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ECONOMIC AND DEMOGRAPHIC DYNAMICS IN CENTRAL EUROPEAN BORDER REGIONS BETWEEN 2014-2020

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Abstract

In our study, we present the main characteristics of economic and population dynamics in border regions in Central Europe. In the analysed area, regime change, and later EU accession have activated and deepened horizontal cross-border interactions within and outside the region, often in order to access EU funds. A number of principles and development methods aim at reducing territorial disparities and thus the negative effects of borderlessness. Democratic local and regional structures, as well as local and regional cooperations with common interests along borders, further deepen the decentralisation process. The reduction of development disparities and the catching-up of underdeveloped regions often concern border regions. The aim of the study is to describe the inequalities (in economic and demographic situation) of Central Europe's regions, highlighting the best-performing and the worst ranked regions in demographic dynamics.

Keywords: Central Europe, border, demography, territorial disparities

INTRODUCTION

The main objective of the European Union's (EU) regional development and cohesion policy is to reduce territorial disparities between Member States and between regions (EC, 2024). To reduce the disparities between the centre and the periphery, the EU mainly supports rural areas or regions lagging behind (in terms of some economic or social indicators). There exists a significant dissonance between the objectives and outcomes of cohesion policy; despite measurable achievements, as the complex approach used by the EU has its territorial limits, and presumably there is a territorial scale at which this approach can be optimally applied (Finta & Horeczki, 2023). One of the main characteristics of these peripheral areas is their low degree of urbanisation, the absence of large cities and extensive agglomerations, and the predominance of small towns and villages. Natural handicaps, remoteness from transport and commercial routes, security and political situation may all contribute to their disadvantaged

status. This type of development can be seen as determinate – throughout history, developed centres and underdeveloped peripheries have always been found (Lux & Horváth, 2018). Most of the peripheral, disadvantaged areas are border areas (Pike et al., 2023), and the diversity of each area is associated with a number of problems: demographic studies show increasing emigration, ageing and depopulation.

Since 1992, net immigration has accounted for a larger share of population growth in the European Union than natural increase. The population change in the EU-27 is positive and is on an upward trend (from 1.4 ‰ in 2011 to 2.1 ‰ in 2019); with the exception of the years 2020 and 2021, which are negative in all respects (see Eurostat database demo_r_gind3). However, according to the latest population projections, the population is expected to decline from 2026 onwards, mainly due to the mortality rate caused by Covid-19 (EC, 2024). The decline is currently specific to the South and East and particularly affects the mainly rural and economically disadvantaged territorial units. In the villages and small towns of the macro-region, the population structure is suffering (ageing, unemployment, increasing Roma population) and traditional economic activities are in decline (fewer and smaller enterprises in border areas, high unskilled rate and high number of participants in public works programmes) (Scott, 2012). An ageing and declining population means a potential loss of local values and cultural heritage (Hidalgo del Espino & Horeczki, 2022). The number of people living below the poverty line is increasing year by year (EC, 2024).

We may ask whether these statements are correct for all European regions. Are they capable of adapting, of setting themselves on a new development path, or is historical determination stronger in their case? We started our research in the border regions of Central Europe (CE), first analysing the demographic trends for the period 2014-2020. Our aim is to identify the positive and negative anomalies in the border regions and to show the spatial variation in population change.

THEORETICAL BACKGROUND

Since the 1990s, European spatial planning and regional studies have shown a sustained interest in border regions and have also intensively studied the border regions of Central Europe (Lentz et al., 2009; Michalek & Zarnekow, 2012; Scott, 2012; Sohn, 2014; Noferini et al., 2020). The underdeveloped European cross-border regions suffer not from a lack of resources, but from their inefficient use, which is caused by the existence of borders. These borders remain an obstacle to attracting external resources and to the emergence and

development of economic cooperation (Capello et al., 2018). This can be seen as one of the characteristics of border regions: isolation, especially where natural borders also make interoperability difficult; and another general factor: dependency - which can be manifested by shifts in the centre of gravity or by the excessive reinforcement of centre-regions. In many contexts, peripherality and borderland are linked (Baranyi, 1999), and areas that are at the edge of state borders and play a separating role can often be described as disadvantaged. This is confirmed by the location of the beneficiary areas in Hungary, where the majority of the micro-regions to be developed under the complex programme are border areas (Pénzes, 2015). Peripherality can also develop not only at the national level, but also at the macro-regional or large regional level (Gorzelak, 2009; Illés, 2002). When the marginalisation process interacts with the quality of the local economy, it is also reflected in the age structure, employment, the number and composition of businesses and competitiveness. The local economy can be weakened, and so can the quality of services in settlements. The worst-case scenario is the disappearance of business-based services, increasing the proportion of income in the municipality that can be generated solely from the central budget and weakening the population's ability to sustain itself. In somewhat peripheral settlements, these problems are cumulative, with additional costs for residents and businesses in terms of travel, commuting, transport and maintaining a decent standard of living. Centralisation can be a solution for the central budget, especially in small settlements, where the burden of maintaining and providing public services is increasing (Pálné Kovács, 2014). Over time, this situation could be followed by further social and economic backwardness, with the demographic spiral appearing unstoppable. Lower real wages and fewer job opportunities in the peripheries (Siskáné Szilasi et al., 2017) can lead to the mobility of the younger, more creative population, the ageing of the region and thus a decline in the number of births (Tóth et al., 2024). A permanent decline in population thus reinforces the dependency situation and leads to further marginalisation (Bański et al., 2018; Tagai et al., 2018).

