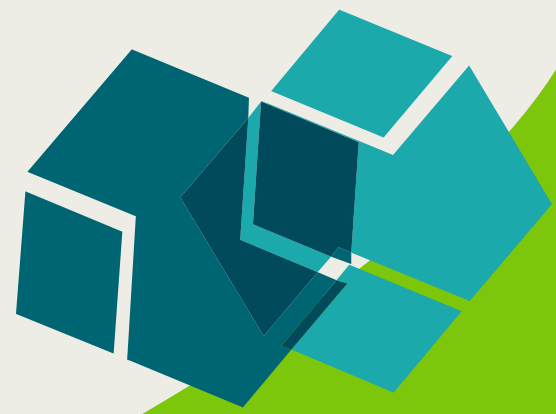




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Exo- and endogenous growth factors in Central and Eastern European Countries in the period of economic prosperity and crisis

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Abstract

The analyses show that the development processes taking place in the two identified types of regions in the CEE countries, i.e. metropolitan and non-metropolitan, were characterised by a high level of complexity. Nevertheless, based on the studies and surveys certain generalisations were made concerning the development trajectories of these regions and the role of the analysed groups of regional development factors, together with the course of development processes depending on a given economic situation. Therefore, the summary discusses, firstly, the similarities and differences of development processes in these two types of regions; secondly, the role of individual groups of factors in economic development processes and, thirdly, the role of the economic context in the development of CEEC regions.

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Introduction

The question of factors driving regional development occupies a prominent place in regional studies due to the opportunities for practical application of such knowledge in formulating and implementing regional policies. The difficulties in finding an unequivocal answer to the question about the key determinants underpinning growth arise mainly from the need to identify the period to be analysed, which can – to put it simply – be long or short. Adopting the assumption on the relevance of such a distinction allows to formulate the hypothesis claiming that while endogenous factors are of crucial significance in the long-term development of regions, regions receiving substantial supports from outside may attain a competitive advantage in the short term. On the other hand, if such supports are not strongly embedded in the local environment, such a region, in the long term, should take into account the risk of capital outflow and the need to undertake economic restructuring, given the mobility of production factors. The differences in the growth factors may also arise from dissimilar development processes occurring in different types of regions identified on the basis of structural dissimilarities. In particular, it can be expected that the core regions will build their competitive advantage on endogenous factors, whereas peripheral regions will be more dependent on exogenous factors.

In this context, the following aspects should be particularly highlighted while analysing regional development factors in the CEECs. Firstly, the systemic transformation, despite its substantial progress justifying the hypothesis of the convergence of development processes with highly-developed countries, can still be evaluated at the regional level in the short rather than long term (also due to quite short series of statistical data). Therefore, it can be expected that the role of exogenous factors in the development success of regions should be more prominent than that of endogenous factors. Secondly, these countries can still be regarded as semi-peripheral in terms of development level compared to highly-developed countries. In consequence, even the core regions can rely more strongly on exogenous rather than endogenous factors, which will be more likely to provide the foundation for the influx of external capital. Thirdly, extensive disparities in the economic structures across and within countries can result in the growth factors being strongly differentiated in consequence of the structural dissimilarities between the core and peripheral regions. The former should be more prominently included into information economy, which may be manifested by the development of knowledge-intensive services and high-tech industries (cf. Krätke 2007), whereas the latter should be much more strongly embedded in the industrial, and in some cases, agrarian, development models.

As a result many authors provide evidence that fast economic growth, coupled with metropolisation processes, has produced regional divergence in CEECs in the recent years since the development dynamics of the remaining regions, mostly problem ones, is visibly lower when compared with metropolitan areas. The factors which are most frequently quoted as those informing regional divergence include (cf. EC 2007, Gorzelak 1996; Radosevic 2001; Bachtler et al. 2002; Tondl, Vuksic, 2003; ESPON, 2006; Gorzelak, Smętkowski 2010):

- **Exogenous factors**, related to the **accessibility of a given region**, which either enables or facilitates the **influx of inward capital**, an aspect of crucial importance for transformation processes in these countries. This, in effect, gives an advantage to regions with large international airports (mainly capital city regions), and also to the western regions of these countries, which are more easily accessible from the better-developed neighbouring

countries and which have enhanced access to European sales markets, in addition – although less conspicuously so – to areas situated in the transport corridors linking the major development centres in these countries. On the other hand, regions situated along the external eastern border of the European Union attract much less interest from foreign investors, also as a result of their underdeveloped technical infrastructure.

- **Endogenous factors**, related to the size and diversification of the economy of a given region (agglomeration effects) and to the **quality of its human capital** (in particular the percentage of residents with higher education) as a factor promoting the development of enterprise, innovative businesses and specialised business services. On the other hand, it should be borne in mind that development based on the local innovation capacity is a phenomenon rarely encountered in CEE countries; in many cases, these factors rather tended to foster the transfer of technologies and duplication of solutions from highly-developed countries. In effect, at an advantage were the regions of large cities furnished with adequate education and research infrastructure, which boosted the quality of the human capital needed for the development of information economy in a strong institutional environment that supports the development of the local enterprise.
- **Structural factors**, related to the presence of sectors with a higher added value in a given region. In particular, the situation differed from region to region in terms of the share of advanced producer services in the regional economy, the role of industrial processing or the scale and intensity of agricultural activities. In effect, slower development could be observed in agricultural regions and in the majority of regions with a heavy concentration of traditional material-intensive and resource-intensive industries, that is, in old industrial districts. At the other extreme, there were metropolitan areas which had, for the most part, undergone deindustrialisation processes and were characterised by a dominance of the service sector.
- **Traditional factors**, denoting the volume of investment inputs and effective use of the available labour (while trying to reach the natural unemployment rate), in compliance with the Cobb-Douglas production function.

