ABSTRACT: The aim of this paper was to present the main features of spatial redistribution of the population in the Belgrade region in the period from 1971 to 2011, by following the ratio between natural and migration components of population change in residential areas. The analysis was conducted using the modified Clarke’s model. According to the 2011 Census, the Belgrade region is inhabited by 1,659,440 residents living in 157 settlements. As the most developed part of Serbia, for a long time Belgrade has been the destination of the majority of those who changed their place of permanent residence within national boundaries. During the observed forty-year period, the immigration significance of certain settlements in Belgrade region changed in accordance with the socio-economic and demographic circumstances. This paper explores how the type of the population dynamics of settlements transformed, the most important changes and new problems that have arisen concerning the settlement structure in the Belgrade region.

KEYWORDS: Belgrade, population dynamics, migration, population growth, typology of population dynamics

The aim of the paper was to present main features of the spatial redistribution of the population within administratively defined boundaries of the Belgrade region, and how development policies, as well as some uncontrolled processes influenced the demographic restructuring of the city.

The main characteristic of demographic development of Belgrade in the late 20th century was constant and distinct population growth, which led
quickly to the formation of a particular demographic concentration pole in Serbia. Growth in Belgrade agglomeration was faster than increase in the population of Serbia, as disproportionality of regional development in Serbia and strong centralization of activities caused equally strong demographic centralization. Territory and population of Belgrade grew following the urban, functional, political and socio-economic development trends, as well as the cause and effect regularity of demographic development thus creating specific inter-agglomeration spatial structure of the population dynamics. Migration in Belgrade, and in case of large urban systems, exerted special influence on the growth and demographic development of the city, but the impact of this component was not equal at different periods and in different parts of Administrative Region of Belgrade. At this point, and with the aim of clarifying the process of territorial redistribution of the population, the authors monitored the changes of the main components of demographic growth of settlements (and municipalities) that are part of the Administrative Region of Belgrade. The last four intercensal periods were analyzed, i.e. from 1971, when Belgrade spread reaching the present boundaries of 3,222 km$^2$, which represents 3.6% of the total area of the Republic of Serbia.

The change in population of certain territorial entities of Belgrade was analyzed using Clarke’s model [1973] of population dynamics and distribution, modified by Friganovic [1990], i.e. based on the interrelationship and importance of natural and migration components of growth. Thus, two types (immigration and emigration) and eight subtypes of population dynamics were specified$^1$.

Given the specificity of the Belgrade region, its complexity and its role in the territorial organization of the Republic of Serbia as the largest urban agglomeration and complex functional system of urban and rural settlements, but also qualitative differences between urban and peri-urban areas, the analyzed territory was divided into three parts:

- Urban unit, consisting of parts of the city municipalities of Voždovac, Vračar, Zvezdara, Zemun, Novi Beograd, Palilula, Rakovica, Savski Venac, Stari Grad and Čukarica.

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$^1$ Emigration types:
- $E1$ Emigration: natural increase, census show population increase, the rate of natural increase is higher than the rate of increase specified by census
- $E2$ Depopulation: natural increase, census show population decrease, the rate of natural increase is higher than the rate of decrease specified by census
- $E3$ Excessive depopulation: natural increase, census show population decrease, the rate of natural increase is lower than the rate of decrease specified by census
- $E4$ “Dying out”: natural decrease, census show population decrease, the rate of natural decrease is lower than the rate of decrease specified by census

Immigration types:
- $I1$ Expansion by immigration: natural increase, census show population increase, the rate of natural increase is lower than the rate of increase specified by census
- $I2$ Regeneration by immigration: natural decrease, census show population increase, the rate of natural decrease is lower than the rate of increase specified by census
- $I3$ Weak regeneration by immigration: natural decrease, census show population increase, the rate of natural decrease is higher than the rate of increase specified by census
- $I4$ Very weak regeneration by immigration: natural decrease, census show population decrease, the rate of natural decrease is higher than the rate of decrease specified by census
• Peri-urban belt, which consists of other settlements of municipalities of Voždovac, Zemun, Palilula and Čukarica.
• Other urban municipalities, Barajevo, Grocka, Lazarevac, Mladenovac, Obrenovac and Sopot

