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Sources of economic growth in CEEC regions – a structural disaggregation

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Sources of economic growth in CEEC regions – a structural disaggregation

Abstract

The paper analyses the sources of economic growth in the regions of Central and Eastern European countries (CEEC) using a multi-dimensional approach that takes into account: a) disaggregation of the economic structure; b) the international and national contexts of regional development processes, and c) the main types of regions. The results corroborate the validity of such an approach, showing the interrelationships between the development dynamics of individual regions and the structural changes that are difficult or impossible to identify using an analysis of aggregated values. In particular, the analyses conducted as part of the study helped identify the key constituents of metropolisation processes taking place in the regions of the major city centres, the progress of reindustrialisation processes occurring in transitional regions and the mechanisms underpinning development of peripheral regions. Based on these differences, some general recommendations for policies implemented in these types of regions were formulated.

Content

Introduction

Stages of growth models were among the group of theories that first set out to explain the differences in the levels of economic growth between countries (e.g. **Rostow 1971**). These theories assume that such differences are consequences of a linear transition from one stage reflecting the advancement of socio-economic transformation processes in a given territory to another. The following phases are typically distinguished **(Capello 2007, p. 91)**:

- 'Autarchy', which refers to the self-sufficiency of the local economic system;

- 'Specialisation', which is made possible by the development of transport infrastructure, associated with the presence of comparative advantages supporting the development of trade;

- 'Transformation', which involves a transition from agrarian to industrial economy, drawing mainly upon the raw materials and other resources found locally;

- 'Diversification', whereby branches of industry, also those manufacturing semi-products, increasingly differentiate, and new industries emerge to satisfy consumer needs of larger populations;

- 'Tertiarisation', associated with the outsourcing of services from industrial enterprises and development of new, information-related services.

It should be noted that this simplified model fails to explain the differences in the level of economic development between highly-developed countries which have reached the last of the aforementioned stages of growth. It is characterised by a prevalent share of services in gross value added - GVA **(Illeris 1996; Boden and Miles 2000)**, which is also transposed into a significantly larger number of jobs in services, and this in turn usually contributes to the faster pace of economic development. Some researchers point out that this is not merely a consequence of the outsourcing of functions from manufacturing enterprises but also of the development of knowledge-intensive services, which first and foremost include a) those associated with the creation and development of technologies, b) advanced business services, including financial services, c) some of knowledge-intensive services in healthcare, education as well as d) media industry **(Krätke 2007)**.

As a result, such services not only complement the industrial sector but also act as important sources of innovation for the economy, thus driving productivity. On the other hand, it should be borne in mind that the entire sector of business services (including the remaining types of services) is characterised by a relatively weak productivity growth **(Kox and Rubalcaba 2007)**. However, most authors argue (e.g. **Desmarchelier et al., 2012)** that selected types of business services improve their productivity faster than other sectors of the economy. This happens because of the improving productivity in individual sectors rather than as a result of shifts between sectors **(Maroto-Sánchez and Cuadrado-Roura 2009)**. Furthermore, business services also affect the economy indirectly, owing to the dissemination of knowledge and increased flexibility of the labour market **(Kox and Rubalcaba 2007)**. In particular, this applies to clients of service companies, which in consequence will usually improve their competitive advantage **(Rinaldo et al. 2012)**.

It should also be noted that one specific feature characterising the Central and Eastern European countries was the delayed transition from the Fordist to the post-Fordist development model **(Gorzelak 1996)**, and therefore the transition to the final development stage discussed above. This was associated with maintaining the socialist economy on the path of industrial development, with some of the countries remaining strongly embedded in the agrarian economy (and consequently with a high share of those employed in agriculture) until the early 1990s. It was only then that disindustrialisation processes and development of a modern market services sector began, in the wake of socio-economic transformation and opening up of the national economies to the global economy **(Eschenbach and Hoekman 2005)**. These changes led to the economic structures of the new Member States being considerably assimilated to those of the EU15 as a result of convergence processes.

It should also be noted that while in the early period of the transformation the role of the service sector grew following the restructuring of industrial plants and modernisation of agriculture, contemporarily the number of jobs in services is on the increase. However, the share that the service sector contributes to economic growth is more a result of increasing productivity within the sector rather than of larger shifts between sectors **(Havlik 2005).**

Based on an analysis of the economic structures of the CEEC and their changes in the recent years **(Table 1)**, it can be concluded that their development paths varied from country to country, albeit with visibly smaller disparities regarding their present situation. The widest differences are associated with the role of the industrial and 'simple' services sectors in the economies of the countries concerned (which can also be a consequence of the differences in the scope of the outsourcing of services from industrial enterprises). Some of these countries have managed to maintain or even develop their industrial capacities in comparison with 1995 (mainly Romania, Estonia and Bulgaria), whereas others have undergone heavy disindustrialisation processes (e.g. Latvia, Slovakia, Slovenia and Poland). On the other hand, countries such as Lithuania, Poland and Bulgaria have witnessed a robust development of 'simple' services. By contrast, this sector played only a minor role in Romania, Hungary, Czech Republic and Slovenia. The differences regarding the condition and dynamics of the remaining sectors were not as wide, and notably included:

