ANALYSIS OF PRODUCTION STRUCTURE OF THE GROSS ADDED VALUE OF THE CEE AND EUROZONE COUNTRIES[1]

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Abstract

In the report, the analysis was carried out through a set of indicators that characterize the economic condition and convergence of the CEE countries with the Eurozone. The study covers the period from 2000 to 2022, using official statistical data from Eurostat. The indicators used in the study have been selected on the basis of their importance for the socio-economic development of each countriy and the EU, and to ensure that the information on this indicators is as complete as possible, i.e. that there are no gaps in some national statistical series.

Key words: structural convergence, gross value added, descriptive analysis

JEL: E52, F02, L16, O47

Introduction

A defining indicator of the state and development of national economies is GDP. It is also extremely important for the implementation of European policy in EU member states. The EU has implemented a policy of convergence of production structure, which aims to achieve dynamic growth and high employment. But what are the differences in the socio-economic situation and development of the countries CEE and how much do they differ? How does the accession of new member states affect the gross domestic product of the EU and to what extent does the enlargement of the community increase or decrease disparities? The answer to all these questions is important in order to achieve greater effectiveness of the implemented policy.

The measurement of differences and the degree of convergence is necessary, with a view to taking concrete actions to overcome them. For this purpose, comparable statistical data and indicators are available that allow an analysis of convergence and divergence in the member states of the European Community. Key instruments for achieving structural convergence are the European funds and

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the economic policies of the member states. They serve to eliminate the main disparities in the Community through synchronous development and structural adjustment.

One of the many possible aspects of the problem of the structural convergence of Bulgaria to the Eurozone is that of the convergence of their production structures. It can be traced back to other economists Chenery (1960) and Baumol (1967), but became more prominent in the period after 2000, especially after the creation of the single European currency. Structural convergence accelerates real convergence, synchronizes the economic cycles of countries (Angeloni et al., 2005), and is a key factor in the development of the EU. That is why most of the scientific research on the topic, both at Bulgarian and EU level, focuses precisely on its productive aspects.

The analyzed problem is important, including for Bulgaria in several aspects. First, although the official criteria for Eurozone membership mainly refer to various aspects of nominal convergence, in principle structural convergence is the most important element for synchronizing the economic cycles of the member countries in the Economic and Monetary Union, and in practice nominal convergence does not is neither necessary nor sufficient to assess a country's readiness for membership. If this synchronization exists, the policy of the European Central Bank can be expected to have the same influence in all EU countries, and if these conditions are absent, it will create additional instability. Second, with Bulgaria‘s accession to the EU, the country‘s economy shows significant structural differences compared to the Eurozone member states. The future accession of the Bulgarian economy to the Eurozone imposes certain conditions regarding the structural convergence of production.

The accession of Bulgaria and Romania in 2007 to the EU led to a doubling of socio-economic differences between the countries, including an increase in inequality in terms of gross domestic product, labor productivity, employment, educational level, innovation, new technologies, etc. In the past, other examples of similar development have been proven during the accession of other countries to the EU (Palan, 2013) already in the 1980s.

Tracking the dynamics of the production structure of the Bulgarian economy over the last more than 20 years, allows us to determine how much of the path of this convergence has already been covered and what part is still to come. In addition, the impact of EU membership on the production structure of the Bulgarian economy and the extent to which it accelerates or slows down its convergence with other countries is also of interest.

The purpose of this report is to analyze the structure of production at the sectoral level for the Bulgarian economy and to assess its importance for increasing the real and nominal convergence with the Eurozone, as well as its role for the effectiveness of the monetary policy of the European Central Bank after the future membership of the country in the single currency area (Soboń & Prokopowicz, 2018).

The convergence of the production structure is an important prerequisite for synchronizing the economic cycles in the Eurozone countries and for increasing the effectiveness of the ECB's monetary policy. The intensification of structural transformation processes related to technological change in recent years is one of the main reasons for the high interest in this topic. In addition, the global recession of 2008 and the subsequent Covid pandemic have also raised a number of questions about the different impacts on individual EU economies.

Due to the differences between the production structures of the Bulgarian economy and the Eurozone, it is assumed that in the process of structural convergence in Bulgaria there would be an accelerated growth of activities with high added value, the low shares of which are often cited as a problem in both scientific and political circles. In this sense, analyzing the convergence process will help to build policies that can further support it.

