IS FERTILITY IN BOSNIA AND HERZEGOVINA NOW DECLINING FASTER THAN IN THE REST OF THE EX-YUGOSLAV AREA?

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ABSTRACT

Bosnia and Herzegovina belonged to the group of republics of the former SFRY, which recorded higher birth rates and a lower mean age at birth of the first child compared to Slovenia, Croatia, and Serbia, thus, experienced "late" fertility transition. However, after independence, although with a quite favorable age structure, population fertility indicators, both absolute and relative, began their decades of marked decline. Using the demographic method, together with general scientific methods and statistical methods, we will analyze the change in birth patterns in Bosnia and Herzegovina with a focus on the last 30 years. This paper shows the change in the age model of fertility in Bosnia and Herzegovina and the consequences that this change had on the level of the total fertility rate. The problem of discontinuity, as well as the methodology of calculating fertility indicators in the inter-census period, forced the authors to use different assessment methods. Bearing in mind the unusually low fertility rate that particularly attracts attention, the paper looks at the problem of estimating the base-line population and calculating relative fertility indicators, especially in the context of the obsolescence of census data. Bosnia and Herzegovina today, in the context of the wider ex-Yugoslav area, occupies a different position when it comes to the age pattern of fertility, making the mentioned area quite homogeneous, but still retaining some peculiarities from the previous period. It is quite certain that the level of the fertility rate, and its age-pattern in Bosnia and Herzegovina do not differ significantly with other ex-Yugoslav countries.

Keywords: total fertility rate, mean age at birth of the first child, SFR Yugoslavia, age-sex structure, estimation.

INTRODUCTION

The long-term decline in fertility in European countries began almost two centuries ago, and in the territory of the former Yugoslavia at the transition from the 19th to the 20th century. Although without essential differences in relation to the broader environment of Southeast Europe, certain differences between the macro units of the former state persisted until the end of the 20th century. In the period between the two world wars, Bosnia and Herzegovina (BiH) was widely underdeveloped agrarian area, most of the population lived in the countryside, and illiteracy was high [5]. The level of overall social and even agricultural underdevelopment was indicated by the fact that on the eve of the Second World War (WW2), most of the land was cultivated with a wooden plow, and

that at the end of 1945 there were only 217 tractors or one plow on three farms [6]. However, after WW2, together with the other republics of the former state, the process of intense deagrarianization began in BiH, which, however, was not initially followed by immediate de-ruralization of the population. This specific form of transition to non-agricultural activities, without significant emigration from the rural area, is confirmed by the fact that only 12% of newly arrived workers in the industry left their place of permanent residence until 1953. BiH society after WW2 was a peasant society in the true sense of the word: most of the population lived in the countryside (83%), only 2% of the population worked in industry, the country was characterized by economic underdevelopment, while 70% of the population was illiterate [6]. This was particularly pronounced among women, where, for example, during the 1950s, the employment rate of the female population was between 2 and 3 percent [5]. In such conditions, BiH met the post-war period with a total fertility rate (TFR) of over five children per woman, twice as much as in SR Croatia, SR Slovenia, and SR Serbia (without the province of Kosovo and Metohija). Childbearing started early, in parallel with early marriage, and lasted long, making the effective fertile period long. Until the end of the 1970s, fertility in BiH was higher than the average for former Yugoslavia. Not only was fertility high after WW2, but the baby-boom period lasted longer than in the most other republics, resulting in a quite favorable population age structure until the end of the 20th century.

A more pronounced decline in fertility occurred during the 1960s, later than in the previously mentioned republics. Although the fertility decline in BiH was faster than the national average (2.19% versus 1.34% per year), the starting point of the fertility decline in BiH was significantly higher, so that the overall national average was only reached at the end of the 1970s. However, what represents the key difference of the fertility transition in BiH compared to low-birth-rate areas (Croatia, Slovenia, Serbia) is that the low-birth-rate areas entered the second demographic transition (fertility transition) ten years earlier than most European countries did, while BiH entered more than ten years later. Namely, the very concept of the Second Demographic Transition (SDT) [12] postulates that in the wider European area, the decline of birth rates to below-replacement level started in mid-1960s, distinguishing three groups of countries whose transition experience was somewhat different. Countries that later enter the long-term fertility decline, often progress faster in that process with the features of the change in the age-pattern of fertility take on the character of the avalanche, once they are activated [13]. Paradoxically, the successor countries of the former SFR Yugoslavia did not manifest the prerequisites for the start of the SDT at all, but it was still happening [7]. Once the traditional patterns of marriage and childbirth in patriarchal societies are disrupted, the decline in fertility becomes precipitous, as confirmed by the contemporary experiences of Iran, Turkey, South Korea, and BiH. The process of modernization of society, although it is often not induced from the inside, but "brought" from the outside, through the expansion of education (especially female) and the transformation of economic activity, affects the decline of fertility as strongly as when it is the authentic outcome of one's own social progress.

This paper will present the most important characteristics of the change in the age model of fertility, primarily as a transformation of cohort and period fertility indicators before the war conflicts in BiH as a starting position, towards those we are witnessing today.

LITERACY AS THE DRIVER OF THE FERTILITY TRANSITION

During the second half of the 20th century, major changes took place in the education and literacy of the female population of BiH. The changes of literacy in BiH after WWII took place in the context of deep social and economic transformations and was marked by continuous improvement. Despite the overall progress, this process was accompanied by pronounced structural inequalities in literacy, especially between men and women, as well as significant differences depending on the age structure and population ethnicity.