Previous negative demographic forecasts for border counties appear to be confirmed (Hablicsek & Tóth, 2009; Tagai & Lennert, 2023). At the same time, current prognoses for rural areas until 2051 also anticipate a population decline in remote rural areas, which is caused by climate change in addition to socio-economic processes (Lennert, 2019). Besides geographical distance and accessibility, the domestic literature also includes delimitations based on indicators measuring complex economic development (Lőcsei & Szalkai, 2008). One of the most active periods of border research was precisely the wave of EU enlargement in 2004. This is the time when the importance of borders was reassessed, and the idea of

cross-border development emerged. Border regions have a specific and prominent place in EU development policy. In the delimitation of border regions, the dilemma naturally occurred as to whether the NUTS 3 territorial level is suitable for defining border regions, since territorial units that only touch the national borders for a short stretch are perceived as border regions, while other territorial units in the buffer zone of the borders but not directly connected to them are not included. The border area includes the border line and the border belt, not only on land, but also on water surfaces, rivers and lakes. Each country can determine the depth of the border area separately (Shabani & Koteski, 2022). The conceptualisation and exact definition of borders can be done by defining km-bands depending on the area of the country: Hajdú (1988) defined it as 20-50 km; according to the EU definition, border regions are defined as areas located within 25 km of the border (Eurostat, 2018); or 100 km for countries with larger areas; Krajkó (1988) considered it appropriate to define a band of 30-35 km; Nagy (2013) defined it in border counties; Mitrică et. al. (2017) dissolved the zones in border sub-regions. The list can of course be continued depending on country borders and study ages. In identifying the border area, the permanence, the past and the permeability of the border must also be taken into account. The more permeable the border, the larger the area of the diffusion effect. Conversely, the more closed the boundary, the greater the area of the restrictive effect. The transport facilities and infrastructure of border crossing points that allow for the establishment of border connections are also important. The intensity and quality of border traffic and the presence of a major settlement with a strong border connection are also important. Since each border area is different, no general delimitation can be justified (Dokoupil & Havlíček, 2002). In the present study, in order to ensure the availability of statistical data, the most practical solution (aggregation of data at this level was available for all the countries studied) was adopted, considering border counties (NUTS 3 border regions) when referring to border areas. A narrower delimitation of border regions, using data at the level of municipalities, may be justified (for example, when examining specific border sections as a case study), but is not applicable for the present study.

Border regions account for almost one third of the population and less than 30% of EU GDP. They face a number of challenges in terms of infrastructure, job creation and demography, and thus a common problem for border regions is population retention (Tóth et al., 2020). Demographic challenges in the Central European region are further exacerbated, with significant differences between border and non-border regions in EU countries that joined before and after 2004 (EC, 2017). The role of borders has become a way of connecting nations, which is consistently applied both in the field of security policy (Vas, 2017) and aid

policy (Pámer, 2018) (e.g. in Interreg Europe programmes). The need for cross-border cooperation is reflected in the main problem areas: project-based or strategically organised. Cross-border partnerships are of particular importance in Central Europe, as most of the territories have been areas of transition between states over the last century (Hajdú, 2023), promoting partnerships, therefore, can strengthen all economic, social and cultural aspects by making borders interoperable; moreover, they can become a pillar of territorial cohesion (Faludi, 2018).

DATA AND METHODS

The geographical framework of the INTERREG Central Europe programme is an optimal platform for the analysis of rural cross-border areas. The historical features and development trajectory of the macro-region forecast a number of similarities, such as declining demographic conditions. In recent years, we have seen that this region is a net emitter of population, not only ageing, but also suffering from permanent emigration. Our analysis, based on EUROSTAT data, has revealed that the most vulnerable populations in the Central European area are mainly those of the border regions. In the macro-region under study, marginalisation is becoming increasingly serious, not only in individual municipalities but also within social groups. Our analysis covers the Interreg Central Europe programme area, nine countries of Central Europe (for two countries not the whole area): Austria, Czech Republic, Hungary, Croatia, Northern Italy, Eastern Germany, Poland, Slovakia and Slovenia. The area covers almost a quarter of the EU territory, with a population of over 148 million (one third of the EU population) and a GDP of almost €4.5 billion, one third of the total EU GDP. The programme area includes seven major cities with a population of over 1 million: Berlin, Vienna, Budapest, Milan, Munich, Prague, Warsaw. 44% of the population live in transition areas (NUTS 3 territorial unit), 30% in urban areas and 26% in rural areas (Interreg Central Europe, 2022). The geographical framework of the area covered by the programme is a suitable framework for analysing the CE countries, with the majority of areas being rural and several types of macro-regional border regions (EU internal borders before and after the 2004 enlargement, Schengen border area, EU external borders). Our studies are carried out at NUTS 3 levels (in order to study the dynamics as accurately as possible), with a total of 457 units in the sample area.

The data used for the analysis was based on the Eurostat database and related to population change (e.g. population size, emigration, live births and deaths) and GDP (e.g. total territorial

GDP measured in euro exchange rate and purchasing power parity). The period of the study is 2014-2020, justified by data gaps: before 2014, most Polish NUTS 3 regions had missing data on net migration and natural increase, presumably due to earlier changes in the NUTS system. We did not wish to fill these data gaps (e.g. by arithmetic averaging), so the disadvantages of the database modified the time frame of our analysis. On the other hand, due to the Interreg area, we are able to track changes in population trends for the 2014-2020 programming period, which further justifies the study of the selected period.

Regarding the time frame of the research, annual averages were used to exclude the bias of outliers in individual years. The overall values for the five years provided an opportunity for comparison with previous studies and to compare trends.

