Global embeddedness and local responses: Trends in income inequality in Hungary following the 2008 economic crisis

Zoltán Egri
Hungarian University of Agriculture and Life Sciences, Institute of Rural Development and Sustainable Economy, Szarvas, Hungary
E-mail: egri.zoltan@uni-mate.hu

Tamás Tánczos
Eszterházy Károly Catholic University, Faculty of Economic and Social Sciences, Eger, Hungary
E-mail: tanczos.tamas@uni-eszterhazy.hu

The transition in Central and Eastern Europe after the regime change caused globalisation to intensify. Hungary is regarded as a model of dependent market economies, and can be considered extremely exposed, with its economic development based on exogenous factors. The processes of economic globalisation (foreign direct investment penetration, trade liberalisation, privatisation, and deregulation) have significantly affected, and continue to influence Hungary's territorial inequality systems and spatial structure.

The study focuses on a specific period, and its primary objective is to analyse the effects of the global crisis, which began in the United States in 2008, on territorial income inequality in Hungary. The authors seek to answer the question of how globalisation embeddedness shapes income trends relative to national growth, and inequality trends, as well as which factors influence the distribution of income. The analyses will first operationalise global embeddedness and then describe spatial inequality processes along this line, using mathematical-statistical and spatial econometric methods (principal component analysis, exploratory spatial data analysis, Theil index, etc.).

In this analyses, the authors first present a multidimensional local (district) pattern of global embeddedness, which shows strong spatial fragmentation in Hungary's socio-economic and income structure. The global microenvironment suggests significant divergence between settlement groups in

Regional Statistics, Vol. 13. No. 4. 2023: 714–751; DOI: 10.15196/RS130407

terms of income growth, growth factors, inequality trajectories, and income mobility. The results point to the specificities of the factors influencing income inequality, in particular, the higher level of road infrastructure, indicative of the country's endogenous spatial structure, the spatial specificities of labour utilisation, and the main context of the economic structure. In the autors view, the results provide evidence that the settlement level can capture, albeit in a limited way, the key income inequality relations of global embeddedness.

Keywords:
global embeddedness,
local income inequalities,
spatial econometrics,
Markov chain

Introduction

The transition economies of Central and Eastern Europe (CEE), abandoning the central planning system, not only introduced the rules of market coordination with the regime change, but also meant to adapt to the global character of the emerging post-industrial economy and participate in global networks (Bourdeau–Lepage 2007). The emergence of the Washington Consensus in the region, which promoted global social and economic processes, meant the implementation of policies such as the expansion of foreign direct investments (FDI), trade liberalisation, privatisation of state industries, and deregulation (Tridico 2011). The European Union (EU) accession has provided a new impetus for individual Member States to deepen globalisation processes (Tridico 2011, Asteriou et al. 2014, Charron 2016).

After the regime change, new and novel global phenomena (innovations, transnational corporations, new technologies and management methods, international competition, metropolization, economic restructuring, industry 4.0, etc.) have significantly altered, and are still changing the spatial structure of countries (Enyedi 2004, Gorzelak 2001, Lux 2012, Nemes Nagy 2009, Nölke−Vliegenthart 2009, Lengyel 2010, Capello−Perucca 2013, Lennert 2019, Smętkowski 2018, Lengyel 2021).

From an EU perspective, two or, with the capital city highlighted, three major contiguous spatial convergence clubs can be identified in Hungary today. On the one hand, Southern Transdanubia, Northern Hungary, Northern and Southern Great Plains, have been among the 20 most deprived regions since Hungary's accession to the EU in 2004, and can be defined as the most depressed and low-income regions (EC 2017, Egri−Tánczos 2018). On the other hand, the convergence club of the Budapest, Pest, Central and Western Transdanubia regions, which holds the largest share of resources, produces more than two-thirds of Hungary's gross domestic

product (GDP). In addition to the harsh regional divisions, Hungary has also become highly fragmented at lower territorial levels: besides the extensive socio-economic peripheries and crisis areas, there is also a presence of successful large centres (Pénzes 2014, Farkas–Kovács 2018, Molnár et al. 2018, Alpek et al. 2018).

Hungary, together with the Visegrád countries, is representative of capitalism in the dependent market economy category (Nölke–Vliegenthart 2009), which is essentially characterised by economic development based on exogenous factors (especially FDI). This statement was also confirmed by the main corner figures of the two convergence clubs mentioned above. Approximately four-fifths of the direct foreign capital investment and 88% of the FDI companies are concentrated in the developed, contiguous cluster. These basic distribution ratios are key indicators of the impact of economic globalisation on spatial inequality.

Our study aims to identify the effects of globalisation on territorial income inequalities in the recovery period following the 2008–2009 economic crisis.

The literature review provides an overview of the links between economic globalisation and spatial income inequalities, and highlights the related domestic contexts. We first operationalise subnational global embeddedness and then describe the linkages between spatial (settlement) income inequalities. Finally, we use spatial econometric methods to illustrate the role of income-shaping factors, with a particular focus on the specificities of global embeddedness.

The link between globalisation processes and spatial (income) inequalities

Globalisation is not the current static state of the world but can be understood as an evolutionary process of increasing integration of markets for goods and services, factors of production (such as technology and innovation), and locations across the globe (Capello–Fratesi 2013). The impact of globalisation is far-reaching, affecting fiscal, social, and territorial policies; economic performance and growth; and regulations, industrial policies, and economic reforms (Tridico 2011, Potrafke 2015).

Market-based economic integration is a positive-sum game that reduces barriers to factor mobility, lowers the costs of trade, improves access to external markets, helps exploit comparative advantages, and reduces transaction costs. Overall, it increases aggregate efficiency (Ohlin, 1933, Crescenzi–Petrakos 2016, Ezcurra–Del Villar 2021). At the same time, the distribution of overall welfare gains is highly contested, with the focus of the debate on distributional and trickle-down effects, as suggested by the Washington Consensus, not being justified (Stiglitz 2002, Potrafke 2015, Crescenzi–Petrakos 2016). Critics of globalisation argue that poverty, decline in government powers, and the growing rate of competition are attributable to globalisation (Potrafke 2015, Stiglitz 2002).

The impact of globalisation on spatial inequalities is not clear and universal, but the issue is topical, as it is likely that globalisation shapes spatial inequalities in such a way that it is creating winning and losing regions (Melchior 2008, Crescenzi–Petrakos 2016, Ezcurra–Del Villar 2021). The strategic interests and decision-making mechanisms of multinational corporations are crucial in global transformation, also affecting global-local relations and determining the economic structure of less developed countries, including transition countries (such as Hungary), which can thus be considered dual economies (Lengyel 2021).

According to neoclassical theory (Ohlin 1933), assuming perfect competition, factor mobility, and constant returns to scale, the flow of capital and labour between regions equalises the prices of factors of production and of different products. Thus, FDI contributes to income distribution and convergence. By contrast, Perroux (1955) and Myrdal (1957) argue that mobility and economies of scale are hampered, and that the presence of advanced industries and the process of cumulative causality lead to spatial polarisation between advanced and lagging regions. New economic geography (Krugman 1991, Fujita et al. 1999) accepts imperfect (monopolistic) competition and explains regional economic development as the result of the interaction between agglomeration forces (economies of scale) and spatial interaction costs. The new economic geography (NEG) models highlight that globalisation and trade-openness exert pressure on regional equilibrium through centrifugal and centripetal forces (Ezcurra–Del Villar 2021).

Economic globalisation and spatial inequalities are also linked to the Williamson hypothesis (Ezcurra–Rodríguez Pose 2013, Charron 2016, Ezcurra–Del Villar 2021), which describes the inequalities between economic development and internal segmentation. Williamson (1965) applied the original model to capitalist economic development. In the egalitarian spatial structure of the pre-capitalist period, a strong polarisation (with increasing divergence) appears with the development of large capitalist industries. This is followed by a reduction of spatial disparities, i.e., convergence, in more developed periods, due to spontaneous and state interventions (Nemes Nagy 2005). The two-dimensional plot of national development and internal spatial inequality yields an inverted 'U' curve. The former socialist region has different characteristics compared to the baseline model: strong convergence and downward levelling have been driven by the specific development policies of the region (Nemes Nagy 2009). In the final years of socialism and after the collapse, as the role of market coordination strengthened, territorial divergence coupled with economic decline emerged and regional disparities returned to market economy trends. At this stage, we can assume the spatially differentiating role of globalisation effects, in particular the often perverse flow of FDI (Gorzelak 2001, 2006, Nemes Nagy 2009, Tridico 2011). Subsequently, a new convergence can be assumed. Over time and evolution, the course of inequalities is not necessarily uniform, and according to several authors, the right-hand side of Williamson's inverted 'U' curve is modified (Amos 1988, Lee 2004).

Spatial inequalities in the effects of globalisation in Hungary

The economic development of CEE countries after the regime change is strongly linked to participation in global value chains based on FDI (Figure 1). Nölke–Vliegenthart (2009) defined this type of capitalism as a dependent economy whose main coordination mechanism is the system of decisions and hierarchies within transnational corporations. In global transformation, the strategic interests and decision-making mechanisms of multinational companies typically determine the regional economic structure of less developed countries, which can, therefore, be considered dual in nature (Lengyel 2021). György–Oláh (2019) define Hungary as an extreme case of a dependent economy; Lengyel (2021) characterizes the country as an externally controlled economy with a dual structure. A dual economy can be observed in the differences between foreign-owned, more productive and high-tech large companies, and domestic small and medium-sized enterprises (SMEs) (Gál–Lux 2014). In Hungary, the share of foreign-controlled companies in gross added value is the second largest within the EU (47.4%, [1]), while the share of exports reaches about four-fifths of the GDP [2]. The specific model characterising CEE countries is based on a low-wage, relatively skilled labour force, which has allowed them to converge with Western European incomes. However, it is precisely the low-wage bill that undermines sustainable income convergence; this is also not helped by the lack of territorial embeddedness of transnational corporations, low positions within value chains, production at low and medium technology levels, and the lack of governance functions.

Overall, FDI contributed to the modernisation of the economy, but the dual economy clearly increased spatial segmentation (Gál–Lux 2014). In the spatial picture of economic globalisation, there is a dividing line between capital cities and the rest of the country, with the former featuring as 'gateway cities' and the latter as 'in between areas' (EC 2013a, Józsa 2019, Pellényi 2020). In addition to capital cities, the spatial picture of CEE countries shows an east-west slope, with spaces close to western markets (Gorzelak 1997, Leibenath et al. 2007, Rechnitzer–Smahó 2011, Szabó–Farkas 2014) emerging as the clear winners of the transformation.

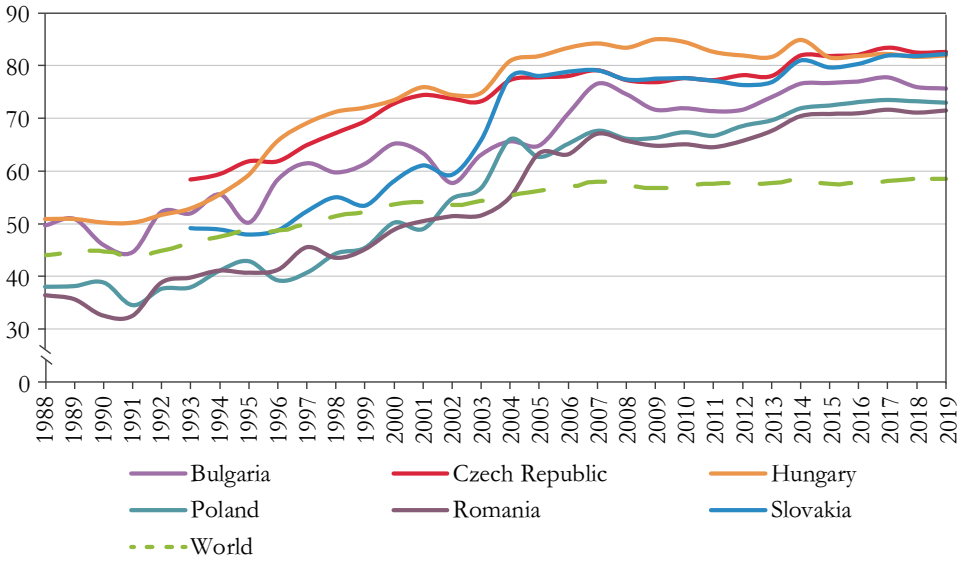
Complex economic globalisation studies in the Hungarian regional perspective are scarce, and most analyses have examined the role and effects of FDI, representing the „dependent market economy" direction (and supply-oriented development policy).

Cséfalvay et al. (2005) presented an analysis of access to global networks at the micro-regional level. The study delineated micro-regions integrated into global and domestic economic networks, and excluded them from both networks, based on the logic of the businesses' connection to global production networks (and, especially, in view of firm size). Global integration is organised, on the one hand, in an insular manner (regional and other hubs) and, on the other hand, along axes (Budapest–

Mosonmagyaróvár, Budapest–Balaton). The above typology shows a medium-strong correlation with the level of development.

