Comparative Analysis of Territorial Development in the Belgrade Metropolitan Area and in Serbian part of the Danube River Basin

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Abstract: - The paper gives a comparative analysis of the territorial development in the Belgrade metropolitan area and in the region of the Danube river basin in Serbia. An identification of main results is undertaken by application of a regional comparative analysis, shift-share analysis and Spider method. The paper shows that the consideration of the national share, industrial mix and regional share in total shift share of both regions indicate very strong process of deindustrialization. It is evaluated that allocative component of economic growth of Belgrade and Danube basin regions has positive value, reflecting the above-average sectoral productivity in these regions compared to the national average. The empirical results show that inter-regional differences in economic growth are almost entirely explained by the differences in regional specificities in terms of employment. Results are important for the increase of regional competitiveness and territorial distribution in this area.

Key-Words: - Comparative analysis, Shift-share, competitiveness, territorial development, Belgrade metropolitan area, Danube region

1 Introduction
Comparative politics is part of a regional academic science which has established itself with the political, economic theory and the theory of sustainable development, as well as with international and domestic policy [1]. The subject of comparative research is international and domestic regional policy, as well as interregional and intraregional dependencies and connections. The applied research methodology is essential in that. The methodological approach is based on the situation analysis, comparisons and guidelines for improvement of the perceived problems of comparative regional policy.

The main subject of comparative politics at mid-20th century has been extended from the institutional dimension (polity) to the dimension of the process and political actors (politics), while in the 1970s it has been shifted to the development dimension of politics, conditions and results of policy actions (policy-policies) [2]. Dogan [3] indicates that the area of comparative politics expanded to many disciplines, so it has an “imperialistic” and “hybrid” character. This is reflected in the existence of various comparisons (over/sub/national level) to the interdisciplinary analysis. The contextual factors play an important role in research of comparative politics at the regional level. This implies that the subject of the regional comparative politics should include the contextual factors and indicators, as the basic determinants of comparative studies. Contextual factors and indicators provide a better connection of case study and specific regional concept that is being studied, compared or evaluated.

When it comes to empirical comparative analysis of the decomposition of regional differences in economic growth on the example of Belgrade and the Danube region in Serbia, the main contextual factors can be named in the transition process and its repercussions on the development segments. During the transition recession in Serbia, further strengthened by the global economic and financial crisis, the one million jobs (out of which 700,000 in the industry) has been lost, with almost one million unemployed, about one million illegal buildings and 1.3 million or 20% of poor citizens, the decline value of the shares, growth illiquidity, growing liquidation and bankruptcy of enterprises, and so on. [4].

The basis for comparison of regional differences and spatial distribution of economic growth is made by the overall development context and divergent/convergent processes.
2 Applied methods of the comparative analysis of regional differences

For comparison of the spatial development of the regional areas analysts rely on standard tools: a set of quantitative methods that includes analysis techniques of the economic base, several models of production functions, shift-share analysis, input-output analysis, location quotient (or Ballassa index), optimization techniques, cost-benefit methods, etc. These techniques can be used to compare regional differences (regional convergence/divergence and territorial cohesion) and traditional regional policy (allocation, distribution). For a comparison of regional differences in the competitiveness of the economy and spatial development of the Belgrade metropolitan area and the Danube region in Serbia, shift-share analysis and spider method (based on indicators) have been used.

2.2 Shift-share analysis

Shift-share analysis is a widely used analytical technique used for retrospective decomposing of changes in employment in different areas or regions. The aim of this analysis is to identify changes in the industry or other economic activities with consideration of comparative advantages in a particular areas/regions regardless of whether they have growth or decline of employment and population. It usually studies agriculture, industrial manufacturing and service industries, indicating a competitive advantages, and rarely on the location advantages of the certain region/area.

According to the general form of analysis, total employment in the regional area is \( e \), while is employment in the activity \( i \) of the region \( e_i \) (at the beginning of the period and \( e_i^{t+n} \) at the end). The calculation includes the wider framework of reference area (country), where the total number of employees \( E \) (at the beginning of the period and \( E^{t+n} \) at the end) with employment in the \( i \) activity \( E_i \) (at the beginning of the period and \( E_i^{t+n} \) at the end). One assumption of the shift-share analysis is that the larger comparative area (state) is closed economic system. Shift-share model is based on the growth/decline in employment in the \( i \) activity of the regional area that is a function of three components [5]: (1) regional share in national growth; (2) mix of changes in the activities themselves; and (3) shift and change of activities in the regional area.

