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Regional Patterns of Deindustrialization and Prospects for Reindustrialization in South and Central East European Countries

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This study has been developed in the framework of research networks initiated and monitored by wiiw under the premises of the GDN–SEE partnership.

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Regional Patterns of Deindustrialization and Prospects for Reindustrialization in South and Central East European Countries

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Abstract

Past decades in Central and South East European countries have been characterised with shrinking of manufacturing output and employment. However, little is known about the causes, nature and the extent of deindustrialization in these countries at the regional level. The objective of this research is to explore the regional patterns of deindustrialization and determinants of reindustrialization in several CEECs and SEECs. Our analysis presents one of the first attempts to address these processes at regional level while taking into account the spatial effects. A spatial panel Durbin econometric technique is applied to data covering 2006 – 2012 period to discern inter – regional from intra – regional effects. Results of investigation reveal spatial clustering of economic activity. Traits of deindustrialization are observed in metropolitan areas and in regions on eastern belt of these countries while other regions reveal traits of shift towards high technology intensive manufacturing. Recommendations for future policy makers are provided.

Keywords: deindustrialization, reindustrialization, regions, spatial analysis

1. Introduction

Over past decades the economic landscape of many developed and developing countries was marked with decreasing manufacturing shares in the output and employment. The sources of deindustrialization in Central and South East Europe (CEECs and SEECs) lie in excessive pretransitional industrialization, economic and political disintegration and pursuit of inward and import oriented policies. Low intensity of enterprise restructuring and the late integration in international economic and political associations have further facilitated this process (Landesmann, 2005; Damiani and Uvalić, 2014; Bartlett, 2014; Bruno et al., 2014). Building on old Kaldorian (1978) arguments about the beneficial role of manufacturing in the aggregate growth recent economic turmoil has once again revived the interest in the topic of reindustrialization (Rodrik, 2006; Tregenna, 2011). Yet, the research on the processes of

deindustrialization and reindustrialization in CEECs and SEECs is rather scarce and descriptive in nature.

The objective of this paper is to explore a relatively unexplored niche in deindustrialization and reindustrialization literature, a role of regional factors. The research seeks to explore the existence and the extent of regional differences in industrial structure, the causes of deindustrialization and determinants of reindustrialization in SEECs and CEECs. There are several reasons ranging from institutional framework over market dynamics, the behaviour of firms and industries and localised vertical and horizontal linkages that can determine the regional growth potential and economic structure (Rodriguez-Pose, 1994; Bathelt and Kappes, 2008; Kunc et al., 2014; Popescu, 2014). The deindustrialization of SEECs and CEECs over past decades as well as importance of potential reindustrialization for their future growth make it worth to investigate the determinants behind the formation of spatio-functional relationships at regional level.

The investigation utilises the data on regions from several SEECs (Croatia, Serbia, Bosnia and Herzegovina and Bulgaria) and CEECs (Czech Republic, Slovak Republic, Slovenia, Hungary, Poland) in the period of advanced transition (2006-2012). The novelty of approach lies in the use of spatial Durbin panel model, a technique that enables examination of both within and between regional factors. The research also aims to explore the role of distance in generation of inter-regional processes. There has been no attempt to address processes of deindustrialization and reindustrialization at regional level using spatial econometric techniques. The rest of paper is structured as follows. Next two sections provide discussion about and the empirical analysis of the sources, nature and implications of deindustrialization. The model for investigation of the prospects of reindustrialization is developed in section four followed with discussion of methodology and the dataset in section five. The results of investigation are presented in section six. Section seven concludes.

2. Deindustrialization and reindustrialization

Over past decades substantial empirical evidence has been produced on the beneficial effect of manufacturing on the aggregate growth (Jasinowski, 1992; Wells and Thirlwall, 2003; Behesti and Sadighnia, 2006). For reasons such as economies of scale, extended scope for

learning optimal application of embodied knowledge and technologies within and outside of sector manufacturing is considered as the engine of technological progress (Cornwall, 1977; Fagerberg and Verspagen, 2002; Szirmai, 2009). Manufacturing fuels technological change in other sectors through backward and forward linkage effects. Yet, the share of manufacturing sector in both output and employment of many economies has been steadily decreasing. Explanations of this trend point to rising living standard and consequent change in demand patterns as well as reallocation of labour from manufacturing to services due to faster growth of productivity in the former sector (Kuznets, 1957; Chenery, 1961; Saeger, 1997; Rowthorn and Ramaswamy, 1997; Szirmai, 2009; Bogliaccini, 2013).

Commonly a distinction is made between two types of deindustrialization referred to as positive and negative deindustrialization (Rowthorn and Wells, 1987; Clavijo et al., 2014). Former refers to the downsizing of manufacturing employment due to reallocation of workers to service sector due to differences in productivity growth. In accordance with this view, deindustrialization is the natural outcome of successful economic development associated with rising living standards in advanced economies and influenced by productivity developments in the service sector (Rowthorn and Ramaswamy, 1997). Influence on economic fundaments may be important via an employment increase in the service sector and its influence on living standards in various countries, regardless of their level of development. The negative consequence of the deindustrialisation could be interpreted as a result of shocks to the system as a large appreciation in the real exchange rate, and promotion of structures which favour production for domestic market (Greenaway and Nam, 1998), as well as political and economic markets disintegration (Damiani and Uvalić, 2014).

Deindustrialization in developed countries is often associated with trade liberalization and greater openness of these economies (Saeger, 1997; Alderson, 1999; Rowthorn and Coutts, 2004). Loss of jobs, declining wages and the reallocation of workers from manufacturing to other sectors of economy are commonly explained with factor price equalization or reallocation of production to low – wage countries in search for quasi rents. Empirical literature does not unambiguously support such reasoning. While some authors suggest that trade liberalization and reallocation of manufacturing abroad accelerates shift towards services (Spilimbergo, 1998; Dasgupta and Singh, 2006; Bogliaccini, 2013) for others the deindustrialization can primarily be associated with faster growth of productivity in

manufacturing than in services and rising propensity to demand for services (Rowthorn and Ramaswamy, 1997; Kollmeyer, 2009).

Under neoclassical framework the exogenous change in relative factor endowments or any occurrence leading to the expansion of non – manufacturing sectors leads to shrinking and import substitution of manufacturing employment and output (Corden and Neary, 1982; Kucera and Milberg, 2003; Palma, 2005; 2008). Evidence from some of developing countries suggests that expansion of resource-intensive sectors has important role in the deindustrialization process (Clavijo et al., 2014). For new structural economics the structure of an economy is endogenous to its factor endowment structure. To this end, changes in economic structure reflect favouring of national institutional and policy environment towards technological upgrading in sectors compatible with its comparative advantage and initial endowment structure through downsizing of market distortions, the coordination of related investments across different firms in the same industries, the compensation of information externalities for the pioneer firms and the nurturing of new industries through foreign direct investment (Lin, 2009; Lin and Chang, 2009; Bruno et al., 2014).

Important feature of economic activity is its uneven spatial distribution. The reasons for such occurrence range from between and within industry externalities (Marshall, 1920; Jacobs, 1969) to historical idiosyncratic factors (Krugman, 1981; 1990). It seems that the diffusion of industry-specific information across the space occurs at slow pace and binds firms for the same location over time (Jaffe, Trajtenberg and Hendersohn, 1993). Similarly, inter-firm networking requires understanding of business culture and the way in which firms make interactions (Cooke and Morgan, 1993). Hence, the maturity of locational information network is important determinant for facilitating of inter-firm communications and information spillovers (Golley, 2002). Importance of historical factors also arises from legacy of industrial activities undertaken by firm which can be associated with better knowledge about supply sources, distribution networks and technology and thus can bind firms for specific location. Audretsch and Feldman (1996) note that spatial concentration of economic activity facilitates development of innovations while Szirmai (2009) suggests that spatial concentration of manufacturing offers sizeable opportunities for the accumulation of capital and thus aggregate growth.

The above reasoning has important implications for the understanding of the nature of deindustrialization process and its impact on regional development and growth. The decline of manufacturing sector in particular region inevitably leads to the disruption of existing supplier, distribution and information linkages. It also requires from all surviving firms in the production chain to engage in search for new information and clients. The rate of success in this process will determine the survival of remaining firms and development prospects of an entire region. At the same time, downsizing of supply on job market could lead to unemployment increase and can trigger migration trends. The consequence of this process is accelerating deindustrialization and regional growth slowdown. Evidence from regions in both Western Europe (Bathelt and Kappes, 2008) and CEECs and SEECs (Popescu, 2014) provide support to the above-described effects of deindustrialization.