Figure 1

Economic globalisation in Central and Eastern Europe



Note: The figure shows the economic pillar of the KOF globalisation index (EGI) of trade and financial globalization.

Source: Savina et al. (2019).

Nemes Nagy–Németh (2005) successfully and decisively explain the micro-regional fragmentation of income inequalities at the turn of the millennium by, among other things, the presence of foreign capital. Analysing the distribution of foreign businesses, Németh (2005) identified a favourable situation along the western border and highlighted the role of knowledge level as a prominent local asset. The motorway effect is differentiated between the eastern and western parts of the country, with a higher density of foreign-owned firms in the west, whereas in the east, it is limited to one or two large cities. The above results, together with the increasing income differentiation that characterises this post-socialist period (Nemes Nagy–Németh 2005, Németh–Kiss 2007), provide evidence for the modified Williamson hypothesis, that is, the role of global openness is thought to play a role in the increasing degree of spatial inequalities. Hungary's dual economy has several spatial characteristics. Related and unrelated variety analyses based on the technological proximity (knowledge spillovers) of businesses in micro-regions indicate the dominant influence of FDI in transition economies. The results show that the related variety of foreign businesses began to have a positive effect on business formation earlier than domestically owned businesses (Szakálné Kanó et al. 2017). Knowledge exploitation

and regional innovation systems exhibit different spatial trajectories in Hungary, one of which, the north-western part of the country, has been linked to the EU through FDI. This also reinforces the dual nature of the Hungarian economy (Lengyel 2012) and maintains the asymmetric interdependence between more developed countries and Hungary (Farkas 2019). Gál (2019) notes the contradictory nature of the relationship between FDI and economic growth (at the county level). The results show that FDI does not contribute to GDP growth, but the opposite is true; that is, growth attracts FDI. This partly contradicts the findings of Lengyel–Varga (2018) (which follow the reverse logic), according to which, it is mainly FDI-driven regional growth linked to manufacturing that has driven national growth since the 2008 economic crisis. The time horizon resolves the contradiction between the two approaches. The role of FDI in the economic growth of CEE countries is typical in the short term and in periods of growth, while the impact of FDI on growth cannot be proven in periods of crisis (Gál–Lux 2014).

The metropolitan dimensions of globalisation have been described by several authors (Molnár et al. 2018, Rechnitzer 2021). The first group of authors describes the interrelations between the economic potential and the structures of Hungarian rural metropolitan areas (and agglomerations). Cities with significant economic output have FDI-driven development based on traded corporations involved in the processing industry, and exhibit significant spatial differentiation. The authors draw attention to the one-sidedness of integration into international production networks, that is, the vulnerability of the local economies. The impact of economic globalisation also affects the rest of the network of settlements. Csomós (2013) shows that there is no significant relationship between the central function of settlements and economic performance, as measured by settlement economy weight. The global effects mediated by FDI are also clearly visible in smaller central and noncentral settlements, including those that were previously negligible players in the economic system. In other words, not only large rural cities, but also smaller settlements, are affected by the exposure to a one-sided economic structure characterised by a small number of large FDI manufacturing firms, and have a 'highly volatile' role in the economic system.

Cities and macro-regions are the main functional spaces of globalisation, but they are also important regulatory spaces in the global economy, despite the weakening position at the nation-state level (ESPON 2013a, Lengyel 2021). However, the above publications clearly show that the effects of economic globalisation are reflected at all territorial levels, thus shaping the spatial structure and inequalities of the country, and continuously maintaining and conserving its significant territorial inequalities.

Purpose of the research

Our study focuses on a specific period and its main objective is to analyse the impact of the globalised crisis that began in the United States in 2008, on domestic territorial income inequality. Hungary, which otherwise had serious structural problems (high dependence on foreign capital and a lack of public finance reforms), faced a significant economic downturn, exceeding the EU average (Lentner 2012, Farkas 2012). The spatial picture of the economic recession in Hungary was highly differentiated, with the Central and Western Transdanubian regions, the first to be integrated into the global economy, suffering the most severe downturn (Egedy 2012). Following the crisis and recovery, Hungary's macroeconomic growth has been uninterrupted, with faster growth rates than in the Czech Republic and Slovakia, and domestic GDP growth above the Euro area average. With high average economic growth between 2010 and 2019, household disposable income also rose significantly (Oblath–Palócz 2020).

Analyses over the period indicate that behind the robust macroeconomic growth at the subnational (county) level, there are signs of widening divergence and convergence clubbing (Lengyel–Kotosz 2018, Lengyel–Varga 2018, Smirnykh–Wörgötter 2021). At a more local scale, Pénzes (2019) points to trends in inequality trajectories within districts, which show two spatial trends after the crisis: convergence in the case of personal income and divergence in the case of the settlement's economic power.

We aimed to address the following research questions and tasks.

1. Compared to national income growth and inequality trends, how heterogeneous can regional correlations be considered?
2. How does global integration contribute to settlement income inequalities?
3. How does this phenomenon contribute to territorial income mobility?

The related analyses are conducted along the lines of spatially homogeneous spaces (clubs), expressing Hungary's territorial differentiation, which is homogeneous in terms of economic globalisation. We use mathematical statistical analyses to highlight the differences in the growth and income inequalities of the different globally embedded spaces. Since income inequalities in settlements also differ significantly along the 'traditional' administrative units (counties, districts) (Németh–Kiss 2007, Pénzes 2019), we assume that they are also interpreted along the lines of global embeddedness, both in the static and dynamic approaches. It is assumed that the phenomena under study exhibit significant heterogeneity and spatial variation.

4. In different globalisation contexts, which factors shape the income distribution at settlement level in the recovery and growth period, following the economic crisis? What factors differentiate the various settlement clubs?

Spatial econometric methods (multivariate regressions) are used to answer the research questions, by which spatial heterogeneity is also considered, looking for phenomena that express real differentiation.

Materials and methods

We expressed multidimensional spatial global economic integration by using the exploratory R-type factor analysis (Sajtos–Mitev 2007), based on relevant literature sources (Ezcurra–Rodríguez-Pose 2013, Potrafke 2015, Egri–Tánczos 2015, Ezcurra–Del Villar 2021). We chose the principal component analysis and aimed to create an independent principal component (with appropriate statistical parameters) that can adequately express global embeddedness.

To detect income inequalities within global clubs and countries, we performed entropy calculations using the generalised Theil index. This measures inequality between settlements; the closer it is to 0, the higher the degree of evenness, that is, equality (Dusek–Kotosz 2016, Bulut–Korukoglu 2022).

Danny T. Quah (1996) applied the classical Markov chain method to study income convergence because of the limitations of traditional β- and σ-convergence analyses. This method, using stochastic transition probability matrices, contributes to the description of our detection of the movement of settlements from one period to another (Monfort 2020). We used likelihood ratio (LR) tests (Bickenbach–Bode 2003, Aritenang 2022).

We used the exploratory spatial data analysis (ESDA) method (Duran–Karahasan 2021) to identify and assess the factors influencing the distribution of settlement income. We built explanatory models using multivariate regression types: ordinary least squares (OLS), spatial two-stage least squares (S2SLS) and spatially weighted least squares (SWLS). For detailed descriptions of the regression methods, see Anselin (1988), Anselin–Rey (2014), Kelejian–Prucha (2010), Drukker et al. (2013), and Grekousis (2020). In our study, we assumed that the spatial patterns of factors explaining income inequalities diverge along global embeddedness; therefore, we used the so-called 'spatial regime' model to investigate this (Anselin–Rey 2014). This approach calculates different regression coefficients for different subsets of settlements, highlighting the spatially differentiated mechanisms of action. Significant differences in the regression coefficients were tested using the spatial Chow test (Chow 1960, Grekousis 2020).

Personal taxable income per permanent resident was used as the basic indicator of settlement income inequality trends. This indicator has several advantages (long time series availability, same methodology) as well as disadvantages (it represents a smaller share of the total macro-income mass; it does not include entrepreneurial income) (Major–Nemes Nagy 1999, Kiss 2007). Income subject to personal income tax is accepted and can be used for more massive spatial income inequality studies with a parametric methodology (Nemes Nagy 2009, Németh–Kiss 2007, Pénzes 2013). It is important to emphasise that the variable is only suitable for describing highly equalised social development; for example, GDP per capita indicates different trends and inequalities (Kiss 2007, Lőcsei 2010, Egri 2020). Due to the spatial

specificities at a low territorial level, this indicator is not perfect either (Dusek–Kiss 2008), so this analysis can also be considered limited. However, several international sources employed this spatial level and this type of indicator to describe local income inequalities (Rattsø 2008, Peeters 2008, Rattsø–Stokke 2010, 2011, Mastronardi–Cavallo 2020).

The key time horizon for this study is the period 2012-2020 (post-crisis growth). Although this is a short period, we believe that relevant correlations can be drawn from this period with respect to income inequality processes at the settlement level.

The database for the analysis was provided by the National Regional Development and Spatial Planning Information System (TeiR) [3]. Within this, data from GeoX Kft., the Hungarian Central Statistical Office (KSH), and the personal income tax and corporate tax returns of the National Tax and Customs Administration are used.

Expression of global embeddedness

In our study, we interpreted the main economic globalisation embeddedness along the lines of homogeneous regions. Due to the inadequate expression of functional (city-region) relations and flows (e.g., labour, capital, goods, etc.), we rejected the interpretation of the phenomenon under study at the level and operationalisation of the settlement. We chose a territorial level that is more aggregated and capable of describing global spatial organisation and domestic spatial processes. The local level plays a prominent role in monitoring globalisation and competitiveness processes (Lukovics 2007, ESPON 2013a, 2018, Lengyel 2021). The micro-regional (micro-region, district) approach is an approximation of the nodal region type (city and catchment area), which meets some or all of the above criteria and has clear development policy links as well (Lukovics 2007, Bodnár 2020, Somlyódiné Pfeil 2020). The chosen spatial level does not fully reflect real socioeconomic movements, but is, nevertheless, of paramount importance for the availability of statistical data.

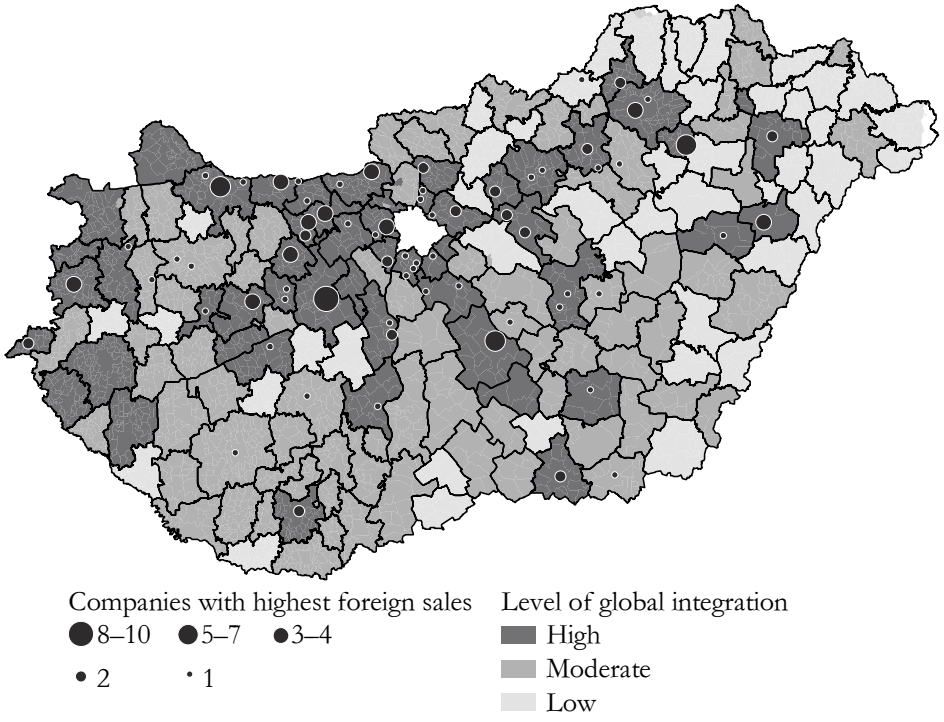
Globalisation processes are interpreted in light of Clark (2000), who argues that globalisation involves the creation of networks of connections between actors at greater (continental) distances, mediated by flows of persons, information, ideas, capital, and goods. This definition is the basis for the KOF globalisation index of macro-level economic, social, and political globalisation (Potrafke 2015), which is closest to the theoretical basis of our analysis. We described microeconomic globalisation using the following key indicators: foreign ownership of registered capital (proxy variable for international capital flows), exports from net sales (proxy for global trade integration), and gross value-added, expressing the weight of production volume (and the level of economic development). The social dimension of globalisation is expressed by the number of guest nights of foreigners, while information flow is indicated by broadband Internet subscribers. From the above indicators, we created specific variables (per thousand permanent inhabitants) and

chose a logarithmic transformation to approximate the normal distribution. The study period comprises the beginning of the income growth period after the 2008 economic crisis (i.e., 2012). Budapest was excluded from the analysis, as the use of the capital city was not justified owing to its prominent (outlier) position in the country (Csomós 2013, ESPON 2013a, 2018).

