SOCIAL DEVELOPMENT

Maternal Age at First Birth: Dynamics, Regional Differences, Determination*

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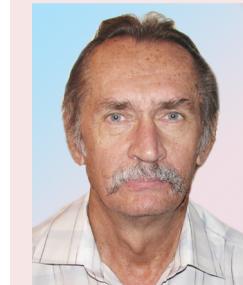
Abstract. The article presents the research results of the age model at first birth in Russia for the period of 1960-2019 which is available for calculations. The authors demonstrate the compatibility of data on first births from different sources, and calculate the indicator of "mean maternal age at first birth" using the methods of longitudinal and transverse demographic analysis (for real and conditional generations). The researchers have revealed that mother's age at first birth in the period from the 1960s to 1994 was decreasing from 24.4 to 22.5 years, then it was growing and in 2019 it made up 25.9 years. The age at first

birth in "young" real generations is lower than in conventional ones, in 2018–2019, it made up 25.9 years, but in none of real generations of women born in 2000 and older the total count value of this indicator reaches this level. This is evidence of timing shifts in the second half of the 1990s – early 2000s, after which, probably, the delayed births were realized, which caused an increase in the birth rate. The average maternal age at first birth has been calculated for all regions of Russia, showing variability from 23 to 28 years, in most of them the figure made up 25-26 years. The minimum values of the indicator are shown in the republics of Tyva (23.4 years), Dagestan (23.5), Chechnya (23.7), and Zabaykalsky Krai (23.9); the maximum values are revealed in Saint Petersburg (28.0) and Moscow (27.7). The main determinants of motherhood age are the level of education and marital behavior, which indicates the importance of socio-economic independence in the process of reproductive behavior formation. The novelty of the study lies in the use of the author's approach taking into account the strengths and weaknesses of longitudinal and transverse demographic analysis, which provides reliable data on mother's age at first birth. From a practical point of view, assessing motherhood age makes it possible to justify the importance of improving the effectiveness of youth and demographic policies.

Key words: maternal age at first birth, age model of birth rate, motherhood age.

Introduction

The current parameters of the demographic situation in Russia and its regions are largely due to the transformation of demographic behavior of the population. In particular, having few children is characteristic of reproductive behavior; families are focused on having one, maximum two children, which is supported by the prevailing psychological reproductive motives. Reproductive and marriage behavior have been evolving simultaneously [1] and by the beginning of the 21st century they have acquired a key feature – the freedom of choice concerning the partner, the age and time of marriage or de facto marital relations without getting married, the preservation of marriage or divorce, remarriage, the number and timing of children or refusal of their birth. The lengthening of the period of children's gaining socio-economic independence, due to an increase in the average duration of education, people's desire to "live for themselves" led to marriage and motherhood "aging": compared to the mid–1990s, the age of marriage increased from 19 to 25 years for women and from 23 to 27 years for men; maternal age at first birth increased from 19 to 25–27 years [2]. Motherhood age is one of the key aspects in solving the problem of increasing the birth rate, which is defined in the strategic documents of the Russian demographic policy. In the context of a prospective decline in the number of cohorts of women of reproductive age, rise in births can be achieved by increasing the number of children in families, and postponing the birth first is a significant risk in this case.

It is important to use reliable and accurate data when analyzing birth trends. The article aims to present the author's calculations of mother's age at first birth for conditional and real generations in dynamics and regional context, and to identify its determinants.

Experience in studying motherhood age and the methodological aspect of the research

First, we should clarify if the concept of "motherhood age" is applicable to the subject of our research. From the point of view of demography, the birth of a child is a demographic event that changes the status of a

woman, a man, or a family by the "number of children" criterion. Having given birth to their first child, they not only become one-child parents, but also acquire the socio-demographic status of "mother" / "father", "parent". We mean the time of acquiring this status, and since it is calculated by the mother's age, we are talking about motherhood and, in fact, it is synonymous with the maternal age at first birth, only focusing on its social content. The social context is necessary in assessing demographic dynamics, first of all, to identify its determination.