Evidence from developing world suggests that deindustrialization in these countries occurs at much lower levels of per capita income than it was the case with contemporary developed economies (Dasgupta and Singh, 2006; McMillan and Rodrik, 2011; deVries et al., 2012; Rodrik, 2015). The inability of labour market in these countries to satisfy requirements of knowledge intensive service sector whose role in the dynamics of modern knowledge economies is provision of specific information for their clients and support in the development of innovation capabilities and outcomes leads to the movement from the manufacturing towards technologically stagnant and non-tradable low knowledge intensive sector (LKIS). The consequences of such structural change are slowdown in economic growth and in income convergence with the developed countries (Rodrik, 2015).

Similar to the other parts of world deindustrialization was an important feature of economic life in CEECs and SEECs over past two decades. Several authors note that primary drivers of deindustrialization in these countries range from excessive industrialization in pretransition period over economic and political disintegration, inward and import oriented policies, low intensity of enterprise restructuring to the late integration in regional, European and global economic and political associations (Greenaway and Nam, 1988; Landesmann, 2005; Damiani and Uvalić, 2014; Bartlett, 2014; Bruno et al., 2014). The process of deindustrialization in second decade of transition was largely driven with trade and capital flow liberalisation (Bartlett, 2014; Damiani and Uvalić, 2014). These processes have resulted in substitution of tradable output with non tradeable goods (Cerović et al., 2014) and have taken place in an environment absent of proactive industrial development policy that would

remedy market failures with respect to coordination, provision of information and compensation of externalities.

Due to democratic deficit and complexities of the political situation in Southeast Europe, the political and economic integration of the SEECs with the EU has been lagging behind the CEECs. It seems that the main implication of the SEECs' lagging behind CEECs in terms of integration to the EU is that, on average CEEC are more specialised in medium high and high technology industries. In large extent, the differences could be explained as a result of FDI from developed European countries in CEECs in the period from 90s onwards (Damijan et al. 2013). Moreover, during 2000s, many CEECs have reversed the trend of deindustrialisation and demonstrated signs of reindustrialization, by specializing in more technology intensive sectors (Landesmann, 2005). At the same time the contraction of manufacturing in SEECs continued albeit with few exceptions such as Bosnia and Herzegovina and Albania. Explanations of these negative processes for SEE countries range from inherited industrial policy from 1980s and the oversized industrial sector, as well as the dissolution of ex-Yugoslavia and the delayed EU integration (Damiani and Uvalić, 2014).

Overall, existing body of knowledge on deindustrialization has pointed to number of factors behind this process. However, it needs to be highlighted that it suffers from a number of shortcomings. First, the prevalent approach of many studies to causes of deindustrialization is to focus on its individual determinants instead of their joint assessment in a comprehensive framework. As noted by Kollmeyer (2009) such approach could lead to omitted variable bias and inaccurate parameter estimates. Secondly, existing studies in general do not pay attention to historical perspective of industrial development. Third, there is limited body of research on the role of regional factors in deindustrialization, particularly when it comes to the assessment of intra-regional and inter-regional effects. Finally, existing information on the processes of deindustrialization in CEECs and SEECs is relatively modest and mostly descriptive in nature. There have been no, to the best of our knowledge, attempts to assess regional dimension of deindustrialization in these two groups of countries while controlling for spatial effects of industrial development. The rest of paper attempts to fill this gap.

3. Regional patterns of deindustrialization in CEECs and SEECs

Before transition the economic landscape of CEECs and SEECs was characterised with an exceptionally high share of industry compared to market economies at the similar level of economic development. The regime switch during 1990s triggered shrinking of manufacturing and in some countries, particularly CEECs, a growth of service sector. An important distinction of this process from similar ones in mature market economies is accompanying disintegration of economic structure including disruption of production links, destruction of trading relationships, a fall in investment all of which took place in the midst of institutional transformation. By 2000s in many CEECs these trends were reversed but the decline of manufacturing in SEECs continued (Landesmann, 2005; Damiani and Uvalić, 2014).

While the nature of deindustrialization processes during 1990s in CEECs and SEECs is largely documented little is known about more recent developments in the second decade of transition. This is particularly true for regional patterns of deindustrialization and reindustrialization. Bearing in mind that by the second decade of transition major institutional reforms in majority of these countries were completed and market mechanisms were in place it is reasonable to expect that industrial development is driven with different set of factors than those in place at the onset of transition. These include changes in productivity, overall competitiveness of sector and the performance of an entire economy. Following Tregenna (2011), regional share of manufacturing employment in total employment can be decomposed in the following way:

Let σ_{ijt} be the share of sector *i* from region *j* in the period *t* in total employment of given region and $L_{ijt,}$ the level of employment in sector *i* of region *j* in the period *t*. From there an identity can be formulated $L_{ijt}=\varphi_{ijt}Q_{ijt}$ where Q_{ijt} is sector *I*'s value added and φ_{ijt} is labour intensity of that sector, measured as L_{ijt}/Q_{ijt}. In addition, let term $\theta_{jt} = Q_{jt}/L_{jt}$,be labour productivity of region *j* in period *t* and δ_{ijt} is the share of sector *i* in total value added in region *j* in the period *t* defined as Q_{ijt}/Q_{jt}. The above expressions enable construction of an identity expressing the share of manufacturing employment in total regional employment as a product of the labour – intensity of manufacturing, the share of manufacturing in total value added and aggregate economy – wide labour productivity:

$$\sigma_{ijt} \equiv \frac{L_{ijt}}{L_{jt}} \equiv \phi_{ijt}\delta_{ijt}\theta_{jt} \quad (1)$$

where all terms are defined as previously. The above identity can be decomposed in three components associated with changes in the manufacturing labour-intensity, share of manufacturing in total value added and economy wide labour productivity:

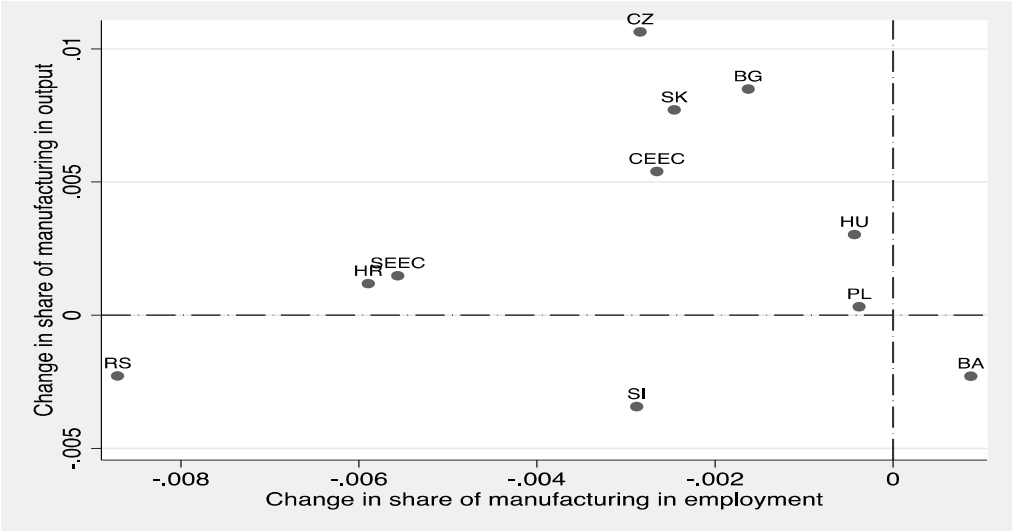
$$\Delta\sigma_{ijt} = \frac{1}{6}\left(\phi_{ijt} - \phi_{ijt-n}\right)\left\{\left(\delta_{ijt-n}\theta_{jt-n} + \delta_{ijt}\theta_{jt}\right) + \left(\theta_{jt-n} + \theta_{jt}\right)\left(\delta_{ijt-n} + \delta_{ijt}\right)\right\} + \frac{1}{6}\left(\delta_{ijt} - \delta_{ijt-n}\right)\left\{\left(\phi_{ijt-n}\theta_{jt-n} + \phi_{ijt}\theta_{jt}\right) + \left(\theta_{jt-n} + \theta_{jt}\right)\left(\phi_{ijt-n} + \phi_{ijt}\right)\right\} + \frac{1}{6}\left(\theta_{ijt} - \theta_{ijt-n}\right)\left\{\left(\phi_{ijt-n}\delta_{jt-n} + \phi_{ijt}\delta_{jt}\right) + \left(\delta_{jt-n} + \delta_{jt}\right)\left(\phi_{ijt-n} + \phi_{ijt}\right)\right\} \quad (2)$$

The component $\frac{1}{6}\left(\phi_{ijt} - \phi_{ijt-n}\right)\left\{\left(\delta_{ijt-n}\theta_{jt-n} + \delta_{ijt}\theta_{jt}\right) + \left(\theta_{jt-n} + \theta_{jt}\right)\left(\delta_{ijt-n} + \delta_{ijt}\right)\right\}$ in equation (2) measures the labour-intensity effect of changes in the sector employment. $\frac{1}{6}\left(\delta_{ijt} - \delta_{ijt-n}\right)\left\{\left(\phi_{ijt-n}\theta_{jt-n} + \phi_{ijt}\theta_{jt}\right) + \left(\theta_{jt-n} + \theta_{jt}\right)\left(\phi_{ijt-n} + \phi_{ijt}\right)\right\}$ measures the contribution of changes in the share of sector in total value added of region to changes in the share of sector in total employment. Finally, the aggregate labour-productivity effect $\frac{1}{6}\left(\theta_{ijt} - \theta_{ijt-n}\right)\left\{\left(\phi_{ijt-n}\delta_{jt-n} + \phi_{ijt}\delta_{jt}\right) + \left(\delta_{jt-n} + \delta_{jt}\right)\left(\phi_{ijt-n} + \phi_{ijt}\right)\right\}$ is a residual in equation that will measure the contribution of changes in aggregate labour productivity to changes in the share of sector in total regional employment.