We then applied factor analysis based on Ezcurra–Rodríguez-Pose (2013) and Ezcurra–Del Villar (2021) to create an independent principal component with appropriate statistical parameters. The significance of Bartlett's test indicates that the included variables are correlated with each other, while the Kaiser-Meyer-Olkin (KMO) index value (0.771) shows that our indicators are appropriate for factor analysis. The single eigenvalue is significantly above the threshold of 1 (3.067), that is, the information concentration is adequate, and the variance coefficient retained is close to 62%.

Figure 2

Global embeddedness of Hungarian districts (during the 2010s)



Note: The database of companies with the largest foreign turnover is the HVG (2014).

The results show that the indicators of global integration 'tend to move in the same direction'; that is, districts with high per capita gross value-added have higher specific export earnings and foreign-owned registered capital, as well as a higher share

of foreign guest nights and broadband internet subscribers among the population.[1] In other words, a principal component with strong economic value content has emerged, and the analysis confirms this characteristic of globalisation processes. Subsequently, a natural breaks (jenks) categorisation, which creates groups with the smallest differences between the elements and the largest differences between the groups, was applied to the factor values. To describe the impact of global effects on spatial heterogeneity, districts were categorised into high-, medium-, and low-integration clubs (Figure 2). The results were compared with the settlement distribution of top businesses with the highest foreign turnover, which confirmed the economic focus of the factor and cluster analysis outputs, based on aggregate spatial data. Please note that the typification results can only be interpreted in Hungarian terms, and the individual categories express relative positions. This categorisation can be further differentiated, and we chose to use a threefold division to avoid spreading.

The structural characteristics of the clubs show significant differences (Table A1 in the Annex), and global embeddedness clearly shows the slopes not only of the dimensions studied, but also of other socio-economic criteria (Table A2 in the Annex). In other words, the greater the global embeddedness, the better the results, with only the highly integrated clubs performing better than the national average.

This district classification is broadly representative of the main territorial characteristics of Hungary (Nemes Nagy–Németh 2003, Enyedi 2004, Nemes Nagy 2009, Pénzes 2014): regionalised spatial differentiation (backward/developed areas), urban-rural disparities, and inequalities between the North-West region and the rest of the country. However, although the results of Csomós (2013) are echoed indirectly, that is, the districts of smaller centres (Kiskunfélegyháza, Szentes, Lenti) demonstrate moderate global embeddedness, this does not translate into overall socioeconomic and infrastructural development, given that their performance is below the national average. The peripheral districts of the county centres (Szekszárd, Kaposvár, Salgótarján, Békéscsaba) do not represent an outstanding economic globalisation environment. In his earlier study, Cséfalvay (2005) defined these spaces as integrated into domestic economic networks, and no significant change occurred in the elapsed period.[2] Consistent with the results of Cséfalvay et al. (2005), both insularity (mainly in Eastern and Southern Hungary) and axial location are still present.

[1] The factor weights are as follows. Gross value added: 0.921; exports from net sales: 0.878; foreign-owned registered capital: 0.843; broadband internet subscribers: 0.653; guest nights spent by foreigners: 0.559.

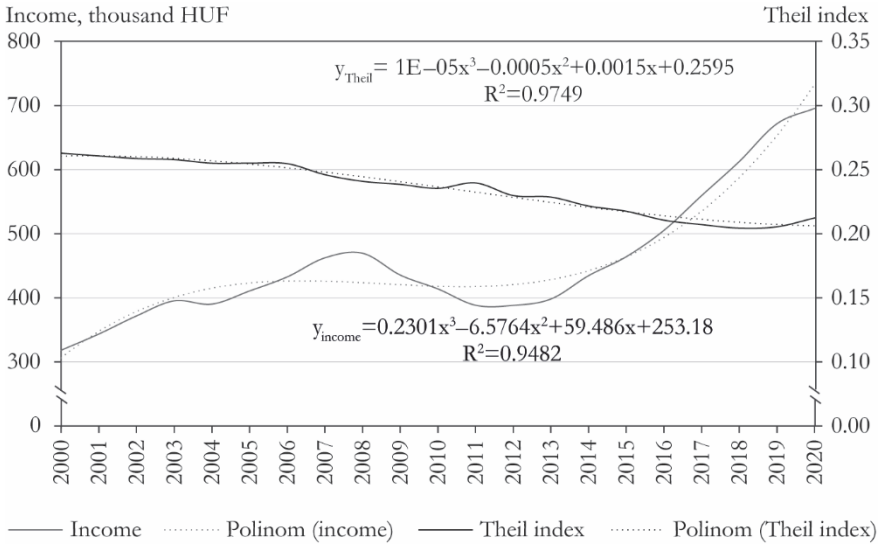
[2] The tests were also run with absolute (not specific) variables, and for these districts no significant change in position is observed.

Income inequality analyses along global clusters

In Hungary, inequalities in per capita income subject to personal income tax have been declining steeply since the millennium; this process is also indicated by the main characteristics of the polynomial trend function fitted to the data series (Figure 3).

Figure 3

Development of per capita income and settlement-level σ-convergence after the millennium (Theil-index, 2000–2020)



Note: The left axis corresponds to the real income per capita, and the right axis shows the Theil index range. The income per capita is presented as a real value (year 2000 prices).

The 2012–2020 period is also clearly characterised by σ-convergence[3], but at the end of it, new divergent trends can be observed, similar to the period following the regime change. The key question is whether this is a short-term phenomenon and what causes it.

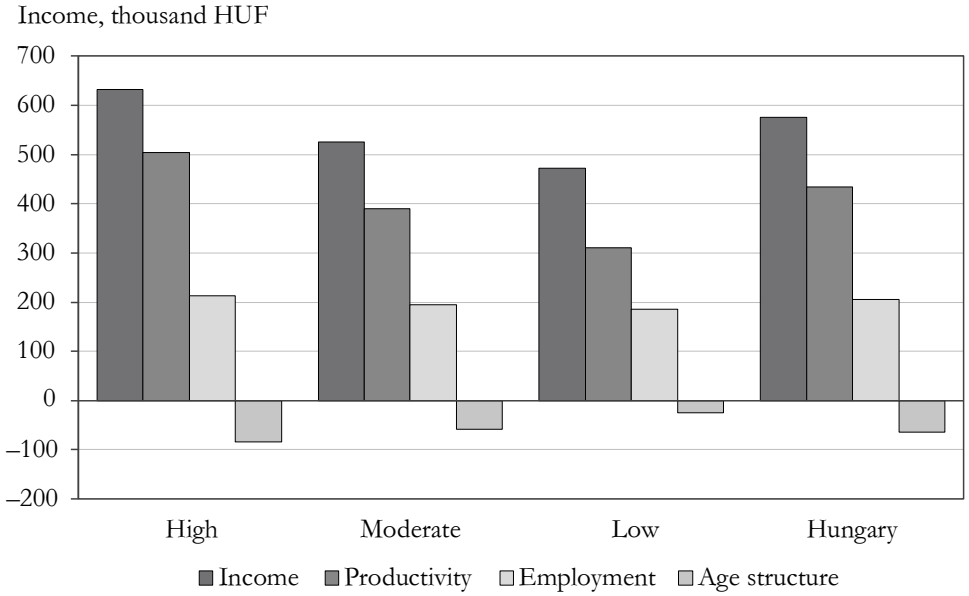
According to the Kruskal-Wallis H-test (Kökény–Kiss 2021), per capita income at the settlement level differed significantly across district categories in 2012–2020. The value of the $\chi 2$ statistic at three degrees of freedom varied between 572.14 and 742.98 over the study period, always with $p<0.000$. $\eta 2$, which indicates the effects of segregation, takes a value between 0.181 and 0.235, indicating that the global environment in the initial period had a significant lasting effect on income inequality throughout 2012–2020. This was also confirmed by the associated non-parametric

[3] The third-degree polynomial regression equation can be given as follows. $y = 0.0002x^3 – 0.0023x^2 + 0.0032x + 0.229$; $R^2 = 0.995$.

post-hoc test, indicating a statistically robust difference between incomes across all categories throughout the study period.

Figure 4

Composition of the increase in real income per capita by economic globalisation clubs, 2012–2020 (without Budapest)



Note: The various values are presented at real value (year 2012 prices).

Between 2012 and 2020, real income per capita increased in all categories, in line with the level of global integration (Figure 4, column 'income'). The national average specific increase is exceeded only by the most globally integrated clubs. These results highlight the pessimism surrounding the catching-up of low-embedded settlements. The increase was also analysed using triadic resolution.[4] As to factors influencing the dynamics, very clear slopes emerged along the lines of global integration, in terms of the factors influencing the dynamics. Starting from the most integrated areas, productivity tended to decline as one moves towards low clusters, whereas the impact of employment and age structure revealed the opposite trend. An extensive analysis by ESPON (2018) shows, for example, that FDI does not support convergence, meaning that the most disadvantaged (and least integrated) areas are the biggest losers. These linkages are also clearly and indirectly reflected in the studied income inequality processes. Despite the least-globalised settlements exhibiting the largest

[4] The income growth in real terms between two points in time can be decomposed into differences in productivity (income/taxpayer), employed persons (taxpayers) and age structure (18–64 age group) (based on Lengyel–Varga 2018).

improvements in labour market activity as a share of the incremental contribution, they tend to be constituted of low-productivity workers whose market income does not exceed previous social benefits (Svraka 2021). According to Lux (2017), despite competitive FDI companies on the periphery, there are no spill-over effects; they are 'alone' and in a unique situation.[5]

The above suggestion to catch up is further nuanced by Figure 5, which shows deviations from the national average, indicating specific income trajectories. The income of the highly globalised club is increasingly diverging from the national average, while the moderately and least globalised integration spaces are not only converging, but their average incomes are steadily falling behind. In other words, trend-like σ convergence is coupled with a growing real income gap. Thus, in the case of income subject to income tax, the effects of economic globalisation clearly increased spatial inequalities. Incomes per cluster do not converge, but incomes within clusters converge for the most part (Figure 6). Based on these characteristics, various global economic clusters are clubbed according to their income.

The σ-convergence results provide a more dynamic picture than the average (country-level) income convergence. The slight national divergence in 2020 is primarily driven by an increase in the differences between the settlements with the lowest global integration, while the other categories show steady convergence processes, albeit to different extents.

If we compare income positions with inequality trends, we observe that the correlations are linked to the Williamson hypothesis and its post-socialist version (Nemes Nagy 2009) in the short run. The settlements in the most developed income and economically globalised environments show a trend-like convergence and the most equalised picture, while those in the middle-income global environment start from a slightly higher level, but the spatial inequalities converge. For the least embedded settlements, a more differentiated trend emerges, and the considerable lag appearing from 2016 onwards is accompanied by a trend-like increase in spatial inequalities (eventually exceeding the national average). For the latter, the small village settlement structure may also be an important explanatory factor (Németh–Kiss 2007).

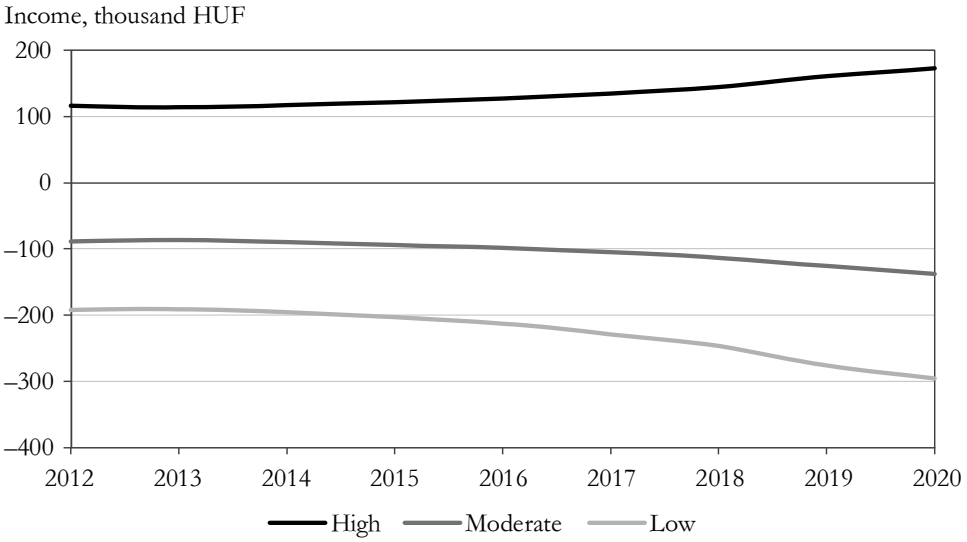
As observed in Figures 3 and 6, spectacular divergence in accordance with global embeddedness begins in 2020, both nationally and in clubs. According to Stiglitz (2022), the Covid-19 pandemic has 'exposed and exacerbated the fragility and inequality of the global economic system'. Several domestic studies (Svraka 2021, Köllő–Reizer 2021, Czirfusz 2021, Vida 2022, Kapás 2022) note that the loss of jobs (and the decrease in income) was much greater in the case of a population with lower education and exposed to poverty during the pandemic. (whereas it was lower in the case of graduates). Therefore, we can reasonably assume that the divergence observed

[5] A good example of this is Ózdi district, which was characterised by a low level of global integration at the beginning of the period under review, but still had several FDI companies that have since been phased out.

along both national and globalisation clubs can be attributed to this. The level of polarisation is stronger in the least embedded settlement club because of its significant backwardness (Table A2 in the Annex).

