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Sectorial Homogeneity of The Structure of Gross Value Added in Eurozone Countries

Robert W. Włodarczyk[1]

In this article, we discuss changes in the sectorial structure of gross value added in Euro zone countries between 2000 and 2007. We illustrate the weight of the four most important sectors of the economy: agriculture, industry, economic and non-economic services on gross value added. In the last part of the article, we show the degree of similarity in the structure under analysis in a dynamic perspective for EMU countries.

Field of Research: Macroeconomics, International Economics.

1. Introduction

Research on the changes and shape of different types of structures is one of the main objects in economic theory. Structural changes are necessary for development and, at the same time, instrumental in its acceleration (Wydymus, 1988). Diverging patterns of growth among developing countries are also visible in differences in terms of structural changes (United Nations, 2006). In other words, development can be defined as a series of modifications occurring in the economic structure (Malina, 2004). This approach is endorsed by Karpinski (1986), who claims that the deeper the changes, the faster the rate of economic growth. More generally, it can be argued that the dynamics of economic growth is a function of structural changes. Empirical research carried out by Kaczorowski *et al.* (2002) for instance, confirmed the positive influence of structural changes on the general efficiency of production factors.

It is very important both from a theoretical and a practical perspective to identify the mechanisms governing the evolution of the structure of economic phenomena. On the one hand, it helps assess the applicability of a certain theory - a combination of theorems comprising a hypothesis which explains a certain concept and conclusions derived from it (Sosenko, 2008). On the other hand, it creates an attribute to verify synthetically the empirical economic interdependences over time. Understanding the mechanisms and principles determining the dynamics of structural changes in individual countries is surely helpful for analytical and forecasting purposes. According to Sadowski (2005) only in theory can there be a case whereby economic development is ideally proportional, that is to say not brought about by structural changes. This is also confirmed by Broszkiewicz (2004), who underlines that the interaction of individual sectorial structures can provoke changes in the sectorial structure as a whole. It is this difference, within the framework of mutual interaction of

Dr Robert W. Włodarczyk, Cracow University of Economics, Faculty of Economics and International Relations, Theory of Economics Department, Poland, e-mail: ror20@wp.pl.

logically arranged structural elements, that causes not only changes in the pace and order proportions but also creates a completely new set of structural elements.

In this article we try to discuss the structure of gross value added and forecast their future trends, taking into consideration dynamic and regional aspects. Identifying the structural changes mentioned above with enable us to draw initial conclusions in terms of similar phenomena in terms of production in the countries under review. This article consists of six parts, including introduction and conclusion. In the second part, we presented the literature review. Then, we compared the four sectorial structures of gross value added in 2000 and in 2007 and we highlight changes in the structure and the most important trends in this regard. In the fourth and fifth parts, we present research methods and the results of empirical analysis respectively. In the last part of paper, we concluded.

2. Literature Review

Since the beginning of the monetary union in Europe, there has been increasing debate over its viability and the stability of its development and its optimality (Rose, 2000; Soltwedel *et al.*, 2000; Kalemli-Ozcan *et al.*, 2001; Burda, 2001; McKinnon, 2001a; McKinnon 2001b; Alesina *et al.*, 2002; Horvath & Komarek, 2002; Mongelli, 2002; De Grauwe, 2003; Horvath, 2003; De Grauwe & Mongelli, 2005; Ricci, 2008). It is based on seminal papers of Mundell (1961), McKinnon (1963) & Kenen (1969). According to Krugman & Obstfeld (2000), for countries entering the EMU to benefit from the monetary union, their economies have to have achieved a high degree of integration with other economies within this currency area. As a result, in most candidate countries to the EMU, efforts focus on fulfilling the strictly defined nominal convergence criteria (adjustment in terms inflation, tax criteria, long term interest rates and exchange rates) (De Grauwe, 2003). However, apart from issues regarding nominal convergence, real convergence is a very important issue (Angeloni & Dedola, 1999). Real convergence involves different aspects of regional and sectorial similarities with regards to unemployment, employment, production and economic openness. In Bukowski's (2007) view, real convergence means a process whereby countries converge in terms of their average level of economic growth, the measure of which is GDP per capita and the level of unemployment. Convergence is also linked to a synchronisation of their cyclical economic patterns. This definition needs to be completed by the necessity to standardise different structural systems within the framework of real convergence. Prior to accessing the Euro Zone, the emphasis is not placed on real terms and crucial aspects such as production and labour market are omitted. It is far from impossible that the level or the structure of production, unemployment or employment in candidate countries can be so distorted compared to current Euro Zone members that joining them can cause serious threat and risks for both parties interested. In this context, the debate on the convergence of the structure of production and the level of employment of candidate countries towards member countries is very important.