For the purposes of this study, under convergence of GDP production structures between two countries, between a country and a group of countries, between groups of countries, etc. it should be understood the process of increasing similarity in the relative share of the added value of the main sectors in the total added value in the economy. It is possible that the opposite process is also present - divergence. It is defined as the process of increasing the differences between economies according to the relevant indicator.

In principle, convergence/divergence can be sought both at the sectoral level and at the level of economic activities. In the first case, data are used on the distribution of gross added value between the three main economic sectors - agriculture, forestry and fisheries, industry and services. In this case, the focus is on the successive transition from the agrarian to the industrial sector and subsequently to the service economy, and the convergence between them is in this case called cross-sectoral (Höhenberger & Schmiedeberg, 2008). At this level, the convergence between the Bulgarian economy and the Eurozone is expected to be more pronounced, taking into account the general tendency for the share of the service sector in modern economies to increase at the expense of the other two sectors.

That is why this report presents a sector-level analysis of the process of convergence of the production structure of Bulgaria and selected countries from CEE to the Eurozone during the period 2000-2022. For this purpose, a descriptive analysis was made, and subsequently, by means of the coefficient of variation, the changes in it were taken into account.

The studied period is from 2000 to 2022 and is long enough to allow summarizing both the dynamics of the processes before Bulgaria's accession to the EU, as well as the impact and changes after its membership. The composition of the Eurozone throughout the period of analysis includes 19 countries, because its changes over the years have a minor impact on the data.

Table 1: Relative shares and their change of the main economic sectors in the gross added value of the economies in the period 2000-2022 (%)

Countries	Agriculture, forestry and fisheries			Industry (including construction)			Services		
	2000	2022	Amendment	2000	2022	Amendment	2000	2022	Amendment
Eurozone	2.3	1.8	-0.5	28.0	20.0	-8	69.7	78.2	+8.5
Bulgaria	12.5	5.0	-7.5	26.0	26.0	0	61.5	69.0	+7.5
Romania	12.0	4.9	-7.1	33.5	24.8	-8.7	54.5	70.3	+15.8
Slovenia	3.5	1.9	-1.6	34.9	25.7	-9.2	61.6	72.4	+10.8
Slovakia	1.9	2.5	+0.6	33.3	25.4	-7.9	64.8	72.1	+7.3
Poland	3.5	2.4	-1.1	32.4	27.6	-4.8	64.1	70.0	+5.9
Czech Republic	3.6	2.3	-1.3	36.8	28.1	-8.7	59.6	69.6	+10.0
Hungary	5.8	3.2	-2.6	31.7	24.0	-7.7	62.5	72.8	+10.3
Croatia	6.1	3.0	-3.1	29.5	17.7	-11.8	64.4	79.3	+14.9
Lithuania	4.9	4.4	-0.5	30.2	22.9	-7.3	64.9	72.7	+7.8
Latvia	5.0	5.8	+0.8	33.0	18.7	-10.1	62.0	75.5	+13.5
Estonia	3.6	2.9	-0.7	30.7	20.4	-10.3	65.7	76.7	+11.0
Average value [3]	5.67	3.48	-2.19	32.0	23.75	-8.25	62.33	72.76	+10.43
Coefficient of variation	58.15	34.28	-23.87	9.35	9.84	+0.49	5.95	3.78	-2.17

Source: Eurostat and author‘s calculations.

The production structure of the Bulgarian economy was significantly influenced by the differences in economic development compared to most Eurozone countries at the end of the 20th century. The existing differences in the distribution of added value between the three main economic sectors are contained in table 1. It also shows the data for the other countries that joined the EU after 2004, some of which are already in the Eurozone. Based on the data from the table, the following conclusions can be drawn about the production structure of the Bulgarian economy (Raychev, 2020). First, at the beginning of the period, the relative share of the Bulgarian agricultural sector was significantly higher than in any other economies under consideration (12.5%). It exceeds more than 5 times that of the Eurozone (2.3%) and more than 2 times the average for the countries under consideration (5.67%). The only country with a similar share is Romania (12%), which join

[3] The average value does not include that of the Eurozone.

the EU with Bulgaria. Bulgaria and Romania have a similar starting point in the production structure due to their similar political and economic history prior to EU membership. During the first years of the period under review, this, together with many other factors, affected their sectoral structure and formed some significant differences compared to them and the Eurozone.

