UNIVERZITET U BEOGRADU
GEOGRAFSKI FAKULTET

UNIVERSITY OF BELGRADE
FACULTY OF GEOGRAPHY

UDK 314

ISSN 1820 - 4244
eISSN 2560 - 5011

Demografija

Godina XVIII
Volume

Beograd 2021
Belgrade

demografija.gef.bg.ac.rs

Demografija
demografija.gef.bg.ac.rs

Univerzitet u Beogradu
Geografski fakultet
www.gef.bg.ac.rs

ISSN 1820-4244
eISSN 2560-5011

UDK: 314
COBISS.SR-ID 118674444

Štampa:
Birograf Comp d.o.o, Beograd

Tiraž:
200

Adresa:
Demografija
Univerzitet u Beogradu – Geografski fakultet
Studentski trg III/3, 11000 Bograd,
Republika Srbija

Kontakt:
Tel: +381 (0)11 2637421
e-pošta: demography.editor@gef.bg.ac.rs
demography.editor@gmail.com
URL: http://demografija.gef.bg.ac.rs/

Demografija izlazi jednom godišnje. Mišljenja autora ne odražavaju nužno gledište uredništva.

Objavljeni prilozi se indeksiraju u sledećim bazama:

- **DOAJ** (Directory of Open Access Journals, Lund)
- **CEEOL** (Central and Eastern European Online Library, Frankfurt am Main)
- **SCIndeks** (Srpski citatni indeks, Beograd)

Izdavanje časopisa ***Demografija*** finansisjski je podržalo Ministarstvo prosvete, nauke i tehnološkog razvoja Republike Srbije.

Demografija
demografija.gef.bg.ac.rs

Univerzitet u Beogradu
Geografski fakultet
www.gef.bg.ac.rs

ISSN 1820-4244
eISSN 2560-5011

UDC: 314
COBISS.SR-ID 118674444

Printed by:
Birograf Comp d.o.o, Beograde

Circulation:
200

Adress:
Demografija
University of Belgrade – Faculty of Geography
Studentski trg III/3, 11000 Belgrade,
Republic of Serbia

Contact info:
Tel: +381 (0)11 2637421
e-mail: demography.editor@gef.bg.ac.rs
demography.editor@gmail.com
URL: http://demografija.gef.bg.ac.rs/

Demografija is issued annually.The opinions of the authors do not necessarily reflect the viewpoint of the Editorial Board.

The journal is indexed in:

- **DOAJ** (Directory of Open Access Journals, Lund)
- **CEEOL** (Central and Eastern European Online Library, Frankfurt am Main)
- **SCIndeks** (Serbian Citation Index, Belgrade)

The Ministry of Education, Science and Technological Development of the Republic of Serbia provides financial support for the printing of the journal.

SADRŽAJ

ČLANCI

DODACI

CONTENTS

ARTICLES

ADDITIONAL INFORMATION

Original Scientific Article
Received: 07.10.2021.
Accepted: 10.11.2021.

UDK: 314.3:616-036.21(497.11)
doi: 10.5937/demografija2118019V

COVID-19 AND FERTILITY IN SERBIA - ROUGH PANDEMIC IMPACT ASSESSMENT

Petar VASIĆ
University of Belgrade-Faculty of Geography, Department of Demography,
e-mail: petar.vasic@gef.bg.ac.rs

Abstract: Past evidence on fertility responses to external shocks, including economic recessions and outbreaks of infectious diseases, shows that people often put their childbearing plans on hold in uncertain times. The outbreak of the COVID-19 pandemic influenced a wide spectrum of everyday life, from employment, financial wellbeing, uncertainty and health concerns, to work and family reconciliation, dating, marrying, and family planning, thus we may expect certain effect on fertility rates too. The possible impact of the COVID-19 pandemic on the birth aggregate during 2021 in Serbia will be calculated based on three different methodologies: Bertillon Birth Effect methodology (BBE), Kearney and Levine (2020) methodology, and Pandemic Wave Impact methodology (PWI - as a newly proposed methodology approach). The primary aim of the paper is to show a potential range of influence of the COVID-19 pandemic on the total number of live births in Serbia during 2021, and the secondary aim is to test our presumptions that this impact mustn't always be negative and that the impact of the pandemic is weakening during the lifespan of the outbreak.

Keywords: COVID-19, pandemic, Serbia, birth decline, fertility.

Sažetak: Dosadašnji dokazi o promenama fertiliteta pod uticajem eksternih šokova, uključujući ekonomske krize i izbijanje zaraznih bolesti, pokazuju da ljudi često stavljaju svoje planove o rađanju na čekanje u neizvesnim vremenima. Izbijanje pandemije COVID-19 uticalo je na širok spektar svakodnevnog života, od zaposlenja, finansijskog blagostanja, neizvesnosti i zdravstvene zabrinutosti, do usklađivanja poslovnih i privatnih obaveza, partnerskih veza, braka i planiranja porodice, tako da sa velikom sigurnošću možemo očekivati određeni uticaj na ukupan broj živorođenja. Mogući uticaj pandemije COVID-19 na agregat rađanja tokom 2021. godine u Srbiji biće izračunat na osnovu tri različite metodologije: metodologije Bertillon Birth Effect (Bertiljonov efekat rađanja - BBE), Kearney and Levine (2020) metodologije i uticaja pandemijskih talasa (PWI - koja je naš predlog). Osnovni cilj rada je pokazati potencijalni raspon uticaja pandemije COVID-19 na ukupan broj živorođene dece u Srbiji tokom 2021. godine, a sekundarni, da proverimo naše pretpostavke da uticaj pandemije ne mora uvek biti negativan, kao i da ovaj uticaj slabi sa protokom vremena.

Ključne reči: COVID-19, pandemija, Srbija, opadanje nataliteta, fertilitet.

