

CHANGING ECONOMIC POSITIONS OF THE REGIONS DURING THE POST-CRISIS DECADE IN HUNGARY

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Most Central and Eastern European countries converged to the EU average in terms of per capita GDP over the post-crisis decade, which was mostly fueled by the increase of employment. At the same time, labour productivity increased at a significantly slower pace, or it even decreased in some years or areas in real terms, which was also the case in Hungary. The most successful regions were not definitely the capital regions, but those that relied heavily on FDI inflow. However, in the last few years of the previous decade, as a result of the high-pressure economy, economic dynamism reappeared in the central region of Hungary and it regained its leading position. We intend to study the regional dynamics of the growth factors over the period after the global financial and economic crisis in Hungary; and to assess the importance of FDI in determining these growth trends. We use explorative statistical methods to analyze the decade-long economic trends regarding the most important labour-market and output indicators at the NUTS3 level provided by the Hungarian Central Statistical Office. The main message of our paper is that for regions with a high degree of FDI their sectoral structure ensures economic stability, while the central region is more vulnerable to the fluctuations of demand-side pressure. At the same time, backward regions are stagnating due to the lack of positive spatial spillover effects.

Keywords: Labour productivity, Regional inequalities, Long-term analysis

JEL Classification: F21, O47, R12

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ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary*

1. Introduction

During the economic transition, Central and Eastern European countries gradually converged to the Western European average level of development (Gyórfy, 2021), and the essential source of employment growth and the technological renewal was the inflow of investment by foreign multinational companies. FDI had an essential role in managing capital shortage and structural shift in the economies (Gál & Singh, 2021), and these impacts manifested in the spectacular increase of labour productivity until the global financial and economic crisis. The main advantages of the strong FDI penetration are expected from their spillover effects on the local economies through knowledge, skills and technology diffusion (Balatoni & Pitz, 2012, Stojčić & Orlić, 2019, Éltető & Alguacil, 2020), which take place predominantly in a vertical nature, i.e., through backward linkages, among the local suppliers of multinationals, as well as in the upstream sectors (Javorcik, 2004, Gál, 2019). However, the emerging structures depend on localised productive legacies, networks, business environment and production factors, therefore, their distribution is uneven in space (Gál & Singh, 2021, Lux, 2017a).

The growth model followed after the regime change has reached its limits (Lux, 2017b). In this respect, the global financial and economic crisis means a turning point, because it had a hysteretic, permanent effect on economic dynamism (MNB, 2016). The main reasons behind the hysteresis were the permanent decrease in the quantity and quality of the factors of production (physical capital, human capital, technological innovation) and the balance sheet adjustment of the private and public economic actors. One of the most important, long-term process was the demographic change under which not only the natural population decline, but also outward migration induced labour shortage and skills mismatch during the last decade, which hindered economic growth. The process led to a significant decrease in the share of active population: at around 5 percent of the Hungarian working-age population live in another EU country compared to the home-country resident population in the corresponding age group, 20 to 64 years (see Eurostat, 2018). This phenomenon appeared in a spatially selective manner; acute labour shortage was apparent especially in those regions that heavily relied on FDI-based, export-led production (Czirfusz, 2020). Although this phenomenon temporarily disappeared in the Covid-19 crisis, it is expected to return fast along with the post-crisis recovery in the middle and the long term. Likewise, labour shortage and the declining level of education may (further) deteriorate the attractiveness of CEE countries for FDI investments in the future (Éltető & Alguacil, 2020).

Paradoxically, in spite of their unquestionable leading position, the growth performance of the capital regions weakened after the crisis, especially in Hungary (Lengyel & Varga, 2018). Similar tendencies were experienced in many countries all over the world which is often referred to as the productivity puzzle (Callaghan, 2021). This process implied that the regional inequalities started to decline in statistical terms, but the true underlying phenomena is regional polarization as a result of a 'diverging elite' and the stagnation of the lagging regions

ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary*

in the Visegrád countries (Fiaschi & Lavezzi, 2007; Lengyel & Kotosz, 2018). By the end of the decade, the paradox analyzed by Lengyel & Varga (2018) has ceased to be in effect, and Budapest has regained its pre-crisis position with respect to growth performance, therefore, regional inequalities started to increase again, and they came close to their previous highest level measured at the time of the financial and economic crisis. At the same time, some signs of slowing down can be detected in the manufacturing-oriented regions, even though their sectoral composition and overall attractiveness ensures a high level of economic stability. Our central assumption is that these processes are attributable to the emergence of the so-called high-pressure economy (Bivens, 2017). This phenomenon is characterized by a high degree of demand-side pressure on the economy which is fuelled by accommodative monetary policy, strong investment dynamics financed from central governmental and EU resources, as well as FDI, and the tightness of the labour market. Government policies in favour of sustaining the high-pressure economy were successful in driving economic recovery, especially as opposed to the orthodox prescription of fiscal austerity experienced in the first few years of the post-crisis period. Not surprisingly, the demand side pressure propagates unevenly across space and somewhat follows the distribution of human capital and investments.

