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EXAMINING TERRITORIAL INEQUALITIES IN LABOUR MARKET PROCESSES IN HUNGARY

Evelin Zapreskó-Farkas
PhD student, University of Miskolc, Faculty of Economics, Institute of World and Regional Economics
3515 Miskolc-Egyetemváros, evelin.zapresko-farkas@uni-miskolc.hu

Katalin Lipták
associate professor, University of Miskolc, Faculty of Economics, Institute of World and Regional Economics
3515 Miskolc-Egyetemváros, katalin.liptak@uni-miskolc.hu

Abstract

The aim of the study is to examine labour market processes at the county level in Hungary, focusing on regional inequality. The territorial differences between Hungarian regions are not only noticeable in terms of income levels, but also in terms of labour market processes. The most commonly used methodology in the literature for measuring territorial inequality, the convergence calculation, was applied. The results are used to classify regions into clusters. The focus of the research period is the 2008 global economic crisis, but for more precise results, the 19-year research period (2000–2019) can be divided into three time periods. The results of the study show that there is some co-movement between labour market and catching-up processes. Highlighting the labour market processes, the absorptive effect of Budapest appears in the periods studied.

Keywords: *labour market, territorial inequality, convergence*

1. Introduction

The various economic processes (economic crises, industrial revolution) have contributed to the increase in territorial inequalities that have accompanied human history (Káposzta, 2014). For a long time, economics has tried to formulate the characteristics of inequalities in terms of space and time, but since the mid-20th century, the need to study economic and social inequalities has emerged (Kocziszky, 2011). Nowadays, we distinguish between economic, social and territorial inequalities, which can be measured by different indicators (Wishlade & Yuill, 1997; Molle, 2007; Kutscherauer et al., 2010).

The present study examines the spatial inequality of labour market processes in the NUTS3 regions of Hungary. For more precise and detailed results, I have divided the 19-year research period into shorter periods, focusing on the 2008 global economic crisis: the pre-crisis period (2000–2007); the onset of the crisis (2008–2013); the recovery from the crisis and the subsequent period until the 'last peace year' (2014–2019). The study focuses on those areas of Hungary that have 'successfully' caught up in terms of labour market processes.

G. Fekete (2006) presented the five main areas of the vicious circle of regional underdevelopment (demographic imbalance, weak regional income generating capacity, under-utilisation of environmental resources, isolation and barriers to meeting needs), which together affect the low employment in a region. Since accession to the European Union, the North-Hungarian region has experienced an increase

in its backwardness compared to other regions of the country, based on labour market and economic indicators. Previous research (Lipták, 2013) suggests that a reorganisation within the North-Hungarian region started before the economic crisis (from 2004). By 2008, the division of the country into two parts became even more evident, with increasing disparities between the parts and levelling out within the parts. Several researchers (Siposné, 2016; Szendi, 2017) agree that the unfavourable labour market situation in the Northern Hungary region was the result of the complexity of the problems. From the unfavourable geographical location, relatively underdeveloped infrastructure, to poor demographic outcomes, all these factors have contributed to the region's lagging behind the national average.

2. The theoretical background to territorial inequality

Spatiality can be seen as a pillar of society and the economic base that goes back to the distant past (Benedek & Kocziszky, 2016).

From the 1900s onwards, there have been different stages of development in conceptual definitions, but from the 1950s onwards, the spatial approach has been strongly established. In Christaller's studies, economic aspects were brought to the fore in the early phase of regional science (Rey, 2004; Jackson, 2004), which developed into a complex discipline (Probáld, 2007). In the first half of the 20th century, the explanation of spatial differences underwent a paradigm shift as social and natural aspects were emphasized. As a result, the spatial modelling of phenomena and processes emerged in the 1950s (Győri 2005). After the paradigm shift, spatiality was emphasised in Schaefer's (1953) study, but spatial processes and their interactions in Berry's (1964) (Nagy, 2006). In the 1970s, the spatial approach also appeared in social geography and in the 1990s the 'new economic geography' trend gained ground. The 'new economic geography' is characterised by a combination of space and time, and a focus on the effects of regional economic growth and convergence (Szendi, 2017). Meyer (2005) in his approach to the "new economic geography" formulated the following (Szendi, 2017): How can geographic endogenization be based on income and technology – i.e. traditional economics – categories, how can geographic endogenization be integrated into economic theory, how can the feedback of economic processes on economic geography be modelled (Meyer, 2005).

Monetary and cohesion policy is a key policy of the European Union, which promotes the reduction of economic, social and territorial disparities. The main objective of cohesion policy is regional catching up (Gáspár & Ferkelt, 2008) and the elimination of territorial disparities (Mendez et al., 2013), which have negative effects on competitiveness (Poledniková, 2014).