INTRODUCTION

The outbreak of the COVID-19 pandemic has influenced a wide spectrum of everyday life, from employment, financial wellbeing, uncertainty and health concerns, to work and family reconciliation, dating, marrying, and family planning, thus we may expect certain effect on fertility rates too. Previous experiences are telling us that some demographic consequences of a progressively widespread epidemics on conception and fertility can be expected (Boberg-Fazlić et al., 2017; Richmond and Roehner, 2018; Aassve et al., 2021). The mechanisms that linked pandemics with subsequent depressed fertility during the past pandemics include a combination of reduced conceptions and embryonic losses during the first month of pregnancy, individual level stress from pandemics and pandemic-related mortality, short-run instability and economic uncertainty, leading to a smaller number of live-births. Two main ways in which the pandemic can influence the total births are: the indirect effect manifesting through the change of reproductive behavior (plans, intentions and realization), and the effect of the infection itself on odds for conception and pregnancy outcomes. This second effect won't be of our research interest, because there are confounding medical evidences regarding the effect of COVID-19 infection on conception and pregnancy outcomes (Li et al., 2021; Joseph and Metz, 2021; Madjunkov et al., 2020), and so far we haven't had a firm medical consensus and data on whether COVID-19 infection has any influence on biological determinants of fertility. In general, epidemics manifest a common pattern regarding impact on fertility: a steep decline in birth rates followed by gradual increases, and then followed by a baby boom. Past evidences on fertility responses to external shocks, including economic recessions and the outbreaks of infectious diseases, show that people often put their childbearing plans on hold in uncertain times (Sobotka et al., 2021; Malicka et al., 2021; Aassve, 2020). Different researches around the globe hinted towards the baby bust in highly, and the baby boom in less developed countries (Aassve et al., 2020; 2021; Ullah et al., 2020; UNFPA, 2021). For example, in highly developed countries (here we include Serbia) the fertility rate is greatly influenced by higher women's educational levels, and high employment rates. During the pandemic, the inaccessibility to childcare outsourcing services, combined with financial uncertainty, could further reduce fertility rates. On the other hand, in less developed economies, prolonged lockdown resulted in a large number of women or men not having access to various forms of contraception. The lack of access to birth control services is likely to result in millions of unintended pregnancies, unsafe abortions, and maternal deaths (Desrosiers et al., 2020). Due to the lockdown, individuals were in their houses with their partners and because of job losses or interrupted work-related activities, the increased time spent at home further escalated the

possibility of a baby boom in rural areas during this pandemic (Ullah et al., 2020; Aassve et al., 2020), expeccting 60 million fewer women using modern contraception (Dasgupta, et al., 2020), and 15 million additional unintended pregnancies worldwide (Riley et al., 2020).

On the contrary, a totally different system of reproductive decision-making in highly developed economies will result in not planning to conceive during the crisis. Historically, economic crises have never been the preferred period for a couple to decide to have a baby. The millions of jobs lost in such circumstances, even when a couple is not directly affected, create a climate of great uncertainty, which depresses family plans (Matysiak et al., 2018). During the current pandemic, however, prolonged school closures and mandated physical distancing have caused an immediate return to childcare within the home. As much as this imposes a heavier burden on parents' time, the lockdown will result in lower desired fertility and childbearing postponements in the short term (Aassve et al., 2020: 371). Overall, the lockdown imposed the constraints to opportunities of one's life choices. Different studies about fertility plans reported that more than one quarter of couples in Italy changed their fertility plans (Micelli et al., 2020), and even 40% of USA couples (Lindberg et al., 2020). The shutdowns resulted in a 6,1% economic decrease in high-income countries on average in 2020 according to the International Monetary Fund, versus a -1% for developing economies. Public health crises and economic shocks have long been recognized as conditions that alter reproductive behavior. The fertility consequences of economic hardship and uncertainty are evident for years after the crisis (Matysiak et al., 2021).

Overall, during epidemics, the birth rates decline immediately after 9 months and recover or further surpass pre-epidemic levels within a year and thereafter. Recent epidemics, such as Spanish influenza, SARS, Zika virus, and Ebola, suggest that fertility rates decline during the emergence of these extraordinary events. Regarding lessons from the previous pandemics, it would be reasonable to guess that COVID-19 may significantly affect future birth rates with long-term consequences. Serbia will not be an exception. Different studies indicate that fertility plans have been negatively revised in many highly developed countries (Luppi et al., 2020; Lindberg et al., 2020; UNFPA, 2021; Berger, 2021; Malicka et al., 2021). Some authors expect that after an initial reduction, it is likely that birth rates will rise again due to the mortality replacement and hoarding effects. Previous studies on epidemics suggest a range from 0,25 to 2 births being added per each death toll over the course of 1 to 5 years after an epidemic (Ullah et al., 2020). The reduction of 1 birth in 1918 during the Spanish flu, was followed by an increase of 1,5 conceptions 1 year later and resulted in a baby boom, but authors researching data for Sweden during 1918-1919 influenza found that a positive fertility

response was short-lived (Boberg-Fazlić et al., 2017). Unlike the 1918–1919 influenza, COVID-19 affects older people more than other age groups and child mortality has been negligible, removing one of the main drivers of the fertility rebounds observed in the combined mortality-fertility crises of the Malthusian era (Aassve et al., 2020). Therefore, it is hard to presume that the COVID-19 death toll will turn out to be a significant fertility driver. Overall, alarms about a potential "baby bust" due to COVID-19, or even a "baby boom" in developing countries, would be premature (UNFPA, 2021).

So far, any predictions of pandemic impact on live-birth aggregate in Serbia haven't been made yet. The title of the paper itself reflects the precise goal of the study. With the aim of assessing the impact of covid-19 crisis on the birth total in Serbia, this paper should answer two basic questions. Firstly, what total number of live-births would we expect to witness in the absence of the pandemic, and secondly, what number of live-births could we expect now when the pandemic is here? The first step on the way to achieve the aim is to calculate the most probable number of regularly expected live-births. The second step, based on several methodological approaches, is to calculate the number of live-births accounting for pandemic impact. Simple residual between these two groups of values should be considered as pandemic impact on fertility in Serbia, presented as aggregate value and relative change during 2021.

METHODOLOGY

The main idea of this paper is to compare the regular expected number of births with the number of births expected according to the Bertillon Birth Effect, the number of births when taking into account short-term shifts in the unemployment rate, and the number of births expected due to direction of the change in the number of affected population (pandemic waves). Regular expected number of live births is calculated on a monthly basis, as an extrapolation of a linear trend during the previous 10 years before the outbreak of the pandemic[1]. Besides the fact that not all areas of the Republic of Serbia weren't equally hit by pandemic waves, births as a demographic variable are observed in total for the whole country to avoid random variations on smaller territorial units. The time period of direct analysis comprises all months starting from the epidemic outbreak in Serbia to December 2021 as the latest month for which we will try to estimate the number of births with the chosen methodology. On the other hand, wider time period of analysis is related to the period from the year 2011 onwards. Working with monthly data pertains to the seasonality of births which

[1] Exact time period is 2011-2020, i.e. the years when the outbreak had no influence on reproductive decisioning relevant for the number of live births during 2021, except for the trend for December which is calculated based on the period 2011-2019 because some part of live births in December 2020 were conceived after the outbreak (05. March in Serbia).

displays a seasonal cycle during the year. This seasonality is not neglected, and our estimate took into account a seasonal pattern of births in Serbia. On the other hand, three different methodological approaches are used to predict the total number of births during 2021.