The problem posed by the difference in structural systems of production or GDP is present in the debate on the effectiveness of currency areas. The discourse on the structure of production with regards to Euro Zone countries is important for a number of reasons. First of all, as a result of the process of globalization and the revolution in information technology, the main structural system of production has been modified

on a worldwide scale, considered both in three sectorial perspectives (agriculture, industry and services) and four sectorial perspectives (agriculture industry, financial services and non-financial services). The structural system of production is characterised by an increased role of common services while at the same time the role of agriculture and industry is limited. It is worth noting that this process is also clearly present in Euro Zone countries. Indeed these countries provide a good example of these transformations and set a point of reference for other regions in the world. Secondly, an expansion of the Euro Zone is faced with a dilemma of inner convergence of the structure of production previously mentioned (Bernhard, 2007)[2]. It is not an easy process as entering countries usually have structures of production that differ from existing members. Indeed differences in this respect exist between members themselves. This results from the fact that, among *a priori* convergences criteria, indicators such as GDP rate, sectorial and regional production were not listed. That's why countries that access the Euro Zone can be characterized by high nominal convergence but unsatisfactory real convergence. Although according to some economists, the process of real convergence should favour the fulfilment of nominal convergence criteria set out in the Maastricht Treaty (Bukowski, 2007), in practice, it is rarely the case. Thirdly, in the context of high diversity in real terms in Euro Zone economies, which can be the result of a varied level of openness of these economies to globalization and unequal absorption of new media technologies and *new economy* progress, there is a considerable risk of weak convergence of economic cycles in EMU countries. A problem of asymmetric supply and demand shocks is also liable to occur (Weber, 1990; Bayoumi & Eichengreen, 1992; Boone, 1997; Artis & Zhang, 1999; Fontagne & Freudenberg, 1999; Aksoy *et al.*, 2001; Korhonen & Fidrmuc, 2001). Fourthly, the occurrence of asymmetric shocks can influence the viability and steady development of the monetary union, as it would hamper the conduct of optimal macroeconomic policy in these countries' interest. This enables us to conclude that a high level of homogeneity in the economic structures within the Euro Zone is a very important determinant of the optimal efficiency of macroeconomic policy in the region as a whole.

In general, achieving nominal convergence in terms of inflation, interest rates, public finance and exchange rates is a formal condition to the accession to EMU. However, in order to achieve monetary integration, therefore to eliminate asymmetric shocks, attaining a high degree of real convergence is of great importance. To this effect, we can identify several structural systems in the economy that are of great interest in terms of production and gross value added. In this way, homogenous structures of production can prevent asymmetric shocks or present an alternative tool for these regions which, despite the imperfect synchronization of their economic cycles, are eager to access the common currency area without having to suffer the consequences of the lack of symmetry in their economic cycles (Orłowski, 2000; Bukowski, 2007; Lis, 2008).

[2] Among the criteria required to achieve optimal currency status, , apart from level of production diversification, a given area must fulfill the following: price elasticity, wage elasticity, financial integration, fiscal integration, political integration, mobility of production factors, open economy, convergence of economic cycles, convergence in inflation.

3. Sectorial Structure Of Gross Value Added In Euro Zone Countries Between 2000 And 2007

One of the most fundamental structures of gross value added analysed in the literature is a divide according to the three main sectors of the economy (Kwiatkowska, 2000; Kaczorowski *et al.*, 2002; Kotlorz, 2005; Adamczyk & Włodarczyk, 2007):

- sector 1: agriculture;
- sector 2: industry and construction;
- sector 3: services.

