The Leontief matrix (I-A);
- The Leontief inverse matrix $(I-A)^{-1}$;
- The determinant of the Leontief matrix (I-A).

The examination and assessment of the impact of the occurred structural changes on economic growth during the two periods (before and after Bulgaria's EU accession) are implemented on the basis of the multiplier analysis in two aspects:

1) In terms of an assessment of the impact of the extensive (volume of gross output) and intensive factors (direct tangible expenditures and the structure of gross output) on the growth of the final output (i.e. GDP) based on the following functional link:

   (1) $\Delta(I-A) * \Delta S_X * \Delta X = \Delta Y$,

   where

   I – unit matrix;

   A – matrix of input coefficients for intermediates

   (I-A) – Leontief matrix,

   X – volume of gross output,

   S_X – structure of gross output,

   Y – final demand, i.e. GDP.

2) In terms of an assessment of the impact of the extensive (volume of final output) and the intensive factors (complete tangible expenditures and the structure of final output) on the increase of the gross output based on the following functional link:

   (2) $\Delta(I-A)^{-1} * \Delta Sy * \Delta Y = \Delta X$,

   where

   I – unit matrix;

   $(I-A)^{-1}$ – Leontief inverse matrix,

   Y – volume of final demand, i.e. GDP,

   Sy - structure of final demand

   X – gross output.

Results

The results of the investigation into the dynamics and structure Bulgaria's economy in the period 2000-2014 fully reaffirm the hypothesis that it is far easier for an economy to grow, rather than develop in a balanced manner. The comparison of the dynamics with which the gross output grows, the final output, the gross added value and the interim output

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with the changes that took place in their industrial structures shows that the Bulgarian economy achieved relatively high growth rates, yet its structure remains relatively constant. This trend was strongly manifested during the pre-accession period. With all four examined macroeconomic characteristics, the growth during this seven-year pre-accession period was more than two and a half times. After 2007, that is after Bulgaria's admission to the EU, the first signs appeared of the exhaustion of these growth prospects as well as the need to define the clear direction of the future restructuring of the economy.

The conducted multiplier analysis revealed that, for the period 2000-2014, the GDP grew approximately five times. The changes that occurred in the economy's structure thoughout the period had a very poor impact on economic growth. Among the three examined factors – direct expenditures, volume and structure of the gross output – the extensive factor was the most relevant one with regard to economic growth. More than 93% of the GDP increase was due to the increased volume of the gross output. The impact of the intensive factors (direct tangible expenditures and the economy's structure) on economic growth was below 0.5%. The reached economic growth depended mainly on the changes in the price levels in the separate markets, not on the economy's effective restructuring.

Table 1 The impact of structural changes on the economic growth in the period 2000-2014

The Impact of:	In millions USD	in %
The Direct Expenditures (I-A)	1 076,29	1,8%
The Structure of Gross Output (Sx_j)	-240,97	-0,4%
The Volume of the Gross Output	56 082,33	93,3%
The Direct Expenditures (I-A) and The Structure of Gross Output (Sxj)	41,30	0,1%
The Direct Expenditures (I-A) and The Volume of the Gross Output	3 895,61	6,5%
The Structure of Gross Output (Sx_j) and The Volume of the Gross Output	-872,17	-1,5%
The Direct Expenditures (I-A), The Structure of Gross Output (Sx_j) and The Volume of the Gross Output	149,47	0,2%
Total	**60 131,87**	**100,00%**

Source: Own calculations from the World Input-Output Database.

The impact of the extensive factor was more marked (gross output) on the GDP growth in the period of Bulgaria's accession to the EU (2000-2007). More than 96% the GDP growth in this period was due to the increased gross output, whereas the impact of the extensive factors (direct tangible expenditures and the structure gross output) was 0.1%.

Table 2 The impact of structural changes on the economic growth in the period 2000-2007

The Impact of:	In millions USD	in %
The Direct Expenditures (I-A)	754,97	1,7%
The Structure of Gross Output (Sx_j)	-273,25	-0,6%
The Volume of the Gross Output	43 266,47	96,3%
The Direct Expenditures (I-A) and The Structure of Gross Output (Sxj)	-43,82	-0,1%
The Direct Expenditures (I-A) and The Volume of the Gross Output	2 108,14	4,7%
The Structure of Gross Output (Sx_j) and The Volume of the Gross Output	-763,01	-1,7%

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The Direct Expenditures (I-A), The Structure of Gross Output (Sx_j) and The Volume of the Gross Output	-122,36	-0,3%
Total	**44 927,15**	**100,00%**

Source: Own calculations from the World Input-Output Database.

After Bulgaria's accession to the EU in 2007, the results show a considerable growth in the share of structural changes on the GDP growth. For the examined seven-year period, nearly 4% of the GDP growth was due to the structural changes that took place in the structure of the generated gross output. In other words, the impact of the integrational process, albeit poor, started manifesting itself with regard to the growth of the Bulgarian economy.

Table 3 The impact of structural changes on the economic growth in the period 2007-2014

The Impact of:	In millions USD	in %
The Direct Expenditures (I-A)	1 078,03	7,1%
The Structure of Gross Output (Sx_j)	564,13	3,7%
The Volume of the Gross Output	13 178,06	86,7%
The Direct Expenditures (I-A) and The Structure of Gross Output (Sxj)	21,62	0,1%
The Direct Expenditures (I-A) and The Volume of the Gross Output	235,12	1,5%
The Structure of Gross Output (Sx_j) and The Volume of the Gross Output	123,04	0,8%
The Direct Expenditures (I-A), The Structure of Gross Output (Sx_j) and The Volume of the Gross Output	4,72	0,0%
Total	**15 204,71**	**100,00%**

Source: Own calculations from the World Input-Output Database.

