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## **DIVERSITY IN EMPLOYMENT STRUCTURES IN RELATION TO ECONOMIC GROWTH IN EURO-ZONE COUNTRIES**

### **1. Introduction**

Structural changes result from the influence of various factors. They lead to the transformation of the whole entity under study and change its essence. Structural perspective of our surrounding is increasingly stressed in economic sciences, although it needs to be remembered that the term “structure” has become a methodological category as a whole, which applies to many fields of knowledge. Together with the development of the complexity of management, the importance of the monotony of changes, dynamics of different types of structures is growing to explain various economic dilemmas.

Structural changes are a necessary condition for growth, being at the same time a rudimental factor of its acceleration [Wydymus 1988, p. 162]. It leads to the conclusion that growth is a kind of sequence of transformations occurring in the economic structure [Malina 2004, p. 20]. The deeper the changes in the structure are, the faster the pace of economic growth is, so it can be thought that the pace of economic growth is the function of structural transformations [Karpinski 1986, p. 29]. Z. Szymła [2005, p. 101] notes that transformations of socioeconomic structures determine the quality aspect of growth, as a result of which these structures acquire new characteristics and properties. A positive and bilateral connection between structural changes and economic growth is underlined by K. Kukuła [1996, p. 11]. A positive influence of structural modifications on the overall efficiency of production factors was confirmed in numerous empirical studies [Kaczorowski et al. 2002, pp. 35-64]. However, it should not be overlooked that structural changes might have negative effects that can hinder economic growth.

An important issue is to familiarise oneself with the rules that govern the evolution of the structure of economic phenomena, both from theoretical and practical points of view. On the one hand, it enables us to assess the application of a certain theory, which is an ensemble of theorems comprising a hypothesis in order to explain a given problem and conclusions which result from it [Sosenko 2008, p. 58]. However, on the other hand, it enables us to proceed to a synthetic verification of economic correlations over time. It is also helpful to understand the principles and mechanisms that determine the dynamic and structural changes in individual countries for analytical and forecasting purposes. Z. Sadowski [2005, p. 9] points out that only in theory can the case of an ideally proportional economic growth be considered, insofar as it does not bring about structural changes. This opinion is also confirmed by R. Broszkiewicz [2004, p. 17], who underlines in his work that the dynamics of the impact of different components of a structure cause changes in the levels of potentials of these components, strengthening the further difference of potentials of this impact.

From the beginning of the European Monetary Union, the debate over its stability has been growing, as well as over its steady development. P.R. Krugman and M. Obstfeld [2000, pp. 622-630] believe that achieving a high degree of integration between economies of existing members of the monetary union and new entrants' economies will be a great benefit for the monetary union as a whole. Based on that, it can be thought that the efforts of most of candidate countries to the EMU are focused on the fulfilling rigidly defined nominal convergence criteria [De Grauwe 2003, pp. 142-143]. However, apart from issues connected with nominal convergence, real convergence remains an important issue. Within the framework of the latter, different aspects of regional and structural similarity are discussed, especially in terms of employment and production. In S. Bukowski's opinion [2007, p. 135], real convergence means the process of countries getting closer in terms of their average level of economic growth, measured by GDP *per capita* and unemployment level. It is also connected with the synchronization of economic cycles. However, it needs to be underlined that, in order to ensure full real convergence of EMU members, it is not meaningless to standardise different structural systems between economies. Within the framework of pre-accession actions to euro zone, little emphasis is put on the real economy, and such important aspects as production or labour market are omitted. Therefore, we might suspect that the level or structure of employment in candidate countries might deviate from present EMU members to such an extent that their accession may pose serious worries and risk for both interested parties. In this context, the debate on adopting labour market structures in candidate countries to the EMU similar to those of the existing member countries may turn out to be very substantial.