Maternal age at first birth is a marker not only of reproductive behavior properly, but also of contraception, self–preservation, and marriage behavior. The conceptual grounds for the significance of the study of all types of demographic behavior in their relationship are described in the work of A.A. Shabunova, T.K. Rostovskaya [3]. The parallel of the evolution of marriage and reproductive behavior was considered by us and the colleagues earlier [1]; it is indicative of "postponing" both first marriages and first births.

This trend is also reflected in the concepts of the second and third demographic transition [4; 5; 6]. They define the determining role of demographic behavior in the dynamics of the population at the present stage of development; take into account the transformation of people's life organization, including the shift of the period of social maturity and economic independence to older ages.

Motherhood aging is typical for a number of countries, and not only the developed ones that have entered the fourth stage of demographic transition. A comparative analysis of cohort indicators of maternal age at first birth for a number of economically developed countries is presented in the work of T. Frejka and J.-P. Sardon [7]. E.M. Shcherbakova notes:

"The average age of a mother at her first child's birth has increased in all CIS countries except Azerbaijan" [8]. The increase in the average mother's age at first birth in Ukraine in comparison with other European countries is analyzed in detail in a number of articles by S.Yu. Aksenova [9-11].

Her works devoted to the analysis of the relationship between the average mother's age at first birth and the birth rate are of great interest [11]. We should also note the earlier publication of D.M. Ediev [12]. These studies confirm the relationship between the motherhood age and the birth rate, proving the importance of this issue in the development and implementation of demographic policy.

Using statistical and sociological data, R.T. Fakhrislamova [13] analyzes changes in the age of childbearing in Russia (comparing them with foreign countries). The level of education is one of the most important determinants of the motherhood age and the birth rate. A relatively high frequency of postponing the first child birth by women with a higher level of education was revealed by both us and our colleagues earlier [14; 15].

Methodology and empirical base of the study. We used the methods of longitudinal and cross population studies for the calculations in this paper. The average mother's age at first birth for conditional generations in Russia is calculated in the article on the basis of age-related birth rates, rather than absolute numbers of births, i.e. it does not depend on the age structure of women of reproductive age.

The information about maternal age at first birth in real generations in Russia can be obtained from three sources.

First, the 2010 census first asked about the date of the first child birth (month, year). However, in the census results published and presented on the Rosstat website, the

distribution of women by age of the first child birth is given mainly in the five-year age group (with the exception of only the age groups of 15−17 and 18−19 years). It is impractical to calculate the average maternal age at first birth on their basis. This could be done using the 2010 census microdata database, but it is currently unavailable.

Second, mother's age at first birth can be calculated on the basis of one-year age birth rates for first births, both for calendar years (these data are considered above) and for real generations of women. The Human Fertility Database presents the data on the average maternal age at first birth for the generations born in 1944-1964 (the restriction to the generation born in 1964 is due to the fact that the dynamic range of calendar birth rates for Russia in this database is yet limited to 2014). Using age-related birth rates for first births, calculated according to Rosstat, allows us to estimate the average mother's age at first birth for younger generations as well.

Third, the maternal age at first birth can be revealed by the results of sociological surveys.

In general, in Russia, the second source is most preferable for analyzing changes in mother's age at first birth in real generations, i.e., calculation based on one-year age birth rates for first births. It allows calculating both the average age and the distribution by age groups. In addition, in this case, these characteristics can be calculated for the post-census period. At the same time, this approach to assessing the characteristics of the maternal age at first birth has very significant limitations in relation to the constituent entities of the Russian Federation. If the dynamic series of annual birth rates by birth order for the country as a whole is available dated from the year of 1959, then for the regions it is available only

dated from the year of 1989[1], therefore , birth rates for real generations in the regions can only be calculated starting from the generation born in 1974. At the beginning of 2020, these women were 46 years old and had not yet completed the childbearing process, although the number of those who will still have their first child is extremely small and cannot significantly affect the average and relative figures for first births. With a slightly greater degree of convention, this is probably also true for all generations of women born in the second half of the 1970s. A comparative inter-regional analysis is possible for younger generations, but only using the indicators calculated for women having reached a certain age, but they will not be final. In addition, it should be borne in mind that for most constituent entities of the Russian Federation, the dynamic series of one-year age birth rates by order of birth since 1989 will not be complete, as far as since 1998, in the records of birth certificates, due to the adoption of the new law "On Acts of Civil Status"[2], there is no information about what number child the mother has. However, in some regions, this information is continued to be collected, and for them it is possible to calculate the maternal age at first birth for women born in 1974 and younger.

