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Estimating the Total Demographic Loss of World War II in Yugoslavia: A Critique of Vladimir Žerjavić's Method

The question of estimating the total demographic loss of Yugoslavia in the Second World War became topical immediately after the end of the war when these estimates became an important aspect in defining the reparational demands of socialist Yugoslavia. The first assessments were made under great political pressure, which was also felt, to a lesser extent, in later revisions. It can therefore be said that each assessment method was adapted according to its purpose. A deviation in this sense is the assessment of Vladimir Žerjavić from 1989, which due to methodological consistency is generally accepted as objective and most often cited in historiographical works. Here we will point out a methodological error of Žerjavić's estimate and suggest a correct calculation method.

1. Introduction

The issue of war victims, that is, of human or demographic loss caused by war, is an extremely important demographic, economic, legal, political, but above all, civilizational issue.

War creates long-term disturbances in the age structure of the population, by a decrease of the cohorts born during the war and an increase in the periods of demographic compensation immediately after the war. This is then reflected on the future, unborn generations.

However, war casualties are not just a demographic problem. Due to the decrease in the share of the working-age population and the increase in social benefits (pensions, compensations, etc.), the war-time population loss is a great burden on war-exhausted economies. Also, resolving the legal status of victims and the rights arising from that status make the issue of war demographic loss a complex legal and political issue at the domestic and foreign policy level. If we add to this the cultural aspects of reverence for the dead, especially the victims, as well as the importance of publishing the victims' names in the function of personal and social catharsis, we can conclude that the issue of demographic war loss is an unusually complex social issue with numerous social and political implications.

It is therefore not surprising that the highest social and political structures of socialist Yugoslavia were continually interested in researching and estimating the demographic war loss of the Second World War in the former Yugoslavia. This interest is to some extent reflected in the number of papers dedicated to this topic, as well as in the fact that they were mainly conducted within state scientific institutes.

From the time immediately after the Second World War until the break-up of Yugoslavia, dozens of papers were devoted to the issue of demographic war loss, in which estimates of demographic war loss were made in the fairly wide range. However, all these works, created at a time when the problem of researching war victims in Yugoslavia was strongly linked to the strategic interests of the Yugoslav state and the needs of the ruling ideology, are characterized by strong ideological and methodological bias[1] and a narrow scientific approach devoid of interdisciplinary and multidisciplinary perspectives. The most serious objection to these works is the scientific partiality conditioned by the impossibility to research all casualties of war, and not only the victims of fascist forces.[2]

Nowadays, the estimates of Vladimir Žerjavić published in 1989 in the paper *Gubici stanovništva Jugoslavije u drugom svjetskom ratu* are generally considered the most reliable. Žerjavić's cautious estimate of 2 022 000 is considered the most realistic. It is generally accepted and the most cited. Therefore, it seems important to us to look back at Žerjavić's method and warn of methodological and interpretive omissions in his work that have not been noticed. We will also propose a methodological model according to which Žerjavić's calculations could be corrected.

2. First post-war research on demographic loss of Yugoslavia in World War II

There is no doubt that estimates of the demographic war loss of SFR Yugoslavia in the past, as well as today after more than sixty years, aroused wide social interest, which led to the inflation of works on this topic of questionable credibility and scientific relevance. Nevertheless, some of these early papers and estimates, due to their impact on the scientific discourse on the issue of post-war demographic loss, deserve a bit more attention.

The first assessment of the demographic war loss of Yugoslavia in the Second World War was made immediately after the end of the war by Josip Broz Tito in his speech in Ljubljana in May 1945. He then estimated the war loss of the Yugoslav population at 1.7 million, thus determining the framework within which research would be conducted, certainly the earliest research, whose primary task was to give scientific credibility to this estimate, not to investigate the real extent of war casualties. The need for scientific verification of "Tito's" assessment will

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[1]   See ŽIVIĆ 1996.

[2]   See SOBOLEVSKI 1992.

become especially emphasized after it became an official assessment of the loss of the Yugoslav population in the Second World War at the International Reparations Commission in Paris in 1946.[3] This fairly free estimate, made in the immediate post-war period when data on the killed and missing did not yet exist due to lack of time, has never been confirmed by any exact scientific method.[4] Nevertheless, under obvious political pressure from the authorities, the estimate of 1.7 million would seek to gain scientific legitimacy for some time. For the 1947 Paris Peace Conference, attended by Yugoslavia, Vladeta Vučković, a math undergraduate student and hitherto unknown official in the Yugoslav Federal Statistical Office, was given the task by the director of the Federal Statistical Office, Dolfe Vogelnik, to calculate in the time of only two weeks (it was the first calculation of any kind) the population loss of Yugoslavia in the Second World War. Although with scarce and disorganised sources, pressed for time, comparing the statistical sources of neighbouring countries and the results of some sample surveys available in 1947,[5] Vučković calculated the total demographic war loss of Yugoslavia, which he estimated at 1.7 million inhabitants. Although the coincidence of this and the previous estimate is significant, Vučković's assessment referred to the total, and not to the real demographic loss of Tito's assessment. Vladimir Žerjavić believed that *it was only later that the notions of demographic and real war loss were confused by the ignorant handling of the number 1,700,000, which became the basis and framework for many misunderstandings and arbitrariness.*[6]

Since the first post-war census, as soon as possible to the end of the war, is crucial for a serious investigation of demographic war loss, and since these estimates of demographic war loss were made before the first post-war census of March 15, 1948, we can rightly doubt their methodology and credibility.

After the publication of the 1948 census results, some of the most important Yugoslav and Croatian demographers and statisticians dealt with the issue of war demographic loss in Yugoslavia: Dragoljub Tasić, Ivo Lah, Dolfe Vogelnik, Bogoljub Kočović, Vladimir Žerjavić, as well as some foreign research centres: Princeton University and Furman University in the United States of America.

In the census year of 1948, immediately after the census, three estimates of the demographic war loss of Yugoslavia appeared, one by a domestic author, statistician Dragoljub Tasić,[7] and two from two American universities, Furman and Princeton.

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[3]   The official estimate of Yugoslavia's demographic war losses in World War II presented to the International Reparations Commission was 1,706,000 casualties. Cf. ŽIVIĆ 2006.

[4]   ŽERJAVIĆ 1989: IX.

[5]   BOGOSAVLJEVIĆ 1996: 492.

[6]   ŽERJAVIĆ 1989: XV.

[7]   According to the work of S. Bogosavljević (cf. BOGOSAVLJEVIĆ 1996: 7.), Tasić performed the calculation in 1951 (cf. ŽERJAVIĆ 1992: 117), although both state that Tasić's calculation was published in the *Konačni rezultati popisa stanovništva 15. 3. 1948*, book I. Introduction, p. XLIX.

Tasić's estimate was the first to go beyond Tito's Ljubljana estimate, estimating Yugoslavia's real demographic loss in World War II at 1,400,000, and a total of 2,428,000 casualties. This estimate, the first based on scientifically relevant methodology, was 300,000 less than the then still official estimate of 1,700,000 real demographic loss confirmed by Vučković's research a year earlier. Estimates made in the United States were even lower. A study from Furman University estimated the real demographic loss of Yugoslavia at 1,500,000, and a study from Princeton University estimated the total demographic loss of the war at only 1,200,000. It is also the lowest published estimate that stands out so much from all the others that it can hardly be credible.[8] Tasić estimates a higher percentage of real demographic loss (58%) than any of the others.[9]

In the 1950s, two new studies provided estimates of the demographic war loss of Yugoslavia in the Second World War, one published by Dolfe Vogelnik, and the other by Ivo Lah, both in 1952 (?).[10] Lah estimated the real demographic loss of Yugoslavia and the annexed territories at 1,000,000 and the total at 2,073,000 casualties, which is 400,000 less than Tasić. Lah's calculations were based on an estimate that, in the absence of war, Yugoslavia would have had a population of 17,872,000 in 1948.[11] According to Vogelnik's calculation, the population, had it not been for the demographic loss of the war, would have amounted to 18,654,000 in 1948, which is almost a million inhabitants more than Lah estimated. To that extent, Vogelnik's estimates of war loss were slightly higher than Lah's. D. Vogelnik estimated the real demographic war loss of Yugoslavia in the Second World War at 1,800,000, and the total at 2,854,000 casualties.[12]

Given the same sources and methodology, the significant differences in these estimates are surprising. Therefore, we must agree with Srđan Bogosavljević, in his 1996 article on the victims of World War II: *Such a difference is surprising even more when it is known that all the authors were employed in the same institution - in the Federal Statistical Office, that they were very well informed about what and how each of them worked in estimating war loss and that they were*

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[8]   ŽERJAVIĆ 1992: 491.