- A relatively high significance of agriculture in GDP creation in Romania, Bulgaria and, Latvia (although decreasing rapidly, which was observable mainly in the former two countries);

- Fast development of the construction sector in Romania, Bulgaria and Slovakia;

- The weakest development of 'business' services in Romania, Bulgaria and Slovakia, and the fastest – in Poland and Latvia;

- Relatively minor differences regarding the share of the public service sector in GVA, with the exception of Romania and Bulgaria – lower share (even though this country recorded the fastest growth in this particular category), while Slovenia and Hungary have higher share of this sector in GVA than average.

Table 1. Gross value added (GVA) in the main economic sectors (%)

Country	GVA (%) in 2010						GVA change (pp) 1995-2010*					
	Agriculture	Industry	Construction	'Simple' services	'Business' services	'Public' services	Agriculture	Industry	Construction	'Simple' services	'Business' services	'Public' services
Bulgaria	4,9	22,3	7,1	26,7	23,3	15,7	-10,8	-0,7	2,3	7,1	0,4	1,7
Czech Republic	1,7	29,6	7,3	24,6	19,0	17,8	-2,8	-1,2	-0,4	0,6	3,1	0,7
Estonia	3,3	22,5	5,9	26,5	23,1	18,6	-4,7	-0,7	-0,2	1,4	3,6	0,6
Latvia	5,0	18,6	5,3	33,1	20,3	17,7	-2,4	-5,8	1,1	2,4	6,8	-2,1
Lithuania	3,3	23,5	5,9	34,8	14,8	17,6	-7,7	-0,9	-1,1	8,9	2,8	-2,0
Hungary	3,5	26,5	4,2	22,8	22,2	20,7	-2,0	-1,8	-0,3	-0,4	3,1	1,5
Poland	3,7	24,7	8,0	29,5	16,9	17,1	-4,6	-3,3	1,3	4,0	4,6	-1,9
Romania	6,4	31,9	10,2	18,8	17,7	15,0	-12,8	-0,1	3,7	2,1	-0,2	7,2
Slovenia	2,5	23,4	6,5	24,4	22,8	20,4	-2,0	-5,8	0,6	3,3	3,0	0,9
Slovakia	2,8	26,5	9,1	26,3	17,9	17,3	-2,9	-4,6	3,9	1,2	0,9	1,5

* for Latvia, change in 1996-2010; for Hungary, change in 1998-2010.

Source: prepared by the author based on Eurostat data

The observable changes in the economic structure typically entail an increased significance of sectors manufacturing goods and providing higher value-added services, at the expense of sectors operating in a lower segment. Such a shift in consequence could become an important source of economic growth. This is in

compliance with the stages of growth theory outlined above, which assumes an increase in productivity at every consecutive stage of transformation. In the case at hand, these changes could be summarised as a transition from a relatively diversified industrial economy (accompanied by a strong position of agriculture in some countries and regions) to service economy based on the modern business services sector. It should also be noted that the significance of the latter sector in the CEEC economies still lags behind the best-developed countries (as compared e.g. to approximately 30% in Germany).

Naturally, structural changes do not represent the sole source of economic growth. In addition to such changes, at least two major groups of factors can be identified:

- Factors which traditionally demonstrate an improved effectiveness in using the labour resources as a result of a greater number of new jobs (reduced unemployment), with the underlying assumption that labour productivity is maintained at a similar level or is improved;

- Modern factors which demonstrate increased labour productivity caused by technological progress.

The existing labour resources, if used effectively, undoubtedly represent a significant source of development, resulting directly from the Cobb-Douglas production function. Therefore, reduced unemployment, accompanied by increased employment in sectors where productivity is higher than average, should lead to economic growth. In the CEE countries, unemployment was a phenomenon unknown before, and had the form of structural unemployment in the initial period of the transformation. This problem was partly resolved following the CEEC's accession to the European Union and the gradual opening up of the Community's labour markets. However, as many studies suggest, the number of jobs in the national economies would increase only in the conditions of a high economic growth since, when slower, growth was mainly generated by improved labour productivity. The latter factor is regarded as the key source underpinning economic growth and facilitated by technological progress. Such progress can be considered exogenous, as in the traditional Slow-Swan growth model, or endogenous, as in the new theory of endogenous growth which suggests that it is grounded in knowledge or capital in a given economic system **(Lucas 1988, Romer 1990)**. It should also be noted that some other sources of economic growth can be indicated, e.g. those associated with a growth of exports, but this particular aspect is not taken into account in the empirical study presented below.

1. Research methodology

The aim of the paper is to verify the sources of regional development in Central and Eastern European countries, and in particular to define the significance of the effect of structural changes for the pace of economic growth in the context of changes taking place in the labour market and improved labour productivity. The analysis looks at three basic dimensions, viz.: a) structural (six basic sectors of the economy), b) external context of regional development (international or domestic, absolute and relative), and c) regional (three main types of regions).