First approach, the so called Bertillon Birth Effect (BBE), is based on the notice that after a massive death spike there was a dip in birth numbers around 9 months later, which was significantly larger than what could be explained by the population change as a result of excess deaths. In addition, it can be noticed that this dip was followed by a birth rebound a few months later. Jacques Bertillon, a pioneer of medical statistics, and French demographer, during the influenza pandemic of 1889–1890 imposed such a hypothesis, and since that time the phenomenon was not revisited in spite of the fact that in the meanwhile there have been several new cases of massive death spikes (Richmond & Roehner, 2018). Recent studies focusing on the short-term fertility consequences of natural disasters, such as earthquakes and hurricanes, find that peaks in mortality are generally followed by birth troughs within a year; whereas studies focusing on a longer time frame following the event, have unveiled patterns of increasing fertility (Aassve et al., 2020; Ullah et al., 2020). The Bertillon Birth Effect is calculated using following formula (Equation 1):

Equation 1: Bertillon Birth effect - original

$$\Delta \boldsymbol{N} = \frac{\boldsymbol{n}}{\mathbf{12}} * \boldsymbol{eM}$$

where $\boldsymbol{\Delta N}$ is the monthly change in the number of live births, $\boldsymbol{n}$ is the annual (regularly expected) crude birth rate, and $\boldsymbol{eM}$ is the monthly excess mortality. Further, the only newer study (to my knowledge) testing the BBE was conducted on six case-studies ranging from 1860 to 2011. They confirmed their starting claim that births happening 9 months after the crisis (epidemic outbreak, earthquake, financial shock, etc.) show a much stronger negative relationship with the number of persons directly affected by the crisis than with the excess mortality itself (Richmond & Roehner, 2018). In that case, they suggested following formula (Equation 2):

Equation 2: Bertillon Birth effect – adjusted by Richmond and Roehner (2018)

$$\Delta \boldsymbol{N} = \boldsymbol{n} * \boldsymbol{Pa}$$

where $\boldsymbol{Pa}$ is the monthly number of persons directly affected by the crisis. In our case $\boldsymbol{Pa}$ would be interpreted as a total number of persons infected by SARSCoV2 during the certain month.

The second approach was discussed by Kearney and Levine (2020), presuming that during extraordinary events such as disasters, economic shocks and outbreaks, short-term fluctuations of unemployment rate have

the prevailing impact on the number of births. They claim that economic reasoning and past evidence suggest that this pandemic will lead people to have fewer children. They impose the prediction for USA that decline in births could be ranging from 300,000 to 500,000 fewer births during 2021. They base this expectation on lessons drawn from economic studies of fertility behavior, along with data from the Great Recession of 2007-2009 (Kearney & Levine, 2020). They stress the critical role that economic conditions play in fertility choices. According to Dettling and Kearney (2014), a 1 percentage-point increase in the unemployment rate is associated with a 1,4 percent decrease in birth rates. Schaller (2016) analyzes the relationship between state-level unemployment rates and birth rates, and finds that a 1 percentage-point increase in state unemployment rates is associated with a 0,9 to 2,2 percent decrease in birth rates. Kearney and Levine (2020) found that a 1 percentage point increase in unemployment reduces the birth rate by a 1,4 percent unweighted estimate, and weighting the observations yields an estimated impact of -1,2 percent. Over a longer time period, from 2003 to 2018, they find that a 1 percentage point increase in state unemployment rate led to a 0,9 percent reduction in birth rate. Here we come to a dilemma in regards to which ratio to use in our assessment. Actually, we will use both, the lowest and the highest ratio to encompass the widest range of possible fertility reduction i.e. 0,9% as the minimum, and 2,2% as the maximum fertility reduction due to 1 percentage-point increase of monthly unemployment rate. This approach certainly has a logical fallacy because the decades-long fertility decrease would yield unprecentedly high unemployment rates so far. Anyway, it could have some reasoning in explaining short-term fertility fluctuations, therefore, we will use estimates of monthly unemployment rates, and its succesive monthly changes to assess the impact on the number of live births.

The third approach is based on an uncommon hypothesis. Main presumption is based on up-to-date demographic experience of highly developed countries which have witnessed fertility ups and downs since the outbreak in March of 2020. Existence of pandemic itself is not a sufficient reason for the depressing fertility, and swings of pandemic waves are followed by opposite fertility fluctuations with a 9-month time lag. The difference between this and BBE methodology stems from their assumptions. First, BBE methodology presumes that the effect on number of live births is negative all the time during the existence of the excess mortality and newly infected population (with time lag of 9 months), which the recent fertility experience of developed countries during the pandemic has disproved. On the other hand, our presumption claims that, when the number of newly confirmed infections is falling, and the epidemic is slowing, people "unlock" their fertility plans, and we have birth recovery 9-10 months later[2]. Vice

[2] The data on live births for 2021 are preliminary, and classified by the month of the registration unlike the final data which are classified according to the month of the occurence, thus may shift one month further.

versa, when the number of infections is rising, people put their fertility plans on hold, and we have the fertility shrinkage 9-10 months later. An additional assumption is that the significance of a pandemic for the reproductive decisioning decreases over time. People progressively adapt to the new situation and strive to lead their lives as normally as possible. By the end of September 2021, a total of over 940 thousand people were infected with the coronavirus in Serbia. To include the last assumption, we calculated the cumulative number of infections, and the degree of infection (epidemic waves) expressed as a ratio of the number of new infections during the month of observation and the total number of infections ending with the month of observation. In this way, we obtained a series of relative numbers that reflect the 'severity' of the epidemic in a given month (Equation 3) (Table 1).

Equation 3. Ratio of infection – relative strength of the epidemic waves

$$Ri = \frac{Pa}{Cm}$$

Table 1. The 'severity' of the epidemic by month

Month	Infections (Pa)	Cumulant (Cm)	Ratio (Ri)	Pandemic Wave Impact (PWI)
mar.20	900	900	1	0,8163
apr.20	8109	9009	0,9000999[3]	0,8347
may.20	2403	11412	0,210567823	1,0387
jun.20	3152	14564	0,216424059	0,9602
jul.20	10988	25552	0,430025047	0,9210
aug.20	5854	31406	0,186397504	1,0342
sep.20	2145	33551	0,063932521	1,0117
oct.20	13403	46954	0,285449589	0,9476
nov.20	128484	175438	0,73236129	0,8655
dec.20	162485	337923	0,480834391	1,0883
jan.21	57340	395263	0,145067967	1,0266
feb.21	63996	459259	0,139346208	1,0256
mar.21	141337	600596	0,235327908	0,9568
apr.21	88961	689557	0,129011815	1,0237
may.21	22915	712472	0,032162667	1,0059
jun.21	4090	716562	0,00570781	1,0010
jul.21	5356	721918	0,007419125	0,9986
aug.21	41015	762933	0,053759636	0,9901
sep.21	179056	941989	0,190082899	0,9651
Total/Average	941989	/	5,443978159	0,9743