According to the 1948 census, 44.9% of the population of BiH was illiterate, with strongly emphasized gender differences (28.7% for men and 59.3% for women). In the wider Yugoslav context, BiH ranked second among socialist republics and autonomous provinces in terms of total illiteracy rates. The highest rate of illiteracy was recorded in the Autonomous Province of Kosovo and Metohija (62%), while high rates of illiteracy were also registered in Macedonia (40.3%) and central Serbia (27.4%). In contrast, the lowest illiteracy rates were recorded in Slovenia (2.4%) and the Autonomous Province of Vojvodina (11.8%) [17]. The results of the same census indicate a marked structural inequality in the level of illiteracy by age cohort. In BiH, among the population 65+ years old, the illiteracy rate was 73.1%, while among women in the same age cohort it reached 92% [28]. In the age group 10-14 years, 34.3% of the population was illiterate, with the illiteracy rate being 44.3% in the female and 28.7% in the male population [28]. This pattern deviates from the expected trend of lower illiteracy in younger cohorts, which has been linked to the disruption and uneven access to education during WWII. Analysis according to ethnicity shows that in 1948, among the population over 10 years of age, illiteracy was 54.4% among Muslims-undeclared, 41.7% among Serbs and 40.3% among Croats [28]. At the state level of Yugoslavia, the illiteracy rate among Muslims-undeclared was 54.3%, while among the female population within this group it reached 70.3% [17].

The 1953 population census indicates a further increase in the level of literacy, whereby the total illiteracy rate in BiH was reduced to 40.2%, while among the females it was 57.1% [18]. According to the results of the 1961 census, this trend continued, and the total illiteracy rate decreased to 32.5%, and among women to 47.8% [19]. The results of the 1971 Census show that in BiH 23.2% of the population was illiterate, with illiteracy being significantly more pronounced among women (35.1%) than among men (10.5%) [20]. In the same census, the share of the population with higher education was only 1.8%. According to the 1981 Census, the illiteracy rate in BiH was reduced to 14.2%, with illiteracy among women at 23.3% and among men at 5.5%. At the same time, the share of the population with completed higher education increased to 4.2%, which indicates considerable progress in the educational structure [21]. Further progress in education was confirmed by the results of the 1991 Census, according to which the share of illiterates decreased to 9.9%. Observed according to gender, illiteracy was 3.4% among men and 16.4% among women, continuing the trend of decreasing overall illiteracy with age and gender differences still present [16]. The share of highly educated population reached 5.5%, with the highest values among people who declared themselves Yugoslavs [10].

The first post-Yugoslav Population Census 2013 showed that the total illiteracy rate in BiH has decreased to 2.8%. Illiteracy was 0.79% for men and 4.76% for women, which confirmed the continuity of gender differences [23]. At the same time, pronounced spatial disparities were identified, with the highest rates of illiteracy registered in municipalities

with an unfavorable age structure, pronounced demographic aging and long-term depopulation processes [11].
Miloš Macura wrote about the influence of literacy on the differentiation of fertility among women in Yugoslavia, pointing, among other things, to the high birth rates in the areas of central Bosnia, which he linked to the high share of illiterate Muslim women [8]. Starting from the fact that the literacy rate in the demographic literature is considered one of the key indicators of reproductive behavior, the decline in fertility in BiH, especially in the period between 1948 and 1971, can be significantly linked to the rapid increase in literacy among the female population. Census data from 1948 show that in the female fertile contingent total illiteracy rate was 56.82% [17]. Illiteracy showed marked age differentiation: it ranged from 35.9% in the 15–19-year-old cohort to 82.5% in the 45–49-year-old cohort [17]. According to ethnicity, the highest rate of illiteracy in the fertile contingent was among women who declared themselves as Muslim-undeclared (69.9%), followed by Serbian (53.9%) and Croatian women (52.14%) [17]. By the census 1971, there was a sharp decrease in illiteracy in the fertile cohort of women, which then amounted to 24.2% [16]. This decline coincides with a pronounced lowering of fertility rates during the 1960s. According to census data from 1971, in the age cohort 10-19 years, illiteracy among women was 6%, while in the cohort from 35-49 years it was 49.7% [16]. In the Census 1991, the total illiteracy of the fertile cohort of women was reduced to 4.3% [16]. The lowest values were recorded in the youngest age group 10-19 years (1.7%), and the highest illiteracy rate registered in the 35–49-year cohort (9.3%) [16].

METHODOLOGY

The subject of research is the pattern of fertility in BiH, both its structural demographic characteristics and the quantity. The change in the birth pattern is reflected in the change in the age at which childbirth occurs, the frequency of births in individual age groups and overall fertility indicators. The transformation of the fertility model during the SDT is changing towards childbirth postponement (a constant increase in the mother's mean age at childbirth (MAB), regardless of parity) and a decline in the fertility level below replacement (approximately 2.1 children per woman). In this sense, the aim of the research is to describe the changes in the birth pattern in Bosnia and Herzegovina since the middle of the 20th century, with a particular focus on the last 30 years.
Regarding the territorial determination of the research framework, the fertility analysis was carried out at the level of BiH as a whole, and certain, smaller, changes in the borders of BiH that existed even immediately after WW2 [6] are not of such a character as to threaten the methodological consistency of the analysis. The timespan can be viewed on several parallel planes. Namely, the fertility analysis itself covers the period 1950-2024 when it comes to period indicators and 1991-2013 in the analysis of cohort fertility indicators[9]. On the other hand, to put the transition of fertility in a specific sociodemographic context, the literacy of the female population was analyzed in the censuses from 1948 to 2013. Such a multidimensional approach to fertility analysis required the use of various data sources, the most important of which are: census books, demographic (vital) statistics, and statistical yearbooks of BiH. In the second part of the fertility analysis, for the purposes of assessing the "real" values of TFR, it was necessary

[9] [1] For a more detailed explanation of the concepts of transferal period and cohort fertility analysis, see "Demography - methods and models", Dušan Breznik, 1972, Institute of Social Sciences, Belgrade.

to assess the annual migration balance after the last population census (in 2013) and to calculate the estimate of the age composition of the fertile contingent in the period 2014-2024, for which alternative sources of data on migration were used, including various studies based on the "mirror statistics" approach, the Migration Profile of BiH, the Migration Profile of the Republic of Serbia, Household Budget Survey in BiH, the Projection of the population of BiH [27] and the age-sex distribution of the migration balance for BiH from the UN World Population Prospects 2022.