In our study, the regional economies were disaggregated into six sectors comprising the following sections, termed as follows:

- 'Agriculture' (NACE section A: Agriculture, forestry and fishing);

- 'Industry' (NACE section B: Mining and quarrying; C: Manufacturing; D: Electrivity, gas, steam and air-conditioning supply; E: Water supply; sewerage, waste management and remediation activities);

- 'Construction' (NACE section F);

- 'Simple' services (NACE section G: Wholesale and retail trade; repair of motor vehicles and motorcycles; H: Transport and storage; I: Accommodation and food service activities; J: Information and communication);

- 'Business' services (NACE section K: Financial and insurance activities; L: Real estate activities; M: Professional, scientific and technical activities; N: Administrative and support service activities);

- 'Public' services (NACE section O: Public administration and defence; compulsory social security; P: Education; Q: Human health and social work activities; R: Arts, entertainment and recreation; S, T, U – the remaining activities).

One analytical problem encountered with the above classification was the division of knowledge-based services into the categories of 'simple', 'business' and 'public' services. In particular, this applies to the 'Information and communication' section that includes information services which should not be classified as 'simple', and some divisions of the 'public' services such as the media industry. Nevertheless, it can be tentatively assumed that the majority of categories regarded as knowledge-based services are classified as 'business' services, although support services are also included in the same category. Another terminological problem is associated with some of the services being termed as 'public', which does not necessarily mean that they are provided solely by public institutions as some activities in this sphere are also offered by private providers.

In analysing the context of regional development, we used an international and national approach and, as part of the former approach, we applied absolute and relative categories. In the former approach (**Model A**), we analysed the changes of regional GDP expressed in EUR, taking into account the appreciation/depreciation of the national currency. In this particular approach, this aspect demonstrates the international competitiveness of a given economy. The second approach **(Model B)** looked at the real pace of growth expressed in the national currency in order to define the success achieved by a given region in relation to the initial situation, made possible also by the positive changes taking place in the national economy. The third approach **(Model C)** eliminated the impact of the national economy on the development of a given region through the relativisation of its pace with the national average. This in effect helped decide whether a given region was a success or a failure in comparison to the remaining regions of a given country.

Furthermore, it should be observed that the CEEC regions are characterised by considerable diversity (with a number of typologies already developed for different hierarchical levels), which indicates that some differences in the sources of economic growth vary from region to region, depending on their individual features. For the purposes of our analysis, NUTS3 subregions were taken into account since they correspond to functional urban regions more closely than the NUTS2 level, typified by a high degree of internal disparities, especially - and typically - in Central and Eastern European countries (cf. **Smętkowski et al. 2012**). As a result, three basic types of regions were distinguished (amongst others that corresponds to **EC 2010**) **(Figure 1)**. The first type includes the core regions, characterised by a high development level – GDP per capita (above 110 % of the national average in 2000). On the basis of contextual analysis, this type of regions was designated as metropolitan, since it mainly covered the regions of large urban centres. Based on an auxiliary analysis of the development dynamics in 2000-2008 and analysis of economic structures, the so-called old industrial regions were separated from this group and included in the second type, which covered transitional regions, mostly industrial or mixed, that combined industry and services or services and agriculture. The last, third group comprised regions with a low level of development (under 80% of the national average in 2000), which were peripheral not only economically, but often also geographically, being situated on the border and far from the major national growth centres. Such typology seems to have higher analytical value in comparison to other typology at NUTS3 level that consists of predominately Urban, intermediary and predominantely rural regions (see EUROSTAT 2010). The second approach overestimate the role of population density and significance of small settlement units..

In temporal terms, the analysis covers the years 2000-2008,[1] i.e. the period preceding the EU accession of the countries concerned and the period directly following the accession. This was a time of speedy economic growth driven, amongst other factors, by a favourable global economic outlook. The period of the financial crisis which began in 2008 was excluded from the analysis due to a considerable volatility of developments taking place in the economy, which made it difficult to offer generalisations for short data series.
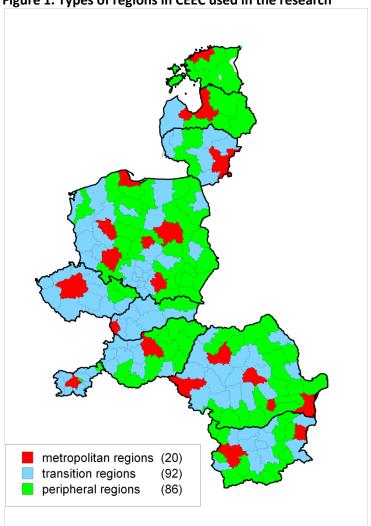
Figure 1. Types of regions in CEEC used in the research

Source: prepared by the author.

