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Recent Changes in the Structural and Regional Disparities of the Labour Market in Serbia – A Shift-Share Analysis

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Summary

This paper provides a comparative analysis of the regional competitiveness of the labour market and the regional concentration of employment in Serbia for the period 2015–2020. A shift-share analysis was used to measure the spatial competitiveness. Based on the results, we have drawn up a typology of 25 regions (NUTS 3 level) in Serbia, and the main processes regarding structural changes and regional employment differentiation were identified as indicators of regional economic development. On this basis, conclusions about the state's location policy in the given period can be drawn, in the context of both its institutional conditions and the accepted model of economic growth.

The article provides a brief insight into the main methodological issues of the shift-share analysis and proposes a new typogram for the classification of territorial units, which is applied in the interpretation of the results and the discussion. The aim of this study is to analyse the structural changes and regional differentiation of the labour

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market. The results are important for determining dynamics in the spatial distribution of employment and the regional competitiveness of the labour market and for improving regional and sectoral policies, regional planning, and labour market management at the regional and national levels.

Keywords: Shift-share analysis, Serbia, regional development, regional policies, employment, labour market.

Zusammenfassung

Aktuelle Veränderungen der strukturellen und regionalen Disparitäten auf dem Arbeitsmarkt in Serbien – Eine Shift-Share Analyse

In diesem Beitrag wird eine vergleichende Analyse der regionalen Wettbewerbsfähigkeit des Arbeitsmarktes und der regionalen Konzentration der Beschäftigung in Serbien im Zeitraum von 2015 bis 2020 präsentiert. Eine Shift-Share-Analyse wurde verwendet, um die räumliche Wettbewerbsfähigkeit zu messen. Auf der Grundlage der Ergebnisse wurde eine Typologie von 25 Regionen (NUTS 3-Ebene) in Serbien erstellt und die wichtigsten Prozesse des Strukturwandels und der regionalen Differenzierung wurden als Indikatoren für die regionale wirtschaftliche Entwicklung ermittelt. Auf dieser Grundlage werden Schlussfolgerungen über die Standortpolitik des Staates im gegebenen Zeitraum gezogen, und zwar sowohl im Kontext der institutionellen Rahmenbedingungen als auch in Bezug auf das akzeptierte Modell des Wirtschaftswachstums.

Der Artikel gibt auch einen kurzen Einblick in die wichtigsten methodischen Fragen der Shift-Share-Analyse, wobei ein neuartiges Typogramm für die Klassifizierung von territorialen Einheiten vorgeschlagen wird, das bei der Interpretation der Ergebnisse und der Diskussion Anwendung findet. Das übergeordnete Ziel dieser Studie ist es, die strukturellen Veränderungen und die regionale Differenzierung des Arbeitsmarktes in Serbien zu analysieren. Die Ergebnisse dieser Studie sind wichtig für die Analyse der Dynamik in der räumlichen Verteilung der Beschäftigung und der regionalen Wettbewerbsfähigkeit des Arbeitsmarktes sowie für die Verbesserung der regionalen und sektoralen Politik, der Regionalplanung und der Planung des Arbeitsmarktmanagements auf regionaler und nationaler Ebene.

Schlagwörter: Shift-Share-Analyse, Serbien, Regionalentwicklung, Regionalpolitik, Beschäftigung, Arbeitsmarkt.

1 Introduction

Exploring the dynamics and differences in regional labour markets is important for deepening one's understanding of the relationship between fundamental processes arising from the mechanism of the market economy on the one hand and the relationship between restructuring policies and the balancing of regional economic development on the other. Our

starting hypothesis is that the inequalities of regional economic development in a market economy are closely related to labour since labour productivity is a major component of income disparities (Gómez-Tello et al. 2020). In this regard, changes in employment distribution have been considered in many studies to be determinants of regional development transformations (Mayor et al. 2007; Cochrane and Poot 2008; Matlaba et al. 2014; Ruault and Schaeffer 2020).

Further research can determine the outcomes of such economic development and the accumulated results of this process, including the value of fixed assets, and highlight the most durable aspects, such as technical and social infrastructure (Wrobel 1992). On this basis, one may make inferences about the efficiency of state policy for the location of economic activities in the research period, in the context of both its institutional conditions and the accepted model of economic growth (Vipond and Forward 1979; Tervo and Okko 1983; Holden et al. 1987; Knudsen 2000).

Uneven regional development is inherent to the transition process from socialism and a centralised planned economy to a Western-type, democratic society and free-market economy in Serbia as well as in other postsocialist countries of Central, Eastern, and Southeastern Europe (Nared et al. 2017; Ratkaj and Jocić 2022). In European countries, regional and spatial policies are increasingly relying on local development as an instrument for achieving a more balanced and polycentric development (Davoudi 2003).

Models of spatial and economic structures in Serbia's strategic and planning documents promote polycentric regional development and, in principle, distance themselves from the monocentricity that comes with a dominant, large urban centre (Ministry of Environment and Spatial Planning and Republic Agency for Spatial Planning 2009, 2011; Grčić et al. 2017). In these strategic documents, the polycentric concept is understood as the "deagglomeration" of the Belgrade region and the creation of a network of regional and local centres in the form of wider functional urban areas. Such a model of spatial organisation is known in the literature as the "network model" (Batten 1995; Davoudi 2008; Capello and Cerisola 2020).

However, contrary to the concept underpinning the growing levels of polycentrism, the problem of inequalities in regional economic development has not been solved in either the countries of the Western Balkans (Miljanović et al. 2010; Manić et al. 2012) or in other regions of the world (Cochrane and Poot 2008; Iammarino et al. 2019; Stimson and Robson 2020). This can be seen, for example, in the regional labour market disparities that have formed in Serbia during the postsocialist period.