[9]   BOGOSAVLJEVIĆ 1996: 493.

[10] According to S. Bogosavljević (1996, 7), the study was first published by I. Lah (1951), followed by D. Vogelnik (1952); V. Žerjavić in his first book (*Gubici stanovništva Jugoslavije u Drugom svjetskom ratu*) states that the study was first published by I. Lah (1951), followed by D. Vogelnik (cf. Žerjavić, 1992, 117), and in his second the book (*Opsesije i megalomanije oko Jasenovca i Bleiburga*) states that the study was first published by D. Vogelnik and then by I. Lah, criticizing Vogelnik's work, although both authors published the study in 1952 (cf. ŽERJAVIĆ 1992: 17); D. Živić states that the study was first published by D. Vogelnik, and then by I. Lah, although both authors of the study published it in 1952 (cf. ŽIVIĆ 2006: 20).

[11] ŽERJAVIĆ 1992: 116-117.

[12] ŽERJAVIĆ 1992: 117.; BOGOSAVLJEVIĆ 1996: 5.

hierarchically distributed so that the lowest in rank, V. Vučković, was the first to publish, and the highest in rank, director D. Vogelnik, was the last to publish an assessment (...) so that the conclusion is that at different times, the assumptions about birth rate, mortality and migration were adjusted according to different political and patriotic motives. [13]

In the 1980s, detailed and complete estimates of the demographic loss of Yugoslavia were published by Bogoljub Kočović in 1985 and Vladimir Žerjavić in 1989. Their results in total demographic loss differ minimally - by 37,000 inhabitants, but they differ significantly in the national structure of casualties. The greatest overlap in the calculated numbers of casualties of the Second World War, is in the case of Croats (93%), followed by Serbs (92%) and Muslims (83%), and the smallest overlap is in the calculation of the casualties of Montenegrins (40%). According to Žerjavić's calculations, the total loss amounts to 2 022 000, and the real demographic loss to 1 027 000. On the other hand, Kočović calculated a 1 985 000 total demographic loss and a 1 014 000 real loss.

Table 1. Overview of the research of the casualties of World War Two according to nationality by B. Kočović and V. Žerjavić

Nationality	Calculation by B. Kočović	Calculation by V. Žerjavić	Overlap in %
Serbs	487.000	530.000	91,9
Montenegrins	50.000	20.000	40,0
Croats	207.000	192.000	92,8
Muslims	86.000	103.000	83,5
Slovenians	32.000	42.000	76,2
Macedonians	7.000	6.000	85,7

Source: Bogosavljević 1996, 495.

In both of these studies a very similar methodology was employed, and certainly the same sources. This is the "classical" methodology used to calculate demographic loss: it is necessary to establish a census difference – in these studies the censuses conducted on March 31, 1931 and on March 15, 1948, – in order to determine the total demographic loss, after which the pure (indirect) demographic loss is calculated and then subtracted from the total loss in order to obtain the real demographic loss. Despite the same sources and similar methodology, the results vary considerably as the potential decline in birth rates due to the war and

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[13]   BOGOSAVLJEVIĆ 1996: 159-170.

the number of those who left the country during and immediately after the war was estimated differently. [14]

A tabular presentation of researchers and published estimates of the demographic war loss of Yugoslavia in the Second World War is given in Table 2 and Graph 1.

Table 2. Overview of descriptive statistics of results of the research of the demographic war loss of Yugoslavia in World War Two

Estimate – Year	Real demographic loss	Total demographic loss
FPRY – 1947	1.706.000	N / A
Vučković – 1947	N / A	1.700.000
Tasić – 1948	1.400.000	2.428.000
Princeton University – 1948	N / A	1.200.000
Furman University – 1948	1.500.000	N / A
Lah – 1951	1.000.000	2.073.000
Vogelnik* – 1952	1.800.000	2.854.000
Kočović – 1985	1.014.000	1.985.000
Žerjavić – 1989	1.027.000	2.022.000
Min	1.000.000	1.200.000
Max	1.800.000	2.854.000
$\overline{X}$	1.349.571	2.037.429
σ	314.860	483.843
$\overline{X}_2$**	1.329.000	2.041.600
$σ_2$**	270.865	232.624

* Vogelnik's lower variant; higher variant of total demographic loss is 3.250.000
** Without minimum and maximum
Source: calculation of the authors according to model by S. Bogosavljević[15]

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[14] BOGOSAVLJEVIĆ 1996: 490.

[15] BOGOSAVLJEVIĆ 1996: 491.

Graph 1. Overview of the results of research of the total demographic war loss
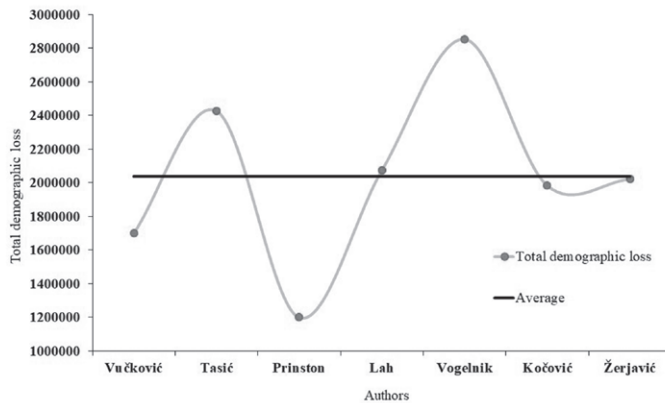*of Yugoslavia in World War Two*

Table 2 clearly shows the variability of the results of the authors who studied the demographic loss of Yugoslavia in the Second World War. The average of the demographic loss of Yugoslavia, according to the analysed authors, is 2 037 429, with a standard deviation of as much as a quarter of the average (!), or 483 843. Given the large standard deviation of the results from the average, we can conclude that from these studies we cannot, not even approximately, reach any conclusion about the total demographic loss, because the difference between the maximum (D. Vogelnik's calculation) and the minimum (Princeton University calculation) is as much as 1,654.000 inhabitants.

The most deviating from the average are: calculations at Princeton University (837,429 inhabitants), then calculations by D. Vogelnik (816,571 inhabitants), D. Tasić (390,571 inhabitants), and V. Vučković (337,429 inhabitants). The closest to the average are the estimates of I. Lah, B. Kočović and V. Žerjavić with the following deviations: Kočović 52,429 inhabitants, Lah 35,571 inhabitants and, finally, Žerjavić only 15,429 inhabitants (see Graph 2). Due to this, as well as the fact that Žerjavić's study is generally considered to be the most reliable of all previously published studies, we will dedicate a bit more space to Žerjavić's study.

3. Research of demographic war loss of Yugoslavia by V. Žerjavić in the study
Gubici stanovništva Jugoslavije u Drugom svjetskom ratu

With his extensive studies *Gubici stanovništva Jugoslavije u Drugom svjetskom ratu* in 1989 and *Opsesije i megalomanije oko Jasenovca i Bleiburga* in 1992, in which he made moderate estimates of Yugoslavia's demographic war loss in

World War II, Vladimir Žerjavić became the most relevant researcher of the demographic loss of the Second World War in the former Yugoslavia. This position, which is confirmed by the number of citations in the scientific literature and the inclusion of his estimates of war loss in recent historiographical reviews, is not diminished by the rather layered critique of his method and research approach. [16] We will provide an overview of Žerjavić's study, as the most systematic and comprehensive so far, and attempt to identify the problems in Žerjavić's assessment that previous critics of his work have omitted.

In his estimates, Žerjavić applies two classical methods, the method of demographic and statistical calculations (similar to Kočović) and the method of verification (according to historical material and sources). [17] In his study, Žerjavić takes over Lah's definition of demographic war loss, which includes: deaths of soldiers and civilians during the war and post-war deaths due to injury, illness, malnutrition, shortages of medicines, etc. caused by the war, furthermore, declining birth rates during the war and afterwards, loss of residents in fertile years who died in the war, or who were separated from their families due to the war and could not participate in the reproduction of the population (from this child deaths should be deducted, those that would have happened during or after the war had the children been born) and refugees.

