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Changes in the Ethnic Composition of Croatia (1991 – 2021) in the Context of the Aging Population Process[4]

This paper investigates current changes in the ethnic composition of the Croatian population by age. The statistical basis of the analysis consists of the population censuses of 1991, 2001, 2011 and 2021. The subject of the analysis is the population that declared itself in terms of ethnicity in the analyzed censuses, which means that the paper does not investigate the ethnically unspecified population. The purpose of the research is to use a comparative and descriptive method to determine the extent of the population aging process, with the aim of assessing the polarization between ethnically declared population categories and the impact of aging on future changes in the ethnic composition of the Croatian population. Considering the current demographic trends in the natural and migratory population change and bearing in mind the established indicators of population aging, the majority of the ethnically declared population of Croatia is far advanced in the aging process and is characterized by high old age, which represents an extremely negative determinant of its future demographic development.

Keywords: ethnic composition, age composition, demographic aging, depopulation, Croatia.

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1. Introduction

This paper investigates current changes in the ethnic composition of the Croatian population by age. The purpose of the research is to apply a comparative and descriptive method to determine the reached level of the population aging process, with the aim of assessing the polarization between ethnically declared population categories and the impact of aging on future changes in the ethnic composition of the Croatian population. The basic time frame of the research is determined by the results of the population census: 1991, 2001, 2011, and 2021. The observed period provides a representative basis for evaluating the intensity and signs of changes in the age structure of both the general population of Croatia and the ethnically defined population. It's important to note that this is the first demographic research in Croatia that analyses the last four population censuses (three inter-census periods) and includes all categories of the ethnically declared population of Croatia, apart from Greeks and Vlachs, because for them, due to their small number, it was not possible to calculate demographic aging indicators.

In a contextual sense, this research is based on the following cause-and-effect parameters: (1) population decline as a continuous trend of demographic decline in the period 1991 - 2021; (2) the process of demographic aging of the general population of Croatia; (3) the characteristics of the ethnic composition of Croatia, which is characterized by a high degree of homogeneity; (4) the connection between the process of demographic aging and the long-term demographic sustainability of the Croatian population with regard to ethnicity; and (5) demographic sustainability as a prerequisite for improving the social, economic, cultural and political position of minority ethnic communities in contemporary Croatian society. Recent and future changes in the ethnic composition of Croatia are determined, among other things, by long-term changes in the age composition of the ethnically declared population as a reflection of the extent of the demographic aging process.

Demographic aging reflects long-term changes in the age composition of the population. Demographic aging is one of the most important and far-reaching global demographic phenomena and challenges of modern times. It should also be noted that in today's environmental conditions, families tend to have fewer children. Čiutienė and Railaitė (2015) point out that "in the context of population aging, increased life expectancy, and declining birth rates leads a

reduction of the active labor force". The same authors say that "a decreasing number of working age people has to support the increasing number of older persons" (Čiutienė and Railaitė, 2015). Sanderson and Schrebov (2007) believe that population aging is one of the key unfavorable demographic processes of today. In addition, the same authors believe that population aging will become an even bigger problem in the future than it is today (Sanderson and Schrebov 2007). Considering the time gap from the period of their research, we can assert that they were right. Naja, Din Makhlouf and Chehab (2017) also point out that the population aging is one of the key unfavourable demographic processes at the global level today. Birren (2013) believes that ethnicity can have an impact on the reached level of aging. This refers to genetic and sociological-psychological factors. Rawland (2007) has similar point of view. He argues that there are differences between the reached levels of population aging in Australia that have sociological-psychological and genetic causes. Ananta, Arifin, and Bakhtiar (2005) have investigated the connection of ethnicity with the aging of the population in Indonesia and they found that there are differences in the levels of old age reached.

Population aging is recognized as one of the demographic "megatrends" of the modern world, alongside population growth, international migration, and the process of urbanization.[5] Due to very low long-term fertility, the increase in life expectancy and the synergistic effect of other factors, demographic aging is a rapid process precisely in the European region that, according to formal statistical criteria, can be observed for several decades (Davoudi, Wishardt and Strange, 2010; Furfaro et al., 2024; Harper, 2014; Hoff, 2011; Kinsella and Phillips, 2005; Walker and Maltby, 2011; Zaidi and Howse, 2017).[6] Demographic aging is the most important long-term process in developing the age structure of the total population of Croatia. Croatia did not remain outside the context of population aging as a global demographic process and phenomenon; moreover, Croatia's rapidly aging population places it among the oldest populations in Europe and the world (Brajković et al., 2023; Nejašmić and Toskić, 2013; Puljiz, 2016; Wertheimer-Baletić, 1992; 2004; 2009; 2017; Živić et al., 2017; Živić, 2021). The share of young population (0-14) has been steadily

5 Cited from World Population Aging 2019, Highlights, Department of Economic and Social Affairs, Population Division, United Nations, New York, 2019.

6 See more details in Aging Europe – Looking at the lives of older people in the EU, Eurostat 2019 report, Publications Office of the European Union.

declining since 1961, when it was determined to be 22.7, to its current value of 14.3 (Census 2021). At the same time, as one of the most important indicators of demographic aging, the share of elderly (65+) population is continuously increasing; in 1961, it was only 7.4, and by 2021, it was 22.5. The aging index is continuously increasing, from 27.2 (1961) to 157.4 (2021). The age dependency ratio of the elderly population (65+) as an approximate indicator of the burden on the working-age population (15–64) has increased from 17.2 (1991) to 35.5 (2021). The average age of the population in Croatia increased from 32.5 years to 44.3 years from 1961 to 2021.[7]

Another important contextual starting point for this research is the fact that Croatia is a country with a high degree of ethnic homogeneity, with Croats as the majority population accounting for 91.6%, while other ethnically declared and undeclared population, including the unknown category, constitute 8.4% of the total population (Population Census 2021). During the second half of the 20th century and the first two decades of the 21st century, ethnic changes were significant and after 1991 they can mostly be defined as a process of homogenization of the ethnic composition, in the sense of an increase in the share of Croats and a decrease in the share of non-Croats. The reasons for this are numerous, and they can be briefly explained by demographic, social, political and economic factors, as well as numerous internal and external migrations with predominant ethnic characteristics. Some of the consequences are changes in ethnic self-identification, i.e. (non)declaration of ethnic affiliation in censuses, as well as significant changes in the spatial distribution of certain ethnic groups. (Akrap and Grizelj, 1995; Akrap, 2008; Berber, Grbić and Pavkov, 2008; Crkvenčić, 1991; Đurđev, Livada and Arsenović, 2014; Kovjanić, 2014; Pepeonik, 1991; Živić, 2004; Žuljić, 1996).

2. Method

In a comparative context, we have calculated and analyzed the indicators of the age composition and the extent of the population aging process between individual ethnic groups and in relation to the general population of

7 Sources: Croatian Bureau of Statistics, Population Censuses 1961, 1971, 1981, 1991, 2001, and 2011 (sex, individual years, and contingents), Internal data of the CBS (accessed 4/2/2023); State Statistical Office of the Republic of Croatia, Featured Topics, Censuses, Census of Population, Households, and Apartments 2021, Population by nationality, age, and sex; www.dzs.hr (accessed March 1, 2023).

