CONVERGENCE OF THE GDP STRUCTURES OF CEE COUNTRIES TO THE EURO AREA

Dimitar Damyanov[1]
Nikolay Velichkov[2]

Abstract: *This paper attempts to find out to what extent CEE countries are converging towards the euro area in terms of their GDP structures. To achieve our objectives, we use a beta-convergence econometric approach that relies on fixed effects panel data estimation. We estimate a simple equation for all GDP structures and compare the results between two groups of countries. The results obtained from the empirical analysis indicate that there is a process of beta convergence in the GDP structures of the CEE countries towards the euro area. The intensity of this process shows certain specifics both in relation to the countries in and outside the euro area, and in relation to individual structural components. The increasing structural similarity does not exclude the manifestation of certain negative influences on macroeconomic dynamics, which could reduce the intensity of the real convergence process.*

Keywords: *economic integration, euro area, structural convergence*
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1. Introduction

The subject of convergence is of increasing relevance in the context of the European economic integration process. Its highest embodiment in various forms is represented by the Economic and Monetary Union (EMU) of the EU. One of the leading challenges related to the construction of the EMU and its effective functioning has to do with the degree of similarity between the individual Member States. In this sense, convergence processes occupy a principal place in the overall framework of the implementation and deepening of integration processes.

The need for similarity between economies in the common European currency area is reflected in the predetermined formal criteria for membership, known as the Maastricht Convergence Criteria. However, the specified criteria are related to different dimensions of nominal convergence, which are not a sufficient condition for the synchronization of business cycles and convergence of the main characteristics of economies, which would ensure the effectiveness of the common monetary policy and the coordination of national economic policies. In this regard, the achievement of structural convergence is of much greater importance for the euro area's resilience to external shocks and the deepening of the integration

[1] *Dimitar Damyanov, PhD, University of National and World Economy, Bulgaria, +359 28195596, ddamyanov@unwe.bg, http://blogs.unwe.bg/ddamyanov/, 29 Aug 2022.*
[2] *Nikolay Velichkov, PhD, University of National and World Economy, Bulgaria, +359 28195631, nn_velichkov@unwe.bg, http://blogs.unwe.bg/nvelichkov/, 29 Aug 2022.*

process. Along with the continuing expansion of the euro area, recent changes in economic conditions around the world have once again highlighted the questions about the differences in the effects of these developments on individual countries and the ability of the European Central Bank (ECB) to effectively pursue its policy objectives.

At the moment, five EU member states from CEE have the status of EMU member state without the right of derogation, i.e., euro area member states (Estonia, Lithuania, Latvia, Slovenia and Slovakia). Six of the EU member states from CEE have the status of EMU member state with the right of derogation, i.e., are not euro area member countries (Bulgaria, Croatia, Czech Republic, Hungary, Poland and Romania). From the latter, two (Bulgaria and Croatia) participate in the European Exchange Rate Mechanism II (ERM II).

There are some significant remaining differences between "core" EA members and these CEE countries. For example, in some CEE economies the share of the agricultural sector is still more than double the euro area average. Others have industrial sector shares that exceed that of the eurozone by more than a third.[3] In addition, in some of the CEE countries the share of investment and capital income in GDP is considerably higher than that of the euro area. Moreover, for these countries higher levels of imports compared to exports are typical for the majority of the period, while the opposite is true for the euro area as a whole. These issues are the specific focus of the present paper. We examine the process of structural convergence of the new EU member states (as described) from Central and Eastern Europe towards the euro area (EA19) to find out how quickly their production, income, and expenditure structures are evolving over the past 20 years. Additionally, we divide the 11 CEE countries into the two groups mentioned above – of those that have already joined the EA and of those that are yet to join it – in an attempt to find out whether there are any significant differences between them in terms of the speed of the convergence process.

