NEW CHALENGES FOR SERBIAN FERTILITY POLICY

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Abstract

Despite the fact that various forms of support policies for families with children have been implemented since the Second World War, Serbia has been facing below replacement fertility for more than 65 years. These policies have been implemented with a predominantly social dimension, without demographically defined goals. Only since 2002, direct pronatalist policy has been implemented in the entire territory of the Republic, and this paper will attempt to make a rough assessment of the impact of such policy on the birth aggregate during the Covid-19 crisis in order to make recommendations for the improvement of existing family and fertility policies. Before that, the possible impact of the Covid-19 pandemic on the birth aggregate during 2021 in Serbia will be calculated based on two different methodologies. This assessment should provide evidence about the efficacy of Serbian family and fertility policy.

Keywords: below replacement fertility, Covid-19 crisis, Serbia, family and fertility policy, birth decline, fertility loss.

Introduction

Besides the long-lasting bellow-replacement fertility in Serbia, the outbreak of Covid-19 pandemic resulted in emergence of so-called Covid Crisis (CC). This CC influenced the wide specter of everyday life, from employment, financial wellbeing, uncertainty and health concerns, to work and family reconciliation, dating, marrying, and family planning. Similar demographic consequences of the progressively widespread epidemics on conception and fertility have been recorded during prior incidents. In general, epidemics manifest a common pattern as far as their impact on population, which is remarkably similar to natural disasters, i.e., a steep decline in birth rates followed by gradual increases and then followed by a baby boom. Past evidence 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). More than two-thirds of the world population have experienced lockdown measures, lasting from weeks to months, and thereby affecting family and social lives, as well as imposing a substantial burden on mental health, which can influence fertility, conception, gestation, and birth (Ullah et al, 2020). Psychological stress and unemployment rates have exponentially risen. Different researches around the globe hinted the baby bust in highly, and the baby boom in less developed countries. For example, in highly developed countries (here we include Serbia) the fertility rate is greatly influenced by higher women educational levels, and high employment rates. During CC the inaccessibility to childcare outsourcing services, combined with financial uncertainty, could further reduce the fertility rates. Opposite, 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

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at home further escalated the possibility of a baby boom in rural areas during this pandemic (Ullah et al, 2020).

On the contrary, totally different system of reproductive decision making in highly developed economies will result in not planning to conceive during the CC. Historically, economic crises have never been the preferred period for a couple to decide to have a baby. The millions of jobs lost in that circumstances, even when a couple is not directly affected, create a climate of great uncertainty, which depresses family projects (Matysiak et al. 2018). Sex lives as well as planning for parenthood have been on the hold by a number of reasons like worries about future economic difficulties, fear of getting infected, complications during pregnancy and shortage of healthcare workers. Additionally, the physical distancing required by the Covid-19 containment strategy imposed also restrictions to (physical) intergenerational support and affected more strongly fertility plans in those countries, such as Italy and Spain, where grandparental childcare is more intensive, and also due to a lower availability of childcare services in these countries (Luppi et al, 2020). 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). 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.

Incorporating lessons from the previous pandemics, it would be reasonable to postulate that the CC may significantly affect future birth rates with long-term effects. The Serbia will not be an exception. Results of one study (Luppi et al, 2020) show that fertility plans have been negatively revised in all five observed countries, and that negative revisions of fertility plans are declining with age. This study found that in Italy, Spain, Germany, UK, and France, the half of the fertility planners postponed conception, one quarter completely abandoned the decision, and one quarter was still planning to get a baby during the CC (Luppi et al, 2020). Other authors expect that after an initial reduction, it is likely that birth rates will rise again due to the mortality replacement and hoarding effects (Ullah et al, 2020). Previous studies of epidemics suggest a range from 0.25 to 2 births being added per each death toll in the course of 1 to 5 years after an epidemic. The reduction of 1 birth in 1918 during Spanish flu, was followed by an increase of 1.5 conception 1 year later and resulted in a baby boom. Yet, it is hard to presume that CC death tool will turn out to be significant fertility driver. Such claim stems from the fact that the most of SARS-CoV2 deceased are the elderly, and that the children are mostly spared from serious illness, and particularly from dying. Conclusion about reproductive decisioning based on the experience of the society in the early phase of demographic transition is at least careless and superficial.