CITY OF BELGRADE

Until the seventies of the 20th century the City of Belgrade had the dynamics of population growth in relation to the total territory of the City of Belgrade – the greatest period of growth were the sixties and population augmented per year for 24 thousand people. In those years, the inner-city area of Belgrade had the share of 90% in the total population growth in the city [Vojković and Devedžić 2010].

Subsequently, during the census period 1971–1981 there was a polarization of population dynamics, since 10 municipalities (or parts of municipalities) were marked by census as part of Belgrade, seven of them had concentrated population, while the city core consisting of Savski Venac, Stari Grad, and Vračar reported population decline. In the most urbanized and densely populated area of the city, depopulation process started when in other parts of city growth and population concentration were intense. This can be related to the conversion of residential area in a commercial, which in turn directly affected the reduction of demographic capacity of the settlements in question. The concentration of large number of functions in the central city core caused a growing need for commercial area which led to the inevitable transformation of residential buildings into commercial, given the limited space at disposal.

In the context of applied typology, strong polarization within the City of Belgrade was reflected in the existence of only two types of population dynamics: excessive depopulation in central municipalities and expansion by immigration in other parts of the settlement, when numerous post-war generations generated the majority of participants in relocation to the capital, particularly to some parts with industrial buildings. The next intercensal period brought greater diversification of the urban parts of the city by the type of population change. The main changes indicated the expansion of depopulation process, as the population decline was recorded in urban parts of the municipality of Palilula, as well as a slowdown in growth or stagnation in other municipalities. For the first time, some parts of the City of Belgrade, particularly the central urban core of the city, were marked with negative population change which is why Belgrade has the status of extinct territory in the observed typology, which is sort of terminological paradox, given the extreme urbanity and the importance of these parts of the city. Therefore, the observed spatial and demographic structure of large settlements such as Belgrade should be placed in the context of functional significance of individual urban units, which in some periods for residential purposes ceded administrative and commercial. It is

2 Although the municipality of Surčin was established in 2004, thus separating the 7 settlements from the municipality of Zemun, the analysis will be performed based on the former administrative division.
also to be related to the deployment of industry and immigration (dis)advantages affected by construction and price of the residential area. Natural decrease in the last decade of the 20th century (or very low positive balance) in most of the municipalities reflects the social crisis, postponement of childbearing, international emigration, and decline of the demographic reproductive potential and aging of population. As many as 6 municipalities in the urban region of Belgrade had decreased number of inhabitants both by natural decrease and migration. Territories of the City of Belgrade affected by depopulation are expending largely, and Stari Grad and Vračar have recorded minimum annual change in the population rate and rate of annual natural population change in the post WW II history.


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<td>Čukarica</td>
<td>17.67</td>
<td>14.81</td>
<td>10.84</td>
<td>7.31</td>
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Note: aPCR – annual population change rate, ANPCR – annual natural population change rate, TPD – type of population dynamics

Source: Census 2011 – Book 20, Database of Statistical Office of the Republic of Serbia

The beginning of the 21st century, introduced with the last inter-census interval, has been characterized by an unfavorable homogenization of natural population change, which is uniformly negative for the entire territory of the City of Belgrade, and the net migration has become the major modifier of the total population dynamics. Thus, the new morphology of polarization recognizes only two municipalities of emigration types (Savski Venac and Stari Grad) which have had that status during the 40 years of observations. Immigration in other municipalities no longer provides expansive growth, but only regeneration of varying intensity. For the first time since 1971, the natural loss of population in the municipality of Vračar is regenerated through immigration,
but not to an extent which is sufficient to counteract depopulation, which can be interpreted as the renewal of the residential funds and the period of intense demand for premises in this part of town, but also the exclusivity of the location which price the potential immigrants cannot afford. There is an interesting twist regarding the natural population change of this municipality which has taken a new position in the inter-settlement relations. Unlike the previous period, when its rate was among the lowest, the new rate values, although negative, are the highest among the municipalities of Belgrade (Table 1).