The central place is occupied by the demographic method (period and cohort) used in the analysis of fertility, but also general mathematical and statistical methods were used in the assessment of the migration balance, as well as general scientific methods in the description of the sociodemographic context of the epoch during which the fertility transition took place and comparison with the surrounding countries (historical and comparative method).

The complex nature of the fertility transition process has imposed the need to use various sources of demographic data and different methods of population science in parallel to fully understand the transformation of fertility patterns.

RESULTS

The average number of children per woman (TFR) in 1950 was 5.12, that is, fourfold than was recorded in the year of the last population census (2013). Fertility decline started already after WW2, so the TFR decreased approximately by one child per decade. In a certain way, the year 1978 represents a turning point when for the first time TFR was below-replacement (2.012), which can be considered the beginning of the SDT in BiH (Figure 1).

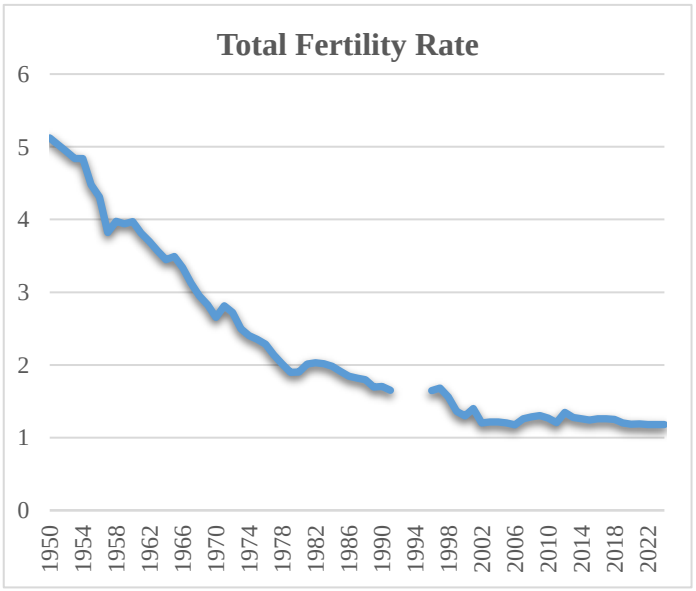

Figure 1. Total fertility rate in the period 1950-2024, Bosnia and Herzegovina

Bearing in mind that the TFR in the methodological sense represents the sum of age-specific fertility rates calculated per one woman (and not per one thousand), it is important to discuss the age-specific birth frequency and cumulative specific fertility rates. Cumulative in this case represents the average number of children born by a woman up to a certain age (Table 1).

Table 1. Age-specific fertility rates

Age-specific fertility rates							
	1965/69	**1975/79**	**1987**	**1997**	**2007**	**2017**	**2024**
15 - 19	0.0490	0.0411	0.0365	0.0361	0.0152	0.0092	0.0071
20 - 24	0.1927	0.1475	0.1323	0.1225	0.0689	0.0539	0.0440
25 - 29	0.1692	0.1219	0.1124	0.0931	0.0834	0.0792	0.0758
30 -34	0.1137	0.0697	0.0555	0.0555	0.0595	0.0722	0.0672
35 - 39	0.0713	0.0342	0.0211	0.0237	0.0208	0.0316	0.0341
40 -44	0.0280	0.0109	0.0055	0.0054	0.0036	0.0054	0.0072
45 - 49	0.0049	0.0011	0.0006	0.0005	0.0003	0.0004	0.0004
Cumulative fertility rates							
15 - 19	0.25	0.21	0.18	0.18	0.08	0.05	0.04
20 - 24	1.21	0.94	0.84	0.79	0.42	0.32	0.26
25 - 29	2.05	1.55	1.41	1.26	0.84	0.71	0.63
30 -34	2.62	1.90	1.68	1.54	1.14	1.07	0.97
35 - 39	2.98	2.07	1.79	1.65	1.24	1.23	1.14
40 -44	3.12	2.13	1.82	1.68	1.26	1.26	1.18
45 - 49	3.14	2.13	1.82	1.68	1.26	1.26	1.18

Source: [15] Statistical Yearbook of the Republic of BiH in 1992; [22] Demography BiH 2024, Agency for Statistics of Bosnia and Herzegovina (2025); and author's calculations.

Obvious changes in the fertility pattern that have occurred in the last 65 years are moving towards childbirth postponement and lowering age-specific fertility rates. However, if we divide the changes into two parts, that is, until 1997 and after 1997 (pre-Yugoslav and post-Yugoslav periods), then the specific characteristics of those changes can be more clearly observed (Figure 2). Namely, most of the decline in Bosnian fertility occurred before the collapse of Yugoslavia, but the transformation of the age model of fertility occurred only after. Thus, from the second half of the 1960s, TFR declined from 3.14 to 1.82 already by 1987 and 1.65 by 1991. In other words, 76% of the total decline in fertility occurred during the first half of the period and only 24% during the second half. On the other hand, if we look at the graphic representation of the rates and their cumulative, we can see that there is no significant change in the age pattern of births in the first half of the period, only a decrease in the frequency. The youngest cohorts (15-19) give birth almost at the same level until the middle of the 1990s, and the peak of fertility even shifts to a lower age in 1997 compared to 1965-1969. However, a more significant transformation of the age pattern of births began only after the collapse of Yugoslavia, and the peak of fertility moves closer to the 30th year of a woman's life. Thus, the cumulative fertility rate shows that not only did the total fertility drop by almost two children, but that more than two-thirds of the increase in the mean age at the birth of the first child (MAB1) occurred right after the independence of BiH.