Croatia and Croats as the ethnic majority population. Having considered the contextual (cause and effect) starting points outlined in the introduction of the paper and based on comparative parameters, we have defined the following hypotheses which we have tried to confirm or reject. These are the following hypotheses:

H1 - Due to the dominant depopulation characteristics of the population of Croatia in the period 1991 - 2021, most ethnic groups are characterized by a demographic decline of varying intensity;

H2 – All ethnic groups in Croatia are characterized by a demographic aging process of varying intensity;

H3 – The majority of ethnic groups in Croatia, especially the smaller ones, are characterized by a higher degree of demographic aging compared to the general population of Croatia and Croats as the ethnic majority population.

Key methodological issues relate to:

(1) Defining the categories within the ethnic structure that will be analyzed. These are the categories of the population that declared themselves as members of an ethnic group in the analyzed lists, namely: Croats, Albanians, Austrians, Bulgarians, Bosniaks,[8] Montenegrins, Czechs, Hungarians, Macedonians, Muslims,[9] Germans, Poles, Roma, Romanians, Russians, Ruthenians, Slovaks, Slovenians, Serbs, Italians, Turks, Ukrainians, and Jews.[10]

(2) Determining the categories and analytical indicators of age structure that are commonly used to determine the level of the demographic aging process. In this sense, the analysis of the age structure was performed according to broad age groups: young population (0–14), working-age population (15–64), and old population (65+). Although there is no universally accepted definition of demographic aging in the literature, this term usually refers to an increase in the share of the old population (60+ or 65+) in the total population (Wertheimer-Baletić, 1999; Nejašmić, 2005). Three groups of analytical indicators are commonly used to determine the extent of aging: (a) mean values (average age), (b) share of elderly population and aging indexes, and (c) age dependency ratio. All three groups of indicators of demographic aging were applied in this study.

8 Bosniaks have been appearing since the 2001 census.
9 Muslims as a category of the ethnically declared population were reported until 1991.
10 In addition to the mentioned ethnic categories, Greeks (1991) and Vlachs (1991–2021) were also reported in the analyzed censuses. However, their numbers are small, and it is impossible to calculate the relevant demographic aging indicators.

3. Results

3.1. Basic characteristics of ethno-demographic changes in Croatia (1991-2021)

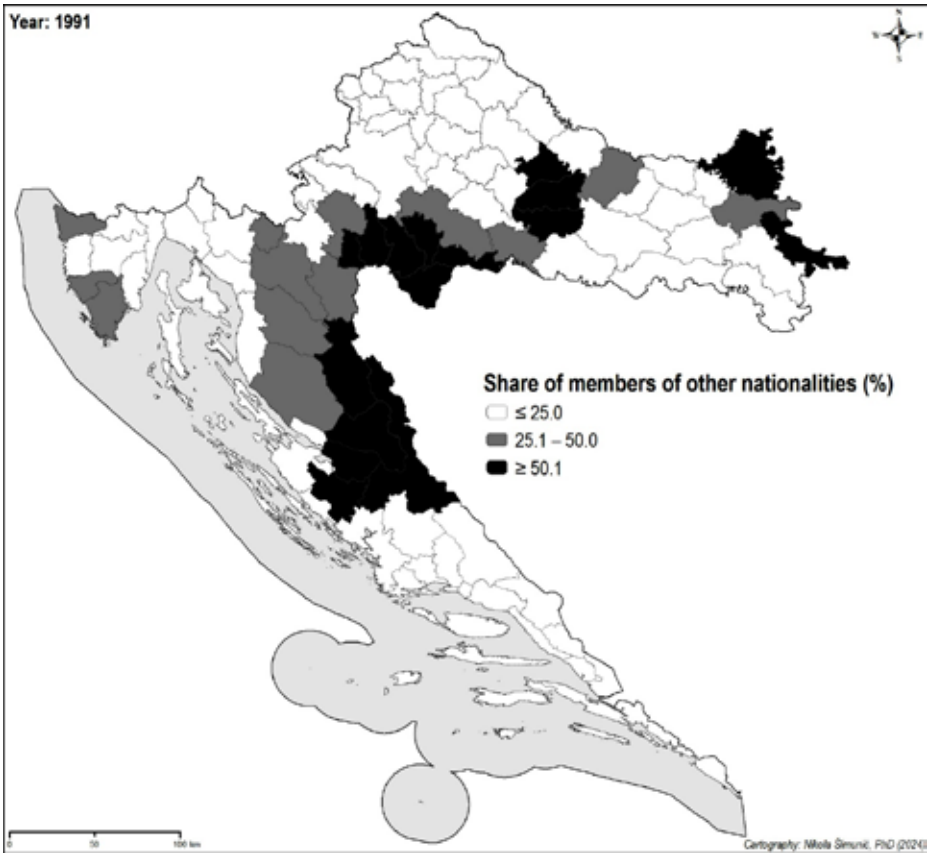
In the introduction to the paper, we have pointed out that since 1991, Croatia has been a country characterized by population decline as the predominant regressive feature of its population dynamics (table 1). The index of inter-census change in the period 1991-2001 was 92.75, in the period 2001-2011 it was 96.56, and in the period 2011-2021 it was 90.36; in total, in the period 1991 - 2021, the inter-census change index was 80.93. According to the type of intensity of inter-census change (Nejašmić, 2005), Croatia was characterized by strong depopulation in the period 1991-2001, moderate depopulation in the period 2001-2011, and strong depopulation in the period 2011-2021. There are numerous long-term and destabilizing factors of the emergence and intensification of the overall depopulation of Croatia (Akrap, 2019). In this extremely depopulated framework, after 1991, changes in the ethnic composition of the population took place. In the context of the homogeneity of the Croatian population at the level of former municipalities (1991), 64.71% of Croatia's population lived in municipalities where Croats made up more than 80.0% of the total population (Figure 1).

The results of the analyzed censuses (table 1) indicate that Croatia has a highly homogeneous ethnic composition of the population – Croats made up 78.1% of the total population in 1991, 89.6% in 2001, 90.4% in 2011, and 91.6% in 2021. The share of other ethnically declared populations was 18.1% in 1991, 8.0% in 2001, 8.1% in 2011, and 6.8%[11] in 2021. This reflects the differentiated inter-census dynamics; the inter-census change index of Croats for 1991 to 2021 was 94.95. Other groups of the ethnically declared population in total have been continuously depopulating, as evidenced by the fact that the index of inter-census change in the period 1991–2021 was 30.28.

In addition to Croats, the numbers of members recorded as Albanians, Austrians, Germans, Roma (the largest increase), and Russians increased during 1991–2001. Other ethnic groups experienced a decline in numbers, with Serbs showing the most pronounced decline and Jews the least. Additionally, the number of

11 In addition to the ethnically declared population, the census results also provide data on those declared according to regional affiliation, those who have not declared, and those who are unknown. These categories accounted for 3.8% in 1991, 2.4% in 2001, 1.5% in 2011, and 1.6% in 2021.