Figure 5

Average deviation of the real income per capita of each settlement group from the national value (without Budapest)

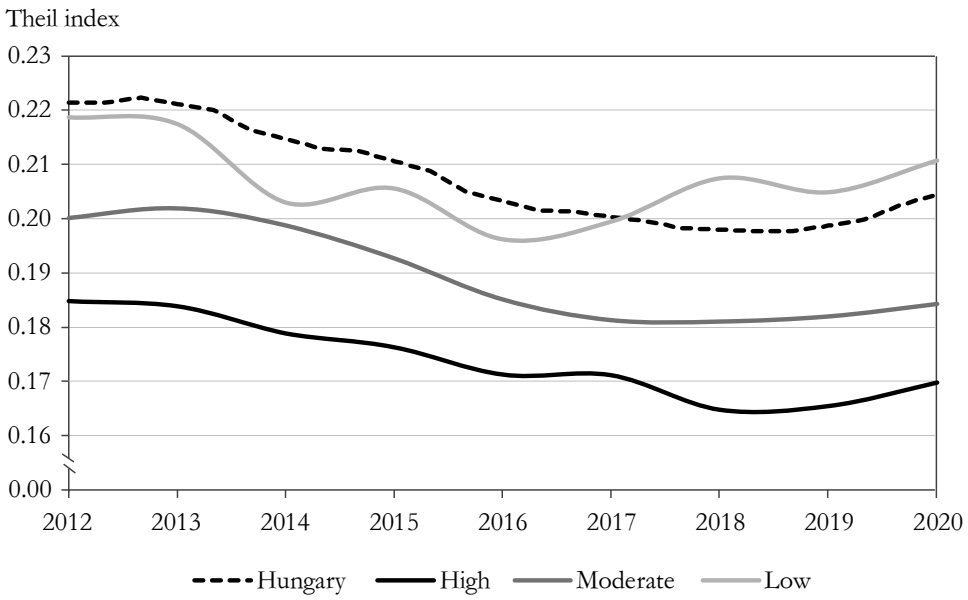


Thus, only the right-hand slope of the U-curve can be modelled in the period under study, but the results for the short period also suggest the role of globalisation effects in the Williamson hypothesis (Ezcurra–Del Villar 2021), which is reflected in taxable income as well. In our view, global economic integration and spatial organisation contribute to the interpretation of the phenomenon, also at the settlement level under study. The context of each globalisation group will be discussed later.

Our preliminary results clearly confirm the findings of international research on settlement-level income inequality (Rattsø 2008, Rattsø–Stokke 2010, 2011, Mastronardi–Cavallo 2020) that the local level is appropriate for the description and interpretation of the phenomena under study.

Figure 6

Inequalities of per capita settlement income based on globalisation classification, 2012–2020 (without Budapest)



Using the Markov chain method, we also examined the mobility and distributions behind the above inequality paths to see how the dynamics of settlement income evolved over the period under study (Table A3 in the Annex).

The impact of global integration on income inequality and convergence was analysed using the Markov matrix. In addition to the original Markov matrix, three 5×5 'globalisation' conditioned transition probability matrices – corresponding to globalisation embeddedness – were created for the analysis.[6] We wished to use them – by controlling the income categories in different globalisation environments – to show the probability of a given settlement remaining or moving in income clusters relative to the national average. The results obtained must be interpreted as a function of the original transition matrix (Le Gallo 2001, Bickenbach–Bode 2003).

By including the global integration of the initial period (2012), the results clearly provide a more complex picture of settlement income convergence and distribution processes (Table A3 in the Annex). According to the associated test statistic

[6] For the basic Markov chain, we used a panel approach, categorising each settlement according to the yearly change. The analysis is based on 25128 transitions, using real income inflated to 2012. To discretize the state space, we used the equal number of observations option, dividing the population into five equal parts, with 20 percent of the settlements belonging to each income class. The first category is 57.27 percent of the national average, the second 70.42 percent, the third 82.53 percent, the fourth 97.34 percent, while the fifth group includes settlements above this level.

(LR = 134.36, with 16 degrees of freedom), the phenomenon under investigation cannot be disentangled from income mobility at the settlement level, with income distribution and convergence being significantly related to global integration.

The transition probability matrices for the different global clubs differ significantly from the national average movement probabilities (LR values in Table A3 in the Annex). The table also clearly shows that the effects of the global environment differ significantly in the national settlement space. Spaces with lower embeddedness are more likely to retain catch up than those in the baseline case. For example, the probability of moving up for the least-developed income class in these settlements is only 9.0%, compared to 10.8% for the original matrix. In addition, the pullback effect was also significant for the lower integrated group, with a 15.1% probability of lagging behind for the most developed category, compared to 7.7% in the baseline case. This phenomenon also holds true in reverse, as the probability of catching up is significantly higher in the highly integrated spatial context, while the probability of levelling down is lower. In the highly integrated group, the chances of catching up increased significantly for the worst income class (from 10.8 to 15.3%), while the chances of backslide were significantly reduced (fifth income class: 5.3% versus 7.7%). Overall, with one or two exceptions, the relationship between the rate of catching-up and lagging behind for the different global categories is almost linear. The phenomenon under study also had a clear impact on stability. A low-level global environment preserves settlements in the lower-income brackets (and mobilises the more developed ones downward), while the same phenomenon is reversed for high embeddedness.

The results of the analysis show differentiated modes of action, significant in all spaces, in the field of settlement income distribution, and convergence between 2012 and 2020; it is a picture that is typical and consistent with global embeddedness. In other words, settlement convergence and its main components (catching up, stagnation, and lagging behind) cannot be separated from the global environment, nor can they be understood without it. Overall, therefore, the Markov chain analysis confirms our hypothesis that the processes of income inequality at the settlement level observed in globalisation clubs are spatially significantly heterogeneous in both static and dynamic relations.

Explaining income distributions – spatial differentiation in the global environment

The following analysis aims to identify the factors that potentially contribute to the income inequalities of globalisation clubs from 2012 to 2020. For the analyses, we applied regression techniques, based on literature synthesis and empirical results (Capello–Fratesi 2013, Capello–Perucca 2013, Smętkowski 2018) related to the main

growth and inequality factors. We interpreted the income-shaping factors in terms of their exogenous, endogenous, structural, and traditional nature.

The basic complementary regression equation is as follows:

$$Y_{i,\,t} = \beta_0+\beta_1 EXO_{i,\,t\text{-}X}+\beta_2 ENDO_{i,\,t\text{-}X}+\beta_3 STRUCT_{i,\,t\text{-}X}+\beta_4 TRAD_{i,\,t\text{-}X}+ \\ +\beta_5 AS_{i,\,t\text{-}X}+\beta_6 HIST_{i,\,t\text{-}X}+ \varepsilon_{i,\,t},$$

where $Y_{i,\,t}$ the average state of income inequalities in 2012–2020, as represented by the average deviation from the national per capita income level, subject to personal income tax. Income inequalities are calculated in real terms and are defined in 2012 prices. This indicator follows a normal distribution.

$EXO_{i,\,t\text{-}X}$ refers to settlement accessibility (2012), export performance (2012), commuting rate (2011), and subsidies based on specific government decisions (2004–2018). Accessibility is conceptualised and operationalised based on national spatial economic and transportation geography specificities (Egri–Kőszegi 2020). We measured the distance from networks (ESPON 2013b), expressed in terms of time and geographical distance from major cities (capital city, regional centre, county seat) on the one hand and from road infrastructure (motorway). Owing to multicollinearity between the variables, information concentration was determined using principal component analysis.

As Hungary is a dependent market economy, the impact of this phenomenon must be measured at the settlement level. This is expressed by the logarithmic settlement value of the export sales of joint businesses.[7] Meanwhile, as part of the supply-oriented regional development policy (Szanyi 2017, Kádár et al. 2019, Egri–Kőszegi 2020), we used a dummy variable for the subsidies allocated mostly to international companies based on specific government decisions. The spatial mobility of the labour force is expressed as the share of employees commuting on a daily basis.

In the regression equation, $ENDO_{i,\,t\text{-}X}$ refers to the share of university, college, or other degree holders (2011) in the 25-X age group and the number of small and medium-sized enterprises (SME) per thousand persons (2012). $STRUCT_{i,\,t\text{-}X}$ refers to the main structural economic characteristics (employment rate in the industry, 2011). The traditional factor of the economy ($TRAD_{i,\,t\text{-}X}$) is identified in this case with the unemployment rate (2012). $AC_{i,\,t\text{-}X}$ means active spatiality (neighbourhood effects, belonging to a region) and, for spatial interactions, the spatially lagged y variables and the residuals are also found here. $HIST_{i,\,t\text{-}X}$ is the Bernoulli variable expressing the endogeneity (long-term effects and determinants) of past spatial policy developments. The settlements included in any development category of the government resolution

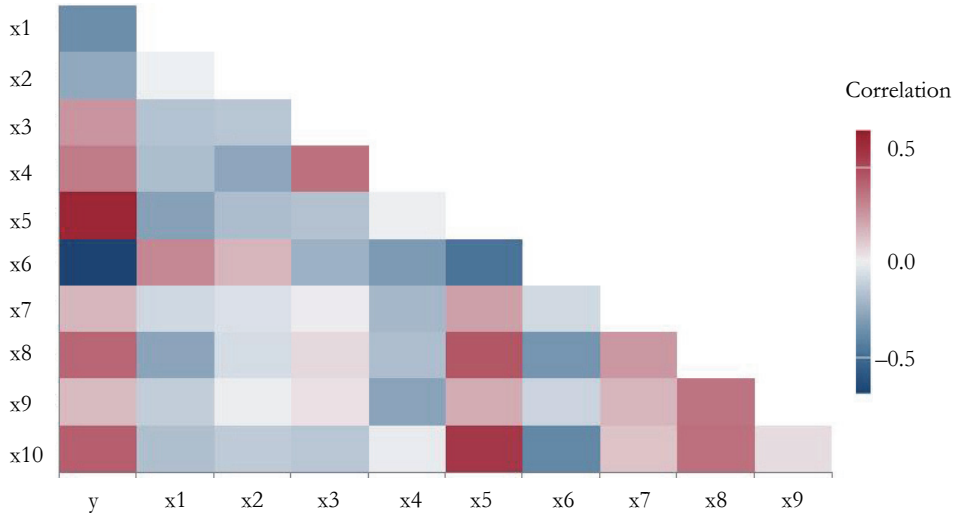
[7] Of course, this indicator is, again, not free from spatial criticisms of the economic value creation indicators measured at low territorial level (in particular, the separation between the seat and actual sites of businesses, the territorialisation of the performance of multi-site organisations, the effects of commuting, etc., Dusek–Kiss 2008). It is noted that related research at settlement level (focusing on joint businesses) shows good correlations in Hungary (Csomós 2013, Tóth-Pajor–Farkas 2017). It should also be noted that the natural logarithmic formula used strongly narrows the scope of the variable.

(OTK 1971) or the county settlement network development plans were assigned a value of 1, while those excluded were assigned a value of 0.[8] β_0, β_1, β_2, β_3, β_4, β_5, β_6 are the regression coefficients of the explanatory variables, β_0 is a constant term, and $\varepsilon_{i,t}$ refers to the random residuals. Figure 7 shows the correlation between the variables included in the regression analysis, which suggests promising preliminary results.

The results that best fit the diagnostic criteria (appropriate level of multicollinearity, homoscedasticity, normal distribution of residuals, treatment of spatial dependence) are reported (Figure 7, Table A4 and A5 in the Annex).

Figure 7

Correlogram of variables in regression analysis



Note: The magnitude and direction of the correlation coefficients are indicated in colours. y: income; x1: distance of Budapest/motorway factor; x2: distance of county seat factor; x3: employment in industry; x4: commuter rate; x5: tertiary education; x6: unemployment rate; x7: subsidies based on specific government decisions; x8: export sales; x9: OTK category; x10: SME.