As described above, the emergence of the high-pressure economy in the last few years of the previous decade partly reshaped the territorial pattern of growth dynamics in Hungary. Indeed, all areas were able to benefit from the high-pressure economy, but not to the same extent. The relative economic position of the peripheral regions remained largely unchanged, the prosperity of the manufacturing-oriented regions turned a bit slower, while the ultimate winner of this process seems to be once again the capital city. To the best of our knowledge, these issues have not been pointed out in the most recent literature of regional studies, therefore, we try to combine the experience of the high-pressure economy literature and the FDI impacts' literature with our own exploratory analyses. We intend to illustrate the main development patterns with Hungarian empirical data provided in a regional disaggregation. To this, we use public databases issued by the Hungarian Central Statistical Office and employ explorative statistical methods to analyze the tendencies over the previous decade. The lowest level of regional aggregation at which the data are available is the NUTS3 level.

Our paper is structured as follows: the next section briefly reviews the literature, and the third section presents the methodology and data used in the empirical analysis. The fourth section introduces the results of our explorative statistical analyses, and the last section concludes.

2. Literature Review

The Visegrád countries are part of the 'Central European manufacturing core', where the primarily FDI-driven manufacturing sector represents a source of innovation and productivity growth (Cutrini, 2019). At the same time, several analyses point out the lack of overall

ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary*

economic convergence between the European regions and the existence of several economic clubs of regions after the crisis, together with club convergence (Iammarino et al., 2019). As a result, a sizeable manufacturing sector and well-developed knowledge-intensive services both enhance growth, while services that use low skills intensively are less relevant or even deteriorate growth prospects (Cutrini, 2019). New developments in the field of Industry 4.0 are expected to further widen the gap between local entrepreneurships, operating primarily in the SME sector that are lagging behind in adopting automation and digital technologies and larger, mainly foreign-owned firms that are early adopters of these technologies (Éltető & Sass, 2021). Consequently, Central and Eastern European regions are challenged by the 'middle income trap' (Gyórfy, 2021) which, in contrast to its name, is traceable not only in the middle-income regions but it can also occur in the capital regions (as apparent in the regional accounts after the 2008/09 crisis) and hinders growth and convergence in the lagging ones, too. The penetration of foreign capital is accompanied by the repatriation of a significant part of the generated profits and a widening gap between gross domestic product and gross domestic income (see the computations presented by Piketty & Novekmet, 2018). Similarly, Balogh et al. (2018) expect that due to the anticipated growth in the income of foreign-owned companies, the GDP-GNI gap may increase over the short run, while its long-term trend depends significantly on whether the convergence of the Hungarian economy with the Western countries is implemented from external or internal funds. Balatoni & Pitz (2012) emphasize that the advantages of FDI inflow can be enhanced through the development of the local economy's absorptive capacity which depends on the available human capital, the physical and financial infrastructure, macroeconomic stability and institutional structure (see also Casi & Resmini, 2017 and Éltető & Alguacil, 2020).

The impact of the FDI inflow differs between sectors, and the highest growth impacts can be achieved in the manufacturing sector, although the local spillover effects can be stronger in the services sector. Besides the economic growth performance (in terms of per capita GDP), the presence of FDI has positive impacts on investments, export sales, average wages and employment rate at the regional level, thereby the concentration of the FDI corporations may increase the 'duality of the economic structure' and regional inequalities (see Gál, 2019). Also, Gál (2019) showed that new FDI tends to flow into those regions which are already more developed and provide other endogenous sources of economic growth, therefore the direction of the causality between FDI and economic growth is not straightforward. Furthermore, crowding-out effects should also be considered as the multinational corporations (often enjoying significant state support) compete with the local entrepreneurships in the regional product and labour markets (Gál & Singh, 2021, Lux, 2017b). All these effects may sustain a high degree of path dependency in the economy at the regional level.

During the decade of the 2010s most Central and Eastern European countries converged to the EU average in terms of per capita GDP which was mostly fuelled by the increase of employment (Czifrusz, 2020). At the same time, labour productivity increased at a significantly slower pace, or it even decreased in some years or areas (at least at constant prices) until the middle of the previous decade. These simultaneous processes are, of course,

ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary*

not independent of each other, since a significant part of the extensive employment growth was achieved in less productive sectors or occupations and not in the frontier sectors. The most successful regions were those that relied heavily on FDI inflow, which were not definitely the capital regions. Generally, it can be more advantageous for a national or regional economy to first extend the labour force (extensive employment growth), and afterwards to enhance its efficiency (increasing productivity), because this way the overall growth performance might be better in the long run (MNB, 2020), in addition to its positive socio-political aspects. However, a shift towards greater competitiveness in the long run requires a new growth model which relies more upon endogenous growth factors and departs from the prevailing dependent economy model (Lux, 2017b).

Recent empirical research by Gál & Singh (2021) analyzes the nexus of FDI inflow and basic socio-economic indicators in Hungary at the NUTS3-level. The authors classify the regions according to their degree of industrialization and it largely overlap with that used in our present article. Their results reaffirmed that the FDI-driven growth model of the Central and Eastern European countries is not sufficient to ensure the long-term prosperity of regions since the positive effect of FDI-driven economic growth is only short-term and spatially concentrated, further exacerbating territorial inequalities.

