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ASSESSMENT AND ANALYSIS OF SOME CHANGES IN THE SECTORAL STRUCTURE OF THE ECONOMY

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ABSTRACT

The regional economic opportunities for the development of economy are linked to the dynamics of regional disparities formation and to the implementation of adequate regional policy in order to achieve economic efficiency.

The socio-economic development of the country depends on the appropriate and effective construction of such regional economic structures, which provide favorable development at both regional and national level. The purpose of this article is to assess the changes in the sectoral structure of the indicators gross value added and employment for the period 2008-2017 and to prove the importance of the services sector as a sector with a growing potential for development. Structural divergences at national level have been assessed at the level of aggregation of three main economic sectors-agriculture, industry and services. The achieved results on the strength and direction of structural changes show that the restructuring takes place at different rates in individual regions, as in regions with a more developed economy and more favorable indicators the dynamics of these processes predetermines structure in which the supply of services is highly prevalent.

Key words: sector structure, structural changes and differences, integral coefficient, regional policy

INTRODUCTION

The favourable adaptation of economic structures is linked to the development of such a regional policy that allows an efficient use of resources, based on the economic potential of a region and its development opportunities. The growth of regional disparities between regions in the country is an unfavorable trend, which inevitably leads to the deepening of socio-economic and demographic problems. On the other hand, these problems affect the economic development of the region and give rise to conditions for both lower economic performance and undesirable structural imbalances, which further exacerbate the effects of undesirable development. The adverse effects of growing regional differences can be reduced by means of differentiated regional policies, in which the development possibilities of the region can be assessed in accordance with its comparative advantages and the intensity of economic, social and demographic processes. The assessment and analysis of the sectoral and branch structure of the region makes it possible to identify the formed regional changes, to study their impact on regional development, as well as to look for reserves and opportunities to avoid unfavorable regional imbalances. The development in one of the sectors in the region is the result of changes in any of the other two main sectors. In general, it is believed that countries and regions with a higher relative share of the primary sector can be defined as those with a weaker economy due to the fact that in the "agricultural" sector labor productivity is lower. The redirection of resources in the other two sectors will lead to an increase in gross value added in them and, consequently, to higher economic development. In the services sector, higher gross value added and lower share of employment, especially in some specific services, is one of the opportunities for higher productivity This is a prerequisite for a higher sector development potential in the region, as fewer resources are used to implement

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structural changes leading to higher productivity. That is why the current study is interested in the regional sector structure of gross value added and employment, as well as in its change over time.

The article considers alterations in the sectoral structure of the two economic indicators, namely "gross value added" and"employed persons " for the period 2008-2017. It also substantiates the role of the "services" sector as a sector with growing development potential. Structural differences at the national and regional levels are assessed at the stage of aggregation of the three main economic sectors - "the agricultural"," industry "and "services", and the time interval chosen for the analysis of the dynamics of structural changes within the country and by region covers a ten-year period.

MATERIALS AND METHODS

The participation of employees in separate sectors, as well as the share of gross value added in sectors for the regions and the country, are calculated by using relative values of the structure. The ratio between "gross value added" and "employed persons" in the sectors "Agricultural", "Industry" and "Services" compared to their total value for the region and the country is presented in percentages.

A generalized assessment of the intensity of structural changes in the selected economic indicators by sectors and regions is obtained by the integral coefficient of the structural changes. The average value of changes in the compared structures during one period related to another, allows us to estimate the change in dynamics during two adjacent periods. For this purpose, the coefficient of K. Gatev (1) is used according to the following formula:

$$Ks=\sqrt{\frac{\sum(W_{i1}-W_{i0})^2}{\sum {W_{i0}}^2+\sum {W_{i1}}^2}}$$

where:

Ks – is the integral coefficient of structural changes

Wi_0 and Wi_1 are the relative proportions of the observed indicators during the two compared periods.

