

MIGRATION

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TREND ANALYSIS OF INTERNAL MIGRATION IN SERBIA

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Summary

The aim of this paper is to investigate the characteristics of internal migration trends in the Republic of Serbia by employing various statistical methodologies to analyse patterns at national and district levels. The main objectives are to examine the temporal aspects of overall migration intensity, spatial patterns, and the relationships between internal migration and selected demographic and socio-economic development factors. The results

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indicate a stagnant trend, with no statistical significance, in the dynamics of internal migration in Serbia from 2002 to 2023, as well as contrasting patterns between total population dynamics and internal migration. The study highlights differences in net internal migration, in-migration, and out-migration trends in districts, establishing that population size and GDP per capita are the most significant factors determining the character of internal migration trends at the district level. These findings contribute to a better understanding of the contemporary internal migration process in Serbia.

Keywords: Migration, internal migration, trend analysis, in-migration, out-migration, migration intensity, spatial patterns, Serbia

Zusammenfassung

TRENDANALYSE DER BINNENMIGRATION IN SERBIEN

Ziel dieser Arbeit ist es, charakteristische Trends der Binnenmigration in der Republik Serbien zu untersuchen, indem verschiedene statistische Methoden zur Analyse der räumlichen Differenzierung und der Erscheinungsformen der Binnenmigration auf nationaler und Bezirksebene herangezogen werden. Die Hauptziele bestehen darin, die zeitlichen Aspekte der Intensität der Binnenmigration, räumliche Muster sowie Zusammenhänge zwischen der Binnenmigration und ausgewählten demographischen und sozioökonomischen Entwicklungsfaktoren zu untersuchen. Die Ergebnisse deuten auf einen stagnierenden Trend ohne statistische Signifikanz in der Dynamik der Binnenmigration in Serbien von 2002 bis 2023 hin, sowie auf einen gegensätzlichen Trend bei der Dynamik der Entwicklung der Gesamtbevölkerung und der Binnenmigration. In der Studie werden Unterschiede bei der Netto-Binnenmigration sowie bei den Zu- und Abwanderungstrends in den einzelnen Bezirken Serbiens untersucht und festgestellt, dass die Bevölkerungsgröße und das Bruttoregionalprodukt per Kopf die wichtigsten Faktoren sind, die Struktur und Ausmaß der Binnenmigrationstrends auf Bezirksebene bestimmen. Diese Ergebnisse tragen zu einem besseren Verständnis der aktuellen Trends der Binnenmigration in Serbien bei.

Schlagwörter: Migration, Binnenmigration, Trendanalyse, Zuwanderung, Abwanderung, Migrationsvolumen, räumliche Muster, Serbien

1 Introduction

Migration is a multidimensional process that takes place across both temporal and spatial contexts. The complexity of its causes and consequences has made population mobility an increasingly important issue in academic and public debates (TATARU 2019; SOARE and GHERGHINA 2024). Internal migration, defined as population movements between different territorial units within a country, changes both origin and destination societies and triggers development changes. As a key component of population change, internal migration can significantly influence population structure, dynamics, and size. Managing internal migra-

tion is important because a balanced spatial distribution of population within a country is crucial for sustainable development. Understanding the scale and direction of internal migration, the characteristics of migrants, and determining how many people are moving and who they are is essential for assessing the socio-economic impacts on both sending and receiving regions (OTOIU et al. 2014; SUKAMDI and MUJAHID 2015; RODRÍGUEZ 2023). Analysing trends in internal migration in spatial and temporal contexts is vital for developing effective migration and regional policies (GÜRISOY and BADUR 2022).

Since the mid-20th century, internal migration in Serbia has been linked to industrialisation, urbanisation, and deagrarianisation. At the beginning of the 21st century, internal migration continued to play a key role in Serbia's population distribution (RADUŠKI 2016; LANGOVIĆ et al. 2024). According to the 2022 population census, the total number of internal migrants (persons who have moved within Serbia from one part of the country to another) in 2022 was 2,323,809, representing 35 percent of the total population (SORS 2023a).

This paper investigates contemporary characteristics of internal migration trends in Serbia, focusing on mobility patterns at the national level and in- and out-migration trends at the district level. Uncovering the factors behind these patterns is an integral part of the analysis. The aim is to contribute to a better understanding of internal migration flows in Serbia at the beginning of the 21st century. The main outputs of this paper include systematisation of the complex database on internal migration; application of various methods of statistical and trend analysis; determination of characteristics of internal migration trends; provision of detailed insights into internal migration patterns at the district level that can inform policy and strategy development.

2 Theoretical Background and Previous Research

The theoretical foundations of internal migration can be found in the scientific work of RAVENSTEIN (1885; 1889), who explained migration patterns through his laws of migration, which serve as specific empirical generalisations (REES and LOMAX 2020). One of RAVENSTEIN's observations is that most migrants go only a short distance. Accordingly, KING (2012) noted that RAVENSTEIN's empirical generalisations apply more to internal than to international migration. The well-known push and pull theory by LEE (1966) offers insight into various, predominantly, social and economic factors that influence the decision to migrate within or outside the country of origin. According to this theory, push factors (e.g., unemployment, low wages, discrimination) are associated with the place of origin, while pull factors (e.g., better living conditions, economic stability, job opportunities) relate to the destination (ALEXANDROVNA and GALIMOVNA 2018). HARRIS and TODARO (1970) focused on urban-rural differences in expected earnings when explaining internal migration patterns. Their model shows that a higher probability of job opportunities and higher expected wages in urban areas significantly influence migration from rural regions (ESPÍNDOLA et al. 2006; FILIZTEKIN and GÖKHAN 2008).

