SOCIO-DEMOGRAPHIC ANALYSIS OF BORDER REGIONS OF BOSNIA AND HERZEGOVINA

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Border river Drina near Zvornik.

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Socio-demographic analysis of border regions of Bosnia and Herzegovina

ABSTRACT: This paper analyses the statistical parameters that give a comprehensive overview of the socio-demographic state of the border areas of Bosnia and Herzegovina, and it represents a novel attempt to examine the disparity and relationships between central and peripheral parts of national territory. The methodology is based on examining the differences between border and non-border municipalities/cities according to four groups of indicators, to obtain four indices: depopulation, natural change, ageing and education. Statistically significant differences were found primarily in the context of population age structure, and it can be concluded that the ageing process has affected bordering regions more than the rest of the country.

KEY WORDS: border regions, Bosnia and Herzegovina, socio-demographic analysis, depopulation, natural change, ageing, education

Družbeno-demografska analiza obmejnih regij Bosne in Hercegovine

POVZETEK: Članek analizira statistične parametre, ki dajejo celovit pregled družbeno-demografskega stanja obmejnih območij Bosne in Hercegovine. Proučili smo neskladja in razmerja med osrednjimi in obmejnimi deli državnega ozemlja. Metodologija temelji na proučevanju razlik med obmejnimi in ostalimi občinami/mesti po štirih skupinah kazalnikov: depopulacija, naravni prirast, staranje prebivalstva in izobrazba. Statistično značilne razlike so bile ugotovljene predvsem v okviru starostne strukture prebivalstva, iz katerih lahko sklepamo, da je proces staranja bolj prizadel obmejne regije kot ostalo državo.

KLJUČNE BESEDE: mejne regije, Bosna in Hercegovina, družbeno-demografska analiza, depopulacija, naravne spremembe, staranje, izobrazba

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1 Introduction

Though geography as a science plays a pioneer role in the study of borders (Konrad 2015), modern borders are studied by a wide range of scientific disciplines, including anthropology, sociology, political science, psychology, law, ethnology and many others, all incorporated in new scientific discipline – border studies (Newman and Passi 1998; Amilhat Szary 2015). It is difficult to give a singular definition of a border, particularly since its function was equated exclusively with the geographical and sociological aspect for so long, with emphasis on the clear distinction between them (Newman 2003). Borders are a multi-significant institution that launches the process of transformation of space (Rumford 2006), not only in the administrative and political sense, but also in the economy, culture and society (Haselsberger 2014). In trying to seek out a single theoretical framework for border studies, many authors emphasize importance and significance of their spatial implications (Donnan and Wilson 1999; van Houtum 2000; Newman 2003; Paasi 2005). Amilhat Szary (2015) also points to the importance of placing emphasis on contemporary research on cross-border processes and socio-spatial issues in border regions. Klemenčić (2005) emphasizes the necessity of modernizing the geographical approach in border studies, which also implies the need for their analysis at the local level.

Perception of borders is critical in its spatial aspect. In listing four key approaches to the study of borders, Nail (2016) asserts that they cannot be isolated and considered separately from the bordering regions, particularly since they are usually drawn between different social and cultural groups. In light of the above, Axelsson (2013) states that the geographic interpretation of border function is mostly based on the spatial aspect, that is particularly pronounced in the border studies. According to Zorko and Šulc (2012), the term »borderland«, as a concept that pertains to the regions along state borders, appears as part of the globalization trends, as the evolution of the theory of state, territory and borders from the modern understanding to the post-modern, in the sense of an erosion of sovereignty, deterritorialization and globalization.

When examining national peripheries, as borderlands are often considered (not only in the geographic, but also in the developmental sense), a multidisciplinary approach is required. According to Anđelković-Stoilković, Devedžić and Vojković (2018), the initial approach is spatial, in which three aspects can be differentiated: causal, consequential and cause-and-effect. This concept is also applied in examining the periphery in the European Union (House 1980; Newman 2006).

Most studies examining the issue of border areas focus on the variety of development issues that these regions face, which justifies the premise that they (e.g., municipalities along the state border) are the periphery in the national context (van Houtum, 2000; van Geenhuizen and Rietveld 2002). Often, border areas are qualified as economically, socially and demographically lagging behind, particularly due to strong national centralism (House 1980; van Houtum 2000). The centre often resembles a concentration of economic activities, capital and decision-making power with great opportunities for development, while the periphery is considered a region of limited resources and small opportunities for innovation, resulting in socio-economic lagging or slower growth (Koči-Pavlaković 1996), although there are certain exceptional cases (Johnson 2009).