Based on the above three components, conclusions can be reached about the causes of deindustrialization (or industrialization) in analysed regions. The decline of manufacturing employment share associated with the labour intensity effect can be understood as a signal that sector as whole is not in decline but the problem is associated with its labour absorbing capacity. The loss of employment driven by sector effect (2nd term) may be interpreted as an evidence that causes of deindustrialization are in lack of sector's dynamism or its competitiveness. Finally, the third element signals whether the decreasing share of employment in the manufacturing sector is related to the worsening performance of an entire regional economy. The sum of three components adds to the change in share of manufacturing employment in total employment of region. Hence, the relative (in percentages) contribution of each of these components to the overall change in share of manufacturing employment can signal the causes behind deindustrialization in analysed countries.

In order to assess the causes of changes in regional manufacturing employment a data from pan-European firm level database on 197 regions from five CEECs (Czech Republic, Slovenia, Slovakia, Hungary, Poland) and four SEECs (Croatia, Serbia, Bosnia-Herzegovina and Bulgaria) is used for 2006-2012 period, the most recent years for which data was available. Recent review of European firm level datasets by the European Central Bank (2014) defines Amadeus as the closest proxy to pan-European firm level dataset and considers it as the most adequate firm level database in European countries at the present time. The analysis covers all major sectors of economic activity where firms are considered as active if at least one observation of revenues is available over the observed time period. The sample size varies over years from 334525 firms in 2006 to 394762 firms in 2012.

Figure 1: Changes in the share of manufacturing in output and employment 2006-2012



Source: Authors' calculations

Starting point of analysis is the inspection of changes in the share of manufacturing in both output and employment of analysed countries. Figure 1 presents average values of both trends. For expositional convenience it is divided in four quadrants. Starting with upper left quadrant it is evident that in majority of countries belonging to CEECs over analysed period there has been an increase in the share of manufacturing in total output that was accompanied with a decline in the share of manufacturing in employment. This group also includes two SEE countries, Croatia and Bulgaria. Figure 1 also includes aggregate data for CEEC and SEEC groups of countries. When observed as a whole, both groups of countries were characterised with rise in output share of manufacturing and declining share of manufacturing

employment. However, the decline of manufacturing share in employment and the rise of output share have been much weaker in SEEC group.

The above pattern can be understood as a signal of a positive deindustrialization where improvements in labour efficiency are accompanied with increasing output of manufacturing. However, it may also signal a shift towards more technology intensive sectors of manufacturing. The lower left quadrant refers to countries that have experienced a decline in both the share of manufacturing in output and in the employment. This trend is particularly emphasised in Serbia and to a lesser extent in Slovenia. Finally, the exception from an entire group is Bosnia and Herzegovina where reported findings suggest a decline in the share of manufacturing in output but an increase in the employment, a signal of a rise in inefficiency of manufacturing sector.

Table 1: Decomposition of changes in the manufacturing share of employment 2006-2012 (national average)

Country	Labour intensity effect	Sector share effect	Aggregate productivity effect	Total
Bosnia Herzegovina	820	-381	-339	100
Bulgaria	-1498	569	829	-100
Czech Republic	-1196	391	705	-100
Croatia	-137	19	18	-100
Hungary	-2024	758	1166	-100
Poland	567	144	-811	-100
Serbia	-360	-36	296	-100
Slovenia	-317	-148	365	-100
Slovak Republic	-903	293	510	-100
SEEC	-846	180	566	-100
CEEC	-339	27	211	-100

Source: Authors' calculations

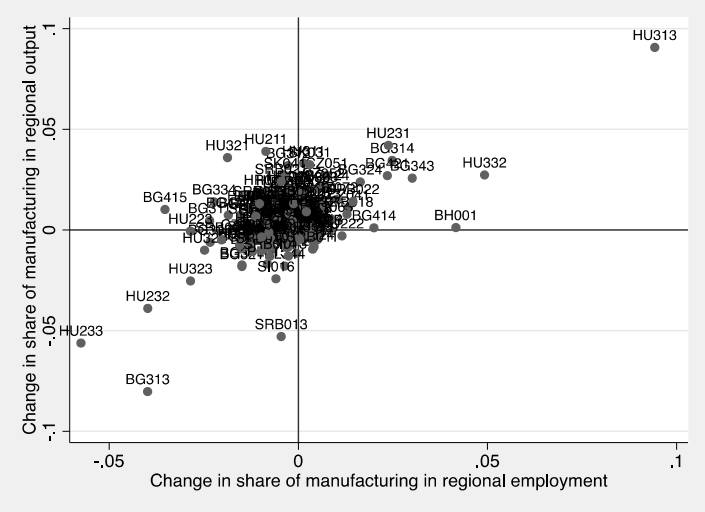
Should sources of above findings be looked for in changes of labour intensity of manufacturing, shift in sectoral dynamism or overall productivity growth or decline? To answer this question, a previously described decomposition of changes in manufacturing share of total employment is presented in Table 1. Reported numbers refer to percentage contribution their sum being equal to 100% of observed change in the employment share. The aggregate data for groups of CEECs and SEECs demonstrate that in both groups of countries the strongest impulse to the decline in manufacturing employment share has come from changes in the labour intensity effect. As said earlier, rising labour productivity reduces demand for manpower and thus leads to a decline in manufacturing employment.

A cross-country analysis reveals heterogeneous picture. Starting with Bosnia-Herzegovina, it is evident that an increase in the share of manufacturing employment has come from a rise in the labour-intensity of manufacturing. Furthermore, these two effects are complemented with the declining dynamism of manufacturing sector and a decline in total productivity of an economy, a pattern suggesting erosion of competitiveness. In Croatia and Bulgaria, two most advanced SEECs the primary source of declining manufacturing employment seems to be declining labour-intensity of manufacturing. At the same time, improvements in the sector share and aggregate productivity growth can be observed. Finally, the origins of a negative manufacturing employment trend in Serbia are in declining labour intensity and sectoral dynamism of manufacturing sector which are not offset with improvements in an overall productivity of economy. The analysis of CEECs reveals similar picture. In all countries declining labour intensity of manufacturing is accompanied with an increase in the sectoral dynamism and aggregate productivity of an economy. The exceptions from this pattern exist in Slovenia and Poland. While in former signals can be detected of declining competitiveness of manufacturing sector (sector share effect), in latter a rise in labour intensity and sectoral dynamism are observed but these effects are offset by declining aggregate productivity.

Four divergent patterns can be distinguished from above. Countries like Czech Republic, Bulgaria, Croatia, Hungary and Slovak Republic might be going through restructuring towards more technologically intensive sectors of manufacturing. Such finding, consistent with evidence from earlier literature suggests that these countries are much closer to restructuring than to classical notion of deindustrialization. In Serbia and Slovenia evidence suggest declining competitiveness of manufacturing sector consistent with the classical notion of deindustrialization. Finally, in Poland, a decline in overall productivity of economy may be at place while findings for Bosnia suggest both declining competitiveness of manufacturing and economy as well as shift towards more labour intensive activities. A question that arises is whether all regions of analysed countries have been characterised with the same pattern of industrial development. Proximity to state border, inflow of foreign capital and associated transfer of skills and knowledge, degree of urbanization and related agglomeration externalities are only some of reasons why it can be expected that the

manufacturing employment and output exhibit divergent path across regions. For this reason, the above analysis is undertaken at the level of NUTS3 regions within analysed countries[1].