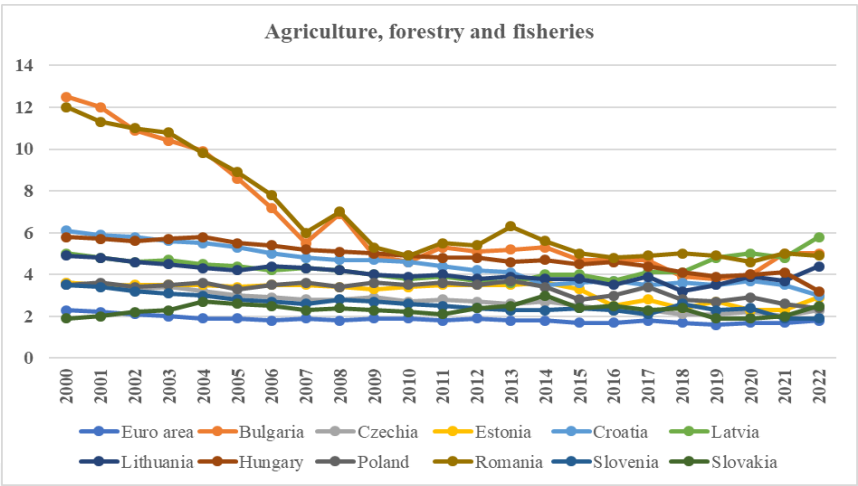
In general, the structure of GDP for individual countries corresponds to the general logic of Fisher's three-sector model of economic development. However, it is clear from comparisons with other countries in the region that the agricultural sector has a much smaller share in total, and therefore the importance of the individual factors that make the production structure should not be underestimated. At the end of the period, there was a significant reduction in the gap with the Eurozone regarding the relative share of agriculture. In absolute terms, it is 3.2%, and compared to the average for the countries, it is 1.52%. The direction of the change in the relative share of the sector is similar in the Eurozone, but the decrease there is much weaker with only 0.5%. Therefore, a clear process of convergence between Bulgaria and the Eurozone is observed for this sector. The trend is similar in Romania, although the process over the years has been a little more uneven than in Bulgaria, with the relative share reached there in the end being 4.9%, and the decrease being 7.1% compared to 2000. The relative share of this sector increased in only two of the countries - these are Slovakia by 0.4% and Latvia by 0.8%. Therefore, by the end of the study period, the variation in the relative shares of the countries for this sector also significantly decreased - from 58.15 to 34.28%.

Table 2: Difference between the largest and smallest value in the relative share of individual sectors for CEE and Eurozone countries during the period under study

Countries	Difference between the largest and smallest value		
	Agriculture, forestry and fisheries	Industry (including construction)	Services
Eurozone	0,7	8,7	9,3
Bulgaria	8,7	10,8	14,9
Romania	1,6	9,1	10,7
Slovenia	1,3	11,6	12,9
Slovakia	3,1	11,8	14,9
Poland	2,2	17,9	18,8
Czech Republic	1,7	9,8	10,8
Hungary	2,6	9,2	10,9
Croatia	1,2	7,7	8,4
Lithuania	7,4	11,5	18,9
Latvia	1,6	9,2	10,8
Estonia	1,1	9,0	9,1
Average:	2,77	10,53	12,53

Source: Eurostat and author‘s calculations.

The agricultural sector is characterized by the smallest fluctuations in its relative share in GVA, with a difference 8.7 percentage points between the maximum and minimum values for Bulgaria, which is, more than 12 times more that of the Eurozone, and only 0.7 for the whole period covered. For the other two sectors, the fluctuations are greater, but it seems that this is also valid for the rest of the CEE countries as a whole, including those that are already members of the Eurozone. In Croatia, for example, the gap between the maximum and the minimum in the industry sector is 11.8, which is very close to that registered for Bulgaria - 10.8. In addition, Latvia has the largest gap for the industry sector – 17.9, again a member of the Eurozone. The situation is similar in the service sector. Bulgaria, Estonia, Croatia, Latvia and Romania are the countries with differences higher than the average for the group under consideration, with the largest differences in Romania and Latvia. The general impression is of a distinct reduction in the difference in the share of the agricultural sector between Bulgaria and the Eurozone within the considered period, as well as convergence with the other countries that joined the EU after 2004.



Source: author's own calculations based on Eurostat data.