3.1 Calculation of the population of Yugoslavia for 1941

Since the last pre-war census in Yugoslavia was conducted on March 31, 1931, a full ten years before the start of World War II in Yugoslavia, a new census was to be conducted in 1941, but was postponed due to the war. Therefore, in order to determine the population growth rates necessary to calculate demographic loss in the period from 1941 to 1948, Žerjavić first had to estimate the total population of Yugoslavia (by post-war republics and provinces) before the war, ie for the year 1941. It was important to take into account that the Post-War Yugoslavia was territorially expanded. Considering that the demographic sources for the Kingdom of Yugoslavia were more accurate and precise than the Italian sources for the newly annexed areas, and that the main war conflicts, and then casualties, took place on the territory of pre-war Yugoslavia, in his study Žerjavić separated the demographic war loss in Yugoslavia from that in the newly annexed areas. [18]

The problem that Žerjavić also faced was the incompatibility of pre-war and post-war census due to the different administrative organization of the state territory. As the census of 1921 and 1931 were conducted by *banovinas*, and in 1948 by republics, it was necessary to recalculate the number of inhabitants since the

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[16]   Usp. ŽIVIĆ 2006.; BOGOSAVLJEVIĆ 1996.; GEIGER 2010.

[17]   ŽIVIĆ 2006: 25.

[18]   Istra and Slovenian Litoral.

original census results were incomparable. For this purpose, Žerjavić used the calculations made by V. Simeunović for the Federal Bureau of Statistics in 1964 and the vital statistics published in the Statistical Yearbook 1938/39, accepting the calculated population for Yugoslavia in the period from 1921 to 1940 by apply-ing fixed rates of geometric progression (1.375% per year), which led to a larger number of calculated inhabitants than would have been the case by applying the rate of natural increase[19] applied by the State Statistical Office of the Democratic Federal Yugoslavia in 1945.

However, since in the 1938/39 Yearbook the population per *banovina* and for the city of Belgrade (including Zemun and Pančevo) was calculated only until December 31, 1938, Žerjavić had to calculate the population growth until March 31, 1941.[20] Given that the calculated growth rates, calculated by the Federal Bureau of Statistics for the *banovinas* and the city of Belgrade in 1964, included internal migration (eg Serbia without provinces), their application would have caused too high or inappropriately low growth rates. Therefore, Žerjavić made a correction of the natural increase rate, which we present in Table 3. In that way, he got a slightly higher number of inhabitants in Slovenia, Croatia and Montenegro, and a slightly lower in Serbia without provinces, where *immigration to the capital Belgrade increased the growth rate.*[21] With these corrections, Žerjavić tried to limit the impact of internal migrations on natural increase rates in 1931-1941.

Table 3. Calculated rates for 1931–1939 and corrected rates for 1931–1941

Banovina	Calculated rate 1931-1939	Corrected rate 1931-1941
Dravska	0,60 % per annum	0,72 % per annum
Savska	0,96 %	0,98 %
Primorska	1,00 %	1,09 %
Vrbaska	1,85 %	1,83 %
Zetska	1,50 %	1,56 %
Drinska	2,22 %	2,18 %
Dunavska	0,76 %	0,77 %
Moravska	1,62 %	1,60 %
Beograd	4,56 %	3,78 %
Vardarska	1,57 %	1,55 %

Source: Žerjavić, 1992, 111.

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[19]   1931. – 1,38%; 1939. – 1,10%

[20]   ŽERJAVIĆ 1992: 110.

[21]   ŽERJAVIĆ 1992: 111.

Having corrected the growth rates, Žerjavić redesigned the *banovinas* into the republics and provinces of SFR Yugoslavia, obtaining the total (estimated[22]) population for 1941, the natural increase rates from 1931 to 1941 and the annual growth rates for the period from 1931 to 1941, by republics and provinces, as we relate in Table 4.

Table 4. Estimated population for year 1941 (in thousands)

Republic / province	Part of *banovina*	Population in 1931	Growth 1931-1941	% 10 years	Population in 1941	Yearly rate
Bosnia and Herzegowina	Primorska	323	46	14,2	369	
	Vrbaska	1.010	200	19,8	1.210	
	Drinska	851	234	28,2	1.085	
	Zetska	140	21	15,0	161	
		2.324	501	21,8	2.825	2,06
Montenegro	Zetska	360	62	17,2	422	1,57
Croatia	Savska	2.704	274	10,3	2.983	
	Primorska	579	57	9,8	636	
	Zetska	50	3	8,0	54	
	Dunavska	70	5	7,8	75	
	Vrbaska	27	5	19,2	32	
		3.430	350	10,2	3.780	0,96
Macedonia	Vardarska	950	155	16,3	1.105	1,51
Slovenia	Dravska	1.144	86	7,5	1.230	0,73
Serbia without p.	Drinska	675	135	20,0	810	
	Dunavska	724	85	11,7	809	

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[22]   These are Žerjavić's estimates based on the previously described corrections in growth rates.

	Moravska	1.369	233	17,0	1.602	
	Vardarska	348	49	14,9	397	
	Zetska	167	23	15,0	190	
	Beograd	267	125	46,8	392	
		3.550	650	18,3	4.200	1,67
Vojvodina	Dunavska	1.593	102	6,4	1.695	
	Drinska	9	1	10,0	10	
	Pančevo	22	5	22,7	27	
		1.624	108	6,7	1.732	0,65
Kosovo	Zetska	209	48	23,0	257	
	Moravska	67	15	23,0	82	
	Vardarska	276	64	23,0	340	
		552	127	23,0	679	2,10
Yugoslavia		13.934	2.039	14,6	15.973	1,38

Source: Žerjavić, 1992, 114-115.

3.2. Calculation of total population and annual rates of population growth in Yugoslavia in the period from March 31, 1941 to March 15, 1948

After determining the total population of Yugoslavia in 1941, Žerjavić tried to estimate the number of inhabitants that Yugoslavia could have had in 1948 if the annual population growth had not been interrupted by the war. To this end, he calculated the peacetime population growth rates for the period from March 31, 1941 to March 5, 1948, according to the immediate pre-war natural increase rates published in the 1964 Statistical Yearbook.

Žerjavić determined that the rates of natural increase after the 1931 census tended to fall, *especially in the period after 1935. In 1935 the rate was 1.31%, in 1937 it was already 1.21%, and in 1939 it was at 1.10%. For the period from 1940 to 1946 there are no registered rates, and for 1947 it jumped to 1.39% and in 1948 to 1.46%.*[23]

Since he had data on the movement of natural increase rates between 1935 and 1939, Žerjavić had only to assess whether this decline in the rates of pre-war

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[23] ŽERJAVIĆ 1992: 116.

Yugoslavia would be stopped, increased or decreased. Here Žerjavić put forward three hypotheses about the movement of natural increase rates during the war.

In his view, population growth rates during the war period, even if there had been no war, would have stagnated at 1% because *there would have been no economic or socio-political conditions that would have turned the growth rate upwards*. [24] After 1941, an increase in growth rates can be expected based on the higher birth rate in 1920, *as these generations reached the fertile age, which could have contributed about 10% to the increase between 1942 and 1945*. [25] Finally, since many areas were liberated at the end of 1944, Žerjavić believed that the growth rates for 1945 and 1946 should be adjusted according to the registered rates from 1947.

In accordance with these hypotheses about population movement, Žerjavić calculated the number of inhabitants and the rates of natural increase for the period from March 31, 1941 to March 15, 1948, as if they had not been interrupted by the Second World War. The results of the calculations are shown in Table 5.

Table 5. Overview of Žerjavić's calculations of population size and natural increase rate for the period from March 31, 1941 to March 15, 1948, as if there had been no war

Date	Population size	RNI (%)	Period	Increase
March 31, 1941	15.973.000	1,05	1941–1942	168.000
1942	16.141.000	1,15	1942–1943	186.000
1943	16.327.000	1,15	1943–1944	188.000
1944	16.515.000	1,15	1944–1945	190.000
1945	16.705.000	1,20	1945–1946	200.000
1946	16.905.000	1,28	1946–1947	216.000
1947	17.121.000	1,39	1947–1948	238.000
March 15, 1948	17.359.000		Total increase: **1.386.000**	

Source: Žerjavić, 1992, 118.

According to Žerjavić's projection, the total population of Yugoslavia would have increased in the period from March 31, 1941 to March 15, 1948 by 8.68%[26] with an annual rate of natural increase of 1.20%.

By calculating the expected population of Yugoslavia in 1948 and making adjustments to the real population according to the census of March 15, 1948,

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[24]   ŽERJAVIĆ 1992: 118.

[25]   ŽERJAVIĆ 1992: 118.

[26]   [(17359000 - 15973000) / 15973000] x 100 = 8,6771 ≈ 8,68.