Table 2. Real economic growth rate (GDP increase, %)*

	N (number)**	Model A		Model B		Model C	
		2000=100	CV	2000=100	CV	2000=100	CV
Regions (NUTS3)	195	231.3	26.7	137.7	14.8	93.6	12.7
-metropolitan	20	273.9	26.9	160.0	16.2	107.1	11.2
-transitional	90	222.4	26.4	134.1	14.4	91.8	13.0
-peripheral	85	230.6	25.2	136.3	12.2	92.2	10.4

* unweighted arithmetic average

**Three regions representing the extreme cases in terms of the analysed indicator values were excluded (Pernik BG, Kaunas and Utenos LT).

Source: prepared by the author based on Eurostat data.

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[1] In the case of Romania, the analysis covered the period 2002-2008, owing to the lack of continuity in the available data series regarding the GVA structure.

In the analysed period, the pace of growth in the types of regions distinguished above was rather varied **(Table 2)**. At the same time, quite interestingly, there were no marked differences between transitional and peripheral regions in that regard. What is more, it can be said that the latter performed even slightly better. This, however, cannot alter the fact that the metropolitan regions acted as the main development drivers in all of the analysed approaches. As a result, the gap between the remaining groups of regions, particularly in the approach relativised with the national average (Model C), was visibly widening.

2. Sources of economic growth in various types of regions

First, the sources of economic growth were analysed in the different types of regions, but without addressing the differences between the individual economic sectors, in order to capture the general dimension of development processes **(Table 2)**.

Table 2. Sources of regional growth in different types of regions*

GDP growth rate:		Structural change pp**	Change in the number of employees (%)	Productivity increase (EUR in %)***
Model A (external – GDP increase w EUR)	Regions (NUTS3)	**0.46**		**0.84**
	-metropolitan	**0.80**		**0.91**
	-transitional	0.37		**0.89**
	-peripheral	**0.49**	-0.32	**0.80**
Model B (internal - real GDP increase in national currency %)	Regions (NUTS3)	0.19		**0.57**
	-metropolitan	**0.50**		**0.59**
	-transitional		0.21	**0.61**
	-peripheral	0.23		**0.56**
Model C (internal – GDP increase in relation to national average =100)	Regions (NUTS3)	-0.20	0.36	0.22
	-metropolitan		**0.49**	0.31
	-transitional	-0.24	0.39	0.25
	-peripheral	-0.29		

only Pearson's r correlation coefficients at a significance level of 0.05 (values over 0.40 are marked in bold)

*** structural change was caluclated as a sum of absolute changes of analysed sec tors share in GVA pp*

**** productivity was calculated as GDP per employee*

Source: prepared by the author.

On this basis, it can be concluded that structural changes play a significant albeit varied role in regional development processes. It can be clearly seen in Model A, and less so in Model B, that the regions of the countries which in the analysed period underwent an appreciation of their national currencies (Model A), and also those where such appreciation was accompanied by a fast pace of economic growth (Model B), were characterised by major structural changes that exerted an overall positive influence on the rate of growth. Nonetheless, Model C shows an opposite correlation, which can be interpreted as a weaker pace of growth in the regions where the restructuring processes had been deeper as compared to the national average. Nevertheless, the value of the correlation coefficient could suggest that the scale of the attendant problems was not overly acute in the period concerned.

Another interesting observation concerns the fact that the number of employed contributed positively to the pace of economic growth only in Model C, mainly owing to an increase in the number of new jobs in the metropolitan areas and in some of the transitional regions (most likely those which were successful economically). No such phenomenon could be observed in the peripheral regions. What is more, in case of

Model A, the increase in the number of employed could indicate hidden unemployment in traditionally labour-intensive sectors (mostly agriculture).

Increased labour productivity was the main source of economic development in all the types of regions both in Model A and in Model B. Quite surprisingly, productivity did not significantly impact the pace of economic growth in Model C; this, however, could primarily be due to its being measured in EUR. In this approach, external competitiveness contributed rather little to improving the regions' position domestically, a development which could only be observed in the metropolitan and transitional regions.

The impact of structural changes on the rate of economic growth varied from region to region and depended on the analysed approach **(Table 3)**.

Table 3. Structural changes (in percentage points - pp) and pace of economic growth *

Structural change (pp) GDP growth rate:		Total	Agriculture	Industry	Construction	'Simple' services	'Business' services	'Public' services
Model A	Regions (NUTS3)	**0.46**	-0.32		**0.41**	0.30	-0.16	
	-metropolitan	**0.80**	**-0.53**		**0.70**			
	-transitional	0.37	-0.33		0.31		-0.30	
	-peripheral	**0.49**	**-0.40**	-0.22	**0.45**	0.35		
Model B	Regions (NUTS3)	0.19			0.21			-0.30
	-metropolitan	**0.50**						**-0.64**
	-transitional			0.24			-0.32	-0.36
	-peripheral	0.23			0.26			
Model C	Regions (NUTS3)	-0.20	0.23		-0.22			-0.35
	-metropolitan							**-0.76**
	-transitional	-0.24	0.27	0.38	-0.30		-0.24	**-0.45**
	-peripheral	-0.29	0.20		-0.24		0.30	

* only Pearson's r correlation coefficients at a significance level of 0.05 (values over 0.40 are marked in bold)

Source: prepared by the author.