There are several aspects of the importance of the convergence of production (output) structures between the members of a single currency area. The process has been shown to be related to the convergence of real GDP levels, that is to the real convergence between economies (*Angeloni, et al., 2005*; *Palan, Schmiedeberg, 2010*; *Zarotiadis, Gkagka, 2013*). The latter is itself a factor for the ability of prospective eurozone members to fulfil the formal requirements for joining the currency area. On the other hand, *MPC task force of the ESCB (2004)* claim that output structure convergence has a positive effect on business cycle synchronization within the EU and is strongly linked to the effectiveness of the ECB's monetary policy. This may be explained by the impact of the composition of an economy's output on the transmission mechanism of monetary policy as well as its effects on inflation. Additionally, for many of the new EU members the relatively low shares of high value-added industries in their GDPs have often been pointed out as one of the reasons for their lower overall income levels. In light of this, a faster convergence process can be expected to bring the benefit of a faster economic growth in these countries.

The factors that affect the convergence of production structures are not studied in this paper, but they have been the subject of many reviews over the years. *Barro, Sala-i-Martin (1992)* explore the importance of the rate of investment and the rate of growth of labor for the process,

[3] For a more detailed study of these developments, see Raleva, Damyanov (2019).

while *Wacziarg (2004)* focuses on the role of the initial factor endowment of countries and the influence of international trade on it. Market size and structure are studied by *Krugman, Venables (1995)* and *Brülhart, Torstensson (2007)*, while the impact of institutional quality is examined by *Raleva, Marikina (2021)*.

Traditionally, similarities in the GDP expenditure and income structure have been perceived as a minor reflection of structural convergence, due to the lack of fundamental analyses of their role in the course and synchronization of the business cycle for groups of countries. This is also the reason for the more limited number of studies that focus on these two dimensions of structural convergence. However, this should not be an explanation for underestimating the importance of convergence in the GDP expenditure and income elements for the sustainable functioning of the EMU. The reason is that the GDP expenditure structure is strongly tied to the short-term and long-term dynamics of macroeconomic activity and is related to the factors that largely determine it. At the same time, certain interrelationships between the GDP expenditure and income structure can be highlighted, which are a source of additional information revealing certain characteristics of economic development. Some empirical studies focus on the synchronization between the expenditure components of GDP in individual CEE countries and those in the euro area (*Darvas, Szapary, 2004*; *Stattev, Raleva, 2006*). A similar approach is used by W. Buiter and C. Grafe, but their analysis focuses on inventories (*Buiter, Grafe, 2002*). Correlation relationships between certain expenditure elements in specific countries and the euro area are also the subject of research by Agresti and Mojon (*Agresti, Mojon, 2001*). Their analysis applies to countries that currently use the euro as their official currency.

Some more recent studies focus on a comparative analysis of the convergence processes in the different GDP structures in selected CEE countries which have not yet adopted the euro to those of the euro area, highlighting some specifics between the studied countries and in the behavior of individual structural components. Velichkov and Damyanov (*Velichkov, Damyanov, 2021*) analyzed the expenditure and production structure of GDP in three CEE countries (Bulgaria, Romania and Croatia), while Raleva (*Raleva, 2021*) included in the analysis the income structure of GDP, limiting the study to Bulgaria and Roma. Both studies are based on the sigma (σ) convergence approach, using respectively the divergence index (*Velichkov, Damyanov, 2021*) and the Krugman specialization index and the index of structural inequality (*Raleva, 2021*).

To achieve our objectives, we use a beta-convergence econometric approach that relies on fixed effects panel data estimation. We estimate a simple equation (described below) for all GDP structures and compare the results between the two groups of countries.

2. Model and Estimation Methodology

For the purposes of this paper, we define the process of structural convergence between economies as the reduction of the differences between the percentage shares of the components of their output, income, and expenditure structures. A beta-convergence approach is applied in

order to determine the existence of structural convergence between the selected economies and the euro area. The equation that will be estimated has the following form:

$$\Delta y_{ijt} = \alpha + \beta y_{ijt-1} + \varepsilon$$

In this, y_{ijt} is the difference between the share s of component i of the GDP of country j during year t and the share of the same component in the euro area, that is $y_{ijt} = s_{ijt} - s_{iEAt}$, while Δy_{ijt} is the change of this difference during year t compared to the previous year, that is $\Delta y_{ijt} = y_{ijt} - y_{ijt-1}$. Therefore, a negative sign of the β coefficient would be an indication of the existence of a structural convergence process between the selected countries and the eurozone.