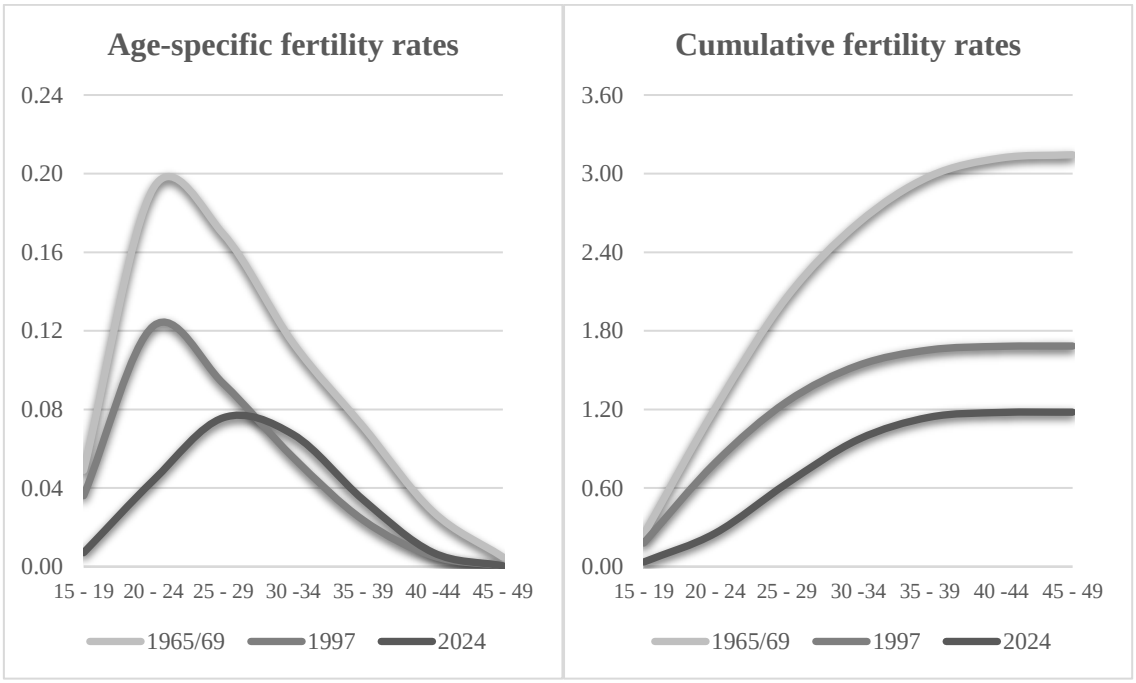

Figure 2. Age-specific fertility rates in BiH, 1965-2024

The previously described changes in birth patterns after independence are also reflected in the increase in MAB, especially in MAB1. The causes of delayed childbearing such as extended schooling, increased participation of women in the labor market and the general trend of later marriages do not distinguish BiH from the wider European environment, and the additional reason of exceptional economic insecurity does not distinguish it from other countries of the ex-Yugoslav area. At the beginning of the 1970s, MAB was 26.8 years, but it declined over the next decade and a half. Not because MAB1 has been lowered, but because fertility has declined due to a serious reduction in the share of higher parities. This significantly shortened the effective fertile period, which must have resulted in a decrease in MAB. For example, in the first half of the 1970s, 12.2% of the total number of births occurred after the age of 35, while only 10 years later this share amounted to only 5.5%, so that MAB dropped to 25.6 years. After the independence of BiH, in 1996, MAB was 26.9 years, but in the following year, due to birth compensation, it dropped to 25.710 years, which was followed by a constant increase. As for MAB1, we only have data from 2004, but based on the ratio between these two indicators, it can be assumed that after the end of the civil war, it was about 23 years, or even slightly less. Figure 3 shows MAB and MAB1 with an estimate for the period 1997-2003. It is certain that over the last 30 years MAB1 has increased by more than five years (Figure 3).

[10] It is assumed that after the end of the war (after November 1995) many women wanted to make up for delayed childbearing, which, along with the average waiting time for conception and pregnancy duration of nine months, resulted in the highest number of births during 1997.

