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ETHNIC DIVERSITY CHANGES OF VOJVODINA BETWEEN 1990 AND 2020

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Abstract

Vojvodina, a region in the southern part of the Pannonian Plain, is home to a significant Hungarian ethnic minority living beyond the borders of Hungary. Located in northern Serbia, it has become one of Europe's most ethnically diverse regions since the 17th and 18th centuries. This diversity is largely due to planned and spontaneous migrations aimed at compensating for the substantial population loss that occurred during the Ottoman conquest of the region and the subsequent wars of reconquest. Historical, political, and economic transformations have drastically altered the dynamics between ethnic groups multiple times. In the second half of the 20th century, homogenization at the provincial level became a predominant trend. Conversely, at the municipal level, various degrees of parallel homogenization and diversification can be observed, depending on local ethnic structures and regional demographic changes. Analyzing ethnic diversity plays a crucial role in quantitative ethnic studies; however, the societal effects of this diversity are still widely debated. Using the ethnic diversity index, we analyze census results from Yugoslavia and Serbia to identify major trends regarding changes in ethnic diversity at both the regional and municipal levels. We argue that large-scale homogenization occurred in the 1990s at the regional level, a trend that has continued thereafter, albeit at a reduced pace. Changes at the municipality level, however, varied significantly, influenced by both spatial and ethnic factors. We have organized the municipalities into four basic groups based on their ongoing diversification processes and current levels of ethnic diversity compared to the regional average.

Keywords: Vojvodina, ethnic diversity, homogenization, ethnic diversity index

INTRODUCTION

Vojvodina, situated in the southern part of the Pannonian Plain, is notable for its significant Hungarian ethnic minority. As part of northern Serbia, it has developed into one of Europe's most ethnically diverse regions since the 17th and 18th centuries, largely due to planned and spontaneous migrations to address the population decline caused by the Ottoman conquest and subsequent wars of reconquest. In addition to the three dominant ethnic groups – Hungarians, Serbs, and Germans – many smaller ethnic groups (including Croats, Romanians, and Slovaks) settled in this depopulated area, contributing to its high levels of ethnic

diversity. While some of these groups remain integral to the region's ethnic landscape, others (e.g., Germans) have significantly decreased in number. The dynamics between ethnic groups have undergone drastic changes due to historical, political, and economic transformations, with homogenization at the provincial level emerging as a significant trend in the second half of the 20th century. In this analysis, we aim to illustrate changes in ethnic diversity over the past decade using the latest Serbian census data, while also highlighting trends from the past 30 years beginning with the last Yugoslav census in 1991 (longitudinal analysis). Our focus will be on the municipal scale, where we will compare and categorize municipalities based on their changes in diversity (cross-sectional analysis). This quantitative analysis serves as a preliminary step in a broader research effort aimed at understanding the evolving ethno-cultural landscape of Vojvodina and its broader region of Central and Southeastern Europe.

THEORETICAL BACKGROUND

A typical branch of ethnic studies involves research based on quantitative analysis. Beyond a simple enumeration of individual ethnic groups and tracking changes in numbers and percentages, a variety of composite indices can be employed to identify community-level characteristics, with the concept of ethnic diversity being among the most extensively studied. This multifaceted phenomenon is utilized across various disciplines to describe the complexity (ethnic, linguistic, cultural, etc.) of a given society and assess its impact on social characteristics such as cohesion and trust. Its influence on more practical social institutions, like education and the economy, is also a subject of research. However, findings can be contradictory or reveal a complex interplay between diversity and different social factors. For example, Alesina and Ferrara (2004) suggest that while diversity can decrease social trust, it may simultaneously foster economic dynamism and innovation. In our analysis, we will utilize the concept of diversity, particularly its changes over time (longitudinal analysis), to understand the ethnic processes of recent decades and provide a generalized framework for comparing the examined territorial units (cross-sectional analysis).

An early attempt to quantitatively analyze ethnic diversity in social sciences can be traced back to the 1970s (Taylor & Hudson, 1972). The so-called ethno-linguistic fractionalization index, developed during this period, was based on ecological indices used to measure biological diversity (Simpson, 1949). In the 1990s, with the study of increasingly diverse Western societies, the use of probability-based indices to measure diversity gained popularity (e.g., Mauro, 1995; Easterly & Levine, 1997; Reilly, 2000; Collier, 2001; Alesina et al., 2003;

Fearon, 2003; Montalvo & Reynal-Querol, 2005). The index was introduced into the Hungarian literature in the 2000s as the diversity index. This method has been utilized by Bajmócy (2004) to study the historical demography of the Kingdom of Hungary, Reményi (2009) to examine the changing ethnic spatial structure of the Yugoslav successor states, Németh (2013) to analyze ethnic relations in the Baltic states, and Léphaft, Németh, and Reményi (2014) to discuss ethnic polarization in Vojvodina.

By employing quantitative analysis, particularly indices, we can model and measure multi-component processes, comparing regions with different patterns of change based on macro-level developments. Indices also allow for comparisons of the same territorial unit across different periods. Focusing on dynamic values (e.g., changes rather than static figures, or in this case, diversification instead of diversity) enables us to analyze large-scale, long-term processes and identify territorial units that require further, in-depth qualitative analysis. Consequently, we can analyze changes in diversity levels among territorial units for the same period (cross-sectional analysis) by comparing their values to identify 'where' changes are occurring, as well as evaluate the level of changes within the same territorial units over different time periods (longitudinal analysis) to determine 'when' these changes are occurring.

Ethnic diversity is a prominent topic in Western social sciences, increasingly relevant due to migration processes. The interactions between citizens from different cultures and the resulting challenges are central to these studies. However, the impact of ethnic diversity on societies – particularly in politics, economics, social cohesion, and conflicts – remains widely debated (Dinesen et al., 2020; Montalvo & Reynal-Querol, 2021). Researchers investigating traditionally ethnically fragmented regions of Central and Southeastern Europe (and beyond), such as Vojvodina, are also interested in the reverse processes of ethnic homogenization and the decline of traditional ethnic diversity (Brubaker et al., 2009; Raduški, 2011; Léphaft et al., 2014), including native languages and cultures. Both phenomena are driven by similar processes and differences in natural population change, migration, and assimilation.

It is essential to acknowledge that relying solely on quantitative analysis in ethnic studies has limitations. Ethnic (and other) identities have become increasingly fluid – changing over time and resulting in significant shifts in longitudinal data analyses, as seen in the case of the Yugoslav category in our case. They have also become increasingly hybrid, involving multiple or mixed identities that complicate cross-sectional data analyses, while quantitative analysis struggles to cope with non-binary situations. Moreover, an increasing number of individuals refuse to disclose their (ethnic) identity, which may stem from multiple identities

derived from ethnically mixed parentage, as is common in former Yugoslavia. This refusal can also lead to inaccurate findings. Acknowledging these limitations, quantitative analysis in ethnic studies and diversity remains a valid approach in review analysis, provided that cross-sectional and/or longitudinal data analyses establish a solid foundation for further in-depth qualitative research, which is a key objective of this paper.

DATA AND METHODS

We utilize the ethnic diversity index (EDI) and its changes (ΔEDI) to measure alterations in the ethnic diversity of a spatial unit (province or municipality). This index is based on Simpson's Diversity Index, which is a straightforward measure of the probability that a person from a given ethnicity in a community will encounter someone of the same or a different ethnicity. The index ranges from 0, indicating completely homogeneous communities, to 1, representing communities where every individual belongs to a different ethnicity. It can be calculated using the formula:

$$EDI = \frac{L*(L-1)/2 - \sum_{i=1}^{n} e_i*(e_i-1)/2}{L*(L-1)/2}$$, where:

L: total population of the municipality
e_i: number of individuals of ethnicity (i)
n: total number of ethnicities

Official census data from the Serbian Statistical Office's website were used as input. We analyzed tables from the 1991, 2002, 2011, and 2022 censuses at the provincial and municipal levels (Statistical Office of the Republic of Serbia, 1991, 2002, 2011, 2023) to calculate changes in ethnic diversity, thereby interpreting processes of ethnic homogenization and diversification in the region. To explain the observed changes, an analysis of yearly demographic statistics at the municipal level from 2012 to 2022 was conducted. By comparing the natural increase in population with the variations observed between two censuses, it has been demonstrated that both natural growth and migration significantly contribute to changes in ethnic diversity (Statistical Office of the Republic of Serbia, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023).