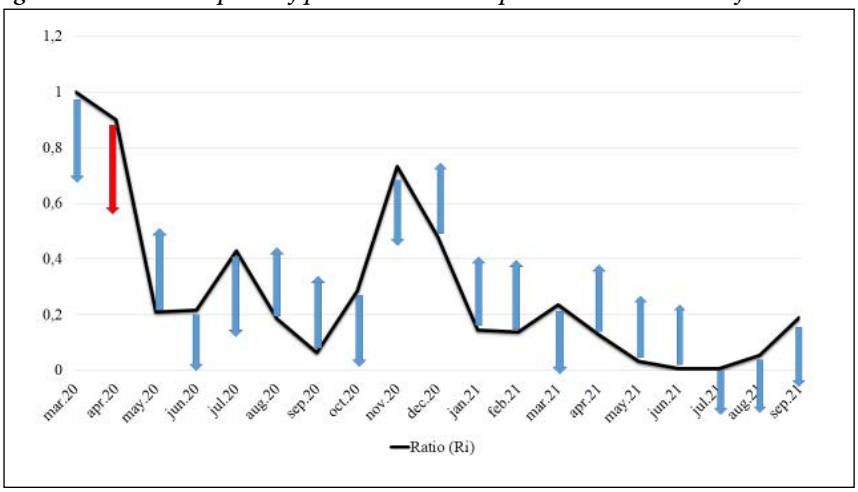
Source: https://www.worldometers.info/coronavirus/country/serbia/ and author's calculations

Furthermore, we assumed that the ***Ri*** recalculated and expressed per sum 1 is inversely proportional to the impact on the number of live births - ***PWI*** (Equation 4). When the ***Ri*** is increasing (grey cells in Table 1), the impact on the number of the live births is negative ($1-\frac{Ri}{\sum Ri}$), and opposite, when ***Ri*** is decreasing, the impact on the number of live births is positive ($1+\frac{Ri}{\sum Ri}$). In other words, the relative strength of the epidemic wave in each month (calculated and expressed per sum 1) is the share of the live birth increase/decrease, depending on the epidemic wave's direction.

Equation 4. Pandemic wave impact on the number of the live births

$$PWI = 1 \pm \frac{Ri}{\sum Ri}$$

Figure 1. Basic assumption of pandemic wave impact on total number of live births[4]



Data and results

The first step in our analysis is to estimate the regularly expected number of livebirths per month during 2021. As mentioned previously, due to a short-term estimation period, the linear monthly trend regarding the period from 2011 onwards will be extrapolated. Second, for the sake of simplicity of

[3,4] It is important to notice that the value for the april 2020 is considered as pandemic upwave, despite its lower pandemic severity ratio compared to march. The reason for such interpretation is based on the claim that value for the march 2020 is overestimated due the fact that there are no previous months to be compared with. Also, strict lockdown in Serbia ended on 06. May, so march and april 2020 can both be described as extraordinary and considered as a pandemic upwave period.

analysis and for the reason that there is no great impact, it will be used the crude birth rate[5] from 2020 in the calculation of BBE (CBR=9,17‰). Further, in order to approach the Kearney and Levine (2020) methodology, we must estimate monthly values of the unemployment rate because we have only quarterly values. Monthly values are interpolated using a linear trend due the short time-period of estimation. These monthly unemployment rates are used to estimate the possible impact on the number of livebirths. Percentage-point change is used to calculate the minimal and maximal assumed impact on fertility. Once again, the minimal impact on the number of live births is set as 0,9% per one percentage-point change, and the maximal impact on the number of live births is set as 2,2% per one percentage-point change of unemployment rate (Table 3).

Table 2. Estimation of the monthly values of the unemployment rate[6]

Quarter	Month	Estimation	Observed
I 20	jan.20	10,77	10,5
	feb.20	10,81	
	mar.20	9,92	
II 20	apr.20	8,24	7,9
	may.20	7,43	
	jun.20	8,03	
III 20	jul.20	9,26	9,8
	aug.20	9,91	
	sep.20	10,23	
IV 20	oct.20	10,28	10,7
	nov.20	10,57	
	dec.20	11,25	
I 21	jan.21	12,52	12,8
	feb.21	13,25	
	mar.21	12,63	
II 21	apr.21	/	11,1
	may.21	/	
	jun.21	/	

Source: RZS, 2021; and author's calculations

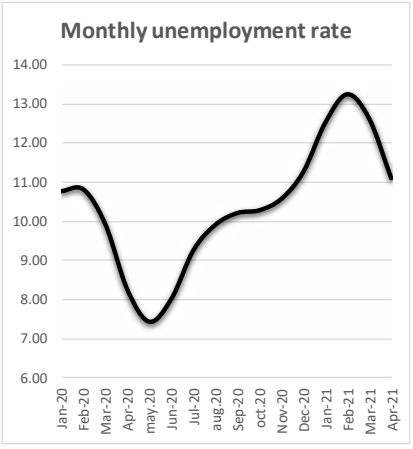


Figure 2. Monthly unemployment rate estimation

[5] Our value differs from the official value because we used average population from Vasić (2021), and not the official estimate from RZS (2021). Our average population was 6727457, and official estimate is 6899126.

[6] Monthly values for the II quarter of 2021 couldn't be calculated because there is no quarterly value for III quarter so we could't interpolate them.

Table 3. Calculations regarding unemployment rate change hypothesis

	Unemployment rate	Percentage of fertility change		Crude Birth Rate Ratio	
	Percentage point change	Minimum	Maximum	Minimum	Maximum
mar.20	-0,89	0,00801	0,01958	1,00801	1,01958
apr.20	-1,68	0,01512	0,03696	1,01512	1,03696
may.20	-0,81	0,00729	0,01782	1,00729	1,01782
jun.20	0,60	-0,0054	-0,0132	0,9946	0,9868
jul.20	1,23	-0,01107	-0,02706	0,98893	0,97294
aug.20	0,65	-0,00585	-0,0143	0,99415	0,9857
sep.20	0,32	-0,00288	-0,00704	0,99712	0,99296
oct.20	0,05	-0,00045	-0,0011	0,99955	0,9989
nov.20	0,29	-0,00261	-0,00638	0,99739	0,99362
dec.20	0,68	-0,00612	-0,01496	0,99388	0,98504
jan.21	1,27	-0,01143	-0,02794	0,98857	0,97206
feb.21	0,73	-0,00657	-0,01606	0,99343	0,98394
Total	**2,44**	**-0,02196**	**-0,05368**	**0,97804**	**0,94632**