The first two of the above-mentioned categories of factors are associated with the most popular theories explaining convergence/divergence processes, i.e. the neo-classical growth models on the one hand, and cumulative-causative polarisation theories on the other; the latter considerably differ from the former in their axiological tenets. The main difference between them is the assumption concerning an general equilibrium, which, in light of the first category of theories is the expected state, and according to the other, economic systems are in a permanent state of disequilibrium. In effect, the first group achieves convergence as a result of the operation of market forces, a phenomenon which leads to an optimised allocation of resources, i.e. a proportionate distribution of production factors should lead to achieving a similar development level in all the regions. In turn, divergence theories of Keynesian origin assume disequilibrium that is associated with accelerated processes of capital accumulation in specific regions, characterised by a competitive advantage built by human capital resources, infrastructure provision or the ability to generate innovations. In this context, we can invoke the theory of cumulative causation formulated by **Myrdal (1957)** and then formalised by **Kaldor (1970)**. It suggested that spatial disequilibrium should increase as a consequence of an interplay of free market forces, which means that rich regions should become

even richer and poor ones - poorer. This is to happen as a result of a vicious circle of causes. The reason for this is that highly-developed regions are attractive for workers since they offer better salaries, especially to those with relevant qualifications. In consequence of the inflow of new workforce, the local labour market is developing, thus encouraging new enterprises to make new investments and attracting inward capital. This, in turn, boosts production and, thanks to the benefits of agglomeration, also increases productivity, strengthening in this way the region's competitive advantage and encouraging the influx of more workers. Negative external effects (associated e.g. with the depletion of the region's resources) can pose a barrier to this model being continued; they can lead to degglomeration, i.e. diffusion of development in space.

Another important division in the contemporary regional development models is associated with the role of **exo- and endogenous factors** in development, particularly with respect to technological progress. These factors can be divided into two broad categories: endogenous theories of (local) development, which consider localised knowledge and innovation as the key development factors, and neoclassical theories of (regional) growth, in which spatial identification of the sources of progress plays no significant role. As pointed out e.g. by **Nijkamp, Abreu (2009)**, what differs them is that in the light of the former, technological progress is not a 'manna from heaven' but a consequence of the local determinants associated with the capacity to create and accommodate innovations that require specific human capital and effective and efficient institutions. Such an approach is based, on the one hand, on the works of **Shumpeter (1939)** discussing the role of enterprise and innovation in development processes, which inspired the contemporary theories of: diffusion of innovation, innovative environment, learning regions and regional innovation systems, and on the other hand, based on the reflections of **Marshall (1920)** concerning agglomeration factors, which in turn informed present-day theories of industrial districts/clusters. At the same time, in light of neo-classical theories, activities with a similar level of technological advancement can occur in any region equally likely. In effect, territorial systems can develop successfully in the conditions which support mobile production factors since they are able to create an environment that attracts them. In this approach, regional development is a consequence of a growing productivity of production factors (capital and labour), with technological progress viewed as an external factor that does not depend on regional economic processes, according to the model developed by **Solow-Swan (1956)**.

Thirdly, these models differ in how they define space in regional development processes. In the first group of theories, it is local and relational, whereas in the second group, it is regional and abstract (**Capello 2007**). This means that in light of the former group, economic space is defined by the relationships existing between businesses, and their concentration fosters the growth of interactions between them. In the latter groups, relationships between regions are taken into account, the latter being regarded as homogeneous 'containers' for economic activity.

In addition, despite the clear differences referred to above, these two dissimilar development models could probably be reconciled, if we take into account: (A) application of different spatial scales (country/region) and (B) changes occurring over time (early/late stage of development).

In the former case, regional convergence can occur, associated with a rapid development of less-developed countries and accompanied by divergence on the national scale. It is because, at the level of countries, the process of the so-called 'catching-up' is taking place; it is mainly associated with the

inflow of inward capital, a phenomenon which is in line with neo-classical development theories. At the same time, economic growth nationally is limited to selected locations, characterised by agglomeration effects and increasing economies of scale, which in turn is consistent with the cumulative causation models. Using the example of CEECs, this phenomenon is discussed in the studies by **e.g. Monastiriotis (2011) and Smętkowski, Wójcik (2012)**.