First, we ran global regressions, covering all settlements, but excluding globalisation clubs. The OLS model was discarded because of the non-normal and heteroscedastic residual characteristics. Spatial dependence tests of the residuals (Lagrange Multiplier, Robust LM) were highly significant for both, lag, and error variables; therefore, a spatial model was justified. Thus, the following estimation was performed using the spatial two-stage least squares method. The model fit was excellent (Pseudo R^2 = 0.721), but the Anselin-Kelejian test again showed a statistically robust spatial autocorrelation of residuals. Finally, we considered the spatial weighted least squares method as a consistent model; the KP-HET standard

[8] The government decision contains several development categories at lower, middle and upper levels. In order to avoid expansion, the dummy variable in the analyses only indicates participation in the category to be developed.

error, which can handle heteroscedasticity (in addition to spatial autocorrelation), was used to estimate the dependent variable (Kelejian–Prucha 2010).

These results are in line with preliminary expectations (Table A4 in the Annex). A higher income position is found in settlements located closer to the capital city, motorways and county seats, and in those with above-average shares of commuters, export sales, skilled population, and industrial employment. Settlements that have been categorised for development under socialism or have received subsidies based on specific government decisions also have significantly higher incomes. High unemployment restrains income inequality, while the presence SMEs does not significantly affect it. The insignificant role of SMEs in income inequality can be explained by several factors. On the one hand, SMEs are highly heterogeneous in terms of sector, area and efficiency (from the forced [micro] enterprises to the traded sector with international presence), and they are also characterised by very weak networking and innovation capacities (Jóna 2016, Lengyel 2021, Jeneiné Gerő et al. 2021). The lambda coefficient is a significant and prominent operator in the SWSLS regression equation, thus providing a relationship between the dependent and independent variables, adjusted for the effects of spatial autocorrelation.

Subsequently, we ran the spatial regime regression models according to the above methodology, based on predefined settlement groups. Again, the spatially weighted least-squares version of the regressions provides the most consistent estimate (Table A5 in the Annex).

The results provide a good representation of the spatial heterogeneity of income inequalities. This is clearly reflected by the fact that most explanatory variables are in line with prior expectations (and of varying strengths), with the majority of effects being significant. Indicating the goodness of fit, the pseudo R^2s are similar to the global model values, exceeding them in the case of settlements with low global integration.

Finally, we used the spatial Chow test to indicate whether the factors affecting income inequalities in each settlement club are statistically different (Table A6 in the Annex).

The results show that belonging to a previous development category or having tertiary education was not a significant predictor of the phenomenon under investigation along the various globalisation clubs. At the same time, it cannot be said that insignificant factors do not influence income. In this case, the coefficients of the global model were applicable, that is, the statistically robust national average processes characterised the spaces under study (Grekousis 2020). Note that path dependence is an important determinant of overall socio-economic development (Acemoglu et al. 2001), the Hungarian implications of which are also clearly evident (Győri–Mikle 2017, Nemes Nagy et al. 2017, Kincses–Tóth 2020). However, the non-significant presence of OTK classification by group is already clear due to spatially differentiated transformation effects in the period after the regime change.

Although Smętkowski (2018) defined it as an exogenous characteristic from the perspective of regional economic development, the dimension of accessibility is, to a significant extent, an endogenous factor in the Hungarian development spatial

structure (Németh 2008, Egri–Kőszegi 2020). The distance from Budapest, other large cities and motorways is an important criterion of the locational and economic centre-periphery relationship (Nemes Nagy–Németh 2003, Lőcsei–Szalkai 2008, Győri–Mikle 2017, Tóth 2018, Kincses–Tóth 2020). The Budapest and motorway accessibility factor adequately expresses the transport network centred around the capital and large cities, i.e., the fact that higher-order roads connect the major metropolitan areas with Budapest, thus reinforcing the presence and continued existence of economic concentration in these centres (Németh 2008, Egri–Kőszegi 2020). The centralised transport network factor strongly explains income differences in areas of low- and high-level globalisation. However, according to our assumptions, this phenomenon can be explained by other mechanisms that differ depending on the actual settlement category.

As for the settlements of the highly integrated club, income inequalities are interpreted to a significant extent by network externalities related to accessibility, through contributions to cost efficiency, increased spatial interactions, and the dispersion of agglomeration forces (de Bok–van Oort 2011, Crescenzi–Rodríguez-Pose 2008, ESPON 2013a). The same phenomenon is described at a more 'localised' level, also by the significant accessibility coefficients of county seats; in fact, the latter variable explains polycentric income inequalities in highly and less integrated spaces with a strength almost similar to the Budapest/highway accessibility factor, while the other factors in question are kept under control. At the same time, the latter groups of settlements are mostly characterised by weaker interactions with the centres (Pénzes 2013, Kiss–Szalkai 2018). The accessibility of Budapest and motorways still indicates the peripherality of location (economic and transportation geography) in the latter club, that is, exclusion from local and global networks (Cséfalvay et al. 2005). Regarding moderately integrated spaces, the variables of road accessibility, although having a suitable sign, appear insignificant. This may be due to several reasons: On the one hand, we can assume that within this cluster, it is not the inequalities at the macro-region level that are characteristic, but the 'localities' that cause spatial heterogeneity and determine income positions (e.g., prime resorts, traded businesses not located in centres). However, we may also assume the role of the lower-order road network, which we did not model, in explaining income.

The proxy variable for global embeddedness at the settlement level (export performance) indicated a significant effect on the distribution of income between 2012 and 2020 in moderately and highly embedded environments. The more integrated the district in which a settlement is located, the smaller the effect of this variable on income. In our view, this contradiction is only apparent. As districts with high global integration have a huge concentration of export sales (89.33%) and their spatial distribution is not as dispersed (71.11% of settlements) as in other clubs, it is assumed that this cannot be considered a major differentiating factor. A similar phenomenon can be observed in the case of subsidies based on specific government decisions, which play an important role in Hungary's supply oriented development

policies.[9] When the other factors are kept under control, it appears to be a significant predictor only in the intermediate spaces, but here, it has a significant return. As for the club most integrated into the world economy, we can assume that the economic impulse of global embeddedness is transmitted through effects on industrial employment. This slope is reflected in the various regression coefficient values for the industry. More advanced and innovative (automated) manufacturing is clearly linked to FDI, and its spatial location shows a significant overlap with more developed and globalised regions (Csomós 2013, Lengyel et al. 2016, Lengyel–Varga 2018, Kiss–Tiner 2021). For labour flows, a clear slope emerges (the less integrated a settlement is, the higher the indicated income returns by commuting), with the members of the regression equations essentially indicating the energy of movement. The commuting patterns show the postmodern characteristics of labour mobility, confirming a service-based economy as well as polycentric development (Kiss-Szalkai 2014). In our view, the non-significant effect of small and medium-sized enterprises adequately reflects the economic development characteristics of large companies (Lengyel 2010). Although cluster- (and SME-) based economic development can be found in some large cities, the number of cooperating SMEs is small on one hand and, on the other hand, the links extend well beyond the catchment area (Horváth et al. 2013, Berkecz-Kovács 2018). The sole supporting role of SMEs is significant in the least embedded group of settlements. These spaces are characterised by the lowest concentration of turnover in the main branches of the national economy (Jeneiné Gerő et al. 2021), and also by a higher density of constraint-oriented firms.

The coefficient on labour utilisation is significantly different in all regressions, and there is a clear downward slope in this case as well. The more embedded a settlement is in the global economy, the higher the effect of the unemployment coefficient on income. It should be noted that the concentration of unemployed persons by education is also correlated with global trends (Győri 2021). The spatial concentration of educated unemployed persons primarily overlaps with highly globalised areas, whereas that of unskilled unemployed persons overlaps with less embedded areas. As our previous results have shown, employment levels have improved the most in the latter spaces, but the least competitive labour force has entered (re-entered) the labour market. The lambda parameter also differs significantly between globalisation clubs, confirming the validity of the basic model for the entire settlement.

The results of the multivariate analyses clearly show that patterns of globalisation can be detected, albeit to a limited extent, at the settlement level. The settlement patterns of global embeddedness differ significantly, confirming the descriptive and empirical (mostly settlement-based) sources cited above, which also address globalisation processes.

[9] As to the subsidies based on specific government decisions, the companies based in Germany can be considered as winners, with 61% of international subsidies. The locations of implementation are linked or close to the network nodes of transportation geography, with the processing industry's predominance (of almost two thirds for the automotive and mechanical engineering sectors) (K-Blog 2019, KKM 2019).

Conclusions

Hungary is considered one of the extremes of dependent market economies, with its development being one of the most exposed to FDI among EU countries. In this study, we sought to highlight the spatiality of the globalisation phenomena taking place in the country and its impact on income inequality at the settlement level.

In our study, we first operationalised the economic dimension of globalisation at the territorial (district) level using multivariate mathematical methods. The initial results show that the economic nature of globalisation, not considering the capital city, generates a very sharp dividing line not only in terms of income but also in terms of socioeconomic and infrastructural factors. Both insularity and 'axiality' persist in the spatial organisation of globalisation.

Between 2012 and 2020, Hungary experienced an almost linear income growth trend, coupled with continuous spatial convergence. When the dimension of economic globalisation is included, it can be observed that the spaces of various embeddedness levels represent major dividing lines not only in the static states of income but also in the dynamic evolution of factors affecting inequalities, and factors that explain income distribution. Over the period under review, the aggregate category with strong global economic embeddedness has been steadily increasing its (taxable) income advantage in favour of moderately and least integrated spaces, resulting in the opening of the real income gap and polarisation. Although the study period can be considered short, the Williamson hypothesis provides an adequate explanation for the relationship between income growth and internal segmentation. From 2020, the income divergence can be observed again, which can be attributed to the impact of the Covid-19 pandemic.

The Markov chain results suggest that income mobility at the settlement level and its main components (catching-up, stagnation, and lagging behind) cannot be separated from the global environment, nor can they be understood without it. The stronger the global embeddedness, the more income catch-up is facilitated, and lagging behind, discouraged. Eventually, this phenomenon occurs in the least-integrated spaces.

Income inequalities and factors affecting the distribution were identified using spatial econometric methods (multivariate regressions). The income inequality processes at the settlement level in regions with different levels of globalisation are mainly determined by the higher-order road network centred on the capital city – which also indicates the country's endogenous spatial structure of development (Varga 2009) – the utilisation of labour, and the economic structure. It should also be noted that improving accessibility does not significantly resolve the centre-periphery development relationship, even in the long run, and that improvements do not always lead to outcomes regarding spatial development (Németh 2008, Egri–Kőszegi 2020). Thus, our results suggest that this network also preserves the exclusion from global production networks. Unemployment has a very strong spatial embeddedness

(Németh 2008, Egri–Kőszegi 2016, Győri 2021), especially along the educational dimension. In our study, we focused only on industry in terms of economic structure. For this reason, the analysis can be criticised, but more detailed employment indicators for other sectors are either not fully available or, if they are, their use has been discarded due to multicollinearity. However, we had to choose a variable that could be expected to be a significant predictor for all three clusters. The role of industry (including manufacturing) is indispensable with regard to spatial development and income inequalities (Lengyel et al. 2016, Molnár et al. 2018), particularly in the clubs of most globalised settlements. Nevertheless, it may give rise to the important question of what the Fourth Industrial Revolution offers to the moderately and least embedded spaces. Some authors (Káposzta 2014, OECD 2019) argue that development based on endogenous resources, including, in particular, natural resources, can be the basis for local economic development in these spaces.

Overall, it can be stated that greater global embeddedness has contributed to income growth and territorial convergence in the period that followed the economic crisis. At the same time, the ongoing Russian-Ukrainian war hampered many global economic movements, contributing to production shutdowns and long-term fragmentation of global value chains. Businesses based in Russia and Ukraine supply specialised inputs, and the shortages of some inputs are already affecting European car manufacturers (IMF 2022). An important research question is how these processes affect further convergence processes in dependent economies and their spatial dimensions.

Finally, we believe that the settlement level used in our analyses is appropriate for capturing the income inequality characteristics of globalisation processes. Although limited, it can still describe the main features, trends, movements, and effects of globalisation.

Acknowledgments

The research of Zoltan Egri was supported by the János Bolyai Research Scholarship of the Hungarian Academy of Sciences.

Annex

Table A1

Main basic characteristics of the globalisation clusters (2012, without Budapest)

Denomination	High	Moderate	Low	Kruskal-Wallis H-test	Eta squared ($\eta 2$)
	level				
Gross value added/inhabitant[a]	166,581	50,887	26,654	130.1***	0.749
Export sales/inhabitant[a]	329,753	48,991	21,570	103.8***	0.595
Foreign-owned registered capital/inhabitant[a)]	82,183	13,251	1,449	97.1***	0.556
Broadband internet subscribers/ 1000 inhabitants	193.4	132.6	86.9	87.0***	0.497
Guest nights spent by foreigners/inhabitant	1,331.3	441.6	73.0	48.6***	0.273

a) In thousand HUF.

Note: The post hoc test related to the Kruskal-Wallis test indicates a significant difference between the groups in each case.