Neoclassical economics explains migration as the result of individual decisions to maximise income and respond to differences in wages and employment conditions

(MASSEY et al. 1993). According to this theory, migration should help reduce disparities between regions. Migration flows from areas with low capital intensity to those with high capital intensity, decreasing capital intensity in the receiving region and increasing it in the sending region (ETZO 2008; HEJDUKOVÁ and KUREKOVÁ 2020). Thus, migration is considered a key driver of economic development, affecting labour supply, productivity, and the spatial organisation of economic activity (XU 2024). The gravity model of spatial interaction states that interactions between two places are directly proportional to their size, population, or gross domestic product (GDP), and inversely proportional to the distance between them (RAMOS 2016; POOT et al. 2016).

In the first decades of the 21st century, the question of why people migrate has remained one of the most important in migration studies. Empirical research indicates that people migrate within a country for various reasons, with spatial socio-economic inequalities serving as the main trigger for migration flows (RODRÍGUEZ VIGNOLI 2008). MOCH (2011) noted that although the spatial characteristics of internal migration differ from country to country, the directions of internal migration flows are generally linked to employment characteristics, concentrations of capital, and demographic patterns. Other evidence indicates that internal migration can play an important role in economic development and has the potential to reduce poverty (DESHINGKAR and GRIMM 2005; SOONHWA 2014).

Significant contribution in understanding internal migration trends in Europe was provided by ROWE et al. (2019). Observing the patterns of internal migration at the regional level, the authors found that in Southern and Eastern Europe migration effectiveness is above average, but is offset by low migration intensities. On the other hand, they pointed out that in Northern and Western Europe high intensities are absorbed in reciprocal flows resulting in low migration effectiveness (ROWE et al. 2019). In the study of internal migration flows within 38 European countries, ROWE and PATIAS (2020) identified the major role of national capital cities in the internal migration system. The research by PREGI and NOVOTNÝ (2025) highlights the importance of the location of key economic centres in inter-regional migration in Slovakia.

Examining trend analysis of internal migration across 18 OECD countries from 1996 to 2018, ALVAREZ et al. (2021) aimed to identify variations in these trends and the economic, demographic, and social factors underlying them. They found that all non-European countries showed a decreasing trend. In contrast, the situation in Europe differed, with some countries exhibiting upward trends, others showing no significant trend in either direction, and some experiencing a modest decline.

The literature review revealed that the demographic aspects of internal migration are often explored in relation to age and education. ZAICEVA (2014) pointed out that population ageing, which characterises both developed and developing countries, may lead to lower migration rates or increased migration among the elderly. In examining the links between patterns of internal migration and education, GONZALEZ-LEONARDO et al. (2022) showed that completing higher education increases the likelihood of internal migration by almost three times. In addition, population size and GDP, as key indicators, are included in the analysis of internal migration (e.g., WANG et al. 2025).

In research on spatial mobility in Serbia, internal migration holds a special place, reflecting the intensity and characteristics of the process. Investigating the characteristics of internal migration based on census data from 1981 to 2011 and annual data from 2002 to 2013, KOKOTOVIĆ KANAZIR et al. (2016) found that internal migration flows were most pronounced in the Belgrade region and major regional centres – Novi Sad, Niš, and Kragujevac. The authors concluded that internal migration towards cities and regional centres in Serbia is primarily driven by greater employment opportunities. SPASOVSKI and ŠANTIĆ (2016), using census data from 1961 to 2011, found that, compared to natural growth, emigration and immigration trends significantly shaped the relocation of the urban population in Serbia, and that the concentration of the migrant population in the modern period is closely linked to economic, social, and other determinants of spatial development. RADOVANOVIĆ et al. (2023) showed that the number of companies per 1,000 inhabitants influences emigration in Belgrade, while there are no direct or indirect causes of emigration or immigration in other regions. BARRIOS GONZALEZ et al. (2024), examining the effects of internal migration flows on regional convergence in Serbia from 2000 to 2018, found that internal migration flows between NUTS3 units mainly fostered divergence.

The issue of internal migration was prominent during the Covid-19 pandemic. In a study covering the period from 2018 to 2020, specifically from March to December each year, LUKIĆ et al. (2022) found that the pandemic affected both the volume and spatial patterns of internal migration in Serbia. Belgrade was the most desirable destination for migrants during this period, but migration intensity decreased after the pandemic began. All areas except Belgrade, North Bačka, Nišava, North Banat, and Zaječar had a negative net migration rate, but showed more favourable values in 2020 compared to 2019, indicating a mitigation of the negative trend, though this was due to a smaller volume of out-migration. LUKIĆ et al. (2023) also found that the pandemic led to an increase in rural-to-rural migration and rural in-migration from medium-sized towns.

Internal migration in Serbia was also examined as part of broader research on migration processes in the country. Research conducted in four local self-government units (Leskovac, Užice, Zrenjanin, Zaječar) showed that internal migration intentions are less common comparing to the international migration intentions. Respondents who plan to migrate within Serbia frequently mentioned Belgrade or another regional centre as their intended destination (ŠANTIĆ et al. 2019). As part of the same research, TODOROVIĆ et al. (2021) confirmed, that most students intending to stay in Serbia plan to migrate to one of the large regional centres. ŠANTIĆ et al. (2023) showed that economic reasons are the dominant factor in the emigration process.

3 Methodology

The spatial framework of the research focuses on the territory of the Republic of Serbia at both the national and district levels. Serbia is located in Southern Europe, on the Balkan Peninsula, and within the Danube region. The study covers 24 administrative districts in Serbia and the City of Belgrade, classified as NUTS 3 (Figure 1). Due to a

lack of data, AP Kosovo and Metohija (Kosovo, under the framework of the UNSC Resolution 1244 from 1999), is not included in the analysis. According to the Law on State Administration, an administrative district is established to perform state administration tasks outside the headquarters of the state administration body (Official Gazette of RS, No. 79/2005, 101/2007, 95/2010, 99/2014, 47/2018, and 30/2018 – as amended). The district was chosen as the territorial framework for the research because its level of detail reveals local specificities, while its broader scope captures wider trends and connects these to national trends.