Previous empirical works found that regional growth inequalities are largely driven by inequalities in labour productivity, as there was a significant convergence in employment rates, especially in Hungary (Zsibók, 2019). The dominance of labour productivity among the sources of economic growth is well expected to strengthen further in the long run in parallel to the general European trends, i.e., the ageing of the population and shrinking of the working-age population (European Commission, 2020). The processes described above have far-reaching consequences on regional economic prosperity and long-run development, since the most essential sources of long-run TFP (total factor productivity) growth, including human, social and institutional capital remain underdeveloped. In light of the above-mentioned productivity puzzle, our presumption is that the dependent market economy model is not advantageous for further productivity upgrading, or even for sustaining the existing level (relative to the EU average) in the Central and Eastern European regions, and it is not suitable for ensuring catching-up in lagging regions (Gál, 2019, Lux, 2017b, Myant, 2018). Some stylized facts describing the growth performance of the regions dominated by the manufacturing sector give rise to this assumption.

High-pressure economy is a timely issue in the context of post-crisis recovery, especially in relation to the recent Covid-19 crisis, but its spatial aspects are scantily reviewed in the CEE countries.

ZSIBÓK Z. (2021).

Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary

3. Methodology and Data

In this article we study the regional dynamics of labour productivity over the period after the global financial and economic crisis and assess the importance of FDI in determining these productivity trends. We focus on Hungarian data and use public databases issued by the national statistical office (Hungarian Central Statistical Office, HCSO), and use explorative statistical methods to analyze the tendencies over the previous decade. The lowest level of regional aggregation is the NUTS3 level.

We employ exploratory statistical methods to investigate the contribution of the different types of regions to economic growth in Hungary. The classification of the regions is based on their economic structure, growth performance and per capita GDP, and we use the practice followed by Lengyel & Varga (2018). Our data are collected from the Hungarian Central Statistical Office and are presented between 2008 and 2019 at the NUTS3 level. GDP values are deflated according to the GDP deflator published by the National Bank of Hungary, and represent values at constant, 2015 prices. In addition to GDP, we collected data from the HCSO on FDI, namely, the number of FDI enterprises and the value of the invested capital, as well as employment data.

The concentration of the economic activity among the NUTS3 regions is measured with the well-known Herfindahl-Hirschman Index which is based on the share of each region within the total national economy. The index is computed according to Equation (1):

$$HHI = \sum_{r=1}^n s_r^2 \quad (1)$$

where s_r denotes the share of region r within the total national economic activity (measured as GDP, FDI capital or the number of employees), and $r = 1$ to n , where n is the number of NUTS3 regions, i.e., 20.

According to the standard growth accounting framework, we intend to analyze the GDP and the labour productivity trends in a decomposed form at the sub-national level, under which GDP per capita changes are decomposed to changes in productivity and changes in employment rate in each region or group of regions. As explained above, the sign of the two underlying factors' contribution to the per capita GDP change can be different. Equation (2) indicates the decomposition of the regional-level per capita GDP:

$$\left(\frac{y}{n}\right)_t^r = \left(\frac{y}{e}\right)_t^r \cdot \left(\frac{e}{n}\right)_t^r = prod_t^r \cdot er_t^r \quad (2)$$

ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary*

where y denotes GDP at constant prices, n is population, e is the number of employees, r is the index of the regions or groups of regions ($r = 1$ to 20 or 1 to 5, depending on the spatial level of the analysis, i.e., 20 counties or 5 county groups) and t is the index of the time period.

The decomposition of the change of the per capita GDP from period t_0 to period t_1 can be elaborated according to Equation (3) as follows (see Lengyel & Varga, 2018 who applied a more detailed decomposition of the growth factors):

$$\left(\frac{y}{n}\right)_{t_1}^r - \left(\frac{y}{n}\right)_{t_0}^r = (prod_{t_1}^r - prod_{t_0}^r) \cdot er_{t_0}^r + (er_{t_1}^r - er_{t_0}^r) \cdot prod_{t_1}^r \quad (3)$$

In our present research, we split the data into two sub-periods of similar length, in the first one $t_0 = 2010$ and $t_1 = 2015$, and in the second one $t_0 = 2015$ and $t_1 = 2019$. This allows us to analyze separately the period of post-crisis recovery and that of the high-pressure economy. Finally, we identify those Hungarian groups of NUTS3 regions that were successful or unsuccessful in either or both of these growth factors.

In what follows, we use the territorial classification established by the influential paper of Lengyel & Varga (2018). The authors differentiate between five types of regions based on their economic structure, growth performance and level of GDP as indicated in Table 1.

Table 1. The classification of the Hungarian NUTS3 regions

Centre	County types			
	FDI manufacturing	Re-Industrialising	Knowledge centre	Rural
Budapest	Győr-Moson-Sopron	Bács-Kiskun	Baranya	Tolna
Pest	Fejér	Zala	Csongrád-Csanád	Somogy
	Komárom-Esztergom	Veszprém	Hajdú-Bihar	Békés
	Vas	Heves		Szabolcs-Szatmár-Bereg
		Borsod-Abaúj-Zemplén		Nógrád
		Jász-Nagykun-Szolnok		

Source: author's elaboration based on Lengyel & Varga (2018)

We find it useful to relate these county types with those of Lux (2017a, b) who differentiated between three types of regions with respect to the spatial structure of the post-socialist countries after the transformation.