The following definition can be formulated based on the literature: Social, environmental and economic territorial disparities occur as a result of the combination of space and time, and different processes and interactions. The extent of disparities is caused by different conditions and resources, which contribute to the economic growth of national economies. By focusing on the 'quantitative revolution', the extent, temporal variation and spatial distribution of disparities have become measurable, which allows the actuality of territorial disparities to be maintained (Zapreskó-Farkas, 2023).

2.1. Social Innovation

Social innovation also has a key role to play in reducing regional disparities. The definition of social innovation adopts the definition of Kocziszky (2015), according to which social innovation is a new approach, a new way of thinking, a new process, which aims to solve problems and needs in society in a new way. The formulation of socially innovative projects to improve the employment situation in lagging regions is a major challenge. This means that innovation can only be recognised on the basis of

a changed way of dealing with the employment problem phenomenon. Whether a project focusing on the labour market is innovative is essentially judged by the context. The normative content of social innovations in employment means that particular attention must be paid to the nature of the added value created for the target group. Social innovation is often determined by its positive impact. Evidence is needed to identify positive impacts on the prevention or reduction of poverty and unemployment, but this is almost impossible given the complex mechanisms by which social interventions operate.

2.2 The theoretical background to convergence

Convergence is a term often used in regional science (Gáspár & Ferkelt, 2008). Convergence means convergence and cohesion and the catching up of different regions by focusing on living standards (Szanyi, 2018).

Nowadays, the study of territorial disparities is indispensable for economic studies due to the different economic or social processes and phenomena. The study of regional disparities can focus on regions with high or low performance. This finding is supported by the literature: no two points in space have the same resources or performance. However, the extent and temporal variation of spatial disparities has made it essential to measure convergence (Kotosz, 2016), which is used to determine the extent of catching up (Gáspár & Ferkelt, 2008). The widening of regional disparities is referred to as divergence, while the narrowing of the extent of disparities is referred to as convergence (Kotosz, 2016). The literature suggests that convergence occurs at different rates in each region because catching up is "the distance to be covered", but convergence can also be equated with "the rate of progress" (Halmai, 2019).

Based on literature sources, Baumol's (1986) study is the main stage of convergence. The study covers 100 years for industrialised countries, focusing on the rate of economic growth. However, according to Quah (1996), lower-income countries cannot catch up with the developed ones, hence convergence cannot be achieved (Alexiadis, 2013).

The statistical analysis of convergence can be paralleled with the study by Barro and Sala-i-Martin (1992). The focus of the study is on the differences between the US Member States. Convergence can be broken down into three categories based on how it can be measured (Capello-Nijkamp, 2009; Dusek-Kotosz, 2016; Fischer-Stumpner, 2009; Le Gallo-Fingleton, 2014). Under the category of absolute convergence, less developed regions are considered to be independent of the trajectory and factors of the developed ones. Under absolute convergence, regional differences are in constant variation, but sigma and beta convergence can be considered as the means of measurement. The group of conditional convergence is characterised by a steady state of equilibrium and constant differences between regions. The measurement of conditional convergence is beta convergence and econometric analysis. The club convergence category is characterised by the constancy of the difference between regions and the initial conditions, which is measured by beta convergence (Lengyel & Kotosz, 2018).

3. Methodology

The convergence calculation (sigma, beta, gamma) is the starting point for regional studies (Szendi, 2016). We distinguish between parametric and non-parametric methods, which include beta and sigma convergence (Kotosz & Ferenci, 2010). Sigma convergence examines the difference and dispersion relative to the mean (Szendi, 2016). Sigma convergence is realized for decreasing CV values (Kotosz, 2016; Szendi, 2016), which expresses the reduction of spatial inequality.
Calculation of sigma convergence:

$$CV = \frac{standard\ deviation}{average} \quad (1)$$

The category of conditional convergence includes beta convergence, which is a regression model focusing on the rate of catching up (Kotosz, 2016). Beta convergence examines the relationship between initial GDP per capita and annual economic growth over the period under study. If beta convergence is achieved, the beta term shows a negative trend and a relationship between the variables under investigation can be detected (Ferkelt, 2005).

Gamma-convergence examines the reordering of the ranking of areas relative to the base year (Szendi, 2016), which shows a preference for areas that are successfully catching up and lagging. Calculation of gamma convergence:

$$\gamma = \frac{var(RGDPCt_i + RGDPCt_0}{var(RGDPCt_0 * 2)} \quad (2)$$

where RGDPC = GDP per capita series, t_i = year under study, t_0 = base year (Boyle & McCharty, 1997; Liddle 2010; Szendi, 2016).