Changes in employment in the \( i \) activity of the regional area from the time \( t \) to time \( t + n \), can be measured by the share change, mix change and shift change according to the formula [5]:

\[
\frac{e_i^{t+n} - e_i^t}{e_i^t} = \text{share change} + \text{mix change} + \text{shift change}
\]

Accordingly

Shift-Share analysis is used to determine contribution of the each component to the regional or local economic growth, by the formula:

\[
SS = NS + IM + RS, \text{ where: } SS - \text{shift-share, the share of changes, NS - the proportion of changes at the national level, IM - the share of industrial structure, the RS - the regional allocation changes.}
\]

The component “national share” (NS) is measured as increase of total employment in the local area due to the growth of national economy in the analyzed period.

The component “industry (structural) mix” (MI) identifies the growth rate of industrial sector in the local area based on national growth rates for individual industrial sectors. Allocative component “regional change” (RS) or the competitive effect is perhaps the most important among the components. It points to the potential and role of leading and lagging industries in the regional/local area. Specifically, the competitive effect compares the growth rate of regional/local area in the industrial sector with a growth rate for the same sector at the state level (or e.g. labor productivity). Leading industry is the one in which a local area has a higher growth rate compared to the growth rate of industry in the state.

Shift-share analysis has more varieties, and in practice is often used the shortened form of shift-share analysis and dynamic shift-share analysis [6]. Shift-share analysis provides an overview of the complex changes in all activities or any activity in shift to or from regional area. The advantage of shift-share method is that it uses a simple way to decompose the territorial/regional differences in economic or sectoral growth by analysis of the three growth components (employment, productivity): structural, competitive/sectoral and allocative [7, 8]. Esteban J. [8] proposes the division of regional growth into three components: structural, differential and allocative. In addition, this technique can be used to identify the economic competitiveness of local industries.

Critics of this method suggest that it often reflects the initial resources of the area without showing its competitive effects, comparative and locational advantages. General experience shows that this technique is basically a descriptive tool and should be used in combination with other types of analysis for the decomposition of regional spatial
differences and determination of the regional economic and spatial potentials - the territorial capital. Main limitations are: it doesn’t take into account other factors such as impacts of business and investment cycles, the identification of comparative advantages, the differences resulting from complex industrial trade, institutional and organizational solutions, etc. The analysis does not provide a clear picture of regional and national economy, although the results are based on long-time series data. At the same time, this technique provides a simple and direct approach to extract the share of national and industrial contributions from regional or local growth, offers a simple and reliable decomposition of regional differences, from the standpoint of comparing the employment and labor productivity with regard to the national average. Technique indicates the competitive effect of the region and its allocative component in the decomposition of employment and labor productivity, as a reflection of local / regional conditions and potentials. Also, the analysis is useful for potential determination of types of industries that can offer significant opportunities for future growth.

In the practical application of this simple analysis, based on a small number of data, many researchers have begun to adapt it by introducing the probability and regression analysis models. In practice, other forms of regional industrial-economic analysis are used, such as econometric modeling, input-output analysis, location quotient, and others.

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2.2 Comparative analysis of regional competitiveness of Belgrade and Danube region

Regional competitiveness is defined as the ability to achieve economic growth, i.e. appropriate level of economic productivity in GDP creation based on utilization of available resources. Today, very complex mechanisms and models for determination and monitoring of the regional competitiveness have been developed, based on numerous and complex indicators.

For a comparative analysis of regional competitiveness of Danube and Belgrade regions, Spider method has been applied, according to the indicators of competitiveness.

Comparative analysis of regional competitiveness of these areas is based on identification and usage of those indicators for which data were available at this territorial level (for Belgrade - level NUTS 2, for Danube region - a summary of data for the level of municipalities and partly for level NUTS 3). The Republic’s statistics does not publish almost any economic data at the regional level, so the selection of indicators was made solely according to the available data [9, 10 and 11]. Despite efforts to apply indicators of competitiveness and regional development identified in the portfolio of the European strategic documents on sustainable development, the selection of indicators was conditioned and limited by available statistical material and strategic-development documents.

Empirical comparison of regional competitiveness of metropolitan region of Belgrade and Danube region was carried out by application of Spider method. It involves translation of the absolute and relative values of eight indicators in Spider standardized values for each region.