Firstly, the economic development of the CEEC regions concurred with the increasing role of simple services and construction in Model A. This could point to the important role of the external influx of capital, which in the analysed period led to increased consumption and development of the housing market that ended in a speculative bubble **(see also Gorzelak and Goh 2011)**. On the other hand, in the domestic approach (Models B and C), the decreasing role of public services in gross value added proved to be of greatest significance as it meant the development of other sectors of the economy (which differed depending on the type of regions concerned). The latter phenomenon was particularly well visible in the metropolitan areas, where the falling share of public services in GVA was strongly correlated with the rate of economic growth, which was also facilitated by a large scale of the transformation processes (in Model B).

This phenomenon could also be observed in the transitional regions, where it was usually associated with reindustrialisation. Quite interestingly, it was accompanied by a decreasing role of business services, which in turn could point to the growing specialisation of regions and the function of business-environment services being taken over by the metropolitan centres (the 'shadow of the metropolis' phenomenon). In Model C, these regions also saw an increased role of agriculture, which could be viewed as proof of the increasing linkages between agriculture and the food processing sector.

On the other hand, a perceptibly greater role of construction in the less-developed peripheral regions could be observed in Model A (and less so in Model B), which could be interpreted as a manifestation of increasing tourism development e.g. in the coastal areas (a phenomenon which is particularly well visible in Bulgaria and Romania) or exurbanisation processes reaching beyond the metropolitan areas (accompanied by the increasing importance of simple services in Model A). Domestically, their agricultural specialisation was strengthened, and

accompanied by a greater role of business services, which could point to the development of metropolitan functions in some of the urban centres situated in the peripheral areas.

The impact of the increasing number of employed in different sectors on the pace of economic growth also varied strongly, depending on the model and type of region **(Table 4)**.

Table 4. Change in number of employed (%) and pace of economic growth*

Change in number of employees (%) GDP growth rate:		Total	Agriculture	Industry	Construction	'Simple' services	'Business' services	'Public' services
Model A	Regions (NUTS3)	-0.14	-0.19	-0.17	0.26	0.20	0.23	-0.39
	-metropolitan							**-0.75**
	-transitional				0.23		0.24	**-0.43**
	-peripheral	-0.32	-0.27	-0.30	0.29			**-0.36**
Model B	Regions (NUTS3)	0.15	-0.21	0.15	0.20	0.35	0.28	
	-metropolitan					**0.47**	**0.56**	
	-transitional	0.21		0.28		0.35	0.30	
	-peripheral		**-0.48**		0.28	0.32		
Model C	Regions (NUTS3)	0.36		0.33		0.26		0.29
	-metropolitan	**0.49**				**0.49**	**0.48**	
	-transitional	0.39		**0.43**		0.21		0.32
	-peripheral		-0.34	0.35		0.26		**0.40**

* Pearson's r correlation coefficients at a significance level of 0.05 (values over 0.40 are marked in bold)

Source: prepared by the author.

In general terms, the increase in the number of employed in the simple services sector was most the easily visible (particularly in Model B). This demonstrates the nature of the tertiarisation model in the CEEC countries, which largely involved the development of labour-intensive, endogenous sectors. It should be pointed out, however, that both in Models A and B, economic growth at regional level entailed an increase in the number of employed in business services, and in Model C (and less so in Model B), also an increase in employment levels in industry.

The first of these observations originated mainly from the development of services in the metropolitan areas, which became the key locations for modern 'simple' and 'business' services. This was probably the main factor responsible for the 'brain drain' of well-educated workforce from other regions to the metropolis.

The second of the observable correlations was mainly associated with industrialisation processes taking place in those transitional regions which had achieved economic success. This could be seen particularly well in Model C (less so in Model B) and could mean that some of these regions (especially those situated in the close proximity of the metropolitan areas and the main transport corridors) proved attractive for inward investment (for FDI in Poland, see e.g. **Domański 2003**). The development of the industrial sector was also accompanied by the outsourcing of simple services, which led to increased employment in the sector.

Industrialisation processes coupled with decreased employment in agriculture were also typical of the peripheral regions, especially those which had achieved a relative development success (Model C). This can be associated with exogenous type of development or development fostered by an influx of inward investment or public transfers facilitating the growth of public services, also boosting employment in the simple services sector. Irrespective of the actual model, the success of these regions was also founded on modernisation processes in agriculture, which also led to decreased employment in this sector.