FIGURE 1 Percentage (in %) of other ethnically declared population of Croatia according to the results of the 1991 Census



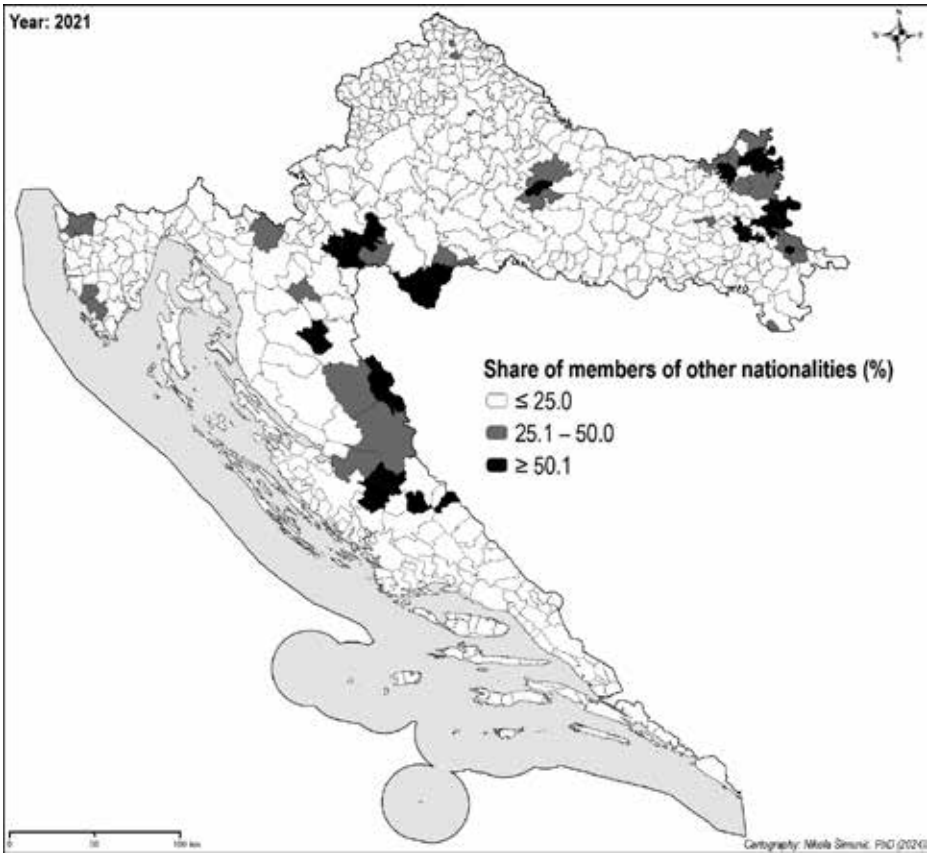
people of regional or unknown ethnicity has decreased significantly. From 2001 to 2011, increases in the number of members were recorded by Albanians, Austrians, Bosniaks, Bulgarians, Germans, Poles, Roma (the largest increase), Russians, Slovaks, and Turks. Other ethnic groups, including Croats, recorded a population decline, with Slovenians suffering the most and the Croats the least. The number of people of regional or unknown ethnicity continues to decline. From 2011 to 2021, Austrians, Germans, Roma, Russians, Turks, and Ukrainians recorded demographic increases, with the Austrians showing the largest increase. At the same time, other ethnic groups including Croats declined, Serbs the most and Poles the least. The number of people of regional or unknown ethnicity continued to decline, although less sharply than in the previous two inter-census periods.

The ethno-demographic changes in Croatia over the past thirty years were mostly determined by geopolitical and developmental circumstances, social

processes that unfolded in southeastern Europe and beyond (Dumbrava, 2018). In this sense, the 1990s were marked by the war of aggression against a significant part of Croatia due to the disintegration of the former Yugoslavia (Nazor, 2011). Wartime circumstances, in addition to high direct demographic losses caused by numerous forced migrations, influenced the spatial redistribution of the population (**Živić** and Pokos, 2004). Considering these factors, the ethnic structure of Croatia's population as a whole and in particular its individual parts changed significantly between 1991 and 2001 (**Živić**, 2002; 2004). In the context of the homogeneity of the Croatian population at the level of cities and municipalities (2021), 88.67% of Croatia's population lived in areas where Croats made up more than 80.0% of the total population (Figure 2).

In the period 2001–2011, the ethno-demographic picture of Croatia stabilized. After the global recession (2015), negative demographic processes such

FIGURE 2 Percentage (in %) of other ethnically declared population of Croatia according to the results of the 2021 Census



as natural depopulation, aging of the population, and selective emigration began to have a greater impact on the ethno-demographic structure. Croatia's accession to the European Union (mid-2013), further facilitated emigration from Croatia, which had a profoundly negative effect on the demographic structure of the areas from where emigration took place and, thus, on the ethnic structure. Such emigrants "take" their bioreproductive potential with them, further strengthening the negative effects of emigration.

TABLE 1. Indices of changes in the structure of the ethnically declared population of Croatia (1991–2021)

Ethnicity	Census				Index of change			
	1991	2001	2011	2021	2001/1991	2011/2001	2021/2011	2021/1991
Croats	3 736 356	3 977 171	3 874 321	3 547 614	*106.45*	*97.41*	*91.57*	*94.95*
Albanians	12 032	15 082	17 513	13 817	*125.35*	*116.12*	*78.90*	*114.84*
Austrians	214	247	297	365	*115.42*	*120.24*	*122.90*	*170.56*
Bosniaks*	-	20 755	31 479	24 131	-	*151.67*	*76.66*	-
Bulgarian	458	331	350	262	*72.27*	*105.74*	*74.86*	*57.21*
Montenegrins	9 724	4 926	4 517	3 127	*50.66*	*91.70*	*69.23*	*32.16*
Czechs	13 086	10 510	9 641	7 862	*80.31*	*91.73*	*81.55*	*60.08*
Hungarians	22 355	16 595	14 048	10 315	*74.23*	*84.65*	*73.43*	*46.14*
Macedonians	6 280	4 270	4 138	3 555	*67.99*	*96.91*	*85.91*	*56.61*
Germans	2 635	2 902	2 965	3 034	*110.13*	*102.17*	*102.33*	*115.14*
Poles	679	567	672	657	*83.51*	*118.52*	*97.77*	*96.76*
Roma	6 695	9 463	16 975	17 980	*141.34*	*179.38*	*105.92*	*268.56*
Romanians	810	475	435	337	*58.64*	*91.58*	*77.47*	*41.60*
Russians	706	906	1 279	1 481	*128.33*	*141.17*	*115.79*	*209.77*
Ruthenians	3 253	2 337	1 936	1 343	*71.84*	*82.84*	*69.37*	*41.28*
Slovaks	5 606	4 712	4 753	3 688	*84.05*	*100.87*	*77.59*	*65.79*
Slovenians	22 376	13 173	10 517	7 729	*58.87*	*79.84*	*73.49*	*34.54*
Serbs	581 663	201 631	186 633	123 892	*34.66*	*92.56*	*66.38*	*21.30*
Italians	21 303	19 636	17 807	13 763	*92.17*	*90.69*	*77.29*	*64.61*
Turks	320	300	367	404	*93.75*	*122.33*	*110.08*	*126.25*
Ukrainians	2 494	1 977	1 878	1 905	*79.27*	*94.99*	*101.44*	*76.38*
Vlachs	22	12	29	22	*54.55*	*241.67*	*75.86*	*100.00*
Jews	600	576	509	410	*96.00*	*88.37*	*80.55*	*68.33*
Others**	152 803	21 801	18 965	22 178	*14.27*	*86.99*	*116.94*	*14.51*
Regional affiliation	45 493	9 302	27 225	12 712	*20.45*	*292.68*	*46.69*	*27.94*
Not declared	73 376	79 828	26 763	22 388	*108.79*	*33.53*	*83.65*	*30.51*
Unknown	62 926	17 975	8 877	26 862	*28.57*	*49.39*	*302.60*	*42.69*
TOTAL	4 784 265	4 437 460	4 284 889	3 871 833	*92.75*	*96.56*	*90.36*	*80.93*

* Until the 2001 Census, Bosniaks were not presented as a national minority.