Figure 1 shows results of evaluation and comparison of regional competitiveness of Danube and Belgrade regions which are significant for regional territorial development. They point on absolute and relative differences in efficiency of usage of territorial capital for each region, confirm absolute and relative domination of Belgrade metropolitan region in the regional competitiveness of the Serbian area and point on significant inter-regional differences in the level of competitiveness, development and efficiency of territorial capital.

A strong process of de-industrialization of cities and regions, the concentration of economic activities and productive forces in the Belgrade metropolitan area, with increasing geographical differences in the level overall and industrial development are the consequence of transitional
recession and reflection of the lack of adequate regional policy, regional policy of industrial innovation, strong impact of market, the use of available territorial capital and spatial directing of activities [12, 13].

3 Results and Discussion on application of Shift-share analysis

By application of shift-share technique we offered in this paper a way of general assessment on as to which part of the inter-regional differences in the average employment can be attributed to specific regional differences in employment (and productivity) and which part to the effects of certain sectoral structure. In order to distinguish the role of these factors, we used a standard shift-share analysis for decomposition of differences in regional employment in relation to the national average, through three components: share of national influence factor, share of economic/industrial structure and regional allocations and conditions. Empirical comparison and evaluation of the dynamics of regional development of Danube and Belgrade regions based on this technique has been implemented for the period 1990-2010.

Comparative analysis shows that in the analyzed areas the greatest contribution to decline of industrial employment was weak and inappropriate competitive industry structure, then the impact of factors and components of the national economic growth trends. In the case of both areas favorable regional conditions had positive impact on the achievement of greater industrial employment, i.e. on prevention of larger decline in industrial employment than would be accomplished according to the dynamics of national growth/decline. As a consequence of a set of general, contextual, local, institutional and favorable regional factors and conditions the industry has recorded a smaller decline of employment (and of total employment) than the average decline in the national economy.

The results of shift-share analysis are sort of indicators of sources of regional differences, competitiveness, regional development conditions, passivity or activity in regional development policies, the existing institutional and organizational arrangements, cooperation, spatial integration, the use of the regional capital, as well as indicators of the role of regional/local level in the creation of regional developmental and spatial disparities. Hereafter are the specific empirical results, a brief discussion of the results and comparative overview of findings for both regional areas.

3.1 Danube region – corridor VII

Application of shift-share analysis in determining the role and contribution of individual components in the economic regional growth compared to the national level have shown the exact results. Due to the intensive process of de-industrialization, very unfavorable influence of industrial structure is evident in the Danube region, with a bit less adverse impact of national components, while only the impacts of regional factors had a positive contribution to economic growth of this area. The industrial structure has very strongly influenced the decline in industrial and total employment of the Danube region by loss of 121,126 employees in the period 1990-2010. In other words, if industrial sector in Danube region declined at the same rate as the industrial sector in Serbia, the region would have lost 121,126 employees. If the manufacturing sector in the region increased/decreased at the same rate as the overall national economy, it would deprive the region of 98,275 jobs. The difference in these figures in relation to the actual change in employment in industrial employment in the Danube region indicates that this region is competitive above average compared to the Serbian average (in real terms there would be a loss of 62,251 employees) regarding that it lost 28,017 workers less, as a consequence of favorable regional conditions. Favorable impact on the movement of the regional total and industrial employment had better conditions and higher productivity Danube region. Table 1 shows the empirical results obtained by application of general shift-share analysis formula in the Danube region - Corridor VII in Serbia in the period 1990-2010.

<table>
<thead>
<tr>
<th>Shift-share (SS)</th>
<th>National share (NS)</th>
<th>Industrial mix (IM)</th>
<th>Regional share (RS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-191,386</td>
<td>-98,275</td>
<td>-121,126</td>
<td>+28,017</td>
</tr>
<tr>
<td>-0.191386</td>
<td>-0.98275</td>
<td>-0.121126</td>
<td>+0.028017</td>
</tr>
</tbody>
</table>

SS = NS + IM + RS
SS= (-98,275) +(-121,126) + 28,017
SS= -191,386
Real SS= -0.098275 – 0.121126 + 0.028017
Real SS = -0.191386