In accordance with the main question of the research, the analysis examined what territorial processes can be identified in the Central European region, which regions can be described as having positive and/or negative population processes. For this purpose, we used various indicators measuring spatial concentration, such as the Dual Index, the Herfindahl-Hirschman Index, the Hoover Index, as well as descriptive statistical indicators (e.g. relative dispersion). For the dual indicator (D), the average of the two subsets of the data series, the above-average (xm) and the below-average (xa) units, is compared, more precisely the above-average part is divided by the below-average part. The value of the indicator can be a number from 1 upwards, it is a dimensionless indicator, the higher the value, the greater the inequality (Dusek & Kotosz, 2017).

$$D = \frac{x_m}{x_a}$$

The Herfindahl-Hirschman (HHI, also known as the concentration) index (K) measures the concentration of natural characteristics (e.g. population, total GDP) between different territorial units (xi). Its values range from 1/n (where 'n' denotes the number of units of analysis) to 1, but when measuring it as a percentage, it can take values between 0 and 10 000, depending on the number of units of analysis. In our study, we have chosen the latter formula for ease of interpretation. An indicator above 0.6 (in percentage form 6000) indicates a strong concentration (Nemes Nagy, 2005).

$$K = \sum_{i=1}^{n} \left(\frac{x_i}{\sum_{i=1}^{n} x_i} \right)^2$$

The data were also analysed using the Hoover index, which also refers to the degree of inequality between socio-economic phenomena. The value, expressed as a percentage, expresses the percentage of one phenomenon (x) that needs to be reallocated between territorial units in order to have a spatial distribution equal to the value of the other characteristic (f) (Dusek & Kotosz, 2017). The set of values for this index varies between 0 and 100. The higher the value, the greater the inequality. Although the index can also be used for specific data (e.g. GDP per capita), for ease of comparison with the indicators presented earlier, the Hoover index is also calculated for non-specific values of population and GDP.

$$H = \frac{\sum_{i=1}^{n} \left| \frac{x_i}{\sum_{i=1}^{n} x_i} - \frac{y_i}{\sum_{i=1}^{n} y_i} \right|}{2}$$

We used these indicators to characterise spatial inequalities in the population, not income or other economic differentials, so we did not use weighted values in our analyses.

RESULTS

Economic situation in Central Europe in the period before the crises
The most frequently used measure of economic development is GDP, the regional values of which show how high the economic and income disparities are not only within the EU but also within individual countries (Fig. 1). Austria and Slovenia have the highest values in the region, together with the Bratislava region. In Romania, the Western region, centred on Timisoara, and the Central region already show similar levels of development to the Central Transdanubia region in Hungary. The regions with the poorest economic performance are the regions along the external borders: the territorial units with Ukraine and Serbia. Support programmes can help these rural and border regions to catch up and increase their competitiveness at both regional and macro-regional level. In the planning and design of development and support policy interventions, the choice of the instrument and method that can substantially facilitate the achievement of development objectives is not indifferent.

This is particularly true in the case of border regions, which are even more sensitive to the differentiation of interventions, since they are characterised by deficiencies in many areas (human capacity linked to governance, the activity and initiative of local society, lack of internal financial and external development resources, etc.) which can be addressed by specific development methods. It is therefore particularly important for the development of rural and border areas that the instrument used should be able to respond to local needs, help to strengthen local governance capacity and contribute to a more efficient use of development resources. The 9th Cohesion Report has shown that cohesion policy has been able to further reduce disparities between regions, which is clearly visible when looking at the evolution of regional GDP over the last twenty years, but also very visible when looking at the last six years (EC, 2024). With two exceptions (Burgenland and Nord-East), the regions of the extended Central-European area (with the Romanian border regions) have grown above the EU average over the last two decades. The majority of regions have achieved growth below the national average, but the capital and metropolitan regions are forecast to grow above both the EU and national averages. The report's presentation of the growth rate from 2001 onwards is somewhat misleading, as it includes both pre-accession funds and EU and other development policy funds received since then.

In terms of economic and demographic conditions, an East-West divide can be identified in the region under review; typically, the eastern regions are experiencing a permanent decline, and the population of the western regions is stagnating or growing at a minimal rate. There are a number of factors that influence the retention of the population, the most important being the economic situation. The most commonly used indicator to measure national income and performance is GDP (Gross Domestic Product). Per capita values of this indicator include data on the population of a given region, allowing a comparison of the actual performance of a given region and trends in population change. (In the context of cohesion policy, GDP is used as a primary economic development factor, with the use of other indicators being left to a later phase of the research.) There is a noticeable correlation between persistent population loss and lower economic output. The GDP per capita of the Central European regions compared to the EU-27 average again shows the West-East slope. In the Eastern regions, the urban core areas are highly developed, with the region's capitals standing out. For the EU's external borders, the vast majority of these regions are below 75% of the EU average. The correlation with demographic conditions is twofold. On the one hand, there is an outward migration from less developed to more developed areas, which is associated with a loss of resources in lagging regions. It is necessary to take account of the fact that depopulation has a

positive effect on GDP per capita, but even this cannot compensate for the income and development of the various areas. The lack of competent human resources is typically one of the most significant limiting factors for positive change (Teveli-Horváth & Varga, 2023). The map of the change of GDP per inhabitant (PPS) in percentage points of the EU27 average (Fig. 1) illustrates the difference in the regions' relative economic position in a particular period. GDP in the Eastern regions shows an upward trend in the second half of the 2010s, with a catching-up path forecast. The year 2020, however, has seen a variable decline, eroding the results of previous years. This effect was more pronounced in the high-base provinces, especially in the regions most dependent on tourism.