On the other hand, evolution approaches explain the scale of regional disparities using the theory formulated by **Williamson (1965)**. According to it, the scale of disparities between regions in time takes the form of the Kuznets U curve, which shows that disparities between regions will grow in the initial phase of economic development. This is because of a tendency whereby several growth poles evolve and attract the bulk of investment and highly-qualified personnel; the diffusion of development processes does not take place until the next phase. According to this concept, diffusion is a consequence of disadvantages of agglomerations and differences in the production costs between affluent and poor regions. This process is accompanied by the diffusion of innovation and knowledge from the core to the periphery, which should in effect lead to regional convergence. To some extent, this is related to the structuralist approach (cf. e.g. **Dawkins 2000**) to development processes (and associated with the third category of factors discussed above). This particular approach notes that these models can quite successfully work for similar economic systems but need to be adapted to the local conditions if substantial differences exist between such systems. In other words, classical theories and concepts may be better suited to different groups of countries/regions which are similar in terms of development level and economic structure. On the regional level, this concept is present in the model of convergence clubs formulated by **Quah (1996)**. It can generally be said that structuralist theories dwell less on the issue of the equilibrium of regional systems and mobility of production factors, and instead highlight the significance of historical processes and dependence of the development of a given region on its earlier development path (the so-called path-dependency). The development levels (stages) of countries or regions may be distinguished using different notions, i.e. by the main sectors of the economy (**e.g. Fisher 1933, Clark 1940**) or by the technological advancement of manufactured products (**Vernon 1966**).

Naturally, in light of these three groups of theories explaining contemporary factors of regional development, we should not forget the traditional Cobb-Douglas production function and the accompanying role of capital investment, capital accumulation processes and effective use of labour.

Attributing the relevant indicators comparable across countries to the aforementioned factors encounters many difficulties associated with the availability of statistical data. Nevertheless, such an exercise was made, with the use of comparable international statistics provided by Eurostat, UNCTAD and ESPON, supplemented by national statistics, also those prepared by experts as part of the GRINCOH project. This also required making relevant estimations in order to increase data compatibility. In comparison with the earlier studies (**Smętkowski 2013**), an attempt was made to analyse the changes in the real values of the adopted measures, and not the relative changes in the region's position relative to the country average. Secondly, while the earlier research was exploratory in character, and limited the regression analysis to the stepwise procedure, due, among others, to a strong correlation between some of the analysed variables, the present analyses are based on multiple regression models, allowing for an evaluation of the interactions occurring between all the analysed variables.

The analysis took into account the following groups of factors and the accompanying measures:

- a) Exogenous factors (volume of foreign capital in MEUR based on UNCTAD national data (disaggregated regionally or with data on the volume of foreign capital or data on the number of business entities with foreign shareholdings); migration balance (domestic and foreign) based on national statistics, multimodal transport accessibility based on the ESPON database);
- b) Endogenous factors (number of business entities per 1000 population based on national statistics; R&D expenditure as a percentage of GDP based on national statistics; share of the population with higher education based on national statistics);
- c) Structural factors (percentage of GVA in agriculture, industry, construction, simple, business and public services based on Eurostat data);
- d) Traditional factors (registered unemployment rate based on national statistics).

The purpose of the analysis was, on the one hand, to correlate these factors to the regional development level expressed in GDP per capita in EUR, and on the other to the development dynamics illustrated by real GDP in various periods of time. Thus, three complementary research approaches were produced:

- 1) The first, allowing to determine how the development level of a given region is associated with its characteristics in terms of regional growth factors; for instance, whether GDP per capita is correlated with the number of business entities in a given region per 1000 population;
- 2) The second, showing how the development dynamics of a given region was dependent on its characteristics in the baseline year; for instance, whether regions with a high share of industry in GVA were developing faster or slower than the country average.
- 3) The third, illustrating how GDP per capita dynamics was dependent on changes in the factors under analysis; for instance, whether the regions where the value of FDIs was on the increase in a given period were developing faster.

The research also took into account the differences in the economic situation, which in the analysed countries was recently marked by a clear shift from a period of prosperity to a crisis. A period of upswing in the years 2002-2008 in the conditions of favourable economic situation globally, but also of positive direct and indirect effects of the CEECs' EU membership was followed by an economic crisis which began in 2008, initiated by the financial crisis in the USA. For this reason, both the values and changes in the analysed indicators were provided for these two periods, i.e. the years 2002-2008 and 2008-2010. In the latter case, the extremely short time horizon of the research should be taken into account; still, considering the volatility of the crisis phenomena, even extending it up to 2011 would not guarantee that the quality of the estimation would be significantly better.

The research also took account of the differences between metropolitan and non-metropolitan regions. In addition to the capital city regions, the former also included regions with GDP per capita above 110% of the country average in 2000, excluding – based on additional contextual analyses –

traditional industrial regions, which altogether produced a set of 20 cases (for more detailed info see: **Smętkowski 2014**). The remaining regions were analysed collectively, as one category of non-metropolitan regions. The study was conducted for the NUTS3 level, with the cities included into the surrounding regions in order to eliminate the impact of the administrative factors on the results.

The analysis made use of such methods as correlation analysis as well as multiple regression analysis to control the mutual relationships between the analysed factors. Such an approach allowed for a better triangulation of the results and in consequence for obtaining better insights into the phenomena taking place. Moreover, in analysing the results, the correlation between the variables was evaluated in every case, using scatter diagrams in order to eliminate any impact of outliers and to evaluate the model's linearity.

1. Factors explaining the level of regional development

An analysis of the correlation between regional development level measured in GDP per capita and the characteristics of the regional economy produced largely similar results in both sections under analysis, i.e. temporal and spatial (**Table 1**).