Žerjavić was finally able to calculate the total demographic loss of Yugoslavia in World War II, which according to his calculation amounted to 2 022 000 inhabitants. The results of Žerjavić's calculation are shown in Table 6.

Table 6. Overview of Žerjavić's calculations of total demographic loss of Yugoslavia in World War II, in thousands

Territory	Census 1931	Calculated		Anne-xed	Total 1948	Census 1948	Diffe-rence	Migr. to Vojv.	Migr. other	Dem. loss
		1941	1948							
BiH	2.324	2.825	3.171	0	3.171	2.565	-606	-86	-40	-480
Montenegro	360	422	472	0	472	377	-95	-37	-5	-53
Croatia	3.430	3.780	4.044	261	4.305	3.757	-548	-53	+7	-502
Macedonia	950	1.105	1.236	0	1.236	1.153	-83	-10	-10	-63
Slovenia	1.144	1.230	1.296	174	1.470	1.392	-78	-2	0	-76
Serbia tot.	5.726	6.611	7.140	0	7.140	6.528	-612	+188	+48	-848
without prov.	3.550	4.200	4.556	0	4.556	4.137	-419	-38	+11	-392
Vojvodina	1.624	1.732	1.805	0	1.805	1.663	-142	+226	+37	-405
Kosovo	552	697	779	0	779	728	-51	0	0	-51
Yugoslavia	13.934	15.973	17.359	435	17.794	15.772	-2.022	0	0	2.022

Source: Žerjavić, 1992., 129.

According to Žerjavić's interpretation of the calculation, *the largest demographic loss, in absolute numbers, is in BiH, Croatia, Serbia outside the provinces and Vojvodina. Bosnia and Herzegovina had the relatively largest loss in relation to the expected population, because the scale of the genocide was relatively the largest and because most of the fighting took place in that republic.* [27]

4. Žerjavić's methodological and interpretive error

However, it seems to us that Žerjavić made two mistakes in determining the total demographic loss, one methodological and one interpretive. The methodological one consists in equalizing pre-war and post-war migrations in order to achieve comparability between the 1931 census and the 1948 census, and the interpretive one in the contradiction that arises from an interpretation unsupported by exact research results.

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[27] ŽERJAVIĆ 1992: 130.

In order to be able to compare the results of the 1948 census with those of the 1931 census, Žerjavić added and subtracted internal migrations from the difference which originated by subtracting the real population determined by the 1948 census from the expected population for 1948 (estimated according to the expected population growth in in the event that there had been no war), showing the result as demographic loss.

In the introduction to his study, Žerjavić explained that the 1931 census listed the present population, and the 1948 census the permanent population, which is a problem in comparing census results. In his paper, Žerjavić stated: *that the 1948 census also included the people born in other republics, and by adding them to the permanent population - and this was done in the statistics of the 1948 census - the present population is obtained, which is comparable to the 1931 census.* [28] However, as noted in the introductory part of the sixth book of the 1948 census results, [29] and as Žerjavić reported in his study, the 1948 census established only the place of birth of immigrants, but not when they moved to the place where they were registered. (Relocation could therefore have been in the 1920-s or 1930-s, as the relevant data point was only that they were not born in the place where they were registered.) In the introductory part of the census results (the same Book VI) it is especially emphasized that the place of birth („rodni kraj") does not equal the place of residence („zavičajnost"), supporting it with the example of mothers who often went to give birth in their mother's house, as well as mothers from the country who often went to the city (hospital) to give birth.

To sum up, the 1948 census registered the permanent population by asking *IV. Place, county and people's republic of birth*, [30] and all immigrants were counted together with the domicile population as the total permanent population.

It is quite certain that, without some corrections, a census registering the permanent population is not comparable to one registering the present population. To that extent, Žerjavić's attempt to level the census is methodologically correct. However, his method is incorrect. Namely, instead of correcting the 1948 census results, corrections should have been made to the 1931 census results. By correcting the 1948 census results, that is, subtracting from the total number of the population of a certain republic in 1948 the population that was not born in it, Žerjavić, in a way, equated the migrations of the late 1920-s with war and post-war organized migrations, including the colonization of Vojvodina.

We believe that the mostly short-term migration, due to which the 1931 and 1948 census are not comparable, should have been removed from the 1931 census

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[28]   ŽERJAVIĆ 1992: 99.

[29]   *Konačni rezultati popisa stanovništva od 15 marta 1948 godine*, knjiga VI, Stanovništvo po rodnom kraju, Beograd, 1955.

[30]   Popis stanovništva 1948., VI. knjiga, IX.

results, and not from the 1948 census results, because the population from the 1948 census born outside of place of residence was most often (certainly moreso than in 1931) part of the permanent colonization migrations. In addition, the war and the new post-war situation encouraged, through a forced industrialization project, the depopulation of villages marked by ongoing migrations to cities as places of greater opportunity. Therefore, we believe that the war and immediate post-war migrations of the late 1940s were far greater, more permanent and more significant than the migrations of the late 1920s that preceded the great economic crisis. Subtracting and adding up the migrant population, as Žerjavić did, resulted in a reduction or an increase of the total demographic loss for the individual republics of the former Yugoslavia. Thus, in the case of Croatia, after Žerjavić's corrections, the number of total demographic loss decreased by 46,000, Serbia without provinces by 27,000, while Serbia with provinces increased by 236,000. It seems to us that such a large increase in the total demographic loss of Serbia with the provinces, after Žerjavić's corrections, further confirms our claim that the deprivation of internal migration from the results of the 1948 census of Yugoslavia was methodologically wrong.

The interpretation error in Žerjavić's work refers to the contradictions between the results of the research that Žerjavić clearly presents in his work and his interpretations which these data do not support.

It is not clear how, from the last column (demographic loss) of his table 16 (page 129), Žerjavić could conclude that *the largest demographic loss, in absolute numbers, was in BiH, Croatia, Serbia outside the provinces and Vojvodina. Bosnia and Herzegovina had relatively the largest loss in relation to the expected population, because the scale of genocide was relatively the largest and because most of the fighting took place in that republic*, [31] when the table clearly shows that Croatia had the largest demographic loss in absolute numbers (502,000), then Bosnia and Herzegovina (480,000) and then Vojvodina (405,000).

It is important to note that Žerjavić in all other tables, in which he deals with the analysis of total demographic loss for each republic of the former Yugoslavia, lists the data from the last column of his Table 16, our Table 7. In addition, in the book *Opsesije i megalomanije oko Jasenovca i Bleiburga* on page 167, and in the book *Gubici stanovništva Jugoslavije u drugom svjetskom ratu[32]* on page 72, Žerjavić provides a graph showing the total demographic loss of the former Yugoslav republics, which also clearly lists Croatia, Bosnia and Herzegovina, Vojvodina, Serbia without provinces, Slovenia, Macedonia, Montenegro and Kosovo in order of total demographic loss, because it is based on the data from the last column of the disputed chart (see Graph 2).

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[31]   Popis stanovništva 1948., VI. knjiga, IX: 130.

[32]   This chart has an error in the title, it should be Demographic and War Loss 1948..

Table 7. Disputed table 16 showing demographic loss for Yugoslavia, by republic and province in 1948

Tabela 16

DEMOGRAFSKI GUBICI JUGOSLAVIJE, REPUBLIKA I POKRAJINA 1948. (u tisućama)

Teritorij	Popis 1931.	izračunato 1941.	izračunato 1948.	Pri-pojeno	Ukupno 1948.	Popis 1948.	Raz-lika	Migracija u Vojvodini	Migracija ostalo	Demograf. gubitak
BiH	2.324	2.825	3.171	–	3.171	2.565	–606	–86	–40	–480
Crna Gora	360	422	472	–	472	377	–95	–37	–5	–53
Hrvatska	3.430	3.780	4.044	261	4.305	3.757	–548	–53	+7	–502
Makedonija	950	1.105	1.236	–	1.236	1.153	–83	–10	–10	–63
Slovenija	1.144	1.230	1.296	174	1.470	1.392	–78	–2	–	–76
Srbija ukupno	5.726	6.611	7.140	–	7.140	6.528	–612	+188	+48	–848
bez pokrajina	3.550	4.200	4.556	–	4.556	4.137	–419	–38	+11	–392
Vojvodina	1.624	1.732	1.805	–	1.805	1.663	–142	+226	+37	–405
Kosovo	552	679	779	–	779	728	–51	–	–	–51
JUGOSLAVIJA	13.934	15.973	17.359	435	17.794	15.772	–2.022	0	0	2.022

In our opinion this column represents total demographic loss. ⟹

Source: Žerjavić 1992, 129.

