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ARTICLE IN THE SPECIAL SECTION

Exploring Fertility Dynamics and Factors Shaping Russia's Demographic Prospects

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ABSTRACT
The research examines fertility patterns in Russia by using current calendar birth rates and their implications for actual generations. Birth rates for these generations are derived from the 2020 Census data and are further refined through calculations employing one-year age-specific rates. This methodology allows us to estimate parameters for age-specific fertility models in real generations, offering a different approach compared to traditional population census methods. Given the variance in fertility rates by birth order, the analysis favors a segmented approach, separately considering trends for first, second, third, and subsequent births. Factors influencing fertility are examined both statistically, with a focus on the impact of population age–gender structure transformations on overall fertility rates, and through insights from *Vyborochnoe nabliudenie reproduktivnykh planov naseleniia* [Sample Observation of Population Reproductive Plans] performed by Rosstat [Federal State Statistics Service] in 2022. Value orientations

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are the primary determinant in reproductive behavior, which means that a key goal of demographic policy is to influence these orientations. However, it is also possible to influence fertility rates through social and demographic policies creating favorable conditions for families to fulfill their desire for children.

KEYWORDS
fertility, birth order, real generations, determinants of fertility, reproductive orientations

Introduction

Fertility, a pivotal demographic phenomenon, influences the population's reproductive patterns, particularly in contexts of low mortality rates. Despite high life expectancy, to ensure population sustainability across generations, each woman ideally should have around 2.1–2.2 children on average. Meanwhile, in Russia, like other economically advanced nations, the birth rate currently falls significantly below this threshold.

This situation leads researchers to seek solutions for addressing challenges in safeguarding the national demographic well-being. However, the concept of demographic well-being remains largely undefined in research literature, with a significant exception of the work by Ryazantsev et al. (2022), who define it as a balanced ratio of quantitative and qualitative indicators of a country's (or region's) demographic development over at least five years.

Typically, authors gauge the level of demographic well-being by examining its constituent elements. These commonly include population size, natural and migratory growth, total fertility rate, mortality structure, life expectancy, and the balance of the population's age–gender structure (Orlova, 2001; Radovel, 2021; Ryazantsev & Miryazov, 2021; Ryazantsev et al., 2023). In this study, in addition to analyzing key demographic processes, particular attention will be given to the trends and factors influencing fertility in Russia.

To understand potential pathways for changes in fertility, evaluate its determinants, and explore strategies to enhance it, we need to analyze both statistical data and research evidence on reproductive behavior. Analysis of fertility trends traditionally relies on both current calendar indicators and indicators for real generations.

The number of children in a family, and consequently within a particular population or community, is influenced by its reproductive behavior. Therefore, analyzing reproductive behavior provides insights into fertility determinants and helps in devising measures to increase fertility.

This study analyzes fertility rates for both hypothetical and real generations, providing insights into how major events like the COVID-19 pandemic and demographic policies such as family benefits affect birth patterns and overall fertility rates across generations. These findings help assess the potential for stabilizing the demographic situation in Russia and forecast its further positive development.

Literature Review and Theoretical Assumptions

Research on fertility dynamics and determinants surged in the 20th century with the advent of regular population censuses and establishment of statistical records. These data allowed for the calculation of demographic indicators for both hypothetical and real generations. In Russia, pioneering studies in this area were conducted by Steshenko (1966) and Sifman (1970).

Currently, there are two main approaches to fertility research in Russia. Advocates of the first approach focus on hypothetical generations: for instance, Zyryanova (2022) analyzed birth rate trends in the Komi Republic during the COVID-19 pandemic, while Rostovskaya et al. (2023) identified factors potentially impacting demographic development in the Republic of Tyva. Ketova and Tretiakova (2020) revealed similarities in fertility trends between the Udmurt Republic and the overall national level. This approach is now used by policymakers to develop federal population management programs.

Proponents of the second approach focus on studying fertility dynamics in real generations to understand how events, processes, or governmental decisions influence fertility and population growth (Zakharov, 2023). For instance, Frejka and Zakharov (2014) compared predicted fertility indicators for hypothetical generations with actual birth rates, revealing limited impact of family and demographic policies implemented in the 1980s. Similarly, Kishenin (2023) examined birth rates across former USSR countries, explaining discrepancies between indicators for hypothetical and real generations. Arkhangelskiy (2019) analyzed birth rates in actual generations of Russian women, identifying timing shifts and assessing the influence of government family support measures on decisions to have additional children among women of different birth years.

The division and analysis of fertility rates for hypothetical and real generations are not unique to Russian demographic studies. International researchers often examine the dynamics of childbirth among women belonging to different age groups. They often discuss the final birth rate among cohorts who have finished their reproductive years. However, fertility during women's active reproductive phase is less commonly analyzed, which suggests that resulting indicator values are more likely to fluctuate. This observation is supported by Kohler and Ortega (2002), who examined fertility dynamics and changes in women's reproductive behavior towards delaying childbirth.