Table 1. Correlation between regional development level and growth factors*

Regional development level (GDP per capita EUR)	All regions (N=197)			Metropolitan regions (N=20)			Non-metropolitan regions (N=177)		
	2002	2008	2010	2002	2008	2010	2002	2008	2010
Unemployment rate (%)	-0.23	-0.22	-0.19	<i>-0.31</i>	<i>-0.12</i>	<i>-0.05</i>	<i>-0.15</i>	<i>-0.09</i>	<i>-0.03</i>
GVA agriculture (%)	-0.67	-0.66	-0.65	-0.59	-0.57	-0.52	-0.68	-0.68	-0.66
GVA industry (%)	0.20	0.13	<i>-0.01</i>	-0.59	-0.55	-0.53	0.39	0.47	0.25
GVA construction (%)	0.30	<i>-0.11</i>	<i>-0.05</i>	<i>-0.38</i>	-0.61	-0.58	0.38	<i>-0.09</i>	0.02
GVA simple services (%)	0.25	0.36	0.40	0.25	0.46	0.36	0.12	0.14	0.26
GVA business services (%)	0.27	0.48	0.33	0.66	0.65	0.61	0.05	0.17	-0.02
GVA public services (%)	0.16	-0.20	-0.19	0.65	0.46	0.53	0.15	-0.23	-0.21
FDI stock (per capita)	0.81	0.70	0.71	0.85	0.74	0.76	0.78	0.68	0.67
Migration balance (per capita)	0.37	0.54	0.42	0.07	0.34	0.33	0.33	0.47	0.34
Multimodal accessibility (index)	0.73	0.78	0.78	0.69	0.76	0.76	0.71	0.71	0.72
SME (per capita)	0.56	0.45	0.45	0.55	0.41	0.44	0.56	0.44	0.43
R&D outlays (per capita)	0.60	0.50	0.55	0.84	0.73	0.75	0.46	0.39	0.45
Higher education attainment (%)	0.38	0.52	0.54	0.30	0.42	0.43	0.25	0.30	0.34

* correlation (R-Pearson) above 0.4 marked in bold; statistically insignificant correlation at a level of 0.05 marked in italics
Source: prepared by the author.

The following major observations can be made regarding the identified groups of factors.

Based on the established correlation, it can be concluded that the value of **invested foreign capital** is crucial for explaining the regional development level in the CEECs (although the correlation between FDI and GDP decreases over time, a likely proof of the diffusion of development processes, with the metropolitan regions still visibly making use of the advantages achieved in the first phase of the transformation). This value is strongly associated with **multimodal transport accessibility**, the role of which remained relatively stable over the analysed period. It should also be noted that the correlation between these measures is not very strong, which can indirectly highlight the role of export opportunities of national enterprises operating in regions with better transport accessibility for development processes. It can mean that the aforementioned diffusion first and foremost occurs in regions with the relatively easiest access. On the other hand, **attractiveness for migration** is not as

crucial for the high development level of regions, which suggests that it is a derivative rather than a driver of such development. Its role is especially well visible in a joint analysis of all the regions, which shows that this aspect is an important factor differentiating metropolitan and other types of regions.

Similarly, the degree of **entrepreneurship**, and the scale of **R&D expenditure** also play an important role in explaining regional development level. While the former variable was of comparable significance in both types of regions (being insignificant in the case of metropolitan regions in 2008 and 2010), the role of the latter factor was better observable in metropolitan regions. Quite interestingly, there was a visible fall in the mutual correlation between those variables and per capita GDP, with a distinctly increasing role of human capital measured by the share of the population with **higher education**. Hypothetically, it could be explained by the greater role of the human resources in enterprises with foreign shareholdings, and their smaller impact on the growth of innovation and position of the local enterprises. Just as in the case of migratory activity, the role of human capital is important particularly when the two groups of regions are analysed jointly.

The **low share of gross value added generated in the agricultural sector** was definitely a structural difference that affected the level of regional development; it was related mostly to non-metropolitan regions and could indicate e.g. higher labour productivity in specialised sectors of agricultural production in metropolitan regions. One significant difference between metropolitan and non-metropolitan regions was the impact of the **role of industry**, which was negative in the case of metropolitan regions and positive in the case of the remaining types of regions. It should also be noted that, during the economic slump, in the latter case the role of industry in explaining regional development level was much less significant, a likely proof of the scale of the crisis in this sector. In the case of metropolitan regions, **business services** were crucial for explaining the development level. At the same time, and very interestingly, during the recession the role of simple services in explaining the development level of metropolitan regions was clearly substituted by the share of public services in GVA, which be viewed as proof of the increasing role of public transfers.

On the other hand, the use of labour is not as significant as a development factor since the productivity of work and not the volume of the utilised pool of labour, is of key importance for contemporary development processes.

Table 2. Regional development level and growth factors – multiple regression*

Regional development level (GDP per capita EUR)	All (N=197)			Metropolitan regions (N=20)			Non-metropolitan regions (N=177)		
	2002	2008	2010	2002	2008	2010	2002	2008	2010
R2 (adjusted)	0.92	0.84	0.82	0.92	0.72	0.66	0.94	0.83	0.80
Unemployment rate (%)	-0.03	-0.09*	-0.03	-0.13	-0.13	0.07	-0.01	-0.07	0.01
GVA agriculture (%)	-0.29**	-0.18**	-0.11	0.11	-0.25	-0.57	-0.39***	-0.31***	-0.22**
GVA industry (%)	-0.16	0.02	0.01	0.64	0.30	0.29	-0.26*	-0.05	-0.08
GVA simple services (%)	-0.10	0.09	0.10	0.79	0.50	0.60	-0.17	0.02	0.03
GVA business services (%)	-0.09	0.02	-0.09	0.67	0.49	0.10	-0.14**	-0.06	-0.16*
GVA public services (%)	-0.15*	-0.08	-0.11	0.39	0.08	-0.14	-0.23***	-0.16**	-0.20**
FDI stock (per capita)	0.65***	0.40***	0.40***	0.74**	0.71*	1.01*	0.67***	0.45***	0.44***
Migration balance (per capita)	-0.04	-0.01	0.03	0.15	0.01	0.26	-0.03	-0.01	0.04
Multimodal accessibility (index)	0.12***	0.30***	0.32***	0.05	0.47	0.75	0.08**	0.22***	0.24***
SME (per capita)	0.38***	0.18***	0.12*	0.15	-0.12	-0.26	0.43***	0.28***	0.19***