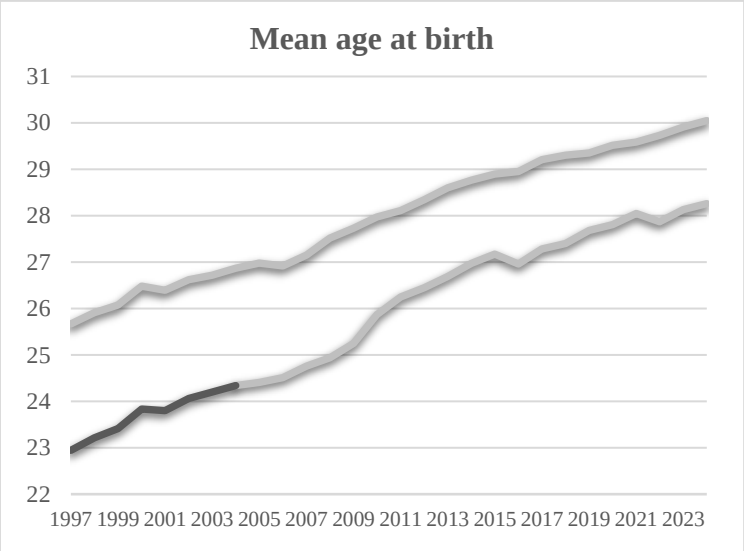

Figure 3. MAB and MAB1 in BiH, 1997-2024

On the other hand, in addition to the period fertility indicators, we also have cohort indicators that more faithfully reflect the actual birth conditions and their age pattern. The description of changes in the age model of fertility in post-Yugoslav BiH can only be complete with a description of the characteristics of the birth pattern that have been recorded immediately before the outbreak of civil war. In this sense, the changes between the 1991 and 2013 censuses were analyzed. In 1991 age-pattern of fertility was already marked by low fertility rates among women up to mid-twenties, and relatively sharply increasing to the mid-thirties. Yet, women achieved up to 70% of total fertility until the end of optimal reproductive age (until 35 years of age), gaining remaining 30% of fertility during advanced maternal ages, and making effective fertile period quite long. Two decades later, in Census 2013, pattern of fertility, although at a lower level, was still quite similar up to the age of 35, but with faster decline in the advanced maternal ages (Figure 4). Completed cohort fertility rate (at ages 45-49) was 2.61 children per woman in 1991, leading to the 23.4% decrease in 2013 (2.00 children per woman). If we reflect on the absolute age-specific changes in fertility, then we can say that fertility fall is relatively constant with age (0.5 children approximately), except for the youngest (smaller) and the oldest (higher) age cohorts.

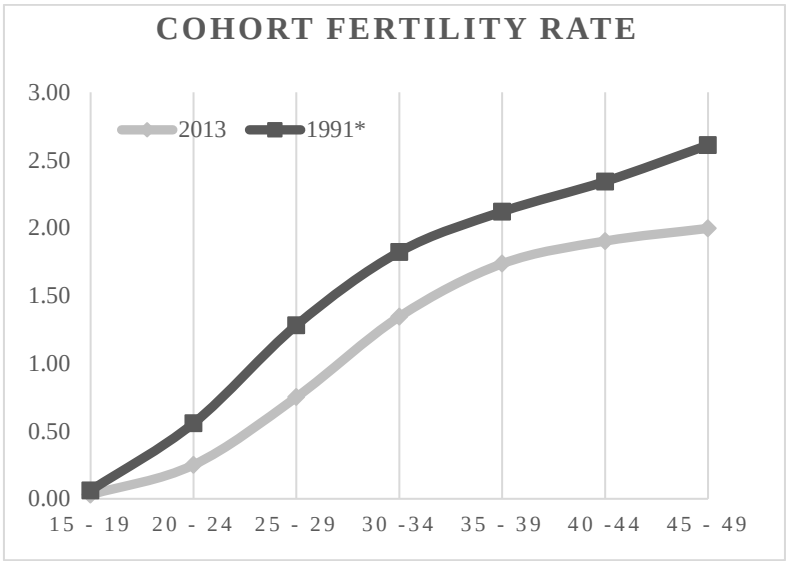

Figure 4. Age-specific cohort fertility rates in BiH, 1991* and 2013

Regarding the proportion of women who gave birth by a certain age, clear changes are visible between the two censuses, especially in women's twenties (Figure 5). Youngest cohort decreased by five percentage points, making up 2% of them participating in reproduction. However, major changes occurred in women of optimal reproductive age (20-34) decreasing by 23, 24, and 12 percentage points in women of 20-24, 25-29, and 30-34 years of age, respectively. At advanced maternal ages, the differences between these two censuses are decreasing with age of women. At the end of the fertile period, women's reproductive participation rate is quite similar in both censuses, 90% and 88% in 1991 and 2013 respectively, indicating relatively low levels of social sterility.

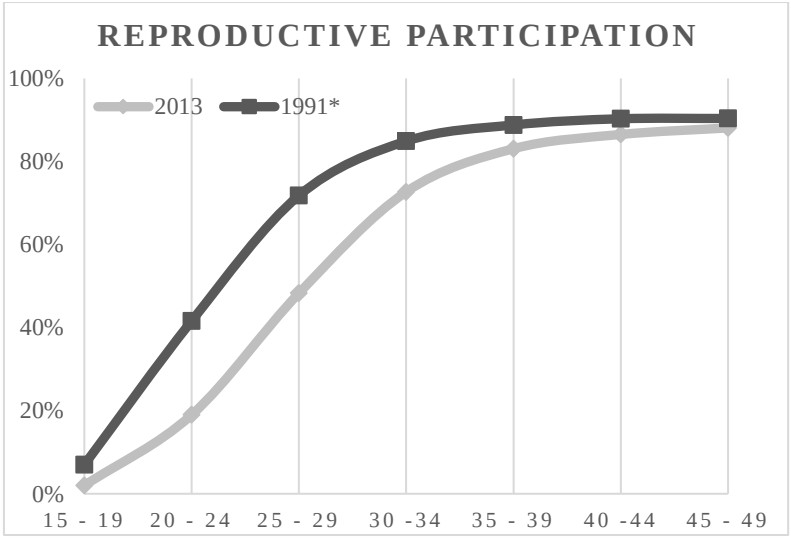

Figure 5. Age-specific reproductive participation rates in BiH, 1991* and 2013

* Analysis of the 1991 Census data in BiH was never finished, and the age and parity specific data were delivered upon request but were not subject of statistical control. The rate does not include all parities because additional data processing showed some illogicalities that were excluded. The first age group refers to fertility up to the fourth child, the second to the fifth child and all others up to the eighth child.

DISCUSSION

Significantly higher fertility in BiH immediately after WWII was inherent to the backward agrarian society of that time, with high fertility rates mostly related to lower levels of education and higher illiteracy compared to other republics, even in urban areas [8].