Source: Author's calculations

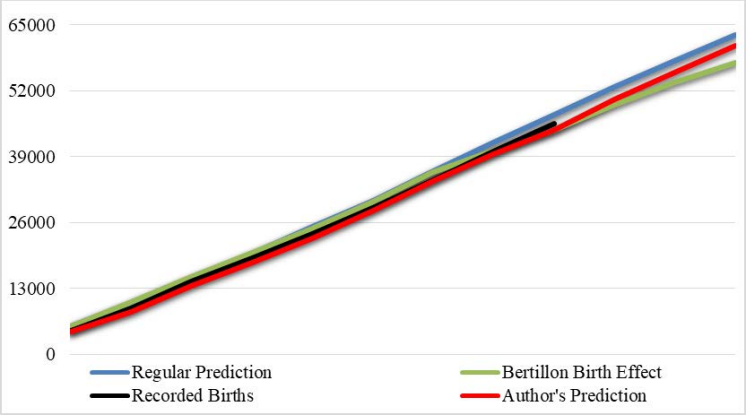
In the end we should present regularly estimated, observed, and the number of live births expected regarding different approaches for assessment of pandemic impact. Three given approaches provide not so wide range of the total number of births. Namely, in the absence of the pandemic, we could expect a 63045 birth total. Some previous estimates, which took the change of the educational structure of fertile women, age structure and the size of the fertile contingent, and the possible changes in the TFR into consideration, were predicting that during 2021 in Serbia a total of 62011 to 63477 babies could be born (Vasić, 2015), is inline with currently proposed number. It is important to say that numbers presented in Table 4. are the result of conceptions 10 months prior. These numbers reflect the impact of the pandemic with the 10 month lag. In other words, our current knowledge about the dinamics of the pandemic allows us to try to predict short-term fertility fluctuations in the succeding months.

Table 4. Total number of live births and pandemic impact assessment

Month	Regular estimate	Observed livebirths	BBE	URI Min.	URI Max.	PWI
Jan.21	5439	4550	5365	/	/	4440
Feb.21	4744	4435	4722	/	/	3960
Mar.21	4915	5349	4886	/	/	5105
Apr.21	4809	4560	4708	/	/	4618
May.21	5219	4762	5165	/	/	4807
Jun.21	5187	5157	5167	/	/	5365
Jul.21	5862	5585	5739	/	/	5931
Aug.21	5575	5567	4397	/	/	5283
Sep.21	5556	5511	4066	/	/	4809
Oct.21	5477	/	4951	/	/	5961
Nov.21	5105	/	4518	/	/	5241
Dec.21	5157	/	3861	/	/	5289
Total	**63045**	**/**	**57546**	**60336**	**58379**	**60807**

Source: Live births and deaths, January-August 2021, RZS 2021, and authors calculations

Figure 3. Cumulative number of livebirths during 2021.



However, if we refer to the first 9 months of 2021 (for which we have the preliminary data) we can notice that the observed number of live births is 3,9% lower than expected, and that BBE differs from the observed number by -2,5% , similar as PWI (by -2,55%). The unemployment rate impact (URI) doesn't provide suitable presumptions for estimating short-term fertility fluctuations, so it's used for the annual number of live births only. On the other hand, if we know that (regarding assumptions of each one of the approaches) the future number of live births will be the result of previous and current conceptions, then we may claim that the probable number of live births during the entirety of 2021 will be set between 57546 and 60807 children. Relatively, the pandemic impact could reduce the number of live births between 3,55 and 8,70 percent (3,9% so far, by the end of September).

DISCUSSION

A serious methodological issue in understanding the possible impact of the COVID-19 pandemic on the number of live births arises from the fact that not only is the conception decision affected, but the potential abortion decision. In the circumstances of fully liberal abortive practice in Serbia, it is hard to get to conclusions about the complete impact of COVID-19 pandemic without precise data about the monthly change of non-medically indiced abortions by their gestational age. Although the impact of COVID-19 infection on pregnancy outcomes has not been confirmed, we can't neglect the fact that some share of pregnant women has passed away (together with their infants) due to COVID-19 infection, especially from early October in Serbia[7]. In circumstances where this data is lacking, we are forced to presume that, with no impact on pregnancy outcome, COVID-19 infections also didn't significantly affected fertility regarding maternal (and fetal) mortality and intentional abortions, and to refer to pandemic impact on conception decisions/intentions only.

So far, only a few attempts have been made to assess the impact of COVID-19 crisis on fertility world-wide. Principally, the pandemic impact on fertility rates is described as a baby boom in low income countries, and the baby bust in high income countries (Ullah et al, 2021). The first is explained by the lack of access to modern contraception and contraceptive fallacy, and the second, by the influence of overall uncertainty and the rise of unemployment. Although Serbia can't be described as either case, we, based on previous demographic experience, may consider Serbia as the part of the high income countries' fertility pattern. In such pattern of decision making, economic anxiety, like the kind brought on by a global pandemic, can cause reduced birth rates. For example, following the 2008 recession, some European countries saw a decline in fertility which commentators have interpreted in terms of increased socio-economic uncertainty, (Comolli, 2017) which may be the model in the current situation as well. Demographers are concerned that the pandemic could lead to an even sharper drop in the already declining birth rates across developed world, due to fears about job loss or health concerns related to the virus itself. Additionaly, those who are employed and able to work remotely, faced additional stress of balancing work with homeschooling and child care, resulting in reduced fertility intentions.

One study stresses that the first wave of the pandemic has been accompanied by a significant drop in crude birth rates beyond that predicted

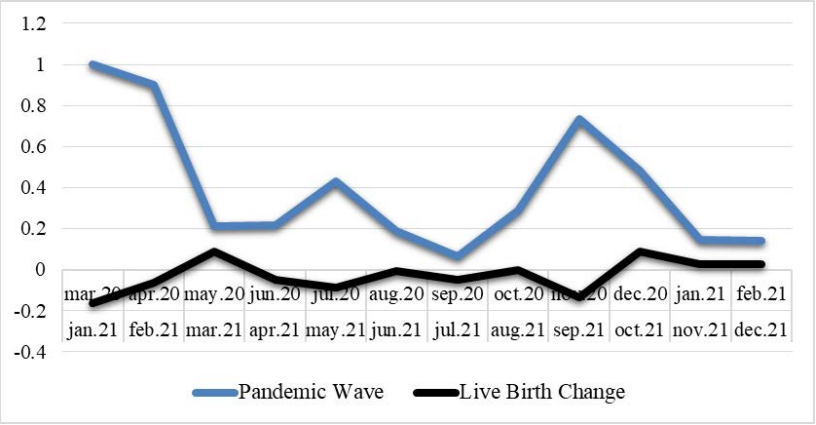
[7] Although the number of pregnant women who died because of covid-19 infection is large enough to attract public attention, there are no scientific evidences about significant imact of their mortality on overall population fertility rate.

by past trends in 7 out of the 22 countries considered. Those seven countries are Belgium, Austria, Singapore, Hungary, Spain, Portugal, and Italy. Statistically significant decreases range from 5.2% in Austria to 11.2% in Portugal and Spain (Aassve et al., 2021). Estimates for the USA are various. Wilde et al. (2020) projected that births would start dropping in November 2020 and this fall would accelerate until February 2021, with about 15% fewer births expected compared to October 2020 (-12.4% in Serbia). Also, McColl and Lynch (2021) found that crude fertility rate in the USA during the first pandemic wave has decreased by 3% more than expected. On the other hand, Kearney and Levine (2020) predicted that, due to the increase of the unemployment rate during 2021, there could be 300 to 500 thousands live births fewer, leading to an 8 to 13 percent decrease in the USA. Yet, newer insights witness just a 1,9% drop in the number of live births in the first half of 2021 in the USA. However, it is important to point out that births from January to June 2021 weren't the object of influence of the big pandemic wave during winter 2020/21. It may happen that the overall impact of the pandemic in the USA during 2021 will be significantly higher than the so far recorded 1,9%. Provisional estimates of the TFR for England and Wales based on the first three quarters of 2020 (ONS, 2020) suggest that fertility rates for England and Wales had fallen to historically unprecedented low levels before any impact due to the pandemic occurred. On the other hand, Berrington et al. (2021) in their projections of the number of livebirths in the UK in four different scenarios (of which only two are in the line with other high income countries' pandemic fertility experiences) found that the decrease during 2021 must be between 4,0 and 6,4 percent.