We have chosen the Autonomous Province of Vojvodina as our study area, which has historically been interpreted as a multicultural ethnic contact zone, particularly regarding the Hungarian and Slavic (especially Serbian) relations. The region has undergone several changes in political rule, particularly during the 20th century, which have left a profound impact on its ethnic landscape. Vojvodina was part of the Kingdom of Hungary until the First World War when it was annexed to the first Yugoslavia. During the Second World War, some areas were reannexed by Hungary, and after the war, it became part of socialist Yugoslavia.

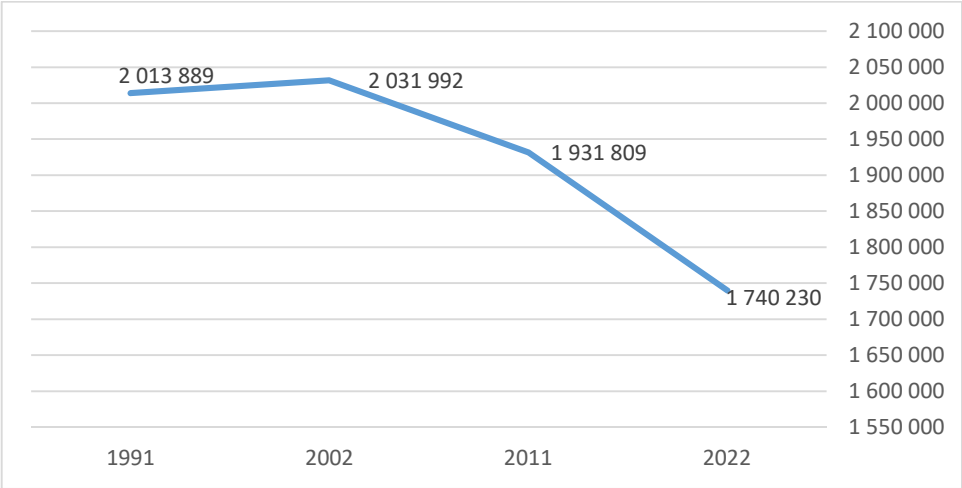
Following the breakup of Yugoslavia, Vojvodina became a northern province of Serbia. Throughout these transitions, both spontaneous and planned ethnically determined migrations have occurred. Today, Vojvodina faces serious demographic challenges, characterized by negative natural growth and emigration.

DEMOGRAPHIC CHANGES IN VOJVODINA OVER THE LAST DECADE

High ethnic diversity is not unique to Europe; various regions exhibit this characteristic which is a consequence of its turbulent history and political geography, which drew the attention of several scholars for decades (Hajdú & Rácz 2024). Vojvodina, Serbia's northernmost province, bordered by Croatia to the west, Hungary to the north, and Romania to the east, serves as a notable example. The region currently has more than 20 different ethnic groups distinguished in censusesn addition to Serbs, there are significant Hungarian, Slovak, Montenegrin, Romanian and Croatian minorities (Trombitás & Szügyi, 2019). The region's ethnic diversity stems from its rich history, in the course of which multiple states have controlled the area and influenced its ethnic composition. The several border changes throughout the 20th century position the region to a prominent place in Hungarian border studies (Scott, 2022). The last significant impact occurred during the 1990s, with the Yugoslav Civil War reshaping the ethnic (and political, economic, etc.) landscape of both the wider region and Vojvodina (Rácz 2023). So far, the 21st century has been calmer for the province, but its ethnic structure and diversity continue to evolve. Various ethnic groups still constitute significant minorities in Vojvodina, but their numbers are consistently declining. Serbia, like many developed countries, particularly in Central and Southeastern Europe, is facing a serious demographic crisis (Judah, 2019, Reményi et al. 2024), characterized by population decline, an aging society, and emigration. These issues, combined with unfolding peripherialisation (Nagy et al. 2022) and the political transformations of the last decades (Rácz & Egyed 2023) pose significant social and economic challenges for both the country and Vojvodina.

The last population increase in Vojvodina occurred after 1991 due to the Yugoslav Civil War, which forced many Serbs to leave their former homes in other Yugoslav republics, prompting a substantial number to settle in Vojvodina. This influx contributed to a decrease in ethnic diversity, as the growing Serbian population led to the increased homogenization of society. By the next census, Vojvodina's population had decreased by 100,183 people, a trend that continued until 2022, when the population fell to 1,740,230 – representing a total decline of 273,659 since 1991 (see Fig. 1).

Figure 1 Population of Vojvodina from 1991 to 2022



Source: Statistical Office of the Republic of Serbia, 1991, 2002, 2011, 2023

Ethnic changes from 1991 to 2022

Significant changes occurred in the ethnic composition of Vojvodina during the decade between the last Yugoslav census in 1991 and the Serbian census in 2001. The last decade of the 20th century had a strong impact on the transformation of ethnic proportions and their spatial distribution. The Yugoslav Civil War, which lasted from 1991 to 1996, not only redrew borders in the Western Balkans but also significantly altered the ethnic makeup of the countries involved (Reményi, 2010).

In 1991, Vojvodina's ethnic composition was much more diverse (see Table 1). Serbs made up just over half of the population, while Hungarians represented the largest minority group at 16.86%. Yugoslavs were the second-largest ethnic group at that time, accounting for 8.56%. Croats, Slovaks, Romanians, and Montenegrins constituted smaller but still noteworthy proportions. The dissolution of Yugoslavia and the subsequent armed conflicts greatly reshaped Vojvodina's ethnic composition, resulting in a rise in the share of Serbs by 8.26 percentage points by the next census. Hungarians remained the largest minority but their representation fell to 14.28%, and the proportion of other ethnicities – especially Yugoslavs – declined significantly, from 8.56% to 2.45% in 2002. Since “Yugoslav” was more of an identity linked to the Yugoslav state, than a traditional ethnicity, many people abandoned it after the country's breakup.

The 21st century has been a much more peaceful period, which is reflected in changes in the ethnic structure. By 2011, the share of Serbs continued to rise by 1.71 percentage points, while the proportions of minorities decreased. Hungarians also saw a reduction in their share, although it was smaller, at 1.28 percentage points. In the last decade of the survey (2011-2022), these trends persisted: the share of Serbs increased by 1.67 percentage points, while the

proportions of minorities – except for the Roma and Yugoslavs – all decreased. Notably, the share of Hungarians fell by 2.52 percentage points.

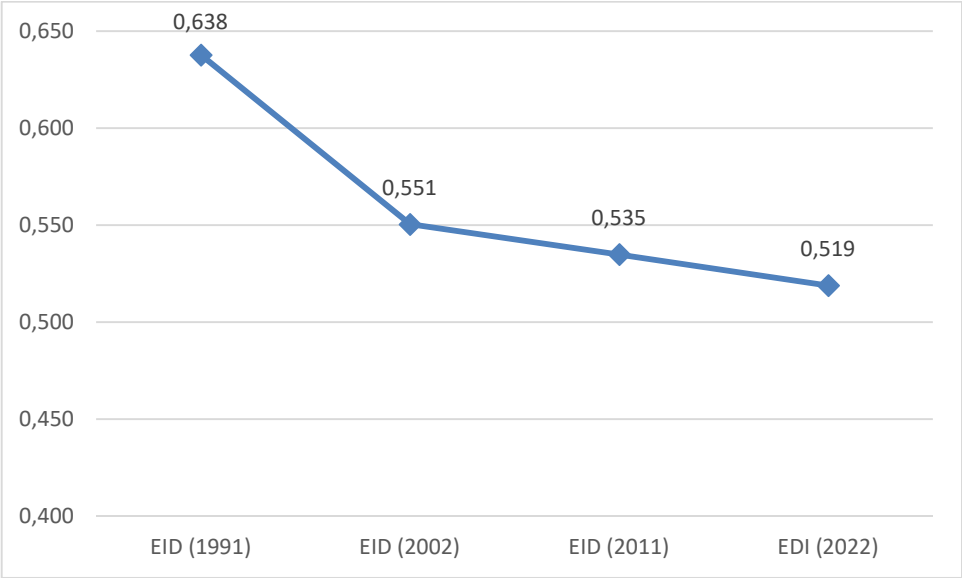
Table 1 The ten largest ethnic groups in Vojvodina