4. Results

In Hungary, industrial production is at its lowest level in the period of regime change, with the metallurgy and machinery industries (60%), mining (36%) and the chemical industry (33%) playing a major role (Illés, 1994; Ehrlich & Révész, 1994). The North-Hungarian region has already experienced a decline in industrial production. In 1996, the share of state aid as a percentage of GPD declined from 16.7% to 5.6%, but the main objective of economic policy is to encourage foreign capital inflows and the development of SMEs (Szanyi, 2004; Lux, 2016). For the capital, industrial concentration is declining, but the share of knowledge intensity in industrial production is prominent. Today, the capital is still considered the largest industrial region (Kiss, 2002; Barta & Kukely, 2004; Beluszky & Győri, 2004; Lux, 2016).

Before the regime change, the Central Transdanubian region had a mixed industrial structure, but the process of restructuring was completed in this region. The strengthening of the Vienna–Budapest axis was facilitated by the closure of industrial plants (coal mining), as favourably located areas came to the fore (Lux, 2016). The closure of industrial plants resulted in a decline in employment, a deterioration in the quality of human resources (concentration of disadvantaged social strata (e. g. Borsod-Abaúj-Zemplén), an increase in emigration and unemployment. The lack of adequate human capital conditions has been a barrier to foreign capital inflows (Kocziszky, 2007; Hudec & Urbanciková, 2013).

Based on the literature studies by Szendi (2013) and Tóth (2017), it can be concluded that beta and sigma convergence has not been achieved in the NUTS3 level areas of Hungary, as the beta tag has a positive value. In terms of results, it can be concluded that over the period 2000–2015, territorial disparities increased because the lower-performing regions could not catch up with the more developed ones. Conversely, sigma convergence was not achieved (CV = 3.31 decreased to 3.45), while beta convergence was achieved in the NUTS2 regions of Hungary, but the beta term takes a 1% lower value in the regression equation.

In the first step, beta convergence is investigated. Based on the results, clusters are created *(Table 1)*. The catching-up cluster consists of regions with high annual economic growth rates and low initial

GDP per capita, while the stable-performing cluster consists of regions with high annual economic growth rates and high initial GDP per capita. The stagnant cluster is characterised by a medium annual economic growth rate and low or medium initial GDP per capita, while the leading cluster is characterised by a low or medium annual economic growth rate and high initial GDP per capita. A region is considered to be underperforming if it has both a low annual economic growth rate and a low initial GDP per capita.

Table 1. *Clustering of the beta convergence cluster*

	Annual economic growth rate			**Initial GDP per capita**		
	Low	Medium	High	Low	Medium	High
A – Cath-up			✓	✓		
B – Stagnant		✓		✓	✓	
C – Outstanding	✓	✓				✓
D – Underperformance	✓			✓		
E – Stable performance			✓			✓

Souce: Own compilation

In the following, my convergence results are presented in terms of GDP per capita and the number of people employed. Beta convergence was achieved for all the periods under review. The closeness of the relationship between them is: R^2 (2000–2007) = 0.1539; R^2 (2008–2013) = 0.0042; R^2 (2014–2019) = 0.4507. The beta convergence results suggest that the worse-performing regions have been able to catch up between 2000 and 2019. (Because of the distorting effect, the capital was excluded from the study.)

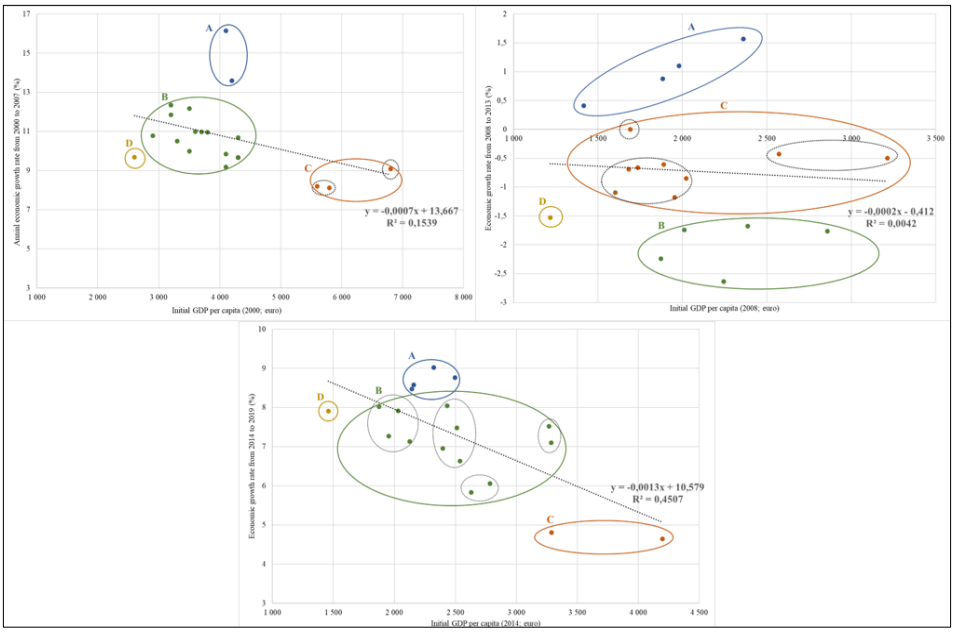

Figure 1. *Beta convergence by GDP per capita in Hungary; NUTS3; (2000–2007, 2008–2013, 2014–2019)* Souce: Own compilation