The conditions to which this coefficient corresponds makes it possible to thoroughly assess through it the structural changes in a dynamic aspect. It has the following characteristics that makes it reliable for the study of intensity: it is expressed by non-negative numbers; it is normalized from zero to one and allows to characterize both absolute and relative changes in the observed indicators. The interpretation is carried out using the scale of interpretation of the integral coefficient of structural changes, the more it approaches the unit, the greater the intensity of changes in the structure during the comparative period in relation to the accepted as a base.

Another way to characterize the development, which gives a generalized assessment of changes in the selected indicators for a certain period of time, is the method of average growth rate on a chain basis. It is calculated by averaging the chain growth rates using the following formula:

$$\overline{T} = \sqrt[N-1]{\frac{y_2}{y_1}.\frac{y_3}{y_2}\ldots\ldots\frac{y_n}{y_{n-1}}}.100=\sqrt[N-1]{\frac{y_n}{y_1}}.100$$

where:

$\overline{T}$ is the average growth rate;

N- the number of averaged values;

$y_{1,2\ldots n}$ - the value of the observed indicator for a given period of time.

Through the average growth rates it is given the generalized characteristics of the average relative change for the time interval we are interested in.

RESULTS AND DISCUSSION

One of the objectives of the study is to establish an indicator by region that will reflect the relative share of gross value added in the "services" sector compared to the other two sectors "the agricultural"and "industry". This coefficient is established as a ratio between the share taken by the "services" sector in gross value added and the sum of the relative shares of the remaining two sectors in GVA (Bulgarian State Standard), that is the gross value added created in these two sectors is the basis for comparing the development of the "services" sector by region. It is assumed that if this relative share is less than one unit, the sector development for the region and the country is low. If the coefficient has a value between one and two, the sector has a medium level of development compared to the other two, and the ratio of above two identifies the sector as having a high level of development in the region and country. The calculated coefficients for the period 2008-2017 for the regions and the country as a whole by their dynamics are presented in **Table 1**.

Table 1. *Coefficient of the share of sector "Services" in GVA in relation to the shares of the sectors "Agricultural" and "Industry" for the period from 2008 to 2017," by region*

Region	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Northwestern Region	1,160	1,444	1,424	1,189	1,180	1,236	1,184	1,213	1,175	1,131
Northern Central Region	1,318	1,384	1,583	1,364	1,272	1,280	1,271	1,315	1,285	1,274
Northeastern Region	1,467	1,884	1,915	1,663	1,669	1,770	1,735	1,760	1,745	1,756
Southeastern Region	1,098	1,111	1,220	1,140	1,074	1,120	1,066	1,109	***0,933***	***0,933***
Southwestern Region	2,719	2,633	3,407	3,015	3,312	3,781	3,875	3,782	3,953	3,896
Southern Central Region	1,145	1,265	1,300	1,214	1,231	1,276	1,373	1,226	1,233	1,255
BULGARIA	**1,731**	**1,835**	**2,109**	**1,895**	**1,927**	**2,065**	**2,075**	**2,062**	**2,029**	**2,018**

Source of the information: NSI and own calculations.

As it can be seen from the calculations presented in the table, for the observed period, there is no value of the coefficient calculations below one. The exception is the Southeastern region in 2016 and 2017, during which the coefficient is 0.933. This shows that, in general, there is a trend of growth in the share of the "services" sector in the GVA compared to the other two sectors in the regions and within the country.

This ratio is particularly important in the Southwestern region,where for example, the share of the sector in 2017 is about four times the total share of the other two sectors. This trend of increasing the importance of the sector has its reasons, which may have different character. On the one hand, these may be reasons associated with demographic changes in the country, on the other hand, sectoral restructuring may be associated with processes related to deindustrialization, changes in living standards, exports, prices, income and employment, etc. These and other different in nature and direction reasons can be studied in more detail to determine the degree of their impact, as well as to assess their significance in the structural processes of the three sectors.
The structure of the three main GVA sectors for the country by year is graphically presented in **Figure 1** to get a visual representation of the emerging development trend:

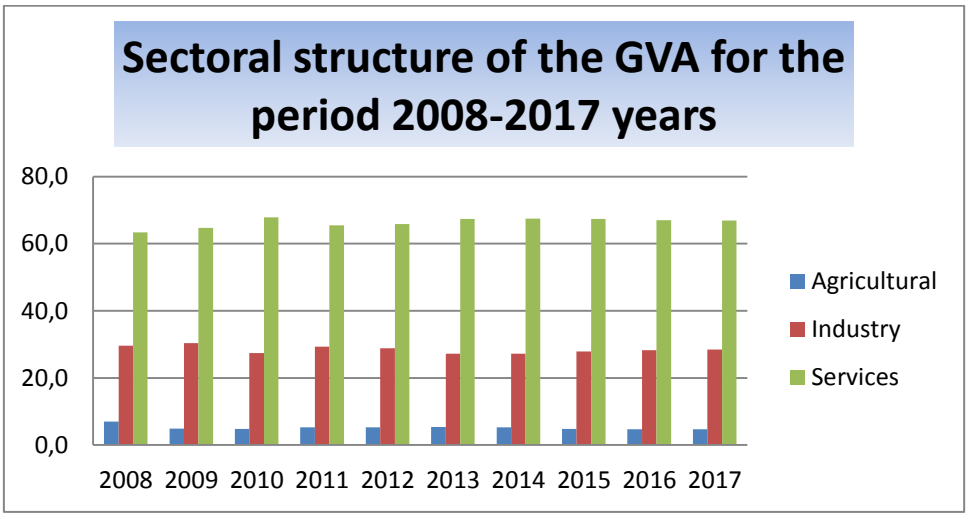

Figure 1. Structure of the sectors "Agricultural", "Industry" and "Services" in GVA for the period 2008-2017.

As it can be seen by the figure, the participation of the services sector in the GVA is the largest for the entire study period and occupies a significant place in the sectoral structure of the economy. The range of development of the "services" sector determines the degree of specialization of the country or region in certain types of services. For example, highly industrialized countries provide mainly a certain type of services, such as financial, information and telecommunications, business and much more, but the development potential of this sector in the region and the degree of its specialization implies a deeper analysis of the service sub-sectors.

One way to track changes in the sectoral structure of the economy by region is to estimate the rate of structural transformation by calculating the integral coefficient of structural changes. There are different

approaches to the presentation of these changes, but in the current study we choose that of K. Gatev. The calculated coefficient of K. Gatev by regions and sectors with a basic structure of the GVA since 2008 and with a chain structure from the previous year is presented in **Table 2**:

Table 2. *Integral coefficient of structural changes in the GVA by sector for the period 2008 -2017*

Year	Integral coefficient in base from 2008			Integral coefficient in previous year's basis		
	Agricultural	**Industry**	**Services**	**Agricultural**	**Industry**	**Services**
2008	------	------	------	------	------	------
2009	0,059	0,048	0,011	0,059	0,048	0,011
2010	0,036	0,045	0,020	0,031	0,053	0,029
2011	0,050	0,025	0,030	0,035	0,032	0,010
2012	0,054	0,054	0,029	0,020	0,054	0,004
2013	0,067	0,087	0,031	0,019	0,035	0,003
2014	0,072	0,102	0,031	0,023	0,031	0,003
2015	0,074	0,093	0,040	0,012	0,043	0,009
2016	0,082	**0,132**	0,050	0,030	0,054	0,011
2017	0,081	**0,127**	0,049	0,032	0,013	0,002