Ethnicities	2022		2011		2002		1991	
	Population	%	Population	%	Population	%	Population	%
Total	1,740,230	100.00	1,931,809	100.00	2,031,992	100.00	2,013,889	100.00
Serbs	1,190,785	68.43	1,289,635	66.76	1,321,807	65.05	1,143,723	56.79
Bunjevci	10,949	0.63	16,469	0.85	19,766	0.97	21,434	1.06
Yugoslavs	12,438	0.71	12,176	0.63	49,881	2.45	174,295	8.65
Hungarians	182,321	10.48	251,136	13.00	290,207	14.28	339,491	16.86
Roma people	40,938	2.35	42,391	2.19	29,057	1.43	24,366	1.21
Romanians	19,595	1.13	25,410	1.32	30,419	1.50	38,809	1.93
Slovaks	39,807	2.29	50,321	2.60	56,637	2.79	63,545	3.16
Croats	32,684	1.88	47,033	2.43	56,546	2.78	74,808	3.71
Montenegrins	12,424	0.71	22,141	1.15	35,513	1.75	44,838	2.23
Macedonians	7,021	0.40	10,392	0.54	11,785	0.58	17,472	0.87
other	191,268	10.99	164,705	8.53	128,726	6.33	71,108	3.53

Source: Statistical Office of the Republic of Serbia, 1991, 2002, 2011, 2023.

The changes in ethnic composition have significantly impacted the ethnic diversity of Vojvodina, with an overall decrease in diversity observed between 1991 and 2022 (see Fig. 2). At the beginning of the 1990s, the diversity index value was still above 0.6, but by the 2000s, it had dropped to 0.55. This decline was largely attributed to the Yugoslav civil war in the 1990s and the subsequent ethnically driven migrations. While the decrease in the diversity index has slowed down in the subsequent years, the process of homogenization has continued and is likely to persist in the future.

Figure 2 Ethnic Diversity Index change in Vojvodina (1991-2022)

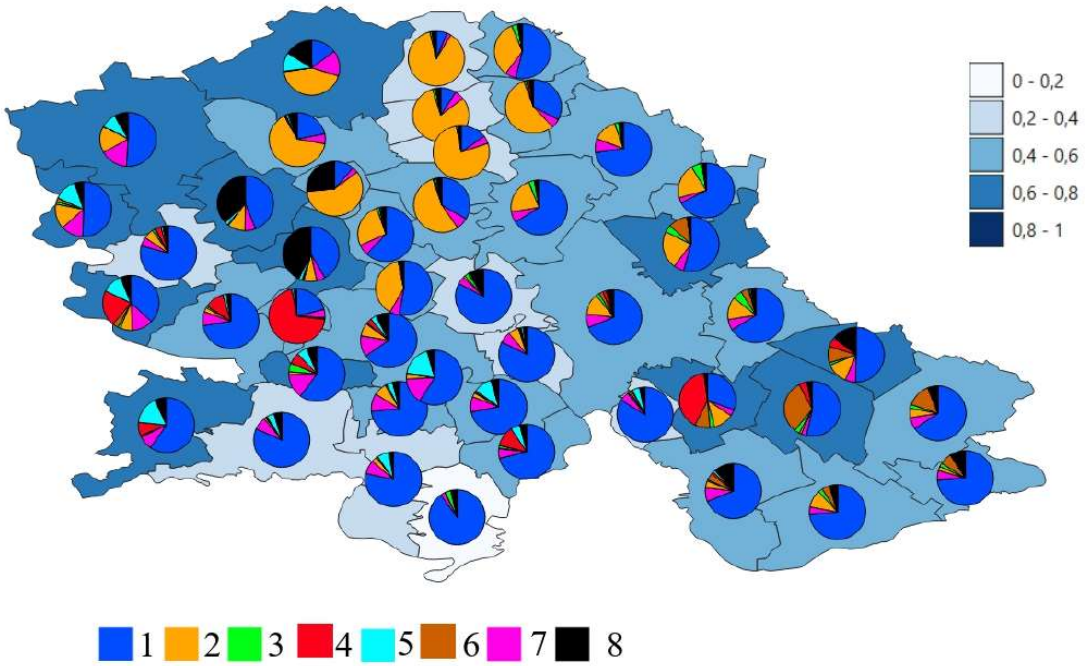


Source: Statistical Office of the Republic of Serbia, 1991, 2002, 2011, 2023.

Based on these findings, it can be concluded that the ethnic structure of Vojvodina is shifting from a former multi-ethnic region toward a more homogeneous future. This trend is observable at the municipal level; however, some municipalities have seen an increase in diversity. In the early 1990s, a group of municipalities characterized by high diversity was clustered in the northern and northwestern parts of the region (see Fig. 3). Additionally, there was a smaller group of high-diversity municipalities in the southeast along the Romanian border. Although Serbs constituted a majority in many of these areas, there were still significant minority groups present, particularly Hungarians and Croats in the northwest, and Romanians and Slovaks in the southeast. A common feature of these high-diversity municipalities was the absence (or only slight presence) of any ethnic group holding an absolute majority, combined with the presence of more than one significant (5%+) minority groups.

The most homogeneous municipalities were not concentrated in one dominant block during this period; rather, they were dispersed throughout the region. A larger cluster was found in the north, including Kanjiža, Senta, and Ada, where the low diversity can be attributed to the prominent Hungarian majority. Additionally, there was a smaller cluster in the southern part of the province with a Serbian majority, while other low-diversity municipalities were scattered across the area. All of these municipalities share the characteristic of having an ethnic group that constitutes over or close to 75% of the population.

Figure 3 Ethnic diversity in 1991 and the largest ethnicities



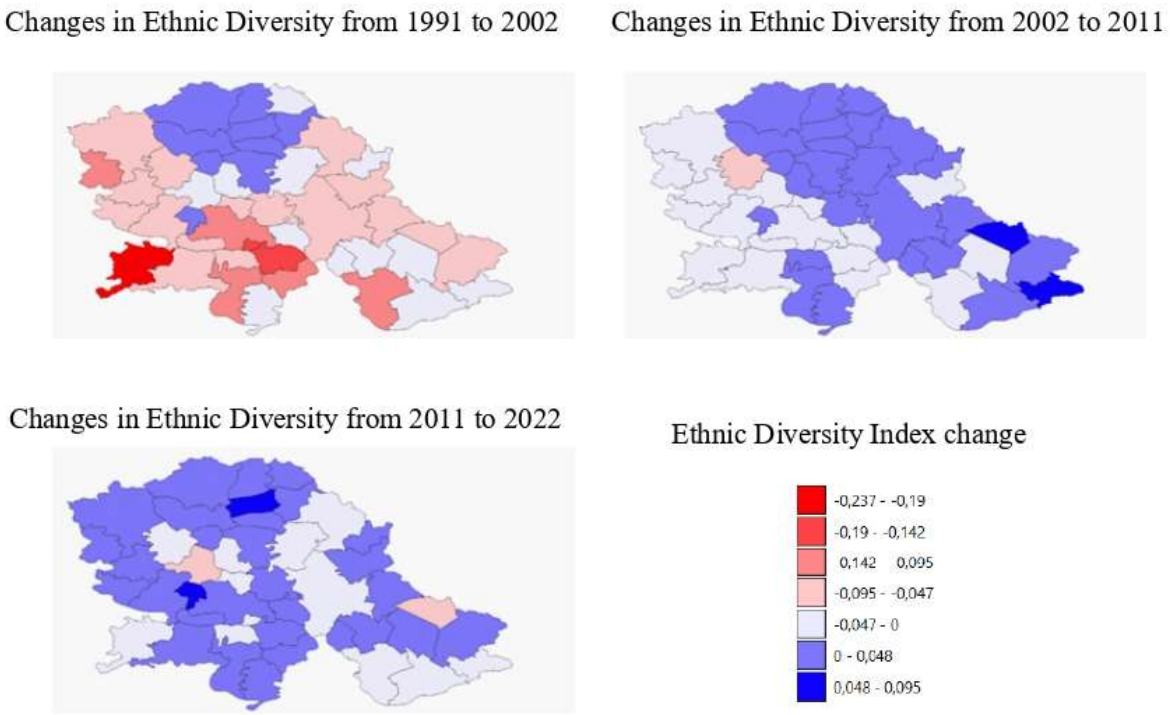
1 – Serbs, 2 – Hungarians, 3 – Roma, 4 – Slovaks, 5 – Croats, 6 – Romanians, 7 – Yugoslavs, 8 – Others.
Source: Statistical Office of the Republic of Serbia, 1991.