Regions may have different annual economic growth rates in beta convergence tests. However, the reduction of regional disparities and catching up can also be driven by the inflow of working capital, economic openness (Kuttor, 2010), and export-import ratios. According to Pénzes' studies, 'development and underdevelopment are becoming mutually reinforcing in several dimensions' and 'the spatial structure is becoming increasingly rigid after the millennium, with a very stable separation between groups of developed and underdeveloped settlements' (Pénzes, 2022, p. 24).

The spatial distribution of beta convergence *(Figure 2)* shows that the catching-up group includes Pest and Komárom-Esztergom from 2000 to 2007; Szabolcs-Szatmár-Bereg, Bács-Kiskun, Tolna and Vas from 2008 to 2013; Borsod-Abaúj-Zemplén, Heves, Bács-Kiskun and Baranya from 2014 to 2019. The stagnating cluster includes: until 2000–2007: one-third of the country; until 2008–2013: Pest, Baranya, Komárom-Esztergom, Veszprém and Zala; until 2014–2019: more than half of the country. Leading group 2000–2007: Fejér, Győr-Moson-Sopron and Vas. Nógrád County can be classified in the underperforming category for all the periods considered.

The beta convergence results are presented below, based on the number of persons employed. The results of the beta convergence *(Figure 3)* show that convergence was not achieved in any of the periods under study because the beta term has a positive value. The closeness of the relationship between them is: R^2 (2000–2007) = 0.4346; R^2 (2008–2013) = 0.1121; R^2 (2014–2019) = 0.1248. The results show that the worst-performing regions have not caught up with the developed ones in terms of employment and that regional disparities have increased over the last 19 years.

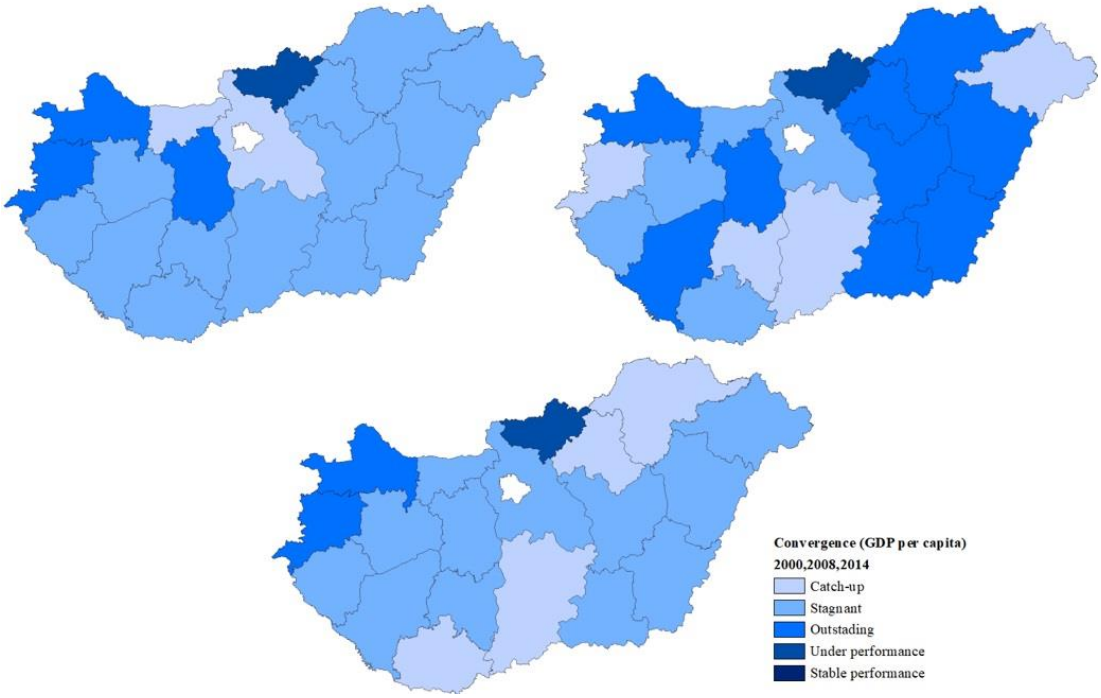

Figure 2. *Spatial distribution of beta convergence in Hungary by GDP per capita; NUTS3 (2000–2007, 2008–2013, 2014–2019)*
Souce: Own compilation