Over the past few years, there has been a tendency to evaluate the role of structural changes of gross value added in the economy in four sectors: sector 1 agriculture; sector 2: Industry and construction; sector 3: non-financial services; sector 4: financial services. This structure has been more common in recent literature than the traditional division of economic activity in three sectors as defined by Clark, Fischer and Fourastie. In contemporary economies, there is a marked tendency towards a shift in the structure of production from agriculture and industry in favour of services. There is also a strong internal reorientation in the services, which is characterised by a decrease in services based on obsolete technologies in favour of new services derived from innovations in IT and efficient technology (Kotlorz, 2005).

Table 1 Share of the four sectors of the economy in creating GVA in Euro Zone in 2000 and 2007 (%)

Country	Year							
	2000				2007			
	Sector I	Sector II	Sector III	Sector IV	Sector I	Sector II	Sector III	Sector IV
Belgium	1,4	27,0	49,0	22,6	0,9	24,1	51,9	23,2
Germany	1,3	30,3	45,7	22,8	0,9	30,1	47,1	21,9
Ireland	3,4	42,2	38,5	15,9	2,1	35,6	43,5	18,8
Greece	6,6	21,0	50,7	21,7	3,6	23,1	49,4	24,0
Spain	4,4	29,2	45,6	20,8	2,9	30,3	45,8	21,0
France	2,8	22,9	49,5	24,7	2,2	20,6	51,9	25,3
Italy	2,8	28,4	48,7	20,1	2,0	27,0	50,1	20,8
Luxemburg	0,7	18,4	65,5	15,4	0,4	14,4	69,8	15,4
Holland	2,6	24,9	50,3	22,1	2,1	24,2	49,8	23,9
Austria	2,0	30,8	46,1	21,1	1,8	30,6	47,3	20,4
Portugal	3,8	27,6	44,7	24,0	2,7	24,5	46,9	26,0
Finland	3,5	33,7	42,0	20,8	3,2	32,6	42,8	21,4
Average value	2,9	28,0	48,0	21,0	2,1	26,4	49,7	21,8

Source: www.eurostat.eu.

The sectorial division mentioned above from the point of view of producing gross value added enables us to assess the degree of modernity of job vacancies and production associated with them. In the past few years, the services sector has tended to increase its share of production and employment while there has been a decrease in the utilization of factors of production by the first two sectors. This is

directly linked to the process of globalization, the development of foreign trade, the increased interdependence of economies and the introduction of innovations in IT and mass media. Also, trade and the *new economy* play a more important part in the process of management. The data in table 1 confirm these tendencies in the Euro Zone between 2000 and 2007. However, it is worth underlining that they showed varied degree of intensity in different countries. At the beginning of the period under study (2000), with the exception of Ireland, all countries were characterised by a prominence of the financial services sector. Ireland showed the same characteristic in 2007. The level of average weight of individual sectors in gross value added in Euro Zone economies indicates that in 2000 (the start of the Euro Zone), agriculture and industry produced around 31% of the total gross value added, services around 69%. As the monetary union was developing, the services sectors took a growing importance, amounting to 71.5% in 2007 while industry and agriculture accounted for 28.5% of gross value added (table 1).

In the agricultural sector, results were diametrically the reverse of the services sectors. In 2000, the share of agriculture in the production of GVA was relatively low in Euro Zone countries, from 0.7% in Luxemburg to 6.6% in Greece. Its share was even lower in 2007 across the board, amounting to between 0.4% in Luxemburg to 3.6% in Greece (table1). The average share of agriculture in GVA decreased over the period under study from 2.9% to 2.1%. The share of Sector II (industry and construction) in GVA was the highest in Ireland in 2000 and 2007, respectively 42.2% and 35.6% (This sector was the most important in Ireland in 2000). Over the same period, sector II was the less prominent in Luxemburg with 18.4% in 2000 and 14.4% in 2007. Sector II's average share in GVA decreased between 2000 and 2007 by 1.6 percentage point. Sector III's share in GVA over the same period was growing. Its highest share was seen in Luxemburg, with 65.5% in 2000 and 69.8% in 2007 and its lowest was in Ireland with 38.5% in 2000 and in Finland in 2007 with 42.8%. The average weight of sector III among Euro Zone countries increased from 48% to 49.7% between 2000 and 2007. The last sector (non financial services) also showed an upward trend as confirms the average increase of its share in GVA from 21% to 21.8% over this period among Euro Zone countries. In 2000, the share of GVA in this sector was comprised between15.4% in Luxemburg to 24.7% in France. In 2007, this figure was from 15.4% in Luxemburg to 26% in Portugal.