Post-1990s, the diversity index in Vojvodina underwent considerable changes (see Fig. 4). The Yugoslav civil war resulted in large-scale emigration of several minority groups, which were replaced by Serbs from other regions of former Yugoslavia. Consequently, diversity decreased in most municipalities, with exceptions found in a larger northern block of municipalities and in Bački Petrovac, but since they have been minority-majority municipalities, the influx of Serbs resulted in diversification (Léphaft et al., 2014).

Changes in diversity were more moderate after 2001, as the influx of Serbs and the emigration of minorities began to slow down. Areas experiencing homogenization were primarily found along and to the west of the Sombor-Temerin-Stara Pazova line. Apart from these, only three municipalities displayed a decrease in diversity: Pančevo and Alibunar in the southeast, and Žitište in the east. The primary reason for homogenization in these areas was the decline in the number of both minority groups and Serbs, with the effect of minority decline being more pronounced. For municipalities along the Sombor-Temerin-Stara Pazova line, while trends of homogenization were similar, there were also cases where the number of Serbs increased, leading to greater homogenization, such as in Kula, Novi Sad, Sremski Karlovci, and Temerin. The latter three municipalities are part of the gravitational zone of Serbia's second largest city, Novi Sad, attracting internal migrants from across Serbia.

In the last decade under observation, most municipalities exhibited diversification, with only 14 out of 45 municipalities showing signs of homogenization. These homogenizing municipalities do not form a contiguous block but are instead segmented into smaller groups. To the southeast, Pančevo, Kovin, and Bela Crkva can be found; to their north are Kikinda, Zrenjanin, and Novi Bečej; to the west lie Kula, Vrbas, Srbobran, and Temerin; while Irig and Sremski Karlovci are located to the south. Additionally, two municipalities, Šid to the west and Plandište to the east, do not connect with any of the above groups. In these municipalities, both the number of Serbs and minorities has decreased. Although the drop in the absolute number of Serbs has been more significant, the reduction has had a more pronounced impact on ethnic groups with smaller populations (see Figure 4).

Figure 4 Ethnic diversity change between 1991 and 2022

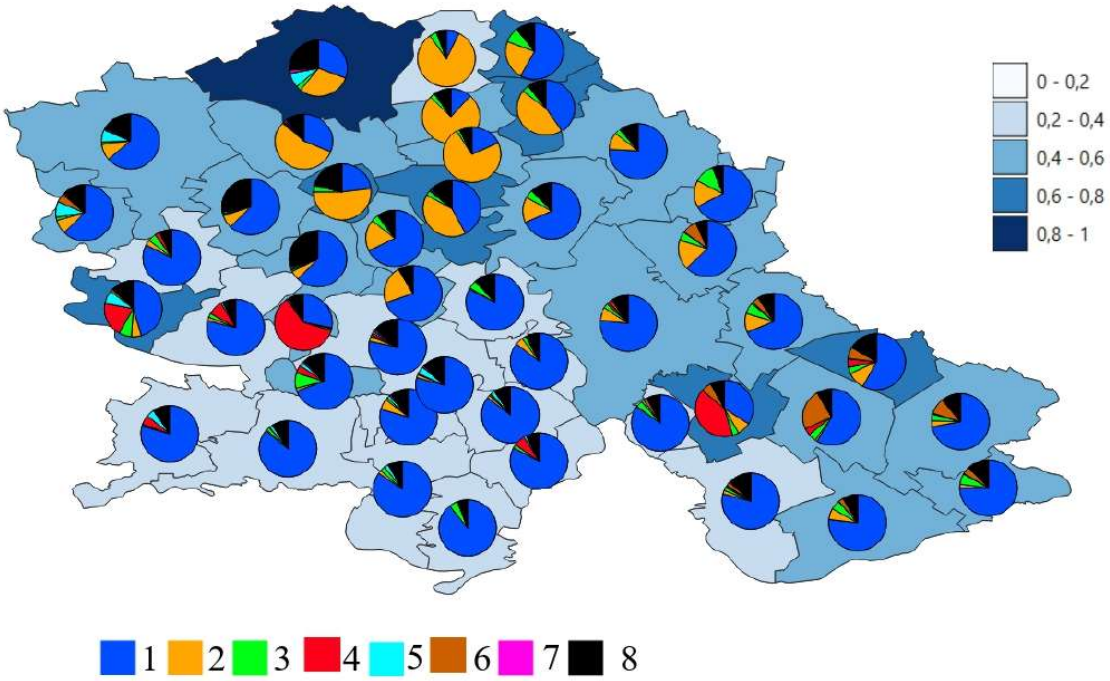


Source: Statistical Office of the Republic of Serbia, 1991, 2002, 2011, 2023.

The spatial distribution of ethnic diversity in Vojvodina has changed significantly since the beginning of the period under study (Fig. 5). The northwestern region, which previously had a high level of diversity, has experienced a substantial decrease. Similarly, the southeastern and eastern areas have become much more homogeneous. The most notable change has occurred in the south and southwest, where a large, contiguous area of municipalities with low diversity has emerged. In these regions, Serbs already constituted the majority in 1991, but over the past 30 years, the number of minorities living here has dramatically declined. While

the number of Serbs has seen only a slight increase since the post-war wave of immigration, the population of minority groups has decreased significantly.

Figure 5 Ethnic diversity in 2022 and the largest ethnicities



1 – Serbs, 2 – Hungarians, 3 – Roma people, 4 – Slovaks, 5 – Croats, 6 – Romanians, 7 – Yugoslavs, 8 – Others.
Source: Statistical Office of the Republic of Serbia, 2023.

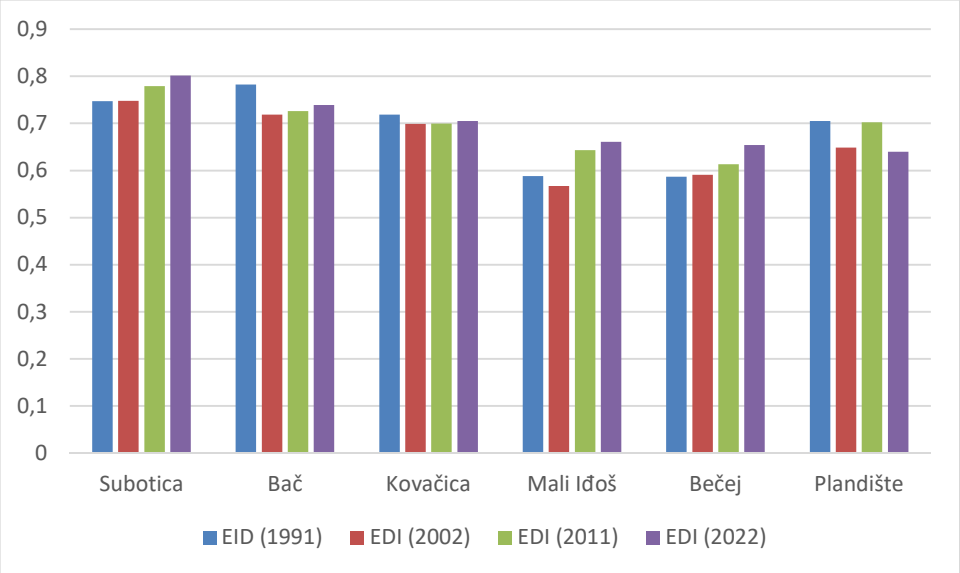
Diversity Index deviations from the regional average

The current level of diversity varies significantly among the municipalities. Based on the average diversity index for the region, we can classify the municipalities into two groups: those with a higher-than-average index and those with a lower-than-average index.