Figure 1 Change in GDP per capita (PPS) in percentage points of the EU27 average between 2014 and 2020
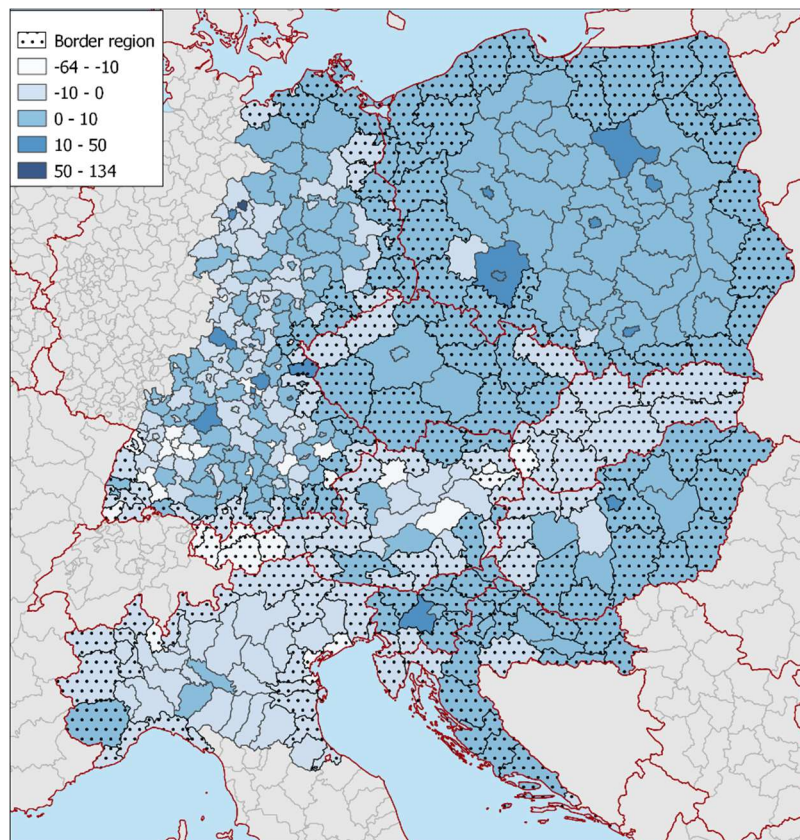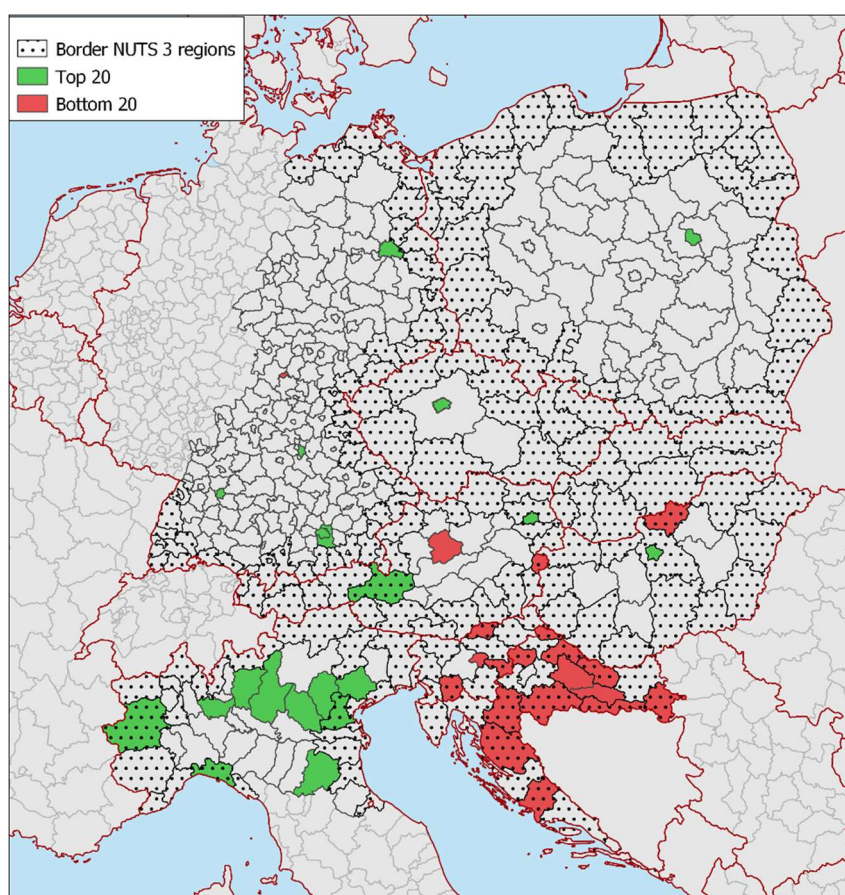

Source: own editing based on Eurostat (nama_10r_3gdp)

The emergence of the Covid-19 epidemic in 2019 and the closures and shutdowns in 2020 have played a key role in the decline of the hospitality and tourism-related sectors. A particularly interesting area of research has been the newly established internal border checkpoints, which have restricted the daily flow of labour, raising a number of problems (see the case of the agglomeration of Bratislava in Hardi et al., 2023). Covid was expected to significantly hinder the economic and demographic relations between CE border regions.

According to a recent relevant analysis of the NSKI (2023) the effects of Covid on cross-border mobility were not so dramatic, however a more careful cross-border behaviour was projected in 2020 (Megyesi & Péti, 2022). Metropolitan areas in the East have proved resilient, with existing inequalities widening, but the decline in more developed regions has compensated for this. Slovakia, Austria and Northern Italy suffered the largest economic and population decline in 2020. In these regions, high rates of population ageing and health risks, as well as the temporary stagnation of tourism, caused serious problems. On average, there was no significant drop in GDP over the period under review, with only some regions in Germany (Eisenach -8.71%, Freising -4.53%) and Northern Italy (Venice -6.68%, Genoa -5.74%) showing a decline of around 5-10%. The most favourable changes were seen in the Polish (Wroclawski 35.01%, Ciechanowski 35.63%) and Czech (Pardubický kraj 31.75%, Královéhradecký kraj 33%) regions, with GDP growth of 30-40% despite a drastically declining year in 2020 (Fig. 2).