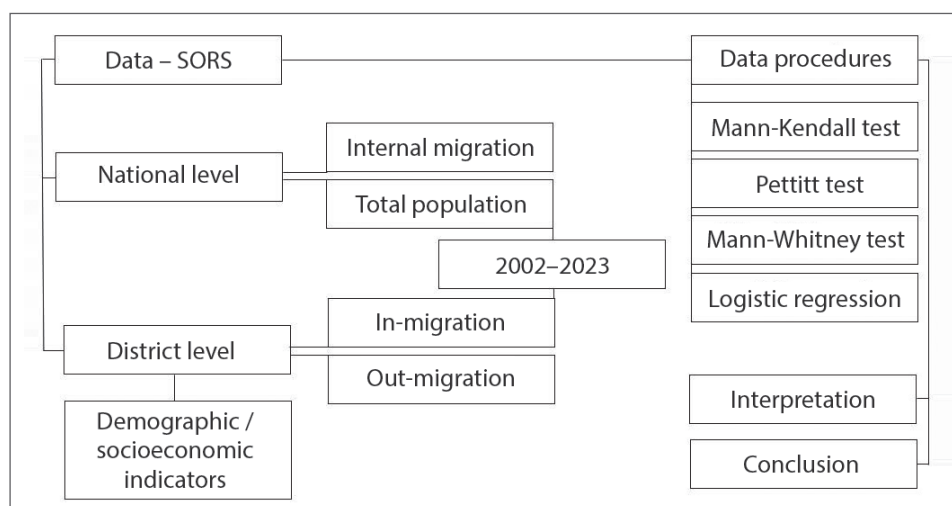
Source: Authors. Own design

Figure 1: Administrative districts of the Republic of Serbia

The aim of the paper is to provide insights into the trends of internal migration in Serbia by analysing:

- Temporal variations of internal migration intensity in Serbia, 2002–2023
- Trend characteristics of internal migration in Serbia, 2002–2023
- Spatio-temporal variations of net internal migration at district level, 2002–2023
- Trend characteristics of in- and out-migration at district level, 2002–2023
- Differences between in- and out-migration trends at district level in terms of selected determinants of demographic and socioeconomic development.

Accordingly, methodological framework of the research includes large sets of data and numerous statistical procedures, which are systematically presented in the Figure 2.



Source: Authors. Own design.

Figure 2: Methodology of the research

In this paper annual data on internal migration in Serbia collected and published by the Statistical Office of the Republic of Serbia (SORS) were used. The dataset includes data on internal migration at the national level, as well as in-migration and out-migration at the district level for the period 2002–2023. The analysis also incorporates data on the total population in Serbia for the same period, using both census data and population estimates (SORS 2006–2024). The data used in this paper are publicly available, which is the main reason for selecting this time series for the research.

Districts in AP Kosovo and Metohija are not included in the study. However, data from 2002 to 2011 for other parts of Serbia include residence registrations of persons from AP Kosovo and Metohija. Due to discrepancies in national in-migration and out-migration data during that period, all procedures for this period used national-level (i.e., Republic of Serbia) data on in-migration.

The descriptive part of the analysis provides an overview of the intensity of internal migration characteristics, including in-migration and out-migration, in the districts of the Republic of Serbia over time. To identify variations in internal migration trends in Serbia, this paper focuses on trend analysis. Applying trend analysis allows researchers to examine the past behaviour of a process, which, through additional methods, helps to understand the mechanisms behind change (STRUMPF 2017; ECDC 2024).

For this paper, the Mann-Kendall test was applied. This test is widely used in physical geography (e.g., LANGOVIĆ et al. 2017; CABRAL JÚNIOR and LUCENA 2019; LANGOVIĆ et al. 2023). Although, to the author's knowledge, it is less commonly used in human geography, some migration studies have employed it (e.g., MAWONIKE et al. 2021). The Mann-Kendall test is a nonparametric method for analysing time series data. It determines whether a time series shows an increasing or decreasing trend and whether the trend is statistically significant (KHAMBHAMMETTU 2005). As this test does not require normally distributed data and can handle extreme values that are difficult to address with parametric tests, it is essential for analysing migration trends (MAWONIKE et al. 2021). In this study, the Mann-Kendall test was applied at both the national and district levels in the Republic of Serbia. Accordingly, regionalisation of in-migration and out-migration trends was conducted at the district level. QGIS was used for cartographic visualisation.

To identify the year of a migration trend reversal (separately for the series of in-migration and out-migration), the non-parametric homogeneity test, the Pettitt test, was applied. This test detects the most likely point of structural change in the time series, without assuming the normality of the data distribution. If Pettitt's test identified a statistically significant point of change ($p < 0.05$), the year of a potential break in homogeneity (referred to as the change year) was determined.

This paper also examined differences between districts in Serbia based on migration trends, focusing on variables related to demographic and economic development. In this context, the Mann-Whitney test was used. This non-parametric test is appropriate for comparing groups without assuming normality of distribution (PALLANT 2007). Based on the theoretical framework and literature review, the Mann-Whitney tests in this paper were conducted using the data and indicators presented in Table 1. The selection of indicators was also determined by the availability of data at the district level. The Mann-Whitney test procedure in this paper builds on the results of the Mann-Kendall test. Specifically, the Mann-Whitney test involves two groups of districts:

- In-migration: districts with increasing and decreasing trends in in-migration.
- Out-migration: districts with increasing and decreasing trends in out-migration.