International studies often compare women's level of education, which generally rose in the latter half of the 20th century, with the final birth rate to show that as women's education level increases, the age of first childbirth rises, intervals between subsequent births lengthen, and consequently, the total number of children decreases. However, there are variations among countries, reflected in the studies by Ahn and Sánchez-Marcos (2020), Andersson et al. (2009), Keskin and Çavlin (2022), Mirić (2018), Naz et al. (2006), Nisén et al. (2021).

The determinants of fertility encompass not only statistical but also socio-economic factors. Initially, Gallup researchers in the United States (Newport & Wilke, 2013) highlighted the correlation between socio-economic well-being and fertility rates. Subsequently, sociologists, economists, and demographers developed frameworks to delineate factors influencing reproductive behavior such as family income, living conditions, employment status of women, career aspirations, residential area type, and others. These factors were discussed by Antonov and Medkov (1982), Borisov

(1976), Filimonova et al. (2023), Hogan et al. (1987), Ildarhanova et al. (2022), Josipovič (2003), Kozlova and Sekitski-Pavlenko (2020), Mezeneva (2010), Mosakova (2008), Rodina (2023), Sinaj and Tushaj (2011), Sivoplyasova et al. (2022).

Additionally, people's reproductive preferences, shaped by parental family models, are often cited as a key fertility factor. Zhuravleva and Gavrilova (2017), Kasimovskaya et al. (2019), Rybakova et al. (2022), and Sivoplyasova (2022) consider this factor as primary.

This study investigates the dynamics and future prospects of Russia's birth rate, focusing on demographic well-being, defined as sustainable population reproduction and natural increase. Therefore, the study aims to identify fertility determinants and reproductive behavior factors to evaluate Russia's fertility prospects and explore potential strategies for improvement. To achieve this objective, we intend to analyze the dynamics of the fertility rate by calendar year and across real generations. Variations in dynamics and the influence of certain factors necessitate a differentiated analysis of fertility indicators by birth order. Special emphasis is placed on reproductive behavior and its determinants, as they shape birth rate levels and trends.

The analysis of statistical data relies on relative and average indicators. The crude birth rate (the number of births per 1,000 population) is contingent upon the age and gender structure of the population. The index method is used to disentangle the structural factor's influence from age-specific fertility rates (see Koshevoy et al., 2018).

In order to forecasting fertility, we employ the classical method of demographic forecasting known as "age shift."

To examine reproductive behavior and its determinants, we use data from the *Vyborochnoe nabliudenie reproduktivnykh planov naseleniia* [Sample Observation of Population Reproductive Plans] conducted by Rosstat [Federal State Statistics Service] in 2022 in all Russian regions (Rosstat, 2022b).

Materials and Methods

The study relies on current state statistics and data from the All-Russian Population Census 2020 (Rosstat, 2022a). The former is used for the assessment of birth rate dynamics by calendar year and its differentiation, while the latter facilitates analysis of changes in birth rates across real generations. Fertility rates for real generations can be derived not only from population census data but also can be estimated by looking at one-year age-specific fertility rates. Furthermore, unlike the population census, this estimation can be conducted annually, i.e., at the beginning of each year; hence, we can calculate age-specific fertility characteristics in real generations, e.g., the average number of children born at a particular age or within a specific age range, and the average age of mothers at childbirth.

Results

Fertility Trends in Russia

After a significant increase in the first 15 years of the 21st century, overall fertility rates in Russia have been declining annually. By 2022, they had decreased by almost a third compared to 2014. Preliminary data for the period from January to October 2023 indicate a further 3.0% decrease in the number of births compared to 2022, with the total birth rate (per 1,000 population) declining by 2.2%.

The dynamics of total fertility rates are influenced by changes in age-specific fertility rates and the transformation of the age–gender structure of the population. The influence of these two components can be differentiated by using the index method (Table 1).

Table 1

Changes in the Total Fertility Rate in Russia in 2015–2022

Year	Change in total fertility rate	Including changes in	
		Age-specific fertility rates	Age and gender structure of the population
2015/2014	0.996	1.018	0.978
2016/2015	0.972	0.995	0.977
2017/2016	0.893	0.917	0.975
2018/2017	0.949	0.976	0.973
2019/2018	0.924	0.950	0.972
2020/2019	0.972	1.000	0.972
2021/2020	0.977	1.004	0.973
2022/2021[1]	0.927	0.938	0.988

Note. Source: calculated by the authors according to data from Rosstat.

In 2015, a slight decrease in the total fertility rate occurred solely due to structural factors. The most significant contribution to the decline in age-specific fertility rates was observed between 2017 and 2019, while in 2020 and 2021, they remained relatively unchanged.

The dynamics of the total fertility rate are negatively impacted by changes in the age gender structure of the population. The active reproductive age group comprises relatively smaller cohorts born in the 1990s. In 2019 and 2020, structural changes contributed to a 2.8% decrease in the total fertility rate, with a slightly lesser impact in 2021 (2.7%).