Table 2. Changes in the share of the four main sectors of the economy in producing GVA between 2000 and 2007 (percentage points)

Country	Sector I	Sector II	Sector III	Sector IV	Sector III+IV
Belgium	-0,5	-2,9	2,9	0,6	3,4
Germany	-0,3	-0,2	1,4	-0,9	0,5
Ireland	-1,3	-6,6	5,0	2,9	7,9
Greece	-3,0	2,1	-1,3	2,2	0,9
Spain	-1,5	1,1	0,2	0,3	0,4
France	-0,6	-2,3	2,4	0,6	3,0
Italy	-0,8	-1,4	1,5	0,7	2,2
Luxemburg	-0,3	-4,0	4,3	0,0	4,3
Holland	-0,5	-0,8	-0,6	1,9	1,3
Austria	-0,3	-0,2	1,2	-0,7	0,5
Portugal	-1,1	-3,1	2,2	2,0	4,2
Finland	-0,3	-1,1	0,8	0,6	1,4

Source: as in table 1.

Table 2 present more detailed changes in the share of different sectors in the structure of GVA in Euro Zone countries between 2000 and 2007. This data indicate that the role of sector I in GVA decreased in all Euro Zone countries. This tendency was the most apparent in Greece, with a decrease by 3 percentage points. The least apparent reduction was seen in Germany, Luxemburg, Austria and Finland, which saw decrease of only 0.3 percentage points. In most countries under study, apart from Greece and Spain, the importance of sector II in GVA also decreased. The most apparent decrease was seen in Ireland, with a drop by 6.6 percentage points and Luxemburg, with 4 percentage points. This sector saw its smallest decrease in Germany and Austria, with drops by 0.2 percentage point. Greece and Spain, as already mentioned, were exceptions: these two countries saw the role of their industry and construction sectors increase by 2.1 and 1.1 percentage points respectively.

As far as services, financial or non-financial, are concerned, it is difficult to isolate one specific trend although the countries under study showed a growing trend in this respect. Between 2000 and 2007, the strongest growth in the share of financial services in GVA occurred in Ireland and Luxemburg, with 5 and 4.3 percentage points respectively. The share of financial services in this process decreased by 1.3 % points in Greece and by 0.6 % point in Holland. In the case of non-financial services, the strongest increase of their share occurred in Ireland by 2.9 % points and Greece by 2.2% points. The importance of this sector in producing GVA decreased by 0.9 % point in Germany and by 0.7% point in Austria.

The structural transformations in Euro Zone countries with regards to GVA appear more clearly when we consider sectors III and IV combined together. In this case, the importance of the services sector in GVA grew between 2000 and 2007 in all the countries under study. This trend was the most apparent in Ireland, where an increase by 7.9 % point was seen, and in Luxemburg, which saw an increase by 4.3% points and in Portugal, with a 4.2 % point increase. The weakest increase of the role of services sector was noted in Spain (+0.4% point), Germany (0.5% point) and Austria (0.5% point) (table 2).

4. Research Method

In taxonomic and taxonometric analysis, the structure has a dual meaning (Strahl, 1998). First of all, the structure is a characteristic object which is described by the sequence of m indicators of structure $w = \{w_1, w_2, \ldots, w_m\}$ such as $\sum_{i=1}^{m} w_i = 1$ where m becomes a share measuring the relative intensification of a certain characteristic in the elements of the structure. Also, it can used to quantify the distance and the similarities with other structures formulated both in dynamic and regional terms. Secondly, the structure is defined in a wider perspective and it poses a set of objects which are characterised by different traits, so it may be understood as the configuration of points on a multi-dimensional plan. In this latter understanding of the notion of structure, the analysis means to look for an optimal number of subsets of these objects in terms of their similarities and to select adequate objects to individual subset. While conducting a comparative analysis of objects with regards to their structure, utilizing suitable of normalisation of variables under study and choosing the right measure of structure similarities are very important. The fundamental characteristic of normalisation is fulfilling the principle of additivity, whereby the variables expressed in different units are under a common denominator (Malina, 2004; Wydymus, 1988). According to Strahl (1998), apart from the principle of additivity, a crucial element that has to be fulfilled by normalization methods is that variables would have uniform preference, which means that the ability to consider all normalised variables as stimulants for a given synthetic criterion.