Aim of the paper

This paper will attempt to make a rough assessment of the impact of pronatalist policy on the birth aggregate in order to make recommendations for the revision of existing birth incentive measures. Actually, there are two precise goals of the paper. First, to make an CC impact assessment on birth total in Serbia, and, second, to provide tool for indirect detecting of the potential rise or fall of the birth rate. To do so, several assumptions are needed. First, potential direct and indirect influence of death tool (number of infections) on birth total won't surpass the 'Bertillon birth effect'(BBE). If so, then we have fertility decrease of the scale that indicates population policy and state policy failure in supporting families with children. Second, every result better than expected influence of pandemic on birth total (nor BBE, neither author's predictions), may be considered as a positive fertility trend even if fertility is declining. And the third, overall socioeconomical environment in the country, altogether with birth incentive measures, may be considered as effective if the positive fertility trend will be recorded, and vice versa. Depending on results, some new fertility policy measures would be suggested.

Methodology

The main idea of this paper is to compare the regular expected number of births with number of births expected regarding death spike during Covid-19 pandemic, and also, with the number of births expected regarding number of affected population. Regular expected number of live births is calculated on monthly basis, as an extrapolation of a linear trend during past 10 years. Besides the fact that not all of the territory

of the Republic of Serbia was equally hit by the pandemic waves, births as the demographic variable are observed in total for the whole country to avoid the random variations on smaller territorial units. Time period of the direct analysis comprises all months from the epidemic outbreak in Serbia to the February 2022 as the latest month for which it is possible to estimate the number of births with the chosen methodology. On the other hand, wider time period of analysis is related to period from the year 2011 onwards. Working with monthly data pertains to the seasonality of births which display a seasonal cycle during the year. This seasonality is not neglected, and our estimate took into account a seasonal pattern of births in Serbia. When the regular birth estimate is obtained, then the Bertillon Birth Effect[1] is calculated using following formula:

$$\Delta N = \frac{n}{12} \cdot eM$$

Where ΔN is monthly change in the number of live births, n is annual crude birth rate, and eM is 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 the births happening 9 months after the crisis (epidemic outbreak, earthquake, financial shock, etc.) show much stronger negative relationship with the number of persons directly affected by crisis than with the excess mortality itself (Richmond and Roehner, 2018). In that case, they suggested following formula:

$$\Delta N = n \cdot Pa$$

Where Pa is the monthly number of persons directly affected by the crisis. In our case Pa would be interpreted as a total number of persons infected by SARSCoV2 during the certain month. Beside BBE model, we will use the relative monthly change in excess mortality[2] to predict the future fertility. The fact that reduction in fertility occurs 8 months[3] after the death spike is allowing us to try to predict the future fertility fluctuations on the basis of already manifested relation between the fertility and the excess mortality. Birth relation is set as:

$$N_{r,m+8} = \left| \left(\frac{R_{c,m} - 1}{3.92} \right) - 1 \right|$$

Where $N_{r,m+8}$ is the multiplier of the regularly expected number of live births during certain month, $R_{c,m}$ is percentage of mortality change 8 months earlier, and **3,92** is the average observed ratio between the mortality change during the first seven months of the pandemic and the birth change eight months later. These three time-series of the birth estimate will be compared in the purpose of detecting eventual influence of family policies.

Data and Results

Regarding the number of live births by month (Table 1), we calculated linear trends to estimate expected number of live births in the absence of any extraordinary or emergency circumstances (also by month). We will call that number of births *the regular estimate*, i.e. the number of births that should occur in the absence of CC. Having in mind that CC in Serbia started with the emergence of the first infection on march the 5th, and that pregnancy and time to pregnancy (TTP) last approximately between 9 and 10 months, then we can be sure that only live births from December 2020 onwards, are the object of influence of CC. Births that have occurred in the period from march 2020 to November 2020, surely weren't under the influence of CC[4]. Thus we come to the time period from december 2020 to ferbruary 2022 as the period of possible CC influence estimation on the number of the live births.

In December, the only observed month in the 2020, the number of live births was 5010, only 161 less than the regular prediction, but for 151 births less than BBE estimation. So we came to the conclusion that the number of births during 2020 was for 1171 small-

[1] In the wake of the influenza pandemic of 1889–1890 Jacques Bertillon, a pioneer of medical statistics, noticed that after the massive death spike there was a dip in birth numbers around 9 months later which was significantly larger than that which 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. 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 and Roehner, 2018).

[2] Relative change: $R_{c,m} = \frac{M,m,t}{M,m,t-1}$, for example $R_{c,m} = \frac{M,dec,2020}{M,dec,2019}$

[3] Presuming that excess deaths in one month are the result of the Covid-19 infections in the month prior, we can say that the birth collapse will occur eight months later.

[4] Only under the influence of direct mortality of women that were already pregnant, which is insignificant.