The adverse effects of structural changes on total fertility rate dynamics are expected to persist until the late 2020s. Forecast calculations, assuming age-specific fertility rates remain at the 2022 level (to isolate the influence of structural factors), indicate a decline in the number of births until 2031 (to 1,103.4 thousand people), with the total fertility rate reaching its minimum in 2029–2030 at 7.8 per 1,000 population. In 2023, exclusively because of changes in the age–gender structure of the population, the total fertility rate may decrease by 2.8%, followed by declines of 2.5% in 2024, 2.3% in 2025, 1.9% in 2026, 1.5% in 2027, 1.0% in 2028, and 0.5% in 2029 (Table 2).

Table 2

Dynamics of the Total Fertility Rate While Maintaining Age-Specific Fertility Rates at the 2022 Level

Year	Number of births	Total fertility rate
2023	1,263.4	8.6
2024	1,226.5	8.4
2025	1,193.1	8.2

[1] Indicators for 2022 may not be entirely comparable to data from previous years, as they were calculated based on the results of the 2020 population census.

Table 2 Continued

Year	Number of births	Total fertility rate
2026	1,164.2	8.1
2027	1,140.7	8.0
2028	1,122.8	7.9
2029	1,110.5	7.8
2030	1,104.0	7.8
2031	1,103.4	7.9
2032	1,108.3	8.0
2033	1,117.8	8.1
2034	1,130.2	8.3

Note. Source: calculated by the authors according to data from Rosstat.

After reaching its minimum in 1999, the total fertility rate in Russia showed an almost steady growth (with the exception of 2005) until 2015. However, in 2016, there was a slight decrease, followed by a more significant decline in 2017–2019 (Table 3).

Table 3

Dynamics of the Total Fertility Rate in Russia in 2015–2022

Year	2015	2016	2017	2018	2019	2020	2021	2022	
								Based on 2020 Census data	Excluding 2020 Census data
Total fertility rate	1.777	1.762	1.621	1.579	1.504	1.505	1.505	1.416	1.452

Note. Source: calculated by the authors according to data from Rosstat.

In 2020 and 2021, the total fertility rate remained practically unchanged, but it decreased in 2022. Official data from Rosstat indicates a significant decrease (by 0.089) in the fertility rate for 2022. However, it is important to note that the calculation for 2021 did not consider the results of the 2020 population census, while the calculations for 2022 did. As a result, Rosstat will recalculate all demographic indicators for the period after the 2010 population census based on the 2020 census results. In this study, to maintain comparability with indicators from the previous period, the total fertility rate for 2022 was calculated without considering the census results. It amounted to 1.452, which is slightly higher than the officially calculated figure based on census data (1.416). The decrease relative to the 2021 level is 0.053.

As it was mentioned before, to maintain a replacement level in the population, the total fertility rate should be approximately 2.1–2.2. At this rate, each generation of parents will be replaced by a generation of children roughly equal in number. If the fertility rate exceeds this level, the population will grow with each generation, indicating extensive population reproduction. If the fertility rate falls below this level, younger generations will be smaller in number, leading to diminished population reproduction. Currently, Russia, like most economically developed countries, is undergoing a period of declining population reproduction.

It is essential to distinguish between population reproduction, which involves the replacement of generations, and the current calendar dynamics of natural population growth, which is the difference between births and deaths. While population reproduction represents the replacement of parents' generations by their children's generations, then in annual natural population growth parameters, the newborns replace mainly their great-grandparents or even older generations. The required total fertility rate for achieving zero natural population growth annually in Russia in 2022 would have been 2.06. However, the actual total fertility rate in 2022 was 1.416, which is 1.45 times lower.

Forecast calculations show that in the coming years, while age-specific mortality rates remain unchanged, the value of the total fertility rate required to ensure zero natural population growth will increase significantly. Only in the early 2030s will it stabilize, but at a very high level (Table 4). This is attributed to upcoming changes in the age and gender structure of the population. In the 2020s, relatively small generations born in the 1990s will continue to enter the active reproductive age. Simultaneously, numerous generations born after World War II will reach ages with a relatively high probability of mortality.

Table 4

Projected Values of the Total Fertility Rate Required to Ensure Population Reproduction

Year	Natural population change	Required total fertility rate
2023	–657.0	2.15
2024	–714.4	2.24
2025	–768.5	2.33
2026	–818.0	2.41
2027	–864.5	2.49
2028	–906.0	2.56
2029	–943.5	2.62
2030	–975.7	2.67
2031	–999.5	2.70
2032	–1,017.4	2.71
2033	–1,029.7	2.72
2034	–1,037.5	2.71

Note. Source: calculated by the authors according to data from Rosstat.

To maintain the total fertility rate necessary for zero natural population growth at the 2022 level (i.e., 2.06), a reduction in age-specific mortality rates compared to the previous year on average by 2.4% in 2023, by 2.5% in 2024, by 2.3% in 2025, by 1.9% in 2026, by 1.5% in 2027, by 1.0% in 2028, and by 0.5% in 2029 is required. Consequently, compared to the 2022 level, age-specific mortality rates should be lower on average: by 4.9% in 2024, by 7.0% in 2025, by 8.8% in 2026, by 10.2% in 2027, by 11.1% in 2028, and by 11.5% in 2029 and 2030.