As in our case, all variables describing the structure of the phenomenon were used in the same unit of measure; we used a normalisation method which is based on quotient transformation (Malina, 2004)[3]:

$\sum_{i=1}^{m} w_{ij}$ (j= 1, 2, …, r) as a point of reference for normalisation of the structure of economic phenomenon in each j-object (country).

The normalization was conducted with the following formula (Włodarczyk, 2006):

$$u_{ij} = \frac{w_{ij}}{\sum_{i=1}^{m} w_{ij}} \qquad (1),$$

where (i = 1, 2, …, m; j = 1, 2, …, r).

The following conditions must be fulfilled:

$$u_{ij} \in \langle 0,1 \rangle \qquad (2),$$

$$\sum_{i=1}^{m} u_{ij} = 1 \qquad (3),$$

$$\sum_{i=1}^{m} \sum_{j=1}^{r} u_{ij} = n \qquad (4).$$

[3] In the economic literature there are four main methods of normalisation of variables: quotient transformation with reference object, standardization, unitarisation and ranging of variables.

After the normalization process, we get the matrix U_{ij}^{t}, with *m* by *r* dimensions, consisting of *n* elements. This matrix is composed of j indicators taking part in the set of all *m*-elements of the structure of *i*-objects (country) under study among *r*-objects under study (countries) for *t*-time unit (year) as described below:

$$U_{ij}^{t} = \begin{bmatrix} u_{11}^{t} & u_{12}^{t} & \dots & u_{1r}^{t} \\ u_{21}^{t} & u_{22}^{t} & \dots & u_{2r}^{t} \\ \dots & \dots & \dots & \dots \\ u_{m1}^{t} & u_{m2}^{t} & \dots & u_{mr}^{t} \end{bmatrix} \quad (5).$$

The next stage was to construct a symmetric square matrix (*S),* the individual elements of which measure the lack of similarity between the structures of the economic phenomenon under study between these *r* objects (countries) in the *t* time units (years) (Chomątowski & Sokołowski, 1978). The structure of this matrix is as follows:

$$S_{ij}^{t} = \begin{bmatrix} s_{11}^{t} & s_{12}^{t} & \dots & s_{1r}^{t} \\ s_{21}^{t} & s_{22}^{t} & \dots & s_{2r}^{t} \\ \dots & \dots & \dots & \dots \\ s_{r1}^{t} & s_{r2}^{t} & \dots & s_{rr}^{t} \end{bmatrix} \quad (6).$$

The calculation of the elements of this matrix for year *t* will be done with each of the formulas below:

a) Distance in local plan (OM)

$$s_{jk} = \frac{1}{m}\sum_{i=1}^{m}\left|u_{ji} - u_{ki}\right| \quad (7),$$

b) Distance in Euclidian plan (OE)

$$s_{jk} = \sqrt{\frac{1}{m}\sum_{i=1}^{m}(u_{ji} - u_{ki})^{2}} \quad (8),$$

c) Clark Divergence Indicator (WDC)

$$s_{jk} = \sqrt{\frac{1}{m}\sum_{i=1}^{m}\left(\frac{u_{ji} - u_{ki}}{u_{ji} + u_{ki}}\right)^{2}} \quad (9),$$

d) Bray Curtis distance (MBC)

$$s_{jk} = \frac{\sum_{i=1}^{m}\left|u_{ji} - u_{ki}\right|}{\sum_{i=1}^{m}\left|u_{ji} + u_{ki}\right|} \quad (10),$$

e) Canberra metric (MC)

$$s_{jk} = \frac{1}{m}\sum_{i=1}^{m}\frac{\left|u_{ji} - u_{ki}\right|}{\left|u_{ji} + u_{ki}\right|} \quad (11),$$

f) Renkonen's index (WR)

$$s_{jk} = 1 - \sum_{i=1}^{m} \min\{u_{ji}; u_{ki}\} \quad (12),$$

where (i = 1, 2, …, m; j, k = 1, 2, …, r).