1. Central regions. The first one includes the metropolitan, especially the capital regions that were able to successfully integrate into the post-industrial economy, they have a competitive services sector (business services, info-communication, financial sector). From the Hungarian regions, the Central region belongs to this category (Budapest, and Pest county, as presented in the first column of Table 1).
2. Intermediate regions. The second group consists of regions which are transitory with respect to competitiveness and accomplished a successful shift towards the industrial transformation. Their competitive advantage primarily relies upon manufacturing and, additionally, on the

ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary*

services sector which extends in parallel with the improving local income situation and demand. The main problems of these regions are the shortage of skilled labour as mentioned above and the challenges of technological upgrading. Our opinion is that from the Hungarian regions, the four FDI manufacturing regions belong to this category (Győr-Moson-Sopron, Komárom-Esztergom, Vas and Fejér counties).

3. Hollowing-out regions. The third group consists of those regions which have been negatively affected by the de-industrialisation process. The Knowledge centre regions (Baranya, Hajdú-Bihar and Csongrád-Csanád counties) and the Rural regions (Tolna, Somogy, Békés, Szabolcs-Szatmár-Bereg and Nógrád counties) certainly belong to this category, while the Re-industrialising regions (Bács-Kiskun, Zala, Veszprém, Heves, Borsod-Abaúj-Zemplén and Jász-Nagykun-Szolnok counties) are halfway between the second and the third category of Lux (2017a,b). In case the trends of the last few years follow, and the regional environment is favourable, some Re-industrialising regions (especially Bács-Kiskun or Heves county) will have the chance to catch up with the FDI manufacturing counties in the medium run.

In view of the development potential of the different county types, we can recognize that the most dynamic economies can be found in those regions where the primarily FDI-based manufacturing sector is present (see Table 2 below). The knowledge production capacities themselves are not enough to enhance the economic development (see Iammarino et al., 2020), since the performance of the Knowledge centre regions is not better than that of the Rural ones, and they all can be regarded as 'hollowing-out regions'. The Centre region is different from the other county groups because of the dominance of the services sector and a relatively minor manufacturing sector.

Figure 1 presents the most important stylized facts that are in the focus of this paper. For the Central region, the post-crisis recovery was indeed sluggish: in real terms, a very limited productivity growth has been achieved throughout the first half of the decade. The high-growth period started only from 2017, which was the era of high-pressure economy in Hungary and the wider CEE region. In contrast, the growth performance of the FDI manufacturing regions was more or less the reverse: they experienced an economic upswing after 2010, but a relative slowdown occurred during the last few years of the previous decade. Re-industrializing regions were able to narrow the gap with respect to the national average productivity in the first half of the decade, and later they preserved their position. At the same time, the position of the Knowledge centre regions with respect to labour productivity deteriorated in the 2010s, and the rural regions perform constantly at around 64-66 percent of the national average.

Table 2. Economic performance in the Hungarian county groups

County groups	GDP per Inhabitant*		Productivity*		Employment rate**	
	2010	2019	2010	2019	2010	2019
Centre	4825.9	6018.8	11844.9	12479.2	55.5	65.9
FDI manufacturing	3124.1	4238.1	7720.4	8677.2	54.1	65.5

ZSIBÓK Z. (2021).

Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary

	GDP per Inhabitant*		Productivity*		Employment rate**	
Re-industrialising	2184.4	3098.0	6029.4	6839.8	48.1	61.3
Knowledge centre	2261.0	2983.9	6319.3	6728.6	48.2	60.1
Rural	1852.3	2547.1	5306.9	5906.3	45.7	57.9
Hungary	3150.3	4204.8	8390.8	9105.0	50.6	62.6

Source: Author's elaboration based on HCSO data

* thousand HUF, at constant prices

** percentage, working-age population, aged 15 to 74

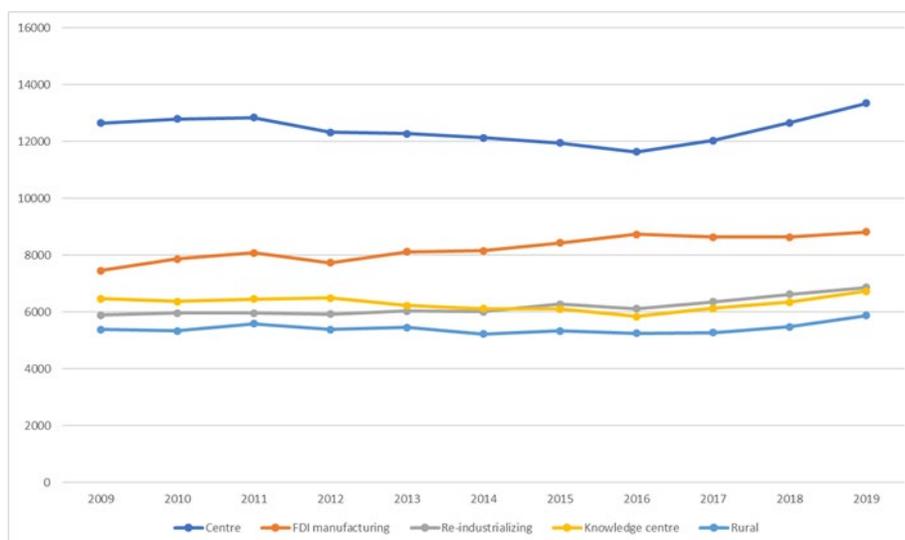
*Source: Author's elaboration based on HCSO data*

