A Comparative Study on Changes in the Spatial Industry Agglomeration in Eastern EU Developing Countries: Romania vs. Bulgaria

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Abstract: Taking a closer look at the spatial distribution of industrial sectors, it becomes quite obvious that there is an increasing disposition for industries to concentrate in certain regions in order to benefit of agglomeration assets. In this context, we consider necessary to analyze how industrial agglomerations have evolved over time and to what extent major transformations have affected agglomeration phenomenon in lagging regions of Eastern countries, finally our paper bringing supportive evidence from Romania and Bulgaria. To what extent, have patterns of industrial agglomeration modified during the transition period? Has relocation of economic activities taken place? What are the main determinants of industrial concentration patterns? These are some crucial questions that we try to find a realistic response through the present paper. Eastern economies are notably challenging from this point of view because they experienced several decades long economic development period which was earmarked by socialist industrialization. Under the planned economy, these countries have faced more barriers to an efficient geographical allocation of economic activities across regions than their peers in the Western Europe especially because they faced the legacy of a planned economy system that determined locations for economic activities based on political decisions, not based on economic efficiency. Thus, our effort can be seen as a contribution to knowledge about agglomeration in the non-Western countries in general, and in developing regions in particular. Focusing our study on two-digit industrial sectors of 14 regions at NUTS2 level, this paper aims to identify and explain the changes regarding the evolution of industrial agglomerations in the last years across Romania compared to Bulgaria. In the end, our analysis will be able to conclude in what manner the effects of transition period influenced the patterns of industrial agglomeration in these two neighboring countries.

Keywords: industrial agglomeration; Eastern countries; geographic concentration

JEL Classifications: R10; R11

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1. Introduction

The history of industrial agglomeration patterns in Eastern Europe has been subject to very inflexible conditions during the socialist period, thus leading to a specific and harmful industrial structure up until the beginning of the transition. Under the socialist system, industrial agglomeration landscape was more or less predetermined and sustained through the accordance of central plans that largely altered the development of dynamic industrial agglomerations rich in positive externalities. Moreover, under the planned economy, Eastern countries have faced more obstructions to an efficient spatial allocation of economic activities across regions than their fellows in the Western Europe especially because they faced the heritage of a planned economy system that determined locations for economic activities based on political beliefs, not based on economic efficiency.

Since 1990, the transition to a market economy in East European countries has resulted in major economic restructuring. Former centrally planned economies had to adapt their regional and sectoral production structure to a market-based economic system. This complex process led to large labor reallocation across sectors and regions by reshaping the industrial agglomerations patterns in East Europe.

A large number of studies has been dedicated to the research of spatial distribution of industrial agglomerations and their developments in Europe (Amiti, 1999; Bruhlhart, 1998, Combes and Overman, 2004; Haaland et al., 1999). Two aspects become immediately visible when taking a closer look at this broad and still growing body of literature. First of all, the results of these studies are rather unconvincing because they seem to depend radically on the time period covered. For this reason different researches and studies will arrive at divergent conclusions depending on the specific time period under consideration. Secondly, the literature focuses mainly on Western European countries and does not include the countries from Eastern Europe. Most probably, due to an obvious lack of data until very recently, Eastern Europe has been left out of most European analyses. Our aim is to fill this gap by analyzing a relatively new and comprehensive set of industry specific time series at regional level. Hence, our breakdown is by industries and also by regions. Most case studies for Western Europe at the industry level reveal that developments prove to have been extremely various in the last decades, with alternating cycles of increasing agglomeration/concentration and diversification. Thus, our purpose here is to extend the coverage of the current literature to Eastern European countries in order to offer an overview of patterns and driving forces behind the formation of industrial agglomerations in this part of Europe, finally our paper bringing supportive evidence from Romania and Bulgaria. These two neighboring countries are notably challenging from this point of view because they imply different characteristics. Most of all, Romania is one of the largest countries in Central and Eastern Europe, being also a dominant employer, while Bulgaria is a

small country located in Southeastern Europe which has just 8,5 million inhabitants.

Considering these, the present paper proposes to shed light on the evolution of industrial agglomerations in transition countries over the last years and compare these developments in Romania and Bulgaria. Thus, the structure of this work is organised as follows. Section 2 describes the structural changes that former socialist countries experienced in the early 1990s, focusing our attention on Romania and Bulgaria case studies. Section 3 explains the methodology to calculate a necessary index in order to observe the evolution of economic agglomerations at regional level. Section 4 presents the results. Section 5 concludes.