Figure 2: Changes in the regional share of manufacturing in output and employment 2006-2012



Source: Authors' calculations

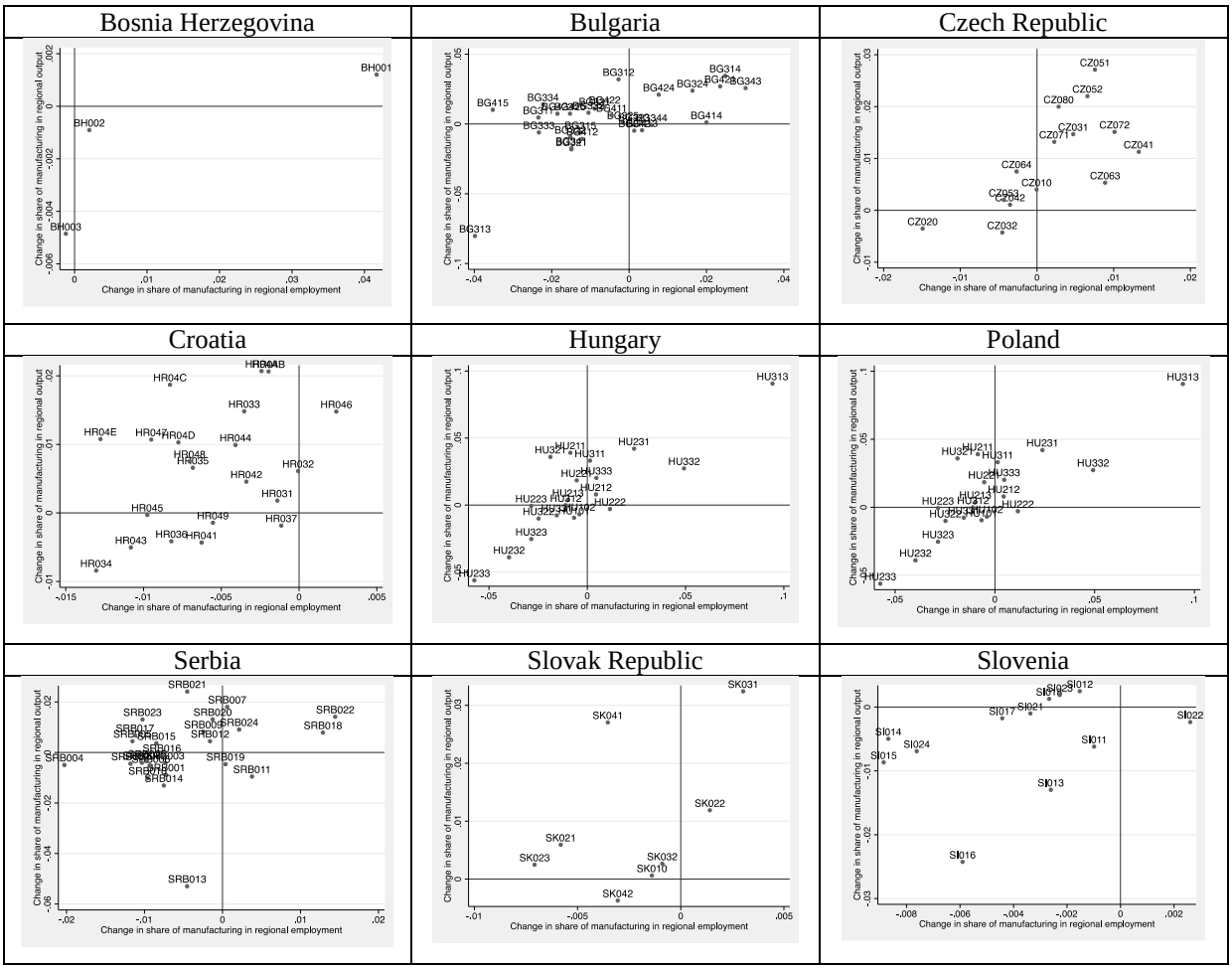
Figure 2 brings together changes in the regional share of manufacturing output and employment of 197 regions included in analysis for 2006-2012 period. Particularly interesting are findings for several regions located in the lower left and upper right corner. Former are regions exhibiting signs of deindustrialization, i.e. decline in both manufacturing output and employment while latter set of regions are characterised with an increase in both output and employment in industry, a sign of eroding efficiency or shift towards labour-intensive industries. The deindustrialization processes are particularly emphasised in one Bulgarian region bordering with Romania and three Hungarian regions bordering with Croatia and Ukraine. With respect to the second group of regions, evidence suggests again that eastern bordering regions of Hungary are characterised with declining competitiveness of manufacturing sector.

Figure 3 provides more detailed assessment dividing regions across countries. Starting with Bosnia-Herzegovina it is evident that its three administrative units follow different paths of industrial development. In CEECs there is evidence of deindustrialization taking place in and around metropolitan areas. The exception from this are only Czech Republic and Slovakia

[1] In the case of Bosnia – Herzegovina administrative division does not correspond with NUTS classification and analysis makes distinction between two country's entities and the district of Brcko.

where majority of regions demonstrate signs of reindustrialization with rise in manufacturing output share in some cases accompanied with rise in manufacturing employment. Further interesting finding is that regions on far east of these countries, mostly bordering Ukraine, Belarus or Romania are also hit by deindustrialization. A likely explanation is that inflow of FDI, responsible for industrial development of these countries throughout much of last two decades has targeted regions closer to the West European member states.

Figure 3: Changes in the regional share of manufacturing in output and employment 2006-2012 (country data)



Source: Authors' calculations

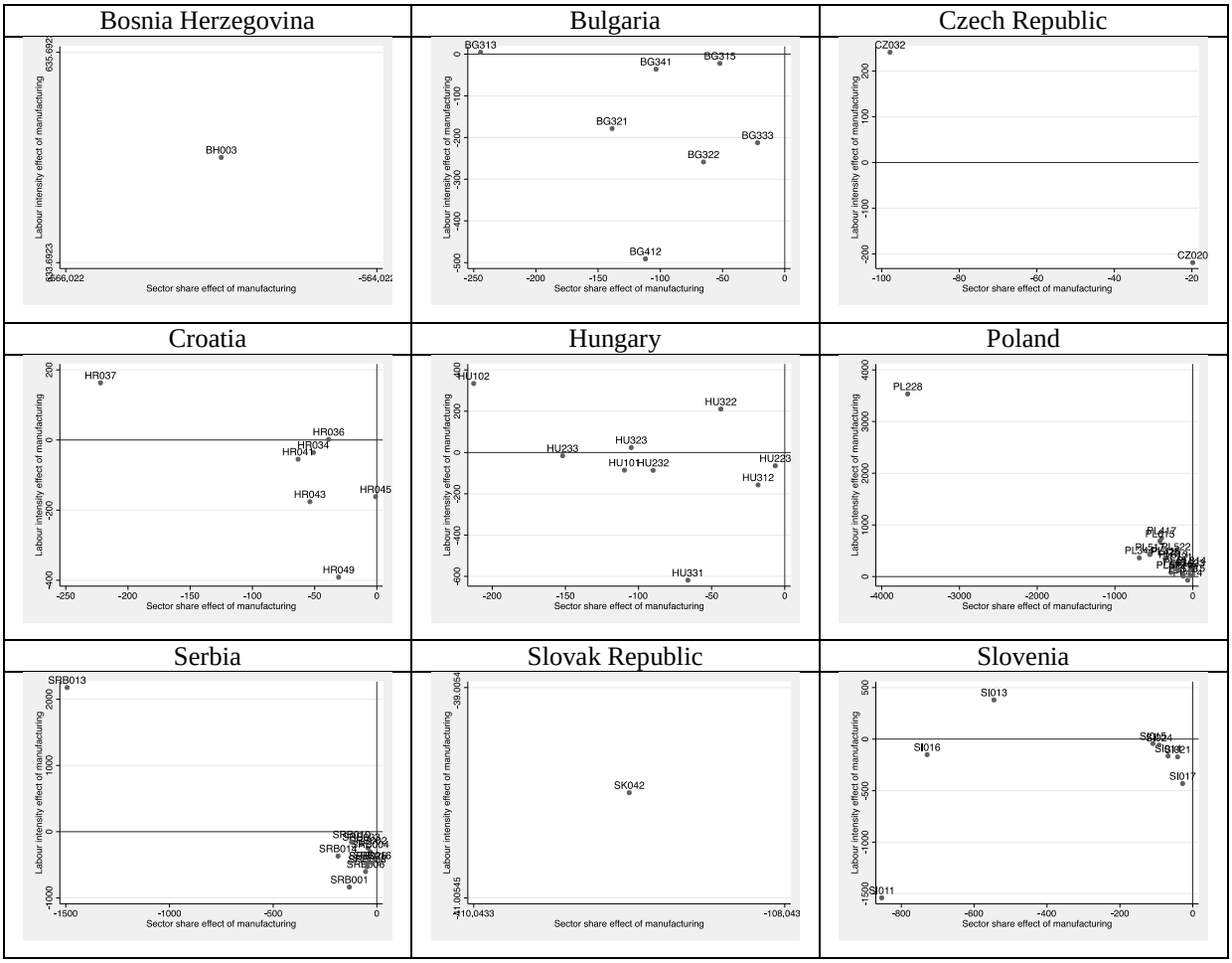
Evidence from remaining three SEECs offer somewhat different story although traits of deindustrialization are also evident in metropolitan areas of these countries and in their surrounding. In Croatia in addition to capital, coastal regions traditionally inclined to tourism are characterised with decline in both manufacturing output and employment. In Serbia, however, signs of deindustrialization can be observed in addition to main metropolitan areas in some of its eastern regions that were known in pretransition period as centers of heavy

industry. A likely reason behind such findings is stagnation and declining competitiveness of industrial producers from these regions. Finally, most of deindustrializing regions in Bulgaria are located in central west area bordering Romania and in eastern coastal regions.