According to Rosstat (2022b), the average desired number of children, i.e., the number of children people would like to have if all necessary conditions were met, was below 2.06: 2.00 for women and 1.97 for men. The average expected number of children (the number they plan to have) is even lower and equals 1.76 for women and 1.74 for men. The average desired number of children was lower than in a similar study conducted in 2017, which is 2.15 for women and 2.16 for men. Of particular concern from the demographic perspective is that people under 25 have a significantly lower average desired number of children: 1.89 for women and 1.84 for men.

Therefore, the probability of achieving the fertility level necessary to overcome natural population decline in Russia in the next decade is extremely low. The focus should be on a slight increase in the birth rate to reduce natural population decline. A more significant increase in the birth rate may be achieved through improved conditions for fulfilling the existing need for children.

Alongside enhancing conditions that facilitate the realization of people's reproductive preferences, it is also imperative to actively promote the large family model since the primary determinant shaping the need for children is value orientations.

The dynamics of the total fertility rate in Russia vary significantly depending on birth order, suggesting that its determinants differ for first, second, third, and subsequent births (Table 5).

Table 5

Total Fertility Rate by Birth Order in Russia in 2015–2022

Year	Birth order		
	1st	2nd	3rd and subsequent
2015	0.787	0.688	0.302
2016	0.764	0.686	0.312
2017	0.705	0.604	0.312
2018	0.664	0.582	0.332
2019	0.638	0.531	0.335
2020	0.625	0.523	0.356
2021	0.609	0.524	0.372
2022 (based on 2020 Census data)	0.595	0.462	0.359
2022 (excluding 2020 Census data)	0.612	0.473	0.367

Note. Source: calculated by the authors according to data from Rosstat.

The total fertility rate for first births peaked in 2012 at 0.811, maintaining near-stability in 2013 at 0.809 before steadily declining in subsequent years. According to Rosstat data incorporating the All-Russian Population Census 2020, by 2022, this figure had decreased to 0.595. An equivalent metric for real generations is the average number of first births or the proportion of women who have had at least one child. If this

metric remained consistent over time, it would suggest that 40.5% of women had not given birth by the end of their reproductive years. However, it is estimated that the rate for currently active reproductive-aged women is approximately 15% or slightly lower. According to the All-Russian Population Census 2020, among women aged 35–39, the average number of first births is 0.86 (indicating 14% without children), and even among those aged 30–34, it is 0.78 (with 22% without children). While the increase in the average number of first births for 35–39-year-olds is projected to be modest, it is expected to be significant for 30–34-year-olds.

The decline in the total fertility rate for first births in 2020 and 2021 was relatively modest, with a slightly larger drop observed in 2021 (2.6%) compared to 2020 (2.0%). However, considering the substantial decrease in age-specific rates for first marriages among women in 2020 (20–24-year-olds by 18.6%, 25–29-year-olds by 14.5%), possibly linked to COVID-19 restrictions, one might have expected a more significant reduction in the total rate for first births in 2021.

It is worth noting that the total fertility rate for first births is closely associated with the number of marriages per 1,000 population in the previous year. In Russia, from 2000 to 2022 the correlation coefficient between these indicators was 0.86.

The introduction of maternal (family) capital for the first child in 2020[2] likely had a positive impact, counteracting the decline in the marriage rate and influencing the change in the total fertility rate for first births in 2021 (O vnesenii izmenenii, 2020). Rosstat indicates that the total fertility rate for first births in 2022 (0.595) was lower than in 2021 (0.609). However, if we compare the 2022 value with the 2021 indicator calculated without considering the 2020 census data to ensure comparability, the total fertility rate for first births for 2022 (0.612) turns out to be slightly higher than that of 2021.

The significant decrease in the total fertility rate for first births, which is notably lower than the average number of first births in actual generations, could be linked to timing shifts resulting in delayed first births. This delay could stem from both the postponement of first marriages (at least their registration) and the postponement of first births in marriage. According to Rosstat (2022b), for couples in their first registered marriage of three years or longer, the percentage of those without children is 6.2% for women and 7.4% for men. In unregistered marriages, the respective percentages are 39.6% for women and 43.7% for men. Additionally, the proportion of women aged 25–29 who have never been married increased from 26.3% according to the 2010 population census to 31.7% according to the 2020 population census.

