

Distinctive Development Trajectories of the Hungarian Border Areas after the Millennium¹

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Abstract. *Border areas are often described as peripheries not only in a geographical sense but in economic contexts as well. The current study focuses on the Hungarian border areas and provides different territorial approaches to delimit the influenced set of settlements. Different sections of the border area are delineated by defining GIS-based buffer zones along the state border. GDP (Gross Domestic Product) is a generally applied indicator to detect the economic processes of selected territories. However, their official publication needs to be more detailed from a territorial point of view. The current study is based on the disaggregation of GDP values (called as the economic power of settlements) to the LAU 2 level between 2000 and 2021. The analyses of these datasets highlight the decreasing trend of relative economic power in the most developed sections of the border areas (Austrian and Wester-Slovakian sections) which was accelerated by the global financial crisis in 2008–2009. Long-term stagnation can be observed at other border sections (except for the Serbian section, which also represented a decreasing trend). The results drew attention to the critical role and the increasing influence of cross-border employment due to foreign tax registration partly distorting the Hungarian income datasets. Despite these methodological uncertainties, the tendencies observed are relevant for the decades after the Millennium.*

Keywords: *border area, cross-border co-operation, GDP, territorial development*

Introduction

Border areas are particular territories from the aspects of regional development. Detecting how state borders influence the development trajectories of given areas is vital. This issue is especially relevant in the case of Central Europe, where the role of borders has significantly changed during the last few decades due to the political transformation happening. The objective of the current study is to analyse the development paths of border areas and border sections of Hungary after 2000 based on the settlement level datasets of disaggregated GDP values.

Borders – territorial development – peripherality

In general, borders are perceived as features acting as a constraint rather than an incentive upon the operation of spatial systems.⁵ Borders often appear as barriers having an essential effect on regional development.⁶ Decrease and discontinuity can be observed in the

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⁵ Shalom Reichman, "Barriers and Strategic Planning: Spatial and Institutional Formulations," in *Theory and Practice of Transborder Cooperation*, ed. by Remigio Ratti and Shalom Reichman (Basel: Helbing and Lichtenhahn, 1993), 55.

⁶ Marina Van Geenhuizen et al. "Trans-Border European Networking: Shifts in Corporate Strategy?" *European Planning Studies* 4, no. 6 (December 1996): 671–673, DOI: 10.1080/09654319608720373; Łukasz D.

number and intensity of activities.⁷ The characteristics of borders have a dominant effect on the neighbouring territory, though the border area also has influences on the features of the border itself.⁸ An increase in the expenditures might occur due to the higher risk for investments in the case of border areas in insecure political situations.⁹ Border regions are frequently described as underdeveloped areas and can often be affirmed empirically,¹⁰ especially in Central and Eastern Europe.¹¹

Borders, as a unique element of the social space, may have several fundamental functions with obviously differing effects on territorial development.¹² Borders may have a positive influence on territorial development as the result of the decreasing barrier function and increasing permeability.¹³ Positive impulses of borders – even during the period of barrier and filter dominance – accumulate in the close neighbourhood of border crossing points,¹⁴ but the anticipated stimulating effect of newly opened border crossing points on local economic development has proved limited along backward border areas.¹⁵ This fact confirms the necessity of a certain level of development to induce economic interaction

Wróblewski, “Rethinking Cross-Border Integration. A Step to Further Discussion,” *Border and Regional Studies* 8, no. 3 (2020): 111–112, DOI: 10.25167/brs2129.

⁷ Henk van Houtum, “An Overview of European Geographical Research on Borders and Border Regions,” *Journal of Borderlands Studies* 15, no. 1 (2000): 60–65; Klára Czimre, *Cross-Border Co-operation – Theory and Practice* (Debrecen: Kossuth Egyetemi Kiadó, 2006), 38; Szabolcs Pásztor, “Special Border Development Issues in Central and Eastern Europe,” in *Społeczno-ekonomiczne i przestrzenne przemiany struktur regionalnych* [Socio-economic and spatial transformation of regional structures], ed. Elżbieta Kaczmarek and Piotr Rażniak (Kraków: Krakowska Akademia im. Andrzeja Frycza Modrzewskiego, 2014), 101–102.

⁸ Niles Hansen, “Border Regions: A Critique of Spatial Theory and a European Case Study,” *Annals of Regional Science* 11, no. 1 (1977): 1–11.

⁹ Remigio Ratti, “Spatial and Economic Effects of Frontiers,” in *Theory and Practice of Transborder Cooperation*, ed. Remigio Ratti and Shalom Reichman (Basel: Helbing and Lichtenhahn, 1993), 23–44.