As in previous cases, the search for causes of industrial development pattern in analysed regions is based on the decomposition of changes in the share of manufacturing employment on labour intensity, sector share and aggregate productivity effect. The horizontal axis measures sectoral share effect while the labour intensity effect is depicted on the vertical axis. The weakness of presentation is the lack of third dimension, aggregate productivity effect. For the expositional convenience regions are divided in four groups. In regions that exhibit traits of deindustrialization both output and employment manufacturing shares are falling. Second group comprises restructuring regions where manufacturing output increases but employment is falling. Third group comprises regions with rising labour intensity of manufacturing where both output and employment shares are growing. Finally, fall in efficiency of manufacturing occurs in regions with decline in manufacturing output but growing manufacturing employment share.

Decomposition of changes in employment for the first group of regions is provided in Figure 4. Important thing to note is that in majority of these regions both manufacturing and sector share effects are negative which may signal declining labour intensity accompanied with the loss of sectoral competitiveness. Such pattern is typical for industries going through restructuring towards more technology intensive products but it also may signal deindustrialization. As movement from one segment of the market to another requires certain period of adjustment, a short run loss of competitiveness can be expected. In few of these regions negative sectoral effect is accompanied with rise in labour intensity suggesting that the decline of manufacturing is also related to decline in aggregate productivity.

Figure 4: Changes in the regional share of manufacturing in output and employment 2006-2012 (country data) – regions with declining output and employment shares

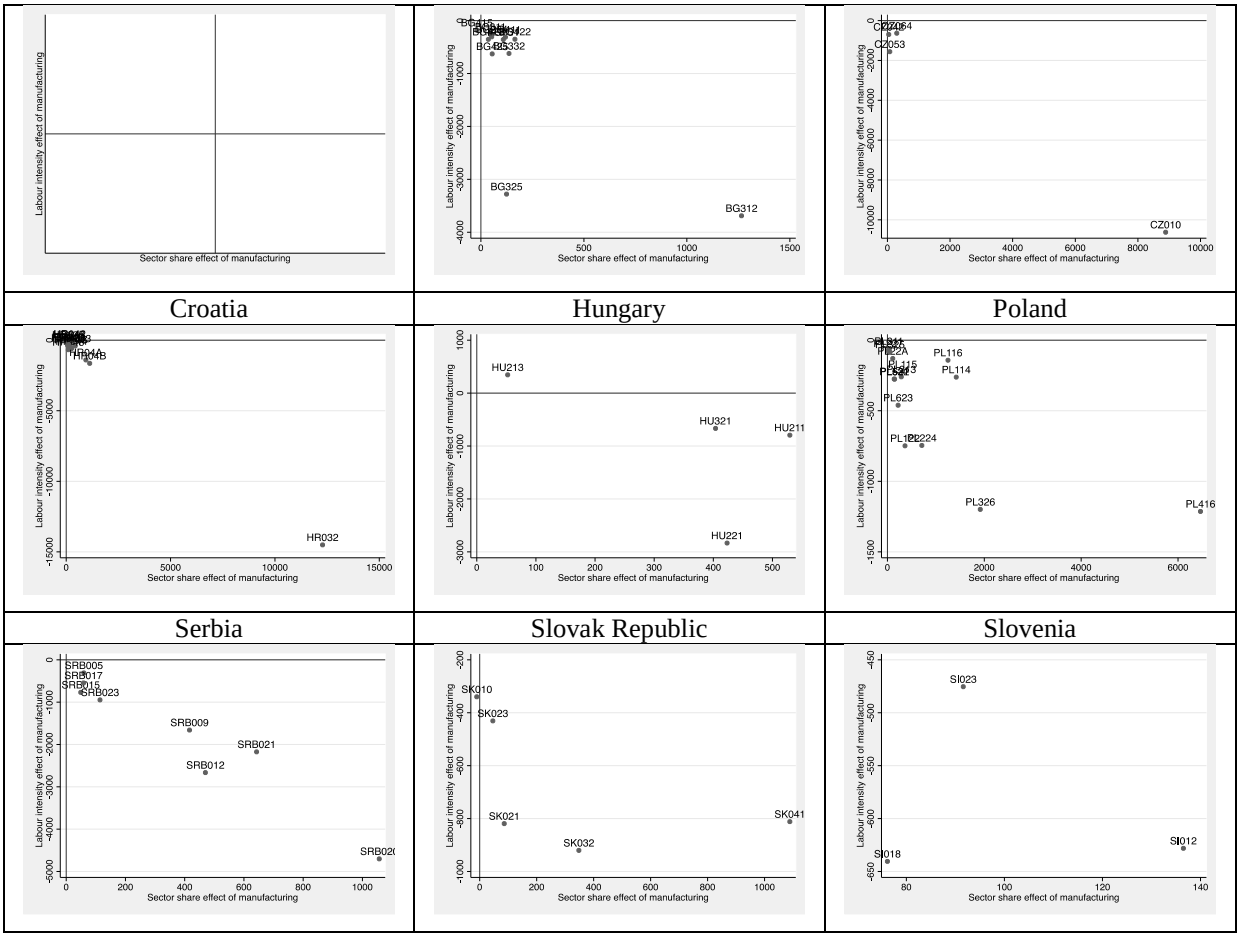


Source: Authors' calculations

The decomposition of employment changes in restructuring regions (Figure 5) reveals different story from the one above. In all regions within this group a positive contribution of sectoral share effect can be observed which signals that the part of rising employment can be attributed to improvement in regional industrial competitiveness. Another interesting finding is the negative contribution of labour effect. As noted previously, improvements in the efficiency of industry as well as shift towards less labour intensive segments of manufacturing can be associated with such finding. Thus the story that emerges from this group is that the improvements in sectoral competitiveness together with the declining labour-intensity, a pattern observed by earlier studies on CEECs are key drivers in reindustrialization of these regions.

Figure 5: Changes in the regional share of manufacturing in output and employment 2006-2012 (country data) – regions with increasing output and declining employment shares