2. Dynamics of Structural Changes in Bulgaria and Romania

Until the beginning of the transition process in the early 1990s, the spatial distribution of economic activities and employment patterns in Eastern European countries strongly deviated from those of Western European economies. In the late 1980s, they were practically dominated by the manufacturing sector in general and heavy industry in particular. Afterwards, transition mechanism activated a process of catching-up of former socialist countries towards incumbent EU Member States that triggered per capita income and structural convergence. Thus, in the early 1990s, Eastern European countries rapidly re-oriented their external relations towards Western Europe. As a result, the sectoral allocation of production and labour resources among the three main sectors (agriculture, industry and services) has become more similar to the sectoral allocation prevailing in Western economies. Considering these, this section aims at understanding the evolution of employment landscape in the main three sectors and dynamics in two transition countries, Romania and Bulgaria. We first analyze the evolution of GDP and aggregate employment figures, so as to gain insights into the process of transition. The evolution of sectoral employment shares in the economy describes the process of economic restructuring in the transition countries.
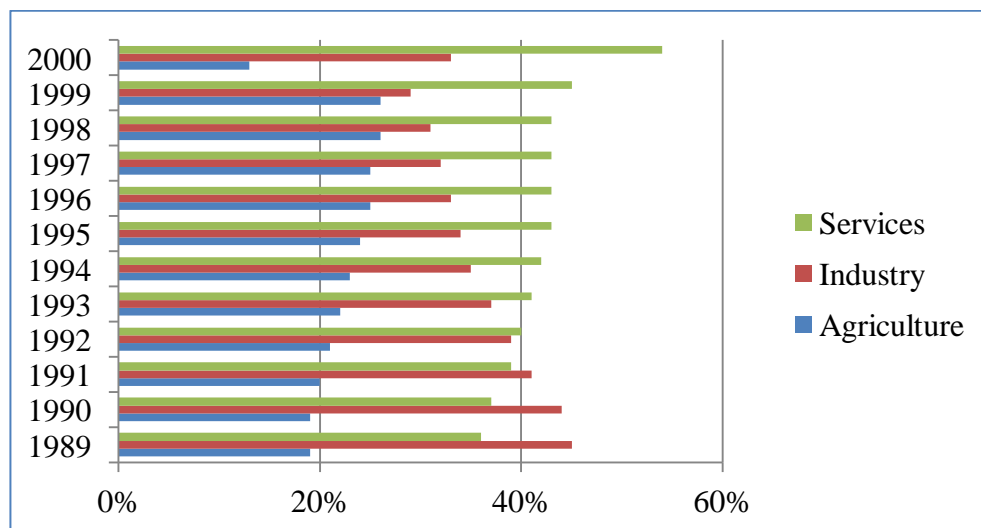
2.1 Bulgaria

Bulgaria has experienced significant losses in GDP and employment since the start of the transition process. While GDP per capita was around 1200 EUR in 1990, it decreased to 1000 EUR in 1994 and to similar values again in 1997. Figure 1 shows the evolution of real GDP and employment growth in Bulgaria during the 1990s. GDP and employment growth moved together during most of the 1990s. Only in 1998, employment declined although GDP kept increasing.
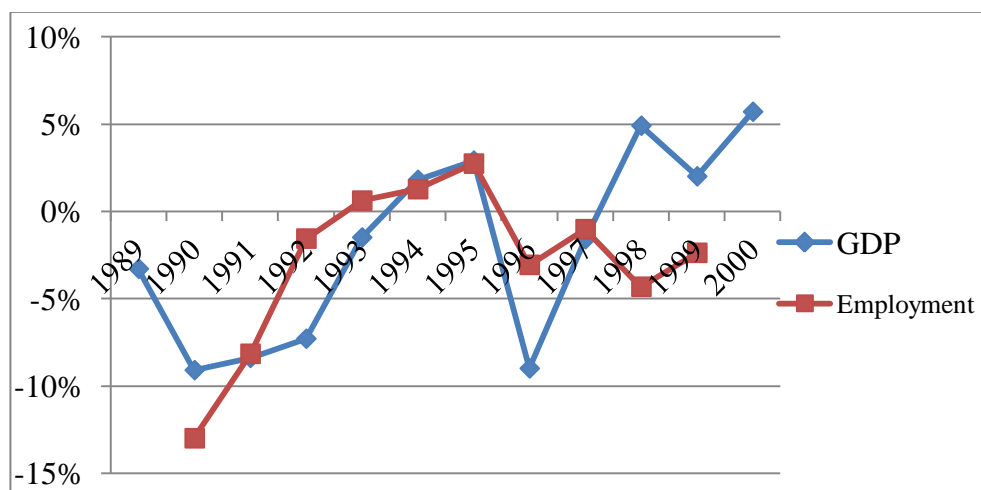
Figure 1. Real GDP and employment growth in Bulgaria