As noted above, the pace of regional economic growth depends primarily (except Model C) on improved labour productivity, although the situation of individual sectors can vary from region to region **(Table 5)**. In general

terms, regional development (Models A and B) is most strongly linked with improved productivity, above all in 'public' services, followed by 'simple' services and industry. It can be assumed, however, that while the latter sector could be a source of economic growth, the productivity of the first sector is a result of a fast pace of growth in other sectors, which made it possible to finance 'public' services on a larger scale. It should also be noted that in a relativised national approach (Model C), the correlation between the rate of growth and improved productivity is quite weak (and most strongly manifested in business services).

Table 5. Change in productivity and pace of economic growth*

Change in productivity (EUR, %) GDP growth rate:		Total	Agriculture	Industry	Construction	'Simple' services	'Business' services	'Public' services
Model A	Regions (NUTS3)	**0.84**	0.38	**0.62**	**0.57**	**0.71**	0.31	**0.85**
	-metropolitan	**0.91**		**0.79**	**0.83**	**0.81**		**0.84**
	-transitional	**0.89**	0.39	**0.73**	**0.59**	**0.75**	0.26	**0.84**
	-peripheral	**0.80**	**0.43**	**0.52**	**0.47**	**0.64**	**0.44**	**0.86**
Model B	Regions (NUTS3)	**0.57**	0.33	**0.39**	0.27	**0.42**	0.20	**0.44**
	-metropolitan	**0.62**		**0.67**	**0.53**	**0.64**		
	-transitional	**0.59**	0.31	**0.50**	0.26	**0.40**		**0.40**
	-peripheral	**0.56**	**0.50**	0.25		0.32	0.37	**0.45**
Model C	Regions (NUTS3)	0.21				0.17	0.24	
	-metropolitan			**0.49**				
	-transitional	0.23		0.24				
	-peripheral		0.23		-0.31		**0.42**	

* Pearson's r correlation coefficients at a significance level of 0.05 (values over 0.40 are marked in bold)

Source: prepared by the author.

The above observations (in Models A and B) apply to all the three types of regions, although the strongest correlations can be seen in the metropolitan regions, and the weakest – in the peripheral regions. In the case of the latter, however, a clear difference can be noticed regardless of the model. Those regions which were the most successful in this group were those where labour productivity in agriculture had increased, which could be interpreted as proof of advanced modernisation processes. In addition, improved productivity of business services was a factor that fostered economic development in this group of regions. This could prove that diffusion processes were taking place in the national settlement systems, manifested by the growth of major urban centres in the peripheral regions. It should also be noted in Model C that there had been a distinct increase in labour productivity in industry, particularly in the metropolitan regions and less so in the transitional regions. In the former case, this could demonstrate that the most advanced branches of industry (e.g. the pharmaceutical industry) were able either to develop or maintain their potential at a stable level.

3. Development models in different types of regions – a tentative summary

Based on the above tables, an attempt was made to construct a multiple regression model incorporating selected variables from each of the analysed categories in all the three types of regions. An exploratory method was used in the exercise, with the aim of identifying mutual linkages between the independent variables, the level of fit and significance of the variables in the constructed regression models.

In case of **metropolitan regions**, the following variables were analysed:

- Change in the share of public services in GVA; a decrease in this category signifies, *à rebours*, the development of the remaining types of economic activity (which are less dependent – with the exception of agriculture – on public transfers);

- Change in the number of employed in business services; an increase in this category may signify the development of exogenous functions in the service sector;

- Change in labour productivity in industry; its increase signifies the development of knowledge-intensive sectors or the diminished role of the traditional sectors/traditional industries.

Table 6. Potential sources of growth in metropolitan areas – selected explanatory variables

	Change in share of public services (pp)	Change in number of employed in business services (%)	Change in labour productivity in industry in EUR (%)
Model A	-0.18	0.44	0.80*
Model B	-0.64*	0.56*	0.63*
Model C	-0.76*	0.43	0.43
Change in share of public services (pp)	x	-0.63*	- 0.36
Change in number of emploees in business services (%)	-0.63*	x	0.45*
Change in labour productivity in industry in EUR (%)	-0.36	0.45*	x

* Pearson's r correlation coefficients at a significance level of 0.05

Source: prepared by the author.

Quite strong correlations can be observed between the variables selected in this way **(Table 6)**; they, however, do not necessarily prove the existence of direct cause-and-effect relationships, but rather point to a strong presence of a specific set of phenomena in the metropolitan areas. Based on the exploratory regression model, considerable differences can be observed in the constituents of economic growth **(Table 7)**. In the supranational approach (Model A), growth is predominantly generated by improved productivity in industry, whereas the other two variables remain insignificant. In the second approach (Model B), regional growth is in equal parts explained by improved productivity in industry and decreased role of public services in GVA. By contrast, in the third model (C), only the latter variable is significant, and indirectly signifies diverse development of the private sector.