The Benjamini-Hochberg-Procedure (BH test) was used for reporting the p-values of all test indicators in two groups.

We used logistic regression as a basis for multivariate analysis in order to obtain information about statistically significant predictors in in-migration and out-migration models, while controlling for the GDP per capita, share of the population with higher education (Population aged ≥ 15) and the ageing index.

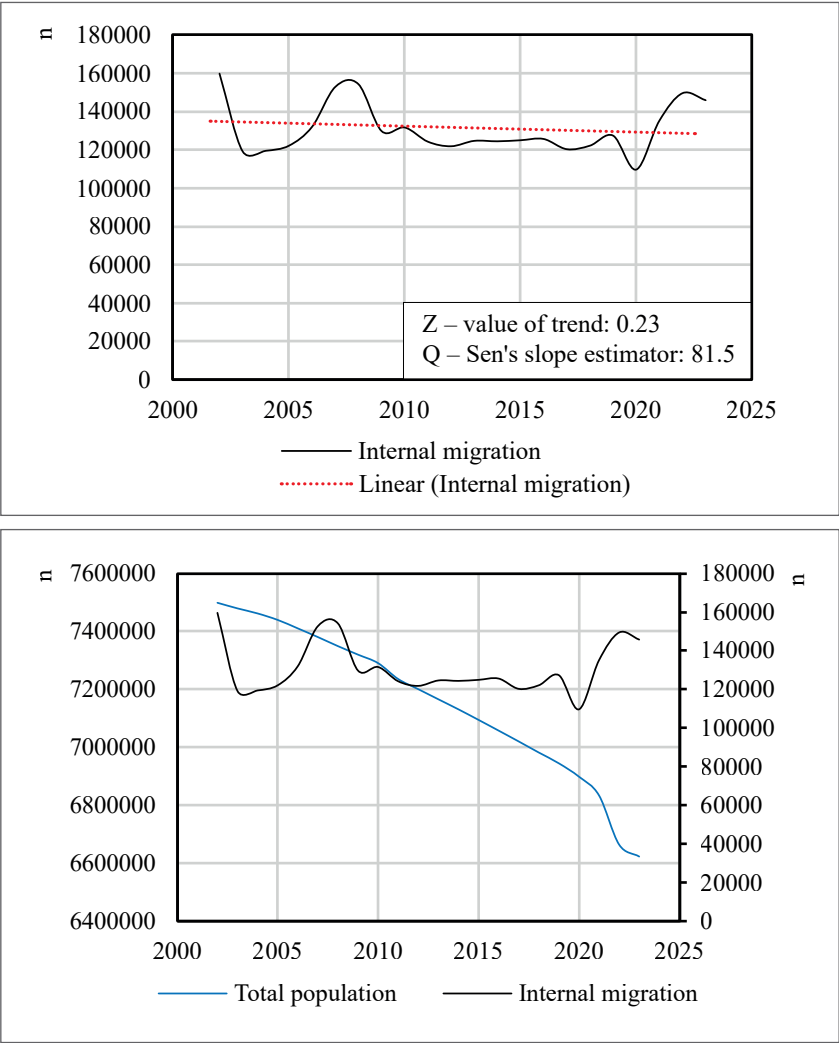
Number	Variable	Source
1.	<i>Population size</i>	Census Data Table: Total population, by settlements (Source: SORS 2024a)
2.	<i>Population density</i>	Census Data Table: Total population, by settlements (Source: SORS 2024a); Authors calculations
3.	<i>Urban population (% of total population)</i>	Census Data Table: Total population, by settlements (Source: SORS 2024a); Authors calculations
4.	<i>Ageing index</i>	Publication: Age and sex, Data by settlements (Source: SORS 2023b); Authors calculations
5.	<i>Share of the population with higher education (Population aged ≥ 15)</i>	Publication: Educational attainment, literacy and computer literacy, Data by municipalities and cities (Source: SORS 2023d)
6.	<i>Share of economically active population (Population aged ≥ 15)</i>	Census Data Table: Economically active population performing an occupation by employment status and sex by areas (Source: SORS 2024b); Authors calculations
7.	<i>GDP per capita</i>	Publication: Regional Gross Domestic Product, Regions and areas in Republic of Serbia (Source: SORS 2023c)
8.	<i>Average salary</i>	Publication: Municipalities and regions of the Republic of Serbia (Source: SORS 2024c)

Table 1: Variables included in the procedure for the Mann-Whitney test (own compilation)

4 Results

The analysis of the Mann-Kendall test shows a stagnant to slightly increasing trend with no statistical significance ($Z = 0.23$) in the dynamics of internal migration over the past 22 years (2002–2023) in Serbia. The value of the Sen's slope estimator ($Q = 81.5$) also indicates a slight positive change in the number of internal migrants on an annual basis during this period. In the observed period, 2002 is singled out as the year in which the largest number of inhabitants in Serbia changed their place of residence (159,685), while in 2020 the fewest internal relocations were recorded (109,747). The dynamics of internal migration in Serbia show different patterns compared to the total population trend, as Serbia's population has been steadily declining for decades (Figure 3).