The analysis of employment structure is one of the most important issues addressed when studying the labour market. The problem of different structural systems of employment takes place in terms during discussions on fostering economic growth and the effectiveness of currency areas. The discussion over employment structure

and dynamics of economic growth in relation to EMU countries is becoming important for a number of reasons. Firstly, globalisation and IT revolution are indeed having a substantial impact on the structural system of employment in terms of economic sectors in most world economies, discussed both in three-sectoral perspective (agriculture, industry, services) and four-sectoral perspective (agriculture, industry, market services, non-market services). In the systems mentioned above there is a growing importance of services, with, at the same time, limiting the role of agriculture and industry. It is worth underlining that this process is not limited to EMU countries, but they even become a pattern of these changes and a kind of point of reference for other regions in the world. Secondly, an expanding euro-zone is faced with the issue of inner standardisation of the structure of employment according to economic sectors. It is not an easy process as countries entering the euro-zone usually have different structure of production and employment than present members. Moreover, there are visible structural divergences in this respect between euro-zone members themselves. It results from the fact that in the collection of verified *a priori* convergence criteria there is no such categories as dynamics, or sectoral or regional structure of GDP and employment. That is why countries entering the euro-zone can be characterized by high nominal convergence, yet with unsatisfactory real convergence. Although in the opinion of some economists, real convergence processes should lead to the stable fulfilment of nominal convergence criteria set up in the Maastricht Treaty [Bukowski 2007, p. 135], in practice, this argument is often difficult to fulfil. Thirdly, the structure of production and employment structure between individual euro-zone countries can be marked too. This would be the direct result of a contrasted level of opening to global markets or historically conditioned by a specialisation in a given field of production. Alternatively, it can derive from a different level of absorption of recent development in information technology and *new economy* gains. In such a case, there is a considerable risk of strong diversity in the level of economic growth accompanied by a weak convergence of economic cycles in the euro-zone. This would result in potential problems in terms of asymmetric supply and demand shocks. Fourthly, the occurrence of such asymmetric shocks within the EMU can have an impact on its very stability as well as hindering its development, since they prevent the implementation of an optimal macroeconomic policy from the point of view of all countries in the currency area. Therefore, it can be concluded that a high level of homogeneity in economic structures, as well as in terms of employment, is an important determinant of the effectiveness of this part of macroeconomic policy that refers to the currency area under study as a whole.

More generally, achieving nominal convergence in terms of inflation levels, interest rates, public finance and exchange rates can be regarded as a formal condition to accession to the EMU. However, a fully successful implementation of the EMU requires the elimination of asymmetric shocks and a stable and evenly distributed growth across the board. For that purpose, in the context of diverging structural systems, achieving real convergence is crucial, particularly in terms of production

and employment [Włodarczyk 2009]. Homogeneous structures can prevent the occurrence of asymmetric shocks. Alternatively, they can be a tool in regions which, in spite of having a low level of synchronization of their economic cycles and being subject to supply shocks, are interested in the benefits of joining the common currency area, but are unwilling to bear the costs associated with the lack of symmetry of supply shocks and economic cycles mentioned before [Bukowski 2007, pp. 16-183; Lis 2008, pp. 329-355; Orłowski 2000, pp. 15-28].

The aim of this article is to show dynamic changes in the structure of employment according to economic sectors in EMU countries as well as the influence of these changes on the pace of economic growth. The basis for the statistical analysis are data about the number of employed aged 15-64 and the pace of growth of real GDP between 1992 and 2007. Regional analyses comprise the euro-zone countries (UE-12). In the second part of the study, a four-sectoral structure of employment in euro-zone countries between 1992 and 2007 is considered. In the third part, the results relating to economic growth in the countries under study are presented. In the next part, correlations between the structure under study and the pace of economic growth are detailed. In the final part, conclusions of the research are formulated.

## 2. Sectoral structure of employment in the euro-zone

Table 1 details the diversity in the sectoral structure of employment in four-sectoral system<sup>1</sup> in the euro-zone countries. The following conclusions can be derived from these data.

1. In all 12 euro-zone countries under study, the tertiary (market services) sector played a dominant role in employment of the workforce, with the exception of Portugal where manufacturing and building still played a major part. On average, between 1992 and 2007, 36.8% of the total employment was in the market services sector, the highest being in Luxemburg (41.9%), the Netherlands (39.1%) and Austria (38.7%) whereas the lowest was in Portugal (31.9%), Finland (34.4%) and Germany (34.7%).