The period that we study is from 2000 to 2019. Annual data from Eurostat is used for all GDP structures, providing approximately 100 observations for each estimation. Specifically, for the production structure we apply the standard disaggregation of economic gross value added (GVA) among a total of 13 economic activities (or groups of economic activities). The agricultural sector is studied as a single economic activity (A), there are five economic activities (industries) in the secondary sector (B – F), and seven economic activities (industries) in the services sector (G – U).[4] This appears to be appropriate despite the differences in the sizes of the individual groups since it allows for a relatively detailed analysis without going into too much detail that would not be relevant to the overall objectives of the study. An alternative approach would be to use employment shares for the output convergence estimations instead of the GVA data as in *Stefanova (2020)*. However, this would not correspond to the rest of the present study where such alternatives are not available.

The study of convergence processes in the GDP expenditure structure distinguishes the following four components: final consumption; investment; exports; and imports. Final consumption includes consumption expenditure of households and non-profit institutions serving households and government expenditure for individual and collective consumption. Investment is equated with gross capital formation. Exports and imports are an expression of the foreign exchange of goods and services.

To evaluate the beta convergence referring to the GDP income structure, three elements are formed: compensation of employees; gross operating surplus and mixed income; and other income components. The first two elements are an expression of income from the two main production factors – labor and capital, and the third element includes all other components of the income structure.

The economies that are studied are as follows: in the first panel we include the countries that have joined the EU since 2004 and have also become members of the eurozone since then – Estonia, Latvia, Lithuania, Slovakia and Slovenia (also referred to below as EA members, EA countries); the second panel consists of the remaining EU members from Central and Eastern

[4] The industries (industry groups) are as follows: A – Agriculture, forestry and fishing; B – Mining and quarrying; C – Manufacturing; D – Electricity, gas, steam and air conditioning supply; E – Water supply; sewerage, waste management and remediation activities; F – Construction; G-I – Wholesale and retail trade, transport, accommodation and food service activities; J – Information and communication; K – Financial and insurance activities; L – Real estate activities; M-N – Professional, scientific and technical activities; administrative and support service activities; O-Q – Public administration, defense, education, human health and social work activities; R-U – Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies.

Europe that are yet to join the euro area – Bulgaria, Croatia, Czechia, Hungary, Poland and Romania (also referred to below as non-member countries, non-EA countries). The comparison between the results of the two panels could provide information about the differences in the speed of adjustment of the two groups to the eurozone. We define the euro area as consisting of 19 countries for the entire period covered by this paper, ignoring changes of the actual membership status of individual countries. Alternative definitions of the euro area result in very similar shares of the components of GDP and have a negligible influence on the estimation results.

3. Estimation results

Following the methodology described above, here we present the results from the panel estimations. They are interpreted in light of the importance of structural convergence described above.

3.1. Convergence of GDP production structure

Starting with the production (output) structure, we find evidence that confirms the existence of a convergence process between CEE countries from both groups and the euro area. With only a couple of exceptions, the estimation results, presented in *Table 1* below, show β coefficients that are statistically significant at the 5% level, while all of them have a negative sign. More specifically, the agricultural industry in euro area member countries from the CEE region appears to show one of the highest convergence rates of all industries, which is a positive development, given the shares of the sector in these countries at the start of the period. The small overall size of the sector, however, means that the impact of this development on the process as a whole is rather limited. Contrary to that, the same industry in non-member states converges at a pace which is one of the slowest among all industries. This is somewhat unfavourable for their potential role in the euro area in the future since these countries currently show the largest gaps to the single currency area in terms of the share of this sector.

Industries in the secondary sector (B – F) in both groups of countries also show an overall tendency to converge towards the euro area average as indicated by the statistically significant negative coefficients in all panel models below (Table 1). As it was in the previous sector, the process appears to be slightly stronger in the countries that are already members of the eurozone, primarily because they converge faster in the two largest industries – *Manufacturing* and *Construction*. The two groups differ most significantly in the rate of convergence of the *Electricity and gas* industry (D), with a much faster increase of the similarity to the eurozone for non-member CEE countries than for the representatives of the region that are part of the bloc. These developments may have certain negative effects on the overall growth rate of some economies as this finding reflects the shrinking of the *Manufacturing* industry both in the euro

area as a whole and in most of the CEE countries studied here.[5] Many of the latter start with manufacturing shares that exceed those in the euro area initially and decline more quickly thereafter.[6]

When it comes to the two smallest components of GVA in the secondary sector – *Mining* (B) and *Water and sewerage* (E), the non-EA CEE countries show a stronger convergence towards the eurozone. Again, however, because of the size of these industries (on average they form around 2% of GVA), this too has a limited impact on the overall process.