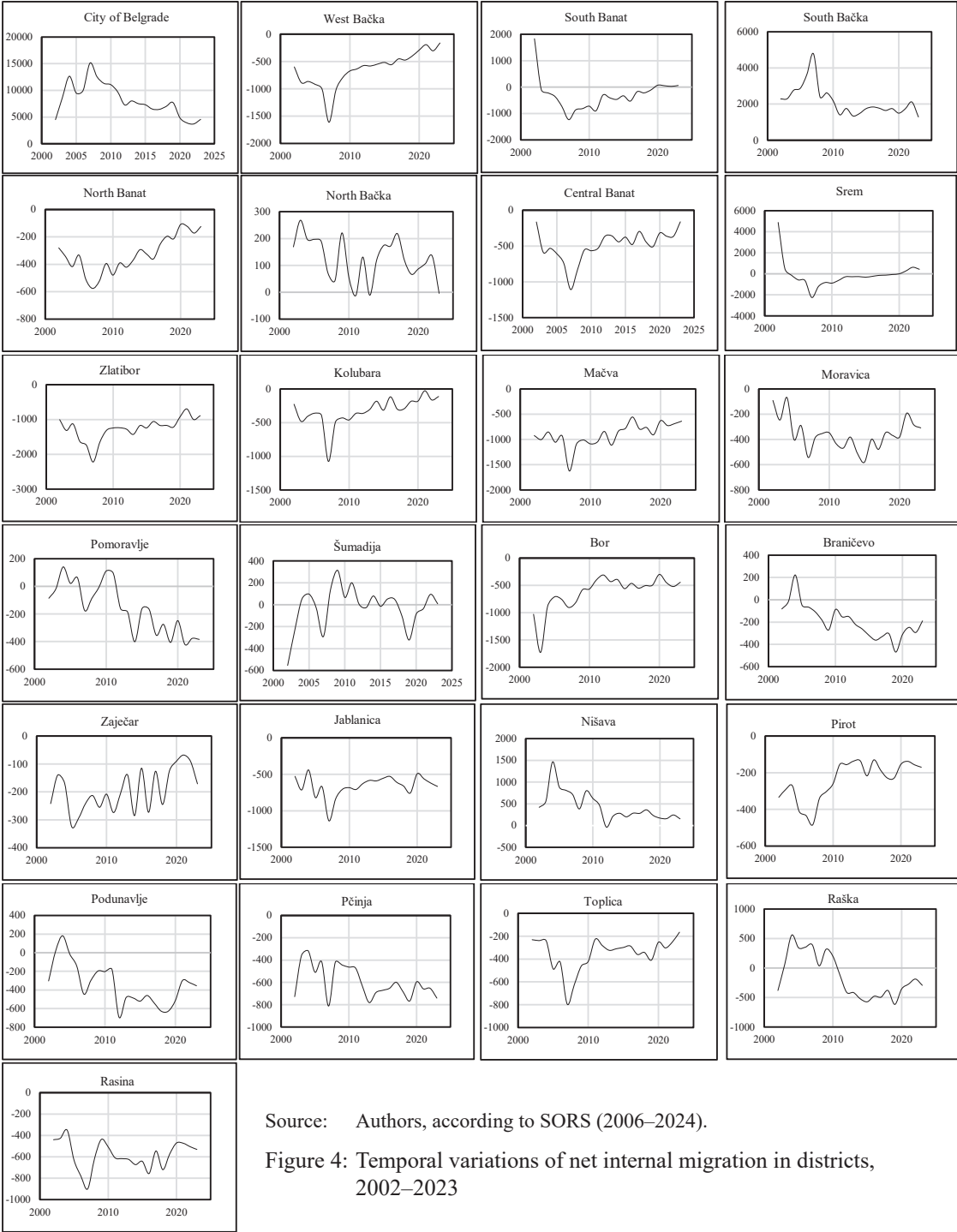
Temporal variations of the net internal migration at the district level revealed that most districts in Serbia were characterised by negative values in the period 2002–2023. The city of Belgrade and South Bačka are the only two regions characterised by positive values of the net internal migration throughout the period. In addition, in Nišava and North Bačka, positive values of the net internal migration were recorded in most years. In Šumadija



Source Authors, according to SORS (2006–2024).

Figure 3: Internal migration trend in Serbia; Results of Mann-Kendall test (a) and comparative review of temporal patterns of internal migration and total population, 2002–2023

district, the net migration value fluctuated during the period, with most years characterised by positive net migration. These are mainly the districts where the regional centres of Serbia are located: Belgrade (City of Belgrade), Novi Sad (South Bačka), Niš (Nišava), and Kragujevac (Šumadija), as well as Subotica (North Bačka), one of the largest cities in the country (by population) (Figure 4).



Source: Authors, according to SORS (2006–2024).

Figure 4: Temporal variations of net internal migration in districts, 2002–2023

Some districts experienced significant changes in net internal migration during this period, shifting from positive to negative or vice versa. In this respect, the South Banat should be mentioned, where the values of the net internal migration have changed from negative to positive from 2020. This change can be seen in light of the spatial proximity to the City of Belgrade and the slightly more favourable living conditions compared to Belgrade, which have contributed to in-migration values exceeding those of out-migration in recent years.

Earlier, LUKIĆ (2011) noted that economic development and a favourable geographic and transportation position relative to Belgrade make Pančevo, the largest town in the South Banat district, attractive to migrants. This pattern also applies to Srem, which shows similar trends as South Banat, and it is located geographically between the City of Belgrade and South Bačka.