¹⁰ George Petrakos, and Lefteris Topaloglou, “Economic Geography and European Integration: The Effects on the EU External Border Regions,” *Department of Planning and Regional Development University of Thessaly. Discussion Paper Series* 12, no. 8 (2006): 153–154.; Szabolcs Pásztor, “A tér és a közgazdaság-tudomány kapcsolatának korlátai a határ menti területek kutatásában” [The limits of the relationship between space and economics in border area research], *Competitio* 11, no. 1 (2013): 98–99.

¹¹ István Süli-Zakar, “A Study of State Borders as Factors Blocking Socio-Economic Progress in North-Eastern Hungary,” *Geographical Review (International Edition)* 66 (40) (1992): 53–64; Grzegorz Gorzelak, *The Regional Dimension of Transformation in Central Europe*, Regional Policy and Development 10 (London: Regional Studies Association, Jessica Kingsley Publishers, 1996), 160.

¹² Remigio Ratti, “Spatial and Economic Effects of Frontiers,” in *Theory and Practice of Transborder Cooperation*, ed. Remigio Ratti and Shalom Reichman (Basel: Helbing and Lichtenhahn, 1993), 23–44; József Nemes Nagy, *Terek, helyek régiók. A regionális tudomány alapjai* [Spaces, places, regions. Principles of regional science] (Budapest: Akadémiai Kiadó, 2009), 169.

¹³ Hansen, 1–11.

¹⁴ Van Houtum, 60–65; Gergely Tagai et al. “Methods of the Analysis of Integration Effect on Border Areas – The Case of Hungary,” in *EuroTimes 6, Intercultural Dialogue and the European Space*, ed. by Cristina-Maria Dogot et al. (Oradea: Oradea University Press, Autumn 2008), 150–159; János Péntes and István Papp, “Települési fejlődési pályák Magyarország határ menti térségeiben” [Settlement development paths in Hungary’s border regions], in *Az elmélet és a gyakorlat találkozása a térinformatikában IX* [Theory meets practice in spatial computing IX], ed. Molnár, Vanda Éva, (Debrecen: Debreceni Egyetemi Kiadó, 2018), 285–293.

¹⁵ János Péntes Kiss, “Illúziók nélkül. A határátkelőhelyek szerepe a határ menti kapcsolatok alakulásában az ukrán, a román és a szerb határszakaszokon az 1990-es években” [Without illusions. The role of border crossing points in the development of cross-border relations along the Ukrainian, Romanian and Serbian borders in the 1990s], *Tér és Társadalom* 14, no. 1 (2000): 179–192.

because a considerable gap between the development levels of the neighbouring territories might hamper cross-border cooperation and cause imbalanced territorial development.¹⁶

The issues of the delimitation of the border areas have permanent relevance due to their relative character¹⁷ and transforming role. For this reason, numerous different border area concepts were published in the related literature,¹⁸ and ten different approaches of delimitations were identified besides their combination.¹⁹ The creation of buffer zones along the state border is regarded as one of the most frequently used methods, which is supported by various GIS tools.²⁰

The Eurostat defines *border regions* as regions with a land border or regions where more than half of the population lives within 25 km of such a border. However, uncertainty in the defining of border areas is demonstrated by the numerous methods for the demarcation of border regions, which were separated into 11 categories and applied to the area of Hungary in previous studies.²¹ In the current study, more categories of border areas were applied based on the buffer zones from the state border.

Methodology of the research

GDP (Gross Domestic Product) is one the most frequently applied indicators regarding regional development. Due to its complex methodology, GDP is typically computed by national statistical offices according to international standards and comprehensive input datasets. Experts criticise it because of its dominant and decisive economic content and inadequate applicability regarding common people's well-being.²² However, it is available only on larger territorial levels (NUTS 3 level is the most detailed in the case of Hungary). The problems with the more detailed territorial GDP data cover the various types of localisation issues and the differences between the place of production and

¹⁶ Martin Van der Velde and Egbert Wever, "Border and Labour Market," *Jurnalul Economic* 8, no. (16), (2005): 139–151; Pásztor, "Special Border Development...", 101–115; Kira Morachevskaya, Mikhail Karpenko, and Alexander Sebentsov, "Border Divergence or Convergence in the Context of Integration: A Case Study of the Russian-Belarusian and Russian-Kazakhstan Borderlands," *Hungarian Geographical Bulletin* 71, no. 1 (2022): 39–53.

¹⁷ Tamás Dusek, *A területi elemzések alapjai* [Basics of territorial analyses] (Budapest: ELTE Regionális Földrajzi Tanszék, MTA ELTE Regionális Tudományi Kutatócsoport, 2004), 63–65.