Bosnia Herzegovina	Bulgaria	Czech Republic



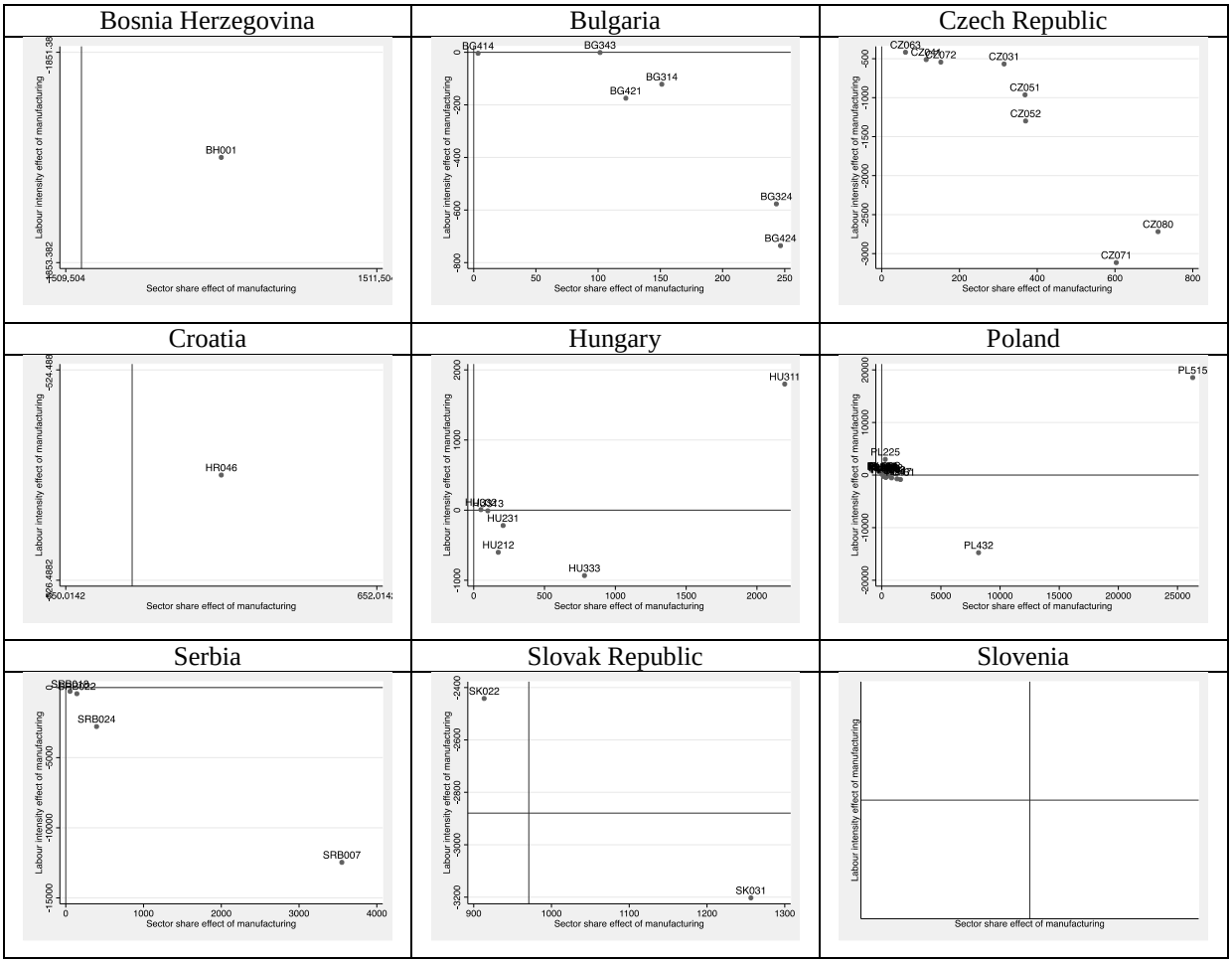
Croatia | Hungary | Poland

Serbia | Slovak Republic | Slovenia

Source: Authors' calculations

Third group of regions encompasses those characterised with an increase in both output and employment shares. The factors behind such pattern differ across countries. On the one hand in Czech Republic, Croatia, Serbia, Bosnia Herzegovina as well as among some Bulgarian, Polish and Slovak regions declining labour intensity of manufacturing is accompanied with positive sectoral effect similar to earlier group of regions. This signals that the source of rise in manufacturing employment is not in shift towards labour intensive activities but rather in improvement of sectoral competitiveness and possibly productivity of an entire region. Hence, it can be argued that industries from these regions due to high growth employ additional workforce that leads to positive trends in both output and employment. However, there are also several regions in which positive sectoral effect comes along with the rise in labour intensity effect. This is particularly true for Polish and Serbian regions belonging to this group. Accordingly in case of such regions one can speak about shift towards more labour intensive activities.

Figure 6: Changes in the regional share of manufacturing in output and employment 2006-2012 (country data) – regions with increasing output and employment shares

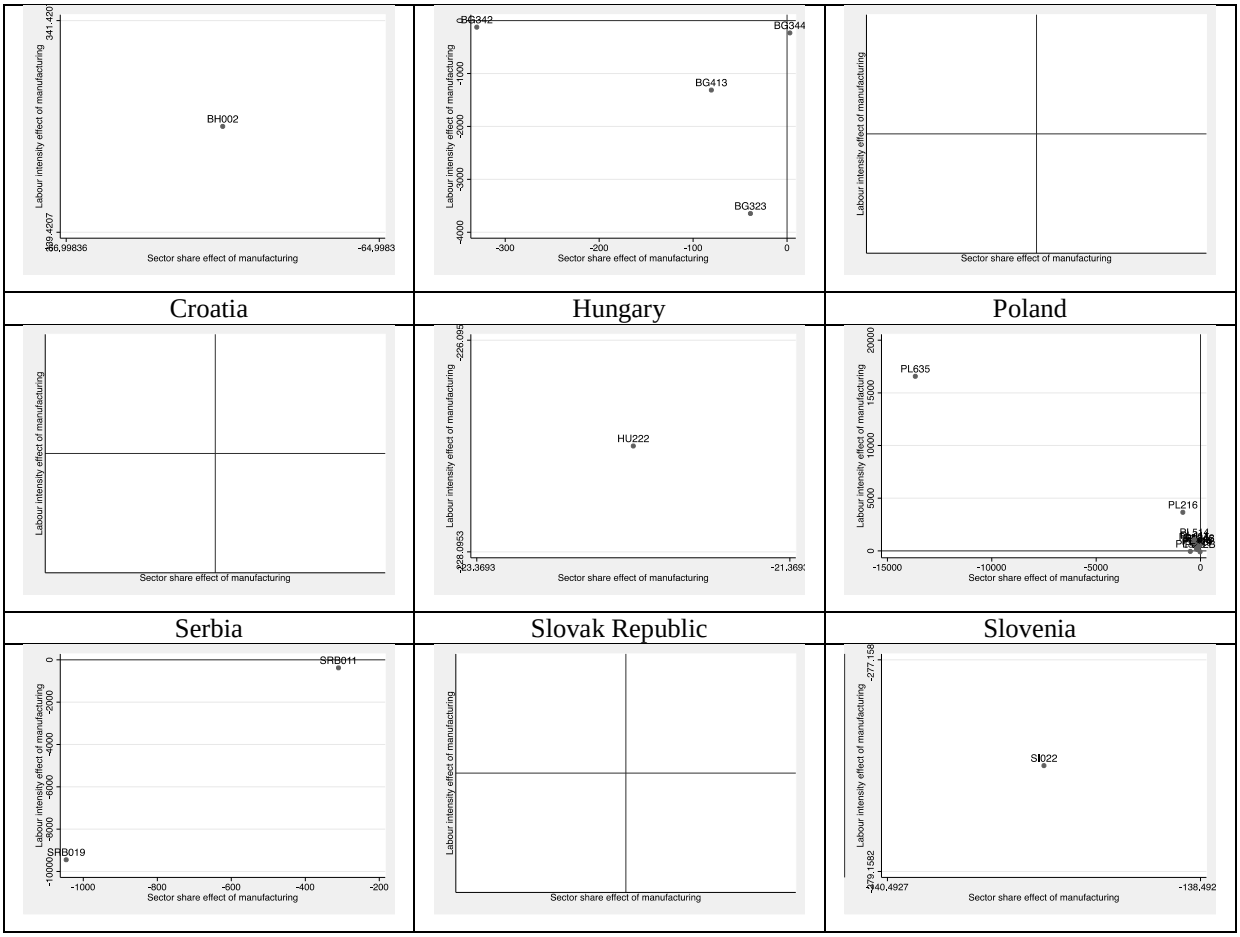


Source: Authors' calculations

The last group of regions includes those whose manufacturing output is declining but employment exhibits an upward trend. Such regions are found only in few countries as it can be seen from Figure 7. In all countries except Poland regions in this group are characterised with declining labour intensity and declining sectoral dynamism. However, in Poland declining sectoral competitiveness is accompanied with an increase in labour intensity of manufacturing.

Figure 7: Changes in the regional share of manufacturing in output and employment 2006-2012 (country data) – regions with decreasing output and rising employment shares