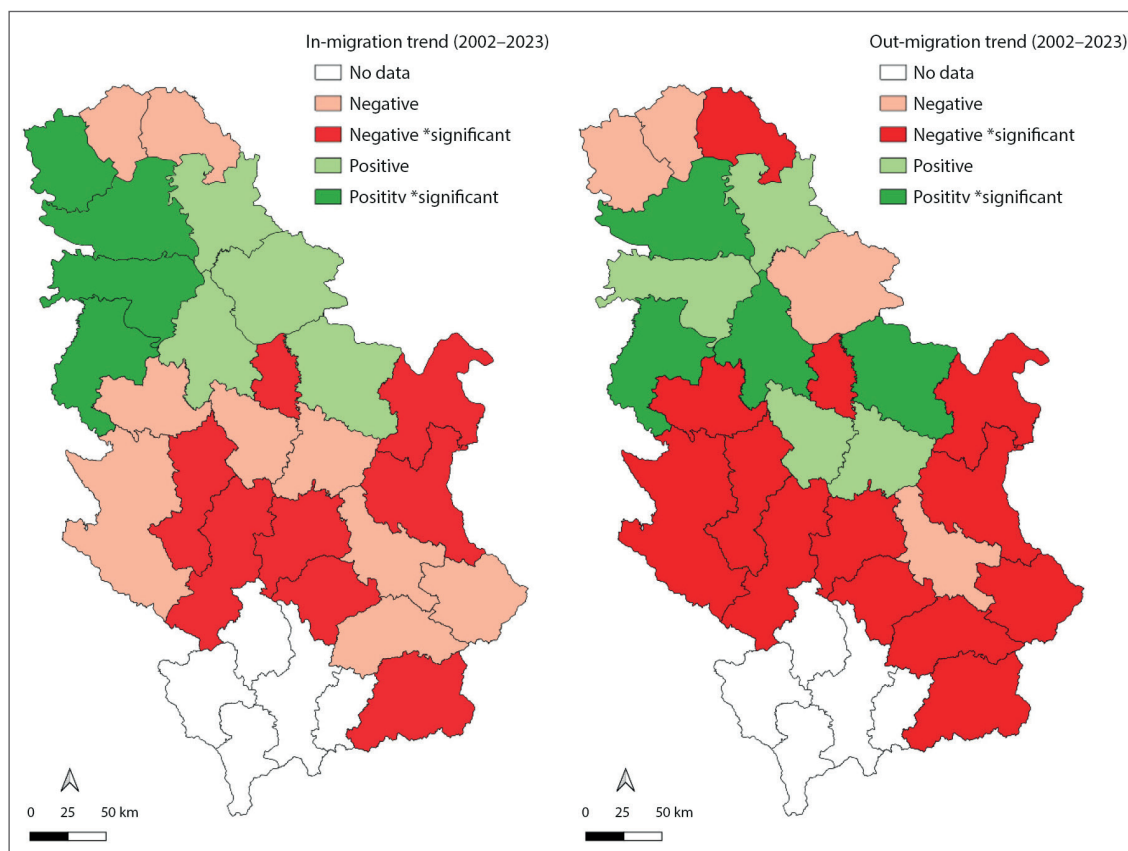
The opposite trend is observed in the Raška district, where the positive values of the net internal migration have turned into negative ones, from 2011. One of the possible reasons for this development is related to the fact that this district received a large number of displaced persons after the events in Kosovo and Metohija in 1999. The influx of displaced persons could have had an impact on the net internal migration in the initial years of the observed period. According to the latest data, Raška is, along with Belgrade, the district with the largest number of displaced persons from Kosovo and Metohija (KIRS 2023).

The results of the Mann-Kendall test show that there are apparent differences between districts in both in- and out-migration trends. Although there are certain deviations, it can be observed that positive trends in the domain of in- and out-migration are primarily characteristic of the northern part of the country, and negative trends the southern part.

Concerning in-migration, 17 districts had a negative or decreasing trend, while eight districts had a positive or increasing trend. Out of the 17 districts where a decreasing trend was recorded, in eight of them (Rasina, Raška, Toplica, Pčinja, Podunavlje, Zaječar, Bor and Moravica) the trend shows statistically significant values. A statistically significant increasing trend occurred in four districts: West Bačka, South Bačka, Srem and Mačva (Figure 5, left).

Out-migration trends also point to differences between districts in Serbia. The Mann-Kendall test reveals a decreasing trend of out-migration in 17 districts, of which in 13 (North Banat, Zlatibor, Kolubara, Moravica, Bor, Zaječar, Jablanica, Pirot, Podunavlje, Pčinja, Toplica, Raška and Rasina) a statistically significant decreasing trend was revealed. On the other side, an increasing trend was determined for eight districts, of which four (City of Belgrade, South Bačka, Mačva and Braničevo) had a statistically significant increasing trend (Figure 5, right).

A detailed analysis of the results of the Mann-Kendall test indicates that in the districts in which a statistically significant decreasing trend of in-migration was revealed, the highest intensity of decline was recorded in the Rasina district. Among the districts in which a statistically significant increasing trend of in-migration was established, slightly smaller variations in the intensity of the growth trend are present. The highest increase intensity was recorded in West Bačka, and the lowest in South Bačka (Table 2).



Source: Authors. Own calculation. Own design.

Figure 5: Spatial variations of annual in- and out-migration trends in the districts of Serbia 2002–2023, according to the results of the Mann-Kendall test

Concerning out-migration, the greatest intensity of decline is recorded in Zaječar and the smallest in Podunavlje. The greatest intensity of increase among the districts characterised by a statistically significant increasing trend of out-migration is seen in South Bačka, and the lowest intensity of growth is recorded in Mačva (Table 2).

The results of the Pettitt test identified a change year, i.e. a year of trend change, in some districts. Based on the analysis, it is evident that the changes predominantly occurred in 2009 and 2010, indicating that significant shifts in migration patterns primarily took place after the financial crisis (Table 2).