The total fertility rate for second births in Russia saw a significant increase in 2007, rising by 0.069 from 0.410 in 2006 to 0.479. This notable increase can be largely attributed to the initiation of the federal maternity (family) capital program. Subsequent years witnessed smaller increases in the total fertility rate for second births: by 0.039 in 2008, 0.018 in 2009, 0.029 in 2010, 0.009 in 2011, and by 0.046 in 2012. Regional measures aimed at assisting families with children may have contributed to this increase in 2012. However, in 2013, the increase in the total fertility rate for second

[2] Maternal capital for the first child is a targeted monetary payment provided to families upon the birth or adoption of their firstborn from January 1, 2020, to December 31, 2026. Maternal capital is issued in the form of a certificate, which can only be spent for specific purposes.

births was minimal (by 0.005), while in 2014 (by 0.033) and 2015 (by 0.030), it was quite significant.

Indirect estimates suggest that from January to August 2016, the total fertility rate was even higher than in 2015, albeit with fewer children born overall. This slight reduction was associated solely with changes in the age-gender structure of the population, while age-specific and total fertility rates increased. However, from September to December 2016, there was a significant decline in the total fertility rate, especially for second births. This decline is notable because there was no corresponding decrease in birth rates for third and subsequent births in the same period.

The dynamics of fertility rates for second births in 2014, 2015, and 2016 could have been influenced by timing shifts associated with families opting to have a second child earlier due to the originally set deadline for the federal maternity (family) capital program, which was scheduled to end in 2016. On December 3, 2015, it was announced that the program would be extended, which likely contributed to a slowdown in timing shifts, as families no longer felt rushed to have a second child. Consequently, a timing gap emerged, leading to a decline in fertility rates starting in September 2016.

After timing shifts associated with the earlier birth of children, a timing failure and a decrease in fertility are inevitable since some of the second children who could be born in subsequent years have already been born earlier. If this program had not been extended, the time gap would have begun not in September 2016, but in January 2017, and it would have been significantly greater. The exit from the timing gap occurs gradually as the generations that were not affected by the timing shifts reach the age of active birth of second children.

This hypothesis is further supported by the fact that there was no decrease in birth rates for third and subsequent births during the same period. If there were any other factors influencing reproductive behavior, then, almost certainly, they would be reflected in third births. Timing shifts practically could not influence the dynamics of third and subsequent births. In contrast to second births, for third and subsequent births the increase in the total fertility rate in 2015 (by 0.008), on the contrary, was the smallest for the period since 2010. In order to qualify for maternal (family) capital for the third child, the second child had to be born before 2007. Instances of a third child being born between 2014 and 2016, with an interval of 8–10 years after the birth of the second child, and a desire to use maternal (family) capital were likely uncommon.

Timing shifts at the birth of a second child are also evidenced by fertility rates in real generations. For instance, for women born in the 1970s, the average number of second births decreases by the age of 30, from 0.34 for those born in 1970 to 0.27 for those born between 1977 and 1980. However, in younger generations, such as those born in 1987 and 1988, the average number of second births by 30 rises to 0.34 again, before decreasing to 0.31 for those born in 1990. Interestingly, in the age interval of 30–32 years, the average number of second births increases from 0.07 for women born in 1970 to 0.14 for those born between 1983 and 1985, but then decreases in younger generations. This indicates that for women born in the second half of the 1980s, there was an increase in the average number of second births at younger ages and a decrease at older ages compared to older generations.

In 2017–2019, the total fertility rate for second births in Russia saw a significant decrease, which was especially pronounced in 2017. However, in 2020, the decrease was minimal (by 0.008), followed by a slight increase of 0.001 in 2021. This trend might suggest that progress was being made in closing the timing gap. However, in 2022, the total fertility rate for second births showed another significant decrease (by 0.051). Without considering the 2020 population census data, its value was 0.473, and with the census data taken into account, it was 0.462. The decrease in 2021 may have been influenced by delayed births (conceptions in 2021) due to the COVID-19 pandemic.

On the other hand, the total fertility rate for third and subsequent births has been increasing almost consistently, and only 2017 showed no change compared to 2016. However, in 2022, the total fertility rate for third and subsequent births showed a decrease of 0.005 (if calculated without considering the All-Russian Population Census 2020 data, i.e., in a form comparable to previous years).

Fertility Rates in Real Generations

According to the All-Russian Population Census 2020, the average number of children born in older generations of women is decreasing, reaching a minimum of 1.60 for women aged 45–49 and 50–54 at the time of the census. However, in younger generations, it slightly increases, reaching 1.66 among women aged 40–44. Even for women aged 35–39, who are still in their active reproductive years, the average number of children born (1.61) is higher than for those aged 45–54.

Generational changes in the average number of children born are driven by two contrasting trends. Firstly, the average number of first births is decreasing, leading to a higher proportion of women without children. Secondly, there is an increase in the proportion of women who have a second child after their first, as well as an increase in the proportion of women who have a third child after their second.

In generations of women who were 60–69 years old in 2020, the average number of first births is 0.93, for 45–49-year-old women it is 0.90, and for 40–44-year-old women it is 0.89.

The proportion of women who have a second child after their first decreases from 67.7% among women aged 65–69 years old in 2020 to 56.1% among those aged 50–54. However, in younger generations, this proportion increases and reaches its peak among women aged 35–39 in 2020 (62.2%). This figure is expected to rise further by the end of their reproductive years. Even now, it exceeds that of women who are 20 years older (61.9%).