The research on the structural changes in the output for final consumption revealed a significant decrease in the share of household consumption and an increase in the share of exports in the post-2007 period. The share of the remaining two elements of final output – investments and government spending – retained a relatively constant level. The conducted multiplier factor analysis showed that the changes in the structure of the final output had not resulted in an effective restructuring of the economy. The impact of the output for final consumption on the increase of the gross output was below 1%, and that of the other intensive factor – direct and indirect expenditures – was below 2%. The impact became even weaker of the structure of the final output on the growth of the gross output after 2007.

Table 4 Impact of the volume and structure of final output on the increase of the gross output for the period 2000-2014.

The Impact of:	In millions USD	in %
The Direct and Indirect expenditures, or Inverse Matrix $(I-A)^{-1}$	-1 612,39	-1,7%
The Structure of Final Demand (Sy_i)	488,70	0,5%
The Volume of the Final Demand	103 225,28	107,2%
The Inverse Matrix $(I-A)^{-1}$ and The Structure of Final Demand (Sy_i)	-300,59	-0,3%
The Inverse Matrix $(I-A)^{-1}$ and The Volume of the Final Demand	-6 257,39	-6,5%
The Structure of Final Demand (Sy_i) and The Volume of the Final Demand	1 896,57	2,0%
The Inverse Matrix $(I-A)^{-1}$, The Structure of Final Demand (Sy_i) and The Volume of the Final Demand	-1 166,52	-1,2%
Total	**96 273,66**	**100,00%**

Source: Own calculations from the World Input-Output Database.

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Table 5 Impact of the volume and structure of final output on the increase of the gross output for the period 2000-2007

The Impact of:	In millions USD	in %
The Direct and Indirect expenditures, or Inverse Matrix $(I-A)^{-1}$	-1 108,97	-1,5%
The Structure of Final Demand (Sy_i)	493,99	0,7%
The Volume of the Final Demand	77 124,13	103,8%
The Inverse Matrix $(I-A)^{-1}$ and The Structure of Final Demand (Sy_i)	-116,08	-0,2%
The Inverse Matrix $(I-A)^{-1}$ and The Volume of the Final Demand	-3 215,50	-4,3%
The Structure of Final Demand (Sy_i) and The Volume of the Final Demand	1 432,33	1,9%
The Inverse Matrix $(I-A)^{-1}$, The Structure of Final Demand (Sy_i) and The Volume of the Final Demand	-336,57	-0,5%
Total	**74 273,32**	**100,00%**

Source: Own calculations from the World Input-Output Database.

Table 6 Impact of the volume and structure of final output on the increase of the gross output for the period 2007-2014

The Impact of:	In millions USD	in %
The Direct and Indirect expenditures, or Inverse Matrix $(I-A)^{-1}$	-1 984,40	-9,0%
The Structure of Final Demand (Sy_i)	-662,92	-3,0%
The Volume of the Final Demand	25 383,76	115,4%
The Inverse Matrix $(I-A)^{-1}$ and The Structure of Final Demand (Sy_i)	-55,86	-0,3%
The Inverse Matrix $(I-A)^{-1}$ and The Volume of the Final Demand	-499,36	-2,3%
The Structure of Final Demand (Sy_i) and The Volume of the Final Demand	-166,82	-0,8%
The Inverse Matrix $(I-A)^{-1}$, The Structure of Final Demand (Sy_i) and The Volume of the Final Demand	-14,06	-0,1%
Total	**22 000,34**	**100,00%**

Source: Own calculations from the World Input-Output Database.

Conclusion

The research on the influence of the structural changes in the Bulgarian economy on the achieved economic growth showed that neither during the pre-accession period, nor during the first seven years as a member of European Union, Bulgaria made not full use of the opportunities of the integration process for the effective restructuring of its economy. The higher dynamics of growth of foreign trade exchange compared to the dynamics of GDP growth does not create the necessary conditions for the growth of the value added in the economy. The foreign trade data show that the increase in exports is mainly due to the raw materials industries (basic metals), which, however, occupy a very small share in the structure of the gross value added created (about 1%). The share of high- and medium-tech industries (medicines, computer technology, chemistry, electronics, mechanical engineering) both in the structure of value added and in the structure of exports remains too small during the entire period studied. The value added in the economy is mainly formed by the activities related to real estate, trade, finance, transport. Relatively constant and high (about 20%) in the structure of the created value added remains the share of the so-called public sector industries such as education, health, energy, government.

These structural changes do not lead to an increase in the efficiency with which the useful result in the economy is created. The data on

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the integral efficiency, calculated through the value of the determinant of the Leontief matrix (I-A), show that in both studied periods (before and after the accession to the European Union), the value of the determinant of the Leontief matrix (I-A) kept relatively constant. In other words, the changes in the structure of Bulgaria's economy and the achieved economic growth do not lead to a tangible increase in the efficiency with which the national economic system functioning as a whole.

In my opinion the main reason lies in the underestimation of the role and importance of the structural factor in the implementation of the various reforms. The structural changes that occurred in the economy during the studied period are rather an expression of the spontaneous and inertial nature of the implemented structural policy than of purposefully pursued results. The big challenge here is how to mobilize the scientific potential to outline the architecture of the future economy and find the ways and means for its practical realization. It is primarily about changing the approach in determining the direction of future development of the economy and its effective restructuring, about a transition from a management philosophy based on deriving possible results (goals) from the inherited prerequisites, to a management philosophy oriented towards deriving the necessary and desired results and outline the necessary structural changes and growth rates to achieve them.

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