Starting from theoretical approaches and empirical conclusions systematically presented in Chapter 2: “Theoretical background and previous research”, the further analysis is based on determining the differences between the districts in terms of migration trends, accord-

District	In-migration					Out-migration				
	Z	trend	α	Q	CY	Z	trend	α	Q	CY
City of Belgrade	0.79	i	–	93.7	–	2.48	i	*	496	–
West Bačka	3.16	i	**	30	–	-0.62	d	–	-3.8	–
South Banat	0.90	i	–	13	–	-0.56	d	–	-10.7	–
South Bačka	2.09	i	*	106.8	–	4.34	i	***	163.2	–
North Banat	-0.23	d	–	-1.3	–	-2.37	d	*	-16.1	2010
North Bačka	-0.93	d	–	-7.3	–	-0.06	d	–	-1.1	–
Central Banat	1.02	i	–	12.6	–	0.01	i	–	-0.7	–
Srem	2.20	i	*	44.6	–	1.24	i	–	21.1	–
Zlatibor	-1.13	d	–	-42.9	–	-1.80	d	+	-56	2010
Kolubara	-0.68	d	–	-9.8	–	-2.85	d	**	-30.4	2009
Mačva	2.93	i	**	60.3	–	1.92	i	+	31.2	–
Moravica	-2.03	d	*	-39	2010	-1.75	d	+	-36.2	–
Pomoravlje	-0.79	d	–	-12.1	–	0.96	i	–	19.3	–
Šumadija	-0.34	d	–	-4.7	–	0.28	i	–	6.2	–
Bor	-2.65	d	**	-29.2	2008	-2.57	d	*	-59.9	2009
Braničevo	0.45	i	–	5.8	–	2.48	i	*	28.2	–
Zaječar	-3.27	d	**	-24	2010	-4.09	d	***	-27.2	–
Jablanica	-1.64	d	–	-23.4	–	-2.00	d	*	-22.4	–
Nišava	-1.64	d	–	-71.2	2010	-1.13	d	–	-27.7	–
Pirot	-0.56	d	–	-2.4	–	-2.20	d	*	-11	2009
Podunavlje	-3.21	d	**	-51.3	2010	-1.72	d	+	-12.3	–
Pčinja	-3.19	d	**	-63.9	2010	-2.71	d	**	-46.4	2010
Toplica	-3.19	d	**	-28	2010	-3.05	d	**	-29.8	2010
Raška	-3.16	d	**	-108.8	–	-2.43	d	*	-67.8	2012
Rasina	-3.50	d	***	-64.8	2010	-3.44	d	***	-60.9	–

Note: Z – value of trend; i – increasing trend, d – decreasing trend; α – level of significance; Q – Sen's slope estimator; CY – change year (Pettitt test)

Level of significance: *** = 0.001 (0.01 %); ** = 0.01 (1 %); * = 0.05 (5 %); + = 0.1 (10 %); – = level of significance higher than 0.1, i.e. does not indicate any significance in this parameter change

Source: Authors. Own calculation. Own compilation.

Table 2: Results of Mann-Kendall test and Pettitt test, district level, 2002–2023

ing demographic and socio-economic indicators. Based on the results of the Mann-Whitney test (Table 3), the following key conclusions can be drawn:

- Districts with an increasing in-migration trend show higher GDP per capita than those with a decreasing trend: Median “Increasing” = 676,000 vs. Median “Decreasing” = 554,000, two-sided Mann–Whitney $p = 0.0495$, effect size $r = 0.396$ (moderate).
- Districts with an increasing out-migration trend have larger population size than those with a decreasing out-migration trend: Median “Increasing” = 267,552.5 vs. Median “Decreasing” = 175,573, two-sided Mann–Whitney $p = 0.0495$, effect size $r = 0.396$ (moderate).

Other variables did not show statistically significant differences at the level of $p < 0.05$, but certain values (e.g. average salary and population density) are close to the signif-

Variable	Group	Median (Increasing)	Median (Decreasing)	p	r
Population size	In-migration	262,810	182,047	0.1398	0.303
	Out-migration	267,552.5	175,573	0.0495	0.396
Population density	In-migration	72.45	62.80	0.3440	0.198
	Out-migration	81.15	62.40	0.0858	0.350
Urban population (% of total population)	In-migration	54.00	54.60	0.7049	0.082
	Out-migration	58.65	53.20	0.7486	0.027
Ageing index	In-migration	157.65	164.25	0.4747	0.151
	Out-migration	123.29	170.99	0.7108	0.159
Share of population with higher education (Population aged ≥ 15)	In-migration	13.75	11.70	0.8383	0.102
	Out-migration	13.75	11.70	0.5997	0.010
Share of economically active population (Population aged ≥ 15)	In-migration	34.90	32.60	0.1898	0.268
	Out-migration	35.25	32.60	0.3078	0.210
GDP per capita	In-migration	676,000	554,000	0.0495	0.396
	Out-migration	586,000	554,000	0.1566	0.291
Average salary	In-migration	76,344	72,105	0.0571	0.384
	Out-migration	76,344	72,105	0.0975	0.338

Note: Two-sided Mann-Whitney test with normal approximation (ties handled by approximation). Effect size $r = |Z|/\sqrt{N}$ with tie correction computed from ranks. BH correction is applied across all 16 tests.

Source: Authors. Own calculation. Own compilation.

Table 3: Results of the Mann-Whitney test

ificance threshold and could indicate latent patterns that should be investigated further (Table 3).

We see from the Table 4 that population size remains a statistically significant predictor of an increasing trend in both the in-migration and out-migration models, when controlling for GDP per capita, education share, and ageing index. Confidence intervals are wide due to small sample size; therefore, we interpret this as exploratory evidence and report full OR/CI/p values.

Outcome	Predictor (z-score)	OR	95 % CI	p
Increasing in-migration	GDP per capita	1.7239	[0.4590, 6.4750]	0.4199
	Population size	6118.3058	[2.5933, 1.4435×107]	0.0278
	Share of the population with higher education (Population aged ≥15)	0.0254	[0.0006, 1.1491]	0.0590
	Ageing index	1.5265	[0.2123, 10.9776]	0.6743
Increasing out-migration	GDP per capita	0.8896	[0.2196, 3.6029]	0.8698
	Population size	3661.9186	[1.4025, 9.5611×106]	0.0409
	Share of the population with higher education (Population aged ≥15)	0.1230	[0.0074, 2.0341]	0.1432
	Ageing index	3.3043	[0.5122, 21.3167]	0.2089

Note: Predictors are standardised (one standard deviation [SD] increase). CI – confidence interval. Due to n=25 and group imbalance (8 vs. 17), OR estimates can be large and intervals wide. Results are interpreted as exploratory.