R&D outlays (per capita)	0.05	0.11**	0.16***	-0.19	-0.35	-0.72	0.05*	0.12**	0.18***
Higher education attainment (%)	0.01	-0.01	0.06	-0.44	-0.62	-0.54	0.01	-0.03	0.01

* statistically significant values marked in bold (***) 0.001; (**) 0.01; (*) 0.05

Source: prepared by the author.

The use of multiple regression largely corroborates the above findings (**Table 2**), in particular the special role of the volume of **invested foreign capital** and transport accessibility in explaining regional development level. In the case of metropolitan regions, only the former factor matters and has any statistical significance, dominating over all the other factors. This clearly shows that the development level of metropolitan regions depends on how strongly they are included in globalisation processes. In non-metropolitan regions, transport accessibility is of paramount importance, which could indicate the export potential of such regions. Among endogenous factors, the level of **entrepreneurship** is statistically significant for explaining the development level of this group of regions, in addition to **R&D expenditure** in the recent years. Hypothetically, this could be viewed as proof of the growing role of innovation for the competitiveness of their economies. As regards structural factors, the **low share of GVA in agriculture** is especially important. However, as the productivity of this sector increases, this factor probably loses in significance in explaining the differences in regional development levels. Furthermore, the role of public services has a negative bearing on the development level, which can partly show the significance of national external transfers. Interestingly, the development level of non-metropolitan regions is negatively correlated with the role of **business services**, as was manifested during the recent economic crisis and could point to the fragile nature of such a development driver in non-metropolitan regions. Another interesting observation is that while in 2002 a high **GVA share in industry** was negatively correlated with the level of development, no such correlation could be established in the subsequent years, including the period of the crisis, which could point to advanced restructuring processes in industry.

2. Factors explaining regional economic growth

2.1. Dynamics of regional growth and regional characteristics in the baseline year

In the subsequent year, it was examined how the development dynamics of regions (change of real GDP per capita) for the periods 2002-2008 and 2008-2010 depended on the value of other variables in the baseline year (2002 and 2008, respectively). For instance, it was investigated whether the regions which had a greater share of business services in GVA at the beginning of the analysed period were developing faster or slower than those where this share was smaller.

First, it should be observed that the analyses indicate very different development paths of regions with similar characteristics. This could suggest an important role of other, soft factors or a strong impact of the local context. Such a situation could also have a bearing on the relatively dissimilar results of the analyses depending on the method used, i.e. correlation analysis and multiple regression.

Table 3. Regional development dynamics and their characteristics in the baseline year

	All (N=197)		Metropolitan regions (N=20)		Non-metropolitan regions (N=177)	
	2002-2008	2008-2010	2002-2008	2008-2010	2002-2008	2008-2010
Real GDP change (%)						
GDP (per capita)	<i>0.01</i>	0.19	<i>-0.27</i>	<i>0.01</i>	<i>-0.07</i>	0.21
Unemployment rate (%)	-0.24	0.18	<i>-0.41</i>	<i>0.16</i>	-0.15	0.23
GVA agriculture (%)	-0.25	-0.21	<i>0.02</i>	<i>0.02</i>	-0.18	-0.21
GVA industry (%)	<i>0.00</i>	<i>0.05</i>	<i>-0.07</i>	<i>0.26</i>	<i>0.08</i>	<i>0.07</i>
GVA construction (%)	0.27	<i>-0.12</i>	<i>-0.22</i>	<i>-0.40</i>	0.30	<i>-0.10</i>
GVA simple services (%)	0.36	0.23	<i>-0.02</i>	<i>-0.07</i>	0.30	0.24
GVA business services (%)	<i>-0.05</i>	<i>0.01</i>	<i>0.20</i>	<i>0.06</i>	-0.28	<i>-0.06</i>
GVA public services (%)	-0.14	<i>-0.04</i>	<i>-0.03</i>	<i>-0.07</i>	<i>-0.12</i>	<i>-0.02</i>
FDI stock (per capita)	<i>-0.01</i>	<i>-0.06</i>	<i>-0.14</i>	<i>-0.07</i>	<i>-0.07</i>	<i>-0.09</i>
Migration balance (per capita)	0.19	0.32	<i>0.32</i>	<i>0.10</i>	<i>0.04</i>	0.35
Multimodal accessibility (index)	0.22	0.29	<i>0.17</i>	<i>0.15</i>	<i>0.06</i>	0.30
SME (per capita)	-0.19	0.30	-0.49	<i>0.42</i>	-0.21	0.28
R&D outlays (per capita)	0.17	-0.15	<i>-0.05</i>	<i>0.13</i>	<i>0.07</i>	<i>-0.21</i>
Higher education attainment (%)	0.18	<i>0.04</i>	0.55	<i>-0.09</i>	<i>-0.14</i>	<i>-0.01</i>

* correlation (R-Pearson) above 0.3 marked in bold; statistically insignificant correlation at a level of 0.05 marked in italics

Source: prepared by the author.