The aim of this paper is to determine the proportional changes in employment in Serbia for the period 2015–2020 and on that basis define the effectiveness of the regional development policy of decentralisation. This research is based on a shift-share analysis of 25 NUTS 3 level regions[1)] and 19 economic sectors. These are statistical regions, but they territorially coincide with administrative districts so we can consider them functional urban areas and, therefore, determine the general characteristics and tendencies of labour market processes (Grčić et al. 2017).

[1)] The NUTS ("nomenclature of territorial units for statistics") classification is a hierarchical system for dividing the economic territory of the European Union and the United Kingdom.

Additionally, the aim of this study is to analyse the structural changes and regional differentiation of the labour market for the period 2015–2020 and to contribute to the literature on the regional economic development in postsocialist countries. Changes in employment data during this period at the national and regional levels were analysed. The results of the shift-share analysis allow us to identify regions in Serbia that have been more or less successful in terms of labour market changes, and these findings can form the basis for formulating a new regional development policy.

When it comes to the labour market, one should keep in mind the changes in the classification of economic activities and the application of the new methodology for determination of employment indicators introduced by the Statistical Office of the Republic of Serbia in September 2015. The "old" methodology was based on data gathered from the regularly conducted Labour Force Survey, while, according to the "new" methodology, data on registered employment are now collected from the Central Registry of Compulsory Social Insurance and the Statistical Business Register. The Labour Force Survey is used for international comparisons, while registered employment rather corresponds to the tasks of studying the labour market at lower territorial levels (Zvezdanović-Lobanova et al. 2021). For these reasons, this study took into account registered employment (excluding registered individual farmers) for the period 2015–2020 (Statistical Office of the Republic of Serbia 2016, 2021).

2 Methodological Model of the Shift-Share Analysis

A shift-share analysis is a type of statistical comparative method of numerical data research, applicable for the retrospective decomposition of changes in employment in different areas. The identified changes can be used to evaluate the comparative advantages of the regions under consideration and their typology.

The basic form of this methodological model was introduced by Jones in 1940 (Ray 1990), and it was standardised in the 1960s in papers published by Zelinsky (1958), Dunn (1959, 1960), and Fuchs (1959). Over the years, many versions of shift-share analysis have been created. These differ from each other in methodology and terminology (Barff and Knight 1988; Montanía et al. 2021). More recent variants of the shift-share method have been analysed by Artige and van Neuss (2014). In its modern form "shift-share analysis is a decomposition technique widely used in regional studies to quantify an industry-mix effect and a competitive effect on the growth of regional employment (or any other relevant variable) relative to the national average" (Artige and van Neuss 2014, pp. 667).

In the framework of this analysis, the statistical database is represented by two crossed matrices with the data on employment by economic sectors "I" and by regions "r". One matrix represents the initial year "0" and the other matrix represents the final year "t" of the considered period. The *total shift* (TS) for a region ("r") is defined as the difference between the actual growth of employment in a given region in a certain period, and the hypothetical growth corresponding to the national growth index. This total shift is defined further as a sum of two components: differential shift – or differential effect (DE) – and structural effect (SE), therefore:

$$TS = DE + SE \tag{1}$$

By denoting two consecutive time periods as "0" and "t", respectively, we come to the first steps in the calculation of "DE" and "SE":

$E^r_{i,0}$ and $E^r_{i,t}$	Employment in region "r" in a sector "i" (in the time periods "0" and "t")
$\sum_i E^r_{i,0}$ and $\sum_i E^r_{i,t}$	Employment in region "r" in all sectors "i" of the economy (= total regional employment in a region "r" in the periods "0" and "t")
$\sum_r E^r_{i,0}$ and $\sum_r E^r_{i,t}$	Employment in sector "i" in all regions "r" of the country (= total national employment in sector "i" in the periods "0" and "t")
$\sum_r \sum_i E^r_{i,0}$ and $\sum_r \sum_i E^r_{i,t}$	Employment in all sectors "r" in all regions "i" (= total national employment in the periods "0" and "t")

We can then calculate the *actual change* (AC) in region "r" which is equal to the number of employees in year "t" minus the number of employees in base year "0" in that area.

$$AC^r = \sum E^r_{i,t} - \sum E^r_{i,0}, \text{ and in total } AC = \sum_r \sum_i E^r_{i,t} - \sum_r \sum_i E^r_{i,0} \tag{2}$$

Next step is the calculation of the *regional share component* (N^r) which is equal to the number of employees in the base year ($E^r_{i,0}$) multiplied by the proportional change in employment in the country (E^r_t/E^r_0) minus the number of employees in the base year in the same area (E^r_0).

$$N^r = \sum_i E^r_{i,0} \left(\sum_r \sum_i E^r_{i,t} / \sum_r \sum_i E^r_{i,0} \right) - \sum_i E^r_{i,0} \tag{3}$$

or in another way:

$$N^r = \sum_i E^r_{i,0} \left[\left(\sum_r \sum_i E^r_{i,t} / \sum_r \sum_i E^r_{i,0} \right) - 1 \right] \tag{4}$$

The next step is the calculation of the net *proportionality shift* (R^r) in area "r" which is equal to the difference between employment in that area at the end of the period and the hypothetical employment that the area would have had if its base year employment had grown at the rate of employment growth for the whole country. This is the difference between the actual employment growth in the area and the hypothetical growth that would result from its share in the state. If the achieved growth (AC^r) in area "r" is lower than expected based on its proportional share (N^r), it is the result of a negative net relative change ($-R^r$), while higher achieved growth is the result of a positive net relative change ($+R^r$).

$$R^r = \sum_i E^r_{i,t} - \sum_i E^r_{i,0} \left(\sum_r \sum_i E^r_{i,t} / \sum_r \sum_i E^r_{i,0} \right) \tag{5}$$

Therefore,

$$AC^r = N^r + R^r \tag{5}$$

In the next two steps, we can calculate the *differential effect* (DE) and structural effect (SE) for region "r".