¹⁸ Csaba Kovács, "Az országhatármentiség értelmezésének földrajzi problémái" [Geographical problems in the interpretation of borderland] (PhD diss., University of Szeged, 2006): 35–40.

¹⁹ István Papp, "A határ menti területek lehatárolása térinformatikai módszerekkel" [Delimitation of border areas using geographic information methods], in *Az elmélet és a gyakorlat találkozása a térinformatikában X* [Theory meets practice in spatial computing X], ed. Molnár, Vanda Éva (Debrecen: Debreceni Egyetemi Kiadó, 2019), 239–246.

²⁰ Pavol Hurbánek, "Theoretical and Methodological Remarks on Peripherality Research: Periphery-Border Relationship and Periphery-Settlement Relationship," in *Global Changes: Their Regional and Local Aspects*, ed. Waldemar Wilk (Warsaw: University of Warsaw, Faculty of Geography and Regional Studies, 2009), 115–122; Henk van Houtum and Mark Eker, "Border Scapes: Redesigning the Borderland," *Territorio* 72 (2015): 101–107.

²¹ Péntzes and Papp, 285–293; István Papp, János Péntzes, and Klára Czimre, "Defining Borders and Border Regions with the Application of Geoinformatics," in *Europe in a Changing World: Opportunities and Challenges*, ed. by Florentina Chirodea et al. (Oradea-Debrecen: University of Oradea Press - Debrecen University Press, 2021), 211–223.

²² Joseph E. Stiglitz, Amartya Sen, and Jean-Paul Fitoussi, "Report by the Commission on the Measurement of Economic Performance and Social Progress," Commission on the Measurement of Economic Performance and Social Progress, accessed December 29, 2023, <https://ec.europa.eu/eurostat/documents/8131721/8131772/Stiglitz-Sen-Fitoussi-Commission-report.pdf>; Gábor Nagy, and Bálint Koós, "First Results in Modelling Objective Well-Being in Hungary at Lower Territorial Level," *Regional Statistics* 4, no. 2 (2014): 71–86.

the place of the income owners.²³ Apart from these critical points, the GDP is regarded as a crucial indicator expressing the economic situation from a given point of view.

The calculation of “economic power of settlements” (EPS) could best be explained as a specially disaggregated indicator of county level GDP data, which has already been used in several Hungarian studies.²⁴

The calculation was therefore as follows:

- we determined the settlements’ share of the taxable income of their county, the volume of local taxes and the number of registered enterprises using datasets from the Hungarian Central Statistical Office (HCSO), National Tax and Customs Administration (NAV) and National Regional Development and Spatial Planning Information System (TeIR);
- based on the average of the received shares, we calculated the estimated GDP of each settlement within the GDP volume of its own county as officially announced by the HCSO;
- per capita values were computed with the help of the population number of settlements;
- these values were transformed into the percentage of the national average (the inflation problem during the investigated period is also treated with this procedure).

The relative values of the economic power of settlements were used for trend analysis, including the linear trend line fitted on the settlements’ values. The steepness of the linear trend line is appropriate to indicate the changes²⁵ during the investigated time interval between 2000 and 2021. Negative steepness values express decreasing trend, while positive ones reflect increasing tendency.

buffer zones from the state border delineated the Hungarian border areas. Several categories of settlements were defined according to their location relative to the border.²⁶

- settlements with border crossings in the 2010s (68 settlements);
- settlements contacting the border (310 settlements);
- settlements within 10 km of the border (676 settlements);
- settlements within 20 km of the border (1222 settlements);
- settlements within 30 km of the border (1692 settlements);
- settlements within 36 km of the border (1895 settlements).

²³ Tamás Dusek and János Péter Kiss, “A regionális GDP értelmezésének és használatának problémái” [Problems in the interpretation and use of regional GDP], *Területi Statisztika* 11 (48), no. 3 (2008): 264–280.

²⁴ Hajnalka Lőcsei and József Nemes Nagy. “A Balatoni régió gazdasági súlya és belső térszerkezete” [The economic weight and internal spatial structure of the Balaton region], in *Kistérségi mozaik* [Mosaic of small regions], ed. by József Nemes Nagy (Budapest: Regionális Tudományi tanulmányok 8. ELTE Regionális Földrajzi Tanszék – MTA-ELTE Regionális Tudományi Kutatócsoport, 2004), 134–149; Hajnalka Lőcsei and Nándor Németh, “A Balaton Régió gazdasági ereje” [The economic strength of the Balaton Region], *Comitatus: Önkormányzati szemle* 16, no. 7–8. (2006): 7–22; Tamás Dusek et al., “A győri járműipari körzet hozzáadott értékének becslése” [Estimating the added value of the Győr automotive district], *Területi Statisztika* 55, no. 1 (2015): 76–87.; Ernő Molnár et al., “Vidéki nagyvárosaink gazdaságának összehasonlító elemzése” [A comparative analysis of the Hungarian minor cities], *Területi Statisztika* 58, no. 6 (2018): 610–637.