The share of those who gave birth to a third child among those who gave birth to a second decreases from 29.1% among women who were 70 years or older in 2020 to 22.9% among those who were 55–59 years old. In younger generations it increases and reaches its maximum (for now) in 40–44-year-old women (29.8%). In contrast, women aged 35–39 and 40–44 show a higher proportion of those who have a third child after their second compared to those aged 70 or older. This difference is expected to slightly increase by the end of their reproductive years.

An assessment of fertility rates in real generations based on one-year age-specific fertility rates indicates that the average number of children born in Russia changed

relatively little in generations of women born in the 1950s (in the range of 1.84–1.90, without pronounced dynamics) and decreased significantly in generations born in the 1960s and early 1970s: from 1.86 for women born in 1960 to 1.58 for women born in 1973. In younger generations, the average number of children born increases slightly reaching a maximum of 1.70 among women born in 1982 (Table 6). At the beginning of 2023, they were 40 years old and until the end of their reproductive period, the average number of children born to them is likely to increase slightly.

Table 6

Fertility Rates in Real Generations in Russia (at the Beginning of 2023)

Women's birth year	Average number of children born	Average number of 1st births (% of those who gave birth to at least one child)	% of those who gave birth to a 2nd child among those who gave birth to their 1st child	% of those who gave birth to a 3rd child among those who gave birth to a 2nd child
1960	1.86	0.95	70.0	25.5
1961	1.83	0.94	68.9	25.0
1962	1.77	0.92	68.0	24.5
1963	1.74	0.92	66.4	24.1
1964	1.71	0.92	64.4	24.3
1965	1.69	0.92	62.4	23.9
1966	1.67	0.92	60.5	24.0
1967	1.65	0.92	58.6	24.3
1968	1.63	0.92	57.2	24.5
1969	1.63	0.93	56.1	24.7
1970	1.61	0.92	54.5	25.0
1971	1.60	0.92	54.2	25.4
1972	1.59	0.91	54.9	25.8
1973	1.58	0.89	55.7	26.6
1974	1.61	0.90	56.9	27.4
1975	1.62	0.89	58.0	28.3
1976	1.63	0.89	59.2	29.1
1977	1.65	0.88	60.6	30.1
1978	1.67	0.88	61.9	31.0
1979	1.69	0.88	62.8	31.7
1980	1.67	0.87	63.3	32.1
1981	1.67	0.86	64.2	32.5
1982	1.70	0.87	65.4	32.7
1983	1.69	0.86	66.5	32.3
1984	1.67	0.85	66.3	32.0
1985	1.63	0.84	65.5	31.7

Note. Source: calculated by the authors according to data from the Human Fertility Database[3] and Rosstat.

[3] https://database.earth/population/russian-federation/fertility-rate

The average number of first births declines across most generations born in the 1960s, settling at 0.92. For women born in 1973–1976, it dips slightly to 0.89–0.90; for those born in 1977–1979, it is 0.88; for those born in 1980–1983, 0.86–0.87; for those born in 1984, it is 0.85; and for those born in 1985, 0.84. Although the average number of first births may show a slight uptick for women born in 1984–1985 before the end of their reproductive years, it is unlikely to exceed 0.86. Consequently, the proportion of women without children has risen from 8% to 14–15%.

The percentage of women having a second child after their first decreases until the generation born in 1971, reaching 54.2%. However, in younger generations, this proportion increases, peaking among women born in 1983 at 66.5%. At the beginning of 2023, these women were 39 years old. Given that the likelihood of having a second child is higher than that of having a first, the proportion of women who have a second child after their first is expected to continue increasing by the end of their reproductive years.

Zakharov (2016) argues that the likelihood of second births today remains significantly lower than the levels observed among generations born in the 1950s and 1960s during the 1980s. However, it seems appropriate to talk about the dynamics of this indicator. Among women born in 1956, the share of those who gave birth to a second child among those who gave birth to their first is 8.6 percentage points higher than for those who are 10 years older. For women born in 1983, it is 12.3 percentage points higher than for women born in 1971.

The share of those who gave birth to a third child among those who gave birth to a second decreases to the generation of women born in 1965, for whom it is 23.9%. The highest value of this indicator, after its increase, is 32.7% (an increase of 8.8 percentage points) for women born in 1982, which means that almost a third of those who gave birth to a second child also had a third. At the beginning of 2023, these women were 40 years old, and it is expected that by the end of their reproductive years, the proportion of those giving birth to a third child after their second will continue to rise. Such a substantial proportion of second-child bearers who opt to have a third child has not been observed in Russia since the generations born in the late 1930s.

The average age of a mother at the birth of her first child decreased until the generation of women born in 1967, for whom it is 22.69 years. In older generations it increases significantly and for women born in 1984 amounts to 24.84 years. For women born in 1985, the average age at the birth of their first child is still slightly lower (24.78), but at the beginning of 2023 they were 37 years old and by the end of their reproductive period this figure will increase.