Similar results are obtained for the industries in the Services sector. A strong convergence process is found in non-member countries in the *Trade, transport, and accommodation* industry (G-I) with its estimated β coefficient being one of the highest of all industries. The same industry in EA members converges at a much slower pace. The opposite is true for the *Financial and insurance activities* and to a certain extent for the *Professional, scientific, and technical activities*, where member countries show a considerably faster rate of convergence compared to non-members. The rest of the industries in this sector appear to be converging at relatively similar rates in both groups of CEE countries. This means that the sector as a whole converges at similar rates in the two country groups. It appears, however, that the EA members are converging faster in industries that are characterised by higher value-added levels. Given the initial industry shares in the sector, this implies a faster growth rate of these industries and, therefore, a more positive growth outlook for the EA member countries from the CEE region.

Table 1. Estimation results: β-convergence of the components of the GDP production structure

	CEE Countries Group	Variable	Coefficient	Std. error	t-Statistic	Prob.	Adj. R^2	F-stat.	Obs.
A	EA	α	0.586	0.117	5.001	0.000	0.226	6.491	95
		β	-0.400	0.073	-5.448	0.000			
	Non-EA	α	0.249	0.144	1.737	0.085	0.084	2.738	114
		β	-0.133	0.040	-3.296	0.001			
B	EA	α	0.047	0.015	3.093	0.003	0.112	3.368	95
		β	-0.238	0.064	-3.721	0.000			
	Non-EA	α	0.265	0.063	4.193	0.000	0.134	3.926	114
		β	-0.320	0.068	-4.695	0.000			
C	EA	α	0.569	0.132	4.309	0.000	0.168	4.790	95
		β	-0.382	0.079	-4.859	0.000			
	Non-EA	α	1.005	0.207	4.853	0.000	0.152	4.375	114
		β	-0.300	0.061	-4.912	0.000			
D	EA	α	0.200	0.090	2.230	0.028	0.056	2.118	95
		β	-0.211	0.068	-3.097	0.003			
	Non-EA	α	0.396	0.100	3.961	0.000	0.127	3.731	114
		β	-0.344	0.075	-4.597	0.000			
E	EA	α	0.002	0.009	0.167	0.868	0.067	2.343	95
		β	-0.253	0.075	-3.349	0.001			
	Non-EA	α	0.053	0.015	3.462	0.001	0.148	4.280	114
		β	-0.330	0.067	-4.896	0.000			

[5] Despite their diverse composition, manufacturing industries have been shown to contribute more to GDP growth (through TFP growth) than non-manufacturing industries, as in *Baumol (1967), Jia, et al. (2020)* among others.

[6] Detailed information about GDP levels and industry shares is available at www.ec.europa.eu/eurostat.