The *differential or comparative component (net differential shift;* D^r) measures the change in relation to changes in employment in all economic sectors in the country. The differential shift for a region represents the sum of positive and negative differences between actual changes in employment in individual sectors in the region "r" and hypothetical changes that would result if the growth of these sectors was in line with the growth rate of the same sectors in the country.

$$DE = \sum_i \left[E^r_{i,t} - E^r_{i,0} \left(\sum_r E^r_{i,t} / \sum_r E^r_{i,0} \right)\right] \tag{7}$$

The *structural (proportional) component (net proportionality shift;* S^r) measures the change in employment in relation to the sector structure of employment in the field. The structural component in region "r" is equal to the number of employees in each sectors of economy in that area in the base year ("0") multiplied by the difference between the national proportional variation in employment in that sector and the average proportional variation in employment in all sectors of economic activity.

$$SE = \sum_i E^r_{i,0} \left(\sum_i E^r_{i,t} / \sum_r E^r_{i,0} - \sum_r \sum_i E^r_{i,t} / \sum_r \sum_i E^r_{i,0} \right) \tag{8}$$

The structural shift corresponds to the effect of a more or less favourable sectoral structure of economy of a given region at the beginning of a given time/period on the size of the total shift. The size of this effect is proportional to a) the value of the initial share of the dynamic sector (comprising all the activities with an above average growth rate) in the region as compared with its share in the country, and b) the value of the difference between the national rate of growth in the national economy (WROBEL 1986).

The value of a shift-share analysis can be found not only in the net relative change (R^r) but also in two components that are the subdivisions of that change: "S^r", the structural component, which is a reflection of sector change, and "D^r", the *differential* or *comparative component*, based on the conclusions that can be drawn regarding the concentration or decentralisation of economic activities. Therefore,

$$R^r = S^r + D^r, \text{ and hence, } AC^r = N^r + S^r + D^r \tag{9}$$

This means that the growth/decrease of employment in the i^{th} activity of the region is a function of a) the regional share in national growth, b) a mix of changes in the activities themselves, and c) shifts and changes in activity in the region (STEVENS and MOORE 1980). Thus, if the achieved growth (AC^r) in area "r" deviates from the hypothetically expected growth based on its proportional share in the country (N^r), it is the result of a positive or

negative structural and/or differential effect. The unfavourable structure of the economy results in a negative *structural* effect, and comparative regional "shortcomings" generate a negative *differential* effect.

Determining the magnitude of the structural effect – which refers to the conditioning of changes through the situation of the structure that existed in the base year– allows researchers to focus on the differential effect. Structural and differential effects provide an answer to the question of whether faster (or slower) growth is the result of (un)favourable structure and/or location policy and the influence of exogenous factors. "The structural effect raises the question: Why is employment growing faster in some sectors of the national economy than in others? The differential effect raises another question: Why is employment in the same sectors growing faster in some regions than in others?" (Perloff 1963).

3 Critical Review and Proposal of a Typogram for the Shift-Share Analysis

In the second half of the 20th century, structural changes in the economy were increasingly treated as the root cause and then as a consequence of the process of regional development. The interdependence of changes in sectoral and spatial structures in the processes of regional economic development is observed in the works of the British and Australian economist and statistician Colin Clark, in the theory of the "growth poles" in the sectoral structure of the economy of the French economist François Perroux, as well as in the theory of "centres of growth" of the French economist and geographer Jacques Budville.

Shift-share analysis does not appear to be derived from any explicit theory of regional employment growth. However, it can be used for regional planning and development policies, as well as for the analyses of their effectiveness, especially concerning the planned and realised reduction of regional disparities. The methodological procedure of shift-share analysis has been applied in numerous studies of structural changes and regional differentiation of the economy, with critical re-examinations, modifications, reformulations, improvements, and innovations (Vipond and Forward 1979; Stevens and Moore 1980; Tervo and Okko 1983; Barff and Knight 1988; Casler 1989; Holden et al. 1989; Knudsen and Barff 1991; Wrobel 1992; Dinc and Haynes 1999; Nazara and Hewings 2004; Márquez et al. 2009; Artige and van Neuss 2014; Goschin 2014; Ruault and Schaeffer 2020; Lahr and Ferreira 2021; Lv et al. 2021; Montanía and Dall'erba 2022; Scarffe 2021).

The advantages of a shift-share analysis are that it uses a simple way to decompose territorial/regional differences in economic or sectoral growth by applying the analysis of three components of growth (e.g., employment, productivity, etc.). These include a) a structural component, b) a differential component, and c) an allocative component (Esteban-Marquillas 1972; 1999). Therefore, this technique provides a simple and direct approach for deriving the share of regional or local growth based on national and industrial contribution by offering a simple and reliable decomposition of regional differences from the point of view of comparing employment and labour productivity to the national average.

A shift-share analysis as a methodological technique can be critically evaluated on several grounds. Its critics have particularly pointed out that shift-share analysis does not provide a clear picture of the regional and national economy, although it is based on a series of statistical data. One of the starting assumptions (and limitations) used when applying a shift-share analysis is that the larger reference area (e.g., the country) is a closed economic system, which in reality is not the case. Apart from the openness of the national economy and the labour market (counting on a closed system), this technique furthermore does not take into account the influence of institutional and organisational factors and the like.