Before using data from the 2010 census and/or basing on current statistics, it is necessary to assess the extent to which they match. If the degree of matching is high enough, both sources of information can be used. If the information differs significantly, then one of the sources

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[1] Russian fertility and mortality database. The Centre for Demographic Research at the New Economic School, Moscow (Russia). Available at: http://demogr.nes.ru/index.php/ru/demogr_indicat/data

[2] On Acts of Civil Status: Federal Law no. 143-FZ, dated November 15, 1997. Available at: http://docs.cntd.ru/document/9052520

should be preferred, but both of them will be questionable. Since the average maternity age at first birth cannot be correctly calculated by the data of 2010 population census (there is no one-year age grouping necessary for this), we can compare the distribution of women of certain generations by maternity age at first birth. The published results of the 2010 census present this distribution in the following age grouping: under 15 years of age, 15–17, 18–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45 years and older. In the Human Fertility Database, age-related birth rates are presented starting from the age of 12. However, if we also use age-related birth rates of 12, 13, and 14 years to calculate birth rates in real generations, then, given that these data are available only since 1959, the indicators can be calculated exclusively for women starting from 1947, and not from 1944 birth year, as when using age-related birth rates starting from 15 years (this is how birth rates in real generations are given in the Human Fertility Database). With this in mind, and taking into account the fact that according to the 2010 census in Russia, the proportion of women who gave birth to their first child under the age of 15 was 0.08%, for comparison it is advisable to use the age distribution for women at first birth at the age of 15 and older.

The age groups of women for whom the data on the distribution by maternity age at first birth are presented are mainly five year periods (20–24, ..., 65–69), except for the youngest (15–17 and 18–19) and the oldest groups (over 70). In this case, there is no grouping of women by birth year in the published results, so it is only possible to use data on the distribution by maternal age at first birth in the generations of women allocated by birth year with a certain degree of conditionality.

When calculating birth rates in real generations based on age-related birth rates, they are applied in a one-year grouping. For comparison with the 2010 census data published in a larger grouping, the proportion of first births by maternal age groups for each generation group is calculated as the weighted average of these proportions for the one-year generations included in the group. As weigh-scales, it is possible to use the number of women who gave birth to at least one child, at one-year generations according to the 2010 census. Let us clarify that when calculating birth rates in real generations based on one-year age-related birth rates, these coefficients were taken not for the full year of 2010, but for the period before the population census (the annual values of the coefficients were multiplied by 0.79).

And, of course, it should be borne in mind that if, according to the 2010 census, the distribution by maternal age at first birth is based on the absolute number of women, then when calculating using age-related birth rates, it is actually based on these coefficients. However, given that the number of each generation of women (which is the denominator when calculating these coefficients) changes relatively little in reproductive age, the distributions are comparable (*Tab. 1*).

Comparing the data based on the distribution of women by age at first birth, obtained from the 2010 census, and on the results of calculations based on age-related birth rates, we may conclude that there are no fundamental differences between them. The only exceptions are women born in 1991–1992, where the differences are significant. For the remaining generations of women, there is no difference in the value of the indicator exceeding 3 percentage points, and only in

Table 1. Distribution by maternal age at first birth in real generations of women in Russia
(according to the 2010 census results and estimates based on age-related birth rates), %