As a result, after calculating taxonomic indicators of structure distance between all objects (countries) for year t, we derived 6 matrices S_{ij}^{t}, each based on different measurements of the distance of structures as of formulas (7) to (12). Using this matrix S_{ij}^{t}, we were able to calculate average measures of the value of intragroup distance of element structures m of the economic phenomenon under study for year t using the following formula:

$$\tau_g = \frac{2\sum_{c=1}^{C_g} s_{gc}}{r_g(r_g - 1)} \quad (13),$$

where g = 1, 2, …, G; t = 2000, 2001, …, 2007; τ_{gt} is the measure of the lack of similarity in regards to the structure under study (in our case, gross value added) within the group of objects g (countries) calculated based on the measure C_g of the lack of similarity of a given structure between pairs of objects under study in the group of objects g (countries) which is a measure of the lack of similarity of a certain structure inside the group. (in our case, g=1 as we study the whole set of Euro Zone Countries altogether); C_g the number of pairs of object compared (countries) which we can calculated with the following relation $C_g = [r_g(r_g - 1)]/2$; r_g being the number of countries in the group while the following condition must be fulfilled $r = r_1 + r_2 + \ldots + r_G$; r the number of objects (countries) under study.

In the next stage, we calculate the average measure of the lack of similarity in the structure of the economic phenomenon under study (Z_t) in year t using the following formula:

$$Z_t = \frac{\sum_{d=1}^{D} \tau_g^{dt}}{D} \quad (14),$$

where d = 1, 2, …, D; τ_g^{dt} - value of the average measure d of the distance of the structure in the group of the economic phenomenon for year t and group g. In the analysis, we use annual data (in €) from Eurostat database, regarding the structure of GVA in the four sectors for the following 12 euro Zone countries (Belgium, Germany, Ireland, Greece, Spain, France, Italy, Luxemburg, Holland, Austria, Portugal and Finland) between 2000 and 2007. The calculations were conducted algorithms from Microsoft Excel 2007.

5. Empirical Analysis and Findings

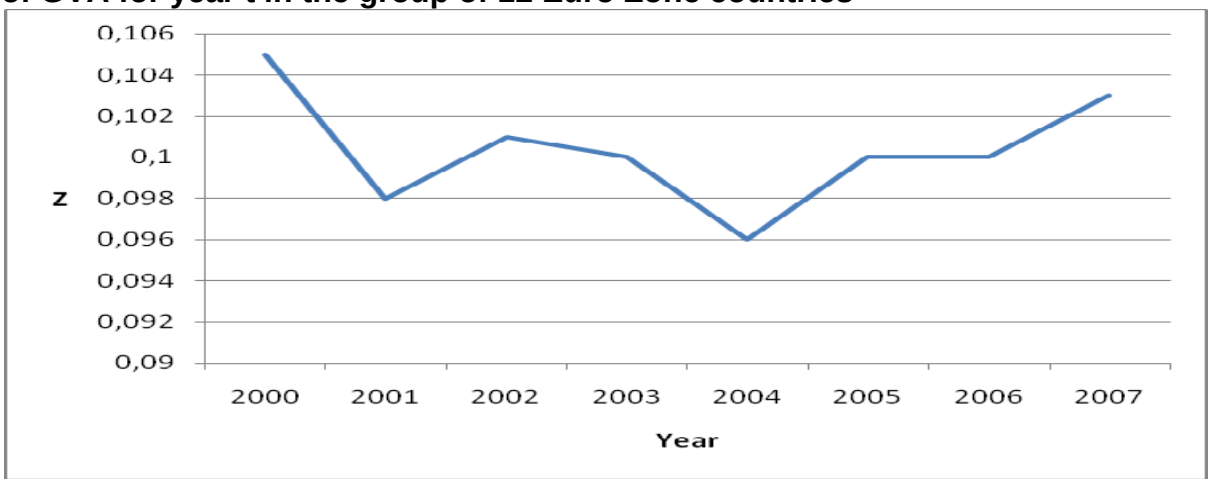
Table 3 presents an estimation of taxonomic indicators of the lack of similarity in the structure of gross value added in the group of 12 Euro Zone countries for each year under study. The results of the analysis are presented for the seven different measures of the distances of structures.