Table 7. Potential sources of growth in metropolitan regions – multiple regression

GDP increase:	beta			b				Corrected R2
	Change in share of public services (pp)	Change in number of emploees in business services (%)	Change in labour productivity in industry in EUR (%)	constant	Change in share of public services (pp)	Change in number of emploees in business services (%)	Change in labour productivity in industry in EUR (%)	
Model A	0.25	0.25	0.78*	-18.6	8.04	0.51	0.95*	0.62
Model B	-0.42*	0.11	0.44*	102.3*	-4.68*	0.08	0.19*	0.52
Model C	-0.79*	-0.16	0.22	103.4*	-4.11*	-0.05	0.04	0.55

* explanatory variables statistically significant at a level of 0.05

Source: prepared by the author.

The results point to strong mutual linkages between the constituents of the metropolisation processes occurring in those regions. First and foremost, they suggest the existence of diversified sources of economic growth in the private sector that can be linked to development in both the service and industrial sectors. In the service sector, this would involve both 'simple' and 'business' services. In the case of industry, the increase in the number of jobs is not as important since the process of forcing the traditional industries out of the metropolitan areas can still be under way. What is of crucial importance, however, is productivity increase in this sector.

The following variables were analysed for the transitional regions:

- Change in the share of industry in GVA, which signifies increased industrialisation of the regional economy;

- Change in the number of employed in simple services, which may signify the outsourcing of services from industrial enterprises;

- Change in labour productivity in industry; its increase indicates the development of knowledge-intensive industries or reduced role of traditional industries.

Table 8. Potential sources of growth in transitional regions – selected explanatory variables

GDP increase:	Change in share of industry (pp)	Change in number of employees in simple services (%)	Change in labour productivity in industry in EUR (%)
Model A	0.02	0.12	0.73*
Model B	0.24*	0.36*	0.50*
Model C	0.38*	0.22*	0.24*
Change in share of industry (pp)	x	-0.01	0.39*
Change in number of employees in simple services (%)	-0.01	x	-0.07
Change in labour productivity in industry in EUR (%)	0.39*	-0.07	x

* explanatory variables statistically significant at a level of 0.05

Source: prepared by the author.

These variables were not mutually linked save for a weak correlation between the increased share of industry in gross valued added and improved productivity in industry, measured in EUR **(Table 8)**. This means that industrialisation was taking place in the context of a growing international competitiveness in the sector. In light of the multiple regression models, an interesting observation can be made about Model A, in which all the three variables proved to be significant **(Table 9)**. By contrast, the impact of the first variable on the rate of economic growth was negative, which means that increased industrialisation does not necessarily positively affect the rate of growth in the regional economy since restructuring processes supported by outsourcing of services are more important, leading to improved labour productivity. This is also corroborated by Model B, in which this particular variable proved insignificant, and the increase in the number of employed in the simple services sector was more important in comparison to Model A. On the other hand, in the national dimension (Model C), it could be seen that the regions undergoing reindustrialisation in a situation of an increasing number of jobs in simple services had improved their position in comparison to similar regions, although this was not accompanied by significantly improved productivity, which seems rather to be a result of processes taking place in the national economy at large. It should also be noted that the level of the regression fit in Models B and C was very low.

Table 9. Potential sources of growth in metropolitan regions - multiple regression

GDP increase:	beta			b				corrected R2
	Change in share of industry (pp)	Change in number of employees in simple services (%)	Change in labour productivity in industry in EUR (%)	constant	Change in share of industry (pp)	Change in number of employees in simple services (%)	Change in labour productivity in industry in EUR (%)	
Model A	-0.31*	0.18*	0.86*	-33.0	-3.27*	0.58*	0.91*	0.63
Model B	0.05	0.40*	0.51*	52.0*	0.17	0.40*	0.17*	0.36
Model C	0.33*	0.23*	0.13	69.0*	0.72*	0.15*	0.02	0.18

* explanatory variables statistically significant at the level of 0.05

Source: prepared by the author.

These results confirm the significance of restructuring processes in the transitional regions with a considerable share of industry in their economies. As part of such processes, employment in industry was reduced and this process was accompanied by the outsourcing of simple services to external companies. At the same time, the ongoing reindustrialisation processes helped improve the position of the industrial regions in comparison with similar regions. On the other hand, in the supranational dimension, increased competitiveness was much more important owing to improved productivity in the industrial sector.

The following variables were analysed for the peripheral regions:

- Scale of restructuring processes defined as the sum of absolute changes in the share of individual sectors in GVA expressed as percentage points (pp);

- Change in the number of employed in industry, where the increase may signify industrialisation through development of labour-intensive sectors;

- Change in labour productivity in agriculture, where increase means modernisation of the agricultural sector.

Although the analysed variables were not mutually correlated **(Table 10)**, their contribution to explaining the pace of growth in the peripheral regions varied from model to model **(Table 11)**. In the first model, restructuring processes coupled with increased labour productivity in agriculture played a crucial role. By contrast, increased number of employed in industry negatively affected the pace of growth, which could indicate that the labour-intensive industrial branches were not competitive internationally. In the second model, modernisation processes in agriculture manifested by improved labour productivity were the most prominent factor. Conversely, in the national approach (Model C), agriculture modernisation processes accompanied by industrialisation processes (which could point to the developing food-processing sector) were found significant. In this case, however, deep structural changes led to the region's position being weakened in comparison to similar regions.