Source of information: *NSI and own calculations*

The results show that changes in the sectoral structure of the GVA are insufficient during the observed period compared to 2008 and the year before. The exception is for the structural changes in the industry sector in 2016 and 2017 compared to 2008, where the strength of the structural change is moderate. In general, during the research period, there is a change in the direction of reducing the relative share of the agricultural sector in the GVA due to the growth of the relative share of the other two sectors-the industry sector and, above all, the services sector. The participation of the separate sectors in GVA, calculated as the average weightless value for Bulgaria and EU-28 member states, shows that the share of the sector "agricultural", "industry" and "services" for our country is 5.2 %, 28.5% and 66.3 %, respectively, and for the EU-28 the average annual relative share of the three sectors is 1.7%, 19.3% and 79.0 %. The comparison between the calculated averages shows that the average relative share for the observed period in Bulgaria is higher than that of the EU-28 for the "agricultural“ and "industry" sectors, respectively, by 3.5 percentage points and 9.2 percentage points, and in the "service" sector it is lower by minus 12.7 percentage points, i.e., there is a potential for the restructuring of resources from one sector to another with the aim of achieving the average for the EU-28.

Changes in economic structures are associated with changes in the participation of workers in various sectors of the economy. The restructuring of the employed is reflected in the movement of labour from one sector to another, as the implementation of favorable structural changes is a prerequisite for higher productivity and, consequently, for greater economic growth. As a continuation of the analysis, a coefficient is calculated showing the share of employment in the services sector compared to that in the agricultural and industrial sector for the period 2008-2017 by region and as presented in **Table 3**:

Table 3*. Coefficient of the share of employment in the services sector relative to the share of the employed in the sectors "agricultural" and "industry" for the period from 2008 to 2017 by region*

Regions	**2 008**	**2 009**	**2 010**	**2 011**	**2 012**	**2 013**	**2 014**	**2 015**	**2 016**	**2 017**
Northwestern Region	0,910	0,977	0,970	0,962	0,982	0,972	0,914	0,939	0,921	0,888
Northern Central Region	0,880	0,950	0,891	0,878	0,928	0,942	0,896	0,867	0,912	0,879
Northeastern Region	1,495	1,461	1,403	1,464	1,508	1,522	1,479	1,461	1,519	1,451
Southeastern Region	1,076	1,216	1,254	1,214	1,202	1,248	1,248	1,241	1,249	1,173
Southwestern Region	2,751	3,090	3,301	3,252	3,304	3,282	3,415	3,566	3,678	3,615
Southern Central Region	0,916	0,898	0,893	0,885	0,930	0,938	0,910	0,924	0,948	0,931
Bulgaria	**1,402**	**1,492**	**1,519**	**1,513**	**1,548**	**1,560**	**1,547**	**1,564**	**1,613**	**1,568**

Source of information: NSI and own calculations.

During the observed 10-year period, the calculated employment ratio is lower than one for the three regions-Northwestern, Northern Central and South Central, indicating that the relative share of employment in the "services" sector is less than the sum of the relative shares of the other two sectors and has a low level of dynamics in these regions.

In the Northeastern and Southeastern region, as well as in the country as a whole, the ratio is between one and two, which is estimated at an average level of development compared to the other two sectors. Only in the Southwestern region there is a significance ratio higher than two, and it is assumed that it is in this region that the services sector has the highest level of employment development. One of the reasons why this ratio is higher than that in the other regions is that here is located Sofia, the capital of the country. It is well ahead in its economic development than the other areas and this gives the region advantages associated with favorable socio-economic characteristics.

Changes in the structure of employment in the three main sectors for the country are presented graphically in **Figure 2** in order to obtain a visual representation of the outlined trend in the development of structural employment:

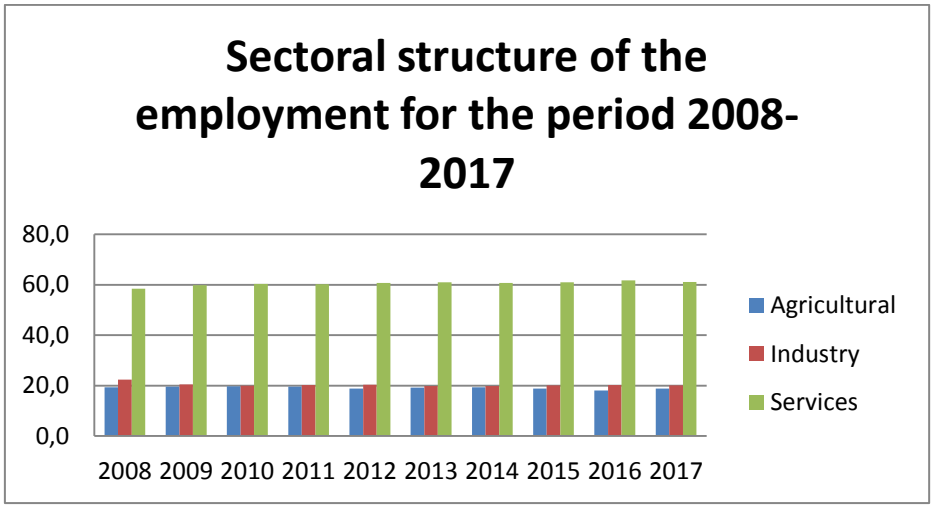

Figure 2. Structure of employees in the sectors "Agricultural", "Industry" and "Services" for the period 2008-2017

The graphic representation of the structure of the employed sectors shows the same general trend as in the industrial structure of the GVA. The largest relative share of employment in the country is in the services sector, and the average annual employment for the research period is 60.5 per cent. This is followed by the share of employment in the sector "industry" with 20.4 % and 19.1% is the average annual employment in the sector of agriculture . The comparison of average annual employment in this sector with the indicators of the EU member States-28 show large variations, since the average relative share of employment in agriculture of EU-28 is 5 % , in the sector "industry" average annual employment is about 16%, and in the sector "Services", the employed are 79% average for the year . In general, the relative share of employment in the agricultural sector in our country is high, and this is due to the unfavorable sectoral regional structure and lower potential for economic growth. Reduction of differences in the relative share of the employed in the sector of "Agriculture" between our country and the member countries of the EU may be possible only if there are prerequisites allowing to overflow people employed in this sector in the other two sectors. A significant role in this regard is played by some factors, such as demographic processes in the regions and the country, the qualification of employees, the stimulation of industries with high technological production, the development of certain types of specific services that do not require high investment, etc.

The intensity of the structural processes of employment is measured by the integral coefficient of K. Gatev is presented in **Table 4.** and it gives a generalized idea of the strength of structural changes compared to the base year 2008 and compared to the previous year:

Table 4. *Integral coefficient of structural changes in the share of employees by sector for the period 2008-2017*

Year	Integral coefficient in the basis year 2008			Integral coefficient in previous year's basis		
	Agricultural	Industry	Services	Agricultural	Industry	Services
2008	------	------	------	------	------	------
2009	0,084	0,021	0,012	0,084	0,021	0,012
2010	0,089	0,037	0,035	0,031	0,019	0,023
2011	0,076	0,042	0,041	0,026	0,006	0,006
2012	0,066	0,044	0,033	0,021	0,005	0,009
2013	0,076	0,036	0,031	0,018	0,010	0,003
2014	0,085	0,046	0,042	0,022	0,012	0,012
2015	0,091	0,053	0,046	0,022	0,017	0,040
2016	0,075	0,059	0,055	0,020	0,018	0,011
2017	0,069	0,061	0,064	0,017	0,006	0,012

Source of information: NSI and own calculations.

The table shows that changes in the structure of employment by region for the economic sectors during the observed period compared to 2008 and compared to the previous year are insufficient. No significant structural changes are found in the integral coefficient measuring the changes in the structure of the GVA, as well as in the structure of the employed.

In general, it can be summed up that structural changes in the three main sectors during the observed 10-year period are weak, smooth and slower, with no abrupt changes thar are associated with the restructuring of resources from one sector to another.