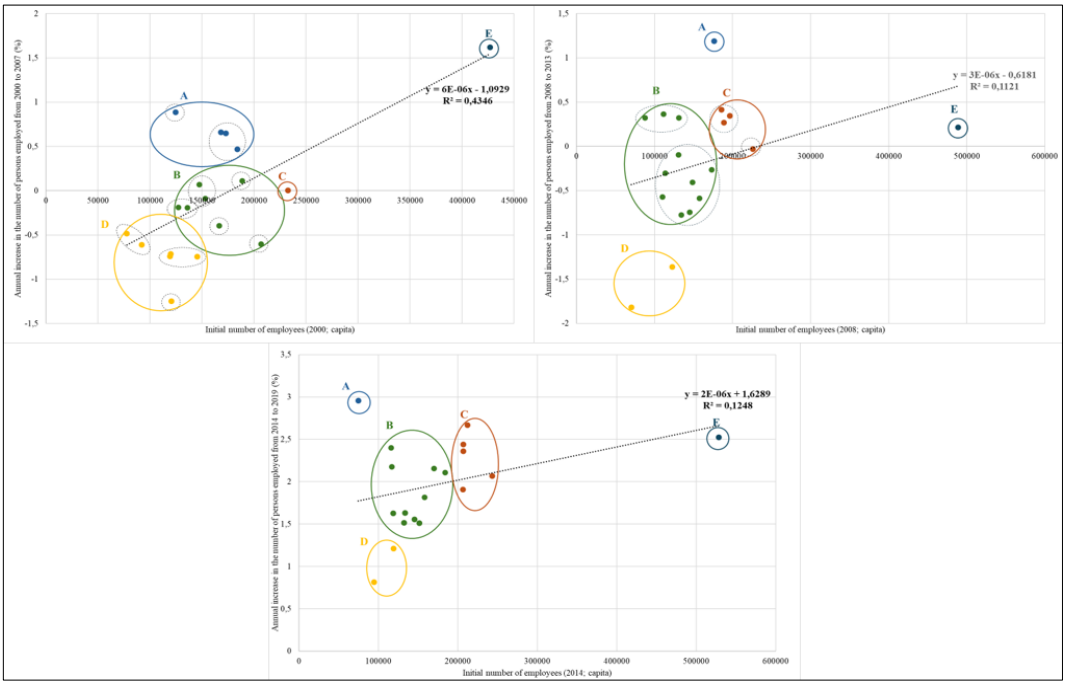

Figure 3. *Beta convergence in Hungary by number of persons employed; NUTS3 (2000–2007, 2008–2013, 2014–2019)* Souce: Own compilation

Based on the spatial distribution of beta convergence *(Figure 4)*, it can be stated that the catching-up cluster can be classified as Fejér, Komár-Esztergom, Győr-Moson-Sopron, Szabolcs-Szatmár-Bereg until 2000–2007; Szabolcs-Szatmár-Bereg until 2008–2013; Szabolcs-Szatmár-Bereg until 2014–2019: Nógrád. The stagnating group includes: 2000–2007: Veszprém, Zala, Hajdú-Bihar, Jász-Nagykun-Szolnok, Bács-Kiskun, Békés and Csongrád; 2008–2013: Fejér, Komárom-Esztergom, Veszprém, Vas, Baranya, Somogy, Tolna, Heves, Jász-Nagykun-Szolnok, Békés and Csongrád. Leading cluster 2000–2007: Borsod-Abaúj-Zemplén; 2008–2013: Győr-Moson-Sopron, Borsod-Abaúj-Zemplén, Hajdú-Bihar, Bács-Kiskun; 2014–2019. In the underperforming group 2000–2007: Vas, Baranya, Somogy, Tolna, Heves, Nógrád; 2008–2013: Zala, Nógrád; 2014–2019: Somogy, Tolna. However, Pest can be classified in the stable performance cluster for all the periods studied.

Sigma convergence has been achieved *(Figure 5)* based on GDP per capita over the past 19 years, with a reduction in regional disparities over the period. The CV of sigma convergence decreased from 0.25 to 0.21 between 2000 and 2019. Sigma convergence has also been achieved in shorter periods, as the CV value decreased from 0.25 to 0.24 from 2000–2007; stagnated at 0.23 from 2008–2013; decreased from 0.24 to 0.21 from 2014–2019.[1]

[1] Including the values of the capital city (Budapest), the value of the sigma convergence CV based on GDP per capita decreased from 0.25 to 0.23 from 2000 to 2007; from 2008 to 2013, it decreased from 0.23 to 0.22; from 2014 to 2019, it decreased from 0.24 to 0.21; from 2000 to 2019, it decreased from 0.25 to 0.21, i.e. convergence is observed over the periods considered.