Source: EUROSTAT

The large losses in GDP were accompanied by significant restructuring across the major three sectors. The share of the industrial sector in total employment decreased dramatically during the 1990s, falling from over 45% in the early 1990s to 29% at the end of the 1990s. Concurrently (in the meanwhile), the sectoral shares of agriculture and services in total employment followed an increasing trend.

Figure 2. Sectoral shares in total employment in Bulgaria

Source: World Bank

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Moreover, the share of industry in GDP also decreased from 58% in 1989 to 26% in 2000. At the same time, the services sector share continuously increased during the 1990s and so did the agricultural sector's even if these two last sectors kept having some fluctuations in the period under review.
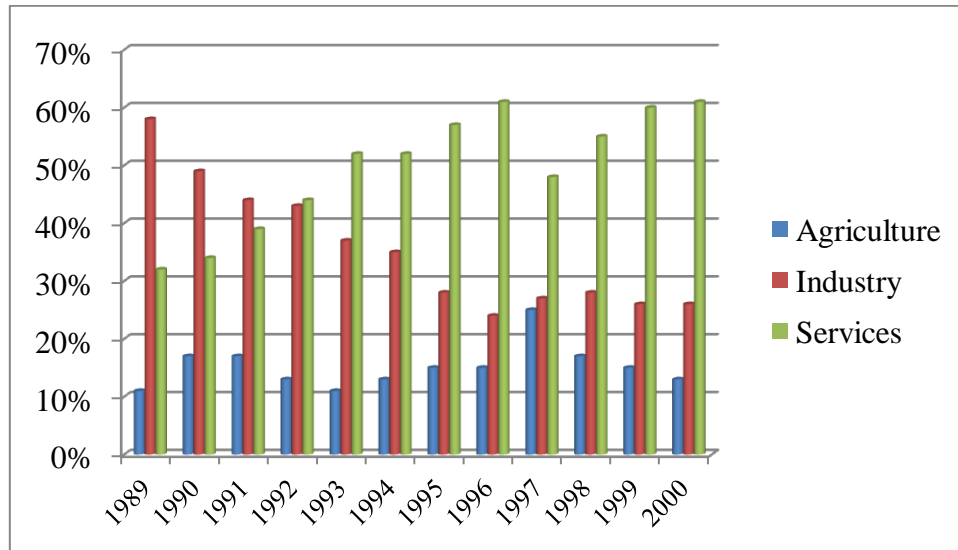

Figure 3. Sectoral shares in GDP in Bulgaria

Source: World Bank

In summary, the industrial sector has lost employment in Bulgaria, while the agricultural sector and service sector retained more or less constant employment.
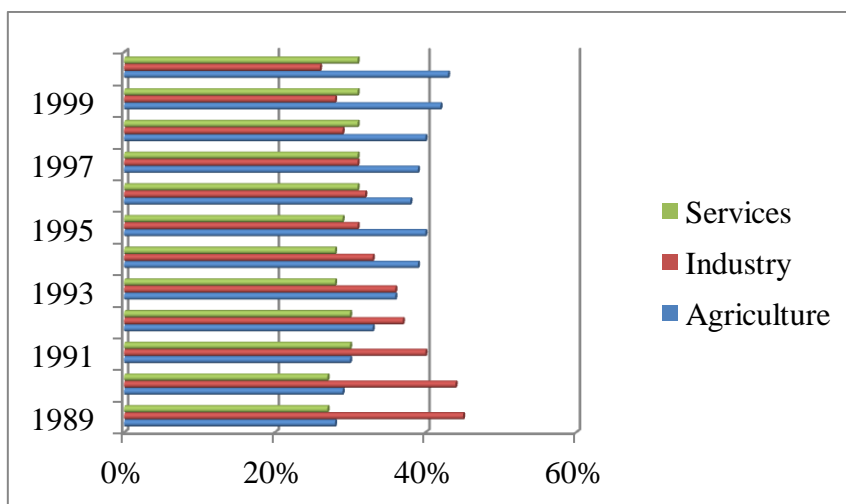
2.2. Romania