²⁵ Tamás Dusek, “A kistérségek jövedelmi helyzetének alakulása 1988 és 2003 között: a változás típusai” [Changes in the income situation of microregions between 1988 and 2003: types of change], in *Átalakulási folyamatok Közép-Európában* [Transformation processes in Central Europe], ed. by János Rechnitzer (Győr: SZE MTDI Évkönyv, 2005), 265–278.

²⁶ István Papp, “A határ menti...,” 239–246; János Péntes et al., “Border Areas and Educational Attainment – Long-Term Analysis of Hungary for the Period between 1960 and 2022,” *DETUROPE* 15, no. 2 (2023): 109–128.

The investigation included these concepts according to the different approaches of delimiting border areas. However, the category within 20 km from the border was selected for further analysis in separating border sections – as a simplification was necessary.

Eight sections of border areas were separated (on the basis of the neighbouring countries, except for the Slovakian border, which was divided in two parts). (**Figure 1**)

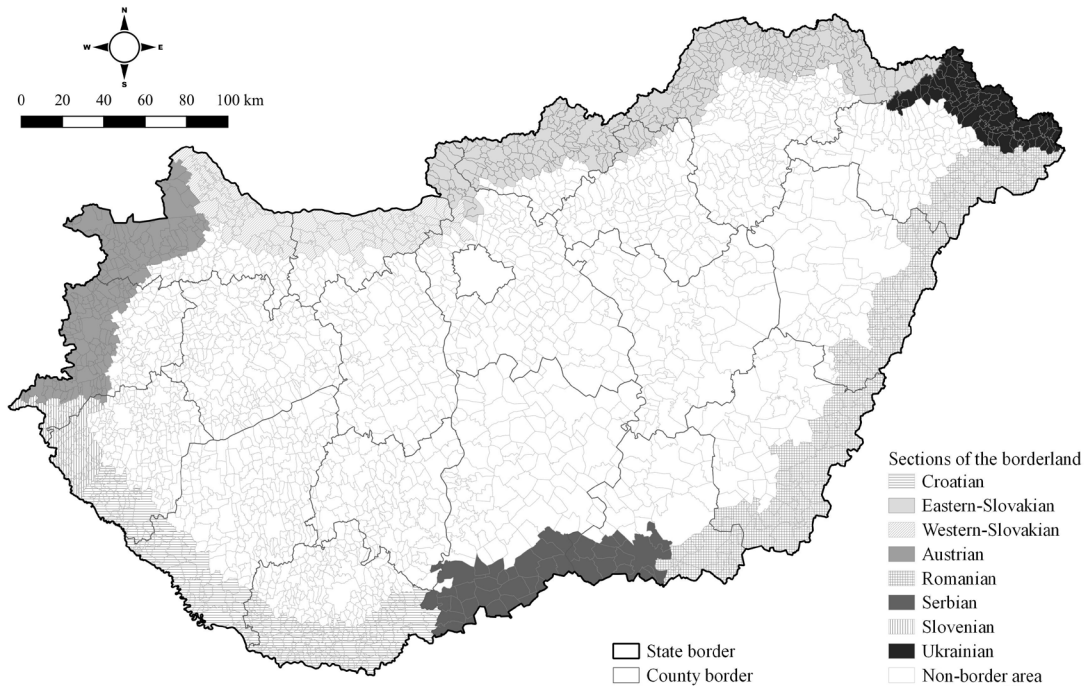


Figure 1. Sections of the borderland in Hungary (within 20 km from the state border)

Source: own edition

The Austrian (182 settlements), Western-Slovakian (107 settlements), Eastern-Slovakian (328 settlements), Ukrainian (88 settlements), Romanian (157 settlements), Serbian (45 settlements), Croatian (233 settlements) and Slovenian (82 settlements) border sections were delimited according to the nearest border crossing points from the total of 3155 settlements of Hungary.

Development trajectories of border areas after the Millenium

The Hungarian GDP per capita value (in purchasing power parity) approximately tripled between 2000 and 2021 (calculated in USD). (**Figure 2**) The national average tendencies represented an almost continuous increase – apart from the recessions during the financial crisis (2008–2009) and the economic shock caused by the COVID-19 pandemic (2020–2021).