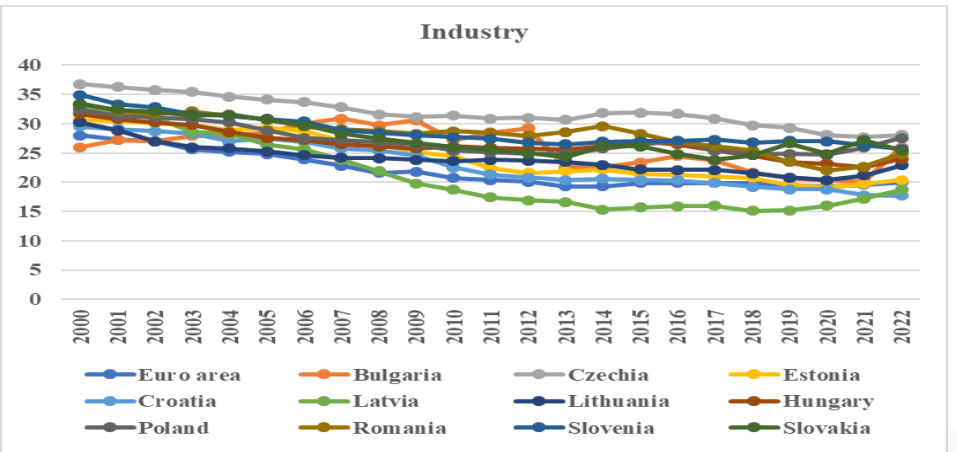
Figure 1: Relative shares of the gross added value of the countries for the sector "Agriculture, forestry and fisheries" in the period 2000-2022 (%)

The divergence between the countries studied as a group and the Eurozone also narrows in 2022, the difference between the average share of the sector in the eleven countries and that of the Eurozone is 1.68%, compared to 3.37% at 2000 year, i.e. it has decreased more than twice. In terms of convergence between the countries and the Eurozone, all this can be defined as positive progress.

The difference in the relative share of agriculture in the Bulgarian economy compared the Eurozone is mainly due to the lower share of the Bulgarian service

sector compared to the Eurozone, and to a lesser extent to the lower share of industry. Nevertheless, the Bulgarian economy at the beginning of the studied period had the lowest share of the industry sector among all the countries examined (26%) and the only country whose share of this sector is lower than that of the Eurozone - there it is 28%.

Regarding the dynamics of the Industry sector for Bulgaria in the following years, it increases its share until 2009 and quickly exceeds that of the Eurozone, after which it begins to decrease and fluctuates in the following years until the end of the period, to reach again its initial value of 26%. On the one hand, such industrial development is positive, as it is a prerequisite for a relatively high GDP growth rate, but it also has a negative side as far as convergence processes are concerned, because the end result is actually an increase in the difference in shares with the Eurozone - from 2% it increased to 6%.



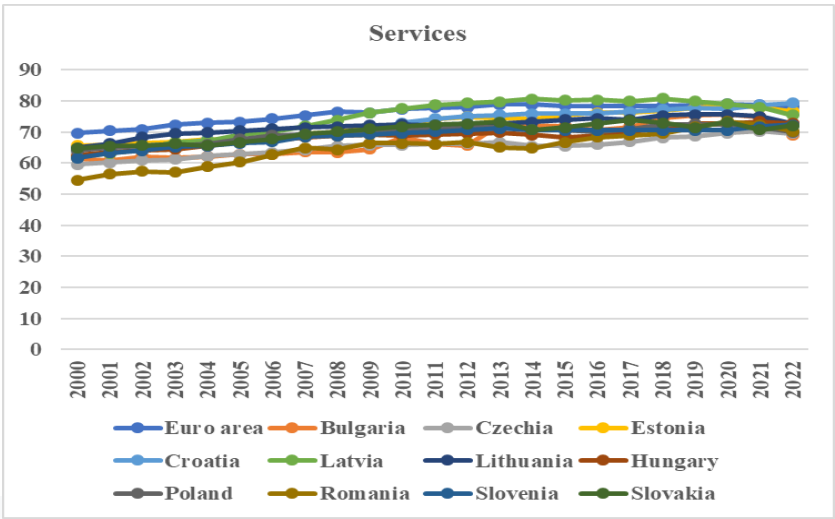
Source: author's own calculations based on Eurostat data.