Higher-than-average diversity index

According to 2022 data, Subotica, Bač, Kovačica, Mali Iđoš, Bečej, and Plandište exhibited the highest values, all exceeding the regional average. These municipalities are primarily located in the northern and northwestern parts of Vojvodina, with the exception of Kovačica and Plandište, found in the southeastern part of the region. The impact of the Yugoslav civil war on diversity changes can be observed in all of these areas (Fig. 6).

Figure 6 The six municipalities with the largest positive deviations from the regional average



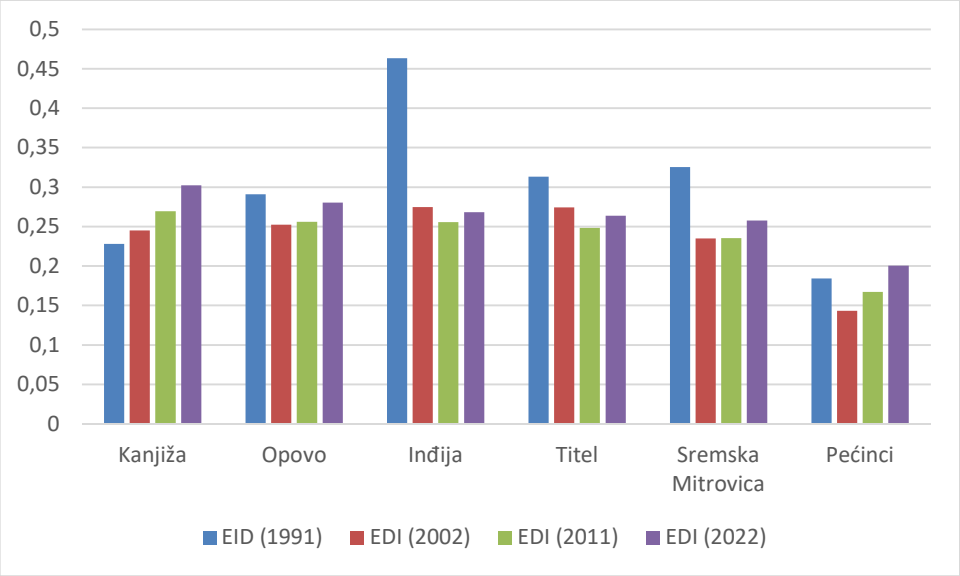
Source: Statistical Office of the Republic of Serbia, 1991, 2002, 2011, 2023.

Subotica had the highest diversity index in 2022 for the entire region, with a value of 0.8014, which is 70.94% higher than the regional average of Vojvodina. Notably, Subotica has consistently maintained an above-average diversity index throughout the study period, which has also been increasing due to a rise in the share of Serbs (who were a minority at the municipal level until the last census) and a decline in the share of minorities, particularly Hungarians (who formed the majority at the municipal level until the last census) and Croats. This trend was similarly observed in other minority-majority municipalities like Mali Iđoš and Bečej. However, Bečej had a lower diversity index in 1991 than the regional average, making its rise to a higher diversity group a more significant change compared to Subotica, which has always been diverse. Bač and Plandište, on the other hand, have been Serb-majority municipalities for several decades. In Bač, significant Slovak, Croat, Roma, and Hungarian minorities contributed to the high diversity value, and further diversification was driven by a larger decrease in the proportion of majority Serbs compared to the minorities combined. Plandište did not experience major diversification in the early 1990s but underwent significant changes between 2002 and 2011, marked by a sharp decline in the number of Serbs, which slowed down by 2022. Kovačica has maintained a Slovak majority over the last 30 years, with Serbs forming the largest minority and Hungarians, Roma, and Romanians present in substantial numbers. Its increasing diversity can be attributed initially to the immigration of Serbs during the 1990s, and in the last two decades, it is mainly due to the decreasing share of the non-Serb population, resulting from emigration, assimilation, and natural decline, particularly among Slovaks – the still relative majority group in this municipality.

Lower-than-average diversity index

Most municipalities with a lower-than-average diversity index are located in the southern part of Vojvodina (including Pećinci, Sremska Mitrovica, Titel, Opovo, and Inđija), with the exception of Kanjiža, which borders Hungary to the north (Fig. 7).

Figure 7 The six municipalities with the largest negative deviation from the regional average



Source: Statistical Office of the Republic of Serbia, 1991, 2002, 2011, 2023.

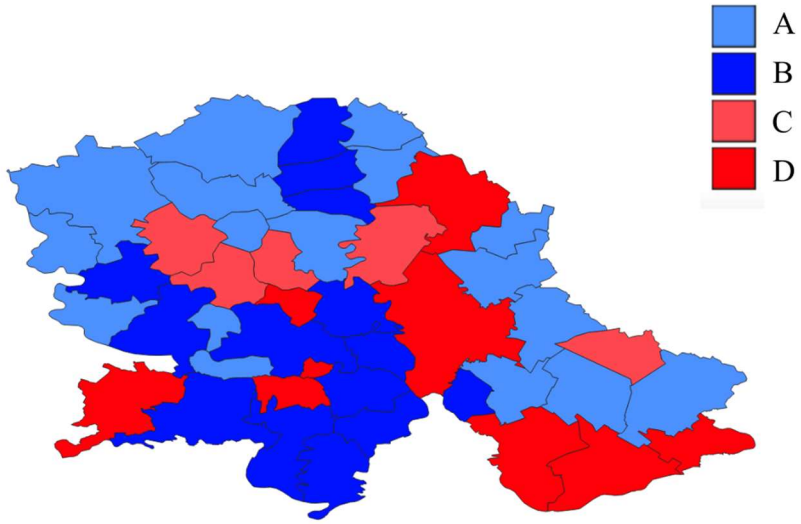
Among this southern group, Pećinci showed the greatest deviation from the average, with a diversity index of 0.2004 in 2022, which is 57.24% lower than the regional average. Like much of Vojvodina, Pećinci's population homogenized after 1991. Following 2002, it began to diversify again; however, the index remained consistently below the regional average, with only the Roma population increasing significantly. The area's diversity has steadily increased, primarily due to a decline in the number of Serbs. Sremska Mitrovica and Titel followed a similar trend, with a significant rise in the number of Serbs during the 1990s, nearly offsetting the decrease in the Yugoslav population. The later increase in diversity was mainly due to a decline in the Serb population (resulting from emigration and low birth rates) alongside an increase in the Roma population. Inđija municipality had notable Yugoslav and Croatian minorities in the 1990s, but their number significantly dropped after the turn of the millennium while the Serb population grew. Eventually, the number of Serbs also started to decline, outpacing the decrease of minorities and leading to an increased diversity index. In Opovo, Serbs have consistently been the dominant majority, with only the Roma and Romanians present in larger numbers. The increasing diversity can be attributed to a significant reduction in the Serbian population, along with an uptick in the Roma and

Romanian populations. In Kanjiža, in contrast to the previous areas, Hungarians formed the majority, with Serbs represented as a minority. Over a 30-year period, the number of Hungarians and several other minorities decreased, except for Serbs and the Roma. The increase in the number of Serbs continued until 2011, after which their number began to decline, while the Roma population continued to grow. This led to continuous diversification over three decades, similar to trends in other minority-majority municipalities. However, despite these changes, Kanjiža remained one of the most homogeneous municipalities.