The rise in the average age of mothers at the birth of their first child can be viewed from two perspectives. On the one hand, older parents often enjoy greater financial stability and have established professional careers. On the other hand, from a demographic standpoint, this trend can have negative implications. Firstly, as individuals age, their health, including reproductive health, tends to decline, potentially leading to fertility issues or infertility. Secondly, if childbirth occurs later in a couple's relationship, it may disrupt their established lifestyle, which was built without children. In other words, postponing parenthood could conflict with the couple's lifestyle

preferences and values. Additionally, the decision to have children may be influenced by the perceived importance of parenthood relative to other priorities and lifestyle choices.

The average age of a mother at the birth of her second child also increases, and to a greater extent than at the birth of her first child. Its lowest value was observed in the generation of women born in 1964 (26.16 years). For women born in 1980, it is 30.02 years and will increase slightly, since at the beginning of 2023 they were 42 years old and some of them will have a second child.

The generational increase in the average maternal age at the birth of her second child surpasses that of her first. Consequently, the gap between the average maternal ages at the births of the first and second children widens. This gap slightly decreased among generations born in the 1950s and early 1960s, possibly due to state support initiatives for families with children in the 1980s, potentially prompting earlier second births in some families. It reached its lowest point among women born in 1963, at 3.31 years. However, among younger generations, this gap has significantly expanded. As of the beginning of 2023, this figure is the highest among those born in 1975 and 1976, at 5.95 years. For younger cohorts, this gap is slightly smaller: 5.89 years for born in 1977; 5.80 for born in 1978; 5.67 for born in 1979; 5.56 for born in 1980. However, since these cohorts have not completed their reproductive years, it is uncertain whether there will be a reduction in this gap due to potential earlier second births, possibly stimulated by intensified support measures like the federal maternal (family) capital introduced since 2007. Nonetheless, a significant reduction in this gap seems unlikely in these generations. Importantly, this difference does not fully represent the average interval between the births of the first and second children. In order to calculate this, we need data on the average age of mothers at the birth of their first child, among those who subsequently had a second child, which are not available.

Determinants of Fertility and Reproductive Behavior

In 2022, to counteract natural population decline in Russia, the total fertility rate would need to reach 2.06. Results from Rosstat (2022b) revealed a group of respondents whose average expected number of children closely approximated this target, as indicated by their responses to the question “How many children (including existing ones) are you planning to have?”

Two distinct groups can be distinguished: one group, the family-oriented, prioritizes the importance of being in a registered marriage and tends to value the traditional family model (this group includes those who assigned 5 points to being in a registered marriage and 1 point to “being free, independent and doing what I want”). The other group, oriented toward individualist values, places greater emphasis on personal freedom and independence, often valuing non-traditional family arrangements (this group includes those who assigned 5 points to “being free, independent and doing what I want” and 1 point to being in a registered marriage).

The family-oriented respondents comprised 17.4% of women and 17.1% of men, whereas those inclined towards individualist values constituted 2.5% and 3.6%, respectively. Respondents who did not exhibit extreme contrasts in their assessments of these values were excluded from these groups.

Reproductive aspirations diverged significantly between the selected groups. Among the family-oriented, women expressed a desired average of 2.19 children, and men, 2.24 children, provided they have all the necessary conditions. Conversely, those oriented towards individualist values aimed for an average of 1.45 and 1.30 children, respectively. The average expected number of children for the family-oriented respondents stood at 2.04 for women and 2.05 for men, while for those oriented at individualist values, it was 1.20 and 1.11, respectively (Table 7).

Table 7

Average Desired and Expected Number of Children Among Family-Oriented Respondents and Respondents Oriented Towards Individualist Values

Group of respondents	Average desired number of children		Average expected number of children	
	Females	Males	Females	Males
Family-oriented	2.19	2.24	2.04	2.05
Oriented towards individualist values	1.45	1.30	1.20	1.11

Note. Source: Rosstat (2022b).

A comparison between reproductive intentions (based on the 2015 micro-census) and the actual average number of children born in women's generations (based on the 2020 census) reveals that the expected number of children falls short by approximately 0.11–0.13. Despite the observed difference between reproductive intentions and actual birth rates, family-oriented individuals tend to come close to achieving the desired birth rate necessary to maintain a stable population (i.e., zero natural increase). The realization, albeit partial, of the desired number of children among family-oriented individuals would result in an average number of children born very close to the threshold of total fertility rate necessary for population reproduction (around 2.1–2.2).

These findings strongly indicate that value orientations significantly influence reproductive behavior. A larger proportion of individuals who prioritize strong family values represent the primary potential source for a notable increase in the fertility rate.

Moreover, an improvement in the standard of living among families could also contribute to an increase in the fertility rate, as it enhances the perceived conditions for fulfilling their desire for children. This correlation is evidenced by the relationship between the discrepancy in the average desired and expected numbers of children and respondents' assessment of the standard of living (Table 8).