Figure 2 The 20 strongest and weakest NUTS 3 regions in terms of the average GDP per capita between 2014 and 2020

Source: own editing based on Eurostat (nama_10r_3gdp)

The 20 best (in green) and worst ranked regions (in red) are shown in Fig. 3. The best ranked areas in terms of economic capacity are the metropolitan areas, the capital cities and the

tourism-preferred regions of Northern Italy. The top scoring includes 4 border regions (three of which are on the Italian border and one Austrian region), on the other side, all except two of the 20 regions with the worst average score in the period are border regions. In terms of both economic and demographic situation, the Croatian counties are a depressed area.

Demographic trends in Central Europe

Of the 457 NUTS3 territorial units examined, 216 are affected by depopulation, but in different relations: 105 are affected by both natural depopulation and emigration. Only 4 regions were identified where natural increase and emigration occurred simultaneously during the period under review: all in Poland. 107 regions experienced immigration in addition to natural decrease, but even this could not compensate for the decrease (mainly in Germany, Italy and Austria). In the capital regions and regions typically located in the western half of the area, on the other hand, population growth is already taking place, most notably in Germany, Italy, Austria and Slovenia, where there is a high rate of emigration despite the natural decrease. The worst-off areas are mostly located in border areas. Although border regions have a very diverse demographic profile, the entire eastern part of the study area is also a Schengen – partly EU – external border, where daily commuting is greatly restricted by border controls. Border demarcation seems to be associated with negative demographic trends mainly at the eastern and southern borders, i.e. Polish, Slovakian, Hungarian and Croatian borders, while the borders between the internal borders of the Schengen area (e.g. Czech-German, Austrian-Slovenian, Austrian-German) are experiencing population growth, partly due to international migration (Lados & Brucker, 2023) and partly due to suburbanisation processes. Poor demographic indicators can be found in mountain areas in general (e.g. the Aosta Valley in Italy, East Tyrol and Carinthia in Austria, or the Carpathian Mountains in Slovakia and Poland), but also in the eastern Bohemian (Olomouc, Moravia-Silesia) and Polish Silesian areas. At the same time, we have noticed that, in some regions, longer-term cooperation can help to retain people in their home region (Suchaček & Urminský, 2024; Tóth-Kaszás et al., 2022).

Looking at the migration gap, natural and total population change separately, the best and worst performing NUTS 3 territorial units clearly show the differences between metropolitan and deprived areas. In general, the areas with the best population change indicators are located in metropolitan agglomerations and in well performing economic districts (e.g. Stredoceský kraj – CZ, Gdanski – PL, Pest county – HU, or Wiener Umland/Nordteil – AT), while areas with the lowest indicators are typically located in border areas (including the external EU borders) (e.g. Vukovarsko-srijemska zupanija – HR, Pozesko-slavonska zupanija – HR, or Békés county – HU).

Table 1 Number of NUTS 3 regions based on categories of population change by country (2014–2020)

Country/ Population dynamic	Total NUTS 3	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
		Population decline			Population increase		
		Out–migration and natural population decline	Out–migration and natural population increase	Immigration and natural population decline	Out–migration and natural population increase	Immigration and natural population decline	Immigration and natural population increase
Austria	35	6	0	5	0	9	15
Czechia	14	4	0	3	0	4	3
Croatia	21	17	0	1	0	3	0
Poland	73	45	4	2	4	6	12
Hungary	20	11	0	5	0	4	0
Germany	227	16	0	57	1	115	38
Italy	47	3	0	31	0	12	1
Slovakia	8	3	0	0	3	2	0
Slovenia	12	0	0	3	0	6	3
Central Europe	*457*	*105*	*4*	*107*	*8*	*161*	*72*

Source: authors' own calculation based on Eurostat (demo_r_gind3)

Covid-19 and digitalisation have caused a major revolution, especially in metropolitan areas with good infrastructure and government support for moving out of the city. Holiday resorts, initially functioning as weekend or second homes, have emerged as permanent residences (Gonzales–Leonardo et al., 2020). Thus, the main factor of territorial development in the region can be identified as the population turnover within the settlement hierarchy, which can be described as urban sprawl: the transformation of small and medium–sized towns, villages (below 1,000 inhabitants), and the inflow of urban services (Rácz, 2022). The rings around the capital have strengthened in the region, with the Czech Republic and Hungary showing the most visible change, being the top 20 growing areas in the macro–region. The most obvious difference is that while Budapest is steadily losing population and Pest county is growing, Prague and Stredocesky kraj are gaining population collectively and steadily. Among the 20 regions with the lowest scores, the majority are border regions, while among the top 20, only a few border regions are identified as attractive destinations, either due to the presence of metropolitan areas (Pest county, Bratislava–Vienna axis) or their significant economic performance (Województwo Pomorskie).