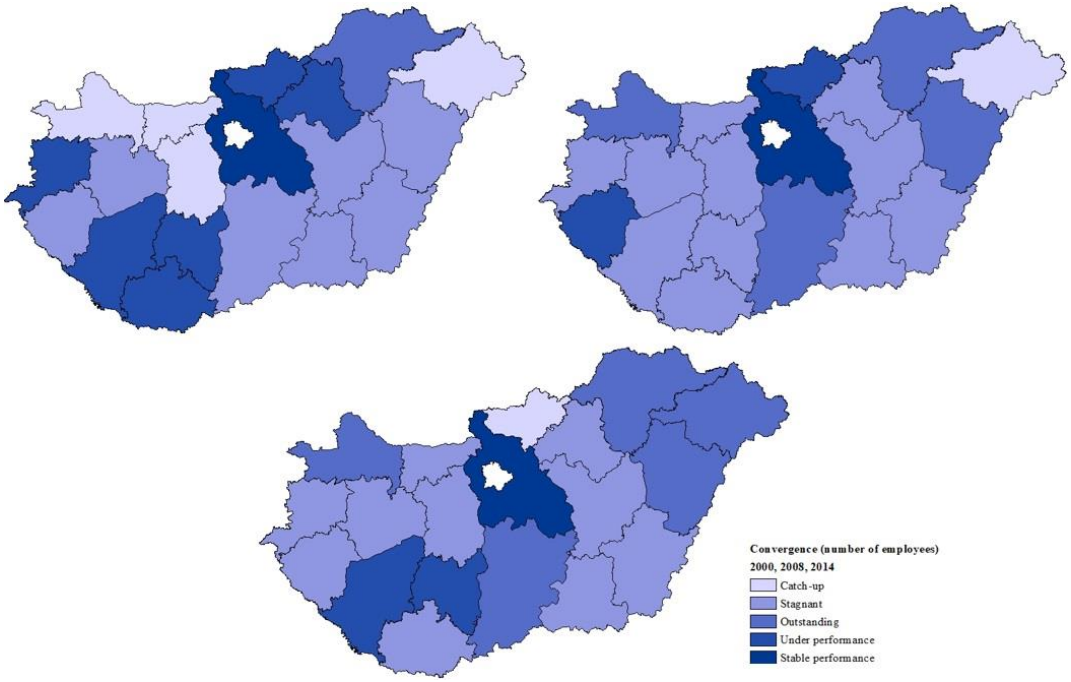

Figure 4. *Spatial distribution of beta convergence in Hungary by number of persons employed; NUTS3 (2000–2007, 2008–2013, 2014–2019)* Souce: Own compilation