During the 1990s, Romania has regularly lost employment (see Figure 4). The decline was especially high in 1994, a 5.1 percent decrease relative to 1993 and in 1996, a 3.8 percent respectively. Contrary to Bulgaria, the evolution of employment has not closely matched the real GDP growth. GDP contracted significantly in the early 1990s, but the economy tended to stabilize in the midd-1990s, entering in a new recession in 1997/1998. Since 2000, GDP started growing again. Particularly in 1995, GDP growth was extremely high coinciding with negative employment growth. These points at productivity gain during the mid-1990s.
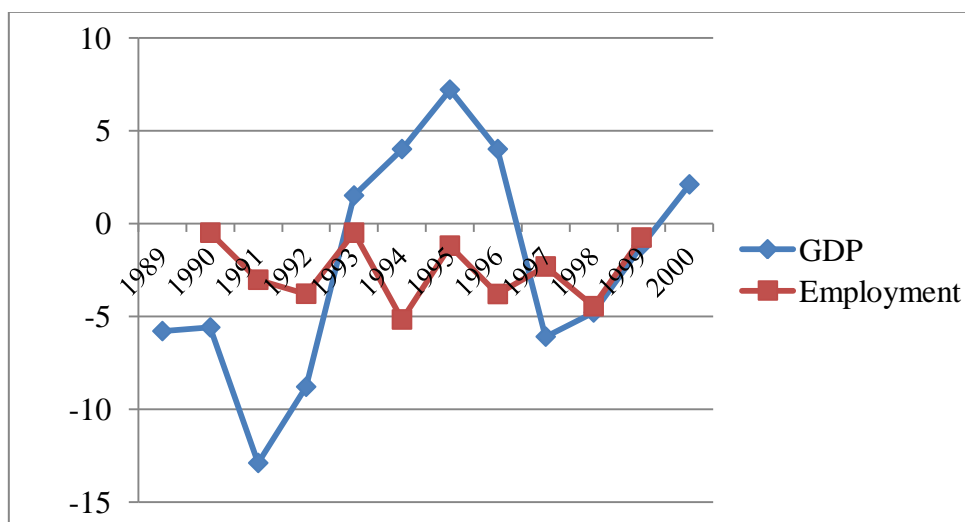
Figure 4. Real GDP and employment growth in Romania

Source: EUROSTAT

Furthermore, the employment share of the industry sector in total Romanian employment declined enormously as shown in Figure 5. This fall was matched by an increase in the employment share of the agricultural sector, which used to have a share of over 40 percent in Romanian employment in 1999. The variation in total employment is mainly driven by the largest three sectors, the agricultural, industry and service sectors.

Figure 5. Sectoral shares in total employment in Romania

Source: World Bank

Likewise, the share of industry in GDP also decreased from 60% in 1990 to 36% in 2000 (see Figure 6). Similarly, the agricultural sector share continued a downward trend. On the contrary, the services sector share followed an ascending line.
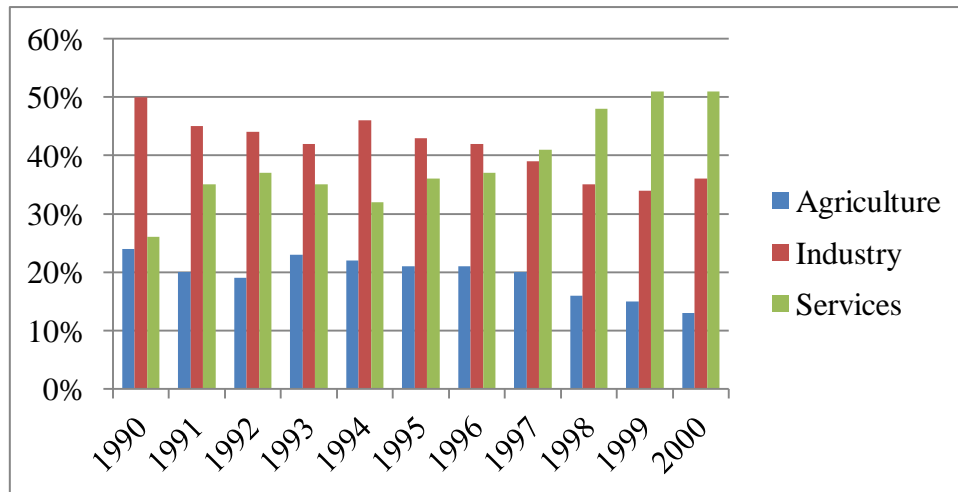
Figure 6. Sectoral shares in GDP in Romania