Women's birth year	Age according to the 2010 census (years)	Age at first birth (years):							
		15–17	18–19	20–24	25–29	30–34	35–39	40–44	over 45
1991–1992	18–19								
	according to the 2010 census	43.4	56.6	–	–	–	–	–	–
	estimation by age-related birth rates	36.7	63.3	–	–	–	–	–	–
1986–1990	20–24								
	according to the 2010 census	10.3	30.7	59.0	–	–	–	–	–
	estimation by age-related birth rates	9.4	28.8	61.8	–	–	–	–	–
1981–1985	25–29								
	according to the 2010 census	5.3	16.3	58.1	20.3	–	–	–	–
	estimation by age-related birth rates	5.0	15.9	56.8	22.3	–	–	–	–
1976–1980	30–34								
	according to the 2010 census	6.1	16.6	47.9	24.0	5.3	–	–	–
	estimation by age-related birth rates	5.7	17.1	46.9	24.4	5.9	–	–	–
1971–1975	35–39								
	according to the 2010 census	5.7	21.0	48.2	17.3	6.4	1.4	–	–
	estimation by age-related birth rates	5.4	21.6	48.4	16.9	6.3	1.5	–	–
1966–1970	40–44								
	according to the 2010 census	4.2	19.2	56.2	13.9	4.6	1.6	0.3	–
	estimation by age-related birth rates	4.0	20.1	56.0	13.7	4.4	1.6	0.3	–
1961–1965	45–49								
	according to the 2010 census	3.2	16.3	57.8	16.7	4.3	1.3	0.3	0.0
	estimation by age-related birth rates	3.0	17.4	58.6	15.6	3.9	1.2	0.2	0.0
1956–1960	50–54								
	according to the 2010 census	2.7	15.1	57.4	17.6	5.5	1.4	0.3	0.0
	estimation by age-related birth rates	2.3	16.0	59.1	16.3	4.8	1.2	0.2	0.0
1951–1955	55–59								
	according to the 2010 census	2.3	13.8	58.0	17.6	6.0	2.0	0.4	0.1
	estimation by age-related birth rates	1.8	14.1	60.4	16.8	4.9	1.7	0.2	0.0
1946–1950	60–64								
	according to the 2010 census	2.4	12.5	57.9	18.9	5.7	2.1	0.5	0.1
	estimation by age-related birth rates	1.8	12.5	59.8	19.0	4.9	1.7	0.3	0.0

Sources: *Results of the 2010 all-Russian population census. Vol. 10. Birth Rate*. Available at: https://gks.ru/free_doc/new_site/perepis2010/croc/perepis_itogi1612.htm; Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/main.php; Rosstat data.

two cases it exceeds 2 percentage points (the age group of 20–24 years at first birth among women born in 1951–1955 and 1986–1990) (see Tab. 1).

Therefore, both sources of information can be used simultaneously. The use of one-year age birth rates allows calculating the average maternal age at first birth and analyzing the dynamics in a one-year grouping by birth year. However, the ability to analyze regional differences is significantly limited. As noted above, regional estimates based on age-related birth rates can only be made for generations born in 1974 and younger. In addition, for a large number of the regions, the maternal age at first birth cannot be calculated at all due to the lack of data on the order of birth for several calendar years, starting from 1998. In this regard, it is advisable to use mainly the data from the results of the 2010 census to analyze regional differences in the maternal age at first birth in real generations.

The information base of the study was made up of Rosstat data, including a special Sample observation of the population's reproductive plans; data generated in the Human Fertility Database; results of the first wave of the all-Russian monitoring "Demographic Well-Being of the Russian Regions Population", in the development of the methodology and organization of which the authors were directly involved. In 2020, 5,616 people were interviewed in 10 regions of Russia (the republics of Bashkortostan and Tatarstan, Stavropol Territory, Volgograd, Vologda, Ivanovo, Moscow, Nizhny Novgorod and Sverdlovsk oblasts, the city of Moscow). A detailed description of the methodology is presented in the article by T.K. Rostovskaya and O.V. Kuchmaeva [16].

Results

The dynamics of the average maternal age at first birth reflects changes in the age model of the birth rate for first births. The average maternal age at first birth, calculated for conditional generations, in Russia in the 1960s and 1980s and the first half of the 1990s was steadily decreasing. In 1960, it was 24.40 years, in 1965 − 24.03, in 1970 − 23.64, in 1975 − 23.29, in 1980 − 22.99, in 1985 − 22.91, in 1990 − 22.65. In 1994, it reached the minimum value of 22.53 years[3].