The GDP per capita indicates significant disparities within Hungary, highlighting a difference of almost four and a half times between Budapest and the most backward county (Nógrád) regarding their values in 2021. The disaggregated GDP – the economic power of settlements – clearly demonstrates the spatial development structure of Hungary.²⁷ (**Figure 3**)

²⁷ János Péntzes and Gábor Demeter, “Peripheral Areas and Their Distinctive Characteristics: The Case of Hungary,” *Moravian Geographical Reports* 29, no. 3 (2021): 217–230.

Western and Northern Transdanubia developed dynamically after the change of regime due to the inflow of FDI and modern processing industries.²⁸ The most developed Northwestern Hungary and the agglomeration of Budapest significantly differ from the Northeastern and Southwestern peripheral areas, where the larger towns represent values closer to the national average. Spectacular disparities can be detected among the different border areas, that fact is also confirmed by different complex development indicators. (**Table 1**)

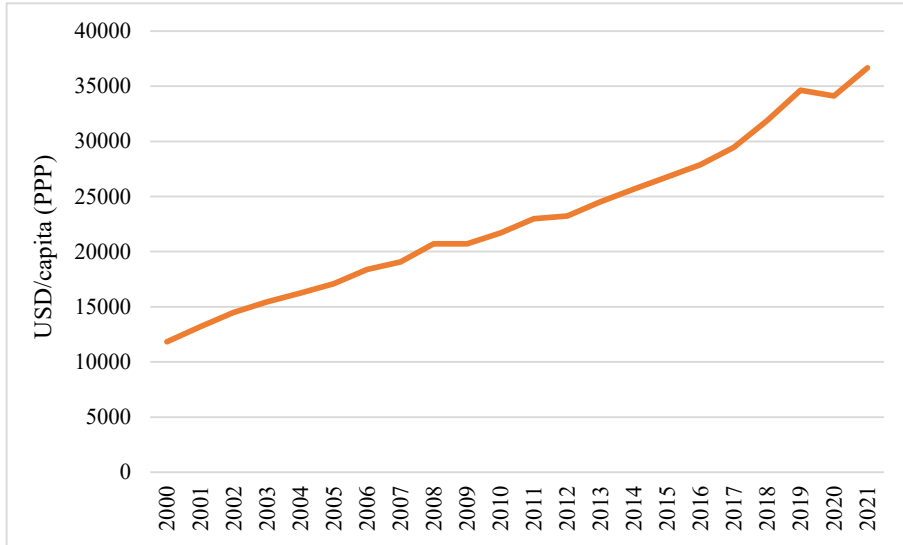


Figure 2. Value of GDP per capita in purchasing power parity (PPP), USD
Source: own edition by the database from the Hungarian Central Statistical Office (HCSO)

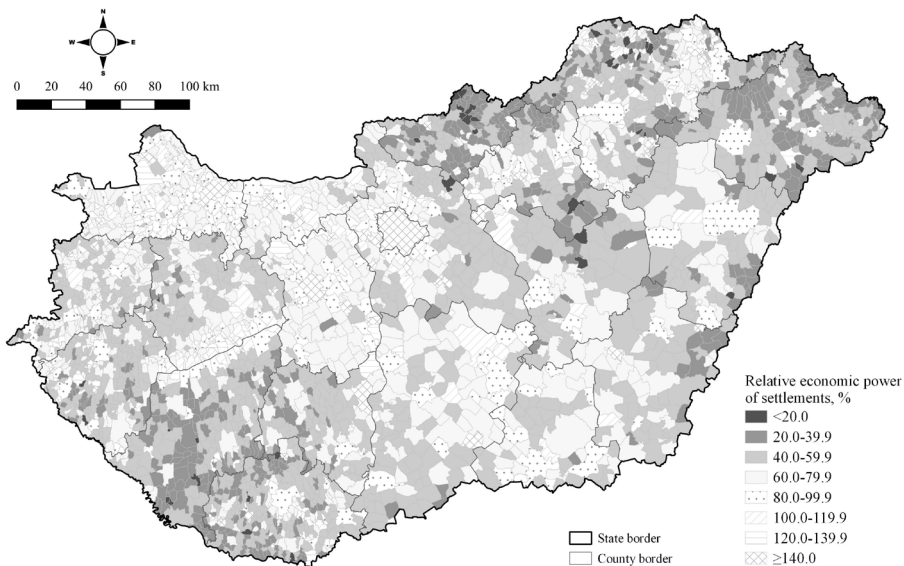


Figure 3. Relative economic power of settlements in the percent of the national average in 2021, %
Source: own edition by the database from the NAV and TeIR

²⁸ József Nemes Nagy, “Centrumok és perifériák a piacgazdasági átmenetben” [Centres and peripheries in the transition to a market economy], *Földrajzi Közlemények* 120 (44), no. 1 (1996): 31–48; Gorzelak, 160.