Source: World Bank

To sum up, both Eastern European countries, Bulgaria and Romania, experienced a process of deindustrialization in the 1990s. In contrast to Bulgaria, however, in Romania there were important employment losses in the service sector even though in the mid-1990s employment in the service sector moved along with increasing GDP.

All in all, the sectoral allocation of production and labor resources among the major three sectors (agriculture, industry and services) has become more resembling to the sectoral allocation existing in Western economies. On the whole, in transition countries the shares of value added and of employment in industry and in the agriculture sector decreased, whereas the service sector became a growing segment of these developing economies. These essential structural changes can be traced mostly to the stronger integration with the EU that has taken place. Intensified trade and a higher inflow of FDI have modified the competitive environment of the Eastern companies and have reshaped the spatial distribution of major economic agglomerations.

3. Measuring Spatial Agglomeration

In the literature on spatial agglomeration, there is a variety of approaches to measure the extent to which an industry is concentrated in a certain area. Probably the most commonly utilized measure to spatially delimit agglomerations is the location quotient, simply written as LQ (O'Donoghue & Gleave, 2004, p. 421). Its ease of use, the accessibility of data, and its applicability at different geographical scales suggest that the LQ is suitable to be used for our purpose of measuring agglomeration. Generally, location quotient is expressed in terms of employment and the formula for computing this index can be written as:

$$LQ = \frac{E_{ir}/E_{i*}}{E_{*r}/E_{**}}$$

where:

E_{ir} represents employment in sector *i* of region *r;*

E_{i*} represents total employment in all sectors of region *r;*

E_{*r} represents employment in industry *i* of all regions;

E_{**} represents total employment in all sectors of all regions.

It is assumed that the base year is identical in all of the above variables.

The rationale underlying this index is that if LQ>1, the industry is "over-represented" in the case study region compared with the rest of the regions. If LQ<1, the sector is "under-represented" in the region (Hayter, 1997, p. 435).

For our analysis, in order to distinguish between those industries that have exhibited substantially different spatial patterns of agglomeration over the last years, we have computed an average LQ by calculating an arithmetic average of the number of employees needed to determine each component corresponding to location quotient.

In our study, we use employment data at regional NUTS 2 level for Bulgaria and Romania over 1999 to 2007. Considering that comprehensive data are limited, we chose this period due to the scarce availability of data. Our data set contains employment on the major economic sectors (2-digit codes) for 6 regions in Bulgaria and 8 regions in Romania. The data included in this data set has been collected from Eurostat's regional database.