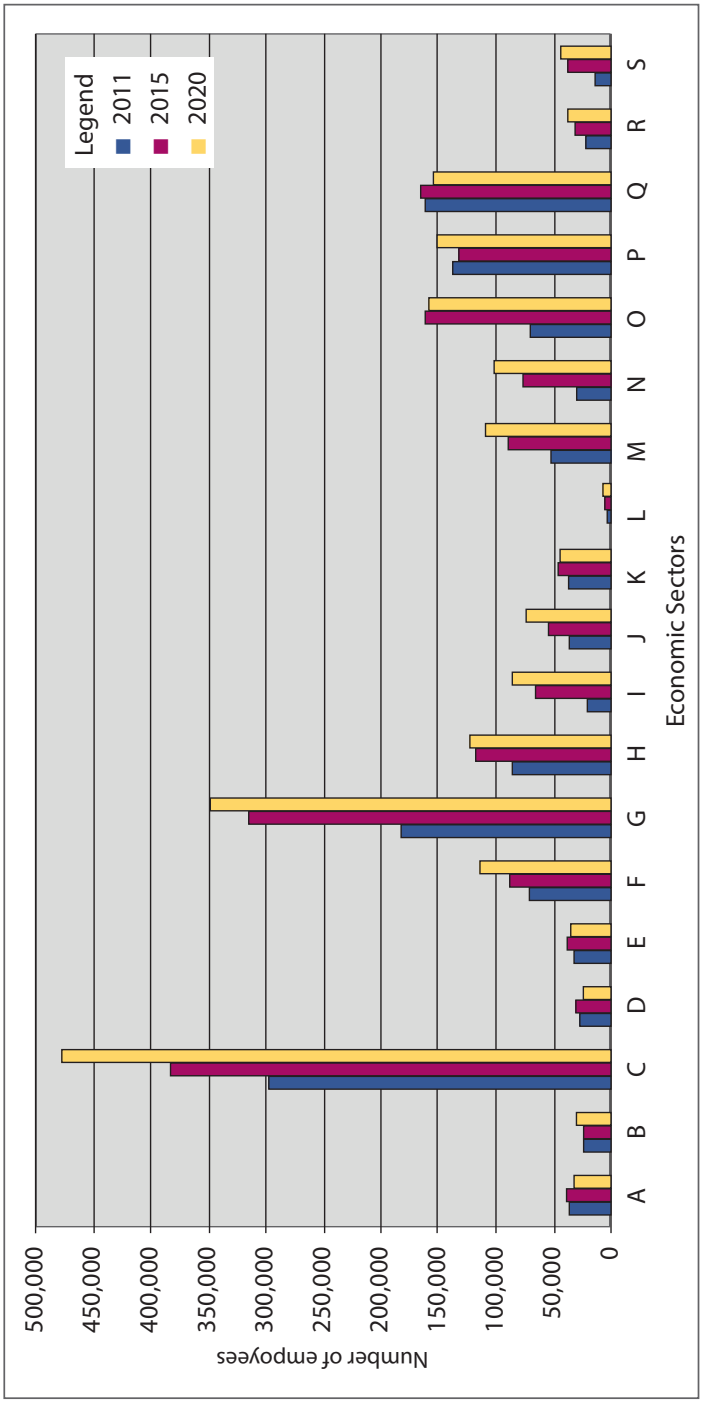
In addition, critics point out that the shift-share method overemphasises the importance of the initial resources of the analysed area and that it does not possess analytical power upon which one could learn more about an area's overall comparative and locational advantages. This is why shift-share analysis should be used alongside other methods that enable us to assess development potentials at the regional and national levels. However, even if shift-share is used only in its rudimentary form, it can be very useful for gaining "a so-called quick-and-dirty insight" into the relationship between structural changes and the regional differentiation of a labour market.

One of the main methodological downsides of a shift-share analysis is the explanation of the causes and driving mechanisms of the observed change. This problem can be solved by linking this method with the theory of regional development and by comparing it with the results obtained from other methods such as probability calculation, regression analysis, econometric modelling, input-output analysis, location quotient calculation, and regional factor modelling.

However, in addition to its methodological shortcomings, shift-share analysis has proven to be a simple and reliable tool for evaluating regional (territorial) aspects of labour market growth and development. The results of this analysis can be applied in sectoral policies and spatial planning at the national and regional levels, which strive for regional territorial cohesion and a spatially balanced labour market.

A further methodological shortcoming of a shift-share analysis is the dependence of the results on the length of the period under study and on the regional division of the territory. A long-term observation period obscures short-term waves of changes and current processes. For example, since 2015, the Statistical Office of the Republic of Serbia has been applying a new employment methodology, which has sharply "increased" the number of employees compared to previous years (Figure 1). Data collected according to the old and new methodologies are not comparable, so in our research we took 2015 as the base year, while the last year of the period under study coincides with the start of the COVID-19 pandemic. However, to detect the pandemic's impact on the economy, the observation period should be shortened to the duration of the pandemic itself. Similarly, large territorial units of observation cloud the internal local changes and trends, and administrative changes make it difficult or impossible to compare data over longer time intervals. Therefore, studying a shorter period and using a smaller number of territorial units produces more precise results in the analysis.

The special quality of this analytical comparative technique is that it provides the possibility of using the results for the creation of a typology and the classification of regions (based on the NUTS-3 level in our case). Therefore, we propose a graphical typogram that



NACE Rev. 2 sections (sectors): A – Agriculture, forestry and fishing, B – Mining and quarrying, C – Manufacturing, D – Electricity, gas, steam and air conditioning supply, E – Water supply, sewerage, waste management and remediation activities, F – Construction, G – Wholesale and retail trade; repair of motor vehicles and motorcycles, H – Transportation and storage, I – Accommodation and food service activities, J – Information and communications, K – Financial and insurance activities, L – Real estate activities, M – Professional, scientific and technical activities, N – Administrative and support service activities, O – Public administration and defence; compulsory social security, P – Education, Q – Human health and social work activities, R – Arts, entertainment and recreation, S – Other service activities.