The transition from emigration subtypes of ‘dying out’ (total depopulation) to immigration type is evident in the municipalities of Novi Beograd, Palilula and Zvezdara, but only the last two are followed by increase of the total population. At the beginning of the 21st century Zvezdara had the highest regeneration by migration due to low prices of housing construction, which provided the highest population growth rate in Belgrade. Given that the population system of a large city is very sensitive and relatively quickly responds to functional changes in the environment, in terms of economic transition and devastation, spatial and demographic changes are usually caused only by a residential factor. It should be noted that the number of inhabitants is affected also by methodological changes. The concept of total population differs in the last three censuses, but the observed processes are evident, regardless of the changes.

PERI-URBAN BELT

Peri-urban belt comprises other parts of urban municipalities: Voždovac (4 settlements), Zemun (8 settlements), Palilula (7 settlements) and Čukarica (6 settlements), due to the fact that the municipalities of Vračar, Zvezdara, Novi Beograd, Savski Venac, Stari Grad and Rakovica are officially parts of the City of Belgrade (in the Census – Belgrade-part). Industrial development and construction of residential areas with a satellite character were launched by intense demographic changes of the peri-urban belt, which consequently had different directions, depending on the development policies of the City and direction of its expansion [Vojković and Devedžić 2010]. During the eighties, peri-urban belt even took the precedence in the dynamics of growth.

In the period 1971–1981, the intense concentration of population took place in the areas of municipality of Palilula, on the left bank of the Danube, which was in accordance with the policy of development of the City of Belgrade and strategic orientation of expansion of the city. Consequences of cancellation of the development policy became evident in the following ten years, when the decline in population was recorded in most areas across the Danube, caused by inadequate living conditions that characterized this area: high level of ground water, high humidity, poor connection to the city due to congestion on Pančevo bridge which is the only link of these settlements with the City, etc. In addition to unfavorable geographical conditions which in turn did not allow establishment of settlements in that area, the establishment of the Agricultural Conglomerate Belgrade (Poljoprivredni kombinat Beograd – PKB) occupied
Map 1. Types of population dynamics of the settlements in the Administrative Region of Belgrade

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<td><img src="image1.png" alt="Map 1971–1981" /></td>
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<td><img src="image3.png" alt="Map 1991–2002" /></td>
<td><img src="image4.png" alt="Map 2002–2011" /></td>
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a huge space which was used exclusively for the purpose of meeting the needs of this property [Živanovic 2008].

Another reason for the demographic discharge of these settlements can be found in the fact that, administratively speaking, this is a border area which is conditionally ‘handicapped’ for faster development. The development of a central settlement in this area in which the population and activities would be concentrated was disabled by the vicinity of Belgrade, on the one hand and Pančevo on the other. However, Borča and Krnjača recorded significantly different demographic development. These settlements, in terms of positive natural change, have, for decades, concentrated population and gradually grown together with Belgrade into an urban continuum. Krnjača is administratively attached to Belgrade, and Borča remained administratively separate settlement within Palilula. In the last inter-census period, increase of population continued but with a slightly negative rate of natural population change.

The concentration of population in the settlements along the direction Zemun-Batajnica-Nova Pazova was also noted. Areas around the Ibarska motorway are also characterized by the strengthening of demographic capacity. A number of ancillary buildings on this road which provided employment opportunities, good infrastructure connecting it with both the north and the south of the state, the proximity of Belgrade, etc. acted as the pull factors and caused demographic strengthening of the surrounding settlements.

The process of population concentration included wider area, or greater number of settlements in the municipalities of Čukarica, Zemun and Voždovac, which resulted in the formation of a group of settlements of immigrational character around these two roads. The character of demographic trends in these settlements is determined largely by migration component of population growth (net migration), while the natural component (natural population change) is less present and in most cases negative.