4. Results

In this section we present the results of LQ calculations which show the variation of spatial agglomerations in terms of employment change in some individual industries between 1999 and 2007. Measuring an average location quotient index helped us in providing an overview of the transformations regarding the evolution of regional industrial agglomerations in the last years across Romania compared to Bulgaria. Thus, in the next figures we map out the values of average LQ index in some selective industries that we considered being driving forces for developing countries.
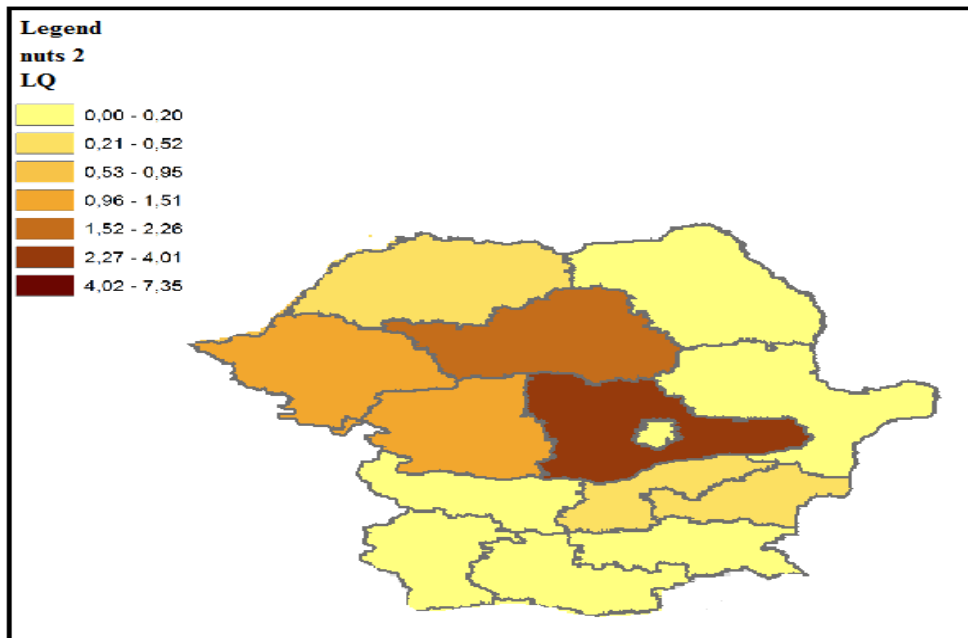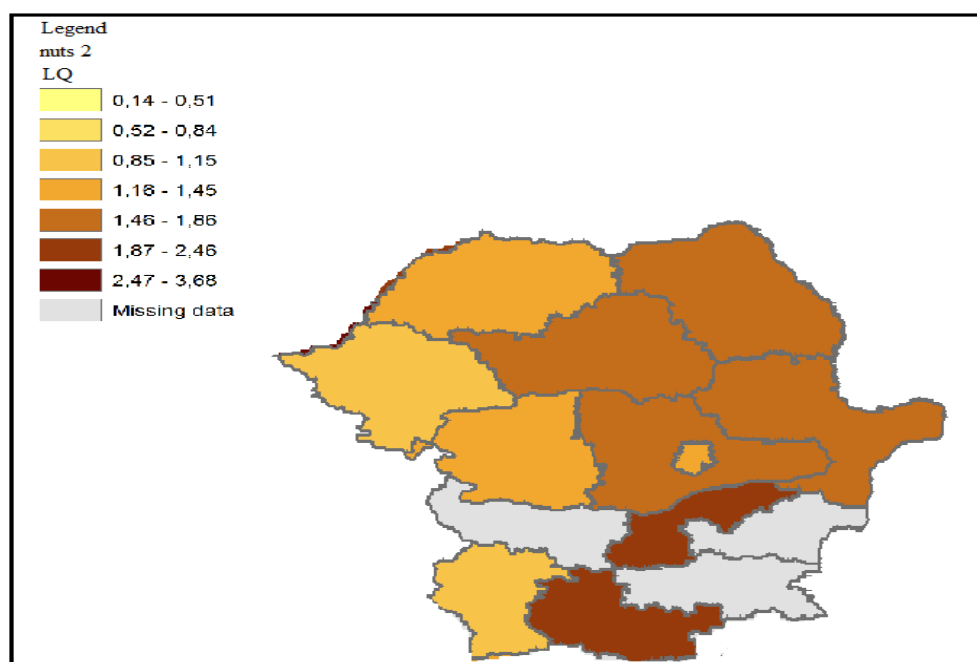

Figure 7. Spatial distribution of agglomerations in automotive industry between 1999-2007

Source: own calculations based on REGSTAT data set

As we can easily observe from the above map, between 1999 and 2007 the South-East part of Romania and the South-West area of Bulgaria developed the same spatial agglomeration patterns in automotive industry. It is quite obvious that in these regions the automotive sector recorded the lowest increase in the degree of labour force concentration. By contrast, employment is more concentrated in this industry in the South-West area of Romania. Moreover, it seems that this particular sector registered the strongest increase in the degree of employment concentration in South-Muntenia region of Romania. This result confirms the flourishing

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automotive industry especially from Pitesti city, this specific sector managing to survive from the era of Soviet-style planning.