Source: Calculations and design by authors

Figure 1: Changes in the employment structure in Serbia by economic sectors 2011–2020

allows us to present the obtained results visually and perform a typology of the units of territorial division, which can then be clearly presented cartographically and explained in relation to relevant factors (see Figures 2 and 3).

4 Results and Discussion

The empirical results and a comparison of the findings on the NUTS-3 level regions show the roles and contributions of individual components for regional employment growth compared to the growth of employment on a national level. The total change in employment (A^r) in Serbia for the period of 2015–2020 was 252,817 or 13.3 percent more than in the base year of 2015. This means that over a period of six years, the average employment growth was slightly more than 2 percent per year, which indicates a more favourable situation compared to the previous period during and after the Great Recession. This is a consequence of the new investment cycle and the revival of economic growth in Serbia in the examined period. The secondary sector has been developing intensively, mainly due to foreign direct investments, but the increase in employment is also recorded in service activities, which speaks of the "tertiarisation" of the economy.

If we look at the spatial distribution of employment growth, the leaders in this regard were the areas with larger urban-industrial centres: the Belgrade area, South Bačka (Novi Sad), Srem (intermediate development zone between Belgrade and Novi Sad), Nišava (Niš), Mačva (Šabac), and Šumadija regions (Kragujevac). The smallest increase in employment was in areas with old industrial centres that had fallen into recession (the Zaječar region, which is declining, and the Bor, Pirot, and Pčinja regions). Some predominantly agrarian areas (e.g., the Banat, North and West Bačka, and Braničevo regions) also recorded stagnant or slow (below average) growth (Figure 2).

The shift-share analysis indicates that the changes in the territorial distribution of employment in Serbia are the result of a combination of the structural, differential, and national components of change. Namely, out of a total of 25 regions, only 10 belong to the *progressive type* (2 with a dominant positive structural effect and 8 with a dominant positive differential effect). The other 15 belong to the *regressive type* (13 with a dominant negative differential effect and 2 with a dominant negative structural effect).

Here the following question arises: what were the driving forces of the progressive regions in Serbia? The authors consider this to be the result of the uneven regional distribution of "creative resources". In the group of creative resources, which are significant for improving the economic competitiveness of several regions in the European Union, Nijkamp et al. (2008) include the quality of human resources, development and research institutions, and entrepreneurial networks and the ability to accept innovative ideas and communication-related interactions about them.

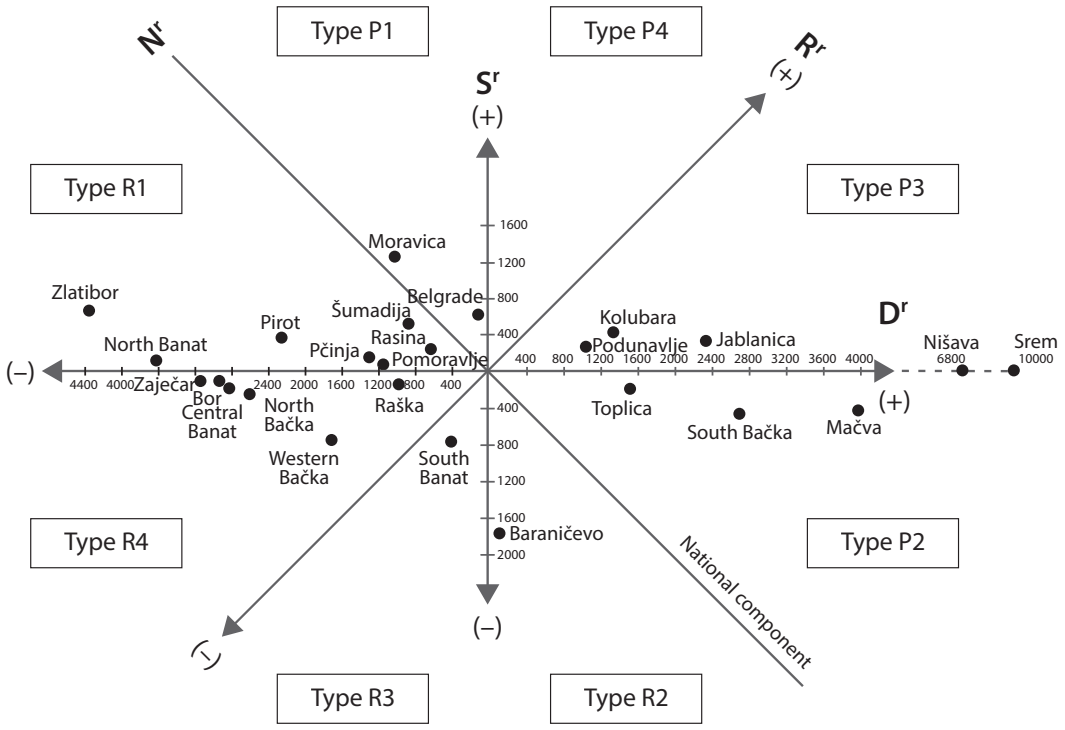
Such resources in Serbia are concentrated in larger urban-industrial agglomerations and scientific research centres that had more favourable conditions for the development of the "knowledge economy", investments in research, and the development of innovative and knowledge-based technologies (Zeković et al. 2014). Meanwhile, creative resources are concentrated, as a rule, in large and medium-sized cities, which significantly explains the