F	EA	α	0.516	0.134	3.840	0.000	0.139	4.043	95
		β	-0.329	0.074	-4.455	0.000			
	Non-EA	α	0.206	0.074	2.779	0.006	0.076	2.556	114
		β	-0.219	0.057	-3.851	0.000			
G-I	EA	α	0.700	0.274	2.550	0.013	0.083	2.695	95
		β	-0.139	0.052	-2.678	0.009			
	Non-EA	α	0.860	0.189	4.553	0.000	0.177	5.049	114
		β	-0.424	0.079	-5.389	0.000			
J	EA	α	-0.013	0.031	-0.430	0.668	0.030	1.575	95
		β	-0.117	0.061	-1.913	0.059			
	Non-EA	α	0.080	0.033	2.434	0.017	0.059	2.186	114
		β	-0.143	0.057	-2.495	0.014			
K	EA	α	-0.659	0.129	-5.125	0.000	0.220	6.292	95
		β	-0.524	0.094	-5.579	0.000			
	Non-EA	α	-0.095	0.052	-1.828	0.070	0.199	5.685	114
		β	-0.283	0.051	-5.492	0.000			
L	EA	α	-0.639	0.136	-4.681	0.000	0.209	5.971	95
		β	-0.302	0.060	-5.012	0.000			
	Non-EA	α	-0.828	0.150	-5.512	0.000	0.168	4.807	114
		β	-0.321	0.061	-5.261	0.000			
M-N	EA	α	-0.597	0.158	-3.788	0.000	0.144	4.167	95
		β	-0.211	0.048	-4.392	0.000			
	Non-EA	α	-0.429	0.148	-2.891	0.005	0.093	2.941	114
		β	-0.132	0.038	-3.481	0.001			
O-Q	EA	α	-0.947	0.181	-5.218	0.000	0.183	5.200	95
		β	-0.260	0.052	-4.979	0.000			
	Non-EA	α	-1.152	0.233	-4.953	0.000	0.170	4.867	114
		β	-0.282	0.058	-4.902	0.000			
R-U	EA	α	-0.129	0.049	-2.646	0.010	0.086	2.773	95
		β	-0.166	0.053	-3.140	0.002			
	Non-EA	α	-0.171	0.061	-2.815	0.006	0.059	2.170	114
		β	-0.214	0.065	-3.291	0.001			

Source: Authors' calculations based on Eurostat data.

Overall, despite the slightly faster convergence of the CEE countries that have already joined the eurozone, the non-members are also showing a positive progress towards the single currency area. This observed trend fits within the conclusions regarding long-run economic development that characterise *Fisher's (1939)* three-sector model. In the long run though, the trends outlined above may lead to an unfavourable widening of some existing gaps between the two groups, since non-EA CEE countries are already lagging behind their eurozone neighbours in many respects.

3.2. Convergence of GDP expenditure structure

The obtained results show the presence of beta convergence of the two groups of countries towards the euro area in terms of the relative shares of all four expenditure components of GDP – final consumption, investment, exports and imports (see Table 2). The β coefficient is negative and statistically significant in all panel models. The above demonstrates the existence of a tendency towards increasing similarity in the GDP expenditure structure of the EU Member States from CEE to that of the euro area within the studied time period.

Upon comparison of the empirical estimates for the two distinct groups of countries, it becomes clear that the process of increasing convergence to the euro area is more pronounced for the countries that have already adopted the euro as an official currency, but the differences are not so significant. The above applies to all structural elements of GDP. The most significant difference between the two groups of countries is observed in the coefficients in the final consumption convergence models. The absolute value of the coefficient β in the model for the euro area countries is about 2.5 times higher than that in the model for the non-euro area countries. This indicates that the catching up process in terms of the relative share of final consumption in GDP for the CEE countries that are in the euro area is significantly stronger than that for the countries that are yet to adopt the euro.

The differences between the two groups of countries in investment convergence are significantly weaker than those in final consumption. At the same time, however, these coefficient differences are greater than the corresponding deviations in the other two expenditure elements - exports and imports. It can be concluded that the greatest similarity in the course of convergent processes in terms of the GDP expenditure structure is observed in those components that are directly related to the openness of the economy, namely exports and imports.

Table 2. Estimation results: β-convergence of the components of the GDP expenditure structure

	CEE Countries Group	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Adj. R^2	F-stat.	Obs.
Final Consumption	EA	α	-0.01	0.146	-0.069	0.945	0.216	6.467	100
		β	-0.32	0.058	-5.491	0.000			
	Non-EA	α	0.017	0.151	0.113	0.910	0.032	1.65	120
		β	-0.125	0.041	-3.078	0.003			
Investment	EA	α	0.947	0.397	2.386	0.019	0.099	3.183	100
		β	-0,284	0.072	-3.931	0.000			
	Non-EA	α	0.64	0.207	3.096	0.003	0.116	3.601	120
		β	-0.235	0.053	-4.463	0.000			
Exports	EA	α	4.629	1.071	4.321	0.000	0.134	4.075	100
		β	-0.16	0.042	-3.814	0.000			
	Non-EA	α	1.899	0.504	3.772	0.000	0.062	2.315	120
		β	-0.147	0.042	-3.489	0.001			
Imports	EA	α	8.277	1.724	4.801	0.000	0.181	5.381	100
		β	-0.276	0.059	-4.705	0.000			
	Non-EA	α	4.109	0.916	4.484	0.000	0.112	3.491	120
		β	-0.263	0.059	-4.496	0.000			

Source: Authors' calculations based on Eurostat data.