Table 1. Number of live births by month, Serbia 2011-2020.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
2011	5720	4880	4974	4729	5226	5439	6218	6187	6061	5733	5335	5096	65598
2012	5496	5050	5173	4997	5352	5360	6177	6371	6051	6242	5638	5350	67257
2013	5521	4807	5068	4646	5000	5330	6225	6151	6052	6142	5278	5334	65554
2014	5584	4692	5053	5079	5172	5795	6235	5871	5922	6093	5312	5653	66461
2015	5748	4931	5162	5204	5067	5409	6172	5657	5991	6008	5103	5205	65657
2016	5360	4832	5143	4908	4879	5019	6062	6276	6101	5964	5410	4780	64734
2017	5301	4840	5263	4816	5311	5347	5877	5878	5641	5806	5519	5295	64894
2018	5497	4792	5032	4618	5151	5271	6142	5818	5502	5720	5246	5186	63975
2019	5631	4785	5034	4997	5112	5231	6090	5784	5670	5647	5166	5252	64399
2020*	5912	4611	4882	4850	4574	5710	5820	5417	5865	5148	4946	5010	62746

Source: Demographic Yearbook of the Republic of Serbia, Preliminary data on live births and deaths in 2020, and author's calculations.

* Notice that number of births in the 2020 year differs from the currently only available preliminary data. As we have the final data for the previous years, we adjusted the preliminary data in the same way they were adjusted in the previous years, and we used following ratios between preliminary and final data on live births.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ratio	1,15	0,99	1,04	1,04	0,94	1,09	0,99	1,01	1,03	0,94	1,02	0,98

er than predicted linear decrease, from which to CC only the 161 births can be attributed. In other words, during the 2020, the CC is responsible for less than 14% of additional fertility decrease.

As our primal interest is on fertility prediction during the year of 2021, in Table 2 we will present monthly data on recorded live births, regular estimate, BBE, and author's prediction.

Table 2. Estimated number of live births during 2021 – regular prediction (RP), Bertillon Birth Effect (BBE), recorded live births (RLB), author's prediction (AP).

2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
RP	5621	4688	5033	4878	4866	5375	5909	5539	5622	5436	5094	5157	63218
BBE	5544	4667	5001	4774	4813	5354	5770	4267	4148	4899	4475	3813	57527
RLB/AP	5221	4384	5551	4762	4454	5600	5366	4171	5334	5383	4509	4456	59192

Source: Prelininary data on live births and deaths in 2021, and author's calculations

Discussion

The change in live birth monthly pattern in Serbia during CC so far is showing the remarkable lining with the assumptions of the BBE, author's predictions and other countries experiences that have faced pandemic waves in the similar ways as Serbia did (Figure 1).

Countries as Croatia, Hungary, Slovenia, and Bulgaria showed similar pattern of epidemic waves and related short-term fertility fluctuations (Sobotka et al, 2021). For example, Hungary, which have similar epidemic experience, but also similar generous population policy measures, recorded fertility decline of -1.4% during the first part of year 2021, remarkably similar as Serbia did (-1.9%) (Figure 2).

Across 17 countries with lower fluctuations in births, the number of births fell on average by 6.5% in December 2020 and 8.9% in January 2021 when compared with the same month of the previous year. Related declines in Serbia were 3.1% and 7.1% respectively. Spain sustained the sharpest drop in the number of births among the analyzed countries, with the number of births plummeting by 20% in December 2020 and January 2021 (Sobotka et al, 2021). 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). The CC is likely to have a variety of short, medium, and long-term consequences for society that may vary across nations in accordance with governmental responses and other health and social policies. Having in mind that available fertility data reflect only to the first half of the 2021 year, and that related death spikes presented only 7.3% ex-

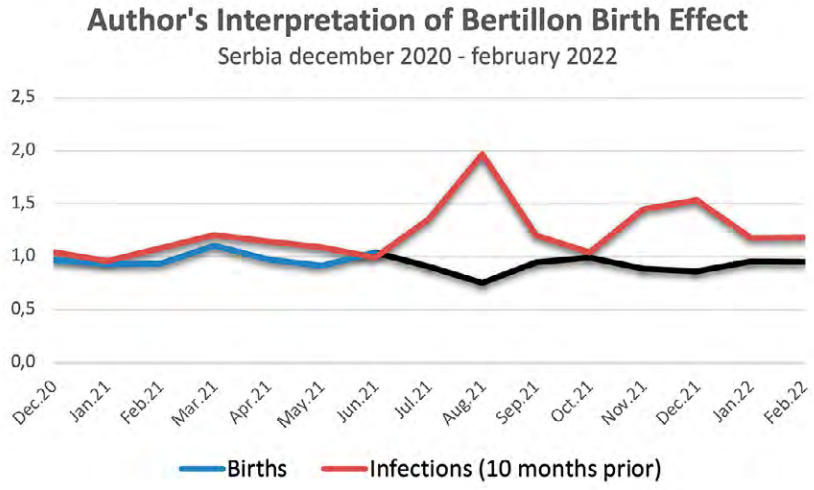


Figure 1. Recorded and estimated quantity and direction of ratio of births to infections