Borderlands research in Southeast Europe (e.g., in Serbia and Croatia) has applied a range of methodological approaches to confirm the hypothesis of border regions as economically, socially and demographically marginalized parts of the national territory (Popović and Radeljak 2011; Zorko 2012; Pejnović and Kordej-De Villa 2015; Vukmirović et al. 2016). In comparing the socio-economic indicators of border regions with the national average and examining the standard of living in these areas (Máliková et al. 2015; Đerčan et al. 2016), determining the incidence of demographic issues (Zupanc 2018; Anđelković-Stoilković 2019) and analyzing borderlands in the context of national security (Vukmirović et al. 2016), multiple authors have concluded that border regions are observed through the paradigm of spatial polarization due to the disparity in the levels of development between the center and periphery.

The study of borderlands and contextualization of social relations and processes within them are highly dependent on political circumstances (van Geenhuizen and Rietveld 2002), and that is the aspect where the case of Bosnia and Herzegovina is of special research interest. This is particularly reflected in the highly complex internal administrative division, regional disparities, weakened connections across internal territorial faults, as well as general political instability (Raos 2010; Reményi, Végh and Pap 2016; Avdić et al. 2022). Considering its overall socio-political situation through the prism of recent disintegration processes with emphasized internal specificities requires a different way of observing Bosnia and Herzegovina's

border regions, in relation to other borderlands. These processes influenced the character of Bosnia and Herzegovina border, which has a great political, historical and cultural relevance. On the other side, it is also worth of considering the impact of European Union borders, which can affect population stability in the adjacent regions, as indicated by Havlíček and Matušková (2002). An insight into their socio-demographic situation, which is the most susceptible to abovementioned influences, could indicate the existence of specificities, or even anomalies in already existing paradigms (Bryant 2004; Đerčan et. al. 2016; Anđelković-Stoilković 2019). Máliková et al. (2015) suggested that it would be interesting to follow the development of social indicators on the opposite side of external border of European Union, such as borderlands of Serbia and Bosnia and Herzegovina.

The border regions of Bosnia and Herzegovina have been relatively poorly studied, and have not frequently been the topic of scientific research, particularly in the context of demographic and socioeconomic development. Most papers on the topic examine the legal dimension, in terms of disputed segments and issues of verifying state borders with neighboring countries, and their historical and geographic development (Halilović and Suljić 2016; Spahić 2017). Osmanković (2008) examined the issue of cross-border cooperation in the context of economic development. Though borders were not the primary focus, they were mentioned in a paper on regional development and disparity, which emphasized the economic implications of the peripheral nature of certain border regions (Nurković 2006). However, to date, there have been no recent scientific or professional analysis of the borderlands in Bosnia and Herzegovina and their socio-demographic development. For that purpose, the task of this paper is to define the border areas of Bosnia and Herzegovina and to investigate the socio-demographic dimension of the level of its peripheral nature in order to add perspective of one highly complex and decentralized country to the theoretical framework of borderlands study.

2 Definition of borderlands of Bosnia and Herzegovina

Bosnia and Herzegovina is a nearly completely landlocked country, with only 24 kilometers of coastline in the sector of Neum and Klek, and a 13 kilometer long maritime border. The remainder of its state border (over 99%) is terrestrial, with 774 kilometers as land borders (primarily mountainous) and 751 kilometers as river borders (Lepirica 2009). Bosnia and Herzegovina borders Croatia to the north, west and south, while Serbia and Montenegro are located to the east. There are several standing border disputes with Croatia and Serbia (Halilović and Suljić 2016).

Delimitation methods for borderlands are often based on administrative criteria, encompassing the municipalities or regions along state borders. This principle is widely used, particularly in geographic research (Zupanc 2018; Anđelković-Stoilković 2019), because of the availability of statistical data, but there are also range of other criteria (Jeřábek et al. 2004; Bufon 2007; Nejašmić 2008; Máliková et al. 2015).