Graph 2. Disputed graph showing the demographic and war loss in 1948
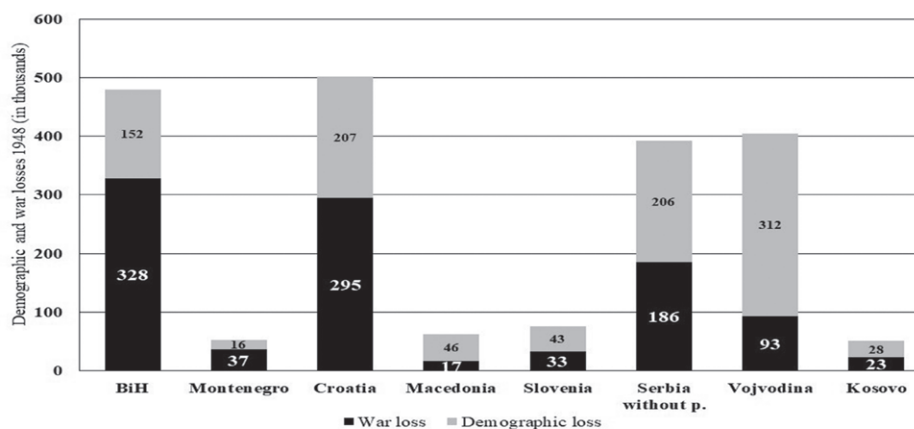
Source: Žerjavić 1992, 167.

How and why this error occurred it is difficult to say, but in general we can see that Žerjavić's study is in many ways unclear. Data sources are often uncertain, as well as his reasons for deciding on the rates of natural growth.

4.1. Calculating the population and the loss of annexed areas

Žerjavić presented data on demographic loss of the annexed areas separately because: *the war situation in the annexed areas was significantly different than in the territories of pre-war Yugoslavia*, [33] and because Žerjavić believed that *presenting separate data on demographic loss for these two areas allows for more accurate review and for more detailed analysis.* [34] It should also be noted that the districts of Buje and Koper were excluded from Žerjavić's analysis because they were not included in the 1948 census.

In his calculations of the population and loss of the annexed areas, Žerjavić used the published data of the Socialist Republic of Croatia for 1953 and 1955 (without specifying where the data were published), the Statistical Yearbook of Slovenia for 1953 and 1955 and the 1948 census of the Federal People's Republic of Yugoslavia. Considering that the data for 1953 and 1955 include the districts of Koper and Buje, Žerjavić singled them out in the final calculation, and corrected the obtained number of inhabitants for the annexed areas by applying a natural increase rate of 1931 to 1948 of 0.9%. Although it is not clear how he estimated the natural increase rate of 0.9%, Žerjavić himself concluded that it was possible that the applied rate is 0.9 percent for the period 1931-1948 did not correspond to reality, especially because of the war of 1941-1945. Table 8 shows the results of Žerjavić's calculations of the expected population of the newly annexed areas to Croatia and Slovenia for 1948.

Table 8. Results of Žerjavić's calculations of the expected population of the areas newly annexed to Croatia and Slovenia in 1948

Year	Croatia	Slovenija	Total
1921	327.211	232.878	560.089
1931	358.300	241.662	599.962
minus Buje and Kopar	30.207	45.000	75.207
1931 plus increase 1931-48	328.093	196.662	524.755
0,9 % yearly	55.000	33.400	88.400
Expected population in 1948	383.093	230.062	**613.155**

Source: Žerjavić 1992, 121.

According to Žerjavić's corrections and calculations, if there had been no war, there should have been a total of 613,155 inhabitants in the annexed area (excluding the districts of Koper and Buje) in 1948, of which a total of 383,093 on the territory annexed to Croatia and 230,062 on the territory annexed Slovenia.

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[33] ŽERJAVIĆ 1992: 125.

[34] ŽERJAVIĆ 1992: 125.

After making a projection of the number of inhabitants who, if it were not for the war, would have been born in the annexed areas in 1948, Žerjavić tried to determine the real number of inhabitants in the annexed areas in 1948. For this purpose, he used the first post-war census of March 15, 1948, which contained the settlements and districts of the annexed area. Žerjavić calculated the real population of the annexed area by establishing the real situation in the annexed areas for Croatia and Slovenia from the census of 15 March 1948, and subtracting from that number those settlements and districts that had previously been in Yugoslavia, [35] and were previously treated in his study as the territory of SFR Yugoslavia. Before taking away the population that had already been in Yugoslavia, he applied to it the annual rate of natural increase for the period 1931-1948, which according to his corrections was 0.9% (see Table 9).

Table 9. Display of Žerjavić's calculations of the population of the areas annexed to Croatia and Slovenia after the Second World War

Population annexed to Croatia			**Population annexed to Slovenia**		
Buzet	19.271		Gorica	64.486	
Labin	23.309		Idrija	18.997	
Lošinj – Cres	14.922		Ilirska Bistrica	20.509	
Opatija	10.732		Postojna	32.980	
Pazin	36.223		Sežana	25.863	
Poreč	23.675		Tolmin	24.241	187.076
Pula, county	29.005		Earliere in Yugoslavia		13.066
Pula, city	20.869		**Net annexed March 15, 1948**		**174.066**
Rijeka, county	35.706				
Rijeka, city	68.352				
Rovinj	9.134	291.198			
Zadar, county	70.379				
Zadar, city	13.954				
Lastovo	1.738	86.071			
Total		**377.269**			
Donos		377.269			

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[35] For Croatia: city of Bakar, Kastav, county of Sušak, city of Sušak, Biograd, Preko; for Slovenia: Gorica, Idrija, Ilirska Bistrica, Postojna, Sežana i Tolmin

Minus earlier in Yugoslavia	March 31, 1931:	
Bakar, city	2.075	
Kastav	10.535	
Sušak, county	18.848	
Sušak, city	16.111	
Biograd	30.063	
Preko	21.870	
Total	**99.502**	
Plus increase 1931–1948	16.845	116.347
Net annexed March 15, 1948		**260.922**

Source*: Žerjavić, 1992, 122-123.

Having compared the results of the 1948 census according to which there were a total of 434,988 inhabitants in the annexed areas (260,922 in Croatia and 174,066 in Slovenia) and his calculation of the projected population in that area in 1948 had there been no war (613,155 inhabitants), Žerjavić concluded that the total demographic loss of the annexed area in World War II amounted to 178,167 inhabitants. A summary of Žerjavić's calculations is shown in Table 10.

Table 10. Summary of Žerjavić's calculations of total demographic loss of the annexed areas in World War II

	Croatia	Slovenia	Total
Projected population	383.000	230.062	613.155
Registered population	260.922	174.066	434.988
Demographic loss	122.171	55.996	**178.167**

Source: Žerjavić 1992, 123.

Žerjavić explained the relatively high demographic loss of 178,167 inhabitants by 'optants' - mainly the Italian ethnic population who did not want to stay in the new state and who emigrated to Italy immediately after the end of the Second World War. [36]

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[36] ŽERJAVIĆ 1992: 123

4.2. Total demographic loss of Yugoslavia, including the annexed areas

Since Žerjavić in his study distinguished demographic loss on the territory of pre-war Yugoslavia from that in the subsequently annexed areas which were previously under Italian occupation, Žerjavić came to the total demographic loss of Yugoslavia in the Second World War by adding the loss on the territory of pre-war Yugoslavia to that in the annexed territories. The calculation of 2,200,000 thus obtained represented, according to Žerjavić, the total demographic loss of post-war Yugoslavia (see Table 11).

Table 11. An overview of Žerjavić's calculations of total demographics loss of post-war Yugoslavia in World War II

	Demographic loss for the territory of pre-war Yugoslavia	Demographic loss for the annexed territories	Demographic loss for the territory of the new Yugoslavia
Croatia	502.000	122.000	624.000
Slovenia	76.000	56.000	132.000
Yugoslavia	2.022.000	178.000	2.200.000

Source: Žerjavić 1992, 171.

4.3. Analysis of the total demographic loss of Yugoslavia in World War II

After determining the total demographic loss of Yugoslavia in the Second World War, Žerjavić analysed the obtained total demographic loss by the republics of socialist Yugoslavia and by categories of the classic division of total demographic loss in demographic theory. According to the definition he took from I. Lah, Žerjavić divided the total demographic loss into four categories: a) pure demographic loss, b) emigration, c) killed or died abroad, d) killed and died in the country. He analysed each category separately.