Table 10. Potential sources of growth in transitional regions – selected explanatory variables

	Change in economic structure (pp)	Change in number of employees in industry (%)	Change in labour productivity in agriculture in EUR (%)
Model A	0.49*	-0.30*	0.43*
Model B	0.23*	0.12	0.50*
Model C	-0.29*	0.35*	0.23*
Change in economic structure (pp)	x	-0.19	0.14
Change in number of employees in industry (%)	-0.19	x	0.07
Change in labour productivity in agriculture in EUR (%)	0.14	0.07	x

* explanatory variables statistically significant at the level of 0.05

Source: prepared by the author.

These results indicate that the peripheral regions are characterised by varied sources of growth. What is definitely of paramount importance is the modernisation of the agricultural sector since it largely defined developmental success in this particular group of regions. The pace of economic restructuring certainly matters externally, whereas internally it can aggravate the regions' situation. An increase in the number of employed in industry is important for domestic (national) success but has a negative impact in the supranational dimension, which could be viewed as proof of the weak competitive advantage of the traditional labour-intensive sectors. It should also be pointed out that the level of the regression fit in Models B and C was very low.

Table 11. Potential sources of growth in peripheral regions – multiple regression

GDP increase:	beta			b				Corrected R2
	Change in economic structure (pp)	Change in number of employed in industry (%)	Change in labour productivity in agriculture in EUR (%)	constant	Change in economic structure (pp)	Change in number of employed in industry (%)	Change in labour productivity in agriculture in EUR (%)	
Model A	0.38*	-0.25*	0.39*	218.1*	2.31*	-0.71*	0.24*	0.41
Model B	0.19	0.12	0.47*	104.4*	0.32	0.09	0.08*	0.26
Model C	-0.27*	0.29*	0.25*	77.8*	-0.27*	0.13*	0.02*	0.21

* explanatory variables statistically significant at the level of 0.05

Source: prepared by the author.

Conclusions and recommendations

The incorporation of different dimensions into the analysis of the sources of economic growth in the regions of Central and Eastern European countries produced interesting results. Firstly, it should be concluded that regional economic growth was strongly correlated with improved productivity, with the exception of the model that relativised the pace of regional growth with the national average, where an increase in the number of new jobs proved more important. This means that the flows of workforce from poorer to more affluent regions had a greater impact on the dissimilarities within individual countries than the differences in improving external competitiveness of regions based on increased productivity.

Secondly, dissimilar sources of economic growth could be observed in different types of regions. Metropolitan processes which, as the research found, incorporated many interrelated processes, proved to be of greatest importance in large city regions. The key such processes were: development of a modern business services sector (presumably, mostly knowledge-based) and high-tech industry (including branches tapping the existing R&D potential). However, based on these analyses, it was impossible to determine whether such a situation was caused by exogenous (e.g. influx of capital, technology transfer) or endogenous factors (e.g. human capital, R&D operations). It should be assumed nevertheless that it was at least partly due to the inclusion of these areas into globalisation processes, a development that acted as a magnet that attracted new, highly-qualified employees from other regions.

In the transitional regions, which also include old industrial regions, restructuring processes in industry played a key part; as a result, the traditional industries lost in significance (which simultaneously was coupled with the outsourcing of some simple services) in favour of modern industrial sectors. It should also be noted that reindustrialisation, which brought a relative improvement to the regions' situation on the domestic arena, did not necessarily boost their success supranationally. In this approach, increased productivity in industry proved much more important; its share in the creation of GVA diminished while the significance of accompanying services was increased.

Accelerated modernisation processes in the agricultural sector, manifested especially by decreased employment, were found to be the key process required to achieve a relative success. This was fostered by industrialisation processes which on their own, however, did not guarantee success supranationally. The location of large urban centres in those regions was a significant factor as cities supported the development of business services, which in turn could be viewed as proof of hierarchical diffusion as part of the national settlement systems.

On the basis of the above observations, a number of general recommendations can be proposed, viz.:

- The observable differences in the situation of the subregions included into one NUTS2 level call for a territorial approach in the planning and implementation of regional policies;

- Metropolitan areas which represent national growth poles, whose development increases convergence between countries, should be targeted by public policies, particularly to ensure a stronger public services sector since it can boost their attractiveness as places where the creative class will choose to live, in this way preventing the 'brain drain' to metropolitan centres in the higher-developed countries;

- The observable reindustrialisation processes can pose a threat in the context of their low technological advancement and low innovation of SMEs, a situation which should be addressed by providing supports to technology transfer and undertaking measures aimed to develop the human capital as well as the research and development potential in the transitional regions;

- Modernisation of agriculture in the peripheral regions, may pose a threat in a long term if the structural changes are decelerated; for this reason, it is recommended to pursue a combination of policies aimed to promote development of their major urban centres since they could derive benefits from the diffusion of metropolisation processes and an to improve their industrial potential.

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