Spatiality of diversity and diversification

To assess the difference in ethnic diversity from the regional average and its change from 2011 to 2022, we classified the municipalities into four categories. This classification considered both the positive and negative deviations of ethnic diversity from the Vojvodina provincial average, as well as the direction of diversification (increasing or decreasing) (Fig. 8).

Figure 8 Clusters of municipalities



A – Ethnically diverse and further diversifying municipalities; B – Less diverse but diversifying municipalities; C – Ethnically diverse but homogenizing municipalities; D – Continued ethnic homogenization with low diversity.
Source: Statistical Office of the Republic of Serbia, 1991, 2002, 2011, 2023.

- Category A includes municipalities that show both a positive deviation in diversity from the provincial average and an increase in diversity (ethnically diverse and further diversifying municipalities).

- Category B includes municipalities with ethnic diversity lower than the provincial average but experiencing an increase in diversity (less diverse but diversifying municipalities).
- Category C consists of municipalities with higher ethnic diversity than the provincial average but showing a downward trend (ethnically diverse but homogenizing municipalities).
- Category D includes municipalities with ethnic diversity below the provincial average that are also experiencing a decrease (continued ethnic homogenization with low diversity).

For the municipalities in category A (ethnically diverse and further diversifying), two larger, spatially coherent areas can be identified: the northwestern group, which includes Apatin, Sombor, Bačka Topola, Mali Iđoš, Subotica, and Bečej and the southeastern unit, which comprises the municipalities of Alibunar, Kovačica, Nova Crnja, Sečanj, Vršac, and Žitište. A smaller pair, Čoka and Novi Kneževac, is located in the northeast; however, other municipalities do not show any territorial coherence. In the larger northern group, the ethnic composition is traditionally very diverse. Apatin and Sombor have a Serbian majority, while Bačka Topola and Mali Iđoš have larger Hungarian populations. In Bečej and Subotica, the Serbian and Hungarian populations are nearly equal. The increase in diversity is primarily due to a greater decline in the local majority's ethnic numbers and a lesser decline among minority groups. In the southeastern unit, Serbs constitute the majority in all municipalities except Kovačica, where Slovaks make up the largest ethnic group. Similar to the northern group, the increase in diversity here results from a larger decrease in the majority ethnic group compared to minorities. In the pair of Čoka and Novi Kneževac, Hungarians are the majority in Čoka, while Serbs constitute the majority in Novi Kneževac, alongside a notable Roma presence. The general population decline, including emigration (both municipalities lost more than 20% of their population in the last decade), contributes to this increase in diversity, affecting majority populations to a greater extent than minorities.

Municipalities in category B (less diverse but diversifying) can also be divided into two large contiguous blocks: one in the north and another in the south. The northern block includes the municipalities of Ada, Kanjiža, and Senta, while the southern block comprises Inđija, Novi Sad, Pećinci, Ruma, Sremska Mitrovica, Titel, and Žabalj. In the northern group, Hungarians are in the majority. The increase in diversity here is primarily due to a steady decline in the Hungarian population resulting from emigration, assimilation, and natural decrease, although other ethnic groups are also declining, albeit to a lesser extent. The

southern group has a different ethnic composition, with Serbs in the majority and larger numbers of Roma, Croats, and Hungarians. The increase in diversity is linked to a significant decrease in the number of Serbs (with the exception of Novi Sad), which aligns with national and regional trends (sub-replacement level fertility rates and emigration). Novi Sad's slight diversification is a consequence of the growth of the number of Serbs through immigration and a simultaneous (and even larger) growth of different smaller groups like Russians and others. Although minority groups are also decreasing in number, their decline is much less pronounced. In the municipalities that do not form a territorially homogeneous group, Serbs are the majority everywhere. However, the ethnic composition varies in each case. Specifically, Hungarians are the largest minority in Kikinda, the Roma in Odžaci, and Slovaks in Bačka Palanka. Diversity in these municipalities has increased due to the continuous decline of the Serb population, while the number of minorities has changed less significantly.

Category "C" includes municipalities that are ethnically diverse but exhibit a trend toward homogenization. This category contains far fewer municipalities, such as Kula, Srbobran, Novi Bečej, and Vrbas, which are located along the Serbian-Hungarian contact zone. Plandište is situated in the southeastern region. In these municipalities, Serbs are still the majority, although there are sizable minority populations of Hungarians, Roma, Slovaks, and Croats. The reduction in diversity is attributed to the more significant decline in the number of minority populations compared to the number of Serbs.

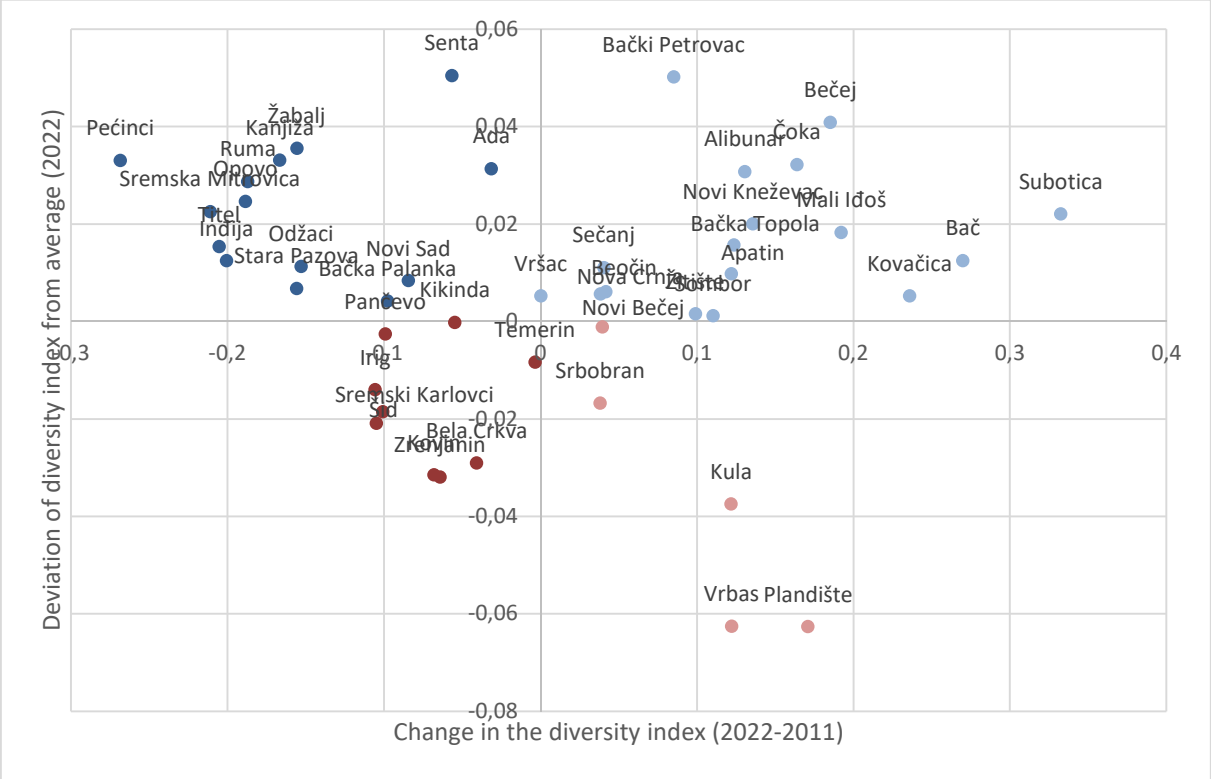
Our final category, "D", features municipalities experiencing continued ethnic homogenization with low diversity. This group consists of a spatially coherent unit located in the southeast along the Danube, including Bela Crkva, Kovin, and Pančevo. Outside this area, there is no spatial connection among other dispersed municipalities: Šid in the southwest, Irig and Sremski Karlovci to the east, Temerin in the interior, and Zrenjanin north of Belgrade. Within the southeastern group, Serbs are the majority ethnic group, while Hungarians, Roma, and Romanians constitute a significant minority. However, their numbers are small in relation to the Serb population. The decline in diversity is primarily due to the decreasing proportion of these minorities. Although the absolute numbers of minorities are declining less than those of Serbs, the proportional decrease is much more noticeable.