Figure 3 The 20 and bottom 20 NUTS 3 regions in terms of population change between 2014 and 2020
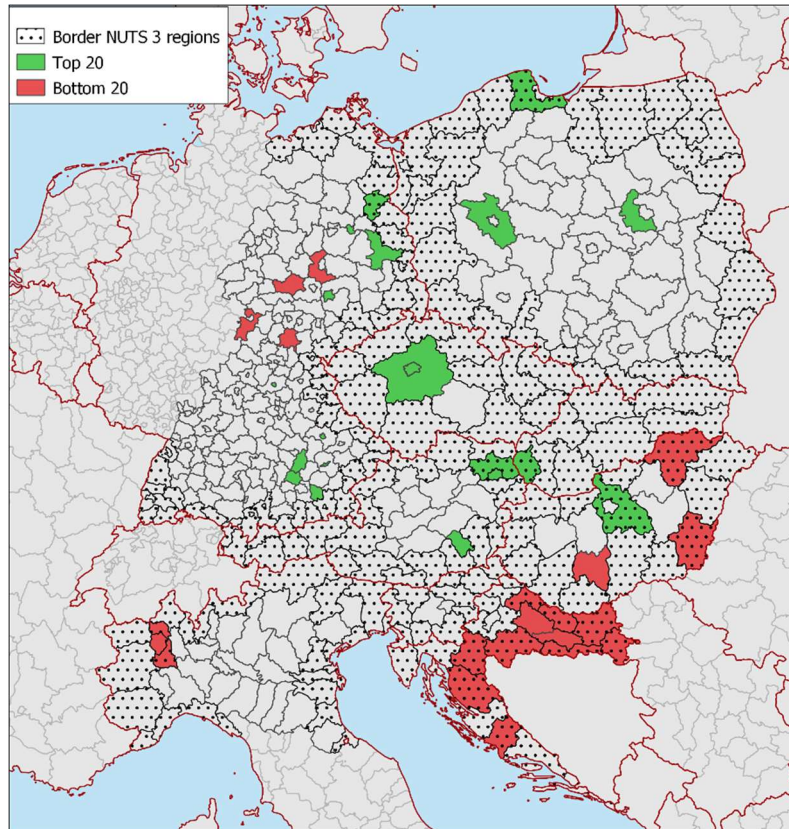

Source: own editing based on Eurostat (nama_10r_3gdp)

Central Europe, where the majority of countries have been facing a persistent population decline since the socialist period (Fiala et al., 2018; Opačić & Crljenko, 2004), is facing a serious sustainability challenge in the upcoming period. Such population decline is the result of very low fertility rates and natural shrinkage. Migration flows within Europe are dominated by the countries that joined the EU in 2004 and afterwards. The extension of EU rights and the possibility of free movement of labour have intensified the already existing east–west and northward movements (Lados, 2018; Moreh, 2014). Our analysis has shown that the population of the border regions is the most vulnerable in the Central European region. Almost without exception, the external borders of the European Union have negative values. Poland and Croatia have similar values due to migration, with a surge in emigration both at the time of EU membership and upon Schengen accession. In the study area, the proportion of areas that have achieved population growth due to natural reproduction was negligible, while emigration is also present. One of these NUTS 3 regions is the Kosicky kraj (Kosicky Region) in Slovakia (Fig. 5). Some research suggests that the trend is linked to higher fertility rates of the local ethnic minority (Pregi & Novotný, 2022). There are persistent negative demographic trends in Eastern Croatia (Fig. 4), which has been characterised by population decline since

the 1990s. The trends in Eastern Croatia are likely rooted in the casualties and migratory losses generated by the Balkan wars, other insecurities and hostile acts led to massive outmigration from the area (Opačić & Crljenko, 2004; Reményi et al., 2024). The unfavourable age structure, the emigration of young and educated people, and regional population concentration paint a negative picture. The reasons for this are seen by Croatian researchers mainly in economic problems. Although the region is endowed with a number of natural and social resources, these are not being exploited efficiently. Agriculture and public services predominate, while manufacturing and high value–added modern services are less developed. The share of inactive, unemployed and agricultural workers is high (Lončar & Marinković, 2015; Rácz, 2019). Eastern countries in the region are more affected by emigration and immigration than Western countries.

Figure 4 The 20 strongest and weakest NUTS 3 regions in terms of the migration balance between 2014 and 2020
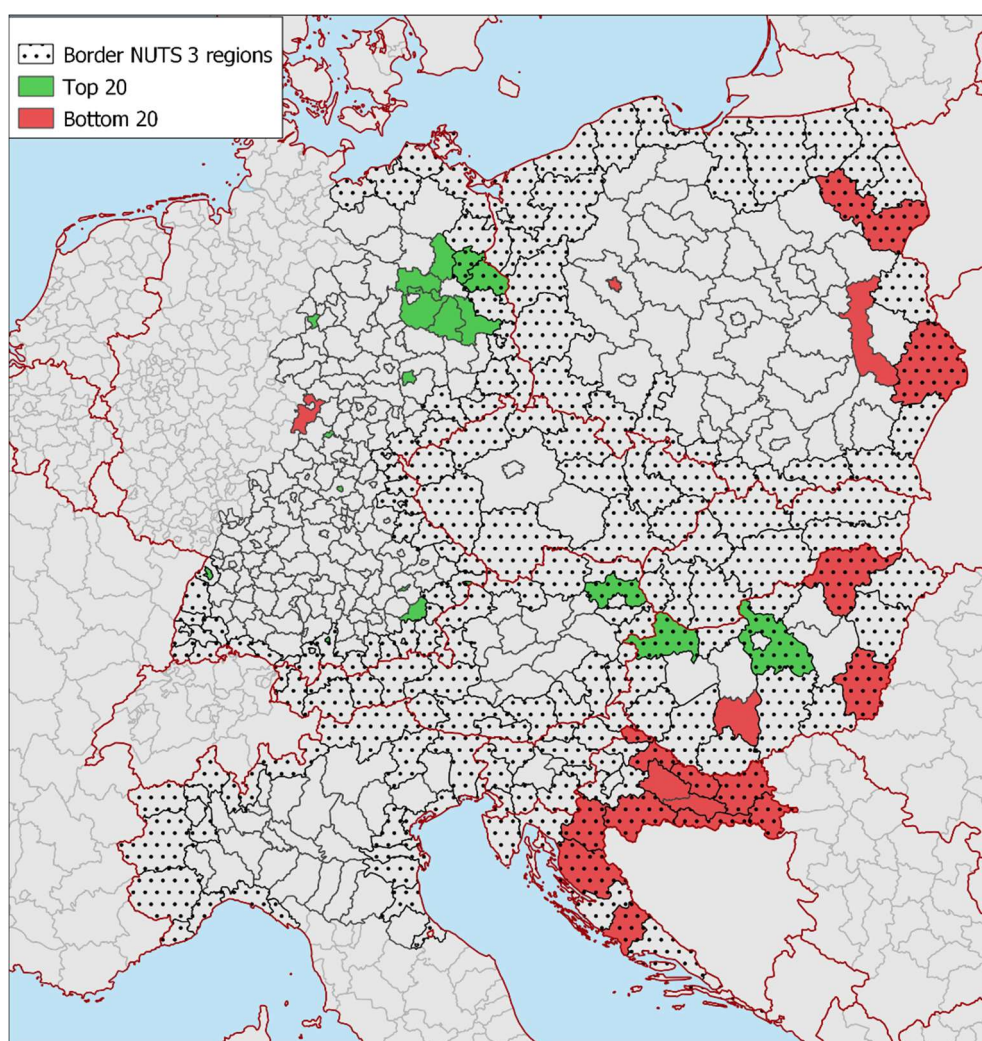
Source: authors' own calculation