*** Significant at 0.001 level.

Table A2

Average structural characteristics of each economic globalisation club for the initial period (2012, without Budapest)

Denomination	High	Moderate	Low	Hungary
	level of global integration			
Percentage of dwellings without comfort and other dwellings[a)]	4.30	9.43	14.41	7.51
Percentage of people with university-, college-, and other degrees [a)]	19.57	12.62	8.67	15.65
Total electricity supplied per consumer (1000 kWh)	7.46	4.58	4.21	6.04
Percentage of registered jobseekers	5.71	8.74	12.54	7.76
Proportion of Roma (Romani, Beás) population [a)]	1.86	4.09	8.43	3.59
Infant mortality rate (2010–2012, thousandths)	4.72	5.56	7.21	5.39
Number of persons receiving regular child protection benefits per thousand inhabitants	40.33	72.96	126.30	64.47
Migration balance (2001–2011, thousandths)	36.49	-6.74	–25.26	11.94
Dependency ratios of the child and elderly population	43.50	45.05	45.36	44.30
Broadband internet subscriptions[b)]	64.07	27.73	8.20	100.00
Guest nights spent by foreigners[b)]	68.77	29.36	1.87	100.00
Gross value added[b)]	80.00	16.06	3.94	100.00
Net turnover from sales: Exports[b)]	89.33	8.74	1.93	100.00
Foreign-owned registered capital[b)]	91.89	7.45	0.66	100.00
Companies filing a corporate tax return[b)]	65.93	26.41	7.65	100.00

a) Data source is the 2011 census.

b) Unit of measurement: distribution ratios.

Table A3

Markov chains by the globalisation clubs of Hungary (2012–2020, without Budapest)

Income class	Transition probabilities					Number of observation
	1	2	3	4	5	
1	0.892	0.108				5030
2	0.075	0.789	0.136			5029
3		0.092	0.785	0.123		5023
4			0.094	0.815	0.091	5023
5				0.077	0.923	5023
Whole matrix LR test value: 134.36 d.o.f.: 16 (p<0.001)						
High level of global integration						
1	0.847	0.153				491
2	0.084	0.746	0.170			820
3		0.091	0.758	0.151		1278
4			0.089	0.808	0.102	2010
5				0.053	0.947	3373
Submatrix LR test value: 60.794 d.o.f.: 8 (p<0.001)						
Moderate level of global integration						
1	0.886	0.114				2479
2	0.072	0.804	0.124			2698
3		0.089	0.795	0.116		2493
4			0.091	0.828	0.081	2264
5				0.118	0.882	1300
Submatrix LR test value: 36.831 d.o.f.: 8 (p<0.001)						
Low level of global integration						
1	0.910	0.090				2060
2	0.075	0.786	0.138			1511
3		0.099	0.795	0.106		1252
4			0.115	0.796	0.089	749
5				0.151	0.849	350
Submatrix LR test value: 36.739 d.o.f.: 8 (p<0.001)						

Note: d.o.f. denotes the degrees of freedom. LR: likelihood ratio by row and submatrix. Each matrix exhibits a stationary distribution over time. Cells with zero to two decimal places were removed from the matrix.

Table A4

Regression results for the Hungarian settlement-level income inequalities (2012–2020, without Budapest)

Denomination	OLS	S2SLS (HAC)	SWLS (KP-HET)
Constant	–525.210*** (–30.664)	–461.128*** (–16.794)	–434.978*** (–18.806)
Subsidies based on specific government decisions	55.465*** (3.379)	51.521*** (4.391)	29.305*** (2.892)
Budapest/motorway	–13.210*** (–5.002)	–8.268* (–1.717)	–21.844*** (–4.038)
OTK category	20.175*** (3.621)	22.145*** (4.187)	18.723*** (4.367)
Tertiary education	17.603*** (30.108)	16.465*** (15.847)	16.738*** (16.271)
Commuter rate	2.238*** (13.512)	1.875*** (7.635)	1.620*** (7.339)
Industry	3.079*** (14.291)	2.805*** (8.652)	2.029*** (7.091)
SME	2.175*** (3.252)	2.063 (1.493)	1.684 (1.533)
Export sales (ln)	2.335*** (4.818)	1.935*** (3.333)	1.797*** (3.765)
Unemployment	–9.342*** (–25.079)	–8.676*** (–18.376)	–9.794*** (–21.638)
Distance of county seat	–11.163*** (–4.362)	–8.987** (–2.250)	–19.287*** (–4.536)
W/lambda	–	0.131*** (3.398)	0.641*** (40.459)
R-Squared	0.6915	–	–
Adjusted R-squared	0.6904	–	–
Pseudo R-squared	–	0.7207	0.6858
Spatial pseudo R-squared	–	0.6927	–
Multicollinearity condition number	20.201	–	–
Jarque-Berra	439.701***	–	–
Breusch-Pagan	617.555***	–	–
Kroenker-Basset	324.786***	–	–
Moran's I	34.792***	–	–
Lagrange multiplier (lag)	682.289***	–	–
Robust LM (lag)	15.067***	–	–
Lagrange multiplier (error)	1,191.983***	–	–
Robust LM (error)	524.761***	–	–
Anselin-Kelejian test	–	147.286***	–
N	3153	3153	3153

Note: The spatial weight matrix is based on the first-order binary queen contiguity. In parenthesis t- (OLS), and z-scores (2SLS. S2SLS. SW2SLS) can be seen. W is a spatially lagged indicator of income inequality, while lambda refers to spatially lagged residuals. *** significant at 0.01 level. ** significant at 0.05 level. * significant at the 0.10 level.

Table A5

Results of settlement-level spatial regressions (SWLS), 2012–2020 (based on globalisation classification, without Budapest)

Denomination	Low	Moderate	High
	level of global integration		
Constant	–534.687*** (–13.201)	–451.180*** (–16.634)	–395.595*** (–7.188)
Subsidies based on specific government decisions	13.598 (0.701)	62.516*** (3.779)	6.765 (0.424)
Distance of Budapest/motorway	–14.995** (–2.072)	–7.184 (–0.962)	–52.112*** (–6.483)
OTK category	15.865 (1.560)	31.037*** (5.198)	13.317* (1.708)
Tertiary education	21.230*** (6.962)	14.720*** (11.976)	15.232*** (9.321)
Commuter rate	2.293*** (6.173)	2.187*** (9.177)	1.096** (2.336)
Industry	1.189*** (4.274)	1.411*** (4.563)	3.751*** (6.348)
SME	5.384*** (4.014)	0.023 (0.017)	1.442 (0.648)
Export sales (ln)	–0.391 (–0.435)	2.574*** (4.288)	1.528* (1.626)
Unemployment	–7.194*** (–9.849)	–10.151*** (–16.704)	–15.330*** (–12.451)
Distance of county seat	–10.185** (1.996)	–6.173 (–1.060)	–56.786*** (–6.255)
Lambda	0.393*** (8.958)	0.597*** (27.017)	0.530*** (16.961)
Pseudo R-squared	0.6966	0.6150	0.6730

Note: The spatial weight matrix is based on the first-order binary queen contiguity. In parenthesis z-scores can be seen. Lambda refers to spatially lagged residuals. *** significant at 0.01 level. ** significant at 0.05 level. * significant at the 0.10 level.

Table A6

Results of the Chow test for spatial division, 2012–2020 (without Budapest)

Denomination	Degree of freedom	Value	Prob.
Constant	2	4.810	0.090
Subsidies based on specific government decisions	2	6.673	0.036
Budapest/motorway	2	18.817	0.000
OTK category	2	3.847	0.146
Tertiary education	2	4.023	0.134
Commuter rate	2	4.895	0.087
Industry	2	12.347	0.002
SME	2	8.006	0.018
Export sales (ln)	2	7.543	0.023
Unemployment	2	33.213	0.000
Distance of county seat	2	24.252	0.000
Lambda	2	17.775	0.000
Global test	26	248.280	0.000

REFERENCES

ACEMOGLU, D.–JOHNSON, S.–ROBINSON, J. A. (2001): The colonial origins of comparative development: An empirical investigation *The American Economic Review* 91 (5): 1369–1401. https://doi.org/10.1257/aer.91.5.1369

ALPEK, B. L.–TÉSITS, R.–HOVÁNYI, G. (2018): Spatial inequalities of disadvantage accumulation and their impact on employability in Hungary *Regional Statistics* 8 (1): 49–77. https://doi.org/10.15196/RS080108

AMOS, O. M. (1988): Unbalanced regional growth and regional income inequality in the latter stage of development *Regional Science and Urban Economics* 18 (4): 549–566. https://doi.org/10.1016/0166-0462(88)90026-9

ANSELIN, L. (1988): *Spatial econometrics: Methods and models* Kluwer Academic.

ANSELIN, L.–REY, S. J. (2014): *Modern spatial econometrics in practice: A guide to GeoDa*, GeoDaSpace and PySAL GeoDa Press, Chicago.

ARITENANG, A. F. (2022): The impact of urban characteristics on the spread of Covid-19 in 2020: The case of Java Island cities, Indonesia *Regional Statistics* 12 (3): 3–17. https://doi.org/10.15196/RS120301

ASTERIOU, D.–DIMELIS, S.–MOUDATSOU, A. (2014): Globalization and income inequality: A panel data econometric approach for the EU27 countries *Economic Modelling* 36 (C): 592–599. https://doi.org/10.1016/j.econmod.2013.09.051

BERKECZ-KOVÁCS, L. (2018): New trends in the development of Hungarian clusters: The case of the Southern Great Plain region *Regional Statistics* 8 (1): 78–95. https://doi.org/10.15196/RS080109

BICKENBACH, F.–BODE, F. (2003): Evaluating the Markov property in studies of economic convergence *International Regional Science Review* 26 (3): 363–392.

BODNÁR, G. (2020): *Az endogén fejlődés tényezőinek vizsgálata rurális térségekben* JATEPress, Szeged.

BULUT, V.–KORUKOGLU, S. (2022): Surface curvature analysis of bivariate normal distribution: A Covid-19 data application on Turkey *Regional Statistics* 12 (4): 3–26. https://doi.org/110.15196/RS120401

CAPELLO, R.–FRATESI, U. (2013): Globalization and endogenous regional growth. In: CRESCENZI, R.–PERCOCO, M. (eds.): *Geography, institutions and regional economic performance. Advances in spatial science* pp. 15–37., Springer-Verlag Berlin Heidelberg. https://doi.org/10.1007/978-3-642-33395-8_2

CAPELLO, R.–PERUCCA, G. (2013): *Do Eastern European regions move towards an endogenous growth pattern? A diachronic perspective of regional success factors* GRINCOH Working Paper Series, Paper No. 1.15.

CHARRON, N. (2016): Diverging cohesion? Globalisation, state capacity and regional inequalities within and across European countries *European Urban and Regional Studies* 23 (3): 355–373. https://doi.org/10.1177/0969776413512844

CHOW, G. C. (1960): Tests of equality between sets of coefficients in two linear regressions *Econometrica* 28 (3): 591–605. https://doi.org/10.2307/1910133

CLARK, W. C. (2000): Environmental globalization. In: NYE, J. S.–DONAHUE, J. D. (eds.): *Governance in a globalizing world* pp. 86–108., Brookings Institution Press, Washington, DC.

CRESCENZI, R.–PETRAKOS, G. (2016): The European Union and its neighboring countries: The economic geography of trade, foreign direct investment and development *Environment and Planning C: Politics and Space* 34 (4): 581–591. https://doi.org/10.1177/0263774X16642640

CRESCENZI, R.–RODRÍGUEZ-POSE, A. (2008): Infrastructure endowment and investment as determinants of regional growth in the European Union. In: STRAUSS, H. (ed.): *Infrastructure investment, growth and cohesion The economics of regional transport investment* pp. 62−101., EIB Papers, Luxembourg.

CSÉFALVAY, Z.–CSIZMADIA, N.–CSORDÁS, L. (2005): Kistérségek versenyképessége és a globális hálózatok *Polgári Szemle* 1 (6-7): 68–76.

CSOMÓS, GY. (2013): Magyarország gazdasági központjainak pozícióváltozása 1992 és 2011 között *Területi Statisztika* 53 (6): 529–550.

CZIRFUSZ, M. (2021): A COVID-19-válság és a térbeli munkamegosztás változásai Magyarországon *Területi Statisztika* 61 (3): 320–336. https://doi.org/10.15196/TS610303

DE BOK, M.–VAN OORT, F. (2011): Agglomeration economies, accessibility, and the spatial choice behavior of relocating firms *The Journal of Transport and Land Use* 4 (1): 5–24. https://doi.org/10.5198/jtlu.v4i1.144

DRUKKER, D. M.–EGGER, P.–PRUCHA, I. R. (2013): On two-step estimation of a spatial autoregressive model with autoregressive disturbances and endogenous regressors. *Econometric Reviews* 32 (5-6): 686–733. http://dx.doi.org/10.1080/07474938.2013.741020

DURAN, H. E.–KARAHASAN, B. C. (2021): Heterogenous responses to monetary policy regimes: A regional analysis for Turkey, 2009–2019 *Regional Statistics* 12 (4): 56–91. https://doi.org/10.15196/RS120403

DUSEK, T.–KISS, J. P. (2008): A regionális GDP értelmezésének és használatának problémái *Területi Statisztika* 48 (3): 264–280.