Certain specificities are also present in the convergence of the individual expenditure components of the GDP structure within the separate panel models. For the countries of Central and Eastern Europe that have adopted the euro, the fastest process of convergence to the euro area is observed in the relative weight of final consumption expenditures in GDP. The opposite is true for the relative share of exports, where the lowest increase in the degree of similarity is

observed. Regarding the relative importance of investments and imports in GDP, it can be noted that the values of the coefficients β are almost identical.

The group of CEE countries that have not yet adopted the euro is characterized by certain peculiarities. The strongest growing structural similarity with the euro area is observed in the relative share of imports in GDP. By analogy with the group of CEE countries that are part of the euro area, and for the group of countries that are not yet in it, close values of the coefficients β are observed in the models related to the convergence of imports and investment. The indicated similarity in the course of convergent processes for these two elements of the GDP expenditure structure can be explained by the existing interdependence of their dynamics over time, which is typical for the CEE countries. It is due to the fact that changes in investment activity are also related to changes in imports, since in these countries fixed assets are mainly of imported origin. These specificities in the dynamics of investments and imports also project their influence on the progress of the structural convergence process. In addition, it can be noted that these features are able to influence the dynamics of GDP both in the short and long run. In the short run, the positive impact of investment growth on GDP is limited by the negative effect associated with the increase in imports, and vice versa – weaker investment activity is accompanied by a decrease in imports, and the resulting effects on GDP are mutually reduced. In the long term, however, the increase of investment is an important factor for economic growth, regardless of the fact that this increase may be primarily determined by the rise of import of capital goods. This is also the reason why the stronger convergence of investments in the CEE countries towards the euro area, which is primarily related to the reduction of their relative share in GDP, projects negative impacts on the possibilities of achieving higher economic growth. These conclusions are also confirmed by other empirical studies that analyze the structural convergence of CEE countries to the euro area (Velichkov, Damyanov, 2021; Raleva, 2021). The indicated stronger structural convergence with the euro area may also have a restraining effect on the intensity of the real convergence process (Velichkov, 2021).

3.3. Convergence of GDP income structure

The empirical results for beta convergence indicate that the β coefficients are negative and statistically significant in all model constructs. Estimates obtained from the econometric modeling relating to compensation of employees, both for the group of CEE countries that are part of the euro area and for those outside of it, cannot be perceived as sufficiently indicative of an increasing structural similarity with the euro area due to problems with the characteristics of the corresponding panel models. This also applies to the model estimating capital income synchronization for the group of countries that are already part of the euro area.

Table 3. Estimation results: β-convergence of the components of the GDP income structure

	CEE Countries Group	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Adj. R^2	F-stat.	Obs.
Gross operating	EA	α	0.415	0.303	1.37	0.174	0.001	1.025	100
		β	-0.139	0.066	-2.093	0.039			

surplus and mixed income	Non-EA	α	1.291	0.350	3.684	0.000	0.106	3.345	120
		β	-0.246	0.06	-4.084	0.000			
Compensation of employees	EA	α	-0.313	0.289	-1.085	0.281	-0.013	0.741	100
		β	-0.118	0.064	-1.848	0.068			
	Non-EA	α	-0.876	0.375	-2.339	0.021	0.038	1.780	120
		β	-0.134	0.052	-2.566	0.012			
Other income components	EA	α	-0.023	0.051	-0.444	0.658	0.198	5.876	100
		β	-0.345	0.068	-5.099	0.000			
	Non-EA	α	0.362	0.106	3.419	0.001	0.074	2.589	120
		β	-0.254	0.065	-3.901	0.000			

Source: Authors' calculations based on Eurostat data.