The border regions of Bosnia and Herzegovina are not uniformly defined spatially, neither in the formal nor in the scientific sense. The Act on Border Control uses the term »border zone« that encompasses the area from the state border to a depth of 10 kilometers, while the »Agreement between Bosnia and Herzegovina and the Republic of Croatia on border transport and cooperation« defined the border zone as an area to a depth of 5 kilometers from the shared border. A borderland buffer zone of a 10-kilometre width would partly encompass the territory of 59 municipalities or cities in Bosnia and Herzegovina. However, in many cases, this is only a small and virtually negligible part of the territory, which effectively does not give those local self-government units the true properties of a border area. For that reason, in this study, we have instead opted to apply an administrative criterion and to include in the border zone only those municipalities or cities that physically touch upon the state border (a total of 37). The majority of these local administrative units lies along border with Croatia (26 in total: Ravno, Neum, Čapljina, Ljubuški, Grude, Posušje, Tomislavgrad, Livno, Bosansko Grahovo, Bihać, Cazin, Velika Kladuša, Bužim, Bosanska Krupa, Novi Grad, Kostajnica, Kozarska Dubica, Gradiška, Srbac, Derventa, Brod, Odžak, Šamac, Domaljevac-Šamac, Orašje and Brčko). There are six border municipalities and cities bordering with Serbia (Bijeljina, Zvornik, Bratunac, Srebrenica, Višegrad and Rudo), and five with Montenegro (Čajniče, Foča, Gacko, Bileća and Trebinje). The remaining 105 local administrative units in Bosnia and Herzegovina are treated as the inland (non-border) zone, with the remark that one additional municipality (Stanari) was established since the last census. However, due to incomplete statistical data, that territory is here considered a part of the city of Doboj.

3 Methodology

Wide spectrum of demographic, economic and social criteria is used by various authors on the topic of borderlands development (Topaloglou et al. 2005; Máliková et al. 2015; Anđelković-Stoilković et al. 2018). This socio-demographic study is based on the official data from the 2013 census of Bosnia and Herzegovina, published by the Agency for Statistics of Bosnia and Herzegovina, and the vital statistics data for the five-year pre-pandemic period (2015–2019) released by both the national and entities statistics agencies. A total of 11 available numerical indicators were considered and classified into four groups: depopulation (population density and the population change index between the last two censuses in 1991 and 2013), natural change (birth and death rates, as well as calculated average of the vital index in the period 2015–2019), ageing (share of population under 15 years and over 65 years, as well as average age in 2013), and education (share of illiterate, computer literate and highly educated population in 2013). In order to obtain insight into whether there are evident differences between the Bosnia and Herzegovina bordering zones and interior of the country, all the above parameters were compared using descriptive statistics at the level of bordering vs non-bordering local administrative units (municipalities/cities), and the national average.

In the next phase of the methodological approach, the national average was calculated for each parameter and the values of all parameters placed on a scale where the national average has a value of 100. The following formula was used:

$$\text{SPI} = \frac{X_{m/c}}{X_{nat}} * 100;$$

where SPI is the simple parameter index of the municipality/city, is the value of the parameter for that municipality/city, and is the value of the parameter at the national level. For parameters where a higher numerical value indicates a poorer result (death rate, share of old population, average age and illiteracy rate), this formula was corrected using the inverse values of the parameters:

$$\text{SPI} = \frac{1/X_{m/c}}{1/X_{nat}} * 100.$$

Following this, a composite index was calculated for each group of parameters: depopulation index (DI), natural change index (NCI), ageing index (AI) and education index (EI), whose systematic numerical components give a uniform weighting. This in essence means that these composite indices are the arithmetic means of the included simple parameter indices.

To more precisely determine the statistical difference in these groups of parameters between border and non-border areas, inferential statistics methods were used; the t-test and chi-square test, with a standard level of significance of the p-value ($\alpha = 0.05$). These new values are used as variables in the t-test, in which states that there are no significant differences between the bordering and non-bordering municipalities/cities. For the purpose of chi-square test, municipalities with a composite index of less than 100 were categorized as less than national average, while those higher than 100 as above national average, and therefore these two categories served as the test variable. In this case, was the same as for the t-test. Considering that, unlike the t-test, non-parametric chi-square test eliminates the effect of standard deviation, which is very pronounced in some indicators, the parallel use of both of these methods has the function of drawing stronger conclusions about the (non)existence of statistically significant differences between bordering and non-bordering municipalities/cities, as well as easier detection of eventual anomalies and data distortion outliers.