Border section	Index of territorial deprivation (2011)	Index of objective well-being (2011)	Complex development index (2013)	Territorial development index (2016)
Austrian	0.673	1.598	46.430	0.592
Western-Slovakian	0.562	1.939	47.001	0.605
Eastern-Slovakian	-0.274	-3.893	39.361	0.499
Ukrainian	-0.239	-4.728	38.523	0.477
Romanian	-0.293	-3.750	39.299	0.504
Serbian	-2.694	0.167	44.498	0.564
Croatian	-0.460	-3.215	41.071	0.515
Slovenian	-3.990	-1.254	41.442	0.538
<i>Hungary</i>	<i>-0.166</i>	<i>0.048</i>	<i>45.398</i>	<i>0.569</i>

Table 1. Development level of the sections of border areas by four methods of complex development calculations after 2010

Source: author's computations on the basis of the datasets from the Hungarian Central Statistical Office and TeIR; Koós, 2015; Nagy and Koós, 2014; 105/2015 (23rd April) governmental decree of the Hungarian Government²⁹

The listed complex indicators (for more details, see Péntzes-Demeter 2021)³⁰ represent different methodologies and scales, but the difference from the national average demonstrates the altering situation of border sections. The Austrian and Western-Slovakian sections have higher values than whole Hungary; at the same time, other sections face desperately low values even compared to other Hungarian values. This fact draws attention to the need to detect the changes in the economic power of settlements during the last decades.

Péntzes and Papp (2018)³¹ highlighted earlier that the border crossing settlements have better indicators than the other settlements in the border region, even in the most backward regions. However, it is partly argued in the case of some border sections.³²

Observed EPS values explain relatively better positions among the settlements with border crossings and those contacting the border. (**Figure 4**) The relative favourable situation of these settlements suddenly changed due to the global financial crisis in 2008–2009, which caused a massive rise in the unemployment rate and the cross-border commuting from the border areas, mainly towards Austria. The crisis especially harmed the manufacturing industry (automotive and electronics industry) – Komárom and Esztergom (as towns with

²⁹ Nagy and Koós, 71–86; Bálint Koós, “A szegénység és depriváció a magyar településállományban az ezredfordulót követően – avagy kísérlet a települési deprivációs index létrehozására” [Poverty and deprivation in Hungarian settlements after the turn of the millennium - or an attempt to create a settlement deprivation index], *Tér és Társadalom* 29, no. 1 (2015): 53–68.

³⁰ Péntzes and Demeter, 217–230.

³¹ Péntzes and Papp, 285–293.

³² Kiss, 179–192.

important border crossings) faced a large scale of losing jobs³³ – this fact also drew attention to the heterogeneity of this group of settlements-as the outstanding values of few towns could distort the tendencies so spectacularly.

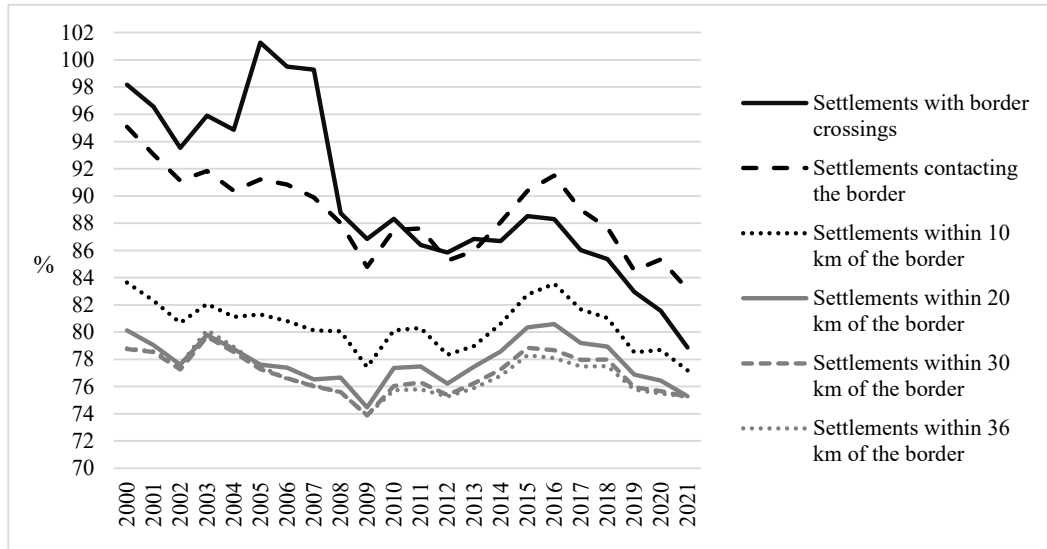


Figure 4. The tendencies of the „economic power of settlements” (in the percent of the national average) in the borderland categories between 2000-2021, %
 Source: own edition by the database from the NAV and TeIR