In the following years, the average maternal age at first birth was steadily increasing, and the rate of increase was significantly higher than the rate of decrease in the previous period. In 1995, it was equal to 22.67 years, in 2000 − 23.54, in 2005 − 24.11. In 2008, its value exceeded the level of 1960, amounting to 24.44

years, in 2010 − 24.90, and in 2013 it exceeded the threshold of 25 years (25.14 years). In 2015, the average mother's age at first birth was 25.46 years, in 2018 − 25.91, in 2019 − 25.94[4].

Despite a significant increase, the average maternal age at first birth in Russia remains one of the lowest among economically developed countries. For comparison, in 2017 in the United States it was 27.24 years, in Lithuania − 27.47, in Estonia − 27.70 (in 2000, its value in Lithuania (23.90) and Estonia (23.95) was only 0.35−0.40 years more than in Russia, and in 2017 the difference was, respectively, 1.68 and 1.91 years), in Hungary − 28.04, in the Czech Republic − 28.23, in Croatia − 28.54, in Slovenia − 28.77, in Finland − 29.11, in Norway − 29.26, in Sweden − 29.31, in Austria − 29.32, in Germany − 29.56, in Japan − 30.12, in Italy − 31.05. For a number of countries, the latest data available on the Human Fertility Database website refers to the year of 2016: Poland − 27.15 years, Great Britain − 28.77, Denmark − 29.24, Canada − 29.25, the Netherlands − 29.76, Switzerland − 30.68, Spain − 30.80. The highest average maternal age at first birth is in South Korea (in 2018 − 31.60 years); it was the most significant increase in the 21 century: by 4 years compared to 2000 (27.55)[5].

In the first half of the 1960s, birth rates for first births in all age groups under 40 were declining in Russia. If at the age of 15−19 years, the decline stopped in 1963, and at 20−24 years − in 1965, then in the group of 25−29-year-old women it continued until 1969, of 30−34-year-olds − until 1974, in 35-39-year-olds − until 1979 (*Tab. 2*).

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[3] Here and further, the average maternal age at first birth for conditional generations is calculated on the basis of age-related birth rates, rather than absolute numbers of births, i.e. it does not depend on the age structure of women of reproductive age.

[4] Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/country.php?country=RUS&tab=si; calculated according to Rosstat data.

[5] Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/main.php

Table 2. Age-related birth rates for first births in Russia, 1959-2019

Year	First born alive per 1000 women aged, years						
	15–19	20–24	25–29	30–34	35–39	40–44	45–49
1959	28.8	113.4	49.8	15.6	5.6	1.1	0.1
1965	23.5	98.4	43.9	12.2	4.4	1.2	0.1
1970	27.6	118.6	32.7	11.8	3.7	1.0	0.1
1975	33.0	115.4	36.7	8.5	3.0	0.7	0.0
1980	41.2	112.6	31.0	9.4	2.4	0.5	0.0
1985	43.4	105.4	30.5	9.1	3.2	0.4	0.0
1990	51.3	104,9	27.4	9.1	3.1	0.7	0.0
1995	41.9	83.5	25.0	6.8	2.2	0.4	0.0
2000	25.8	73.1	30.3	8.5	2.4	0.5	0.0
2005	24.9	68.8	38.8	11.1	2.8	0.4	0.0
2010	24.5	64.8	49.0	16.2	4.5	0.8	0.0
2015	21.0	58.7	50.6	19.9	6.1	1.1	0.1
2016	19.0	57.7	50.0	20.5	6.5	1.2	0.1
2017	15.9	52.5	44.7	19.2	6.2	1.2	0.1
2018	13.8	49.8	41.4	18.7	6.4	1.3	0.1
2019	12.7	48.1	39.8	17.7	6.3	1.3	0.1

Sources: Russian fertility and mortality database. The Centre for Demographic Research at the New Economic School, Moscow (Russia). Available at: http://demogr.nes.ru/index.php/ru/demogr_indicat/data (accessed: June 26, 2020); Rosstat data.