OTHER URBAN MUNICIPALITIES

Administrative region of Belgrade in 1972 expanded by merging six suburban municipalities: Barajevo, Grocka, Lazarevac, Mladenovac, Obrenovac and Sopot, which gained the status of urban settlements in 2005. Analysis of demographic trends and processes characteristic for this territory was conducted at levels of municipality and settlement.

In the early stages of post-war development of Belgrade, numerous settlements in its immediate hinterland and suburban municipalities were losing population due to the relocation of population to the City of Belgrade. However, more rapid growth of suburban municipalities began in the 1970s. Thus, the analysis of the population in the first two observed intercensal periods showed that all municipalities, in general, achieved the expansive growth of

3 Typical for all agricultural conglomerates is, on the one hand, to reserve a huge area for current use or for any subsequent expansion of existing facilities, or on the other hand to prevent any other use of land. This reduces the possibility of expansion of construction land or intensive formation of settlements in this part of the Belgrade area.
immigration. On the other hand, only the municipality of Sopot was characterized by natural loss of population, and the immigration was not sufficient to ensure the population increase (Table 2).

The municipal centers were generators of the urbanization process and they concentrated the population in terms of positive natural population change. Based on the population dynamics, the municipal, city and industrial headquarters were distinguished, as well as their suburban zones, from the rest of the settlement. For example, with the development of industrial activities in Obrenovac and Lazarevac, as the most significant energy resources in the country, and due to the proximity of Belgrade, the central settlement of these municipalities achieved expansive growth of immigration, since they became more attractive for immigration in comparison to all parts of the former Yugoslavia [Vojković et al. 2010]. This was particularly emphasized in the municipal center of Lazarevac in which, during the eighties, the population increased up to 68.6‰, while the surrounding area became deserted. Specifically, on the territory of Lazarevac, the extraterritorial effect of Mining energy complex Kolubara is evident. It gained land by expropriation and turned it into coal-pits which resulted in the displacement of the family owners of the land. Such a process often covers vast areas and leads to the disappearance of entire settlements. Developmental effects of this complex are not felt or expressed in the area of its immediate location, but its positive effects are evident at higher territorial levels. As these are capital-intensive plants, which require large investments in facilities, as well as in the production process, they require certain number of experts. Professional staff, as a rule, requires better living conditions, which are usually not located near their workplace, but in the immediate neighborhood.

However, population growth in the period 1981–1991 in most municipal centers was low, whereas in other settlements, demographic increase was more evident. This particularly referred to urban settlements of Mladenovac and Sopot, mainly due to their poor functional capacity which was unable to provide satisfactory social and economic needs of immigrants. Insufficient number of jobs, lack of propulsive economy, deindustrialization and privatization, few cultural educational institutions, underdeveloped service sector, underdeveloped transport that would make existing centers more accessible and encourage the emigration.

At the municipal level, the highest growth rate was achieved in the municipality of Grocka, and it owed this enormous growth to informal colony of Kaluđerica which was intensively expanding and grew together with Belgrade. Main traffic communications between Belgrade and Smederevo integrated this area and contributed to its attractiveness regarding settlement, and the concentration of population in settlements along the route. In the municipality of Obrenovac, the constructed part of the highway increased the gravitational power of the settlement around it and caused the concentration of population along the highway, while the south-west part of the municipality was demographically discharging.
During the last decade of the 20th century significant changes at the municipal level were recorded. Mladenovac was marked with the emigration subtype 'dying out', while in other municipalities immigration alleviated the effects of the below replacement level of reproduction, and/or still produced expansive growth (Table 2). At that time, population growth around Belgrade was significantly slowed down, a shift in the direction of immigration occurred, and almost 90% of the migration flow in those years was directed towards settlements of peri-urban ring and suburban municipalities [Vojković and Devedžić 2010]. Previously initiated process of redistribution of population in the suburban municipalities continued, the border settlements of municipal center became more attractive for settlement than the center, and one might even say that some municipalities (Mladenovac, Lazarevac and Sopot) entered a phase of suburbanization.