In order to get a more comprehensive picture of socio-demographic development of Bosnia and Herzegovina's borderlands, in the final methodological phase a simple method of municipalities/cities classification is designed. By combining the four composite indices, all the local administrative units in Bosnia and Herzegovina were classified into five categories, with the focus on the bordering municipalities/cities. The first category contains the municipalities and cities with the most favorable socio-demographic characteristics, i.e., those in which all four composite indices had above average values in relation to the national level. The second category includes municipalities/cities with three out of four above-average indices; the municipalities/cities in the third category has two out of four above average indices, while the fourth one is characterized by only one above average composite index. The fifth category contains those municipalities/cities where all the composite indices were below the national average. Although these categories do not

represent statistically or spatially profound clusters, this kind of classification can be considered useful in order to address basic level of socio-demographic disparities in the studied regions in combination with cartographic choropleth method.

4 Results

In examining the average values of the selected socio-demographic indicators (Table 1), it can be concluded that the borderlands of Bosnia and Herzegovina have less favorable parameters in relation to the non-border areas in 9 out of 11 cases – the exemptions are population change index and percentage of young population. However, in order to obtain clearer conclusions on the significance of differences between border and non-border regions, below we present the results of the inferential analysis (Table 2 for t-test; Table 3 for chi-square test) that is based on the values of the selected parameters for each individual municipality or city.

The lack of significant differences in the population change index for the period 1991–2013 between the border and non-border areas in Bosnia and Herzegovina was confirmed through both inferential methods. This in particular refers to the parametric t-test method, which is based on a comparison of mean SPI for two categories municipality/city, t ametric chi-square test, χ^2 (1, N = 142) = 1.7, p = 0.193, since it

Table 1: Average values of selected socio-demographic indicators for border and non-border regions of Bosnia and Herzegovina.

Selected variables	Bordering municipalities	Non-bordering municipalities	National average	Standard deviation (national level)
Population change index	81	80	81	29
Population density (people per km^2)	57	75	69	594
Birth rate 2015-19 (‰)	7.3	8.6	8.2	2.9
Death rate 2015-19 (‰)	11.3	11.1	11.1	4.5
Vital index 2015-19	0.64	0.78	0.74	0.32
Young population (%)	15.5	15.4	15.4	2.6
Old population (%)	14.9	14.0	14.2	5.5
Average age	39.8	39.4	39.5	3.5
Highly-educated population (%)	8.0	10.1	9.6	4.4
Computer literacy (%)	29.1	34.,0	32.6	7.4
Illiteracy rate (%)	2.84	2.81	2.81	2.8

Table 2: Mean simple parameter indices of socio-demographic indicators for bordering and non-bordering municipalities/cities with t-test results.

Selected variables	Bordering municipalities	Non-bordering municipalities	t	p
Population change index (mean SPI)	102	97	0.7	0.517
Population density (mean SPI)	101	282	−1.8	0.068
DEPOPULATION INDEKS	102	190	−1.8	0.077
Birth rate 2015-19 (mean SPI)	73	90	−2.2	0.005
Death rate 2015-19 (mean SPI)	199	98	1.5	0.221
Vital index 2015-19 (mean SPI)	76	87	−1.7	0.098
NATURAL CHANGE INDEKS	116	92	0.0	0.973
Young population (mean SPI)	96	96	0.2	0.853
Old population (mean SPI)	84	84	−4.0	0.000
Average age (mean SPI)	95	95	−3.4	0.001
AGEING INDEX	91	91	−3.1	0.002
Highly-educated population (mean SPI)	85	78	0.9	0.377
Computer literacy (mean SPI)	80	79	0.3	0.790
Illiteracy rate (mean SPI)	121	100	2.0	0.050
EDUCATION INDEX	95	86	1.5	0.131

shows that a larger number of municipalities/cities higher than the national average than expected were located in the border zone in comparison to inland regions, which is contrary to the assumption that the border zones are exposed to greater depopulation. On the other hand, the high standard deviation affected the higher SPI for population density. However, for this parameter the t-test again did not reveal a statistically significant difference, even though the value came close to significant level, tvery low level of significance, χ^2 (1, N = 142) = 0.1, p = 0.719. Very similar inferential indices were also obtained for the depopulation index (DI), as a composite parameter, tlculations, the general conclusion is that no significant differences were found between the border and non-border zones in Bosnia and Herzegovina in the context of depopulation.