The development potential of the three main sectors is different for the regions of the country and is driven by different rates of economic growth. Accelerated growth in one or the other sector can lead to structural imbalances that are not commensurate with the capacity to adapt the socio-economic system in the region. That is why, it is necessary to monitor structural changes in the three sectors in order to establish a balanced rate of resource overflows from one sector to another, avoiding unfavourable imbalances.

The analysis of structural changes is supplemented by one generalized measure of dynamics associated with the average relative change of sector structures. In **Table 5** there is presented the average chain growth rates in the structure of the GVA and in the employed by economic sector.

Table 5. *Average growth rates on a chain basis in the structure of GVA indicators and the employed for the period 2008-2017 by sector and region*

Regions	Average growth rate in the structure of GVA by economic sectors (%)			Average growth rate in the structure of employees by economic sector (%)		
	Agricultural	Industry	Services	Agricultural	Industry	Services
Northwestern Region	97,5	101,2	99,9	100,6	99,6	99,9
Northern Central Region	97,1	101,3	99,8	100,5	99,5	100,0
Northeastern Region	97,9	99,0	100,8	101,9	98,0	99,9
Southeastern Region	95,8	101,7	99,1	98,8	100,3	100,5
Southwestern Region	94,9	97,2	100,9	98,8	97,3	100,7
Southern Central Region	93,9	100,9	100,5	99,9	99,9	100,1
Bulgaria	**95,7**	**99,5**	**100,6**	**99,7**	**98,8**	**100,5**

Source of information: NSI and own calculations.

Thus calculated, the average annual growth rate shows that in the regions and in the country there are no significant changes in the sectoral structure compared to the previous year. Lower average rates of development of the GVA indicator in all regions for the sector "agriculture" are established, and in general for the country, except for this sector, lower rates

of growth in the sector "industry" are also evident. However, in the "Services" sector compared to the previous period there is a slightly higher dynamics.

The change in the services sector is determined by the change in the other two sectors, and if no significant changes in the structure of the other two sectors are identified during this 10-year interval, it is logical that the changes in the structure of the services sector are not significant. Nevertheless, it is the sector with the largest relative share in the structure of the economy, and changes in it have a significant impact on improving efficiency in the national and regional economy. A prerequisite for a more detailed assessment is to keep pace with the growth of employment in this sector with the growth of the relative share of the GVA, as this is due to changes in relative productivity and is reflected in the overall economic development. The increase in the efficiency of the sector as a result of higher relative productivity creates opportunities for the overall economic development of the region. Some of these options are associated with structural changes towards the development of such subsectors in the services sector, which provide lower employment, lower investment, higher GVA and comparative advantages in the services with respect to certain specific activities, typical of the region.

CONCLUSION

The results on the strength and direction of structural changes show that restructuring occurs at different rates in different regions. In regions with more developed economy and more favourable indicators, the dynamics of these processes predetermine a structure in which the supply of services strongly prevails. Such a region for our country is the Southwestern region, where the relative share of services in comparison with the other two sectors is much higher than their total value. This region is significantly ahead of the other regions in its economic development, and it is very likely for this trend to continue in the future. This, in turn, creates great regional differences that will deepen in the future.

A comparison of the average relative shares for Bulgaria and the EU-28 countries indicates a higher participation of the GVA and the agricultural sector for our country, which is an indicator of the degree of economic development achieved and is related to the possibility of restructuring in the main sectors.

In general, the different intensity of structural changes leads to the formation of economic and social consequences, and this, in turn, is a prerequisite for reducing the level of regional aggregation. The intensity of structural processes for the selected time interval in the country is weak, and during the research period no accelerated rates of development have been established, which create imbalances and unbalanced changes. "At the same time, the importance of further developing the structure of the industry cannot be underestimated, as relatively weak structural changes at the macro level can have a significant impact on the guiding principles and pace of socio-economic development of the country"(2) .

Bridging the existing differences between the regions of the country is possible through the implementation of targeted regional policies, taking into account economic and demographic processes, in order to maintain and stimulate the development of existing capacities and create conditions for a balanced distribution of resources.

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