It is important to note that Žerjavić proceeded to analyse only the total demographic loss incurred on the territory of pre-war Yugoslavia, ie without the included annexed areas.

After calculating the total increase for the territory of pre-war Yugoslavia in the period from 1941 to 1948 as if there had been no war (1,386,000 inhabitants), he tried to determine the related natural increase in the period from 1941 to 1945 in order to be able to calculate pure demographic loss.

He did this by applying percentages to the figure of 1,386,000, as follows: for the period from 1941 to 1945, 56%, and for the period from 1945 to 1948, 44%. From this, he finally calculated the natural increase in the period 1941-1945, estimating it at 776,000, or 56% of the total growth in the period from 1941 to 1948, and for the period 1945-1948, 610,000 inhabitants, or 44% of the total growth in the period from 1941 to 1948.

Having determined the natural increase for the period 1941-1945 as if there had been no war, Žerjavić tried to determine what the decline in natural increase could have been given the war situation. Although the author states that *for European countries it is estimated that the decline in natural increase during World War II was about 15%, for Greece 35%, in my calculations I decided to apply a rate of 42% for Yugoslavia,* [37] which led him to a figure of 326,000 pure demographic loss. For each republic and province, Žerjavić applied a different rate of decline in natural increase in the period 1941-1945, although it is not clear by what criteria he determined these rates. Thus, for example, he applied a drop rate of 34% for Croatia, 50% for Serbia, 14% for Slovenia, etc. *The highest drop in birth rate, ie natural increase, were applied for BiH, Croatia and Serbia, where most of the fighting took place.* [38] Žerjavić 's distribution of pure demographic loss for Yugoslavia by socialist republics and provinces is given in Table 12. [39]

Table 12. Overview of Žerjavić's calculations of pure demographic loss for Yugoslavia by republics and provinces, in thousands

	BiH	Monte-negro	Croa-tia	Mace-donia	Slo-venia	Serbia With p.	Serbia Wit-hout p.	Vojvo-dina	Ko-sovo	Total
n. increase 1941-48	346	50	264	131	66	529	356	73	100	1.386
-44% 1945-48	152	22	116	58	29	233	157	32	44	610
= 56% 1941-45	194	28	148	73	37	296	199	41	56	776
% dem. loss	**52**	**25**	**34**	**18**	**14**	**50**	**50**	**36**	**27**	**42**
Dem. loss	101	7	50	13	5	150	120	15	15	326

Source: Žerjavić, 1992.,147.

Another component of the total demographic loss that Žerjavić investigated was emigration. Since Žerjavić previously used data from the Statistical Yearbook 1938/39, which he assumed included all population movements from 1931

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[37] ŽERJAVIĆ 1992: 146.

[38] ŽERJAVIĆ 1992: 147.

[39] ŽERJAVIĆ 1992: 147.

to 1939, in this part he dealt only with migrations that occurred between 1939 and 1948. Žerjavić processed the emigration of the population by the balancing method, which he claimed to be *strictly applied in this study* and is *the only correct method for calculating the movement of the population between certain areas and assimilation between certain nationalities because it excludes the possibility of doubling or omitting certain items or figures*.[40]

As an explanation for pre-war emigration, Žerjavić cited economic reasons, while emigration in the period from 1940 to 1948 he explained by *quislings and collaborators who withdrew together with the enemy*.[41] As will be seen from Table 13, most emigrants were Germans, followed by Serbs, Croats and Turks, while most residents emigrated from Vojvodina, Croatia, Serbia without provinces, and Bosnia and Herzegovina (see Table 13).

Table 13. Overview of Žerjavić's calculations of emigration in the period from 1939 to 1948, in thousands

Natio-nality	BiH	Mon-tene-gro	Croa-tia	Ma-cedo-nia	Slo-venia	Ser-bia	Serbia without p.	Vojvo-dina	Ko-sovo	To-tal
Serbs	10	2	12*	-	-	56	55**	1	-	80
Croats	6	-	30***	-	-	3	-	3	-	39
Slove-nes	-	-	1	-	5	-	-	-	-	6
Mace-donians	-	-	-	3	-	-	-	-	-	3
Monte-negrins	-	3	-	-	-	-	-	-	-	3
Mu-slims	5	3	2	6	-	7	5	-	2	23
Czecho-slovaks	-	-	4	-	1	5	5	-	-	10
Poles	13	-	2	-	-	-	-	-	-	15
Russi-ans	1	-	2	-	-	4	4	-	-	7
Hunga-rians	2	-	7	-	-	2	-	2	-	11
Ger-mans	12	-	90	-	24	299	13	286	-	425

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[40]   ŽERJAVIĆ 1992: 152.

[41]   ŽERJAVIĆ 1992: 151.

Roma-nians	-	-	-	-	-	4	4	-	-	4
Albani-ans	-	1	-	-	1	2	-	-	2	4
Turks	-	-	-	17	-	8	-	-	8	25
Italians	1	-	2	-	-	-	-	-	-	3
Jews	1	-	4	-	-	3	1	2	-	8
Others	-	-	1	-	-	3	3	-	-	4
Total	51	9	157	26	31	395	86	297	12	669

* 2.000 Serbs from Croatia remained abroad, and 10.000 emigrated from 1940 to 1948

** In the paper „Ring bez granica", *Duga* No 341., March 21 to April 3, 1988, p. 74-75, it is claimed that 40 thousand POWs remained abroad, and we assume that 15 thousand popele emigrated in the period 1940-48.

*** 2.000 Croats remained abroad, and 28.000 emigrated from 1940 to 1948

Source: Žerjavić 1992, 150.

Although Žerjavić considered the balancing method he applied to be *the only correct one*, the application of this method seems to us, together with the estimates of those killed abroad and in Yugoslavia, to be perhaps the weakest part of Žerjavić's study. First of all, it is not clear from which sources exactly the author took the data on population migrations or how he came to them. Admittedly, the article cited several articles dealing with Yugoslav emigration, [42] but it was not stated whether he took the data from those articles. Therefore, we could suspect that the balancing method, in this case, could be called the adjustment method, since there was no elaboration of this method, and the explanation of the function and methodologic justification of the economic method in demographic analysis was reduced to the author's own claim that this approach is justified. Žerjavić did not explain what the balancing method consists of, and as we could not find such a method (or a similar one) in the works of important demographers such as Dušan Breznik, Alica Weltheimer-Baletić or Jakov Gelo, [43] and as Žerjavić was trained as an economist (and worked in the profession his whole life), we assume that it is the classical method used in economics *to balance something that can be measured, estimated and by which a result can be expressed*[44] - in this case the number of emigrants. In other words, after determining the final result (either by assessment or otherwise), the distribution is balanced by predetermined categories

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[42] Cf. TOMASEVICH 1979, JELIĆ-BUTIĆ 1977, *Das Schicksal der Deutschen in Jugoslawien*. Deutscher Taschenbuch Verlag G. m. b. H. & Co. K.G. München (1984)

[43] Cf. BREZNIK 1980.; GELO 1987.; WERTHEIMER-BALETIĆ 1999.

[44] *Rječnik bankarstva, s. v.*

(in Žerjavić's case it is either the republics of former Yugoslavia or nationalities), according to parameters that can be purely arbitrary, ie assumptions, or default parameters as in economics with the aim that the final, previously set result, always corresponds. That is why Žerjavić stated that the balancing method *excludes the possibility of doubling or omitting certain items or figures*. [45] We certainly want to leave open the possibility that the data that Žerjavić provides on Yugoslav emigration are (approximately) accurate, but we cannot know that because they are not transparently processed.

Having dealt with the pure demographic loss and emigration, Žerjavić was left with those who were killed or died abroad and those who were killed or died in the country. Žerjavić processed these two components (categories) of demographic loss first by "calculating" those killed or dying abroad, and then deducting pure demographic loss, emigration and killed or died abroad from the total demographic loss. Thus he arrived at the final number of those who were killed or died in the land.

Žerjavić would, finally, by way of phrases *it is a fact, it is known, it is calculated* and similar, come to the conclusion that about 80,000 inhabitants of Yugoslavia were probably killed or died abroad. At the same time, it is quite unclear how he came to that number, and it is even less clear how he managed to categorize the number of people killed or died abroad by republics and places of execution. The table of those killed or died abroad is given in full (see Table 14).