The absence of a significant difference in this context indicates that 46% of the border municipalities/cities have above average value of the depopulation index, which is nearly identical to the ratio for the total number of local administrative units in Bosnia and Herzegovina. The abovementioned municipalities/cities in the border region mostly clustered into three regions: Herzegovina, Bosanska Krajina and Northeast Bosnia. In judging by the values of the depopulation index (DI), a particularly favorable situation was seen in four local administrative units: Cazin (DI = 199), Bužim (DI = 179), Brčko (DI = 181) and Bijeljina (DI = 175). On the other hand, the highest level of depopulation was seen in Bosansko Grahovo in the west and Srebrenica in the east, which have lost more than half of their pre-war population, mostly as war fatalities (or genocide in the case of Srebrenica) and migration. The population of Eastern Bosnia is generally characterized by very unfavorable depopulation parameters.

Concerning the natural change index (NCI) for the period 2015–2019, the component parameters considered were birth rate, death rate and vital index. Since the first two parameters are calculated as the value per 1000 inhabitants on the basis of the number of those born and died, and the assessment of the population in the given years, the vital index is used as a means to control any estimating errors. While the birth rate was found to differ with strong statistical significance between the border and non-border municipalities/cities in favor of the latter, both in parametric, t(71) = −2.2, p = 0.005, and non-parametric tests, χ^2 (1, N = 142) = 9.0, p = 0.003, no significant differences were found for the death rate, t(42) = 1.5, p = 0.221; χ^2 (1, N = 142) = 0.1, p = 0.783. To better illustrate this contrast, those municipalities/cities that were above the national average for natality comprise just 16% of the bordering local administrative units, while above average mortality was seen in 46% of them. The obtained inferential values for the vital index gave mixed results. The non-parametric chi-square method showed that there is a statistically significant difference in favor of non-border areas, χ^2 (1, N = 142) = 6.0, p = 0.015, while the t-test did not give a significant result. These results indicate the evident distortion of data in just a few specific municipalities.

Table 3: Chi-square test results for above and below average socio-demographic indicators values in bordering and non-bordering municipalities/cities of Bosnia and Herzegovina.

Selected variables	Bordering municipalities		Non-bordering municipalities		χ^2	p
	Above average	Below average	Above average	Below average		
Population change index (mean SPI)	19	18	41	64	1.7	0.193
Population density (mean SPI)	16	21	49	56	0.1	0.719
DEPOPULATION INDEX	17	20	50	55	0.0	0.861
Birth rate 2015-19 (mean SPI)	6	31	45	60	9.0	0.003
Death rate 2015-19 (mean SPI)	17	20	51	54	0.1	0.783
Vital index 2015-19 (mean SPI)	6	31	39	66	6.0	0.014
NATURAL CHANGE INDEX	9	28	42	63	8.9	0.003
Young population (mean SPI)	14	23	42	63	0.1	0.817
Old population (mean SPI)	8	29	56	49	11.1	0.001
Average age (mean SPI)	9	28	57	48	9.9	0.002
AGEING INDEX	8	31	54	51	9.9	0.002
Highly-educated population (mean SPI)	11	26	20	85	1.8	0.176
Computer literacy (mean SPI)	2	35	14	91	1.7	0.190
Illiteracy rate (mean SPI)	22	15	38	67	6.1	0.014
EDUCATION INDEX	13	24	22	83	3.0	0.085

The same factor also explains the highly unusual values of the natural change index and the very discrepant significance levels obtained by both tests, t (42) = 0.0, p = 0.973; χ^2 (1, N = 142) = 8.9, p = 0.003.

The above average values of the natural change index (NCI) were confirmed in 27% of bordering local administrative units. Among them, no significant evidence of clustering was detected, with the exception of Bužim (NCI = 159), Velika Kladuša (NCI = 134) and Cazin (NCI = 110) in the Krajina region, where these parameters again have a visible higher value than the national average. Due to the seemingly low death rate, the sparsely populated municipality of Ravno in the Herzegovina region has unreasonably high natural change index (NCI = 563). In the negative context, Bosansko Grahovo was again in first place (NCI = 40), and it should be stated that virtually the entire northern border region showed below average values of this parameter, even though it is not a sparsely populated area. The eastern borderlands were found to be relatively heterogeneous for this index.