Bosnia Herzegovina	Bulgaria	Czech Republic



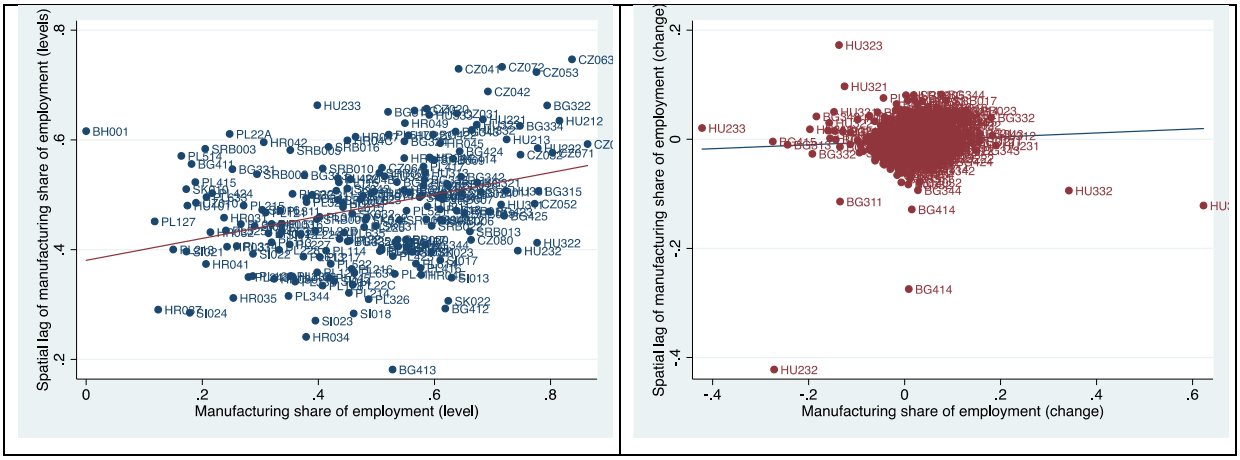
Source: Authors' calculations

Looking at above findings several stylised facts emerge. First, in all analysed countries signs of deindustrialization can be observed. Deindustrializing regions are mainly metropolitan areas and their surrounding as well as eastern bordering regions. This signals spatial pattern in distribution of economic activities. The sources of particular development paths pursuit by different regions can be looked for in changes of labour intensity, sectoral competitiveness and changes in overall regional performance. Analysis of this section suggests that successful, reindustrializing regions perform the way they do mainly due to improvements in sectoral competitiveness and aggregate productivity although in some cases these regions also experience a rise in manufacturing employment. On the other hand, deindustrialization seems to be related primarily to the declining competitiveness of manufacturing. In some cases this is accompanied with declining labour intensity of sector suggesting that the process of restructuring is underway towards less labour intensive activities which requires adjustment in short run. However, above mentioned are only some of factors responsible for the deindustrialization. For this reason next section brings together number of other factors trying to answer how can reindustrialization of SEEC and CEEC regions be encouraged.

4. Prospects for reindustrialization in SEECs and CEECs.

Bearing in mind findings from previous section, this part of research will examine the determinants of changes in the regional share of manufacturing employment. The modelling approach presents advancement over existing research on industrial development in CEECs and SEECs by taking into account inter-regional spatial correlation. Rising productivity of some regions may trigger inter – regional migration of workers while regional level of development, enterprise governance models, industrial structure and agglomeration externalities generate centrifugal and centripetal spatial forces. The extent and influence of these factors on other regions depends on industrial structure of those regions as well. To this end, one can expect spatial effects when it comes to changes in regional industrial share. Moran scatterplot of changes in regional share of manufacturing employment (Anselin, 1996; 2011; Nicolini and Resmini, 2011) points to positive spatial correlation and polarization of regions with low and high levels of manufacturing employment being clustered on the opposite sides of the spectrum.

Figure 8: Moran I scatterplot of levels and changes in employment share of manufacturing 2006-2012



Source: Authors' calculations

In order to further explore the existence of spatial effects of reindustrialization and also to establish which regional characteristics contribute to this process, an econometric model is developed taking form

$$\sigma_{ijt} = c_0 + \rho \sum_{k=1}^{n} w_{jk}\sigma_{kt} + \beta_1 \text{output share}_{it} + \beta_2 FDI_{it} + \beta_3 \text{urbanization}_{it} + \beta_4 \text{localization}_{it} + \beta_5 \text{high tech share}_{it} + \beta_6 \text{kis share}_{it} + \theta_1 \sum_{k=1}^{n} w_{jk} \text{output share}_{jt} +$$

$$\theta_2 \sum_{k=1}^{n} w_{jk} FDI_{jt} + \theta_3 \sum_{k=1}^{n} w_{jk} urbanization_{jt} + \theta_4 \sum_{k=1}^{n} w_{jk} localization_{jt} +$$
$$\theta_5 \sum_{k=1}^{n} w_{jk} high\ tech\ share_{jt} + \theta_6 \sum_{k=1}^{n} w_{jk} kis\ share_{jt} + \beta_7 SEEC_{rt} + \beta_8 ipr_{rt} + \beta_9 buss_{rt} +$$
$$\beta_{10} inv_{rt} + \beta_{11} corup_{rt} + \lambda \sum_{k=1}^{n} \varepsilon_{kt} + u_{it} \qquad (3)$$

where the dependent variable is relative index of deindustrialization (or reindustrialization) defined as the ratio between regional and national shares of manufacturing employment in total employment of region/country. An increase in this variable suggests that increase in regional employment occurs faster than for a nation as a whole or that a share of manufacturing employment in given region is declining at slower rate than the manufacturing of entire country.

Right hand side of equation includes relative index of manufacturing output defined as quotient between regional and national shares of manufacturing in total output. Previous section suggests that understanding of reindustrialization process cannot rely solely on the employment analysis. The negative sign of this variable would signal reducing labour intensity of manufacturing and sectoral shift towards more technology intensive industries previously defined as positive deindustrialization process. Analogously, a positive sign could be interpreted as an evidence of rising labour-intensity of manufacturing. Model also includes variable defined as a share of foreign ownership within region. Foreign ownership can be associated with higher intensity of competition and increased transfer of skills and knowledge. In transition economies FDI was associated with enterprise restructuring, rising productivity and better competitiveness of firms. Regions with stronger concentration of FDI can be expected to exhibit efficiency improvements and shift towards technology intensive sectors all of which will reduce the need for manufacturing employment.

The spillovers from intersectoral diversity of agglomeration such as sharing of basic assets, information, resources and institutions (Malmberg et al., 2000; Stojcic et al., 2013) as well as industry-specific learning and innovation, the introduction of new technology through contact with early adapters or benefits of information flows about market conditions are controlled for with two variables. Urbanisation economies is measured as the ratio between number of firms in region and total number of firms in country in given year while localisation economies refers to intra – regional ratio between firms from specific industry and all manufacturing firms. Previous sections suggest that manufacturing employment will be

determined with an overall economic structure of region. To this end, the role of technology intensive sectors is particularly important.

A shift towards more technology intensive manufacturing sectors exerts downward pressure on the demand for low skilled workforce and generates demand for skilled workers. The overall effect of the two will depend on the alignment between regional labour structure and the needs of labour market. To control for these effects model includes two variables measuring the share of high tech manufacturing and knowledge intensive services in the region. The quality of institutional environment is measured with indicators of business freedom, protection of intellectual property rights, investment freedom and freedom from corruption taken from Heritage foundation. The model also includes dummy variable controlling for SEECs regions and a set of annual time dummies to control for cross-sectional shocks. All noncategorical variables taking positive values enter model in logarithm form.

The estimation is undertaken with spatial Durbin panel econometric technique that allows for the spatial effects of dependent variable, independent variables and error term. The coefficients $\theta_1 - \theta_5$ refer to spatial lags of explanatory variables while coefficient ρ measures the impact of spatial lag in dependent variable of given region. For the purpose of this analysis two alternative specifications of row standardized spatial weight matrix (W) that defines position of cross – sectional units in space are employed, "neighbourhood" matrix where spatial correlation is limited only on neighbouring regions and w_{ij} takes value of 1 if regions *i* and *j* are neighbours and 0 otherwise and another one where full spatial correlation is allowed and the w_{ij} is defined as inverse distance between regional centres (Anselin, 1999; Le Sage, 1998; 1999; Baltagi et al., 2007; Olejnik, 2008).

Prior to estimation, model diagnostics (Table 2) should be addressed. In both specifications, reported values of coefficient ρ lie within acceptable range suggesting that the dependent variable follows spatially integrated process SI(0). LR tests demonstrate that null hypotheses of spatially lagged dependent variable and spatial lags of regressors being equal to zero should be rejected with very high probability. Hence, spatial estimation techniques should be preferred over conventional econometric analysis (Elhorts, 2013; Shehata and Mickaiel, 2014). Analysis of conventional and robust LM tests (Burridge, 1980; Anselin, 1988) indicates that spatial Durbin model should be given preference when LM tests for the both

spatial lag and spatial error are significant or the conventional LR tests and robust LM tests point to different models (Elhorst, 2010; Shehata and Mickaiel, 2014).

Table 2: Model diagnostics

Specification	1	2
Spatial weights matrix	Binary	Inverse distance
Number of observations	1379	1379
Number of units (regions)	197	197
Log likelihood function	829.80	836.17
Wald test	41749***	40974***
LR TEST SDM vs. OLS H_0: $(\rho = 0)$	39.29***	18.76***
LR TEST H_0: $(wX's = 0)$	83.21***	79.17***
ρ	0.20***	0.56***
Acceptable range for ρ	-1.06< ρ<1.00	-2.64< ρ<1.00
Spatial Error Autocorrelation Tests H_0: (no spatial error autocorrelation)		
Global Moran MI	-0.03*	0.02***
Global Geary GC	1.18**	0.98
Global Getis-Ords GO	0.02*	-0.02***
Moran MI Error Test	-2.90***	8.40***
LM Error (Burridge)	2.13***	18.66***
LM Error (Robust)	5.86**	604.34***
Spatial Lagged Dependent Variable Tests H_0: (no spatial autocorrelation)		
LM Lag (Anselin)	7.16***	31.26***
Lm Lag (Robust)	5.17**	616.94***
General Spatial Autocorrelation Tests H_0: (no general spatial autocorrelation)		
LM SAC (LMErr+LMLag_R)	7.29**	635.60***
LM SAC (LMLag+LMErr_R)	7.29**	635.60***

*Note: ***,** and * denote statistical significance at 1%, 5% and 10% level of significance respectively*
Source: Authors calculations

Common procedure suggests that spatial Durbin model should be given preference when LM tests for both spatial lag and spatial error are significant or the conventional LR tests and robust LM tests point to different models (Elhorst, 2010; Shehata and Mickaiel, 2014). Following above described procedure it is evident that all model diagnostics support the choice of spatial Durbin model over other spatial estimators. Overall, these diagnostics indicate robustness of selected models and allow us to proceed with interpretation of results.