Districts	Z 2015	AC^r		N^r		R^r		S^r		D^r	
	№	№	%	№	%	№	%	№	%	№	%
Belgrade	667,166	89,557	13.42	88,949.1	13.33	607.94	0.09	642.64	0.10	-34.70	-0.01
West Bačka	37,741	2,586	6.85	5,031.8	13.33	-2445.77	-6.48	-737.33	-1.95	-1,708.44	-4.53
South Banat	57,643	6,458	11.20	7,685.2	13.33	-1,227.18	-2.13	-818.88	-1.42	-408.30	-0.71
South Bačka	189,408	27,494	14.52	25,252.6	13.33	2,241.42	1.18	-463.69	-0.25	2,705.11	1.43
North Banat	33,886	969	2.86	4,517.8	13.33	-3,548.81	-10.47	132.96	0.39	-3,681.77	-10.87
North Bačka	50,294	3,779	7.51	6,705.4	13.33	-2,926.38	-5.82	-293.78	-0.58	-2,632.60	-5.23
Central Banat	41,352	2,504	6.06	5,513.2	13.33	-3,009.20	-7.28	-164.53	-0.40	-2,844.68	-6.88
Srem	70,449	19,351	27.47	9,392.5	13.33	9,958.48	14.14	104.61	0.15	9,853.86	13.99
Zlatibor	65,792	5,127	7.79	8,771.6	13.33	-3,644.64	-5.54	671.21	1.02	-4,315.85	-6.56
Kolubara	36,742	6,627	18.04	4,898.6	13.33	1,728.42	4.70	417.33	1.14	1,311.09	3.57
Mačva	54,501	10,831	19.87	7,266.3	13.33	3,564.72	6.54	-417.33	-0.77	3,982.06	7.31
Moravica	52,493	7,233	13.78	6,998.6	13.33	234.44	0.45	1,265.83	2.41	-1,031.39	-1.96
Pomoravlje	41,788	4,435	10.61	5,571.3	13.33	-1,136.33	-2.72	17.24	0.04	-1,153.57	-2.76
Rasina	46,812	5,816	12.42	6,241.2	13.33	-425.15	-0.91	222.81	0.48	-647.96	-1.38
Raška	61,029	6,986	11.45	8,136.6	13.33	-1,150.61	-1.88	-117.08	-0.19	-1,033.53	-1.69
Šumadija	68,065	8,826	12.97	9,074.7	13.33	-248.68	-0.37	565.94	0.83	-814.62	-1.20
Bor	27,457	736	2.68	3,660.7	13.33	-924.67	-10.65	-61.51	-0.22	-2,863.16	-10.43
Braničevo	336,63	2,864	8.51	4,488.1	13.33	-1,624.08	-4.82	-1,766.98	-5.25	142.91	0.42
Zaječar	22,542	-261	-1.16	3,005.4	13.33	-3,266.38	-14.49	-118.92	-0.53	-3,147.46	-13.96
Jablanica	39,120	7,853	20.07	5,215.6	13.33	2,637.38	6.74	310.83	0.80	2,326.54	5.95
Nišava	86,293	18,446	21.38	11,504.9	13.33	6,941.09	8.04	37.62	0.04	6,903.47	8.00
Pirot	20,339	812	3.99	2,711.7	13.33	-1,899.67	-9.34	362.31	1.78	-2,261.98	-11.12
Podunavlje	36,032	6,133	17.02	4,803.9	13.33	1,329.08	3.69	286.45	0.80	1,042.63	2.89
Pčinja	38,626	4,040	10.46	5,149.8	13.33	-1,109.76	-2.87	117.43	0.30	-1,227.19	-3.18
Toplica	17,031	3,615	21.23	2,270.6	13.33	1,344.36	7.89	-195.18	-1.15	1,539.55	9.04
Total	**1,896,264**	**252,817**	**13.33**	**252,817.0**	**13.33**	**0.0**	–	**0.0**	–	**0.0**	–

Note: № – absolute numbers of employees; % – relative numbers (percents); AC^r – increase in the number of employees in the period 2015–2020; N^r – regional share component; R^r – net proportionality shift; S^r – structural component; D^r – differential component. Percentages are calculated in relation to the number of employees in the base year (2015).

Source: Calculations by authors.

Table 1: Shift-share analysis of changes in the number of employees by area, 2015–2020 (absolute numbers and percentages)



Legend

Progressive types (P)

Type P1 = ($+S^r > -D^r$) Progressive type with dominat positive structural effect and participation negative differential effect

Type P2 = ($-S^r < +D^r$) Progressive type with dominat positive differential effect and participation negative structural effect

Type P3 = ($+S^r < +D^r$) Progressive type with dominat positive differential effect and participation positive structural effect

Type P4 = ($+S^r > +D^r$) Progressive type with dominat positive structural effect and participation positive differential effect

Regressive types (R)

Type R1 = ($+S^r < -D^r$) Regressive type with dominat negative differential effect and participation positive structural effect