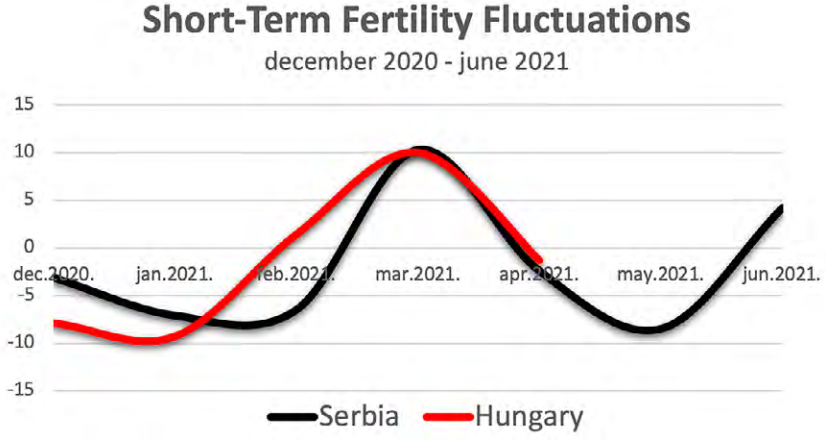


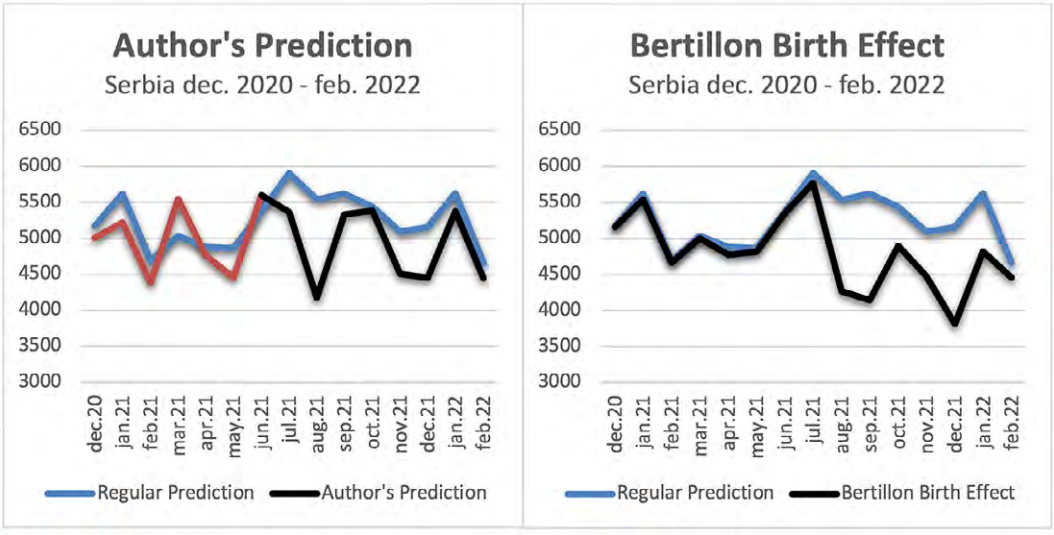
Figure 2. Ratio of recorded to expected monthly number of live births

cess mortality, it is obvious that baby-bust is yet about to happen during the following months. Excess mortality in Serbia started to rise seriously from October 2020, and during following 6 months amounted 36% on average. This five-fold increase of excess mortality surely will have tremendous negative effect on number of live births during the second half of this calendar year. In other words, so far, from January to June, number of births fell only by 1.6%, but we may expect that fertility decline during second half of this year will reach about 10.8% according to the author's methodology, and even 16.4% according to BBE methodology. Whatever turn-out to be closest to reality, we may expect that total number of the live births during 2021 in Serbia will be from 6.4% to 9.0% lower than expected.

The difference between these two methodologies 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 (with time lag of 9-10 months), which the previous fertility experience of developed countries during CC has denied. And second, author's presumption that epidemic waves produce similar short-term fluctuations of fertility. In other words, excess mortality and number of exposed persons (number of newly confirmed infections) produce the opposite effect on number of births with a time lag of 9-10 months. For example, when number of newly confirmed infections is falling, and epidemic is slowing, then people "unlock" their fertility plans, and we have birth recovery 9-10 months later, and vice versa, when number of infections is rising then people put their fertility plans on hold, and we have the fertility shrinkage 9-10 months later.