Table 14. Overview of Žerjavić's calculations of those killed or died abroad during World War II

	BiH	Croatia	Mace-donia	Slove-nia	Ser-bia	Serbia without p.	Vojvo-dina	Ko-sovo	Total
In Germany, incl. Poland and Austria:									
Serbs in Mauthausen	-	1	-	-	12	12	-	-	13
Serbs, vario-us locations	4	4	-	-	8	6	2	-	16
Croats, various loca-tions	2	3	-	-	-	-	-	-	5
Croats, ea-stern front	-	2	-	-	-	-	-	-	2
Slovenes, varioius locations	-	-	-	3	-	-	-	-	3

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[45] ŽERJAVIĆ 1992: 152.

Muslims, eastern front, Germany and France	3	-	-	-	-	-	-	-	3
Jews	1	6	7	1	9	-	8	1	24
Total	10	16	7	4	29	18	10	1	66
In Norway (Serbs)	1	1	-	-	1	1	-	-	3
In Egypt (Croats)	0	2	-	-	-	-	-	-	2
In Italy									
Croats	-	5	-	-	-	-	-	-	5
Slovenes	-	-	-	3	-	-	-	-	3
Serbs	1	-	-	-	-	-	-	-	1
Total	12	24	7	7	30	19	10	1	80

Source: *Žerjavić 1992, 155.*

As can be seen from the table, according to Žerjavić, most people killed abroad were inhabitants of Croatia, followed by Serbia without provinces, Bosnia and Herzegovina and Vojvodina. On the other hand, Serbs were killed the most abroad, followed by Jews and Croats. We believe that further presentation is not necessary because Žerjavić himself concluded that these results *must be considered incomplete*. [46]

Since Žerjavić elaborated on three of the four categories, with the breakdown of total demographic loss shown so far, by simply subtracting the calculated categories from the total loss, Žerjavić obtained the number of dead, killed and deceased in the country. It is important to note that Žerjavić did not calculate this number anywhere in the analysis and that it became visible only in the last table of this part of the study, which presented the demographic and war loss of Yugoslavia. The table shows that Žerjavić calculated that 947,000 people died in combat, died or were killed in the country. It is also evident that Bosnia and Herzegovina had the most inhabitants who died in combat, were killed or missing, followed by Croatia, Serbia without provinces, Vojvodina, Montenegro, Slovenia, Kosovo and Macedonia. The aforementioned table of demographic and war loss of (pre-war) Yugoslavia is given in full in Table 15. Žerjavić also presented these results graphically (see Graph 3).

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[46]   ŽERJAVIĆ 1992: 154.

Table 15. Overview of Žerjavić's demographic and war calculations loss of (pre-war) Yugoslavia in the Second World War by categories of loss, in thousands

Structure	BiH	Monte-negro	Cro-atia	Mace-donia	Slove-nja	Serbia			Ko-sovo	Total
						Tot.	Serbia without p.	Vojvo-dina		
Total dem. loss	480	53	502	63	76	848	392	405	51	2.022
Pure dem. loss	101	7	50	13	5	150	120	15	15	326
Real dem. loss	379	46	452	50	71	698	272	390	36	1.696
Emigra-tion 1939 – 48	51	9	153	26	31	355	46	297	12	625
Rema-ined abroaad	-	-	4	-	-	40	40	-	-	44
War loss	328	37	295	24	40	303	186	93	24	1.027
Died abroad	12	-	24	7	7	30	19	10	1	80
Died in the country	316	37	271	17	33	273	167	83	23	947

Source: Žerjavić 1992, 166.

Graph 3. Copy of the picture from page 167 from Žerjavić's book knjige Opsesije i megalomanije oko Jasenovca i Bleiburga which shows the demographic and war loss of 1948 (pre-war) Yugoslavia by republics and provinces
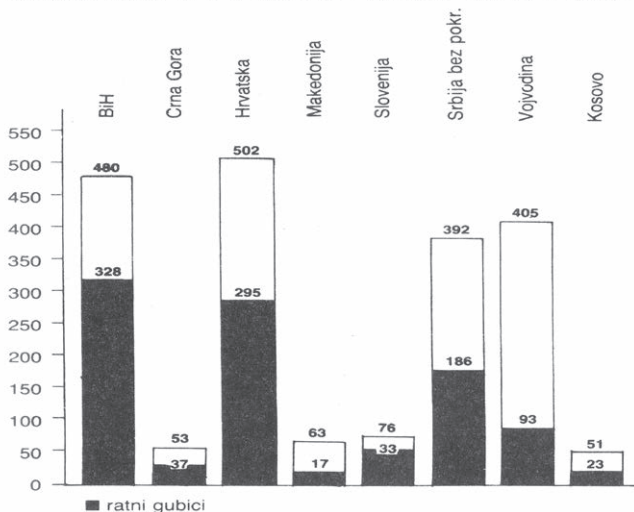
Source: Žerjavić 1992, 167.

From Graph 3 and Table 15, it is clear that, even without the demographic loss of the annexed areas, Croatia had the largest total demographic loss, according to Žerjavić's calculations, followed by Bosnia and Herzegovina, Vojvodina, Serbia without provinces and so on. Therefore, it is really unclear how Žerjavić, in explaining his results, could conclude that *the greatest demographic loss, in absolute numbers, are in BiH, Croatia, Serbia outside the provinces and Vojvodina.*[47]

5. Proposal of a method for estimating long-term demographic war loss

Total demographic war loss consists of real demographic loss (direct demographic loss, ie war mortality and migratory demographic loss) and pure (indirect) demographic loss. Determining real demographic loss is fairly simple and exact, while estimating pure demographic loss is somewhat more complex.

Total demographic loss represents the difference between the expected (projected) population in a given area as if there had been no war and the real population in that area determined by the first post-war census. The population estimate is made for the first post-war census year. In this way, total demographic loss is obtained for the year for which the estimate is calculated (the year of the first post-

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[47]   ŽERJAVIĆ 1992: 130.

war census), which contains a methodological problem because the calculation treats women of different ages equally, regardless of their fertility potential. This creates an unrealistic picture because women victims of war who perished at the end, or at the end of the fertile period could no longer have had offspring (if they had had them before, they were visible in the census) and were not and would not be part of the active population. On the other hand, women who died at the beginning, or before the beginning of the fertile period, had yet to have children, and they would have also been part of the labour contingent.

We want to warn that life went on beyond the year of the first post-war census and all those who would have been born after the year of the first post-war census should be included in the account of pure demographic loss (and therefore total demographic loss). This is particularly important, not only in demographic, but also in economic terms.

According to Wertheimer-Baletić, *starting from the type of closed population, it follows that the natural increase of the total population determines: a) the natural increase of the population into the labour contingent, b) the natural increase of the active population (labour force), and c) the increase of the employed. There is a positive correlation of different intensity among these quantities. The strongest link is between the growth rate of the total population and the growth rate of the labour contingent...*[48] Demographic processes are, therefore, in terms of their consequences for the economic and social development of the population, long-term processes.

Although war is followed by population renewal (baby boom), when natural growth rates are higher than in the pre-war period, it does not change the fact that war contingents of the population remain truncated permanently disrupting the age and gender structure of the population. This disorder is visible in every subsequent census.

Therefore, it seems to us that when calculating the total demographic loss, the population that was not born due to the war should be taken into account even after the year of the first post-war census. To this end, it would be worth estimating how many women (by age cohorts, aged 0 to 49) would have lived in a particular area in the year of the first post-war census assuming there had been no war. Then, from the first post-war census, it should be established how many women were registered by age cohorts, aged 0 to 49, for the same area in the same year. After the difference would establish the total demographic loss of the female population by age cohorts, it is necessary to organize age classes that include women of childbearing age and before (0 - 49) as five-year periods (0 - 4 years, 5 - 9 years, 10 - 14 years, 15 - 19 years, 20 - 24 years, 25 - 29 years, 30 - 34 years, 35 - 39 years, 40 - 44 years, 45 - 49 years). If demographic loss is calculated with great

[48]   WERTHEIMER-BALETIĆ 1982: 295.

time lag (as for World War II), it is possible to establish specific fertility rates for each age group over consecutive five years from vital statistics. If demographic loss is calculated with only a small time lag (as would be the case for the 1990-s war), specific fertility rates should be estimated for each age group, and, either from vital population statistics or by estimation, the mortality rates should be determined for each age class for each subsequent five-year period. The number of children who would have been born to women victims of war (whether as direct loss or pure loss), by the end of their fertile period, would be obtained by applying the determined or calculated specific fertility and mortality rates to the number of women remaining, after, for each subsequent five-year period, we move the age classes (to the right) so that the last age class falls away from the total number of calculated demographic loss of women aged 0 to 49 years. The number of inhabitants obtained in this way is added to the number of total demographic loss obtained in one of the previously described ways.