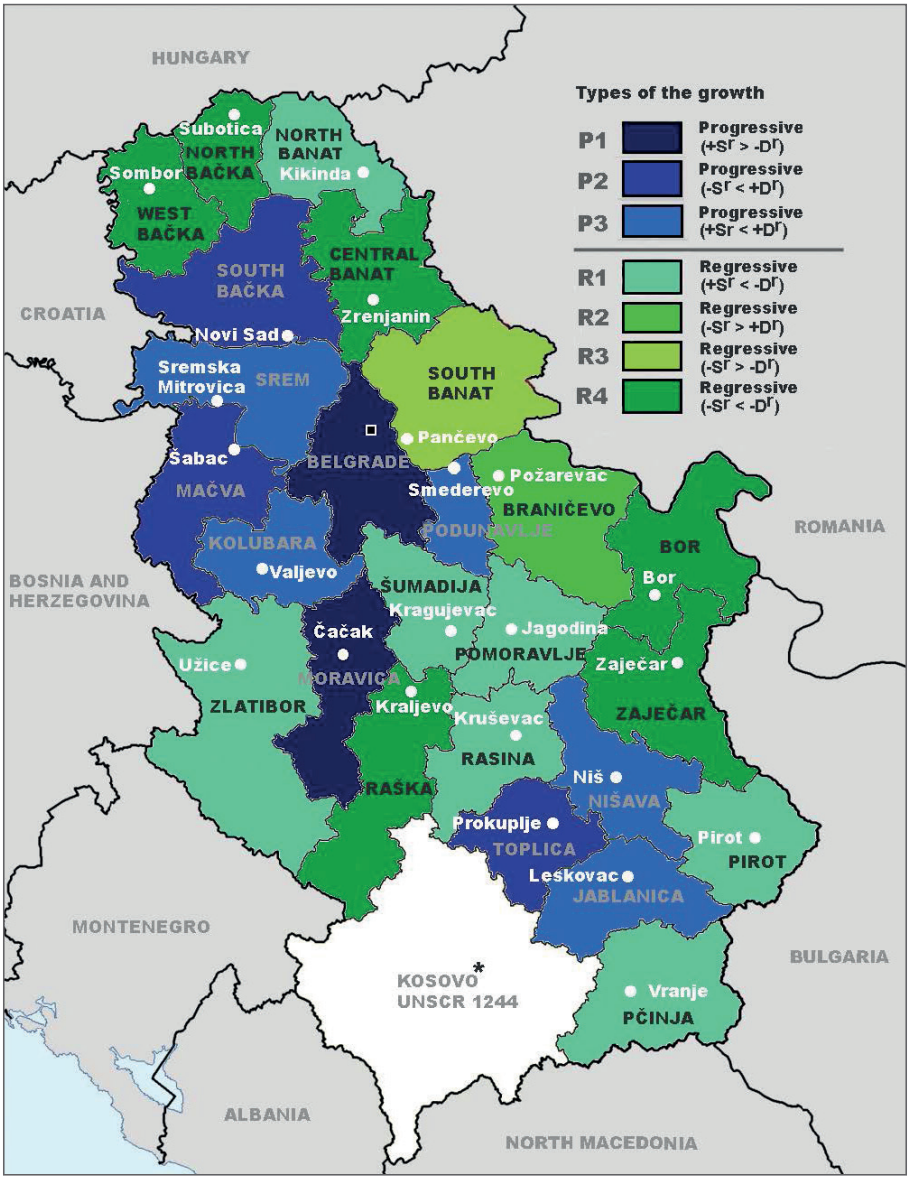
Type R2 = ($-S^r > +D^r$) Regressive type with dominat negative structural effect and participation positive differential effect

Type R3 = ($-S^r > -D^r$) Regressive type with dominat negative structural effect and participation negative differential effect

Type R4 = ($-S^r < -D^r$) Regressive type with dominat negative differential effect and participation negative structural effect

Source: Authors' analysis, own design

Figure 2: Typogram of 25 districts according to the results of the shift-share analysis of employment changes for 2015–2020



Source: Authors' analysis, own design

Figure 3: Types of employment growth according to the results of the shift-share analysis (according to Table 1 and Figure 2 [3])

[3] This designation is without prejudice to positions on status and is in line with the United Nations Security Council Resolution 1244/1999 and the International Court of Justice's *Advisory opinion on Kosovo's declaration of independence*.

territorial concentration of investments and jobs. There are other factors, such as external economies, infrastructural systems, and other characteristics of the locations of economic activities, which synergistically acted on economic development and the labour market.

The results of the shift-share analysis stress that two broader areas of the progressive-type regions were formed due to the employment increase: One is in the Danube-Sava-Drina belt, dominated by the metropolitan areas of Belgrade and Novi Sad, large cities and industrial centres, and the Danube development corridor and highway corridor zones, which provide attractive locational conditions for economic and industrial development. The second area is in southern Pomoravlje with its centre in Niš, which is growing into a regional centre and transport hub of the central Balkans. Regressive-type regions form a vast peripheral area that includes mostly border and hilly-mountainous areas, which may explain the deficit of creative resources.

Extremely high relative growth was recorded in the Srem region (27.5 %) due to significant greenfield investments, especially foreign ones that occurred in the late 2000s and after. Above-average relative values of employment growth were recorded in areas with old industrial centres, such as the Niš (city of Niš), Jablanica (Leskovac), Toplica (Prokuplje), South Bačka (Novi Sad), Kolubara (Valjevo), Mačva (Šabac), and Podunavlje regions (Smederevo), due to brownfield investments and modernisation. Belgrade, as the capital and the largest urban, industrial, and service centre, was at the level of average growth in that respect.

If all areas had relative growth equal to the average value (13.3 %), then the employment changes in the areas would differ from the actual changes (column N^r in Table 1). Relative to this hypothetical benchmark, the inequality of actual employment growth by areas (column R^r in Table 1) is calculated. The relative values (net proportionality shift, R^r) show whether the number of jobs in the area in relation to the relative values of the national component (N^r) is growing faster or slower. Based on that, the types of regional changes are determined (Göler et al. 2007).

According to this component (R^r), higher than hypothetically expected growth is recorded in 10 areas. Regions that have a positive R^r component were classified into a group of progressive types and those with a negative sign were classified as regressive types (see Figures 2 and 3). Ten regions with a positive sign are geographically grouped into two territorial units: Central-Western (the Srem, South Bačka, Belgrade, Mačva, Kolubara, Moravica, and Podunavlje regions) and Southeastern (the Nišava, Jablanica, and Toplica regions).