The mechanisms that linked pandemics with subsequent depressed fertility during past events include a combination of reduced conceptions and embryonic losses during the first month of pregnancy, individual level stress from pandemics and pandemic-related mortality, short-run instability from environmental shocks and economic volatility leading to decreased investment in the population size of future generations (Ebrahim et al., 2020). Richmond & Roehner (2018) have shown that sudden death spikes are almost always followed 9 months later by a birth trough. Some predictions suggest ups and downs in births associated with the waves of the COVID-19 pandemic (Goldstein, 2020) with a decreasing impact on short-term fertility fluctuations during the lifespan of the pandemic (Sobotka et al., 2021), similar as ours, but without any intention to quantify the relation between pandemic waves and birth swings. However, the data in Sobotka's speech are the results of the comprehensive preliminary study (Sobotka et al., 2021) which found patterns of fertility fluctuations during the COVID-19 outbreak remarkably similar to the ones in Serbia. This pattern implied the steepest decline in January 2021, and recovery during March and early

April 2021. As many as 13 out of the 30 observed European countries followed this pattern, among which are: France, Austria, Belgium, UK, Germany, Sweden, Denmark, Finland, Spain, Portugal, Italy, Hungary, Russia, and the EU-28 average. Average decline for all 30 observed countries in January 2021 was 10,6% and recovery during March and early April 2021 was 3,3%. As for Serbia, the January birth drop was 16,3% and the March birth recovery was 8,8%.

Figure 4. Short-term fertility fluctuations (relative to expected values) - observed to August and predicted onwards



Remarkably similar fertility pattern implies similar impact on the number of live births, allowing us to presume that actually the pandemic was the main common factor. However, our disclaimer stems from the fact that data on livebirths in our analysis is classified by the month of registration – not the month of occurrence, so the conclusions may change when we get the final data on livebirths. One of the possible explanations of the fertility decline smaller than pandemic impact assessment, is the reproductive behavior model of the Roma population similar as in populations of the low-income countries (implying a fertility increase), altogether with their belated and prolonged responce to the pronatalist financial measures introduced during 2019. Namely, some estimates found that number of Roma population in Serbia range from 400 to 800 thousands[8] (Fiscal council RS, 2021; Robayo-Abril and Millán, 2019), where regarding their relatively high fertility rate (Szabo et al., 2021), possible small shifts in Roma fertility can affect national aggregate between 12 and 25%. Previous experience about intense respond of the Roma population to the generous financial

[8] Last evidented number of Roma population was 147604 in the 2011 Census in Serbia, but the problem of the fluctuative ethnostatistical data (Radovanović & Knežević, 2014) imposes the issue that real number of Roma population could be three to five times higher than recorded.

benefits to encourage childbearing (Sedlecky & Rašević, 2015; Vasić et al., 2014) leads us to the hint that discrepancy between estimated PWI and observed monthly number of livebirths stems from it.

The expected impact of the pandemic on the number of livebirths in Serbia during 2021 is not crucial, but it can neither be neglected. Similarly, Ullah et al. (2020) concludes based on the number of births in Italy that pandemic impact won't be large because change in family planning will, to some extent mitigate mortality replacement and hoarding effect. Yet, we claim that pandemic impact in Serbia won't be large not because mitigation of uncertainty and mortality replacement, but because of time-related decreasing of pandemic impact (people adapting to the new circumstances). So far, during the COVID-19 pandemic, child mortality has been negligible, removing one of the main drivers of the fertility rebounds observed in the combined mortality-fertility crises of the Malthusian era (Aassve et al., 2020). Such claim has been confirmed by numerous studies, all stressing that many people have revisited their fertility plans and abandoned or, more often, postponed their reproductive intentions (Luppi et al., 2020; Lindberg et al., 2020; Malicka et al., 2021) due to increased financial insecurity, health concerns or household duties during the pandemic, with the financial situation and mental well-being as the most important. In Serbia, as in high income countries where uncertainty plays a major role in decisions about parenthood, the overall impact of pandemic will certainly be negative, but not as negative as BBE methodology predicts and consequently it is also likely that there won't be a baby boom at all.

CONCLUSION

Our attempts to measure the potential pandemic impact on the number of live births in Serbia during 2021 revealed that the overall decrease shouldn't surpass 8,7% but likely won't be lower than 3,55%. In other words, it is expected that there will be between 2,2 and 5,5 thousand babies less than it should be under normal circumstances. There is still no consensus in the scientific community regarding the pandemic's impact on human fertility rates. Although we can agree with the prematurity of the claims from UNFPA technical brief, they certainly aren't without a logical bedrock. One of the main bedrocks for this claim in Serbia would be the unprecedented drought in marriages during the 2020 and the first half of the 2021, with the decrease of more than 30% in respect to 2019. Bearing in mind that the number of livebirths is in positive correlation with the number of first marriages and consensual unions, such shortage of first marriages during 2020 and the first half of 2021 will surely have long lasting negative consequences on the number of live births in years to come. Unfortunately, it is likely that the

number of excess deaths will far exceed the number of missing livebirths in Serbia, unlike the case in many other European countries. If, by any chance, the livebirth shortage proves to be smaller than expected, it will mean that current population policy measures show the first signs of efficacy, so they should be given special attention for the sake of the additional improvement.

The paper was written as a part of the research program of the Faculty of Geography – University of Belgrade for 2021, supported by the Ministry of Education, science and technological development of the Republic of Serbia.