DUSEK, T.–KOTOSZ, B. (2016): Területi Statisztika Akadémiai Kiadó, Budapest.

EGEDY, T. (2012): A gazdasági válság hatásai városon innen és túl *Területi Statisztika* 52 (4): 334–352.

EGRI, Z. (2020): A területi jövedelemegyenlőtlenségek változása Békés megyében, 1988–2017 *Területi Statisztika* 60 (4): 477–512. https://doi.org/10.15196/TS600404

EGRI, Z.–KŐSZEGI, I. R. (2016): Az egészségi állapot szerepe hazánk területi gazdasági fejlődésében *Területi Statisztika* 56 (5): 520–548. https://doi.org/10.15196/TS560502

EGRI, Z.–KŐSZEGI, I. R. (2020): A közúti elérhetőség szerepe a kelet-magyarországi gazdasági teljesítményben és gazdaságfejlesztésben *Területi Statisztika* 60 (6): 653–687. https://doi.org/10.15196/TS600603

EGRI, Z.–TÁNCZOS, T. (2015): Spatial layers and spatial structure in Central and Eastern Europe *Regional Statistics* 5 (2): 34–61. https://doi.org/10.15196/RS05203

EGRI, Z.–TÁNCZOS, T. (2018): The spatial peculiarities of economic and social convergence in Central and Eastern Europe *Regional Statistics* 8 (1): 49–77. https://doi.org/10.15196/RS080108

ENYEDI, GY. (2004): Regionális folyamatok a posztszocialista Magyarországon *Magyar Tudomány* 49 (9): 935–941.

ESPON (2013a): *Territorial impact of globalization for Europe and its regions final report* ESPON, Luxembourg.
ESPON (2013b): *TRACC – TRansport ACCessibility at regional/local scale and patterns in Europe* ESPON, Luxembourg.
ESPON (2018): *The World in Europe, global FDI flows towards Europe* Applied Research Synthesis Report. ESPON, Luxembourg.
EUROPEAN COMMISSION (EC) (2017): *Competitiveness in low-income and low-growth regions: The lagging regions report*. Brussels.
EZCURRA, R.–DEL VILLAR, A. (2021): Globalization and spatial inequality: Does economic integration affect regional disparities? *The Annals of Regional Science* 67 (2): 335–358. https://doi.org/10.1007/s00168-021-01050-5
EZCURRA, R.–RODRÍGUEZ-POSE, A. (2013): Does economic globalization affect regional inequality? A cross-country analysis *World Development* 52 (C): 92–103. http://dx.doi.org/10.1016/j.worlddev.2013.07.002
FARKAS, B. (2012): A világgazdasági válság hatása az Európai Unió régi és új kohéziós tagállamaiban *Pénzügyi Szemle* 2012 (1): 52–68.
FARKAS, B. (2019): *Piacgazdaságok az Európai Unióban A piacgazdaság közép- és kelet-európai modellje* Akadémiai doktori értekezés tézisei, Szeged.
FARKAS, J. ZS.–KOVÁCS, A. D. (2018): Kritikai észrevételek a magyar vidékfejlesztésről a vidékföldrajz szempontjából *Területi Statisztika* 58 (1): 57–83. https://doi.org/10.15196/TS580103
FUJITA, M.–KRUGMAN, P.–VENABLES, A. J. (1999): *The spatial economy: Cities, regions, and international trade* MIT Press, Cambridge.
GÁL, Z. (2019): Az FDI szerepe a gazdasági növekedés és a beruházások területi differenciálódásában Magyarországon *Közgazdasági Szemle* 66 (6): 653–686. https://doi.org/10.18414/KSZ.2019.6.653
GÁL, Z.–LUX, G. (2014): *ET2050 Territorial scenarios and visions for Europe volume 8 – Territorial scenarios and visions for Central and Eastern Europe* Final Report, ESPON, Luxembourg.
GORZELAK, G. (1997): Regional development and planning in East Central Europe. In: KEUNE, M. (ed.): *Regional development and employment policy: Lessons from Central and Eastern Europe* pp. 62–76., ILO, Budapest.
GREKOUSIS, G. (2020*): Spatial analysis methods and practice describe – Explore – Explain through GIS* Cambridge University Press, New York. https://doi.org/10.1017/9781108614528
GYÖRGY, L.–OLÁH, D. (2019): A magyar függő gazdaság kapitalizmusmodellje a visegrádi országokkal való összevetés tükrében *Pénzügyi Szemle/Public Finance Quarterly* 64 (1): 7–28.
GYŐRI, T. (2021): Az álláskeresők iskolai végzettség szerinti koncentrációjának vizsgálata a XXI. század gazdasági recesszióinak kezdetén *Észak-magyarországi Stratégiai Füzetek* 18 (1): 38–48. https://doi.org/10.32976/stratfuz.2021.18
GYŐRI, R.–MIKLE, G. (2017): A fejlettség területi különbségeinek változása Magyarországon, 1910–2011 *Tér és Társadalom* 31 (3): 144–164. https://doi.org/10.17649/TET.31.3.2866

HORVÁTH, M.–KEREKES, I.–PATIK, R. (2013): *Elemzés a magyar klaszterfejlesztés elmúlt 4 évéről (tények és tanulságok)* MAG Magyar Gazdaságfejlesztési Központ, Budapest.
HVG (2014): A legnagyobb magyar cégek, HVG TOP500 *HVG* melléklet 13 November 2014.
JENEINÉ GERŐ, H. E.–KINCSES, Á.–TÓTH, G. (2021): A hazai mikro-, kis- és középvállalkozások térbeli jellegzetességei *Területi Statisztika* 61 (6): 769–796. https://doi.org/10.15196/TS610604
JÓNA, GY. (2016): A koopetitív kkv-hálózatok területi dimenziói és hatásai *Területi Statisztika* 56 (1): 66–88. https://doi.org/10.15196/TS560105
JÓZSA, V. (2019): *A vállalati beágyazódás útjai Magyarországon* Dialóg Campus Kiadó, Budapest.
KÁDÁR, K.–NÉMETH, E.–KEREKES, G.–TÓTH, L. (2019): Állami befektetésösztönzés és munkahelyteremtési intézkedések *Észak-magyarországi Stratégiai Füzetek* 16 (3): 4–16.
KAPÁS, J. (2022): Has COVID-19 caused a change in the dynamics of the unemployment rate? The case of North America and continental Europe *Regional Statistics* 12 (1): 3–26. https://doi.org/10.15196/RS120107
KÁPOSZTA, J. (2014): Területi különbségek kialakulásának főbb összefüggései *Gazdálkodás* 58 (5): 399–412.
KELEJIAN, H. H.–PRUCHA, I. R. (2010): Specification and estimation of spatial autoregressive models with autoregressive and heteroskedastic disturbances *Journal of Econometrics* 157 (1): 53–67. https://doi.org/10.1016/j.jeconom.2009.10.025
KINCSES, Á.–TÓTH, G. (2020): Magyarország térszerkezetének változásai 1870-től napjainkig *Statisztikai Szemle* 98 (6): 522–546. https://doi.org/10.20311/Stat2020.6.Hu0522
KISS, É.–TINER, L. (2021): Robotizáció a negyedik ipari forradalom idején a világban és a magyar iparban, területi megközelítésben *Területi Statisztika* 61 (5): 577–604. https://doi.org/10.15196/TS610502
KISS, J. P. (2007): *A területi jövedelemegyenlőtlenségek strukturális tényezői Magyarországon* Doktori disszertáció Szegedi Tudományegyetem, Földtudományok Doktori Iskola, Szeged–Budapest.
KISS, J. P.–SZALKAI, G. (2014): A foglalkoztatás területi koncentrációjának változásai Magyarországon a népszámlálások ingázási adatai alapján, 1990–2011 *Területi Statisztika* 54 (5): 415–447.
KISS, J. P.–SZALKAI, G. (2018): Az ingázás mobilitási jellemzői a legutóbbi népszámlálások adatai alapján *Területi Statisztika* 58 (2): 177–199. https://doi.org/10.15196/TS580203
KÖKÉNY, L.–KISS, K. (2021): There is a time and a place for everything (and for everyone): Examining main socio-demographic and territorial differences in use of leisure time *Regional Statistics* 11 (2): 136–164. https://doi.org/10.15196/RS110206
KÖLLŐ, J.–REIZER, B. (2021): A koronavírus-járvány első hullámának hatása a foglalkoztatásra és a vállalatok árbevételére *Közgazdasági Szemle* 68 (4): 345–374. http://dx.doi.org/10.18414/KSZ.2021.4.345
KRUGMAN, P. (1991): *Geography and Trade* MIT Press, Cambridge.
LE GALLO, J. (2001): *Space-time analysis of GDP disparities among European regions: a Markov chains approach* [Research Report] Laboratoire d'analyse et de techniques économiques (LATEC).

LEE, S.-S. (2004): Spatial dynamic variations of regional inequality in Korea and Japan *Studies in Regional Science* 34 (1): 97–116. https://doi.org/10.2457/srs.34.97

LEIBENATH, M.–HAHN, A.–KNIPPSCHILD, R. (2007): Der „Mitteleuropäische Kristall' – zwischen „Blauer Banane' und „osteuropäischem Pentagon'. Perspektiven der neuen zwischenstaatlichen deutsch-tschechischen Arbeitsgruppe für Raumentwicklung *Angewandte Geographie* 31 (1): 36–40. https://doi.org/10.1007/s00548-007-0008-2

LENGYEL, B. (2012): *Tudásalapú regionális fejlődés* L'Harmattan Kiadó, Budapest.

LENGYEL, I. (2010): *Regionális gazdaságfejlesztés: Versenyképesség, klaszterek és alulról szerveződő stratégiák* Akadémiai Kiadó, Budapest.

LENGYEL, I. (2021): *Regionális és városgazdaságtan* Szegedi Egyetemi Kiadó, Szeged.

LENGYEL, I.–KOTOSZ, B. (2018): Felzárkózás és/vagy távolságtartó követés? A visegrádi országok térségeinek fejlődéséről *Tér és Társadalom* 32 (1): 5–26. https://doi.org/10.17649/TET.32.1.2910

LENGYEL, I.–SZAKÁLNÉ KANÓ, I.–VAS, ZS.–LENGYEL, B. (2016): Az újraiparosodás térbeli kérdőjelei Magyarországon *Közgazdasági Szemle* (63) 6: 615–646. https://dx.doi.org/10.18414/KSZ.2016.6.615

LENGYEL, I.–VARGA, A. (2018): A magyar gazdasági növekedés térbeli korlátai – helyzetkép és alapvető dilemmák *Közgazdasági Szemle* 65 (5): 499–524. http://dx.doi.org/10.18414/KSZ.2018.5.499

LENNERT, J. (2019): A magyar vidék demográfiai jövőképe 2051-ig, különös tekintettel a klímaváltozás szerepére a belső vándormozgalom alakításában *Területi Statisztika* 59 (5): 498–525. https://doi.org/10.15196/TS590503

LENTNER, CS. (2012): A magyar gazdasági válság és válságkezelés néhány történeti és nemzetközi aspektusa *Pénzügyi Szemle/Public Finance Quarterly* 55 (3): 561–584.

LŐCSEI, H. (2010): *Területi növekedési pályák Magyarországon*, 1990–2008 Doktori disszertáció ELTE TTK Földtudományi Doktori Iskola, Budapest.

LŐCSEI, H.–SZALKAI, G. (2008): Helyzeti és fejlettségi centrum-periféria relációk a hazai kistérségekben *Területi Statisztika* 48 (3): 305−314.

LUKOVICS, M. (2007): *Térségek versenyképességének mérése* JATEPress, Szeged.

LUX, G. (2012): Reindusztrializáció Közép-Európában. In: BARANYI, B.–FODOR, I. (eds.): *Környezetipar, újraiparosítás és regionalitás Magyarországon* pp. 21−34., Magyar Tudományos Akadémia Közgazdaság- és Regionális Tudományi Kutatóközpont Regionális Kutatások Intézete, Pécs–Debrecen.

LUX, G. (2017): A külföldi működő tőke által vezérelt iparfejlődési modell és határai Közép-Európában *Tér és Társadalom* 31 (1): 30–52. https://doi.org/10.17649/TET.31.1.2801

MAJOR, K.–NEMES NAGY, J. (1999): Területi jövedelemegyenlőtlenségek a kilencvenes években *Statisztikai Szemle* 77 (6): 397–421.