** Included are all other declarations not stated in the presented modalities.

Sources: Croatian Bureau of Statistics, Census of Population, Households, Dwellings and Agricultural Holdings 1991, Population composition by age and sex, Internal data of the CBS; State Statistical Office of the Republic of Croatia, Featured topics, Censuses, Census of population, households, and dwellings 2021, Population by ethnicity, age, and gender. www.dzs.hr (accessed on April 18th , 2023).

In conclusion, despite the negative demographic processes that introduced distortions into the figures pertaining to ethno-demographic structural changes, there was a more pronounced ethnic homogenization in the observed period (1991–2021). The most pronounced ethno-demographic changes are related to the increase in members of the Roma (index 268.56) and the decrease in the Serbian ethnic group (index 21.30). Along with Roma, only Albanians, Austrians, Germans, Russians, and Turks had a demographic increase, while other ethnic groups declined, Serbs the most and Poles the least.

3.2. Indicators of demographic aging of the ethnic population of Croatia

The share of the elderly population (65+), according to the results of the 1991 Census (Table 2), ranged from 1.5 (Roma) to 43.0 (Jews). Concerning the share of elderly in the total population (11.6), seven ethnic groups (Albanians, Montenegrins, Macedonians, Muslims, Roma, Romanians, and Turks) had a below-average value, while the other groups had an above-average value. The aging index ranged from 3.2 (Roma) to 678.9 (Jews). Regarding the aging index of the total population (60.0), seven ethnic groups (Albanians, Montenegrins, Macedonians, Muslims, Roma, Romanians, and Turks) had a below-average value, while the other ethnic groups had an above-average value. If we take the share of the elderly population and the aging index as reference indicators of the demographic aging process, only Albanians, Muslims, and Roma had a young population in 1991 because both indicators were below the threshold values. According to the value of the aging index, Romanians and Turks can still be included in the young population, while all other ethnic groups had already reached a certain level of demographic aging, with 12 of them showing a greater number and share of the elderly than the young.

TABLE 2. Selected indicators of the structure of the ethnically declared population of Croatia by age according to the results of the 1991–2021 Census

Ethnicity	Share of elderly population 1991	Aging Index 1991	Share of elderly population 2001	Aging Index 2001	Share of elderly population 2011	Aging Index 2011	Share of elderly population 2021	Aging Index 2021
Total Population	11.6	60.0	15.7	92.2	17.7	116.3	22.5	157.4
Croats	11.8	60.3	17.5	115.4	16.8	107.0	21.6	148.6
Albanians	2.6	9.3	3.9	14.1	5.6	24.4	10.7	58.8
Austrians	34.1	456.3	22.3	275.0	25.6	217.1	34.2	595.2
Bosniaks	-	-	8.5	55.8	12.3	103.1	21.4	197.9
Bulgarians	17.2	232.4	29.3	1385.7	32.6	1628.6	34.7	910.0
Montenegrins	8.4	56.7	26.4	573.1	35.2	1176.3	47.6	1351.8
Czechs	18.7	153.8	23.2	228.1	25.3	276.6	31.0	325.3
Hungarians	20.6	186.0	26.8	301.9	29.9	364.1	36.2	468.2
Macedonians	7.3	58.8	19.9	354.8	29.0	613.3	35.4	605.8
Muslims	2.7	11.2	-	-	-	-	-	-
Germans	20.7	248.2	26.3	353.7	37.3	528.7	43.9	847.8
Poles	19.7	384.8	15.5	1257.1	17.4	557.1	30.4	769.2
Roma	1.5	3.2	1.6	3.5	1.5	3.3	2.5	6.0
Romanians	7.5	29.9	12.6	69.0	11.5	142.9	16.9	228.0
Russians	28.9	566.7	16.6	245.9	11.6	214.5	13.0	181.1
Ruthenians	15.9	118.8	26.9	249.6	28.1	340.0	38.4	607.1
Slovaks	14.4	100.0	20.4	192.8	21.5	205.2	29.9	333.9
Slovenians	28.0	360.8	38.8	1418.3	41.9	1706.2	51.3	1496.2
Serbs	11.7	67.2	28.2	384.9	32.2	492.4	42.7	632.9
Italians	22.4	177.3	28.6	306.7	30.6	344.0	33.6	339.3
Turks	4.4	21.9	5.7	25.0	10.1	53.6	8.4	57.6
Ukrainians	14.3	106.3	21.3	215.3	22.2	346.7	21.5	282.1
Jews	43.0	678.9	38.2	1294.1	27.3	421.2	35.9	334.1

The authors calculated the figures according to Croatian Bureau of Statistics, Census of Population, Households, Dwellings and Agricultural Holdings 1991, Population composition by age and sex, Internal data of the CBS; Croatian Bureau of Statistics, Census of Population, Households and Dwellings 2001, Population by nationality, age, and sex, Internal data of the CBS; Croatian Bureau of Statistics, Highlighted topics, Censuses, Census of population, households, and dwellings 2011, Population by nationality, age, and sex; Croatian Bureau of Statistics, Featured topics, Censuses, Census of population, households, and dwellings 2021, Population by ethnicity, age, and gender; www.dzs.hr (accessed on March 1st , 2023).

The share of the elderly population, according to the results of the 2001 Census (table 2), ranged from 1.6 (Roma) to 38.8 (Slovenians). Concerning the share of the elderly population in the total population (15.7), five ethnic groups (Bosniaks, Poles, Roma, Romanians, and Turks) had a below-average

value, while the other groups had an above-average value. The aging index ranged from 3.5 (Roma) to 1418.3 (Slovenians). Regarding the aging index of the total population (92.2), five ethnic groups (Albanians, Bosniaks, Roma, Romanians, and Turks) had a below-average value, while the other ethnic groups had an above-average value. If we take the share of the elderly population and the aging index as reference indicators of the demographic aging process, only Albanians and Roma had a young population in 2001 because both indicators were below the threshold values. According to the value of the aging index, only Turks could still be included in the young population, while all other ethnic groups had already reached a certain level of demographic aging, with 17 of them having the number and share of the old population greater than the young.

The share of the elderly population, according to the results of the 2011 Census (table 2), ranged from 1.5 (Roma) to 41.9 (Slovenians). Concerning the share of the elderly population in the total population (17.7), eight ethnic groups (Croats, Albanians, Bosniaks, Poles, Roma, Romanians, Russians, and Turks) had a below-average value, while the other groups had an above-average value. The aging index ranged from 3.3 (Roma) to 1706.2 (Slovenians). Regarding the aging index of the total population (116.3), only five ethnic groups (Croats, Albanians, Bosniaks, Roma, and Turks) had a below-average value. In contrast, other ethnic groups had an above-average value. If we take the share of elderly population and the aging index as reference indicators of the demographic aging process, only the Roma had a young population in 2011 because both indicators were below the threshold values. According to the value of the aging index, only Albanians could still be included in the young population, while all other ethnic groups had already reached a certain level of demographic aging. In 19 of them, the number and share of the old population were greater than that of the young. Only the Turks (53.6) had an aging index below 100, indicating that this population has entered the aging process.