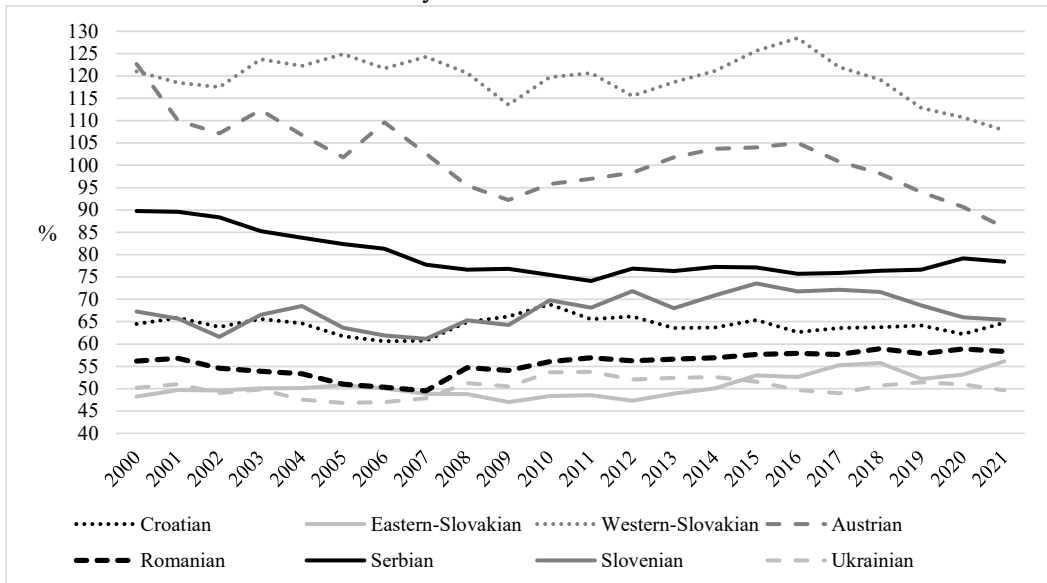


Figure 5. The tendencies of the „economic power of settlements” (in the percent of the national average) in the sections of borderlands between 2000-2021, %
 Source: own edition based on databases of the NAV and TeIR

³³ Gyöngyi Barta and Hajnalka Lőcsei, “The Effect of the Recent Economic Crisis on the Spatial Structure of Hungarian Industry,” *Területi Statisztika* 14, no. 51 (special issue) (2011): 99–109.

A fluctuating but altogether decreasing trend could be observed in the case of the broader border area categories after 2000 compared to the national average (it does not absolutely decrease due to the significant national economic growth during this period).