2. In all euro-zone countries, apart from Greece, the share of the agricultural sector in total employment was relatively small, which confirms the low productivity in this sector in comparison with the services sector, for instance. Also, the systematic elimination of the agricultural sector from the process of creating value in GDP is characteristic of highly developed countries.

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<sup>1</sup> Four-sectoral system comprises: sector I defined as the agricultural sector (comprises 2 branches: "agriculture, hunting and forestry", "fishing"); sector II known as the industry sector (also comprises 2 branches: "industry", "construction"); sector III is named as the market services sector (consists of 5 branches: "trade and repair", "hotels and restaurants", "transport, storage and communication", "financial intermediation", "real estate, renting and business activities"); sector IV is regarded as the non-market services sector (comprises 4 branches: "public administration and defence", "education", "health and social work", "other community, social and personal service activities").

Table 1. Diversity in employment structures according to economic sectors\* in EMU countries between 1992 and 2007 (in %)

Country	Sector I	Sector II	Sector III	Sector IV
Belgium	2.2	26.7	36.6	34.5
Germany	2.7	33.8	34.7	28.9
Ireland	7.9	28.3	37.7	26.0
Greece	15.9	23.4	37.4	23.2
Spain	7.0	30.7	38.2	24.1
France	4.3	25.9	35.7	34.1
Italy	5.3	32.5	35.2	27.0
Luxemburg	2.6	21.8	41.9	33.7
The Netherlands	3.2	21.0	39.1	36.6
Austria	5.9	29.9	38.7	25.6
Portugal	9.0	33.9	31.9	25.2
Finland	6.1	27.0	34.6	32.2
Average UE-12	6.0	27.9	36.8	29.3

\* The average share of the economic sectors in total employment in EMU countries between 1992 and 2007.

Source: individual calculations on the basis of data from Eurostat.

3. Apart from the dominant role of the market services sector, euro-zone countries were characterised by various degrees of importance of their industry and non-market services sector in job creation. Three groups appear: countries where non-market services sector has greater importance than industry sector (Belgium, France, Luxemburg, the Netherlands, and Finland); countries where the industry sector has greater importance than the non-market services sector (Germany, Spain, Italy, Austria, Portugal) (in the case of Portugal, the industry sector has the greatest significance in the structure of employment, even greater than that of market services sector); countries where the importance of non-market services sectors and industry sector is comparable (Ireland and Greece).

4. The analysis of the average percentage of those employed in individual economic sectors in euro-zone countries (Table 2) points to the fact that, between 1992 and 2007, of all sectors, the roles of the primary and the secondary sectors in creating jobs have decreased the most. In the primary sector, this decrease was 3.6 percentage points (from 8 to 4.4% between 1992 and 2007). In the secondary sector (building and industry), this decrease was 4.9 percentage points (from 30.7 to 25.8% between 1992 and 2007).

5. Over this period of time, the Euro-zone experienced a significant increase (5.4 percentage points) in the importance of the non-market services sector in employment from 25.7% in 1992 to 31.1% in 2007. A similar increase occurred in the market services sector, where the increase between 1992 and 2007 was 3.1 percentage points, from 35.6 to 38.7%. It is worth underlining that, over that period of time, the increasing importance of the services sector in employment was considerable as the share of this sector rose in total by 8.5 percentage points.

Table 2. Diversity in employment structures according to economic sectors\* in EMU between 1992 and 2007 (in %)

Years	Sector I	Sector II	Sector III	Sector IV
1992	8.0	30.7	35.6	25.7
1999	6.0	28.2	36.7	29.1
2007	4.4	25.8	38.7	31.1
Change between 1992 and 2007 (in percentage points)	-3.6	-4.9	3.1	5.4

\* The average share of the economic sectors in total employment in EMU between 1992 and 2007.

Source: individual calculations on the basis of data from Eurostat.

6. The results observed in the change in the sectoral structure of employment in EMU countries indicate that in compliance with the Fisher Clark theory of sectoral employment structure, we can conclude that the changes in the employment structure in the EMU have been positive [Kwiatkowski et al. 2003, p. 232], in particular in terms of the decrease of the share of the primary sector and the increase in the importance of the services sector in the demand for labour.