Figure 1. The dynamics of labour productivity in the different county groups between 2009 and 2019 (thousand forints, computed at constant prices)

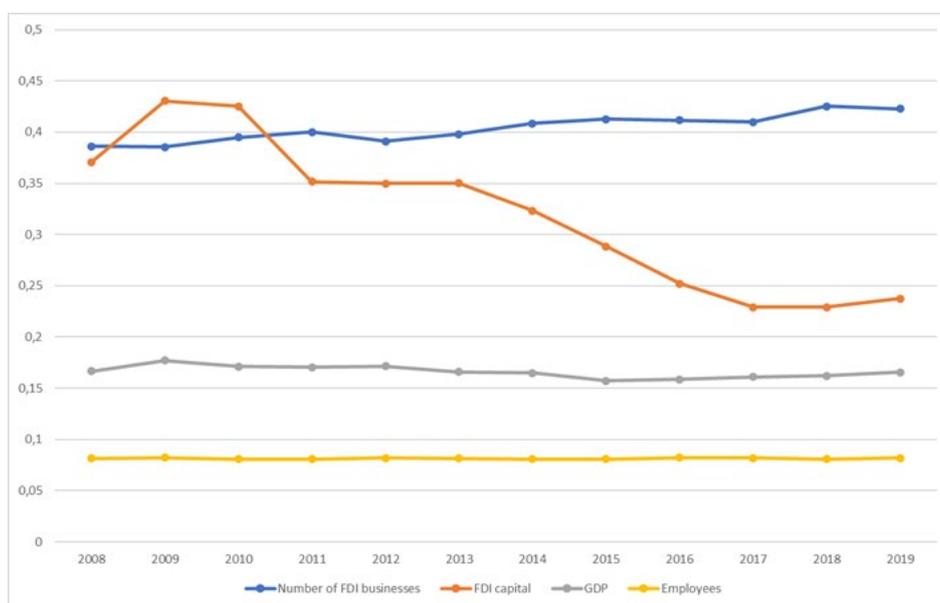
4. Results

Hungary has followed an FDI-driven growth model since the regime change, but the spatial distribution of these investments has been uneven in space. Although there was a gradually increasing concentration in the number of FDI enterprises (it dropped from around 29 thousand in 2009 to 21 thousand in 2019), the concentration of the volume of the FDI capital significantly decreased after the global financial and economic crisis (Figure 2). It follows that the spatial distribution of the FDI enterprises and that of the FDI capital are not the same. Generally, in the central and more developed western part of Hungary, both the number of FDI enterprises and the volume of FDI capital is high. Re-industrializing regions have a lower number of FDI firms, but the volume of FDI capital is relatively high, that is, FDI capital is more concentrated among the firms (there are less firms with higher average FDI capital). In the

ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary*

Knowledge centre type regions, the number of FDI firms, the volume of FDI capital and the indicator of FDI capital per enterprise are all very limited. Rural regions are somewhere in between, with low number of FDI firms but moderate FDI capital per enterprise. It can be stated that the volatility of the FDI capital is much higher than that of other related variables such as FDI enterprises, GDP or employment (Gál, 2019).

Regarding the FDI capital per employed persons, six NUTS3 regions emerge as leaders: the Central region including Budapest and Pest county, as well as those counties that were identified above as 'FDI manufacturing' regions: Győr-Moson-Sopron, Fejér, Komárom-Esztergom and Vas counties. These NUTS3 regions are in a contiguous area, they are located at the Northwestern part of Hungary, between the capital city and the Austrian border (Figure 3).

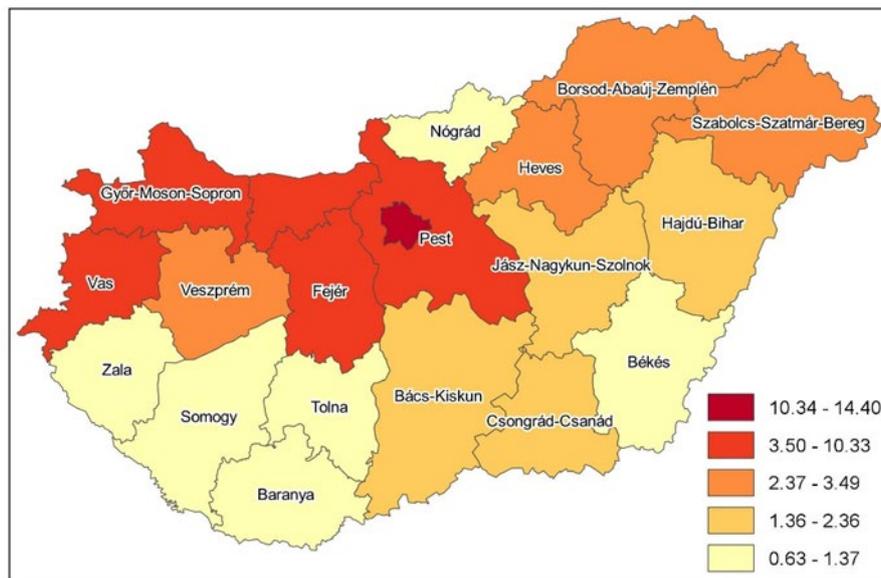


Source: Author's elaboration based on HCSO data

Figure 2. The concentration of selected economic indicators among the Hungarian NUTS3 regions based on the Herfindahl-Hirschman Index, 2008 to 2019

ZSIBÓK Z. (2021).

Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary



Source: Author's elaboration based on HCSO data

Figure 3. FDI capital per employee in the Hungarian NUTS3 regions (averages between 2015 and 2019, million HUF)

As suggested by the literature review above, there is a strong positive cross-sectional relationship between the volume of FDI and labour productivity in a regional disaggregation, and this is confirmed by our evidence as indicated on Figure 4 below. Using a linear regression with OLS estimation we found a positive and significant relationship between labour productivity and the FDI capital per employee among the Hungarian counties and county groups. As stated above, the volume of FDI capital fluctuates significantly between years. Therefore, in order to have a more general picture, we use the data of more than one year, that is, the average of the data between 2015 and 2019. The regression results can be summarized as follows (Table 3).

Table 3. The cross-sectional relationship between FDI capital per employee and labour productivity

	5 county groups	20 NUTS3 regions
Constant	4750.706	5227.356
Standard error	741.652	391.470
p value	0.008	0.000
FDI per employee	656.962	649.335
Standard error	125.738	76.199
p value	0.014	0.000
R-squared	0.901	0.801
No. of observations	5	20

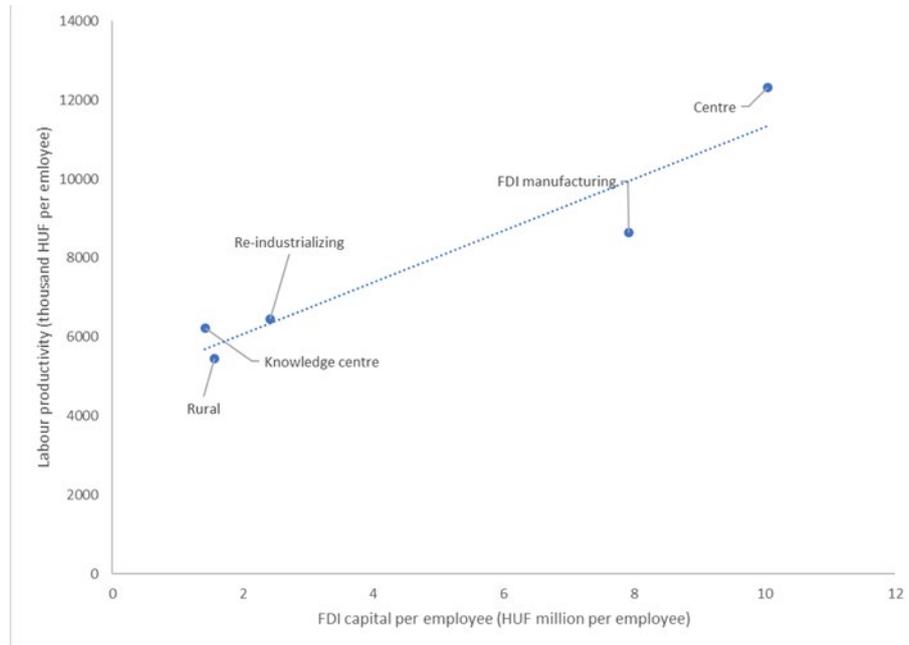
Source: Author's elaboration based on HCSO data

ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary*

Between 2010 and 2019, the highest GDP growth has been achieved by the FDI manufacturing and the Re-industrialising regions: the GDP computed at constant prices was 136 percent of the 2010 value in both of these county groups. The Knowledge centre regions achieved only 126 percent, the Centre achieved 128 percent and the Rural regions performed a value of 130 per cent compared to the value of GDP in 2010 (at constant prices). The same interregional order can be observed with respect to productivity, but the growth has been much smaller in this period: the national average in 2019 has been only 108.5 percent of the 2010 value (Table 2). In this regard, the Centre regions' performance was the weakest (103.6 percent), while the FDI manufacturing and the Re-industrialising regions achieved 112.9 and 114.1 percent, respectively. Knowledge centre regions were the second weakest with 106.9 percent and Rural regions improved to 110.6 percent between 2010 and 2019.