3.2 Belgrade region

Application of shift share analysis in determining the role and contribution of individual components in the economic growth of the Belgrade metropolitan area compared to the national level
showed similar results as for the Danube region. Due to the intensive de-industrialization process, Belgrade region is characterized by a considerable volume of adverse impacts of industrial structure, with less adverse impact of national components. Industrial structure and the factors that determine it (compared to the national level of employment decline in industry and overall economy) led to the decline of industrial and overall employment in the Belgrade area by loss of 60,532 employees in the period 1990-2010. In other words, if the industrial sector in the region declined at the same rate as the industrial sector in Serbia, Belgrade would have lost that number of jobs. If the manufacturing sector in the region declined at the same rate as the overall national economy, it would deprive Belgrade - 49,111 jobs. The difference in these figures in relation to the actual change in industrial employment in Belgrade suggests that this region is competitive above average compared to the Serbian average (otherwise, the real loss would be 8,096 employees) as the real extent of loss of employment is lower for that amount. This is a consequence of the favorable regional conditions. The influence of extremely attractive and convenient metropolitan factors made a positive contribution to the economic trends of the area, measured in relation to the Serbian level of increase/ decrease in employment. A comparative research does not intend to study these advantages and limitations, territorial capital of Belgrade, nor the influence of development of the services sector as the dominant economic sector. Results of shift-share analysis for the Belgrade region are shown in Table 2.

Table 2. Results of shift-share analysis in Belgrade metropolitan region in period 1990-2010.

<table>
<thead>
<tr>
<th>Shift-share (SS)</th>
<th>National share (NS)</th>
<th>Industrial mix (IM)</th>
<th>Regional share (RS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-91,548</td>
<td>-49,111</td>
<td>-60,532</td>
<td>+18,096</td>
</tr>
<tr>
<td>-0.091548</td>
<td>-0.04911</td>
<td>-0.060532</td>
<td>+0.018096</td>
</tr>
</tbody>
</table>

\[ SS = NS + IM + RS \]
\[ SS = -49,111.88 - 60,532 +18,095.88 \]
\[ SS = -91,548 \]

Real SS = -0.04911 - 0.060532 + 0.018095

Results of comparative empirical analysis indicate that the process of de-industrialization, measured by drastic drop in employment has been very intense in the area of Belgrade and Danube region. Increased employee productivity and favorable regional conditions and territorial capital of Belgrade and Danube region, as well as better management arrangements have contributed to alleviation of overall decline of industrial employment in these areas, compared to the Serbian average. Allocative component of decomposed economic growth of both regions has a positive value (+0.028017 and +0.018095). This shows that both regions are specialized in sectors whose productivity is above the national average. Comparative review of results of shift-share analysis is presented in Table 3 and 4, and in Graph 2.

Table 3. Comparative review of the results of shift-share analysis in regional areas in period 1990-2010 (absolute shift-share values)

<table>
<thead>
<tr>
<th></th>
<th>NS</th>
<th>IM</th>
<th>RS</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danube region</td>
<td>-98,275</td>
<td>121,126</td>
<td>28,017</td>
<td>-191,386</td>
</tr>
<tr>
<td>Belgrade</td>
<td>-49,111</td>
<td>-60,532</td>
<td>18,096</td>
<td>-91,548</td>
</tr>
</tbody>
</table>

Graph 2. Comparative review of the results of shift-share analysis in regional areas in period 1990-2010

4 Conclusions

The empirical results show that inter-regional differences in economic growth are almost entirely explained by differences in regional specificities in terms of employment. Allocative component of decomposed economic growth of both regions has a positive value as a reflection of specialization in the sectors of both regions, whose productivity is above the national average. Comparative analysis indicates that the process of regional de-industrialization,
measured by a drastic drop in employment, was very intensive in the area of Belgrade and Danube region. Favorable allocative factors - regional conditions and territorial capital of Belgrade and Danube region have contributed to alleviation of the overall decline of industrial employment in these areas, compared to the Serbian average. Although having negative values, the structural component of the shift-share analysis of both regions shows a slightly better effect of regional economic decline than the national average. This also shows a certain higher level of labor productivity in the Belgrade metropolitan area and Danube region. It is estimated that, if appropriate measures and activities are not taken, further spatial concentration and specialization of economic and industrial structures in both regions with the growing regional disparities can be expected in Serbia. Metropolitan region of Belgrade, the Danube corridor VII zone and medium-sized towns in the corridor X, provide attractive and competitive conditions for economic development. The results may serve to promote regional and sectoral policies and regional spatial planning.

Serbian regional development policy should be based on the combined market factors, spatial competition, territorial capital and territorial cohesion and convergence [14, 15]. Our results indicate that nothing essential is lost if the analysis of regional growth convergence is done explicitly or implicitly with one-sector model rather than with multi-sectoral models.

References