Table 3: Average values of distance of the four sectorial structures of GVA among Euro Zone countries (EU 12) between 2000 and 2007

Years (*t*)	Taxonomic indicators of the lack of similarity in the structure inside the group						
	τ^{OE}	τ^{OM}	τ^{MR}	τ^{MC}	τ^{WDC}	τ^{MBC}	Z_t
2000	0,056	0,047	0,094	0,148	0,191	0,094	0,105
2001	0,052	0,043	0,087	0,139	0,182	0,087	0,098
2002	0,053	0,044	0,089	0,143	0,187	0,089	0,101
2003	0,051	0,043	0,086	0,143	0,190	0,086	0,100
2004	0,050	0,041	0,083	0,138	0,181	0,083	0,096
2005	0,051	0,042	0,085	0,146	0,192	0,085	0,100
2006	0,052	0,043	0,086	0,145	0,189	0,086	0,100
2007	0,054	0,045	0,090	0,147	0,189	0,090	0,103

Source: Author's own

Graph 1: Level of lack of similarity inside the group of four sectorial structures of GVA for year t in the group of 12 Euro Zone countries



Source: Author's own

Explanatory notes to table 3 and graph 1: $\tau^{OE}, \tau^{OM}, \tau^{MR}, \tau^{MC}, \tau^{WDC}, \tau^{MBC}$ are taxonomic indicators of the lack of similarity inside the group of four sectorial structures of GVA for year t in the group of 12 Euro Zone countries calculated respectively based on: Distance in local plan (OM), Distance in Euclidian plan (OE), Clark Divergence Indicator (WDC), Bray Curtis distance (MBC),Canberra metric (MC), Renkonen's index (WR); Z_t - taxonomic indicator of the lack of similarity inside the group of four sectorial structures of GVA for year t in the group of 12 Euro Zone countries calculated based on an average arithmetical value of indicators OE, OM, MR. MC, WDC, MBC.

Graph 1 present the evolution of the lack of similarity of the group under study based on distance z. Between 2000 and 2004, at the beginning of the Monetary Union, in Europe, there was certain homogeneity of the structures of GVA among these countries. Between 2004 and 2007, however, the process of intensification of the structural divergence in GVA was noted. We can therefore assume that 2004 was a

turning point in this regard. That year, 10 new countries joined the EU. We can conclude that up to 2004, there had been a positive effect of monetary integration on the level of homogeneity of the structure of GVA. After that, this tendency reverted completely. The accession of new countries to the EU could have influenced greatly the trade flows inside the EU. This in turn would have caused stronger transformation in the structure of GDP in individual countries and at the same time lesser homogeneity in the structural systems of Euro Zone countries.

6. Conclusions

The analysis conducted in this study helps formulate a few final conclusions. First of all, over the period under study, the financial services sector was apparently the main provider of GVA in Euro Zone countries. Apart from that, this sector's share showed an upward trend from the beginning of the EMU, as its increase from 48% in 2000 to 49.7% in 2007 shows. The fact that Euro Zone countries were deriving most of their income from the services sector qualifies them as a region with a highly competitive structure of GVA. Secondly, agriculture played a near negligible role in the role in the countries under study, delivering only from 0.4% to 3.6% of the total GVA in these countries. His situation should be perceived as favourable to Euro Zone countries, as this sector is characterized by low efficiency and limited usage of knowledge-based assets. Thirdly, from the analysis of the similarity of the structure of GVA among Euro Zone countries, it appears that in the first years after the EMU came into force, an increase in terms of the homogeneity of theses countries in the structure of GVA was confirmed but this tendency inverted after 2004. A growing heterogeneity is observed until 2007 in this respect. Fourthly, the increase in the divergence of the structure of GVA between 2004 and 2007 contrasts with the arguments put forward by a number of economists that monetary union favours homogeneity and convergence of individual economic structures.

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