The overall ageing index (AI) showed a statistically significant difference between border and non-border municipalities/cities, t(72) = –3.1, p = 0.002; χ^2 (1, N = 142) = 9.9, p = 0.002. This primarily pertains to the ratio of the elderly population (above 65 years) and average age. Though at first glance these indicators do not appear to be so different between the border and non-border areas as a whole (Table 1), when viewed in relation to the local administrative units, these differences achieve a very high level of significance, both in the parametric, t(82) = –4.0, p = 0.000; t(69) = –3,4, p = 0.001, and non-parametric tests, χ^2 (1, N = 142) = 11.1, p = 0.001; χ^2 (1, N = 142) = 9.9, p = 0.002. This leads to the clear conclusion that bordering municipalities/cities have a significantly higher share of the older population and a significantly higher average age of the overall population in comparison to non-border areas. However, there is a high similarity between regions in the share of the young population (under 15 years), which was nearly the same in both groups of municipalities/cities, t(60) = 0.2, p = 0.853; χ^2 (1, N = 142) = 0.1, p = 0.817.

Only eight bordering municipalities (22%) had an above average value of the ageing index (AI), while all others showed an unfavorable age structure of the population (higher degree of general ageing) in relation to the national average. The most favorable findings (generally the youngest populations) were as expected in four local administrative units in the Krajina region: Bužim (AI = 174), Cazin (AI = 128), Velika Kladuša (AI = 123) and Bosanska Krupa (AI = 118). A relative surprise in this category were four municipalities/cities in Republika Srpska (Gradiška, Srebrenica, Gacko and Bileća) since all but the first are situated in the depopulation hit eastern part of the country. Bosansko Grahovo is the western municipality with the least favorable population age structure (AI = 50), followed by Ravno in the south, Kozarska Dubica in the north, as well as Rudo and Čajniče in the east.

The results regarding education index (EI) revealed some surprising and contradictory trends. No statistically significant differences were found between border and non-border municipalities/cities for the share of highly educated population. However, it was surprising to see that the mean SPI was higher in the border than the non-border zone, despite the location of the most important university centers inland, and that nearly one-third (31%) of border municipalities/cities were above the national average for this indicator, as opposed to less than one-fifth (19%) of non-border local administrative units. For computer literacy, a massive difference was detected between the large urban centers and small rural areas, and only two border cities (6%) had an above average number of computer literate people. However, these differences were not found to be statistically significant, particularly with the t-test, t(116) = 0.3, p = 0.790. Statistical significance was only found in the difference of general illiteracy rates, in favor of the border areas. An above average SPI for literacy was found in 59% of border and only 36% of non-border municipalities/cities. Both parametric, t(69) = 2.0, p = 0.050, and non-parametric tests, χ^2 (1, N = 142) = 6.1, p = 0.014, showed that the differences between these two groups of local administrative units were statistically significant.

In terms of the regional differences in the education structure of the borderland population of Bosnia and Herzegovina, there is a prominent disparity between north and south. Namely, all the municipalities and cities of the borderlands in the Herzegovina region had an above average education index, while nearly the entire Podrinje region (with the exception of Foča) in the east, Posavina region (with the exception of Orašje) in the north, and Krajina region (with the exception of Bihać) showed a below average value of this parameter. Trebinje, as the main urban centre of the Eastern Herzegovina region stood out the most for this index (EI = 186). It is interesting that the spatial pattern in this case is completely opposite to the parameters describing depopulation. An explanation of this phenomenon can be sought in the negative correlation with the share of the agricultural population.