The share of the elderly population, according to the results of the 2021 Census (table 2), ranged from 2.5 (Roma) to 51.3 (Slovenians). Concerning the share of the elderly population of the total population (22.5), eight ethnic groups (Croats, Albanians, Bosniaks, Roma, Romanians, Russians, Turks, and Ukrainians) had a below-average value, while the other groups had an above-average value. The aging index ranged from 6.0 (Roma) to 1496.2 (Slovenians). Concerning the aging index of the total population (157.4), only four ethnic groups

(Croats, Albanians, Roma, and Turks) had a below-average value, while the other ethnic groups had an above-average value. If we take the share of the elderly population and the aging index as reference indicators of the demographic aging process, only the Roma had a young population in 2021 because both indicators were below the threshold values. All other ethnic groups had experienced a certain degree of demographic aging, with 19 having a greater number and share of the old population than the number and share of the young. Only Albanians (58.8) and Turks (53.6) had an aging index below 100, but it was clear that these populations had already entered the aging process.

The previously described changes in the basic indicators of the demographic aging process reflect inter-census changes in the number of ethnically declared populations according to broad age groups. Table 3 shows the calculated inter-census change indices as an indicator for comparing the results of the 1991 and 2021 censuses. The analysed ethnic groups[12] can be divided into six categories:

(1) Ethnic groups where the depopulation of all broad age groups was recorded (Czechs, Hungarians, Romanians, Ruthenians, Slovenians, Serbs, and Italians), with the greatest depopulation of the young (index 8.3) and the working-age population (15.3) occurring among the Serbs. The highest range of depopulation of the old population was among the Slovenians (63.4);

(2) Ethnic groups that recorded the depopulation of the young and working-age population and the demographic increase of the old population (Croats, Bulgarians, Montenegrins, Macedonians, Germans, Poles, Slovaks, and Ukrainians). The largest depopulation of the young (7.6) and the working-age population (20.6) was recorded among Montenegrins, while the Macedonians recorded the greatest demographic increase in the old population (273.9);

(3) Ethnic groups that recorded the depopulation of the young population and the demographic growth of the working-age population and old population (Albanians and Turks), with Albanians recording a greater depopulation of the young population (73.3), the Turks a greater demographic increase of the working-age population (130.7), and the Albanians a greater demographic increase of the old population (464.2);

(4) Ethnic groups that recorded a demographic increase in all broad age groups (Austrians and Roma), with the Roma (245.8, 296.7, and 457.6) in all

12 Since Muslims were declared until the 1991 Census and Bosniaks from the 2001 Census, these two ethnic groups were not analyzed according to the index of inter-census changes in large age groups.

three categories recording a higher demographic increase than Austrians;

(5) The Russian ethnic group, which recorded a demographic increase in the young (294.4) and working-age population (261.7) and a decline in the old population (94.1); and

(6) The Jewish ethnic group, which recorded a demographic increase of the young (115.8) and a decline in the working-age population (74.0) and old population (57.0).

Generally speaking, the range of the index of inter-census change of the young population in the period 1991–2021 ranged from 7.6 (Montenegrins) to 294.4 (Russians), of the working-age population from 15.3 (Serbs) to 296.7 (Roma), and of the elderly population from 57.0 (Jews) to 464.2 (Albanians).

TABLE 3. Index of changes in the ethnically declared population of Croatia according to large age groups: comparison of census results in 1991 and 2021.

Ethnicity	Young Population	Working-age Population	Old Population	Total
Total Population	59.6	75.9	156.3	80.9
Croats	70.6	89.4	174.0	94.9
Albanians	73.3	120.6	464.2	114.8
Austrians	131.3	182.5	171.2	170,6
Bosniaks	-	-	-	-
Bulgarians	29.4	47.1	115.2	57.2
Montenegrins	7.6	20.6	182.0	32.2
Czechs	47.3	52.0	99.9	60.1
Hungarians	32.3	38.1	81.2	46.1
Macedonians	26.6	41.9	273.9	56.6
Muslims	-	-	-	-
Germans	71.4	86.2	243.8	115.1
Poles	78.8	84.3	157.5	96.8
Roma	245.8	296.7	457.6	268.6
Romanians	12.3	47.4	93.4	41.6
Russians	294.4	261.7	94.1	209.8
Ruthenians	19.5	32.5	99.6	41.3
Slovaks	40.8	57.0	136.4	65.8
Slovenians	15.3	24.5	63.4	34.5
Serbs	8.3	15.3	78.1	21.3
Italians	50.7	56.7	96.9	64.6
Turks	92.2	130.7	242.9	126.3
Ukrainians	43.2	76.0	114.6	76.4
Jews	115.8	74.0	57.0	68.3

The authors calculated the figures according to the sources listed in Tables 1 and 2.

The average age of the population, which indicates the average age of the population at the time of the census, is one of the most commonly used aggregated analytical indicators of the population's age structure and the extent of

aging reached. In this paper, the average age of the ethnically declared population of Croatia was calculated based on the results of the 2021 Census (Figure 1). The average age of the total population of Croatia was 44.3 years. Only four ethnic groups had a lower average age (Croats, 43.8; Turks, 37.9; Albanians, 37.0; and Roma, 23.5), indicating a younger population compared to the general population. The remaining ethnic groups had a higher average age than the national average, ranging from 45.4 years (Romanians) to 61.2 years (Slovenians). Thus, the average age range in 2021 ranged from 23.5 years for the Roma to 61.2 years for the Slovenian population. It is important to emphasize that, according to average age, only the Roma satisfied the requirement to be categorized as a young population.

FIGURE 3 Average age (in years) of the ethnically declared population of Croatia according to the results of the 2021 Census.

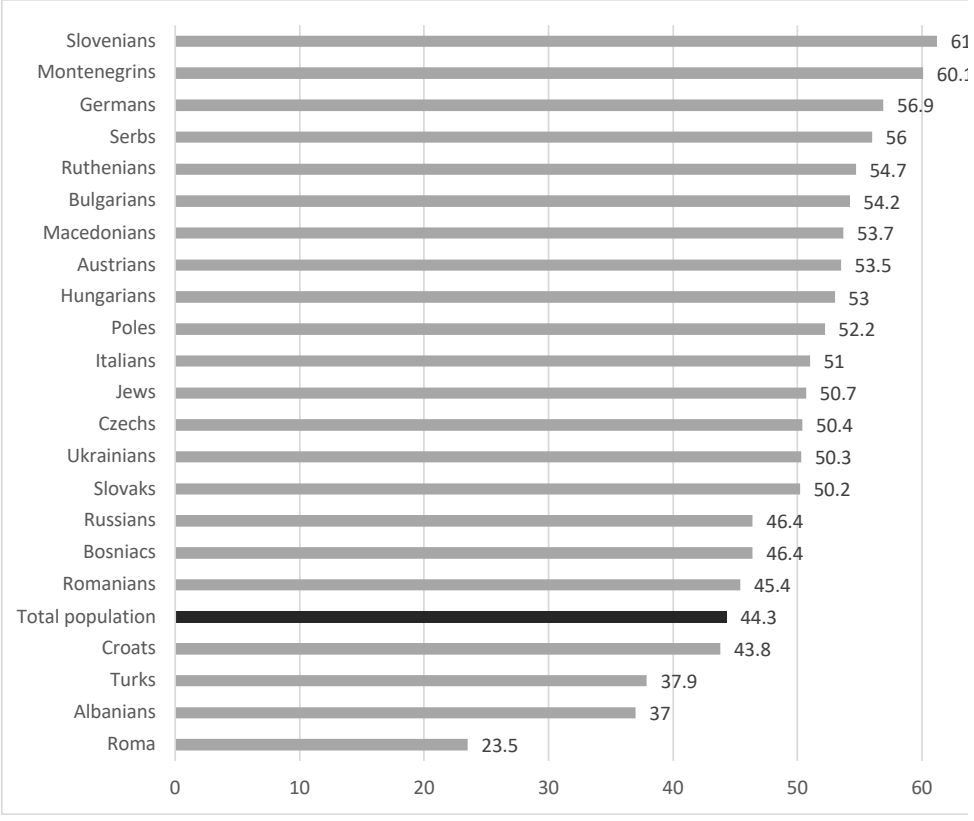


TABLE 4. Age dependency coefficients of the ethnically declared population of Croatia according to the results of the census in the period 1991–2021.