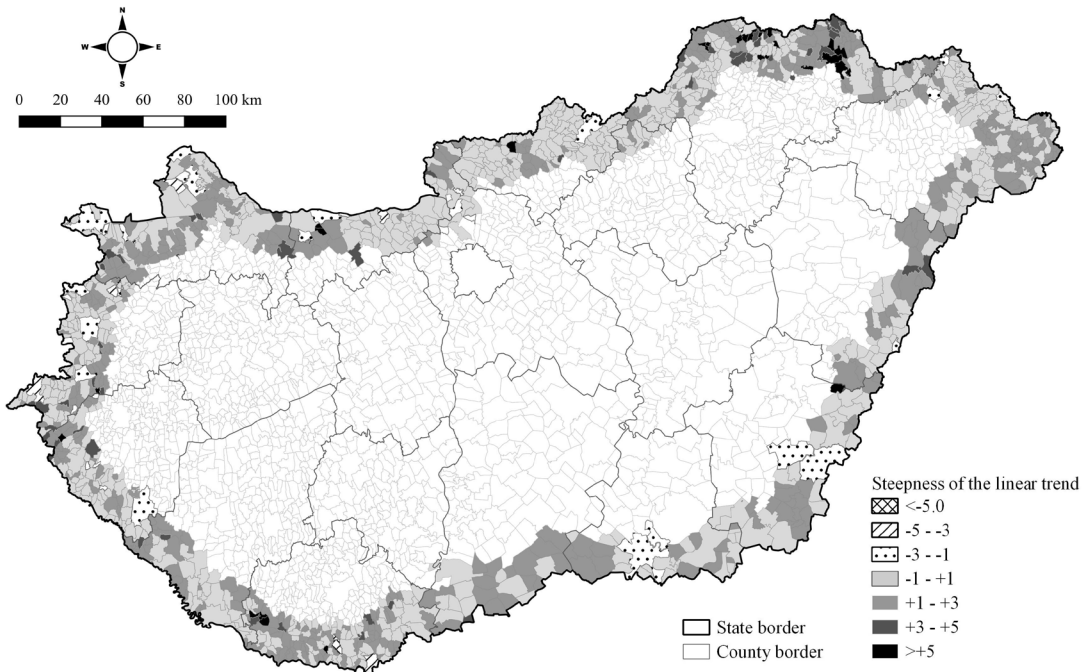


Figure 6. Steepness of the linear trends calculated by the relative economic power of settlements between 2000 and 2021

Source: own edition based on databases of the NAV and TeIR

In spite of these trends, significant disparities were discovered when investigating the segmented border sections. (Figure 5) The Austrian border area represented the most obviously decreasing trend, with an almost 30 per cent fall in the relative EPS value. This tendency drew attention to one of the obstacles of the methodology of EPS calculation, because – for official reasons – only those incomes registered at the Hungarian National Tax and Customs Administration were included. Those incomes registered at the foreign tax administrations should have been included in the calculations, which caused significant spatial distortions, mostly in the case of those settlements with large numbers of residents working in Austria or Slovakia. Employment in foreign countries and cross-border commuting strengthened after the accession of Hungary to the European Union (EU) and the common labour market.³⁴ This trend was dominant among the settlements close to border crossings in the northwestern part of Hungary,³⁵ and some settlements represented a

³⁴ Tamás Egedy, “A külföldre ingázás statisztikai, demográfiai és területi jellemzői Magyarországon” [Statistical, demographic and spatial characteristics of outward migration in Hungary], *Területi Statisztika* 57, no. 4 (2017): 385–405; János Péter Kiss, and Gábor Szalkai, “Az ingázás mobilitási jellemzői a legutóbbi népszámlálások adatai alapján” [Mobility characteristics of commuting based on recent census data], *Területi Statisztika* 58, no. 2 (2018): 177–199.

³⁵ Dániel Balizs and Péter Bajmócy, “Cross-Border Suburbanisation around Bratislava – Changing Social, Ethnic and Architectural Character of the “Hungarian Suburb” of the Slovak Capital,” *Geografický Casopis* 71, no. 1 (2019): 73–98.; Egedy, “385–405.

significant fall in their relative economic power for this reason. Although income is only one of the economic indicators in the disaggregation process of county level GDP, the extent of this process was enough to distort the values. It is important to emphasise that these special local trajectories along the Austrian and Western-Slovakian border (near Vienna and Bratislava) were regarded as statistical and methodological distortions, not actual economic tendencies.

Despite the distortions of the methodology, these highlighted trends clearly demonstrated the weakening position of these areas after the Millennium. Only the Western-Slovakian border section was above the national average in 2021. A pronounced decrease tendency has been detected since the mid-2010s, which was not modified by the COVID-19 pandemic crisis.

Other sections of the border area were deeply below the Hungarian average, mostly reached values between its 50 and 70 percent and long-term stagnation was the most characteristic. Only the Serbian border area represented a declining trend until the early 2010s, which stagnated during the last decade. The influence of Szeged's economic performance determined this trend.

The dominance of stagnation was also reflected by the settlement level trajectories expressed by the steepness of the linear trends fitted on the values of relative economic power of settlements during the investigated period. At the same time, these trends called attention to the blurring and weakening inhibiting character of state borders, even in the peripheral areas.

Conclusions

The Hungarian border areas represented altering development paths after the change of regime – the northwestern part of the country including the Austrian and Western-Slovakian border sections, started to develop. In the case of the other border sections faced with structural crises and general depression during the 1990s – the dividing character of the border deepened these symptoms.

After the millennium and the accession of Hungary to the EU, most of the border areas showed slight divergence from the national average or stagnation, representing a “fluctuation” trend. Convergence of underdeveloped areas could have been observed after the crisis in 2008–2009, and a noticeable decline occurred after the mid-2010s. However, most of the settlements in the border sections represented stagnation during the whole investigated period between 2000 and 2021.

The values of the relative economic power of settlements decreased in the most developed parts of the borderland sections. In recent years, the Western-Slovakian zone is also getting close to the national average. Certain doubts may arise about the methodology of these investigations (like the distorting impact of cross-border commuting). However, the results highlighted the significant role of borderlands in the related research.

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