MASTRONARDI, L.–CAVALLO, A. (2020): The spatial dimension of income inequality: An analysis at municipal level *Sustainability* 12 (4): 1622. https://doi.org/10.3390/su12041622

MELCHIOR, A. (2008): *East-West integration and the economic geography of Europe* Paper to the project 'EU Eastern Neighbourhood: Economic Potential and Future

Development' (ENEPO) NUPI Working Paper, Norwegian Institute of International Affairs, Oslo.

MOLNÁR, E.–DÉZSI, GY.–LENGYEL, I. M.–KOZMA, G. (2018): Vidéki nagyvárosaink gazdaságának összehasonlító elemzése *Területi Statisztika* 58 (6): 610–637. https://doi.org/10.15196/TS580604

MONFORT, P. (2020): *Convergence of EU regions redux recent trends in regional disparities* Working Papers 2/2020, Brussels.

MYRDAL, G. (1957): *Economic theory and underdeveloped regions* Duckworth, London.

NEMES NAGY, J. (2005): Fordulatra várva – a regionális egyenlőtlenségek hullámai. In: DÖVÉNYI, Z.–SCHWEITZER, F. (eds.): *A földrajz dimenziói* pp. 141–158., MTA Földrajztudományi Kutatóintézet, Budapest.

NEMES NAGY, J. (2009): *Terek, helyek, régiók: A regionális tudomány alapjai* Akadémiai Kiadó, Budapest.

NEMES, G.–JENEY, L.–VARGA, Á.–JUHÁSZ, P.–KOROMPAI, A. (2017): *Megvalósult és elmaradt szinergiák a fejlesztéspolitikában – Uniós és hazai támogatások kölcsönhatásai földrajzi keretben (Szinergiák)* Projekt jelentés, Budapesti Corvinus Egyetem, Budapest.

NEMES NAGY, J.–NÉMETH, N. (2003): *A „hely" és a „fej" A regionális tagoltság tényezői az ezredforduló Magyarországán* Budapesti Munkagazdaságtani Füzetek 7. MTA Közgazdaságtudományi Intézet, Budapest.

NEMES NAGY, J.–NÉMETH, N. (2005): Az átmeneti és az új térszerkezet tagoló tényezői. In: FAZEKAS, K. (ed.): *Munkapiac és regionalitás Magyarországon* pp. 75–137., MTA Közgazdaságtudományi Intézet, Budapest.

NÉMETH, N. (2005): Az autópálya-hálózat térszerkezet alakító hatásai – Magyarország esete. In: FAZEKAS, K. (ed.): *Munkapiac és regionalitás Magyarországon* pp. 139–178., MTA Közgazdaságtudományi Intézet, Budapest.

NÉMETH, N. (2008): *Fejlődési tengelyek az új hazai térszerkezetben Az autópálya-hálózat szerepe a regionális tagoltságban* PhD-értekezés Eötvös Loránd Tudományegyetem Természettudományi Kar Regionális Tudományok Tanszék, Földtudományi Doktori Iskola, Budapest–Fonyód.

NÉMETH, N.–KISS, J. P. (2007): Megyéink és kistérségeink belső jövedelmi tagoltsága *Területi Statisztika* 47 (1): 20–45.

NÖLKE, A.–VLIEGENTHART, A. (2009): Enlarging the varieties of capitalism: The emergence of dependent market economies in East Central Europe *World Politics* 61 (4): 670–702. https://doi.org/10.1017/S0043887109990098

OBLATH, G.–PALÓCZ, É. (2020): Gazdasági növekedés, fogyasztás és megtakarítás Magyarországon az elmúlt évtizedben. In: *Társadalmi Riport 2020* pp. 39–59., TÁRKI Társadalomkutatási Intézet Zrt., Budapest.

OHLIN, B. (1933): *Interregional and international trade* Addison Wesley, Cambridge.

PEETERS, L. (2008): Selective in-migration and income convergence and divergence across Belgian municipalities *Regional Studies* 42 (7): 905–921. https://doi.org/10.1080/00343400701541839

PELLÉNYI, G. M. (2020): *The role of Central & Eastern Europe in global value chains: Evidence from occupation-level employment data* ECONOMIC BRIEF 062. European Commission Directorate-General for Economic and Financial Affairs, Publications Office of the European Union, Luxembourg.

PÉNZES, J. (2013): A foglalkoztatottság, az ingázás és a jövedelmi szint összefüggései Északkelet- és Északnyugat-Magyarországon *Területi Statisztika* 53 (3): 202–224.
PÉNZES, J. (2014): *Periférikus térségek lehatárolása – dilemmák és lehetőségek* Didakt Kft., Debrecen.
PÉNZES, J. (2019): *A hazai területi egyenlőtlenségek alakulása jövedelmi mutatók tükrében* A Magyar Regionális Tudományi Társaság XVII. Vándorgyűlése Területi kutatások Közép-Európában, Sopron, 2019. október 11. http://www.mrtt.hu/vandorgyulesek/2019/07/penzes.pdf
PERROUX, F. (1955): Note sur la notion du pôle de croissance *Economique Appliquée* 8: 307−320.
POTRAFKE, N. (2015): The evidence on globalisation *The World Economy* 28 (3): 509–552. https://doi.org/10.1111/twec.12174
QUAH, D. (1996): Empirics for economic growth and convergence *European Economic Review* 40 (6): 1353–1375. https://doi.org/10.1016/0014-2921(95)00051-8
RATTSØ, J.–STOKKE, E. (2010): *Migration and dynamic agglomeration economies: Time-series evidence from Norway*. Working Paper Series 11111, Department of Economics, Norwegian University of Science and Technology.
RATTSØ, J.–STOKKE, E. (2011): *Income convergence, migration and geography: Distribution analysis of regions in Norway* ERSA conference papers ersa10p174, European Regional Science Association.
RECHNITZER, J. (2021): A gazdasági szerkezet és a változások irányai. In: RECHNITZER, J.–BERKES, J. (eds.): *Nagyvárosok Magyarországon* pp. 65–67., Ludovika Egyetemi Kiadó, Budapest.
RECHNITZER, J.–SMAHÓ, M. (2011): *Területi politika* Akadémiai Kiadó, Budapest.
SAJTOS, L.–MITEV, A. (2007): *SPSS kutatási és adatelemzési kézikönyv* Alinea Kiadó, Budapest.
SAVINA, G.–HAELG, F.–POTRAFKE, N.–STURM, J-E. (2019): The KOF globalisation index *Revisited Review of International Organizations* 14 (3): 543–574. https://doi.org/10.1007/s11558-019-09344-2
SMĘTKOWSKI, M. (2018): The role of exogenous and endogenous factors in the growth of regions in Central and Eastern Europe: the metropolitan/non-metropolitan divide in the pre- and post-crisis era *European Planning Studies* 26 (2): 256–278. https://doi.org/10.10)80/09654313.2017.1361585
SOMLYÓDINÉ PFEIL, E. (2020): A vidéki térségek felzárkóztatásának feltételei és eszközei uniós szemszögből – Visszatérés az endogén erőforrásokra alapozott fejlesztési szemlélettől az újraelosztó támogatáspolitikához Magyarországon *Tér és Társadalom* 34 (4): 18–44. https://doi.org/10.17649/TET.34.4.3298
STIGLITZ, J. E. (2002): *Globalization and its discontents penguin books* London.
SZABÓ, P.–FARKAS, M. (2014): Kelet-Közép-Európa térszerkezeti képe *Tér és Társadalom* 28 (2): 67–86. https://doi.org/10.17649/TET.28.2.2612
SZAKÁLNÉ KANÓ, I.–LENGYEL, B.–ELEKES, Z.–LENGYEL, I. (2017): Entrópia-dekompozíció és a vállalatok kapcsolati közelsége a hazai várostérségekben *Területi Statisztika* 57 (3): 249–271. https://doi.org/10.15196/TS570301
SZANYI, M. (2017): Tőkevonzás vagy -taszítás? A befektetésösztönzési politika változásai a rendszerváltás utáni Magyarországon *Prosperitas* 4 (1): 42–62.
TÓTH, G. (2018): *Az elérhetőség szerepe a térszerkezet társadalomföldrajzi vizsgálatában* MTA Doktori értekezés, Magyar Tudományos Akadémia, Budapest.

TÓTH-PAJOR, Á.–FARKAS, R. (2017): A vállalkozói ökoszisztémák térbeli megjelenésének modellezési lehetőségei – Tények és problémák *Közgazdasági Szemle* 64 (2): 123–139. http://dx.doi.org/10.18414/KSZ.2017.2.123

TRIDICO, P. (2011): *Institutions, human development and economic growth in transition economies* Palgrave Macmillan, London.

VARGA, A. (2009): *Térszerkezet és gazdasági növekedés* Akadémiai Kiadó, Budapest.

VIDA, GY. (2022): A regionális megvalósult versenyképesség néhány szempontjának területi jellemzői Magyarországon 2010 és 2019 között *Területi Statisztika* 62 (5): 538–569. https://doi.org/10.15196/TS620503

WILLIAMSON, J. G. (1965): Regional inequality and the process of national development: A description of the patterns *Economic Development and Cultural Change* 4 (2): 3–84.

INTERNET SOURCES

BOURDEAU-LEPAGE, L. (2007): *Advanced services and city globalization on the Eastern fringe of Europe* Belgeo. http://journals.openedition.org/belgeo/11703 (downloaded: February 2021)

GORZELAK, G. (2001): *Regional development in Central Europe and European integration* 11. p. http://www.bbsr.bund.de/nn_23680/BBSR/EN/Publications/IzR/2001/11__12Gorzelak,templateId=raw,property=publicationFile.pdf/11_12Gorzelak.pdf (downloaded: March 2010)

GORZELAK, G. (2006): *Main processes of regional development in Central and Eastern Europe after 1990* Regional Diversity and Local Development in Central and Eastern Europe International seminar, Warsaw 10 November 2006, presentation. http://www.oecd.org/dataoecd/58/41/37778478.pdf (downloaded: March 2010)

INTERNATIONAL MONETARY FUND (IMF) (2022): *World economic outlook war sets back the global recovery* International Monetary Fund. https://www.imf.org/en/Publications/WEO/Issues/2022/04/19/world-economic-outlook-april-2022 (downloaded: April 2022)

K-BLOG (2019): Hol lett munkahely a multiknak kiosztott milliárdokból? https://k.blog.hu/2018/07/04/nagyvallalati_tamogatasok (downloaded: October 2019)

KÜLGAZDASÁGI ÉS KÜLÜGYMINISZTÉRIUM (KKM) (2019): EKD támogatások 2014–2019. https://www.kormany.hu/download/e/37/b1000/EKD_tamogatas_2014-2019.pdf#!DocumentBrowse (downloaded: October 2019)

OECD (2019): *Rural 3.0 people-centred rural policy*. http://www.oecd.org/cfe/regionaldevelopment/Rural-3.0-Policy-Note.pdf (downloaded: November 2020)

RATTSØ, J. (2008): *Puzzles of convergence and catching up: Regional income growth in Norway*. First draft, preliminary analysis. https://www.researchgate.net/publication/228429446_Puzzles_of_convergence_and_catching_up_Regional_income_growth_in_Norway (downloaded: August 2019)

SMIRNYKH, L.–WÖRGÖTTER, A. (2021): *Regional convergence in CEE before and after the global financial crisis* IHS Working Paper, 33 Wien: Institut für Höhere Studien (IHS), Wien. https://nbn-resolving.org/urn:nbn:de:0168ssoar-75847-6 (downloaded: April 2022)

STIGLITZ, J. E. (2022): Inequality got much worse *Scientific American* 326 (3): 52–53. https://doi.org/10.1038/scientificamerican0322-52 https://www.scientificamerican.com/article/covid-has-made-global-inequality-much-worse/ (downloaded: May 2022)

SVRAKA, A. (2021): *Recent trends in income inequalities in Hungary using administrative data* Taxation Working Papers 8 Ministry of Finance, Department of Tax Policy and International Taxation. https://ideas.repec.org/p/auo/moftwp/8.html (downloaded: May 2022)

DATABASES/WEBSITES

[1] EUROSTAT (2021): *Foreign control of enterprises by economic activity and a selection of controlling countries (from 2008 onwards)* https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=fats_g1a_08&lang=en (downloaded: December 2021)

[2] WORLDBANK (2021): *Exports of goods and services (BoP, current US$).* https://data.worldbank.org/indicator/BX.GSR.GNFS.CD (downloaded: December 2021)

[3] ORSZÁGOS TERÜLETFEJLESZTÉSI ÉS TERÜLETRENDEZÉSI INFORMÁCIÓS RENDSZER (TEIR): https://www.oeny.hu/oeny/teir/#/ (downloaded: November 2021)

GOVERNMENT RESOLUTION/GOVERNMENT DECREE/LAW

OTK (1971): Resolution No. 1007/1971 (III.16.) of the Revolutionary Workers'-Peasants' Government of Hungary on the national settlement network development concept [1007/1971. (III. 6.) számú kormányhatározat az Országos településhálózat-fejlesztési koncepcióról] *Építésügyi Értesítő* 1971. április 7.