7. However, it needs to be underlined that, comparing the relative importance of sectors in employment between individual countries based on average values between 1992 and 2007, substantial divergences can be observed. The strongest divergences in the agricultural sector (13.7 percentage points between Greece and Belgium), in the non-market services sector (13.4 percentage points between the Netherlands and Greece), in the industry and building sector (12.9 percentage points between Portugal and the Netherlands), and the lesser diversity can be observed in the market services sector (10 percentage points between Luxemburg and Portugal).

### 3. Economic growth in the euro-zone

Comparing the levels of growth rates, measured by real GDP, indicates that euro-zone countries were highly contrasted in this respect. This raises concerns for the synchronization of economic cycles, which is so important for the good functioning of the euro-zone.

In Table 3, we include information relating to the pace of growth of real GDP in euro-zone countries with subdivisions from 1992 to 1998 and 1999 to 2007. Using data for the whole period under study, it can be concluded that average annual economic growth ranged from 1.4% in Italy to 6.8% in Ireland. This means quite a high span of average pace of real GDP growth, since Ireland outgrew Italy by almost five times. Comparing the results of average real GDP growth confirms that this span decreased between 1999 and 2007 compared to the period between 1992 and 1998. In the period of implementation of the euro-zone, the diversity in

average economic growth decreased. Another interesting conclusion is the increase in average pace of growth of real GDP between 1999 and 2007 compared to the period between 1992 and 1998. This was confirmed in nine countries while in the other three (Portugal, the Netherlands and Ireland), the reverse happened.

Table 3. Diversity in average annual economic growth in EMU countries between 1992 and 2007 (in %)

Country	1992-1998	1999-2007	1992-2007	Change*
Belgium	1.8	2.3	2.1	0.5
Germany	1.5	1.5	1.5	0.0
Ireland	7.0	6.6	6.8	-0.4
Greece	1.8	4.2	3.1	2.4
Spain	2.2	3.7	3.1	1.5
France	1.7	2.2	2.0	0.5
Italy	1.3	1.4	1.4	0.1
Luxemburg	3.6	5.1	4.5	1.5
The Netherlands	2.9	2.4	2.7	-0.5
Austria	2.1	2.4	2.3	0.3
Portugal	2.4	1.7	2.0	-0.7
Finland	2.5	3.4	3.0	0.9

\* Difference in average annual economic growth in EMU countries between period 1999-2007 and 1992-1998 (in percentage points).

Source: individual calculations on the basis of data from OECD.

Comparing these two subperiods (1999 to 2007 and 1992 to 1998), it appears that Greece, Spain and Luxemburg benefited the most from the accession to the euro-zone in terms the acceleration of the pace of their economic growth. Portugal, the Netherlands and Ireland benefited the least. Germany is a very interesting case as it practically kept the same pace of economic growth after adopting the common currency.

#### 4. Analysis of the correlation between sectoral structure of employment and economic growth in the Euro zone

In this part of the study, we introduce the following equation and estimate the results of its estimated parameters [Adamczyk et al. 2008, pp. 63-73]:

$$g_{it} = \alpha + \alpha_{PB}PB_{it} + \alpha_{UR}UR_{it} + \alpha_{UN}UN_{it} + \sum_{j=1993}^{2007} (\beta_j * D_j) \quad (1)$$

where:  $g_{it}$  – growth rate in country  $i$  in year  $t$  ( $t=1992, 1993, \dots, 2007$ );  
 $i$  – euro-zone countries (Belgium, Germany, Ireland, Greece, Spain, France, Italy, Luxemburg, the Netherlands, Austria, Portugal, Finland) [estimation 1]; first subgroup of countries: Italy, Luxemburg,

the Netherlands, Austria, Belgium, Germany are countries who had relatively the highest GDP *per capita* in 1995 according to PPP (Purchasing Power Parity) [estimation 2]; second subgroup of countries: Ireland, Greece, Spain, France, Portugal, Finland are countries with relatively the lowest GDP *per capita* in 1995 according to PPP [estimation 3];