The high female unemployment and illiteracy of that era were key factors in the high fertility rates. The number of employed women in BiH was only 49 thousand in 1954 [29]. Until the end of the 1970s, the share of the urban population was about one-third, and due to the large demographic losses during WWII (approximately 25% of the total population), the compensation period lasted longer than in other republics [5]. Early childbearing in BiH was so common in the period after the WWII that in analyzes of specific fertility rates, it was observed that only the category of women aged 15 to 19 years did not reduce the level of the rate, more than 30 years after the end of the war [5]. The decline in fertility rates was observed mostly in women aged 25 and over, which indicates the limitation of marital fertility, but with early and almost universal marriage. Until the end of the 1970s, over 80% of women married before the age of 24 [30].

An interesting qualitative explanation of the specific fertility transition in BiH can be found in the study "Man, birth, society" [4]. Based on a survey conducted in 1970 with the aim of determining the social conditioning of changes in fertility in BiH, it was concluded that industrialization and the growth of women's employment affect the decline in fertility rates, but that, due to distinct differences in the speed of economic and regional development in the territory of BiH, in those parts that were affected by economic stagnation, and where the fertility transition has already begun, unfavorable socio-economic conditions further accelerated its decline. Among other things, the research recognizes class affiliation (peasants, workers, officials, experts) as the predominant determinant of the differential fertility of the population of BiH in that period. Thus, the differences between the highest and the lowest class in achieved fertility were 263%, but they decreased in the desired number of children (33%) and were the smallest in the ideal number of children. On the other hand, only the members of the highest-class recorded below-replacement fertility, and at the same time, they were the only ones to record a higher desired fertility than the achieved one, indicating that among all the lower classes there was an unsatisfied need for family planning. In the peasantry, the realized fertility was 1.3 children per woman higher than desired [4].

In the conclusions of the mentioned research, which was carried out in six municipalities of BiH, it was underlined that a further decline in fertility in the class of experts (1.58) and officials and non-production workers (2.66) is not expected, but that the majority of the further decline in fertility could occur in the class of workers (2.55) and peasants (4.15) [4]. Unfortunately, the decline in fertility occurred among all classes, but the decline was more intense among the lower classes. In 1970, this research recorded a total average number of desired children of 2.54, however, regardless of the lack of similar research in the recent period, the research conducted for the purposes of developing the "Demographic Strategy of the City of Banja Luka" recorded the desired number of children of 2.06 [3], indicating that the preferences of the population are shown to be an important limiting factor in the potential rehabilitation of the birth rate in BiH.

The latest, very low, recorded values of the period TFR of 1.18 in 2024, as well as in most years after the 2013 Census, really raise doubts. The shortcomings of period rates in countries where population estimates become outdated as we move away from the census

in time are well known [9]. The biggest shortcoming of such estimates is actually the lack of data on international migration and migration balance, which in highly emigration countries such as BiH usually leads to a greater or lesser overestimation of the resident population in the country. According to World Bank estimates, BiH, with 44.5% of its population abroad, ranks 16th in the world in terms of emigration [14]. Consequently, such an overestimation of the country's population negatively affects the level of the fertility rate. In order to make at least an approximate estimate of the resident population, it is necessary to estimate the international migration balance.

As part of the Study on emigration from BiH [2], based on mirror statistics from the countries of the European Union, the USA and Australia, as well as data from the Migration Profile of BiH, an assessment of the value of emigration until 2018 was carried out. However, the Study itself emphasized that the data do not include emigration to Turkey, the UAE and Serbia, which is an important shortcoming of this assessment considering that Turkey and the UAE are important destinations for emigrants from the Federation of Bosnia and Herzegovina, and Serbia is an important destination for emigration from Republika Srpska. However, as an estimate of emigration, data on the number of persons who were outside the country for 12 months or longer (approximately 58% of the total emigration) was taken from this study, and the linear trend of this number was extrapolated for the years after 2018. To this number, we added 1/3 of persons who took the citizenship of the Republic of Serbia[11] in the corresponding year, thus estimating the annual emigration from BiH.

As far as immigration is concerned, data on immigration to BiH can be considered very reliable, and their monitoring is continuous by the Ministry of Security. For the purposes of assessing the migration balance in this paper, immigration is calculated as the sum of returnees (with the assistance of the IOM and under the Agreement on Readmission) and the number of persons to whom a temporary residence permit was issued. A rate of 0.58 was applied to persons who were issued a temporary residence permit (due to the lack of classification according to the length of stay), which represents the share of those who stay for 12 months or longer, because the same principle is observed among BiH citizens who emigrate. Therefore, the assumption is that as citizens of BiH who emigrate, do so for a period longer than a year with a share of 0.58, foreigners with a temporary residence permit in BiH do the same. Based on the previously described procedure, the values of the annual migration balance were obtained (Table 2).

[11] The Republic of Serbia allows dual citizenship, and those who obtain citizenship do not have to deregister from BiH, so domestic records do not recognize it as emigration. The share of 1/3 was taken as a flat rate i.e. the minimum proportion of those who could leave Bosnia and Herzegovina in the corresponding year.

Table 2. Annual international migration in BiH, 2014-2024

Year	Emigration	Imigration	Migration ballance
2014	16762	7070	-9692
2015	16423	8384	-8039
2016	21816	8418	-13398
2017	26828	7963	-18865
2018	36704	6995	-29708
2019	36726	6541	-30185
2020	34552	5178	-29374
2021	35093	6154	-28939
2022	53226	7342	-45884
2023	58247	8345	-49902
2024	46776	9150	-37626

Source: [2] Study on emigration Bosnia and Herzegovina (2019); [24] The Migration Profile for Bosnia and Herzegovina 2014-2024; [25] The Migration profile of the Republic of Serbia 2014-2024; and author's calculations.

To be distributed according to age and sex, the obtained estimate of the annual values of the migration balance was multiplied by the shares of the female population by age from the empirical migration model applied in the UN World Population Prospects 2022 for BiH [26] (Table 3).