In the last analyzed period, similar to the situation in the City of Belgrade, all the observed municipalities recorded negative natural change at a very similar rate values (app. 5‰). Unlike in urban municipalities, the immigrant population in the suburban municipalities can provide population growth or it can at least ensure its stagnation by ‘covering’ the effects of biological de-population (Table 2). All municipalities have immigration character which is uneven though. Grocka and Barajevo still have the highest growth although slower in comparison to the previous period. However, in this period, number of settlements that are designated as E4- ’dying out’ by the applied methodology, is increasing (Map 1). Only the municipal centers and their immediate environment show higher values of tested indicators.

The observed period of four decades of demographic trends and population redistribution in Belgrade show that the city shifted from one level of polarization in the seventies to another level of polarization. During the first decade of the 21st century, in the spatial structure of the population dynamics
of AR Belgrade, the depopulation-emigration territory of three settlements in northern AR was outlined, as well as large southern territory of the same type with smaller areas of population growth. Polarization processes are obvious, since 'the central part' of Belgrade agglomeration is almost 'homogeneously attractive' for immigrants which is why most settlements are still in the demographic growth (Map 1). Unfavorable homogenization is reflected in the predominance of deaths over births. Thus, net migration has become the dominant component in defining the number of total population and type of change. Polarization of immigration and emigration settlements in the first observed period had similar territorial patterns, but the latest data shows weakening of the gravitational influence of the northern border of Belgrade, as well as reduction of immigration settlements from the south. In Belgrade, there are no more settlements with expansive growth, which guarantees only two positive components of population dynamics by the applied typology. On the other hand, all types of emigration settlements indicate that the emigrations are 'merged' with the negative biological component, which is the reason why depopulation is complete and revitalization opportunities are limited. Earlier factors of spatial distribution of population, such as industrialization and the construction of roads, lose their importance and give way to new factors, primarily investment in construction of residential areas.

REFERENCES

РЕЗИМЕ: Циљ рада је да укаже на основне карактеристике процеса просторног преразмештаја становништва београдског региона у периоду од 1971–2011. године, праћењем односа природне и миграционе компоненте промене броја становника по насељима. Анализа је урађена применом Кларковог модела. Београдски регион по Попису из 2011 године насељава 1.659.440 становника у оквиру 157 насеља. Посматране четири деценије демографских кретања и преразмештаја становништва у Београду, показују да је из једног нивоа поларизације седамдесетих година, град прешао у други ниво поларизације у последњем периоду. Током прве деценије 21. века у просторној структури динамике становништва АП Београда испрофилисала се депопулационо-емиграциона територија од три насеља на северу АП, као и већа јужна територија истог типа са мањим зонама популационог раста. Поларизациони процеси су очигледни јер је „средишњи део” београдске агломерације готово „хомогено атрактиван” за имигранте, због чега је већина насеља у њему још увек у демографском порасту (Карта 1). Неповољна хомогенизација се огледа у преваги умрлих над рођенима. Тако миграциони салдо постaje доминантна компонента у дефинисању броjностi укупног становништва и типа промене. Поларизација имиграционих и емиграционих насеља из првог посматраног периода има сличне територијалне обрасце, али највиши podаци покazuju слабљење гравитационог утицаја северног обода Београда, као и редуковање имиграционих насеља с југа. У Београду више не постоje насељa са експанзивним порастом, коју према примењеноj типологији гарантују само обe позитивне компоненте динамике становништва. Са друге стране, сва насељa емиграционог типа указују да су се исељавања „удружила” са негативном биолошком компонентом, због чега је депопулација потпуна a могућности ревитализације су ограничене.

КЉУЧНЕ РЕЧИ: Београд, популациони раст, миграције, типологија популационе динамике