The best–performing areas in terms of natural increase during the period under study are found in the areas around large cities (Fig. 5), where population growth has been driven by suburbanisation and rural–urban migration. On the other hand, the worst–performing include the Alpine areas of Austria (e.g. Tiroler Oberland, Rheintal–Bodenseegebiet – 3.3-3.2 ‰), where population growth is driven by tourism. The Eperjes district (Presovsky kraj – 3.4‰) in the Eastern Slovakia region shows a slightly different trend. Although, like the Kassa district, Eperjes is also affected by emigration, the natural increase is partly due to ethnic reasons (Nestorová Dická, 2021). However, due to the loss of human capital, population growth has not been accompanied by economic growth, so the region's population retention capacity may be questionable in the future (Pénzes et al., 2023). In the Central European region under study, most NUTS 3 areas (370 out of 457, 81%) are characterised by natural decrease, which is in line with general European trends.

Figure 5 The 20 strongest and weakest NUTS 3 regions in terms of the natural population change between 2014 and 2020
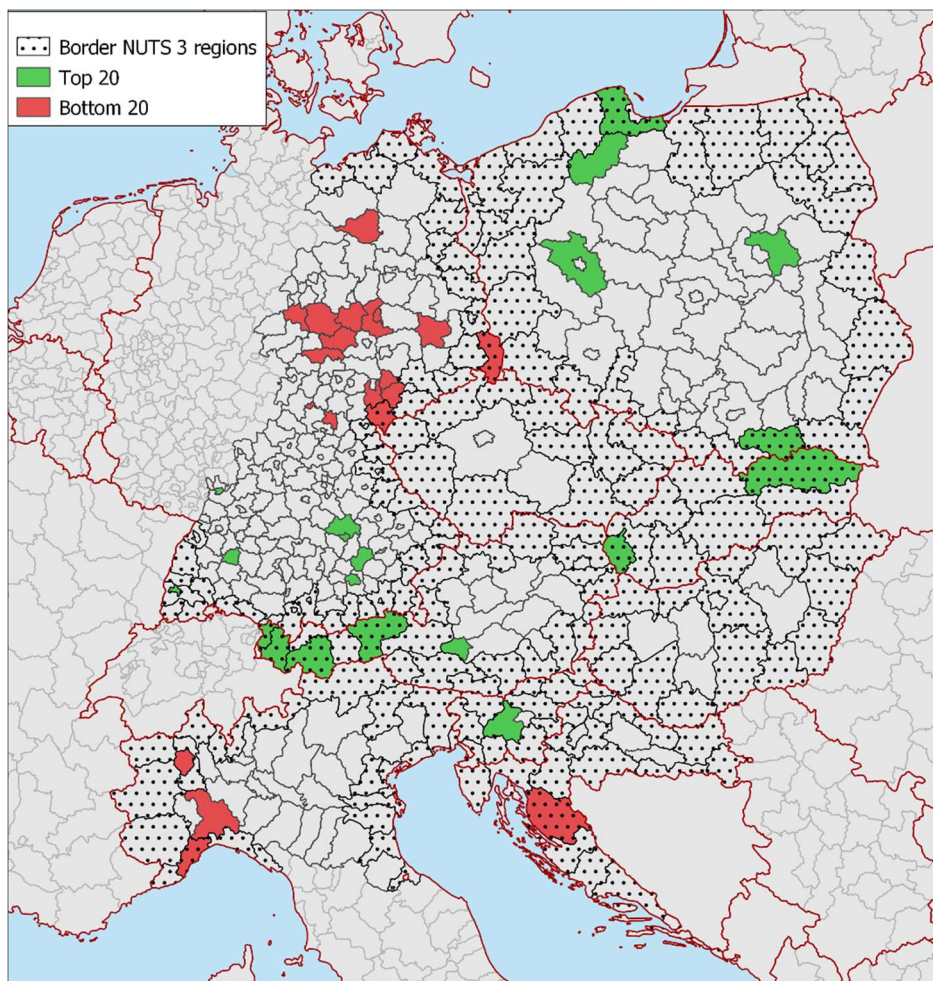
Source: authors' own calculation

The areas with the worst values do not stand out from the rest, while the areas with an average annual natural decrease of 9 ‰ are at the bottom of the list, the most notable being the Leipzig-Dresden axis mentioned above, as a region with a uniform negative image, which already showed similar trends before the period under analysis (Lentz et al., 2009).