Figure 2: Relative shares of the "Industry" sector in the countries' gross added value in the period 2000-2022 (%)

The situation in the Eurozone is similar, but the region's share of the sector is finally on a down ward trend. The prevailing trend in most of the other countries is towards a decrease in the share of this sector at the end of the period, while for Bulgaria, despite some declines over the years, it rather grew in the second part of the period under review. The dynamics of the average share of industry and the coefficient of variation for the studied group of countries reveals a contradictory situation, since on the one hand the difference between the average share of this sector for the group of countries and the Eurozone decreases from 4% in 2000 to 3.75% in 2022 year, which is most likely due to the slower depreciation for countries using a single currency. On the other hand, however, according to the

coefficient of variation, the difference within the studied group of countries grows from 9.35 to 9.84. In the case of Bulgaria, the share of industry ultimately remains unchanged compared to the beginning of the period, while at the same time its values approach the average value for the studied countries, which, however, has a very weak impact on the degree of convergence with the Eurozone.

As for the services sector, the relative share for Bulgaria is 61.5% and is very similar to that of other countries (61.6% on average), but in all of them this share is lower than in the Eurozone. This applies both to the beginning and to the end of the considered period (only Croatia is an exception at the end of the period).



Source: author's own calculations based on Eurostat data.

Figure 3: Relative shares of the "Services" sector in the countries' gross added value in the period 2000-2022 (%)

The share of the service sector in Bulgaria as a whole is increasing mainly due to a decrease in the share of the agricultural sector. The increase at the end compared to the beginning of the period is the largest of the three sectors – from 61.5% to 69%, i.e. with 7.5%.

This trend is also observed in the Eurozone, as a result of which there is a relatively weak but sustainable reduction in the difference in the share of services between Bulgaria and the Eurozone. In contrast to the previous two sectors, the share of the services sector does not differ significantly from the rest of the studied countries, and during most of the period, Bulgaria remains close to the average value of the group. Taken together as a group, the eleven countries show minimal convergence to the Eurozone in terms of their shares in this sector, with the difference between their averages decreasing by 1.93% and the variation by 2.17%, again suggesting a slow but gradual rapprochement process.

Table 3: Percentage change (in %) in the relative share of gross value added in the main economic sectors in Bulgaria, Romania and the Eurozone in 2022 compared to 2000

Percentage change in the relative shares in the main sectors			
Sectors/Countries	Bulgaria	Romania	Eurozone
Agriculture, forestry and fisheries	-60%	-59,17%	-21,74%
Industry	0%	-25,97%	-28,57%
Services	12,2%	29%	12,2%

Source: Eurostat and author‘s calculations.

Therefore, regarding the comparison of the share of each of the sectors in the gross added value, for the Bulgarian economy with the Eurozone, the difference has decreased due to the contraction mainly of agriculture and the upward growth of services. The general impression is that the Bulgarian economy has a relatively high degree of structural similarity with the Eurozone countries, despite some significant differences, mainly related to the agricultural sector.

Conclusion

The descriptive analysis carried out so far identifies the main trends in the production structure of the Bulgarian economy and compares it with that of the Eurozone and other CEE countries with similar characteristics to Bulgaria. Both positive and negative trends are observed for the main sectors. Therefore, due to the complexity of the economic development, it is not possible to draw a comprehensive conclusions from this information alone as to whether Bulgarian’s economy is moving closer or further away from that of the Eurozone. Additional calculations with specialized indicators are needed to overcome this limitation and to make a quantitative assessment of the degree of similarity between the economies under study.

References

1. Angeloni, I., Flad, M. & Mongelli, F., (2005). Economic and Monetary Integration of the New Member States: Helping to Chart the Route. ECB occasional Paper No. 36, September, pp. 52.
2. Baumol, W. (1967) Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis. American Economic Review, 57, 415-426.
3. Chenery, H. (1960). Patterns of Industrial Growth, American Economic Review, 50(4), 624-654.
4. Höhenberger N. & Schmiedeberg, C. (2008). Structural Convergence of European Countries, Center for European. Governance and economic

development research, discussion papers. No. 75, July. CeGE Discussion Paper, Retreived from: https://www.econstor.eu/handle/10419/32002
5. Palan, N. (2013). Structural change and convergence: An empirical analysis of production structures in Europe. In Europäische Hochschulschriften/ European University Studies/: Publications Universitaires Européenn. Peter Lang.
6. Raychev, T. (2020). Assessment of structural changes of concessions in the water and sewerage sector, Economics and computer science, ISSUE 1, Knowledge and business, p. 92-123.
7. Soboń, J. & Prokopowicz, D., (2018). Anti-crisis state intervention and created in media images of global financial crisis (in:) "International Journal of New Economics and Social Sciences", Międzynarodowy Instytut Innowacji „Nauka-Edukacja-Rozwój" in Warsaw, 8.