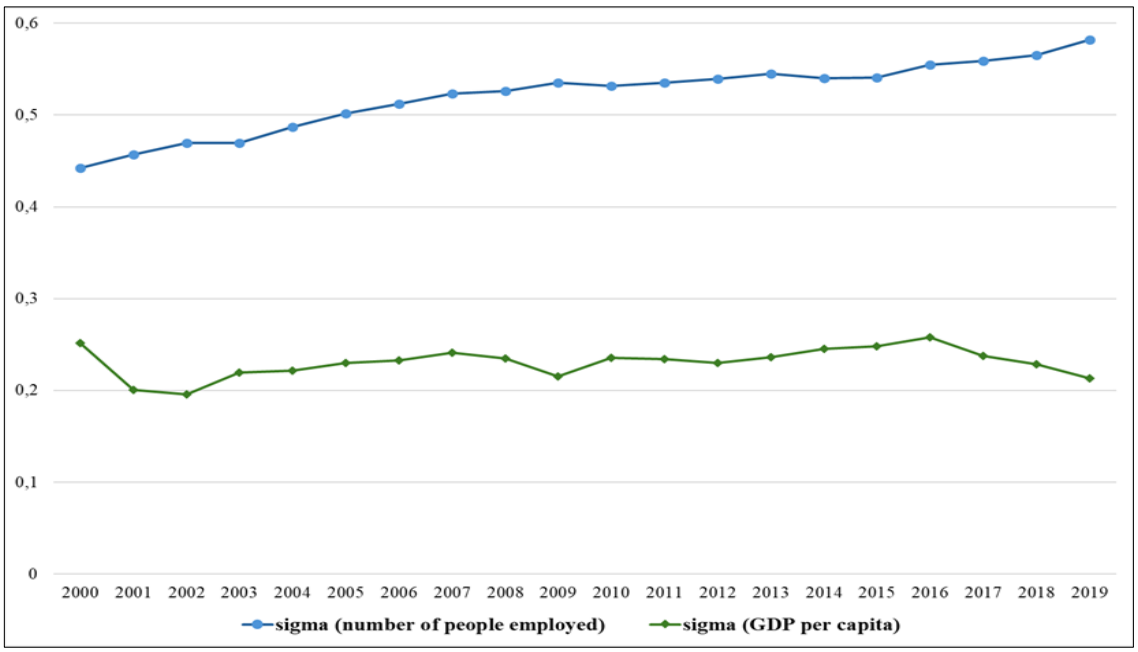

Figure 6. *Sigma convergence in Hungary by GDP per capita and number of persons employed; NUTS3 (2000–2019)*
Souce: Own compilation

Conversely, sigma convergence has not been achieved in terms of employment over the last 19 years, with regional disparities increasing over the period. The CV of sigma convergence increased from 0.44 to 0.58 between 2000 and 2019. Sigma convergence was not achieved in the shorter periods either, as the CV value increased from 0.44 to 0.52 from 2000–2007; from 0.52 to 0.54 from 2008–2013; and from 0.54 to 0.58 from 2014-2019.[2]

Gamma-convergence looks at changes in ranking. Based on GDP per capita *(Table 2)*, gamma convergence is 0.98–95 between 2000–2007; 0.99–0.97 between 2008–2013; 0.99–0.96 between 2014–2019; and 0.98–0.91 between 2000–2019.[3]

According to the number of employed persons *(Table 3)*, the gamma convergence value ranges from 0.99–0.99 between 2000–2007; 0.99–0.99 between 2008–2013; 0.99–0.99 between 2014–2019; and 0.99–0.98 between 2000–2019. Over the periods under study, there is a stagnating trend in the value of gamma convergence. The exception is the period from 2000 to 2019, when the gamma convergence value is decreasing. The gamma convergence results show that there has been no major change in the ranking of areas.

Table 2

Gamma-convergence by GDP per capita in Hungary; NUTS3; (2000,2008,2014, 2019)

	sequence 2000 = base period		**sequence 2008**		**sequence 2014**		**sequence 2019**
Győr-Moson-Sopron	1	Győr-Moson-Sopron	1 ●	Győr-Moson-Sopron	1 ●	Győr-Moson-Sopron	1 ●
Fejér	2	Komárom-Esztergom	2 ⇧	Vas	2 ⇧	Komárom-Esztergom	2 ●
Vas	3	Fejér	3 ⇩	Fejér	3 ●	Fejér	3 ●
Veszprém	4	Pest	4 ⇧	Komárom-Esztergom	4 ⇩	Vas	4 ●
Zala	5	Vas	5 ⇩	Pest	5 ⇩	Bács-Kiskun	5 ⇧
Pest	6	Zala	6 ⇩	Zala	6 ●	Pest	6 ⇩
Komárom-Esztergom	7	Veszprém	7 ⇩	Csongrád-Csanád	7 ⇧	Tolna	7 ⇧
Tolna	8	Csongrád-Csanád	8 ⇧	Tolna	8 ⇧	Veszprém	8 ⇧
Csongrád-Csanád	9	Tolna	9 ⇩	Bács-Kiskun	9 ⇧	Heves	9 ⇧
Hajdú-Bihar	10	Hajdú-Bihar	10 ●	Veszprém	10 ⇩	Zala	10 ⇩
Baranya	11	Heves	11 ⇧	Hajdú-Bihar	11 ⇩	Csongrád-Csanád	11 ⇩
Bács-Kiskun	12	Bács-Kiskun	12 ●	Heves	12 ⇩	Hajdú-Bihar	12 ⇩
Somogy	13	Baranya	13 ⇩	Borsod-Abaúj-Zemplén	13 ⇧	Borsod-Abaúj-Zemplén	13 ●
Heves	14	Jász-Nagykun-Szolnok	14 ⇧	Baranya	14 ⇩	Baranya	14 ●
Békés	15	Somogy	15 ⇩	Jász-Nagykun-Szolnok	15 ⇩	Jász-Nagykun-Szolnok	15 ●
Borsod-Abaúj-Zemplén	16	Borsod-Abaúj-Zemplén	16 ●	Somogy	16 ⇩	Somogy	16 ●
Jász-Nagykun-Szolnok	17	Békés	17 ⇩	Békés	17 ●	Békés	17 ●
Szabolcs-Szatmár-Bereg	18	Szabolcs-Szatmár-Bereg	18 ●	Szabolcs-Szatmár-Bereg	18 ●	Szabolcs-Szatmár-Bereg	18 ●
Nógrád	19	Nógrád	19 ●	Nógrád	19 ●	Nógrád	19 ●
Gamma convergence value:		From 2000 to 2007: 0,98-0,95 From 2008 to 2013: 0,99-0,97 From 2014 to 2019: 0,99-0,96					

Souce: Own compilation

[2] Including the values for the capital city in terms of the number of persons employed, the sigma convergence CV increased from 0.75 to 0.78 from 2000 to 2007; stagnated from 0.79 to 0.79 from 2008 to 2013; increased from 0.78 to 0.79 from 2014 to 2019; increased from 0.75 to 0.79 from 2000 to 2019, i.e. convergence is observed over the periods considered.