Ethnicity	1991	2001	2011	2021
Total Population	17.2	23.4	26.4	35.5
Croats	17.4	26.0	25.0	33.9
Albanians	3.9	5.8	7.9	15.0
Austrians	60.8	32.7	40.9	57.1
Bosniaks	-	11.2	16.2	31.5
Bulgarians	23.1	43.3	49.8	56.5
Montenegrins	11.0	38.4	56.8	97.2
Czechs	27.2	34.9	38.7	52.2
Hungarians	30.3	41.7	48.3	64.6
Macedonians	9.2	26.8	43.9	60.4
Muslims	3.8	-	-	-
Germans	30.5	41.4	66.9	86.1
Poles	24.9	18.9	21.9	46.4
Roma	2.9	3.0	2.7	4.5
Romanians	11.3	18.5	14.3	22.4
Russians	45.1	21.9	13.9	16.2
Ruthenians	22.7	43.4	44.2	69.5
Slovaks	20.4	29.6	31.7	48.8
Slovenians	43.9	66.7	75.2	113.3
Serbs	16.6	44.0	52.7	84.5
Italians	34.7	46.3	50.6	59.4
Turks	5.9	8.0	14.2	10.9
Ukrainians	20.1	31.3	31.0	30.3
Jews	87.2	65.1	41.2	67.1

The authors calculated the figures using the sources listed in Tables 1 and 3.

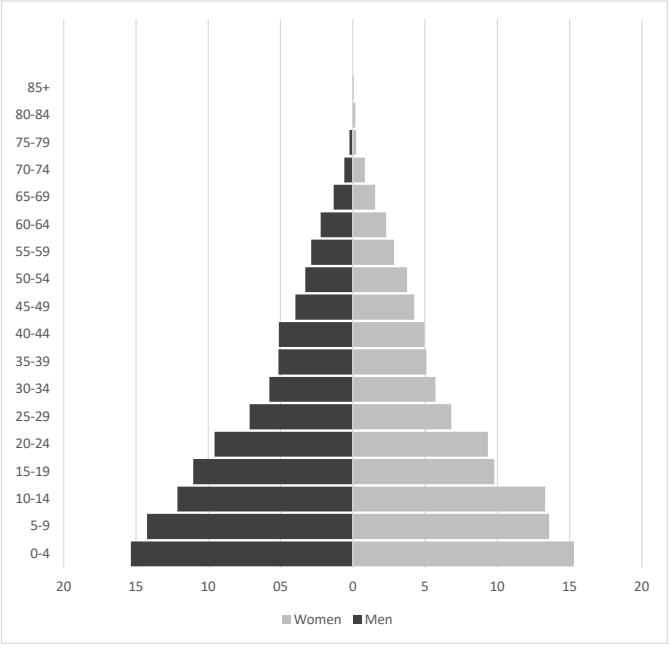
The calculated coefficients of age dependency of the elderly population (Table 4) confirm the advanced demographic aging of the ethnically declared population of Croatia and the presence of significant differences in the degree of aging reached. Thus, the values of old-age dependency ratio ranged in 1991 from 2.9 (Roma) to 87.2 (Jews), in 2001 from 3.0 (Roma) to 66.7 (Slovenians), in 2011 from 2.7 (Roma) to 75.2 (Slovenians), and in 2021 from 4.5 (Roma) to 113.3 (Slovenians). According to the results of the 2021 Census, fourteen ethnic groups had an above-average value and eight groups had a below-average value compared to the total population of Croatia. Austrians, Bulgarians, Montenegrins, Czechs, Hungarians, Macedonians, Germans, Ruthenians, Serbs, Italians, and Jews showed a particularly high burden on the working-age contingents, most notably the Slovenians, who alone have a larger number and share of the population aged 65+ compared to the population aged 15–64.

4. Discusion and conclusion

Given that, as Wertheimer-Baletić (2004) points out, the processes of total and natural depopulation are in close correlation and interaction with changes in the biological structure of the population, negative demographic trends were observed in most groups of the ethnically declared population of Croatia from the 1991 Census to the 2021 Census. It is impossible to understand and explain these trends without insight into the changes in their age composition, that is, without an assessment of the stage of the demographic aging process they have reached, which increasingly emerges as an extremely negative determinant of demographic sustainability.

Croatia is a country with a very high degree of homogeneity, based on the ethnic composition of its population, and the ethnic homogeneity further increased throughout the observed inter-census periods, with a significant decrease in the share of non-Croatian ethnic groups.

FIGURE 4 Sex and age pyramid of Roma in Croatia according to the results of the 2021 Census.



Due to the inherited negative demographic trends and processes (natural decline, emigration and negative migration balance, demographic aging), which in the early 1990s were reinforced by demographic war losses (war mortality, forced and other migrations), the majority of the ethnically declared popula-

tion of Croatia was confronted with the challenge of long-term demographic sustainability. In any case, largely due to a relatively small population base, Croatian ethnic groups are predominantly subject to deep demographic aging, which is not a positive determinant of biodynamics.

FIGURE 5 Sex and age pyramid of Slovenians in Croatia according to the results of the 2021 Census.

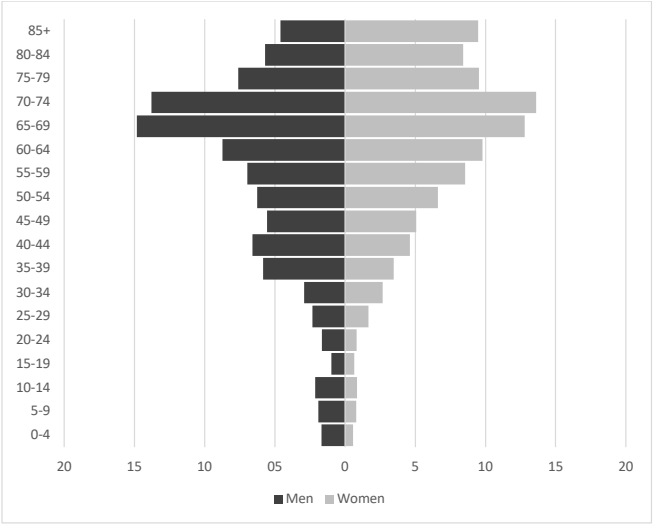
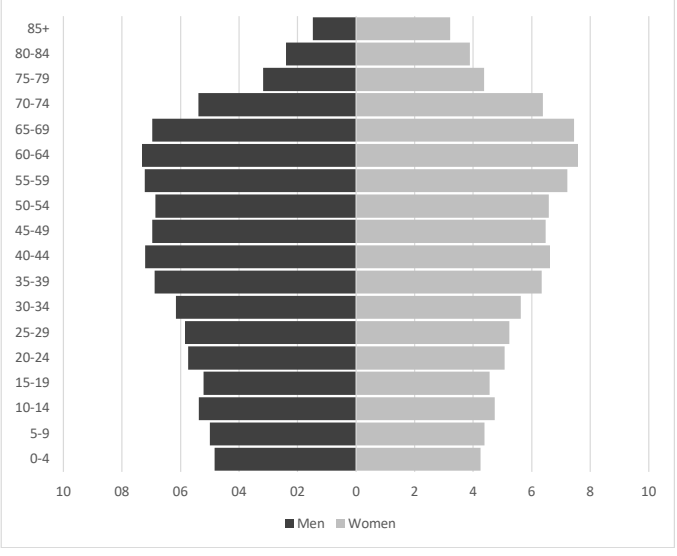


FIGURE 6 Sex and age pyramid of Croats in Croatia according to the results of the 2021 Census.