The weak productivity performance is partly a result of the extensive employment growth (Czirfusz, 2020), through which the number of employees increased from 3.73 million persons in 2010 to 4.51 million persons in 2019 at the national level (the 2019 value is 120.9 percent of the 2010 value). In this period, the largest number of employees entered the labour market in the Centre and the FDI manufacturing regions (24 percent and 21 percent increase, respectively), the Re-industrialising, Knowledge centre and Rural regions increased with around 18 to 19 per cent. In terms of employment rates (the number of employees divided by the number of working-age population), the largest increase has been measured in the Re-industrialising regions: a significant, 13.2 percentage points increase. Rural regions also performed well with a 12.2 percentage points increase, and employment rates in the rest of the regions increased with 10.4 to 11.8 percentage points. The lowest improvement has been experienced in the Centre regions, but Budapest and Pest have already performed well during the decade between 2010 and 2019. Similarly, FDI manufacturing regions indicate employment rates consistently well above the national average. As a result, a notable interregional convergence took place after the 2008/09 crisis in employment rates, since public policy measures (such as the public work scheme and the 'work-based society' approach followed by the government after the crisis) and the remarkable economic expansion allowed a large part of previously inactive population to enter the labour market (MNB, 2020). Acknowledging these achievements of the policies in establishing a work-based society in Hungary, we can presume that the further extension of employment will take place at a slower pace due to the ageing society and the weaker employability of the inactive working-age population.

ZSIBÓK Z. (2021).

Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary

Source: Author's elaboration based on HCSO data

Figure 4. The relationship between FDI capital stock and labour productivity in the Hungarian county groups (averages between 2015 and 2019)

Figure 5 indicates the results of our computations based on Equation (3) regarding the contribution of the change of labour productivity and the change of employment rate to the GDP growth in two sub-period. In stark contrast to the pre-crisis period, the data suggest that during the previous decade, the main source of GDP growth has been the growth of employment, while productivity has played a smaller role. In the phase of the post-crisis period (roughly 2010 to 2015) only FDI manufacturing regions and Re-industrializing regions achieved a positive contribution of productivity growth. In the second half of the decade, with the emergence of high-pressure economy the contribution of labour productivity turned positive in each region, but it was relatively lower in the FDI-manufacturing regions and significantly higher in the Centre. These aggregate data mask an important trend, namely, that the labour force is continuously shrinking because of the decreasing share of working-age population. In the new Millennium, the share of the working-age population remained stable at around 68 to 69 per cent in Hungary, however, after 2012 it started to gradually decrease, and fell below 66 per cent after 2019. Together with this factor, the role of employment growth in this period (2010 to 2019) is even greater.

ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary*

These results imply that the position of the Hungarian NUTS3 regions with respect to economic growth is not stable in the long run. The most persistent (unfortunately, poor) growth performance can be observed in the Rural and Knowledge centre regions which are characterized by stagnation and 'hollowing out'. Many of the Re-industrializing regions seem to be on a slowly improving path. The highest variation of growth performance can be detected in the Centre region. With the emergence of the high-pressure economy, most of the benefits appeared in this area, because the increasing income level boosted the already dominant service sector, and the large-scale public (government and EU-financed) investments resulted in economic buoyancy. We assume two reasons behind the relative slowing down of the FDI manufacturing regions in the second half of the 2010s. The first one is related to the limits of the FDI-dependent growth, of which the most challenging is the shortage of high-skilled labour force. This phenomenon might be partly related to the increasing cross-border commuting of the workforce, since FDI manufacturing regions are located by the Austrian and Slovakian border. The other related phenomenon is that in the regions outside the Centre, due to the relative lack of a critical mass in their regional economies, large-scale investment decisions and changes in the operation of large production facilities have a notable influence on their economic indicators. In consequence, some firm-level business decisions or government-induced investment decisions might largely influence the regional-level productivity growth paths.

Even though, the Centre region and the FDI manufacturing regions are the types of regions which remain attractive for within-country labour migration and for capital investments in the long run, and this sustains their relatively stable position among the Hungarian regions (and with that, their resilience). In the absence of targeted spatial policy initiatives, we expect an ongoing territorial polarization (Egyed & Rácz, 2020). National and regional productivity growth is hindered by the lack of diffusion of technology from frontier (FDI) firms to locally embedded firms. The same phenomenon was observed by McCann & Vorley (2021) in the context of the United Kingdom's 'productivity conundrum'. We expect that the new Covid-19 crisis will exacerbate these trends due to the fact that FDI-driven manufacturing sectors seem to be more resilient to the adverse impacts of this crisis than other sectors such as tourism and traditional services sectors which are important in the less developed regions (McCann & Vorley, 2021). At the same time, the reappearance of the high-pressure economy may move the position of the central region forward.