The calculation method is shown in the following diagram:

Table 16. Proposal of a calculation method

Year	Age classes									
	0–4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49
G_x	1	2	3	4	5	6	7	8	9	10
G_{x+5}		1	2	3	4	5	6	7	8	9
G_{x+10}			1	2	3	4	5	6	7	8
G_{x+15}				1	2	3	4	5	6	7
G_{x+20}					1	2	3	4	5	6
G_{x+25}						1	2	3	4	5
G_{x+30}							1	2	3	4
G_{x+35}								1	2	3
G_{x+40}									1	2
G_{x+45}										1

From the number of women, in each age class, should be subtracted those who would have died from various causes according to specific mortality rates for each year: Gx (first post-war census) - Gx + 40, and apply the specific fertility rates for the corresponding year to the number obtained. for each age class

6. Conclusion

Despite the same sources and a similar methodology, the results of research into the total demographic loss of Yugoslavia in World War II vary considerably. This variability stems mainly from different estimates of the war-induced decline in birth rates and external war and post-war migrations.

The lowest estimate was given by Princeton University (1,200,000) and the highest by Dolfe Vogelnik (2,854,000). Ivo Lah, Bogoljub Kočović and Vladimir Žerjavić have approximate results (I. Lah, 2,073,000; B. Kočović, 1,985,000; Žerjavić: 2,022,000). However, the estimates of Vladimir Žerjavić and Bogoljub Kočović, which show minimal deviations, are considered to be the most detailed and most complete. Žerjavić's assessments deserve special attention, as, despite the criticism, they are generally accepted and most often quoted.

By methodological analysis of Žerjavić's influential study *Gubici stanovništva Jugoslavije u drugom svjetskom ratu* from 1989, we found several shortcomings that could call into question the reliability of Žerjavić's results, as well as a calculation error.

In general, it can be said that Žerjavić's study is in many ways incomplete, and in some methodological aspects incorrect.

The first problem in Žerjavić's work concerns inconsistencies in quoting sources. He often took data from sources that he did not cite or describe, and therefore the authenticity of the data on which he built his analysis is questionable. By using phrases such as *it is a fact, it is well known, it is calculated* Žerjavić made his sources unverifiable and thus scientifically irrelevant.

The procedure is similar in the analysis itself. He did not explain how or why he opted for specific rates of natural change. As these rates are arbitrary and the results of the analysis highly dependent on them, their introduction into the analytical procedure without explanation is a significant methodological shortcoming. When calculating pure demographic loss, Žerjavić applied a different rate of decline of natural increase in the period 1941-1945 for each republic and province, although it is not clear why and how he chose this particular rate of decline for each republic. All this makes it impossible to clearly follow Žerjavić's methodological procedure and verify his method. This is especially true for the analysis of Yugoslav emigration, where it is not clear how the estimated number came about, and it is even less clear by which method he managed to distribute the number of killed or dead abroad in the republics and places of execution.

Additionally, sometimes Žerjavić's interpretation did not follow from his data. Intentionally or accidentally, Žerjavić replaced the total with war demographic loss, concluding that BiH had the largest demographic loss in absolute numbers, followed by Croatia, Serbia outside the provinces, etc. However, according to his

calculations, Croatia had the largest total demographic loss in absolute numbers, then BiH, then Vojvodina.

Certainly the most significant methodological omission in Žerjavić's study is contained in the methodologically unacceptable balancing procedure that Žerjavić introduced from the economic to the demographic analysis. Applying the balancing method, Žerjavić corrected the calculated number of total demographic loss by republics and provinces by the number of internal migrations at the level of Yugoslavia. Although after this correction the number of demographic loss at the level of Yugoslavia remained unchanged (2 022 000), the distribution of demographic loss at the level of republics and provinces changed, which prevented a scientifically sustainable interpretation of demographic change. Žerjavić, therefore, added and subtracted internal migrations in order to present these results as a demographic loss.

All this requires serious caution and a critical approach in the use of research results of Vladimir Žerjavić, which is generally absent from historiographic works.

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Procjena ukupnih demografskih gubitaka Drugoga svjetskog rata u Jugoslaviji: kritika metode Vladimira Žerjavića

Pitanje demografskih gubitaka u Drugom svjetskom ratu nametnulo se kao važno političko pitanje na samom početku novostvorene jugoslavenske države, odmah po završetku rata. Procjena broja u ratu izgubljenih života bila je za Jugoslaviju važna na vanjskopolitičkome planu radi utvrđivanja ratne odštete, a na unutarnjopolitičkom radi razrješavanja opterećujućeg pitanja odgovornosti kolaboracionističkih režima za pogrome civilnog stanovništva. Ne treba stoga čuditi inicijativa i pokroviteljstvo države nad istraživanjima demografskih ratnih gubitaka, kao ni strogi nadzor pod kojim su ta istraživanja provođena u državnim znanstvenim institutima. Rezultat toga bile su procjene prilagođene specifičnim državnim i ideološkim potrebama koje karakterizira ideološka jednostranost, uzak metodološki pristup te znanstvena neobjektivnost proizašla iz selektivnog obuhvata ratnih žrtava.

Pomak u istraživanjima demografskih ratnih gubitaka predstavljaju studije Bogoljuba Kočevića i Vladimira Žerjavića objavljene u drugoj polovici 80tih godina prošlog stoljeća kada je kriza društvenog sustava socijalističke Jugoslavije već bila nastupila i kada je stisak režima počeo popuštati. Vrlo male razlike u procjenama te nastojanje za historijskom verifikacijom statističkih izračuna Vladimira Žerjavića priskrbili su procjenama dvojice autora auru znanstvene objektivnosti. Budući da su Žerjavićeve procjene objavljene u studiji *Gubici stanovništva Jugoslavije u drugom svjetskom ratu* iz 1989. g. općenito prihvaćene i zastupljene u hrvatskoj historiografiji i publicistici, u radu se donosi kritika Žerjavićeve metode i upozorava na metodološku pogrešku u njegovoj procjeni.

Prva zamjerka koja se može dati Žerjavićevu radu jest metodološka netransparentnost. Autentičnost podataka na kojima Žerjavić gradi analizu krajnje je dvojbena budući da je njihovo citiranje nedosljedno i selektivno pa su njegovi izvori neprovjerljivi. Na sličan način Žerjavić postupa i u analizi, arbitrarno primjenjujući stope prirodne promjene, a da ih pri tom ne izvodi, niti obrazlaže, iako o njima ovise rezultati analize. Tako je kod izračunavanja čistih demografskih gubitaka za svaku republiku i pokrajinu poslijeratne Jugoslavije primijenio različitu stopu pada ratnog prirodnog prirasta. Pritom procjena tih stopa nije izvedena, niti je obrazložena, što onemogućuje jasno praćenje metodološkog postupka i provjeru primijenjene metode. Isto vrijedi i za procjenu gubitaka u jugoslavenskoj emigraciji, gdje nije jasno kako je ta procjena donesena, a još manje je jasno kako je broj ubijenih u inozemstvu uspio distribuirati po republikama i mjestima pogubljenja.

Svakako najznačajniji metodološki propust u Žerjavićevoj studiji sadržan je u metodološki dvojbenom postupku bilanciranja koju Žerjavić iz ekonomske uvodi u demografsku analizu. Primjenjujući metodu bilanciranja Žerjavić je izračun ukupnih demografskih gubitaka po republikama i pokrajinama korigirao brojem

unutarnjih migracija na razini Jugoslavije. Tretiranjem unutarnjih migracija kao demografskog gubitka, promijenila se distribucija demografskih gubitaka na razini republika i pokrajina, čime je onemogućena znanstveno održiva interpretacija demografske promjene, iako je procjena demografskih gubitaka na razini Jugoslavije ostala nepromijenjena.

Te metodološke makinacije i manipulacije dovode u pitanje pouzdanost Žerjavićevih nalaza pa je ozbiljan oprez i kritički pristup u korištenju njegovih istraživačkih rezultata prijeko potreban, iako u pravilu izostaje.

Ključne riječi: ukupni demografski gubici, Drugi svjetski rat, Jugoslavija, Vladimir Žerjavić

*Keywords***:** total demographic loss, total population loss, World War II, Yugoslavia, Vladimir Žerjavić

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