Table 3: Results of estimation

Specification	(1)	(2)
Spatial weights matrix	Binary	Inverse

		distance
Variable		
Spatial lag of dependent variable ln (*empshare*)	0.20***	0.56***
Output share ln (*output share*)	0.36***	0.37***
Urbanisation economies ln (*urbanisation*)	-0.04***	-0.03***
Localisation economies ln (*localisation*)	-0.01	-0.01
Foreign direct investment (*fdi)*	-0.01	-0.17***
High tech manufacturing share (*htech share*)	0.25***	0.27***
Knowledge intensive services share (*kis share*)	-0.82**	-0.76***
Output share – spatial lag ln (*woutput share*)	0.003	0.30**
Urbanization economies – spatial lag ln (*wurbanisation*)	0.03***	-0.01
Localization economies – spatial lag ln (*wlocalisation*)	0.04**	0.39***
Foreign direct investment – spatial lag (*wfdi*)	-0.09	1.81***
High tech manufacturing share – spatial lag (*whtech share*)	-0.10	0.35
Knowledge intensive services share – spatial lag (*wkis share*)	0.67***	4.57***
Dummy variable for SEEC group of countries (*SEEC*)	0.01	0.07***
Intellectual property rights protection ln (*ipr*)	-0.08***	-0.06**
Freedom of doing business ln (*buss*)	0.05	0.07
Freedom of investment ln (*inv*)	0.01	0.02
Freedom from corruption ln (*corup*)	0.13***	0.11**
TIME DUMMIES	Yes	Yes
Constant term (*cons*)	-0.19	0.25

*Note: p-values in brackets where ***,** and * denote statistical significance at 1%, 5% and 10% level of significance respectively. Robust standard errors used.*
Source: Author's calculations

Results of investigation are presented in Table 3 provide support to our thesis about spatial effects of reindustrialization A positive and statistically significant coefficient on spatial lag of dependent variable suggests that a rise in manufacturing employment share of particular region leads to an increase in manufacturing employment of other regions. Analogously, this finding signals that deindustrialization trends are spatially distributed, a finding consistent with insights obtained in section 3. The magnitude of effect seems to be sensitive on the specification of spatial weights matrix. This can be understood as evidence of spatial distribution of full effects of deindustrialization (reindustrialization) trends.

In both specifications a positive and statistically significant coefficient is obtained on variable measuring the intra-regional effects of the contribution of manufacturing output share. On the one hand, it can be understood as an evidence of rising labour intensity of manufacturing, a trend observed in some of regions in both SEECs and CEECs. However, rising employment and output should not necessarily be inconsistent with a shift towards more sophisticated technology intensive sectors. The expansion of high tech industries generates demand for skilled workers that may give a rise to the improvement in manufacturing employment. The latter explanation seems more convincible if observed together with positive and significant coefficient on variable controlling for share of high tech manufacturing. Regions with higher share of these industries are characterised with higher manufacturing employment. These

findings suggest that regions in analysed countries are building their industrial competitiveness on high tech sectors which in turn generates manufacturing jobs.

Findings on the role of foreign direct investment and knowledge intensive services are negative. Former may imply that foreign firms invest efforts in improvements of labour efficiency in manufacturing but also it may suggest that international companies mainly operate in sectors outside manufacturing. The latter finding is further evidence in support of our thesis about movement of manufacturing sectors in analysed regions towards high tech manufacturing as it signals that manufacturing sector and knowledge intensive service sector are competing over same profile of educated and skilled workers. Finally, intra-regional impact of urbanisation economies is negative. On the one hand, this may signal that firms in our regions do not exploit benefits of these general agglomeration externalities. On the other hand, due to the construction of variable it may also be sign that we are picking up the effect of competition.

Turning to the spatial effects of included variables, a positive sign on spatial lag of output share suggests that improvements in manufacturing output of individual regions through horizontal and vertical linkages between producers as well as through the migration of labour have beneficial effect on manufacturing output of other regions. It seems that existence of within regional localisation economies has beneficial impact on the manufacturing outside of those regions. A likely explanation is that centrifugal forces are in place here. The benefits from localisation economies are usually labelled as sector specific while they exert negative effects on firms in other sectors. The specialisation in services and associated localisation economies could thus act as incentive for producers from manufacturing sector to allocate their production outside of region. Further support to such reasoning comes if one observes positive coefficients on variables measuring spatial effects of foreign direct investment and of share of knowledge intensive services. Both of these effects are positive while their intra-regional components discussed earlier had negative signs. A conclusion arising from these findings is one of spatial clustering of activities. Hence, stronger regional tertiarisation leads to manufacturing increase in other regions.

Among variables controlling for the quality of institutional framework significant coefficients are obtained with respect to freedom from corruption and protection of intellectual property rights. While former comes with positive sign, the negative coefficient of the latter is

somewhat surprising. Sudsawasd and Chaisrisawatsuk (2014) note that in environments at low levels of development of intellectual property rights tighter enforcement of these regulations increases costs of access to advanced technology thus making it more difficult to use existing innovations as a base for subsequent creative activities. Finally, coefficient on variable controlling for difference between CEECs and SEECs is significant and positive only in case of inverse distance matrix.

5. Conclusion

Recent global economic turmoil revokes old arguments about the beneficial effect of manufacturing on economic growth and creates the need for understanding of deindustrialization and possibilities for reindustrialization in SEECs and CEECs. This is particularly true for the former group of countries as rare evidence from existing literature suggest that industrial decline and structural shift from 1990s continued in these countries even long after their CEECs counterparts embarked on the road of reindustrialization. However, formulation of policies that can stimulate manufacturing growth and regional development in these countries requires identification of factors moulding existing regional industrial patterns. It is only on such foundations that policies can be formulated which will enable these countries and their regions to grow and to provide their citizens with a better standard of living.

Evidence obtained in this analysis from many regions of CEECs and SEECs bear more resemblance to a shift towards more technologically intensive segments of manufacturing than to a classical notion of deindustrialization. It appears that development of knowledge intensive services has adverse effect on industrial development as two sectors compete over same profile of skilled workers. We were able to observe spatial clustering of economic activity in all analysed countries with manufacturing being concentrated in the proximity of border with Western European countries and outside metropolitan areas which exhibit classical traits of deindustrialization. The specialization in high technology and knowledge intensive sectors embodies higher potential for future growth as it implies quality driven competitiveness and potential for appropriation of above – average returns. Future development of these economies shall depend thus on the creation of environment conducive to emergence of key enabling technologies which are at foundations of technology intensive sectors.

Further structural measures should devote particular attention to regions whose origins of deindustrialization are in the lack of restructuring and declining regional competitiveness. Our analysis revealed many former centres of industrial development, in majority of cases on the eastern belt of CEES and SEECs which are characterised with declining output and employment in manufacturing. The fall of once dominant resource and labour intensive industries such as heavy metallurgy in these regions was not followed with emergence of new sectors that would take their place. Future regional policy should promote development of these sectors while taking account about balanced development and stimulate both groups of regions in order to prevent generation and widening of the development gap between them.

Our analysis has provided evidence in favour of regional nature of deindustrialization and reindustrialization processes. To this end, the development of regional policy capacities is prerequisite for understanding of the national and/or supranational policy processes that would stimulate industrial development. However, in Europe reindustrialization as a policy concept is dominantly perceived as the national and supranational (EU level) policy agenda. In this context, decentralization of industrial policy and finding of ways for contribution of regional products and services to the European value chain presents a crucial challenge for regional policy makers in CEECs and SEECs in the future. Finally, future policy measures should be devoted to strengthening of institutional framework. As our analysis demonstrated fight against corruption has positive effect on industrial development. In many analysed countries, particularly SEECs, corruption remains significant obstacle to the development of market economy and barrier to investment, doing business, entrepreneurship and optimal allocation of public expenditure. Along similar lines, policy measures should be aimed at protection of intellectual property rights in a way that will not present burden for local firms and constraint to their innovation activities.

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