DISCUSSION AND CONCLUSION

The social and economic fault lines within Europe are creating a high degree of polarisation, which is hampering the development of (mainly) rural areas, the sustainability of individual landscapes and the prosperity of local societies. The macro-region under study has a very diverse administrative structure, with a network of settlements of different sizes and functions, the nodes of which are generally urban settlements with a larger population and a dominant position in the socio–economic–regional division of labour. These nodes are the main bases of population concentration (Rácz & Egyed, 2023). For Central Europe, capital cities, regional centres and metropolitan areas are in a privilaged position in terms of both internal and external migration. The social and market prestige of capitals within the country has clearly increased. NUTS 2 regional centres along the borders and NUTS 3 county capitals and small regional centres are also in a special position as centres of internal and cross–border (mainly national) migration flows.

The current rate of population decline raises many questions about the future of the Central European macro–region. The decline is no longer accepted as a possible scenario but as an actual scenario. The latest policy recommendations already see smart shrinkage, levelling off and population retention as a positive development. The economic risks arising from the depopulation of certain areas can also cause regional and national problems; thus, the next stage of our research would look in detail at the economic disparities in the region. After mapping the problems of the macro–region, we will propose development policy solutions and a spatial development model for the underdeveloped rural and border areas. The recommendations for reducing territorial disparities would first be used to strengthen tourism cooperation in border areas.

Highlighting the areas near the border and away from the border, the results show contrasting trends (Table 2). In the border areas, some indicators (e.g. Relative Spread, Dual Index, HHI Index) show opposite trends, while stagnation and some concentrations are also indicated between 2014 and 2020, but the Hoover Index also points to a reduction in spatial disparities. Areas that are further away from the border show a stronger concentration in the

previous indicators, but the Hoover index here also indicates a reduction in spatial disparities. For both categories, the results are presumably strongly influenced by administrative delimitation, with capital cities and other regional centres showing a higher concentration of the respective indicator. This is particularly true in border regions, where a few large cities (e.g. Vienna, Budapest, Bratislava) have a stronger influence on the results. Taking all this into account, the results obtained should be considered with appropriate limitations. Based on our current results and previous research, we assume that the social and economic cleavages that have emerged within Europe are creating a high level of polarisation.

Table 2 Changes in spatial concentration indicators between border and non–border areas in Central Europe (2014-2020)

Concentration/ Area	Border regions				Non–border regions			
	Population		GDP		Population		GDP	
	2014	2020	2014	2020	2014	2020	2014	2020
Highest value	3176180	3265327	160165	172 309	3421829	3669491	118519	156035
Lowest value	31672	32838	387,56	457	20450	20251	599	696
Average	353822	355857	7527	8 682	293479	297532	7978	9404
Relative spread	8,9	9,1	21,2	19,8	11,6	12,3	14,8	16,5
Ratio of highest to lowest value	100,3	99,4	413,3	377,3	167,3	181,2	197,9	224,3
Dual indicator	3,8	3,9	5,2	4,9	4,5	4,5	5,4	5,6
HHI index	93,1	94,3	198,8	180,6	95,9	98,5	139,2	150,5

Source: based on Eurostat (deo_r_gind3; nama_10r_3gdp) database

The study shows that border regions have a very diverse demographic profile, which can differ depending on the type of border. Different dynamics can be observed in the Eastern and Southern regions, which are also the external borders of the European Union, in the border regions of the new Member States that joined in 2004 and the old Member States, as well as in the border regions of the old Member States. Overall, this area has been steadily losing population, but for some countries a minimal average increase can be observed over the period under review (2014-2020). Half of the region is suffering from population decline and a quarter from both natural decrease and emigration. The population decline is explained by low birth rates, high emigration rates, ageing, a large number of ethnic minorities (Roma minority) and a relatively poorer economic position.

The population dynamics of the historically more developed German–Czech–Austrian areas are more positive, with natural increase and emigration prevailing in large parts of the regions. The situation is particularly grave in the Croatian voivodships, the Hungarian counties and the Polish voivodships, where the extremely high emigration rate is accompanied

by low birth rates and economic performance. In terms of population dynamics, the west–east gradient has remained unchanged, with these negative demographic trends being exacerbated further east or south. The NUTS 3 territorial units of Poland, Croatia and Hungary on the EU's external borders are experiencing significant depopulation, with a few exceptions, and, in addition to natural depopulation, emigration.

The study of the spatial differentiation of certain spheres of socio–economic development is considered a classical research direction in several disciplines – economic geography, regional science, border studies, demography, etc. In these disciplines, we study the spatial location and positioning of economic forces, population and labour movements, and demographic characteristics in different regions. In some cases, these analyses are carried out in isolation from each other and are unable to reveal the general laws underlying the spatial organisation of society. Thus, in addition to exploring the characteristics of border regions, the study attempts to show whether there has been a concentration or a fragmentation of the countries under study over the last few years. A more detailed examination of each area will be carried out in the next stages of the research.

The study identifies areas with population trends that are unfavourable, but it should be noted that the NUTS 3 territorial level only allows for a partial analysis. Unfortunately, the current level of analysis hides further spatial disparities, and more detailed territorial data (e.g. at district or municipality level) and further studies are needed to delimit more precise results (e.g. actual peripheries).

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