REFERENCES

Aassve, A. et al. (2020). The COVID-19 pandemic and human fertility. *Science*, 369(6502), 370-371. doi: 10.1126/science.abc9520

Aassve, A. et al. (2021). Early assessment of the relationship between the COVID-19 pandemic and births in highincome countries. *PNAS*, 118(36), 1-3. https://doi.org/10.1073/pnas.2105709118

Berger, L. et al. (2021). COVID-19 lockdowns and demographically-relevant Google Trends: A cross-national analysis. *PLOS ONE-Public Library of Science*, 16(3), 1-28. https://doi.org/10.1371/journal.pone.0248072

Berrington, A. et al. (2021). *Recent trends in UK fertility and potential impacts of COVID-19* (Working Paper no. 95). Southampton: University of Southampton, Centre for Population Change, 1-45. Retrieved from https://www.cpc.ac.uk/docs/WP_95_Recent_trends_in_UK_fertility.pdf

Boberg-Fazlić, N. et al. (2017). *Disease and Fertility: Evidence from the 1918 Influenza Pandemic in Sweden* (Discussion paper, IZA No. 10834, June 2017), Bonn: IZA - Institute of Labor Economics, 1-61. Retrieved from https://docs.iza.org/dp10834.pdf

Comolli, C, L. (2017). The fertility response to the Great Recession in Europe and the United States: Structural economic conditions and perceived economic uncertainty. *Demographic Research*, 36(51), 1549-1600. doi: 10.4054/DemRes.2017.36.51

Dasgupta, A., Kantorová, V. & Ueffing, P. (2020). The impact of the COVID-19 crisis on meeting needs for family planning: a global scenario by contraceptive methods used [version 2]. *Gates Open Research* 4(102), 1-22. https://doi.org/10.12688/gatesopenres.13148.2

Desrosiers, A. et al. (2020). A systematic review of sexual and reproductive health interventions for young people in humanitarian and lower-and-middle-income country settings. *BMC Public Health*, 20(article number 666). doi: 10.1186/s12889-020-08818-y

Dettling J. L. & Kearney, M. S. (2014). House prices and birth rates: The impact of the real estate market on the decision to have a baby. *Journal of Public Economics*, 110(C), 82-100. doi: 10.1016/j.jpubeco.2013.09.009

Ebrahim, S. et al. (2020). COVID-19 Pandemic and Sub-Replacement Fertility. *Authorea*, 1-3. https://doi.org/10.22541/au.159819233.38980294

EUROSTAT (2021). Eurostat Fertility Database, Retrieved from https://appsso.eurostat.ec.europa.eu/nui/ show.do?dataset=demo_frate&lang=en

Goldstein, J. R. (2020). *Rebirth after disaster: models of post-pandemic fertility and marriage* (Keynote, conference on "Demographic aspects of the COVID-19 pandemic and its consequences," Vienna, Wittgenstein Centre for Demography and Global Human Capital, 30 November 2020). https://www.oeaw.ac.at/fileadmin/subsites/Institute/VID/PDF/Conferences/2020/COVID19/Slides/Keynote_2_Goldstein_WIC2020.pdf

Jessamyn, S. (2016). Booms, Busts, and Fertility - Testing the Becker Model Using Gender-Specific Labor Demand. *Journal of Human Resources*, Winter 2016, 51(1)1, 1-29, doi: 10.3368/jhr.51.1.1

Joseph, N. T. & Metz, T. D. (2021). Coronavirus Disease 2019 (COVID-19) and Pregnancy Outcomes - State of the Science. *Obstetricians and Gynecologists*, 138(4), 539-541 doi:10.1097/AOG.0000000000004548

Kearney, M. S. & Levine, P. (2020). Half a million fewer children? The coming COVID baby bust. *Brookings*. Retrieved from https://www.brookings.edu/research/half-a-million-fewer-children-the-coming-covid-baby-bust/

Li, F. et al. (2021). Impact of COVID-19 on female fertility: a systematic review and meta-analysis protocol. *BMJ Open*, 11(2) e045524. doi:10.1136/bmjopen-2020-045524

Lindberg, L. D. et al. (2020). *Early Impacts of the COVID-19 Pandemic: Findings from the 2020: Guttmacher Survey of Reproductive Health Experiences* (Research report in Guttmacher Institute, New York). doi: 10.1363/2020.31482

Luppi, F., Arpino, B. & Rosina, A. (2020). The impact of COVID-19 on fertility plans in Italy, Germany, France, Spain and UK. *Demographic Research*, 43(47), 1399-1412. doi: 10.4054/DemRes.2020.43.47

Madjunkov, M., Dviri, D. & Librach, C. (2020). A comprehensive review of the impact of COVID-19 on human reproductive biology, assisted reproduction care and pregnancy: A Canadian perspective. *Journal of Ovarian Research*, 13, Article number 140(2020). https://doi.org/10.1186/s13048-020-00737-1

Malicka, I., Mynarska, M., & Świderska, J. (2021). Perceived consequences of the COVID-19 pandemic and childbearing intentions in Poland. *Journal of Family Research*, 33(3), 674-702. https://doi.org/10.20377/jfr-666

Matysiak, A., Vignoli, D. & Sobotka, T. (2018). *The Great Recession and fertility in Europe: A sub-national analysis.* (Vienna Institute of Demography Working Papers 02/2018). Vienna: VID. https://www.econstor.eu/bitstream/10419/184849/1/WP2018_02.pdf.

Matysiak, A., Sobotka, T. & Vignoli, D. (2021). The Great Recession and Fertility in Europe: A Sub-national Analysis. *Eur J Population* **37,** 29–64. https://doi.org/10.1007/s10680-020-09556-y

McColl, R. & Lynch, E. (2021). *Delaware's Fertility Rate and COVID-19* (Research report in UD Center for Community Research & Service, Biden School for Public Policy and Administration, August 2021). Retrrieved from https://udspace.udel.edu/bitstream/handle/19716/29092/Delaware%27s%20Fertility%20Rate%20and%20COVID-19%20v2.pdf?sequence=3&isAllowed=y

Micelli, E. et al. (2020). Desire for parenthood at the time of COVID-19 pandemic: an insight into the Italian situation. *Journal of Psychos Obstetr Gynecol*, 41(3), 183-190. doi: 10.1080/0167482X.2020.1759545

ONS (2020) Provisional births in England and Wales: 2020 https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/articles/provisionalbirthsinenglandandwales/2020#:~:text=3.-,Number%20of%20live%20births%20and%20fertility%20rates,most%20recent%20peak%20in%202012

Petrović, P. & Milanović, M. (2021). Inkluzija Roma u Srbiji: empirijska analiza. (Research report of Fiscal Council of Republic of Serbia, Beograd), 1-50.

Radovanović, S. & Knežević, A. (2014). *Romi u Srbiji*. Beograd: Republički zavod za statistiku.

Richmond, P. & Roehner, B. M. (2018). Coupling between death spikes and birth troughs. Part 1: Evidence. *Physica A: Statistical Mechanics and its Applications*, 97–111. https://doi.org/10.1016/j.physa.2018.04.044

Riley, T. et al. (2020). Estimates of the Potential Impact of the COVID-19 Pandemic on Sexual and Reproductive Health In Low- and Middle-Income Countries. *Int Perspect Sex Reprod Health*, 16, 46:73-76. doi: 10.1363/46e9020. PMID: 32343244.