By combining the four composite indices, all the local administrative units in Bosnia and Herzegovina were classified into five categories, with the focus on the bordering municipalities/cities (Figure 1). The first category contains the municipalities and cities with the most favorable socio-demographic characteristics, i.e., those in which all four composite indices had above average values in relation to the national level. The fifth category contains all those municipalities/cities where all the composite indices were below the national average. At the national level, only eight municipalities/cities could be categorized in the first group, and out of these, four are found in the Sarajevo Canton and none lie within the border area. The second category contains five bordering municipalities/cities, with three in the Krajina region (Cazin, Velika Kladuša and Bužim) and two in the Hercegovina region (Posušje and Ravno). The third category contains eight municipalities/cities, with five in the Herzegovina region (Čapljina, Ljubuški, Grude, Trebinje and Gacko), and three in the Northeast Bosnia region (Brčko, Orašje and Zvornik). The fourth category included the largest number of border municipalities/cities, with a total of 17: Bihać, Bosanska Krupa, Kostajnica, Gradiška, Srbac, Odžak, Šamac, Domaljevac-Šamac, Bijeljina, Bratunac, Srebrenica, Višegrad, Foča, Bileća,

Categories of socio–demographic indicators:
- II – generally favourable
- III – medium favourable
- IV – less favourable
- V – the least favourable

0 10 20 30 km

Content by: Aida Avdić, Boris Avdić and Ivan Zupanc
Map by: Boris Avdić
Source: Population Census of Bosnia and Herzegovina, 2013; Vital Statistics of Bosnia and Herzegovina, 2015-19
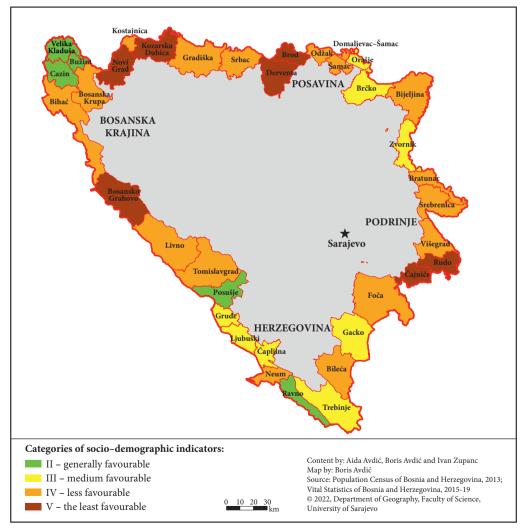© 2022, Department of Geography, Faculty of Science, University of Sarajevo

Figure 1: Socio-demographic categories of the municipalities/cities in borderland of Bosnia and Herzegovina.

Neum, Tomislavgrad and Livno. In all these cases, only one composite index showed an above average value, which is particularly surprising for Bihać and Bijeljina, as important regional centres. Finally, the fifth category contains seven municipalities: Novi Grad, Kozarska Dubica, Derventa, Brod, Rudo, Čajniče and Bosansko Grahovo. All these municipalities have a predominantly ethnic Serb population, and with the exception of the latter, all of them are located in the entity of Republika Srpska.

5 Discussion and conclusions

Here is presented a novel approach to examination of geographic and socio-demographic characteristics of the specific borderlands, that have not been a commonly studied topic to date in any scientific discipline that deals with similar issues, and therefore the approach and methodology applied here could be of multiple benefit in a range of contexts. Research methodology is adjusted to the circumstances of demographic underdevelopment and multiple statistical basis deficiencies, as well as to the context of recently disintegrated political territories (following the breakup of SFR Yugoslavia – Akrap 2008; Gosar 2012), where internal divisions and disparities often exceed those in bordering zones. Somewhat surprising results of this research partially changed the paradigm of bordering regions as national and functional periphery (House 1980), and pointed to the obvious need for comprehensive approach to the study of social phenomena of borderlands (Lorentzen 2012; Haselsberger 2014), by taking into consideration their demographic, economic, historical, cultural, environmental and other specificities. Geographical aspect of border studies is substantial to revelation of complex relations in regions adjacent to international borders, and this study is just an example of putting socio-demographic features into proper spatial context.

The results obtained in this research indicate that there are significant differences in the ageing index of the border municipalities/cities of Bosnia and Herzegovina in relation to non-border areas. This primarily pertains to the share of the older population, which is higher than the national average in nearly 80% of border municipalities, and of average population age. These findings point out to advanced stages of the demographic ageing process, which is characteristic of the borderlands of this country. Age structure of borderlands population can be explained by the action of multiple factors, such as migration (with a pronounced emigration component that is further intensified by its border status, due to faster crossing of the border, proximity to developed cities in neighboring countries, etc.). The increasing share of the older population can also be associated with the reduced birth rates, and a reduction or stabilization of the death rate (Nejašmić and Toskić 2016). Examining the broader region, a similar situation can be observed in the Serbian borderlands, in which demographic ageing is also more prominent in relation to other, non-border areas (Anđelković-Stoilković 2019). On the other hand, in Croatia there are no significant differences in the level of population ageing between the border and non-border municipalities, indicating a pronounced homogenization of the ageing process at the national level (Nejašmić and Toskić 2013).