It is much more difficult to offer clear-cut conclusions based on the analysis of these correlations compared to the analysis of development level. The key observations are the following (**Table 3**):

- **Human capital** plays a significant role as the driver of growth of metropolitan regions in the period of economic prosperity, accompanied by a negative impact of a well-developed **SME sector**. The latter may be a result of an excessive fragmentation of this sector and therefore its being among the basic and non-basic functions in the case of metropolitan regions. These correlations, however, are of negligible importance in the period of economic crisis;
- In the case of non-metropolitan regions in the period of prosperity, a high share of **simple services and construction** in GVA had a bearing on the dynamics of regional development. This could suggest that the fulfilment of citizens' consumer needs is associated with capital transfers (EU funds and transfers from emigrants). This is corroborated by a faster development of regions **with a smaller share of agriculture** in GVA and a lower unemployment rate. On the other hand, this is taking place in the context of a smaller role of business services and a lower degree of SME penetration. In the crisis conditions, the region's **attractiveness for migration** is gaining in significance, coupled with its multimodal accessibility and a well-developed enterprise sector. Interestingly, the regions with higher GDP values were performing better even in a situation of a higher unemployment rate, but with a smaller role of agriculture.

Table 4. Regional development dynamics and regional characteristics in the baseline year – multiple regression

	All (N=194)		Metropolitan regions (N=20)		Non-metropolitan regions (N=174)	
	2002-2008	2008-2010	2002-2008	2008-2010	2002-2008	2008-2010
Real GDP change (%)						
R2 (adjusted)	0,42	0,27	-	-	0,35	0,33
GDP (per capita)	-0.11	0.30	-1.35	-0.10	-0.02	0.48**
Unemployment rate (%)	-0.11	0.32***	-0.20	0.01	-0.06	0.33***
GVA agriculture (%)	-0.58	0.03	0.44	0.59	-0.74*	0.01
GVA industry (%)	-0.38	-0.01	1.08	1.51	-0.50	-0.14
GVA simple services (%)	0.07	0.19	1.16	0.42	0.00	0.07
GVA business services (%)	-0.23	-0.01	0.88	1.04	-0.29	0.00
GVA public services (%)	-0.11	-0.14	0.54	0.02	-0.23	-0.10
FDI stock (per capita)	-0.22	-0.27**	0.25	-0.11	-0.18	-0.44***
Migration balance (per capita)	0.10	0.31***	-0.04	-0.48	0.03	0.36***
Multimodal accessibility (index)	0.33***	0.05	0.56	0.10	0.16	0.07
SME (per capita)	-0.61***	0.07	-0.52	0.30	-0.57***	-0.07
R&D outlays (per capita)	0.20**	-0.15	0.44	0.41	0.16*	-0.17*
Higher education attainment (%)	-0.07	-0.18	0.09	0.35	-0.18*	-0.06

* statistically significant values marked in bold (***) 0.001; (**) 0.01; (*) 0.05

Source: prepared by the author.

Based on the multiple regression analysis (**Table 4**), it can be concluded, firstly, that no correlation models could be established between the indicators' values in the baseline year and the rate of the development for metropolitan regions. On the other hand, it could be observed in non-metropolitan regions (but with low values of the model's coefficient of determination) that a faster growth in the period of prosperity was taking place in the context of a lesser role of agriculture and lower SME penetration. On the other hand, economic growth was fostered by the volume of R&D expenditure, but not necessarily with the human capital resources being developed significantly above the average. During the financial crisis, the development level of regions and their earlier attractiveness for migration gained in significance. In contrast, the earlier presence of foreign capital had a negative impact (which could be a symptom of a crisis of the export sectors), and such negative correlation could also be found between R&D expenditure and low unemployment rate.

2.2. Dynamics of regional growth and changes of other variables

The fast rate of regional development across the analysed sections was associated with a **decreasing role of public services in GVA**, or, conversely, an increasing role of other sectors (except agriculture), visible in the two types of regions (**Tables 5 and 6**). This means that the increasing role of these services, which could be strongly correlated with public transfers, provided no stimulus for economic growth. A high share of agriculture in the economy had a similarly negative impact, which proved that despite modernisation, increase of productivity in agriculture still remained lower than in the remaining sectors of the economy. During an economic boom, the unemployment rate would also decrease, a process which was particularly well visible in non-metropolitan regions.

In **metropolitan regions**, the increase in the number of SMEs and a lesser role of GVA in public services were two crucial factors determining development dynamics. Based on the structural

changes, it can be assumed that those business entities which were not established in traditional sectors but rather in branches of information economy were of particular importance. During the crisis, it was crucial for these regions to maintain their attractiveness for the influx of inward capital, whereas the increasing role of the construction sector helped reduce the negative impact of the broader economic situation. The latter aspect could be a result of increased expenditures on public infrastructure, financed from the Cohesion funds, but it could also prove to some extent that the good business outlook continued in the commercial property market. Moreover, lack of correlation between GDP and the continued drop in the share of GVA in public services can be viewed as proof of a growing role of domestic supports.