Finally, as a result of different presumptions of these two methodologies, we have different dynamics of expected fertility decline, and different estimation of amount of fertility loss due to CC (Figure 3a and 3b). According to BBE methodology we will face the lack of 5.7 thousand of newborn until the end of the year, and according to newly presented methodology, we could face smaller lack of babies amounting close to 4 thousand babies less than expected.

Various studies on European and USA populations have confirmed an immediate and sudden decline in



Figures 3a and 3b. Estimation of CC related fertility decline

fertility due to CC, with the 9-10 months lag (Sobotka et al, 2021; Luppi et al, 2020; Berger et al, 2021; Wilde et al, 2021). This fertility decline is driven by many potential channels - marriages were postponed, younger people and couples living apart had fewer opportunities to meet, families struggled to accommodate to home schooling, channels of childcare were often interrupted for long-time period, family planning strategies were changed, unemployment was on the rise, feel of uncertainty was overwhelming, etc. In the end, the expectations about the income have dominant influence on reproductive decisions. The more individuals expect their income in the future to be insecure due to the current economic crisis, the greater might be the probability that their fertility plans will change (Luppi et al, 2020).

Here we come to the role of the state social and family support system. In countries with smaller labor market shocks, and diverse and generous social and family support measures, fertility decline was less sharp. Tragically, the countries with traditionally unbalanced labor markets, weak work and family reconciliation, strong role of grandparental childcare, and already poor fertility rates, experienced greatest fertility decline (Luppi et al, 2020; Berger, 2021). In order to estimate future fertility shock, some researchers analyzed Google Search Trends (Wilde et al, 2021; Berger, 2021), and they found that long-term effect on fertility shouldn't be large. Wilde et al (2021) based their claim of 15% fertility decline on the predictions of employment decrease, but the direct, fertility related, search haven't showed much of the decline. On the other hand, findings of Berger et al (2021) show that shock on searches about pregnancy test, abortion, and family planning was temporary and vanished 2-3 months after the outbreak, suggesting that significant changes in overall fertility intentions are not very likely. However, searches about union formation, relationships and weddings show steep decline with no sign of full recovery so far. To the extent that trends in union formation parlay into subsequent trends in fertility, this may suggest declines in near-term first-birth fertility. Having in mind the fall of first-time marriages in Serbia during 2020 for 35%, and traditionally high share of shotgun[5] marriages, we may expect substantial fall in the number of the live births during the year of 2021. Additionally, delaying of the first marriage and first birth will have severe consequences on frequency of conception problems in Serbia (Vasić, 2021).

Conclusion

The pandemic will cast a long shadow on birth trends in Europe throughout the whole year 2021 and probably beyond (Sobotka et al, 2021). Economic and labour market uncertainty are likely to continue exerting negative pressure on fertility plans, even if the waves of infection eventually subside. Current economic performance of Serbia doesn't provide much to make the rapid, V-shaped baby boom likely in the near future. Disadvantaged position of young adults, high gender inequalities, and dysfunctional labor market, as in the rest of the Southern, Eastern and South-Eastern Europe, in the absence of the carefully rethinked fertility policy measures, even with high financial assets, will surely yield the long-lasting fertility depression for Ser-

[5] Marriages where the bride is already pregnant in the time of the wedding.

bia. Our results suggest that the number of live-births is likely to decrease for 6.4% - 9.0%, or 4000 to 5700 live births less than expected. It will be a matter of the pro-family environment if the fertility decrease will be less profound. Opposite, if the fertility decline will be larger than suggested, than is very likely that Serbian fertility policy is totally missing the point.

Some of the recommendations regarding fertility and family policies are related to the significance of supporting the earlier parenthood through the several channels. First, recognizing the need for earlier parenting through the specific goals of Birth Incentive Strategy, Strategy of the Public Health, and National Program for the Promotion and Preservation of Reproductive Health. And, second, to incorporate marriage support as a significant part of family policies. The fact that reproductive process sovereignty of the marriage is shrinking is true, but many aspects of social, health, safety, and overall wellbeing characteristics of the formal marriage are the reasons why it should be supported as a predominant reproductive unit based on, and responsible for, the reproduction itself.

CC put tremendous challenge for family and fertility policy through the further birth and marriage postponement, acceleration of fertility decline, and the urge for introducing the principles of *specificity, flexibility*, and *timeliness* as main bedrocks for Serbian fertility policy.

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