Source: Authors. Own calculation. Own compilation.

Table 4: Logistic regression with standardised predictors (odds ratios)

5 Discussion

Analysis of internal migration trends in Serbia in the period 2002–2023 shows that, at the national level, this process generally follows similar patterns each year, with some deviations. These deviations at the national level could be linked to global crises (e.g. financial crisis 2008; Covid-19 2020) that affected the patterns of socioeconomic development and had an evident impact on migration in Serbia as well, as confirmed by earlier research (ŠANTIĆ et al. 2021; LUKIĆ et al. 2022; LUKIĆ et al. 2023).

In most districts of Serbia, there are decreasing trends, both in-migration and out-migration, which is especially evident in the southern part of the country. The City

of Belgrade, in particular, plays a significant role in attracting internal migration, consistent with the findings of ROWE and PATIAS (2020), who emphasise the importance of capital cities in the internal migration process. This phenomenon is not a new finding, as previous research has also highlighted the role of regional centres as significant locations for internal migrants (e.g., KOKOTOVIĆ KANAZIR et al. 2016; SPASOVSKI and ŠANTIĆ 2016).

In addition to the City of Belgrade, the South Bačka region also stands out, showing positive migration trends. A detailed analysis indicates that the geographical proximity of Belgrade and the South Bačka district is a factor in the positive changes that occurred in the South Banat district and Srem during the observed period. On the other hand, districts like Rasina, Pčinja, Toplica, and Zaječar show specifically unfavourable trends. The values of Sen's slope estimator indicate a decrease in the intensity of migration in these areas.

Our findings indicate that GDP per capita and population size are particularly important in the process of internal migration. Accordingly, the findings align with earlier concepts emphasising the role of economic factors in shaping migration (LEE 1966; MASSEY et al. 1993) and support the gravity model. However, our results revealed that districts with an increasing out-migration trend have a larger population size than those with a decreasing out-migration trend, clearly indicating changes in internal migration flows. Considering the long-term decline in demographic potential in districts lacking regional centres, this finding is consistent with broader demographic trends and is therefore not unexpected. On the other side, contrary to some findings (ZAICEVA 2014; GONZALEZ-LEONARDO et al. 2022) that established a relationship between the age of the population and education, our research at the district level did not show a connection. However, we leave room for a deeper examination of this relationship in the future.

The results reveal patterns that are not visible at first glance, demonstrating that positive values do not necessarily indicate that the situation is entirely favourable, while negative values do not specifically indicate that the situation is completely unfavourable and unchangeable. By providing trend analysis results at both the national and district levels in Serbia, we believe our findings are relevant for further action, in line with individual development policies, as each district requires special attention. Here, we primarily refer to key aspects of economic and social development that should consider migration trends into account. Given the observed differences between districts, it is clear that more uniform regional development at the national level would promote balanced growth and provide more effective guidance for internal migration. This is especially relevant for districts in the southern parts of the country, which are characterised by particularly unfavourable trends.

The Economic Migration Strategy of the Republic of Serbia (2021–2027) emphasised the need for more efficient management of internal migration flows in Serbia and recognised the importance of investing in measures for balanced spatial development. Although the process is complex, with deep historical roots and no systematic resolution to date, the initiative represents a positive step toward more effective internal migration measures and sustainable development.

Although our work offers a different approach to researching internal migration in Serbia and combines various methods, we would like to emphasise that the findings of this study should be considered in light of certain limitations. As mentioned, the paper uses official data from the Statistical Office of the Republic of Serbia on internal migration; therefore, we consider these data relevant for researching internal migration processes. However, due to the unclear treatment of internally displaced persons from Kosovo and Metohija in migration statistics until 2012 (NIKITOVIĆ 2019), our results should be seen with these limitations in mind. Nevertheless, it does not diminish the overall contribution of the research, as our work provides valuable insights into broader trends, highlighting key patterns and relationships. Additionally, our paper offers perspectives on various possibilities for internal migration research and presents a methodological framework that has not yet been applied in internal migration research in Serbia.

6 Conclusion

In this paper, we examined the characteristics of internal migration trends at the national and district levels in Serbia, linking them to selected socioeconomic development indicators. By providing insight into district-level issues, the paper offers an opportunity to consider the findings for each district when developing future strategies. A special contribution of our work is that it offers insight into previously unexplored patterns of trend analysis in Serbia and provides a basis for future research.

Our future work will focus on research at lower territorial units, primarily at the municipal level and, if possible, at the settlement level. We recognise the importance of a longer time frame to observe the dynamics of the process through different stages, and in future research, we will seek to address this gap. Additionally, we intend to include other types of migration in our research. Applying trend analysis to multiple migration types over a specific period will enable a systematic approach to migration management. We recognise that limited data will make this more challenging. Nevertheless, we will attempt to address all types of mobility that can be traced using the given methodological framework.

Since this evidence indicates that the extent of internal migration could also be influenced by global crises, future research should involve experts in the field to examine more deeply the causes of socio-economic changes at the global level (LANGOVIĆ et al. 2025; SREĆKOVIĆ et al. 2017; SREĆKOVIĆ et al. 2021). We believe it is important to promote this research because it provides a more detailed overview of migration trends and supports timely action. We believe our work has contributed to consideration of this issue.

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