Economic restructuring in the CEE regions between 2000 and 2018: the role of the information and communication sector

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One of the indicators of long-term economic development is higher value-added sectors, e.g. how the information and communication sector is growing. Economic restructuring is also an essential element of the smart specialization strategies emphasized in EU regional policy, as they aim to promote integrated, place-based economic development programs. In our research, we examine how the economic structure of the NUTS3 level territorial units (counties) of five Central and Eastern European countries (Bulgaria, the Czech Republic, Hungary, Romania, and Slovakia) changed between 2000 and 2018.

These five countries have followed a broadly similar path in recent decades, having been members of the Comecon until 1990, so their economic structure has been characterized by an economic policy and a prominent role for industry. The opening up of the market and privatization following the change of regime, mainly as a result of the accelerating EU accession negotiations since the turn of the millennium, have modernized the economic structure of the countries. Foreign direct investment (FDI) has emerged, initially as a resource-seeking and then as a market-seeking investment. Among the countries, the Czech Republic, Hungary, and Slovakia joined the EU in 2004, while Bulgaria and Romania joined the EU in 2007. Subsequently, FDI investments in the search for efficiency, with the free movement of goods, capital, services, and people, have gradually emerged as a result of EU principles.

In all five countries, reindustrialisation has been a priority, including strong incentives for foreign investment. Investments in the manufacturing sector have also been supported through rebates, promoting cheap labor and creating favorable institutional conditions for them (eg restrictions on trade unions, loosening of dismissal conditions). This process of reindustrialisation coincided with the 4.0 industrial change in developed countries, which projected a kind of division of center (semi-) periphery between the developed western and less developed eastern member states of the European Union (Nagy et al. 2019, 2021).

The strategic interests and decision-making mechanisms of multinational companies (production, service companies, financial institutions, investment funds) are decisive in the global processes, which also transform the spatial characteristics of the global economy and the global-local relations. These trends determine the economy of the less developed countries, including the economic structure of the regions of the transition countries (such as Hungary), which can thus be considered dual in nature. And these dual economies and their regions can easily be trapped in the middle income, and their economic structure "closes".

The concentration of economic activities is accompanied by their specialization, both of which have a strong impact on productivity developments. Henderson (1995, p. 272) highlighted the following spatial division of labor for the urban system, cities, and their area: villages and small towns (agriculture, traditional manufacturing, traditional textiles, food, simple metal processing, non-metallic minerals, etc.), medium-sized cities (modern manufacturing, mechanical engineering, vehicle manufacturing, etc.) and metropolitan areas (high-tech activities and modern services, instruments, electronics, finance, media, arts, etc.).

After that, we would like to describe the used methods and data. The database of our study consists of the counties of the 5 countries, the capitals were merged with the counties forming their catchment area (except in the case of Bratislava), e.g. Budapest with Pest county. As a result, we analyze 108 territorial units to describe the regional inequalities and patterns:
- Bulgaria: 27
- Czech Republic: 13
- Hungary: 19
- Romania: 41
- Slovakia: 8

Based on the Eurostat database, 11 sector groups were considered. For all 108 territorial units, Eurostat will report the number of persons employed and the GVA at current prices in national currency between 2000 and 2018. Of course, the localization of activities, ie their assignment to territorial units, is problematic in several cases, e.g. for transport activities or multi-site companies. Based on the ESA2010 methodology, these estimates are similarly distributed among the territorial units in each country, which can be used for international comparisons.

We also worked with the methodology used in one of our previous studies in our current research. The entropy-based Theil index can also be used to analyze the spatial concentration of economic activities and the specialization of regions (Lengyel et al. 2016, 2017). Thissen et

al. (2013, pp. 63–64) developed an analytical framework for examining the smart specialization of EU regions: Spatial concentration can be observed in a sector if the companies operating in the given sector are typically grouped into a few territorial units and the spatial distribution of the sector differs from what is expected based on the spatial distribution of the whole economy. The concept of spatial dispersion (for the sector) can be used as a counterpoint to the concept.

Thissen et al. (2013) used a Theil index to measure both the spatial concentration of subsections and the specialization of regions. The Theil index relies on the concept of entropy and measures the disorder of a studied criterion. Data on employment and gross value added (GVA) of 11 sector groups per county are taken into account each year. The spatial concentration of sectors of each region type are analyzed using Theil indices. In the case of Theil indexes, we use location quotients (LQ indexes) to measure the spatial concentration of economic activities and the specialization of regions. On the basis of the determined LQ values, we calculated two Theil indexes for each year between 2000 and 2018.

A spatial concentration index for each manufacturing subsection:

$$Conc_j = \left[\frac{1}{I}\frac{1}{\ln(I)}\right]\sum_{i=1}^{I}\left[\left(\frac{LQ_{ij}}{\frac{1}{I}\sum_{i=1}^{I}LQ_{ij}}\right)\cdot\ln\left(\frac{LQ_{ij}}{\frac{1}{I}\sum_{i=1}^{I}LQ_{ij}}\right)\right]$$

The values of these indicators close to 1 indicate the territorial concentration of the given sector and the specialization of the economy of the given area. While values close to 0 indicate scatter (for spatial concentration index) and diversity (for specialization index).

Among the results, we can see that there is a strong concentration of modern business services, especially information and communication, as well as the financial sectors in big cities, mainly in capitals, while retail services but also manufacturing are more spatially distributed. Labor productivity in modern business services is improving rapidly, reaching 55% in the 12 older EU Member States, while e.g. the manufacturing industry, which enjoys priority development aid, has been stagnant at 30% for years.

To sum up, it can be stated that behind the structural transformations and rearrangements that took place during the examined period, we can discover differentiated regional development trajectories. In the CEE5 countries thet regions play a dominant role, where the gross domestic product is relatively high, labor productivity is also higher, and the development of the business capital is developing in these regions. However, the changes that took place between 2000 and 2018 predict that the dominance of these areas will exacerbate territorial

inequalities in certain countries in the supranational region. Consequently, the policy challenge is divided into two-hand: on the one hand, these central regions need to be developed to compete on the international stage, but care must also be taken to avoid glaring territorial inequalities.