Table 3. Age-specific migration balance for women in BiH, 2014-2024

	15 – 19	20 – 24	25 – 29	30 -34	35 – 39	40 -44	45 – 49
2014	-544	-977	-915	-677	-438	-279	-199
2015	-451	-810	-759	-561	-363	-231	-165
2016	-752	-1351	-1266	-935	-605	-385	-275
2017	-1059	-1902	-1782	-1317	-852	-542	-387
2018	-1668	-2994	-2806	-2074	-1342	-854	-610
2019	-1694	-3043	-2851	-2107	-1364	-868	-620
2020	-1649	-2961	-2775	-2051	-1327	-844	-603
2021	-1625	-2917	-2734	-2021	-1307	-832	-594
2022	-2576	-4625	-4334	-3204	-2073	-1319	-942
2023	-2801	-5030	-4714	-3484	-2254	-1435	-1025
2024	-2112	-3793	-3554	-2627	-1700	-1082	-773

Source: [2] Study on emigration Bosnia and Herzegovina (2019); [24] The Migration Profile for Bosnia and Herzegovina 2014-2024; [25] The Migration profile of the Republic of Serbia 2014-2024; [26] UNWPP 2022; and author's calculations.

Based on the estimated migration balance by sex and age, corrections were made to estimate the size and age composition of the fertile contingent of BiH for the period 2014-2024 and to recalculate age-specific fertility rates (Table 4).

Table 4. Estimated age-specific, and total fertility rate in BiH, 2014-2024

ASFR	15 – 19	20 – 24	25 – 29	30 -34	35 – 39	40 -44	45 – 49	TFR*	TFR
2014	0.0108	0.0491	0.0896	0.0724	0.0270	0.0046	0.0003	**1.269**	1.258
2015	0.0106	0.0475	0.0875	0.0732	0.0276	0.0047	0.0002	**1.256**	1.242
2016	0.0103	0.0503	0.0870	0.0750	0.0294	0.0048	0.0003	**1.285**	1.258
2017	0.0087	0.0495	0.0868	0.0779	0.0321	0.0050	0.0004	**1.302**	1.259
2018	0.0075	0.0515	0.0845	0.0770	0.0328	0.0055	0.0004	**1.296**	1.252
2019	0.0071	0.0514	0.0818	0.0750	0.0335	0.0057	0.0003	**1.274**	1.204
2020	0.0067	0.0479	0.0826	0.0727	0.0341	0.0057	0.0004	**1.251**	1.185
2021	0.0066	0.0470	0.0836	0.0772	0.0335	0.0062	0.0004	**1.272**	1.190
2022	0.0060	0.0442	0.0905	0.0764	0.0353	0.0063	0.0003	**1.295**	1.180
2023	0.0054	0.0429	0.0986	0.0765	0.0365	0.0071	0.0006	**1.338**	1.182
2024	0.0057	0.0425	0.1015	0.0756	0.0381	0.0074	0.0004	**1.356**	1.179

Source: [22] Demography BiH 2024, Agency for Statistics of Bosnia and Herzegovina (2025); and author's calculations.

The deviation of the obtained TFR values compared to the officially recorded ones increased over time and reached 0.18 children per woman in 2024, i.e. 15%. Similar deviations were recorded in Serbia at a slightly lower level, with the highest values recorded in 2021 and amounting to 0.07 children per woman, i.e. 4.6% [9] (Figure 6).

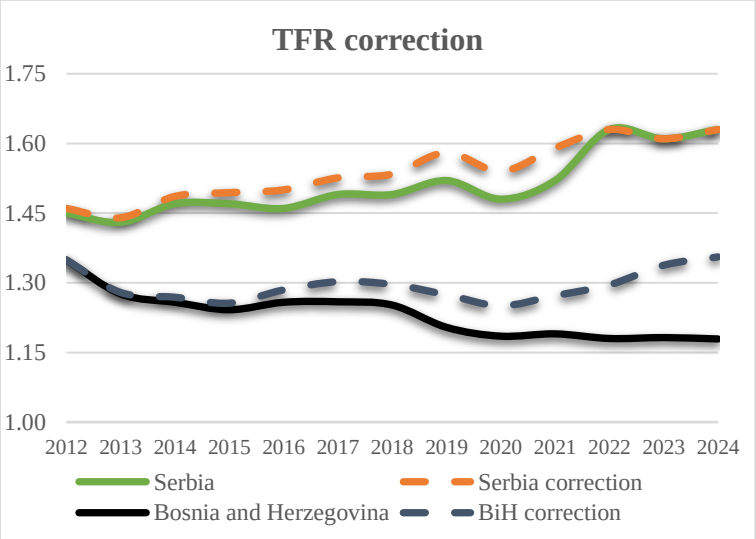

Figure 6. Recorded and corrected TFR in Serbia and Bosnia and Herzegovina, 2012-2024

Regardless of the different values of corrected TFR in Serbia and BiH, a similar pattern, or trend, is easily discernible. In this sense, it is very useful to compare the trend of TFR in all the former Yugoslav republics (Figure 7). The change of corrected TFR values in BiH shows a similar pattern as in Serbia and Montenegro, but, compared to all other former republics, it is at the lowest level. In addition, only these three countries record a full TFR recovery after the shock caused by the COVID-19 pandemic.