Regarding the coefficient β in the model referring to the convergence of the relative share of gross operating surplus and mixed income in GDP for the countries that are still outside the euro area, it can be noted that it indicates an increasing similarity with the EU monetary union. A higher share of capital income in GDP compared to the corresponding share for the euro area is typical for this group of countries. In this regard, stronger convergence with the euro area corresponds to a decrease in this share in the CEE countries. However, the decrease in the relative importance of gross operating surplus and mixed income in GDP is also accompanied by certain negative effects. These effects refer to the dampening effect on investment activity. In turn, the limitation of investment projects its negative impact on aggregate economic activity as well. These negative effects are supposed to be more pronounced precisely in the countries where a stronger convergence of the GDP income structure to that of the euro area is observed. The aforementioned acts as one of the reasons for the higher economic growth observed in Romania compared to that in Bulgaria in recent years (Raleva, 2021).

The analyzed dependence between the relative importance of capital income and investment activity is also the basis of the existence of a relationship of convergent processes relating to the GDP income and expenditure structure. This can explain the close estimates obtained for the coefficient β in the model for the assessment of convergence in the relative share of investment, referring to the CEE countries that have not adopted the euro, and the respective coefficient in the model for the convergence of the share of capital income for the same group of countries.

The panel models that estimate the beta convergence of other income components outside of compensation of employees and gross operating surplus and mixed income indicate increasing similarity with the euro area both for the group of CEE countries where the euro is already the official currency and for the group of countries that have not yet adopted the euro. The growing convergence in this particular structural element does not have strong macroeconomic projections, considering that it includes such components that are not related to the actual income from the production factors. At the same time, however, the observed increase in the degree of similarity is indicative of the ongoing process of convergence in the GDP income structure as a whole.

4. Conclusions

The results obtained from the empirical analysis give reason to conclude that there is a process of beta convergence in the GDP structures of the CEE countries towards the euro area. The intensity of this process shows certain specifics both in relation to the countries in and outside the euro area, and in relation to individual structural components. When it comes to the production structure, the CEE countries that are already members of the euro area appear to be converging more strongly towards the single currency area than their non-EA counterparts. This is due mostly to the changes in the industries from the secondary sector, while in Services the two groups show comparable convergence rates overall. There are some indications that EA member countries from the region tend to converge faster than non-members in industries that generate higher value added and which also have smaller shares than the eurozone average. This can be expected to contribute to a better growth outlook for these economies at least in the short to medium run.

For the expenditure components of GDP, a more pronounced increase in the degree of similarity is also observed for the CEE countries that are part of the euro area. For these countries, the strongest catching up process is registered in the relative share of final consumption in GDP. As for the countries that do not yet use the euro as an official currency, the strongest growing structural similarity with the euro area is registered in the relative share of imports in GDP. In addition, for both groups of countries, similarity is observed in the manifestation of convergent processes related to imports and investments, arising from the specifics of the interdependence in their dynamics.

The stronger convergence of the relative weight of investment in GDP for both distinct groups of countries also corresponds to certain negative effects, expressed in a depressing influence on economic growth, which can become a limiting factor for achieving real convergence. The registered convergence of investment is also accompanied by an increase in the similarities of the share of income from capital in GDP. The latter is confirmed by the obtained econometric results for CEE countries outside the euro area. These convergent processes can be perceived as intensifying each other. This is due to the fact that the stronger convergence of the share of gross operating surplus and mixed income to the corresponding share in the euro area is associated with a decrease in this share in the CEE countries, which has a negative effect on investment activity. The limitation of investment activity in CEE countries, on the other hand, is a prerequisite for increasing similarity in the relative weight of investment in GDP in these countries with the corresponding weight in the euro area.

All this is indicative that a clear process of increasing convergence in the GDP structural elements of the CEE countries towards the euro area is being observed. This is an important prerequisite for increasing the level of synchronization of the economic cycle between the countries, which has a significant role for the effective functioning of strong integrated communities. This is essential both for the CEE countries that are already in the euro area, and for the others that are yet to adopt the euro but are in varying degrees of readiness for participation in the common currency area. Increasing homogeneity between countries makes their economies more resilient to external shocks and implies greater effectiveness of supranational policies. At the same time, however, the increasing structural similarity does not

exclude the manifestation of certain negative influences on macroeconomic dynamics, which could reduce the intensity of the real convergence process.

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