In addition to the above, there is a strong differentiation in the degree of demographic aging between individual ethnic groups (Figure 3, 4 i 5). Thus, the Roma are on the positive side, with the most favourable and youngest age-sex structure, while the Slovenians are on the extremely negative side. Given their numbers, Croats are, as expected, within the limits of the structural characteristics of the general population. Moreover, they occupy a slightly better position than the overall population of Croatia.

One of the most important long-term factors influencing changes in the age-sex structure of the ethnically declared population of Croatia, in the context of the progression of the demographic aging process, is the long-term trend in the movement of birth rates/fertility among ethnic groups. Research by D. Pavić (2013, 2014) warns of a very large variation in the birth rate, where the most likely explanation for the low birth rate of certain groups, along with other factors,[13] is their extremely unfavorable age structure and accelerated demographic aging.

It is rather debatable whether ethnic groups in which the number and share of the old population are greater or significantly greater than the young can provide enough of their bio-reproductive potential to enable demographic self-revitalization or long-term sustainability. It is all the more so because the ethnic structure depends not only on the laws of movement and development of the population but also on other social and economic processes (assimilation, integration, minority rights, etc.), including possible changes in the method of census reporting. In addition to all that, it is difficult to predict the impact of migration on the number and structure of the ethnically declared population in conditions of low birth rates. The low birth rate is a general characteristic of demographic dynamics as well as economic movements, which are still significant push factors for external emigration.

Bearing in mind everything that has been said so far, all three research hypotheses have been confirmed. First, most groups of the ethnically declared population, including Croats as the ethnic majority population, in the analysed period (1991-2021) are characterized by demographic decline, as a reflection of unfavourable trends in natural and migration change, as well as changes in patterns of ethnic self-identification in population censuses. Second, all eth-

13 D. Pavić (2013, 2014) succinctly points out that when explaining the differences in birth and fertility rates among ethnic groups, three basic hypotheses are commonly used in the literature: the social characteristics hypothesis, the minority group status hypothesis, and the cultural hypothesis, which were explained in detail by R. Forste. and M. Tienda (1996).

nic groups are characterized by the process of demographic aging, because the share of elderly population and the aging index increasing across all of them. However, there are significant differences in the reached level of aging (the extremes are Roma with the youngest and Slovenians with the oldest population); Thirdly, the majority of ethnic groups are characterized by older age and a higher degree of aging compared with the general population of Croatia, and thus also compared with Croats as the majority population.

Based on the analysis, demographic aging is a negative factor in the future demographic development of most groups of the ethnically declared population of Croatia, which means that their further depopulation can be expected along with emigration and negative bio-reproduction. This means that in the future we can expect an even more pronounced ethnic homogenization of Croatia, i.e. an increase in the relative share of Croats in the total population, although Croats in terms of the number will continue to be prone to depopulation.[14] However, less numerous ethnic groups with an extremely high degree of demographic aging, such as Austrians, Bulgarians, Montenegrins, Macedonians, Germans, Poles, Ruthenians, Slovenians and others, will experience an even stronger depopulation.

14 Although recent labor migration and irregular migration in Croatia are not the focus of this research, it is still necessary to point out the possibility that the future ethnic composition may be formed under their greater or lesser influence. All the more so because approximately 85% of immigrants to Croatia, or 58,538 people, according to data for 2023, are non-Croatian citizens (foreigners). Source: Croatian Bureau of Statistics, Migration of the population of the Republic of Croatia in 2023; www.dzs.hr (accessed March 26th, 2025).

List of sources and literature

Akrap, Anđelko; Grizelj, Marinko (1995). Ethnodemographic processes in the former Yugoslavia after World War II. *Hrvatska danas*, 1 (1-2), pp. 34-57.

Akrap, Anđelko (2008). The Demographic Context of the Disintegration of the Socialist Federative Republic of Yugoslavia. *Pilar*, 3 (5), pp. 11-58.

Akrap, Anđelko (2019). The Population of Croatia: Factors of Downward Trends. *Obnovljeni* Život, 74 (3), pp. 335-349.

Ananta, Aris; Arifin, Evi Nurvidya; Bakhtiar (2005). Ethnicity and Ageing in Indonesia, 2000–2050. *Asian Population Studies*, 1(2), pp. 227–243.

Berber, Maja; Grbić, Božo; Pavkov, Slavica (2008). Changes in the Share of Ethnic Croats and Serbs in Croatia by Town and Municipality Based on the Results of Censuses from 1991 and 2001. *Stanovništvo*, 2, pp. 23-62.

Birren, James E. (2013). *Handbook of the Psychology of Aging*, Academic Press.

Brajković, Lovorka; Korać, Dora; Vučenović, Dario (2023). Aging and the Quality of Life of Pensioners. *Kroatologija*, 14 (1), pp. 197-218.

Crkvenčić, Ivan (1998). Croatian Ethnic Territory and the Multiethnic Composition of Croatia as a Results of Population Migrations. *Društvena istraživanja*, 7 (1-2), pp. 109-125.

Čiutienė, Ruta; Railaitė, Rasa (2015). A Development of Human Capital in the Context of an Aging Population, *Procedia - Social and Behavioral Sciences*, 213, pp. 753-757.

Davoudi, Simin; Wishardt, Michelle; Strange, Ian (2010). The ageing of Europe. Demographic scenarios of Europe's futures. *Futures*, 42 (8), pp. 794-803.

Dumbrava, Costica. (2018). The ethno-demographic impact of co-ethnic citizenship in Central and Eastern Europe. *Journal of Ethnic and Migration Studies,* 45 (6), pp. 958-974.

Đurđev, Branislav; Livada, Svetozar; Arsenović, Daniela. (2014). The Disappearance of Serbs in Croatia. *Zbornik Matice srpske za društvene nauke*, 148, pp. 583-591.

Forste, Renata; Tienda, Marta (1996). What's behind racial and ethnic fertility differentials?. *Population and Development Review*, 22 (supplement), pp. 109-133.

Furfaro, Emanuela; Pelle, Elvira; Rivellini, Giulia; Zaccarin, Susanna (2024). Which support is provided in which country? Patterns among older adults in Europe. *European Journal of Ageing, 15*(21), pp. 1-16.

Harper, Sarah (2014). Economic and Social Implications of Aging Societies. *Science,* 346(6209), pp. 587-591.

Hoff, Andreas (2011). Population Ageing in Central and Eastern Europe as an Outcome of the Demographic Transition. In: Andreas Hoff (ed.), *Population Ageing in Central and Eastern Europe: Societal and Policy Implications* (pp. 1–24). Ashgate.

Howse, Kenneth; Sidorenko Alexandre (2022). Europe: An age-inclusive society?. *Journal of Population Ageing*,15, pp. 301-305.