Robayo-Abril, M. & Millán, N. (2019). *Breaking the Cycle of Roma Exclusion in the Western Balkans*. Washington: World Bank. Retrieved from https://openknowledge.worldbank.org/handle/10986/31393

RZS (2021). Preliminary data on live births and deaths – January-September 2021, https://publikacije.stat.gov.rs/G2021/Pdf/G20211286.pdf

RZS (2021). Preliminary data on live births and deaths – January-December 2020, https://publikacije.stat.gov.rs/G2021/Pdf/G20211017.pdf

RZS (2021). Baza podataka, Živorodjeni prema mesecu rodjenja https://data.stat.gov.rs/Home/Result/18030507?languageCode=sr-Latn

RZS (2021). Anketa o radnoj snazi u Republici Srbiji 2020. https://publikacije.stat.gov.rs/G2021/Pdf/G20215671.pdf

RZS (2021). Anketa o radnoj snazi, II kvartal 2021. – saopštenje https://publikacije.stat.gov.rs/G2021/Pdf/G20211239.pdf

RZS (2020). *Demographic yearbook in the Republic of Serbia*, Retrieved from https://www.stat.gov.rs/publikacije/?d=14

Sedlecky, K. & Rašević, M. (2015). Challenges in sexual and reproductive health of Roma people who live in settlements in Serbia. *The Europaen Journal of Contraception & Reproductive Health Care*, 20(2), 101-109. doi: 10.3109/13625187.2014.957825

Sobotka, T. et al. (2021). Baby bust in the wake of the COVID-19 pandemic? First results from the new STFF data series. *SocArXiv papers*, 33 pages, originally posted on: 23 March 2021 (2021), unpublished. doi:10.31235/osf.io/mvy62

Szabó, L. et al. (2021). Fertility of Roma Minorities in Central and Eastern Europe. *Comparative Population Studies*, 46(2021), 387-424. Doi: https://doi.org/10.12765/CPoS-2021-14

Ullah M. A. et al. (2020). Potential Effects of the COVID-19 Pandemic on Future Birth Rate. *Frontiers in Public Health*, 8:578438, 1-6. doi: 10.3389/fpubh.2020.578438

UNFPA (2021). How will COVID-19 impact fertility? Technical brief, 9 July 2021.

Vasić, P. (2021). Preliminarna analiza efekata COVID-19 krize na agregat umiranja u Srbiji u 2020. godini. *COVID-19: Sociodemografski procesi izazovi i posledice pandemije* (Knjiga sažetaka). Beograd: IDN-CDI i DDS, 16-18.

Vasić, P. (2015). Promene u obrazovnom sastavu fertilnog kontigenta u Srbiji na početku 21. veka i uticaj na rađanje. *Zbornik radova 4. Srpski kongres geografa: Dostignuća, aktuelnosti i izazovi geografske nauke i prakse* (Knjiga sažetaka). Beograd: Univerzitet u Beogradu-Geografski fakultet i Srpsko geografsko društvo.

Vasić, P., Gligorijević, V. & Devedžić, M. (2014). Responding to Population Policy – Which Women Can Provide the Greatest Demographic Benefit in Serbia? *Zbornik Matice Srpske za društvene nauke*, 148, 541-550.

Wilde, J., Chen, W. & Lohmann, S. (2020). COVID-19 and the future of US fertility: what can we learn from Google? (IZA Discussion Paper, No. 13776), Bonn: IZA - Institute of Labor Economics, 1-34. Retrieved from https://ftp.iza.org/dp13776.pdf

Worldmeters (2021). https://www.worldometers.info/coronavirus/country/serbia/

COVID-19 I RAĐANJE U SRBIJI - GRUBA PROCENA UTICAJA PANDEMIJE

Petar VASIĆ

REZIME

Izbijanje pandemije COVID-19 uticalo je na sve aspekte svakodnevnog života, te je opravdano očekivati određeni uticaj i na stopu fertiliteta. Dva glavna načina na koja pandemija može uticati na ukupan broj rođenih su: indirektni efekat koji se manifestuje kroz promenu reproduktivnog ponašanja (planovi, namere i realizacija) i efekat same infekcije na verovatnoću začeća i ishod trudnoće. Ovaj drugi efekat neće biti uzet u razmatranje jer postoje potpuno suprotstavljeni medicinski dokazi o uticaju infekcije COVID-19 na začeće i ishod trudnoće. Generalno, epidemije ispoljavaju uobičajeni obrazac u pogledu uticaja na fertilitet: nagli pad praćen postepenim povećanjem, a zatim periodom kompenzacije.

Po izbijanju epidemija, natalitet opada nakon 9 meseci i počinje da se oporavlja ili čak premašuje nivoe pre epidemije u roku od godinu dana i kasnije. Uzimajući u obzir pouke iz prethodnih pandemija, bilo bi razumno pretpostaviti da bi COVID-19 mogao značajno uticati na buduće stope rađanja i to uz dugoročne posledice. Srbija neće biti izuzetak u tom pogledu, pa se postavljaju dva glavna pitanja: koliki ukupan broj živorođenja bi bio očekivan u odsustvu pandemije, i drugo, koji broj živorođenja možemo očekivati sada kada je pandemija u toku? Mogući uticaj pandemije COVID-19 na agregat rađanja tokom 2021. godine u Srbiji izračunat je na osnovu tri različite metodologije: metodologije Bertillon Birth Effect (BBE), Kearney and Levine (2020) i i uticaja pandemijskih talasa (PWI koja je naš

predlog). Razlike između ove tri metodologije proizilaze iz njihovih različitih pretpostavki. BBE podrazumeva negativan efekat na rađanje sve vreme pandemije, Kearney i Levine (2020) tvrde da je stopa nataliteta negativno korelirana sa stopom nezaposlenosti, a mi tvrdimo da pandemijski uticaj ne mora uvek biti negativan i da slabi tokom trajanja epidemije. Na osnovu ovih pretpostavki i metodologija procenili smo ukupan broj živorođene dece tokom 2021. godine u Srbiji na između 57.546 i 60.807, odnosno očekujemo između 3,55 i 8,7 odsto manje živorođene dece u odnosu na redovno očekivani broj, koji smo procenili na 63.045 živorođenja. Uticaj pandemije na broj živorođene dece u Srbiji tokom 2021. nije preveliki, ali se ne može ni zanemariti. Uticaj pandemije u Srbiji 2021. neće biti veliki ne zbog poništavanja uticaja neizvesnosti i uticaja nadoknade mortaliteta, već zbog smanjenja uticaja pandemije sa protokom vremena (prilagođavanje ljudi novim okolnostima). Ipak, imajući u vidu da je broj živorođene dece u direktnoj korelaciji sa brojem prvih brakova i vanbračnih zajednica, značajno smanjenje broja prvih brakova tokom 2020. i prve polovine 2021. godine sigurno će imati dugotrajne negativne posledice na broj živorođene dece u godinama koje tek dolaze.

Ključne reči: COVID-19, pandemija, Srbija, opadanje nataliteta, fertilitet.