Table 8

Difference Between the Average Desired and Expected Numbers of Children Depending on the Assessed Standard of Living

Assessment of the living standard (points)	Females	Males
90–100	0.15	0.17
70–80	0.19	0.19
50–60	0.24	0.23
30–40	0.20	0.29
0–20	0.26	0.29

Note. Source: Rosstat (2022b).

The smallest disparity between the average desired and expected number of children for both women and men is observed among those who rate their standard of living highest (90–100 points), while the largest gap is associated with the lowest assessment of the standard of living (0–20 points).

People's assessment of the standard of living predominantly reflects their perceptions of favorable conditions for fulfilling their desire for children. Therefore, it is recommended to account for the influence of the perceived standard of living on the expected number of children in homogeneous groups with regard to their desire for children. Typically, the desired number of children serves as a distinguishing indicator in such cases.

To ensure an accurate assessment of the impact of standard of living on reproductive intentions, we need to consider the influence of existing children on individuals' perceptions of their standard of living, with a separate focus being made on those without children to avoid potential biases (Table 9).

Table 9

Average Expected Number of Children Among Respondents Without Children Depending on Their Assessment of the Standard of Living and the Desired Number of Children

Assessment of the living standard (points)	Average expected number of children given the desired number of children:			
	Females		Males	
	2	3	2	3
90–100	1.90	2.63	1.92	2.79
70–80	1.89	2.56	1.81	2.69
50–60	1.84	2.62	1.82	2.54
30–40	1.91	2.76	1.72	2.65
0–20	1.91	2.03	1.61	3.00

Note. Source: Rosstat (2022b)

According to Rosstat (2022b), for women without children, in groups with the same desired number of children, there is generally no correlation between the average expected number of children and the perceived standard of living. However, an exception is observed for women who would like to have three children but rate their standard of living as very low (0–20 points), which results in a notably lower average expected number of children. Conversely, men who would like to have three children exhibit a notably higher average expected number of children with the lowest perceived standard of living. However, it should be noted that other factors may also influence the relationship between desired and expected numbers of children. Differences in the average expected number of children vary significantly across columns with different desired numbers of children compared to rows with different assessments of living standards, indicating that the desire for children more strongly shapes reproductive intentions than the conditions for their realization. Additionally, a significant determinant of reproductive intentions is the number of children in the parental family (see Table 9 and Table 10).

Table 10
Average Desired and Expected Number of Children Depending on the Number of Children Born to the Respondent's Mother

Number of children born to the respondent's mother	Females		Males	
	Average desired number of children	Average expected number of children	Average desired number of children	Average expected number of children
1	1.73	1.54	1.70	1.52
2	2.03	1.84	1.99	1.79
3	2.25	2.01	2.22	2.00
4	2.57	2.33	2.52	2.24
5 or more	2.92	2.67	2.99	2.58

Note. Source: Rosstat (2022b).

If the respondent's mother had five or more children, the average desired number of children is notably higher for both women (by 1.19) and men (by 1.29) compared to those who were the only child. Similarly, there are significant but slightly smaller differences between these two groups in the average expected number of children: by 1.13 for women and by 1.06 for men. This pattern has been observed in other studies, for example, Balashov and Savinov (1987), Kuz'min (1986). Therefore, a relatively smaller number of children in a family tends to result in lower reproductive aspirations in children from that family, potentially leading to a decrease in the birth rate in the subsequent generation.

Conclusion

The birth rate in Russia remains significantly below the level required to ensure population replacement and prevent natural decline. The notably low total fertility rate for first births can be attributed primarily to the trend of delaying marriages, or at least their formal registration. At the same time, there is also a tendency to postpone childbirth in marriages. This assessment is supported by the fact that this rate is notably lower than the average number of first births in actual generations.

The rise in the total fertility rate for second births persisted until 2015–2016, largely owing to the influence of the federal maternal (family) capital program. The substantial increase in this rate in 2014 and 2015 indirectly indicates shifts in timing, with some families opting for earlier childbirth of their second child. The subsequent decline in the total fertility rate for second births can be attributed largely to inevitable timing disruptions following such shifts, where second children that might have been born in those years were instead born earlier.

In the data on real generations, we can observe two contrasting trends. On the one hand, there is a decline in the average number of first births among younger women, leading to a slight increase in the proportion of women without children. On the other hand, there is an increase in the proportion of individuals who proceed to

have a second child after their first, as well as an increase in the proportion of those who have a third child after their second. Therefore, in addition to supporting second, third, and subsequent births, demographic policies should also address the growing proportion of childless individuals.

Our findings show that the primary determinant in reproductive behavior is value orientations. Consequently, a key focus of demographic policy aimed at boosting future fertility rates and ensuring population replacement is to influence these orientations to prioritize family, marriage, and children. It is these value orientations that chiefly dictate the desire for children. However, some increase in the fertility rate can also be attained through social and demographic policies geared towards establishing more favorable conditions for families to fulfill their desire for children.

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