[3] Including the values for the capital city based on GDP per capita, the gamma convergence ranges from 0.98 to 0.96 from 2000 to 2007; from 0.99 to 0.98 from 2008 to 2013; from 0.99 to 0.97 from 2014 to 2019; from 0.98 to 0.93 from 2000 to 2019, i.e. convergence is observed over the periods considered.

Table 3

Gamma-convergence by number of persons employed; NUTS3; (2000, 2008, 2014, 2019)

	sequence 2000 = base period		sequence 2008		sequence 2014		sequence 2019
Pest	1	Pest	1	Pest	1	Pest	1
Borsod-Abaúj-Zemplén	2	Borsod-Abaúj-Zemplén	2	Borsod-Abaúj-Zemplén	2	Borsod-Abaúj-Zemplén	2
Bács-Kiskun	3	Bács-Kiskun	3	Szabolcs-Szatmár-Bereg	3	Szabolcs-Szatmár-Bereg	3
Hajdú-Bihar	4	Győr-Moson-Sopron	4	Győr-Moson-Sopron	4	Hajdú-Bihar	4
Győr-Moson-Sopron	5	Hajdú-Bihar	5	Hajdú-Bihar	5	Győr-Moson-Sopron	5
Szabolcs-Szatmár-Bereg	6	Szabolcs-Szatmár-Bereg	6	Bács-Kiskun	6	Bács-Kiskun	6
Fejér	7	Fejér	7	Fejér	7	Fejér	7
Csongrád-Csanád	8	Csongrád-Csanád	8	Csongrád-Csanád	8	Csongrád-Csanád	8
Veszprém	9	Jász-Nagykun-Szolnok	9	Jász-Nagykun-Szolnok	9	Jász-Nagykun-Szolnok	9
Jász-Nagykun-Szolnok	10	Veszprém	10	Veszprém	10	Veszprém	10
Baranya	11	Komárom-Esztergom	11	Baranya	11	Baranya	11
Békés	12	Baranya	12	Békés	12	Békés	12
Zala	13	Békés	13	Komárom-Esztergom	13	Komárom-Esztergom	13
Komárom-Esztergom	14	Zala	14	Somogy	14	Heves	14
Somogy	15	Heves	15	Zala	15	Zala	15
Vas	16	Somogy	16	Vas	16	Vas	16
Heves	17	Vas	17	Heves	17	Somogy	17
Tolna	18	Tolna	18	Tolna	18	Tolna	18
Nógrád	19	Nógrád	19	Nógrád	19	Nógrád	19
Gamma convergence value:		From 2000 to 2007: 0,99-0,99 From 2008 to 2013: 0,99-0,99 From 2014 to 2019: 0,99-0,99					

Souce: Own compilation

To summarise, the gamma convergence results show stagnation in terms of the number of persons employed; however, there is a slight catching-up between the regions in terms of GDP per capita.

5. Summary

In the theoretical part of the paper, different definitions of territorial inequality and convergence are presented. While the focus of the analysis of territorial inequality is on the combination of space and time, the 'new economic geography' approach focuses on economic growth and convergence.

Using convergence calculations (sigma, beta, gamma), the NUTS3 level areas of Hungary are examined over the last 19 years. The most commonly used indicator in the convergence studies, GDP per capita, is paired with the labour market indicator, the number of persons employed. For more precise and detailed results, the period is broken down into shorter periods.

In terms of GDP per capita, beta convergence has been achieved, i.e. regional disparities have decreased over the period under study without including the capital city. On the other hand, according to the number of persons employed, beta convergence was not achieved, i.e. spatial disparities increased over the period under study without including the capital.

The sigma and beta convergence results are similar. Sigma convergence in terms of GDP per capita is achieved, but sigma convergence in terms of the number of persons employed is not achieved over the period under review. There is a large difference between the CV values of the two indicators under examination. The CV of the number of persons employed shows a higher degree of regional disparities between the territorial units.

Gamma convergence has not been achieved in terms of the number of persons employed but has been achieved in terms of GDP per capita. Based on GDP per capita, spatial disparities are decreasing and there is a positive shift in the ranking of areas, while based on the number of persons employed, spatial disparities are not decreasing and there is no major shift in the ranking of territorial units.

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