In **non-metropolitan regions**, just as in metropolitan regions, increase in the number of SMEs and in the number of people with higher education were factors with a positive impact on the dynamics of growth in the period of prosperity other than the ongoing structural changes, manifested by a decreasing role of agriculture and industry. In the period of economic crisis, it should be noted that crisis resistance mechanisms were becoming similar to those observable in metropolitan regions, i.e. their continued attractiveness for inward capital and development of the construction sector. In parallel, the role of the structural factor and simple services increased in these regions, in comparison to the earlier model based on development of entrepreneurship and human capital resources.

Table 5. Regional development dynamics and changes in the value of the remaining variables*

	All (N=194)		Metropolitan regions (N=20)		Non-metropolitan regions (N=174)	
	2002-2008	2008-2010	2002-2008	2008-2010	2002-2008	2008-2010
Real GDP change (%)						
Unemployment rate (%)	-0.33	-0.32	<i>-0.21</i>	<i>-0.32</i>	-0.30	-0.34
GVA agriculture (%)	<i>-0.19</i>	<i>-0.08</i>	-0.47	<i>-0.43</i>	<i>-0.12</i>	<i>-0.03</i>
GVA industry (%)	<i>-0.07</i>	<i>-0.14</i>	-0.45	<i>-0.37</i>	<i>0.04</i>	<i>-0.12</i>
GVA construction (%)	<i>-0.07</i>	0.55	<i>0.41</i>	0.79	<i>-0.10</i>	0.52
GVA simple services (%)	<i>-0.07</i>	0.21	0.32	<i>-0.03</i>	<i>-0.15</i>	0.24
GVA business services (%)	<i>0.02</i>	<i>-0.20</i>	<i>-0.19</i>	<i>-0.21</i>	<i>0.02</i>	<i>-0.23</i>
GVA public services (%)	-0.41	-0.52	<i>-0.41</i>	<i>-0.07</i>	-0.41	-0.57
FDI stock (per capita)	<i>-0.01</i>	0.32	0.37	0.76	<i>-0.03</i>	0.31
Migration balance (per capita)	<i>-0.03</i>	<i>-0.08</i>	<i>-0.10</i>	0.26	0.03	<i>-0.09</i>
SME (per capita)	<i>0.11</i>	<i>-0.22</i>	0.48	<i>-0.01</i>	0.02	<i>-0.24</i>
R&D outlays (per capita)	<i>-0.09</i>	0.07	0.15	0.17	<i>-0.08</i>	0.08
Higher education attainment (%)	0.10	<i>-0.19</i>	<i>-0.10</i>	<i>-0.37</i>	0.15	<i>-0.16</i>

* correlation (R-Pearson) above 0.3 marked in bold; statistically insignificant correlation at a level of 0.05 marked in italics

Source: prepared by the author.

Table 6. Regional development dynamics and changes in the value of the remaining variables*

	All (N=194)		Metropolitan regions (N=20)		Non-metropolitan regions (N=174)	
	2002-2008	2008-2010	2002-2008	2008-2010	2002-2008	2008-2010
Real GDP change (%)						
R2 (adjusted)	0.43	0.58	0.84	0.90	0.82	0.60
Unemployment rate (%)	-0.36***	-0.11	0.12	0.47	-0.37***	-0.18**
GVA agriculture (%)	-0.28***	-0.17**	-0.36	-0.29	-0.22**	-0.12
GVA industry (%)	-0.36***	-0.05	-0.21	0.04	-0.29**	0.02
GVA construction (%)	-0.14	0.32***	0.10	0.49*	-0.14	0.28***
GVA simple services (%)	-0.21	0.19**	-0.92**	-0.71	-0.19	0.26***
GVA business services (%)	-0.06	-0.07	-0.23	-0.74	-0.03	-0.06
GVA public services (%)	-0.52***	-0.46***	-0.98***	-0.17	-0.49***	-0.44***
FDI stock (per capita)	0.09	0.16***	0.68	0.40*	0.08	0.18***
Migration balance (per capita)	0.04	-0.07	0.69	0.40	0.06	-0.06
SME (per capita)	0.25***	-0.07	0.73**	0.19	0.21**	-0.10
R&D outlays (per capita)	0.01	0.02	0.11	0.03	0.01	0.02
Higher education attainment (%)	0.16	-0.08	0.30	-0.04	0.18**	-0.04

* statistically significant values marked in bold (***) 0.001; (**) 0.01; (*) 0.05

Source: prepared by the author.

Conclusion

The analyses showed that the development processes taking place in the two identified types of regions in the CEE countries, i.e. metropolitan and non-metropolitan, were characterised by a high level of complexity. Nevertheless, based on the studies and surveys certain generalisations were made concerning the development trajectories of these regions and the role of the analysed groups of regional development factors, together with the course of development processes depending on a given economic situation. Therefore, the summary discusses, firstly, the similarities and differences of development processes in these two types of regions; secondly, the role of individual groups of factors in economic development processes and, thirdly, the role of the economic context in the development of CEEC regions.