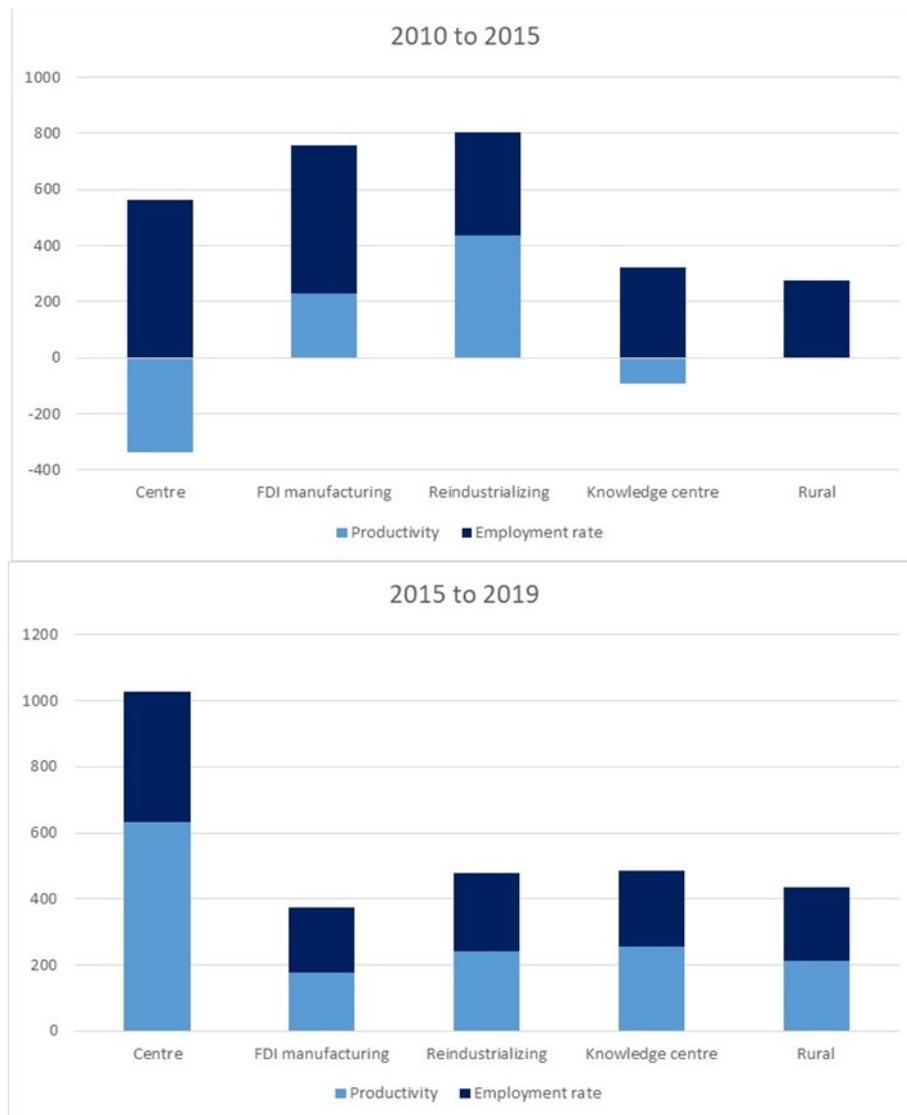
ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary**Source: Author's elaboration based on HCSO data*

Figure 5. The contribution of the productivity change and the employment rate change to the overall per capita GDP change in the Hungarian county groups between 2010-15 and 2015-19 (thousand HUF per capita)

5. Conclusion

This research studied the regional dynamics of labour productivity over the previous decades with a primary focus on the period after the global financial and economic crisis; and assessed the importance of FDI in Hungary in determining these productivity trends. Our computations reaffirmed that the most dynamic economic performance appears in those

ZSIBÓK Z. (2021).*Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary*

regions that are specialized on the FDI manufacturing sectors. After a spectacular upsurge, some signs of an economic slowdown appeared in the FDI-oriented regions during the last years of the previous decade. Even though, their sectoral specialization ensured a high level of stability. With the emergence of the high-pressure economy, the Central region of Hungary regained its leading position. The spatial and structural embeddedness of the FDI corporations is weak, therefore, in the absence of significant local spillover effects, this regional economic pattern does not support the regional rebalancing. Even those counties that have significant knowledge production capacities (Knowledge centre type NUTS3 regions) performed poorly in terms of productivity and economic growth. At the same time, we might reasonably suspect that FDI is not the ultimate generator of regional economic growth, because there is a 'virtuous circle' according to which FDI flows into the already developed places within the country that are endowed with higher quality human and infrastructural resources, and this further enhances growth performance and the attractiveness of the regions. We can refer to this phenomenon as path dependence.

Ideally, long-run regional economic growth would be supported by all types of growth factors in a balanced manner (i.e., both employment growth and productivity improvement, which was only detected in the FDI manufacturing type regions, and partially in the Central region in the post-crisis decade), however, actual demographic trends do not allow to achieve this in all regions in the future. Under these circumstances, the preferable way for Hungarian economic policy is to increase competitiveness through technology upgrading in manufacturing and services sectors and equally importantly, enhance the business environment and encourage investments in human and social capital in a territorially balanced way. These initiatives would enhance the absorptive capacity of the regions and thereby have beneficial impact on the spillover of productivity growth from firms operating in prosperous regions to those in lagging regions, so that the aggregate national performance would benefit from this in the medium and long run.

A major limitation of this research is the relatively coarse spatial resolution. Although NUTS3-level data allow us to study the extent and dynamics of sub-national spatial inequalities, firm-level analysis would be an important complement to reinforce our results at a finer scale. Another, data-related limitations, as mentioned before, is that a few large-scale investments and production facilities dominate the economy in several counties in Hungary, therefore, county-level economic variables are vulnerable to the performance of a few large enterprises. These limitations mark the way of future research, including an extended spatial coverage in the wider CEE region, as well as getting deeper insights from county-specific case studies. In relation to the territorial aspects of the high-pressure economy, the spatial distribution of private domestic investments, EU funds and income flows would also be useful in the analysis.

ZSIBÓK Z. (2021).

Changing Economic Positions of the Regions during the Post-crisis Decade in Hungary

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