The next map provides a spatial representation of agglomeration patterns in food and beverages in 8 Romanian regions and in 3 Bulgarian regions from 1999 until 2007.
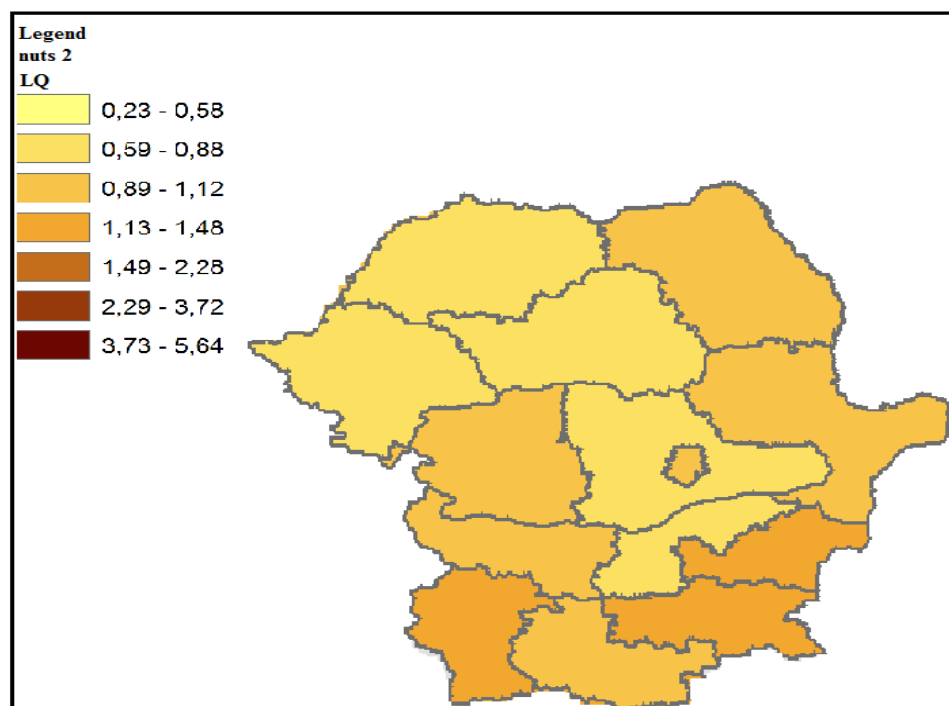

Figure 8. Spatial distribution of agglomerations in food and beverages industries between 1999-2007

Source: own calculations based on REGSTAT data set

Even though there are some missing data for Bulgaria, we can observe that this important sector registered a significant increase in the degree of labour force concentration in Severen tsentralen and Yuzhen tsentralen. By contrast, Romanian regions didn't follow the same agglomeration pattern, the central area and the South-East part of Romania being characterized by a lower degree of labour resources concentration.

In the following map, we can visualize the geographical representation of agglomeration patterns in construction industry in Romania and Bulgaria over 1999 to 2007.

Figure 9. Spatial distribution of agglomerations in construction industry between 1999-2007

Source: own calculations based on REGSTAT data set

This map presents a more or less uniform degree of agglomeration patterns of the construction industry in the regions of the two countries taken under consideration in the period under review. The only exceptions are 3 Bulgarian regions: Yugozapaden, Severoiztochen and Yugoiztochen. In contrast with all the rest regions, these 3 Bulgarian regions are characterized by a slightly higher degree of labour resources concentration.

5. Conclusions

In this paper we have attempted to explore the transformations occurred in the spatial industry agglomeration across the Eastern EU developing countries, paying special attention to lagging regions from two neighboring countries, namely Bulgaria and Romania. We have carried out more an explorative analysis which came up with interesting results. First of all, we found both similarities and particularities in the process of employment growth in the two above mentioned transition countries. During the 1990s the industrial sector has declined strongly in Bulgaria and Romania, while the service sector has grown in Bulgaria.

Nevertheless, Bulgaria and Romania have experienced a growing share of employment in agriculture. At a general level, these two developing countries have experienced a massive reallocation of production and the labor force during transition, which strongly affected the patterns of regional concentration of employment. In a further step we investigated the evolution of spatial agglomerations in terms of employment change across 14 regions from Bulgaria and Romania by closely looking at regional agglomeration patterns inside individual industries. Our results suggest that economic activities have become increasingly concentrated at regional level between 1999 and 2000. All in all, our outcome can be of special interest because it concerns situations from Eastern Europe that are substantially different from the common case-study material found in the current literature. Of course, much supplementary work is needed in order to provide more vigorous clarification of the questions raised.

6. Acknowledgement

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