Similar trends are occurring in other municipalities, differing only in the declining minority group. In Šid and Temerin, the decline of the largest minority groups – Croats in Šid and Hungarians in Temerin – contributes to homogenization. In Kikinda, the main minority groups are the Hungarians and the Roma, while in Zrenjanin, several ethnic groups, including Hungarians, Roma, Romanians, Slovaks, and Croats, are seeing diminishing numbers,

reinforcing the homogenization trend. Many of these municipalities offer better opportunities: for example, Zrenjanin serves as a relatively large urban center, Pančevo is near Belgrade, and Irig, Sremski Karlovci, and Temerin are close to Novi Sad. As a result, their migration balance is better than the regional average, leading to less emigration and more immigration than typical for the region. Minority communities tend to be older, so natural decline affects them more than the majority population, which is often overrepresented in internal migrations.

There is a territorial connection among the municipalities within the mentioned categories, but the value properties reveal different patterns (Fig. 9).

Figure 9 Relation between the variation in the diversity index and the deviation from the regional average in the districts



Source: Statistical Office of the Republic of Serbia, 2011, 2023.

In municipalities of category “A”, despite most elements showing a higher proximity value regardless of spatial relationship, some stand out as well-separated. For instance, Subotica, which shows the largest deviation from the average, is only closely related in this respect to Bač and Kovačica, located in entirely different parts of Vojvodina. Another example is Bački Petrovac, which markedly differs in its diversity increase from the rest of its category; the closest municipality to it in terms of this value is actually in category “B” (Senta). In category “B”, most municipalities are grouped into a larger cluster, except for a few outliers such as

Senta and Ada, which deviate slightly in a negative direction from the average for Vojvodina but show a high degree of diversification. Additionally, Pećinci shows a considerable negative deviation from the regional average, but demonstrates a high increase in diversity.

Regarding the municipalities in category “C”, although they form a spatially coherent group, it is challenging to place them further apart in terms of their values. Kula, Vrbas, and Srbobran are spatially proximate yet exhibit differing levels of homogeneity. The municipalities within category “D” show relatively similar values with no outliers among them, which is particularly noteworthy given the absence of any spatial connection between the majority of them.

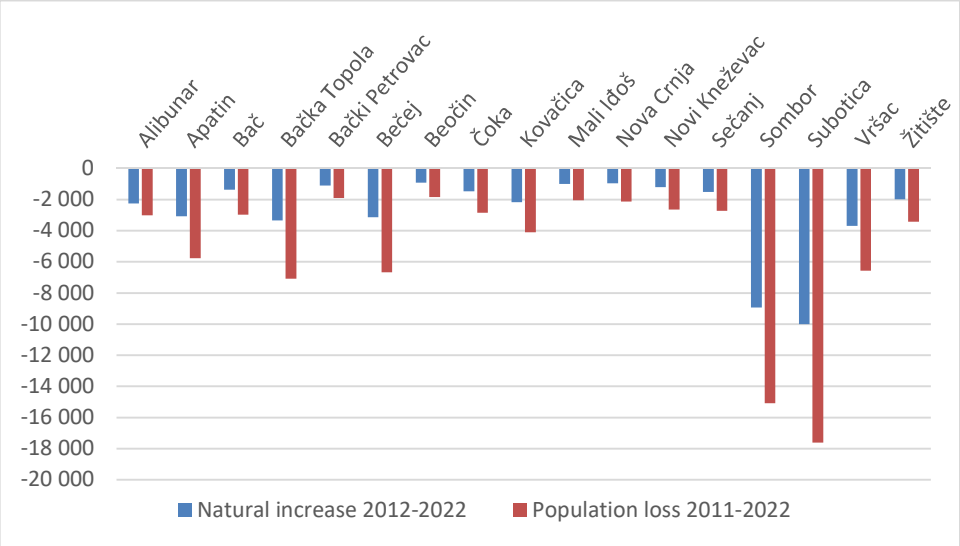
Changes in natural reproduction

The entire territory of Vojvodina is experiencing a population decline, as indicated by natural reproduction figures. Over the last decade, the province's population has decreased by 191,579 people, a significant portion of which can be attributed to natural decrease. Data from 2012 to 2022 supports this assertion; however, the graphs show that natural decrease alone does not fully explain the population gap between the two censuses. This evidence suggests that emigration is also a major factor influencing the demographic changes in the region. Specifically, Vojvodina's population has decreased by 124,705 individuals due to natural decrease, accounting for 65.09% of the overall decline between the two censuses.

In the previous chapter, we examined the relationship between the deviation of the 2022 diversity index from the average and changes in the diversity index from 2011 to 2022 to create certain categories. This section investigates the relationship between natural change and population decline across municipalities within these categories.

In “Category A” municipalities, it is evident that the total natural decrease accounts for only around half of the overall population loss. This is particularly pronounced in the municipalities of Subotica, Sombor, Bačka Topola, and Bečej. In Subotica, natural decrease represents just 56.8% of the ten-year difference; in Sombor, 59.21%; in Bačka Topola, 47.18%; and in Bečej, 47.1%, respectively. These statistics highlight the impact of migration, alongside natural changes, on the overall population size and, consequently, on the ethnic composition of the area (see Fig. 10).

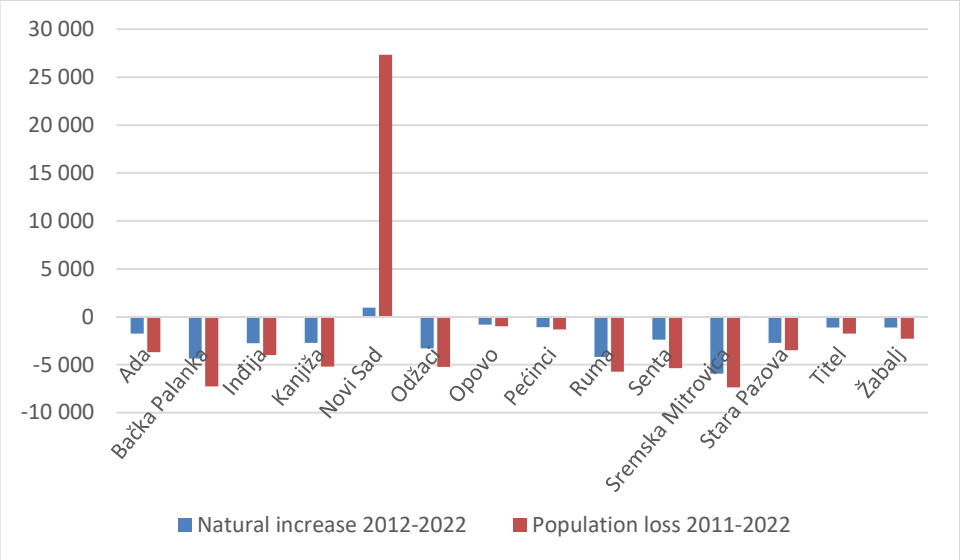
Figure 10 The difference between the natural change (2012-2022) and the population change (2011-2022) in Category A.



Source: Statistical Office of the Republic of Serbia, 2011, 2013-2023.

"Category B" includes municipalities with a diversity index below the provincial average but showing a steadily increasing diversity. The situation here differs significantly from Category A; only half of the municipalities report rates of natural change similar to those observed earlier. There is a substantial variation among municipalities: for instance, in Novi Sad, natural change accounts for only 3.52% of the total population difference, while in Opovo, it represents 81.49%. This clearly illustrates the importance of migration and its effects on both population dynamics and diversity in Novi Sad (see Fig. 11).