$PB_{it}$  – percentage of people employed in the industry and construction sector in country  $i$  in year  $t$ ;

$UR_{it}$  – percentage of people employed in the market services sector in country  $i$  in year  $t$ ;

$UN_{it}$  – percentage of people employed in the non-market services sector in country  $i$  in year  $t$ ;

$D_{1993}, D_{1994}, \dots, D_{2007}$  – binary variables for years 1993, 1994, ..., 2007;

$\alpha \geq 0$  and  $\alpha_{PB}, \alpha_{UR}, \alpha_{UN}, \beta_{1993}, \beta_{1994}, \dots, \beta_{2007} \in \mathfrak{R}$  – equation parameters (1).

Parameter  $\alpha$  marks the rate of economic growth in a given country in 1992, which would occur if 100% of the employed in that country worked in the agricultural sector. The sums of parameters  $\alpha + \alpha_{PB}$ ,  $\alpha + \alpha_{UR}$  and  $\alpha + \alpha_{UN}$  define the rates of economic growth in countries in year 1992 which would occur in 100% of the employed worked in industry and construction, market and non market services. Parameters  $\beta_{1992}, \beta_{1993}, \dots, \beta_{2007}$  are correction on the constant  $\alpha$  for subsequent years.

Parameters of equation (1) were estimated using the least squares method and are depicted in Table 4. Presented in Table 4, estimation of equation parameters (1) helps formulate the following conclusions:

a) in the simulation carried out, values of corrected coefficient ( $R^2$  corrected) indicate that explanatory variables in equation (1) explain the dynamics of growth of real GDP between 1992 and 2007 to the extent of 36.6% in the whole of euro-zone countries, 62.1% in euro-zone countries with a relatively higher GDP *per capita* and of about 38.5% of euro-zone with lower GDP *per capita*;

b) in the whole simulation, when every additional percentage point of people employed in industry and construction resulted in a decrease in the pace of real GDP in the whole simulation in euro-zone countries by about 0.11% points. However, in the subgroups mentioned before, this interaction was statistically negligible;

c) the variable  $UR$  which shows the percentage of people employed in the market services sector is statistically important in all three estimations that have been presented. Every additional percentage point of people working in market services resulted in an increase in the pace of economic growth of 0.14% points in the whole simulation, nearly 0.34% point in the subgroup of euro-zone countries with relatively higher GDP *per capita*. In the subgroup of countries with relatively lower GDP *per capita*, that figure was 0.39 percentage point;

Table 4. Estimation of equation parameters (1) [estimations 1-3]

Independent variables	Estimated OLS parameters			t-Statistic			p		
	Est. 1	Est. 2	Est. 3	Est. 1	Est. 2	Est. 3	Est. 1	Est. 2	Est. 3
$\alpha$	0.022	-0.149	-0.148	0.565	-1.561	-2.341	0.573	0.123	0.022
$\beta_{1993}$	-0.011	-0.014	-0.008	-1.557	-2.250	-0.694	0.121	0.027	0.490
$\beta_{1994}$	0.018	0.009	0.027	2.451	1.415	2.332	0.015	0.161	0.022
$\beta_{1995}$	0.021	0.002	0.041	2.956	0.285	3.552	0.004	0.777	0.001
$\beta_{1996}$	0.015	-0.005	0.034	2.106	-0.754	2.925	0.037	0.453	0.005
$\beta_{1997}$	0.031	0.009	0.051	4.310	1.490	4.411	0.000	0.140	0.000
$\beta_{1998}$	0.029	0.007	0.045	4.000	1.186	3.959	0.000	0.239	0.000
$\beta_{1999}$	0.032	0.013	0.043	4.361	2.089	3.739	0.000	0.040	0.000
$\beta_{2000}$	0.035	0.017	0.044	4.823	2.744	3.830	0.000	0.008	0.000
$\beta_{2001}$	0.010	-0.014	0.023	1.312	-2.198	2.009	0.191	0.031	0.048
$\beta_{2002}$	0.006	-0.015	0.016	0.777	-2.388	1.412	0.438	0.019	0.162
$\beta_{2003}$	0.001	-0.024	0.016	0.094	-3.742	1.351	0.926	0.000	0.181
$\beta_{2004}$	0.014	-0.006	0.023	1.956	-0.859	1.952	0.052	0.393	0.055
$\beta_{2005}$	0.011	-0.009	0.019	1.484	-1.353	1.596	0.140	0.180	0.115
$\beta_{2006}$	0.020	0.003	0.025	2.737	0.527	2.089	0.007	0.600	0.040
$\beta_{2007}$	0.017	-0.001	0.023	2.344	-0.215	1.906	0.020	0.830	0.060
$\alpha_{PB}$	-0.113	0.047	0.077	-2.437	0.448	1.022	0.016	0.655	0.310
$\alpha_{UR}$	0.140	0.335	0.388	2.231	2.863	3.542	0.027	0.005	0.001
$\alpha_{UN}$	-0.098	0.113	-0.021	-2.808	1.359	-0.377	0.006	0.178	0.707
*	Estimation 1			Estimation 2			Estimation 3		
$R^2$	0.426			0.692			0.501		
sk. $R^2$	0.367			0.621			0.385		
DW	2.356			2.454			1.857		
AC	-7.989			-8.894			-7.677		
S.C.	-7.667			-8.386			-7.169		
F-statistic	7.147			9.631			4.3		
n	192			96			96		