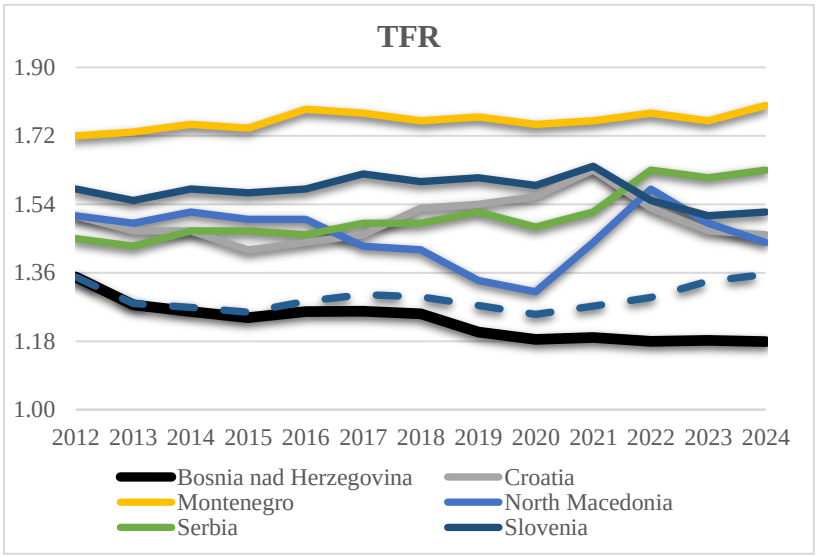

Figure 7. TFR in ex-Yugoslav area, 2012-2024

Apart from the TFR value, an important indicator of fertility transition is the mean age at birth of a child (MAB), which is increasing in all countries of the ex-Yugoslav area. The mean age at the birth of the first child (MAB1) is the highest in Croatia and Slovenia (29.8 and 29.6 respectively), and the lowest in BiH and North Macedonia (28.3 and 28.2 respectively). Considering the pace of growth of MAB1 in BiH, it can be said that BiH is now 10 years behind Croatia and Slovenia. When we look at the total MAB, the differences are similar, and BiH records values like those in North Macedonia. The pace of increase of MAB and MAB1 in BiH does not differ compared to other countries of the ex-Yugoslav area, but the lower values of these indicators are evident (Figure 8).

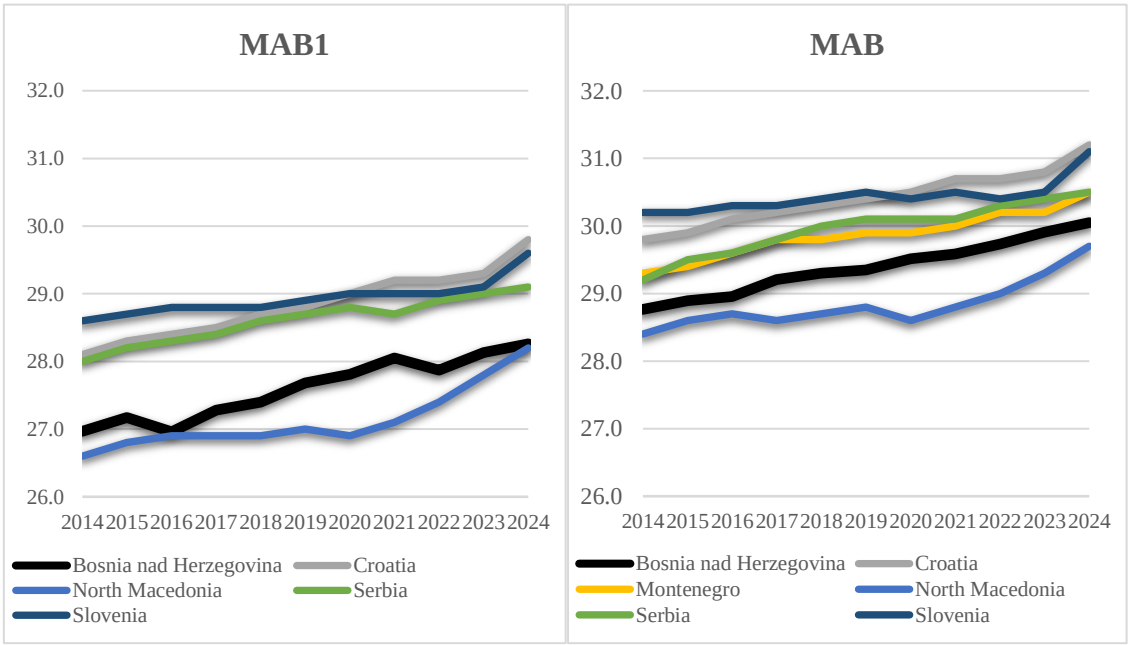

Figure 8. MAB and MAB1 in ex-Yugoslav area, 2014-2024

CONCLUSION

Fertility transition in BiH, although it started later, and with significantly higher TFR compared to the low-fertility part of the former Yugoslavia, during the second half of the 20th century progressed very quickly due to the sharp increase in women's literacy, the improvement of the educational structure and the transition from agriculture to the industrial sector of economic activity. In 1978, TFR fell below replacement for the first time, thus BiH entered the process of the SDT. The continuation of the decline in fertility starting from the early 1980s until today was characterized, at first, by the decline in marital fertility among women aged 25 and more years old, without a significant change in the age pattern of birth, but only by lowering the quantum, and was followed by major changes in the fertility pattern occurred at the turn of the 20th to the 21st century embodied in the postponement of the birth of the first child and further reduction of the quantum of fertility. However, the registered decline of fertility in BiH in the last few years is not as sharp as it seems. Observing the corrected values of TFR (where the strong emigration from BiH after the last population census was considered), it can be said that the population of BiH largely records similar fertility trends as other surrounding countries, and that the model of earlier entry into reproduction is very similar to that of North Macedonia. Although it is at a lower level compared to other countries, fertility in BiH has not been declining faster than in the rest of the ex-Yugoslav area recently because most of the decline in fertility took place before the collapse of Yugoslavia, only the change in the age pattern of fertility took place during the last 2-3 decades. The Ex-Yugoslav area is today, in terms of population fertility, far more homogeneous than it was at the time of the existence of the former SFR Yugoslavia.

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