In the case of metropolitan regions, their **attractiveness for inward capital** was of crucial importance for reaching a high level of growth. This could suggest that the scale of internationalisation of a metropolitan economy and its inclusion into a global space of flows was the key development factor. Such a process was taking place in the conditions of good multimodal transport accessibility, the presence of an R&D potential and well-developed stock of human capital. As a matter of course, this was accompanied by a number of other phenomena, associated e.g. with structural transformation (deindustrialisation and tertiarisation of advanced business services). Using a dynamic approach, we can see that the role of foreign capital in development processes is largely a derivative of the first phase of the transformation period. Successes of regions in the period of economic prosperity were mainly visible in those metropolitan regions which had adequate **human capital resources** and where **entrepreneurship** was on the rise. It can be assumed that a new type of entrepreneurship was at play, associated with informational economy. In the period of the financial crisis, however, the role of foreign capital was better visible once more time in the metropolitan regions, together with – paradoxically perhaps - an increased role of the construction sector, possibly a consequence of the increased volume of public investment projects, including those co-financed from the EU, which created demand-side effects for the local economy.

A much wider mix of factors fostering a fast development rate could be observed in the remaining regions. Just as in the first group of regions, here **foreign investment** was of crucial importance, in addition to good multimodal accessibility, which facilitated the influx of inward capital and created favourable conditions for the export orientation of the regional economy. In structural terms, **a low share of agriculture** in gross value added was of primary importance in non-metropolitan regions, with a rather ambivalent impact of the share of industry. In the latter case, high labour productivity mattered even more (cf. **Smętkowski 2014**), as proved by an increasing role of **R&D expenditure** in explaining the development level of these regions. Another endogenous development factor was the level of SME penetration, whereas the role of human capital stock measured by the number of people with higher education was not as important. These characteristics in the baseline year had little bearing on the development dynamics of these regions, which can be viewed as proof of their very different development paths. The structural factor in the form of a low share of agriculture in GVA proved to be of the greatest importance. In turn, during the financial crisis the region's migratory attractiveness was of greater importance, at least the smaller outflow of the population than in other regions of this group. In the dynamic approach, fast development of these regions was also fostered by a growth of entrepreneurship and increase in the human capital stock, in addition to falling unemployment and reduced share of public services in GVA, which does suggest that the endogenous factors do play a role. However, the attractiveness of such regions for inward capital began to matter anew in the wake of the crisis, which was accompanied by a parallel increase of construction in GVA (most probably thanks to public investment projects).

The analyses found that the development processes of the investigated groups of regions were in many respects similar. Achieving a high level of development was possible mainly owing to **exogenous factors** such as the influx of foreign capital and multimodal transport accessibility (both potential determinants of pro-export orientation of the regional economies). In the case of **endogenous factors**, penetration with SMEs was of cardinal importance, but it was no guarantee of fast development dynamics. In this approach, a rapid increase in the number of enterprises was more important, but this process was visible mainly in the metropolitan regions. It can also suggest the hypothesis that these were mainly business entities operating in the sphere of informational economy which were set up in response to emerging market opportunities and not out of necessity, driven by an unfavourable situation on the labour market. **Structural transformation** also played a considerable albeit varying role in development processes. In particular, dissimilarities in the economic structures did not significantly affect the growth of metropolitan regions, although higher GDP per capita values could be found in those metropolises where deindustrialisation processes were more advanced. On the other hand, a higher degree of industrialisation could explain the development level of non-metropolitan regions, but less so than the role of agriculture in their economies. The latter was also of primary importance in explaining the development dynamics of regions, manifested by a slower development of agricultural regions. In addition, those non-metropolitan regions were performing better where the role of agriculture and industry, with its traditional sectors, was decreasing.

The main differences between the identified groups of regions included the role of **human capital and interregional migrations**. In this respect, metropolitan regions represented growth poles which trained highly-qualified specialists on the one hand, and on the other served as destinations for the migration of students and other well-educated individuals from non-metropolitan regions. Interestingly, the share of people with tertiary education played a more prominent role in the

regions from the second group achieving a development success than the increase in the number of new SMEs, a factor which was of greater significance in metropolitan regions.

In terms of regional development, the fundamental difference between the period of economic boom and economic slump was the reduced role of **endogenous** growth factors (especially an increase in the number of small and medium-sized enterprises), and of **structural** factors, associated mostly with a decline of traditional industries and agriculture, which were superseded by **exogenous** factors such as the inflow of inward capital and expansion of the construction sector, accompanied by the supposedly leading role of public investment projects, including those co-financed from the EU funds.

Recommendations

Based on the research, the following recommendations can be proposed for the period following the present crisis/economic downturn:

- Efforts should be made to rebuild the **endogenous potential** of CEEC regions through creating conducive conditions for the expansion of innovative SMEs. In metropolitan regions, this should involve in particular establishing better linkages between business and academia. In non-metropolitan regions, support should be extended to the development of enterprise and technology transfer from metropolitan centres, which should be accompanied by measures aimed to improve the quality of human resources through the improvement of the education system. In the latter regions, ongoing restructuring processes should also be supported and accelerated, particularly those intended to reduce the role of agriculture in the economy.
- The above should be attained using the **European funds**, which were earlier largely spent on temporarily alleviating the consequences of the economic crisis, producing demand-side and not supply-side effects. The improvements in the living standards and environmental quality, achieved in this way, in the current and future programming periods should be augmented by efforts to reinforce their pro-innovation impact and in this way foster economic development.
- The **unique regional features and context** should be necessarily taken into account while devising and implementing regional development strategies and programmes, since the development paths of regions with similar characteristics can vary considerably; this suggests a significant role of soft, often immeasurable and distinctive factors associated with the local setting in their development processes.

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