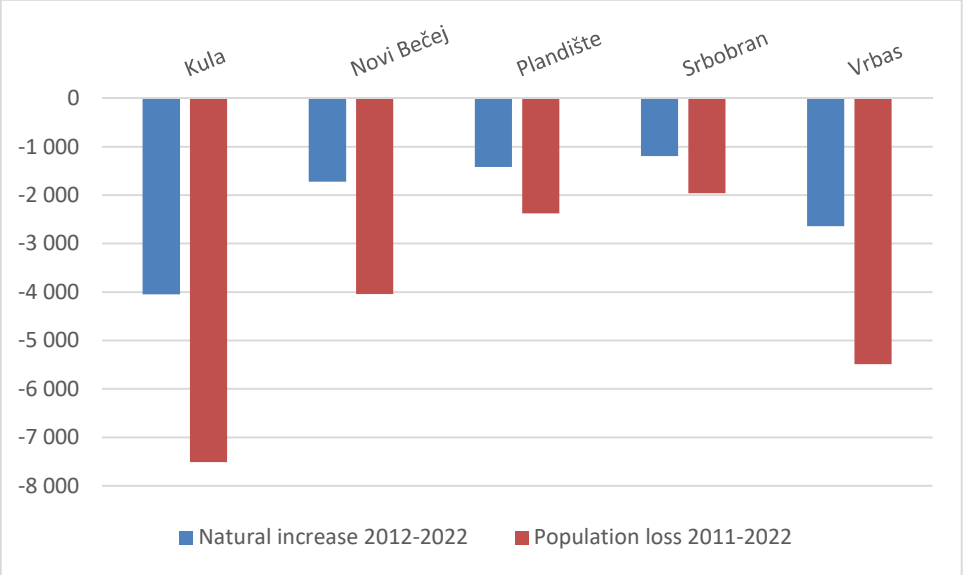
Figure 11 The difference between the natural change (2012-2022) and the population change (2011-2022) in Category B.



Source: Statistical Office of the Republic of Serbia, 2011, 2013-2023

"Category C" contains fewer municipalities than the previous two, characterized by high ethnic diversity but a consistent decrease in that diversity. In these municipalities, as in many from previous categories, natural change accounts for only about half of the overall population decline between the censuses. Notably, this is the case for Novi Bečej, where natural decrease constituted only 42.63% of the population decline, and for Vrbas, which saw a natural decrease of 48.07% (see Fig. 12).

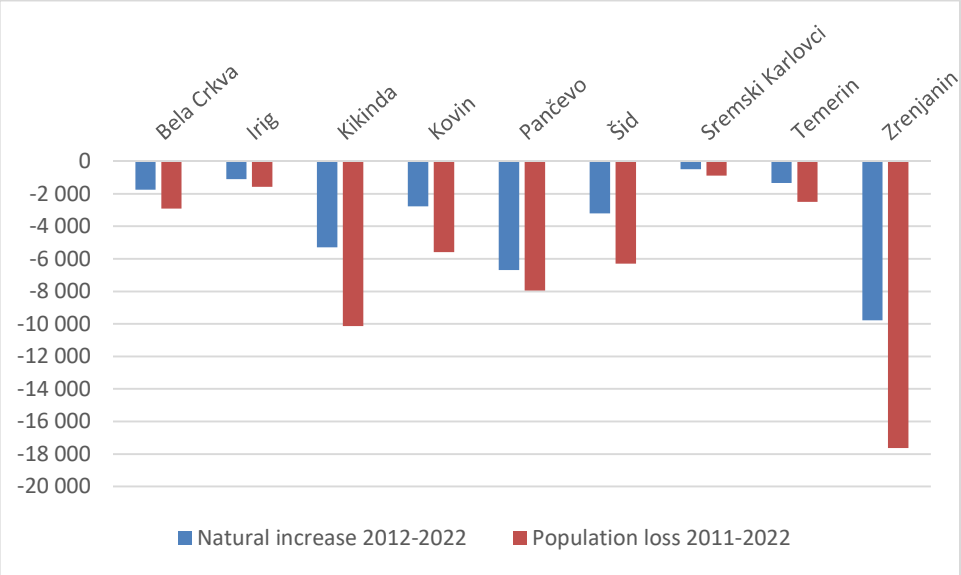
Figure 12 The difference between the natural change (2012-2022) and the population change (2011-2022) in Category C.



Source: Statistical Office of the Republic of Serbia, 2011, 2013-2023.

"Category D" includes municipalities with a low diversity index and ongoing homogenization. The trends observed here resemble those in previous categories, with two exceptions. In Pančevo, natural decrease accounts for 84.1% of the overall population loss, indicating that emigration plays a minimal role in this municipality's decline. In contrast, in Irig natural decrease gives 69.41% of the population loss (see Fig. 13).

Figure 13 The difference between the natural change (2012-2022) and the population change (2011-2022) in Category D.



Source: Statistical Office of the Republic of Serbia, 2011, 2013-2023.

The aforementioned figures illustrate the significant extent of natural decrease across Vojvodina. However, in many cases, these figures only account for around half of the total population decline, with migration serving as another crucial factor. This situation is particularly relevant for minority groups, such as Hungarians. Several media reports have highlighted this issue, some featuring various researchers discussing the depopulation of Vojvodina (Cérna, 2017). Several scholars noted that continuous emigration primarily impacts young people, driven especially by challenges in education and economic opportunities. In the case of further education, the most common reason for emigration was education in Hungarian, as there are few opportunities for this in Serbia (Kincses & Papp, 2020). Sociologist Róbert Badis, during a lecture at the Újvidék Scholars' Club on May 20, 2024, indicated that the decline in the Hungarian population has intensified, increasing from 40,000 in the previous decade to 70,000 in the last ten years. He attributed this decline to three main factors: 45 percent due to natural decrease, 40 percent to emigration, and 15 percent to assimilation. The introduction of dual citizenship after 2011 has been a significant factor facilitating the emigration of a substantial number of Hungarians from Vojvodina. As a result of the emigration of young people, the birth rate in the region has sharply declined, exacerbating the reduction of the ethnic population and contributing to the ethnic homogenization of the area (HHzs, 2023; Kabók, 2013; Vajdasági Magyar Akadémiai Tanács, 2024).

CONCLUSIONS

The ethnic composition of Vojvodina has changed significantly since the last census conducted during the Yugoslav era. The proportions of ethnic minorities have been reduced, and their spatial distribution has also shifted. In the initial phase of the 30-year period under review, processes of homogenization played a crucial role in shaping the region's ethnic landscape. The few municipalities that experienced diversification during this time were predominantly those with minority majorities, primarily due to the immigration of Serbs.
Over the following two decades, more municipalities underwent changes leading to increased diversity, even as the overall proportions of ethnic minorities continued to decline. The diversity index of these municipalities indicates that, at the beginning of the study period, only the southern periphery exhibited low diversity. However, over thirty years, an increasing number of municipalities reached similar diversity levels, causing the area of low diversity to shift northward.

In both the positive and negative changes regarding diversity, certain areas demonstrated deviations from the region's average diversity. Municipalities with higher-than-average diversity are primarily located in the northern part of Vojvodina, presenting a varied landscape where Hungarians or Slovaks may form majorities, but where an increase in diversity is often linked to a decline in these populations. Conversely, there are regions where Serbs are the majority, and their increased diversity stems from a more significant decrease in their numbers. This situation can be exacerbated by ethnic minorities generally having lower fertility rates and higher emigration rates among Serbs.

Lower-than-average diversity regions are mainly situated in the south, where the predominance of Serbs and a limited presence of other ethnic groups contribute to low diversity, with the exception of the Kanjiža municipality, where Hungarians are the majority. By examining the variation in diversity and how municipalities deviate from regional averages, we categorized the municipalities into four broad groups. Analyzing the spatial characteristics of these categories allowed us to define spatially coherent units within each group. Despite some municipalities forming a coherent spatial area, significant differences in values were still evident, particularly in category "C", which comprises only a few municipalities where these discrepancies are pronounced.

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