Explanations:

- $R^2$  – determination component;  
sk.  $R^2$  – adjusted determination component;  
DW – Durbin-Watson statistics;  
AC – Akaike'a information criterion;  
S.C. – Schwarz criterion;  
n – number of observations.

Source: individual calculations.

d) the share of people employed in non-market services sector, like the share of those employed in industry, proved important only when carrying out an estimation of whole simulation. However, it needs to be noted that the higher the percentage of people employed in this part of services, the lower the pace of economic growth

was. Every additional percentage point of people employed in this sector of the economy resulted in a drop in the pace of real GDP in euro-zone countries of about 0.1 percentage point;

e) from the estimation of parameters  $\beta_{1993}, \beta_{1994}, \dots, \beta_{2007}$  the following conclusions can be derived Firstly, the binary variables  $D_{1993}, D_{1994}, \dots, D_{2007}$  for subsequent years are in most cases statistically important. Secondly, the values of estimated parameters  $\beta_{1993}, \beta_{1994}, \dots, \beta_{2007}$  in the case of estimation (1) are positive (apart from 1993) which implies that the pace of economic growth in euro-zone countries in the following years was higher than its pace in 1992.

#### 4. Conclusions

The analysis conducted in this study helps formulate the following final conclusions. Firstly, between 1992 and 2007, there were systematic structural changes in employment in euro-zone countries. Among them was the decrease in the participation of the agricultural sector, as well as industry and construction in employment. At the same time, there was a notable increase in employment in the services (market and non-market) sector. It is worth underlining that since the euro came into force in 1999, there has not been any escalation in structural changes in terms of employment in economic sectors. Secondly, euro-zone countries are still characterised by substantial divergence in terms of the percentage of employed in individual economic sectors. Those differences range from 10 percentage points in the market service sector to 13.7 percentage points in the agricultural sector. Within the euro-zone three countries stand out in particular: Greece, Portugal and the Netherlands. In the case of the first two, the indicators of structural employment are the poorest compared to other euro-zone countries, as is confirmed by the lowest level of market services sector and the highest share of agriculture in employment (Greece). Portugal shows the highest share of building and industry and the lowest share of market services sector. In the case of the Netherlands, the situation is opposite. This country boasts the highest percentage of people employed in non-market services and the lowest percentage of people employed in industry and building. Thirdly, the empirical analysis confirms that the increase of the percentage of people working in market services resulted in an acceleration of growth of real GDP in euro-zone countries. However, an increase in this percentage in agriculture and industry and building impacted adversely on real GDP growth. There was also a certain diversity of these correlations with the euro-zone. In the group of countries with relatively lower levels of GDP *per capita*, a stronger influence of the share of people working in market services sector on real GDP growth was observed than in the case of relatively richer euro-zone countries.

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