It was surprising that no significant level was detected in the general differences concerning depopulation, vital statistics (for parametric test) and education between border and non-border municipalities or cities, since somewhat more pronounced deprivation parameters were expected in the border areas, as a generally accepted demographic pattern of the peripheral areas of neighboring Croatia (Pokos and Mišetić 2009) and Serbia (Vukmirović et al. 2016). The values of the death rate in border areas did not differ from those recorded inland, which is an anomaly, taking into account the unfavorable age structure. However, the peripheral position in the national context does not always necessarily mean marginalization in the sense of availability of certain services, such as health care and education. This is supported by the results of the analysis of the education index, where a lack of significant differences is attributed to the proximity of university centers in the neighboring countries and the positive cross-border influences. The largest differences within this composite index were seen in illiteracy rates, which were unexpectedly lower in the border areas, primarily due to the municipalities/cities in the Herzegovina region. A higher illiteracy rate in the inland areas can be attributed to various factors, including the dominance of mountainous terrain, where access to education was limited in the past (Emirhafizović and Zolić 2017; Pašalić Kreso 2017).

This research however did not provide a clear and uniform conclusion on the differentiation of border and non-border municipalities/cities in the context of the socio-demographic indicators, which could be ascribed to the high diversification of the border regions. This is best seen in the example of Cazinska Krajina and Herzegovina regions, whose demographic indicators are more favorable in relation to the

national average, as opposed to Posavina and Podrinje regions on the other hand, which showed pronounced unfavorable socio-demographic characteristics. Cazinska Krajina (Cazin, Velika Kladuša and Bužim) is a historical region that traditionally represents one of the most vital regions in Bosnia and Herzegovina in demographic sense. This can be explained by the ethno-cultural factors (the area is homogenously inhabited by the Bosniak or Muslim population) and the strongly pronounced traditionalist identity (Lojić-Duraković 2019), that is reflected in the relatively high birth rate. For these reasons, Cazinska Krajina does not fall within the typical peripheral areas, at least not in the context of demographic indicators. The same is true for Herzegovina, which shows somewhat reduced population density due to the natural predisposition of the region, but the traditional elements and pronounced ethno-religious homogeneity (Croatian/Catholic in Western Herzegovina, and Serbian/Orthodox in Eastern Herzegovina) contribute to a more stable population dynamic. Herzegovina also borders with one of Croatia's most developed tourism regions – Dalmatia, and the border between these areas in the cultural sense is highly permeable, which is also reflected in the higher degree of cross-border cooperation (Jurilj 2020). On the other hand, the Posavina and Podrinje regions are heavily war-affected areas, and the direct demographic losses continue to be a very present factor even today. It is important to emphasize that cluster analysis with inclusion of other available socio-economic indicators would provide statistically more substantiated model regarding explanation of borderland heterogeneity and connections within it, so we think that this suggestion should be taken into consideration regarding future research on this topic.

Limitations in the research process primarily concern the issue of fictitious statistics and the lack of relevant socio-economic indicators. The available data are quite scarce and limit the opportunities for creating standard or widely accepted composite indicators, such as the human development index, human poverty index or multiple deprivation index. This disables any testing of correlations between demographic with economic indicators, which would give clearer and more specific insight into the social processes ongoing in border regions, and would also open the path for a clearer clustering of municipalities and cities. It is also necessary to keep in mind that the ethnic structure of the population in the study area largely influenced the results obtained, even though this factor was not treated as a variable in the research. However, the indicators considered during this study provide a sufficient basis to assess the demographic potential and resources within a given local area. The obtained results indicate a need to consider the heterogeneity of the borderlands of Bosnia and Herzegovina in future studies. This suggests the need to more clearly identify the factors causing the heterogeneity of processes in the different border regions of Bosnia and Herzegovina. Meanwhile, in order to obtain deeper insight into the socio-cultural processes in this space, it would be desirable to include a survey of the local population in future research.

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