Kinsella, Kevin; Phillips, David R. (2005). Global Aging: The Challenge of Success. *Population Bulletin, 60* (1), pp. 1–42.

Kovjanić, Aleksandar (2014). Ethnodemographic characteristics and position of Serbs in Croatia. *Demografija*, 11, pp. 119-134.

Nazor, Ante (2011). *Greater-Serbian Aggression Against Croatia in the 1990s*. Hrvatski memorijalno-dokumentacijski cetar Domovinskog rata – Zagreb.

Naja, Sarah; El Din Makhlouf, Mohamed Mohei., and Chehab, Mohamad Abdul Halim (2017). An ageing world of the 21st century: a literature review. *International Journal Of Community Medicine And Public Health*, 4(12), pp. 4363–4369.

Nejašmić, Ivo (2003). Characteristics of the biological (demographic) composition of the population of Croatia. *Hrvatski geografski glasnik*,65 (2), pp. 29-54.

Nejašmić, Ivo (2005). *Demogeography: Population in spatial relations and processes*. Zagreb*,* Školska knjiga.

Nejašmić, Ivo; and Toskić, Aleksandar (2013). Ageing of the Population in Croatia–the Current Situation and Perspectives. *Hrvatski geografski glasnik*, 75 (1), pp. 89-110.

Pavić, Dario (2013). Birth Rates of Ethnic Groups in Croatia from 1998 to 2008.*Migracijske i etničke teme*, 29 (1), pp. 39-62.

Pavić, Dario (2014). Fertility Dynamics of Ethnic Groups in Croatia from 1998 to 2012.*Migracijske i etničke teme*, 30 (3), pp. 67-93.

Pepeonik, Zlatko (1991). Post-war changes in the ethnic composition of Croatia and the influence of the environment. In: Ivan Crkvenčić (Ed.), *Političko-ge-*

ografska i demografska pitanja Hrvatske (str. 41-59), Zagreb: Savez geografskih društva Hrvatske.

Puljiz, Vlado (2016). Ageing of the Population – A Social Policy Challenge. *Revija za socijalnu politiku*, 23 (1), pp. 81-98.

Rowland, Donald T. (2007). Ethnicity and Ageing. In: Allan Borowski; Sol Encel; Elizabeth Ozanne (ed). *Longevity and Social Change in Australia*, UNSW Press, pp. 117-141.

Sanderson, Warren. C.; Scherbov, Sergei. (2007). A new perspective on population aging. *Demographic Research*, *16*, pp. 27–58.

Walker, Alan; Maltby, Tony (2012). Active Ageing: A Strategic Policy Solution to Demographic Ageing in the European Union. *International Journal of Social Welfare,* 21(S1), pp. 117–130.

Wertheimer-Baletić, Alica (1992). Demographic changes and global demographic processes in Croatia in the post-war period. *Encyclopaedia Moderna*, 2 (38), 238-351.

Wertheimer-Baletić, Alica (1999). Population and development. Zagreb: Mate.

Wertheimer-Baletić, Alica (2004). Depopulation and Ageing – Crucial Demographic Processes in Croatia. *Društvena istraživanja*, 13 (4-5), 631-651.

Wertheimer-Baletić, Alica (2009). Population ageing as a world process. *Rad 505*. Razred za društvene znanosti HAZU, 111-169.

Wertheimer-Baletić, Alica (2017). .Demographic theory, population development in Croatia and population policy (selected papers). Samobor: Meridijani.

Zaidi, Asghar; Howse, Kenneth (2017). The Policy Discourse of Active Ageing: Some Reflections. *Journal of Population Ageing, 10*, pp. 1–10.

Živić, Dražen. (2002). The Ethno-Demographic Framework of Greater Serbian Aggression Against the Republic of Croatia, 1991–1997. *Journal of Croatian Studies*, 2 (1), pp. 25-50.

Živić, Dražen; Pokos, Nenad (2004). Demographic Losses During the Homeland War as a Determinant of Depopulation in Croatia (1991–2001). *Društvena istraživanja*, 13 (4-5), pp. 727-750.

Živić, Dražen (2004). Forced migration and ethnic changes in Croatia between 1991 and 2001. Časopis *za suvremenu povijest*, 36 (2), pp. 639-661.

Živić, Dražen; Turk, Ivo; Šimunić, Nikola (2017). Changes in Age Structure of the Population of Croatia as the Indicator of Demographic Ageing and

reducing demoreproduction. In Markešić. I. (Ed.). *Čovjek i smrt Teološki. filozofski. bioetički i društveni pristup* (pp. 531-550), Institut društvenih znanosti Ivo Pilar, Hrvatsko katoličko sveučilište, Posmrtna pripomoć.

Živić, Dražen (2021). Regional Specificities of Demographic Aging: World, EU, Croatia. In: Pavić, Željko; Šundalić, Antun; Zmaić, Krunoslav; Sudarić, Tihana; Stefani, Claudiu; Bialous, Maciej; Janković, Dejan (Ed.), *Global Challenges & Regional Specificities* (pp. 368-390), Faculty of Humanities and Social Sciences Osijek, Faculty od Agrobiotechnical Sciences Osijek, University of Bialystok, Faculty of Agriculture of Novi Sad, "1 Decembrie 1918" University of Alba Iulia.

Žuljić, Stanko (1996). National minorities in the Republic of Croatia. *GeoJournal*, 38 (4), pp. 425-429.

Data sources

Croatian Bureau of Statistics, Census of Population, Households, Dwellings and Agricultural Holdings 1991, Population composition by age and sex, Internal data of the CBS;

Croatian Bureau of Statistics, Census of Population, Households and Dwellings 2001, Population by nationality, age, and sex, Internal data of the CBS.

Croatian Bureau of Statistics, Highlighted topics, Censuses, Census of population, households, and dwellings 2011, Population by nationality, age, and sex; www.dzs.hr (accessed on March 1st and April 18th, 2023).

Croatian Bureau of Statistics, Featured topics, Censuses, Census of population, households, and dwellings 2021, Population by ethnicity, age, and gender; www.dzs.hr (accessed on March 1st and April 18th, 2023).

Croatian Bureau of Statistics, Migration of the population of the Republic of Croatia in 2023; www.dzs.hr (accessed March 26th, 2025).

Promjene u etničkom sastavu Hrvatske (1991.–2021.) u kontekstu procesa starenja stanovništva

Sažetak

U radu se istražuju aktualne promjene u etničkom sastavu hrvatskog stanovništva prema dobi. Statistička osnova analize su rezultati popisa stanovništva 1991, 2001, 2011. i 2021. godine. Predmet analize stanovništvo je koje se u analiziranim popisima nacionalno izjasnilo, što znači da se u radu ne istražuje etnički neizjašnjeno stanovništvo. Svrha istraživanja komparativnom je i deskriptivnom metodom utvrditi dosegnutu razinu procesa starenja stanovništva, s ciljem procjene polarizacije između etnički izjašnjenih kategorija stanovništva i utjecaja starenja na buduće promjene u etničkom sastavu stanovništva Hrvatske. S obzirom na aktualne demografske trendove u prirodnom i mehaničkom kretanju stanovništva te imajući u vidu utvrđene pokazatelje starenja stanovništva, većina etnički izjašnjenog stanovništva Hrvatske duboko je u procesu.

Ključne riječi: etnički sastav, dobni sastav, demografsko starenje, depopulacija, Hrvatska.