These areas are attractive to foreign and domestic investments due to favourable location conditions (primarily good infrastructure of international importance and skilled labour). This explains the concentration of new jobs in the wider gravitational-functional zones of Belgrade and Niš, despite the generally proclaimed policy of decentralisation and balanced regional development. A total of 15 areas have a negative Rr, and they are mosaically distributed across the territory of Serbia. These areas experienced development difficulties due to the economic crisis, failed privatisations, and a lack of investment in industry restructuring. They have reoriented their economies towards the agricultural sector, family entrepreneurship, and small businesses, often utilising informal employment to avoid taxation (the “grey economy”).

The *structural effect* (S^r) is positive in areas with a high share of employees in those industries that were dynamic ("propulsive") at the state level, and vice versa. That is, S^r is negative in areas with a high share of activities that were stagnant or declining at the state level (Göler et al. 2007).

The structural crisis and deindustrialisation led to the collapse of industry in Serbia in the last decade of the twentieth and the first decade of the twenty-first centuries (Göler et al. 2007). In recent times, the negative structural effect is very high in areas where the collapse of large industrial systems deepened the crisis of the labour market (South Banat and Braničevo), and it is also present in a number of functionally marginalised regions that together form an economically depressed area. Only two regions (Belgrade and Moravica, with the centre in Čačak) have a high positive structural effect. A positive structural effect is also present in a large number of other areas due to their larger cities which are regional and economic centres, transportation hubs, and favourable locations for economic activities that require not only highly qualified personnel for information technology, research and development, and knowledge-based services but also qualified workers for the construction, industry, and service sectors.

The magnitude of this effect in relation to the employment level at the beginning of the research period ranges from 2.41 percent (in the Moravica region, with the centre in Čačak) to –5.3 percent (in the Braničevo region, with the centre in Požarevac). The negative structural effect indicates a structural disbalance, which is fuelling economic and social problems. The increase in foreign investment (Ratkaj et al. 2021) has a positive impact on the labour market and is strengthening the private sector, mainly in the tertiary sector and the processing industry.

The *differential component* (D^r) has a dominant share in the progressive and regressive change in values of the net proportionality shift (R^r). On the typogram (Figure 2), we can see that the structural component is larger than the differential in the progressive direction in two areas (the Moravica and Belgrade regions) and in the regressive direction in two areas as well (the South Banat and Braničevo regions). The type of change in the number of employees is determined by the values of the differential component in eight areas in the progressive and 13 areas in the regressive directions. The interpretation of differential effects is diversified and dependent on the specific context of individual areas. The value of this component in each area depends on the influence of favourable or unfavourable location conditions and comparative advantages in competition with other areas, but it should be borne in mind that "cultural and political factors are dominant in shaping the labour market in relation to economic factors" (Pilc 2017).

The differential effect in the progressive change of the absolute number of employees is greatest in the Srem and Nišava regions, which is a consequence of significant investments. The Belgrade agglomeration owns a large part of foreign direct investments, which in recent times are increasingly directed to the nearby Srem area, with a significant impact on employment. Certain border areas are leading in regressive change. The relative values of D^r in relation to the state of employment at the beginning of the research period are progressive mainly in the areas in which the favourable transport position (the Pan-European transport corridors VII and X) and benefits of agglomeration (in the Belgrade, Novi Sad, and Niš regions) have positively affected job growth.

The policy of deagglomeration and deconcentration of Belgrade's industry has had some effect, but it only encouraged the growth of the surrounding centres with suitable access routes in its sphere of influence (the Srem, Mačva, and Kolubara regions). The trend of concentrated activities continued despite the declared policy of deconcentration. Border and mountain areas are mainly regressive along with, in some cases, areas that had seen relatively large investments in resource-intensive activities, such as agricultural production or infrastructural development programmes. In the latter situations, the investments were not accompanied by an adequate increase in the number of jobs (see Table 1 and Figures 2 and 3.)

5 Conclusion

A shift-share analysis, like any methodological procedure, has its limitations, but its heuristic potential should not be underestimated. In this paper, a shift-share analysis was applied in research on the labour market in Serbia. The results indicate a deepening of regional disparities and regional polarisation in the observed period. In summary, the results of the shift-share analysis show that in the period 2015–2020, the key role in changes in economic growth was played by the regional component, with a negative sign in 13 and a positive sign in 8 regions.

As a rule, intensive progressive changes refer to large cities as centres of employment, with Belgrade, Novi Sad, and Niš being the leading growth centres thanks to their attractive and competitive conditions for economic and social development. In progressive-type regions, favourable conditions have provided a positive effect in terms of employment and the prevention of a greater than national average decline in employment. The structural component was dominant only in four areas: two with a positive sign (Belgrade and Moravica) and two with a negative sign. The typological classification of territorial units and the cartographic presentation of progressive and regressive types provide a good insight into the processes of spatial polarisation of the Serbian economy.

This study used the basic mathematical form of the shift-share method. The novelty lies in the graphic typogram used for the synthesis of the results and their explanation. Cartographic representation of the types of regions and progressive and regressive territorial units lends meaning to the entire process of the shift-share analysis and facilitates the explanation of the process of structural changes and regional differentiation of the labour market. This technique, however, has methodological shortcomings in explaining differences between employment growth rates and in revealing the nature of the factors hidden behind the growth components that reflect the dominant change processes. A true assessment of regional development policy should consider not only its undoubted achievements in the categories of planned and realised reduction of disparities on the level of regional economic development but also costs and any market economy conditions that limit manoeuvring possibilities and reduce efficiency.

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