At the same time, in the 15−19 age group, the birth rate for first births was steadily increasing from 1964 to 1990 and in 1977−1998 it was higher than in the 25−29 age group. For 20−24-year-old women, the birth rate for first births was increasing in 1966−1971, and then it was decreasing almost annually until 1985. The decline in this indicator in the group of 25−29-year-olds in the 1960s was interrupted in 1970−1972 and continued again until 1984. In the 30−34 age group, the long-term decline in the birth rate for first births (until 1983) was interrupted only in 1975−1977.

A brief period of increase in the birth rate for first births in the early second half of the 1980s was followed by a continued decline after 1988. Only in the 15−19 age group did this figure increase until 1990.

As we have already noted, the average maternal age at first birth has been increasing since 1995. The age model of the birth rate for first births has been changing. If in the 15−19 age group, the decline in the birth rate for first births continued until 2001, and at the age of 20−24 years − until 1999, then in the 25−29 age group, this coefficient began to increase in 1994.

Further, in the 25−29 age group, the birth rate for first births continued to grow steadily until 2013. In the age groups of 30−34 years and 35−39 years, its increase continued until 2016. It has declined slightly in recent years, but in both of these age groups, as well as among 40−44-year-old women, the birth rate for first births is now higher than in 1959. We should note that in 2016−2019, the birth rate for first births among women aged 30−34 was higher than in the 15−19 age group. After some stabilization in 2000−2012, the birth rate for first births in the 15−19 age group has been significantly decreasing in recent years.

Among 25−29-year-old women, as well as among older women, the birth rate for first births in 2012−2016 was higher than in 1959.

In contrast to the 25−29 age group, the increase in the birth rate at the age of 20−24 occurred only in 2000−2003. In 2005−2009, it remained stable, and in the last decade it has significantly decreased (see Tab. 2).

Table 3. Average maternal age at first birth in generations of women born in 1944–1971 in Russia, years

Birth year	Average maternal age at first birth	Birth year	Average maternal age at first birth	Birth year	Average maternal age at first birth	Birth year	Average maternal age at first birth
1944	23.46	1951	23.35	1958	23.03	1965	22.76
1945	23.43	1952	23.32	1959	22.97	1966	22.71
1946	23.48	1953	23.26	1960	22.93	1967	22.69
1947	23.59	1954	23.20	1961	22.90	1968	22.69
1948	23.50	1955	23.17	1962	22.88	1969	22.69
1949	23.46	1956	23.13	1963	22.84	1970	22.74
1950	23.39	1957	23.09	1964	22.79	1971	22.84

Sources: Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/country.php?country=RUS&tab=si; Rosstat data.

The increase in the average maternal age at first birth takes place not only by calendar indicators for the so-called conditional generations, but also in real generations of women.

Our calculations show that in general, in Russia, as of the beginning of 2020, we can talk about the total value of the average maternal age at first birth for generations of women born in 1971 and older (*Tab. 3*).

Probably, starting from the generations of women born in the late 1940s, the average maternal age at first birth decreases (this could be estimated more precisely when having data for generations of women older than the birth year of 1944). If women born in 1947 have an average age at first birth of 23.59 years, then those who are 10 years younger (born in 1957), it is 0.5 years less (23.09 years), and women born 10 years later (born in 1967) it is less by another 0.4 years. In the generation of women born in 1967−1969 the minimum (after a decrease) value of the average mother's age at first birth was probably reached − 22.69 years (see Tab. 3). We have noted above that in the 1960s−1980s and the first half of the 1990s, the value of this indicator was decreasing by calendar years, i.e. for conditional generations. It is clear that its value is formed under the influence of age at first birth among women of different generations. But it should be noted that women born in 1967−1969, on average, gave birth to

their first child in 1989−1992 and the average mother's age at first birth in 1989 was 22.78 years, in 1990 − 22.65, in 1991 − 22.60, in 1992 − 22.60[6]. These values are very close to the average maternal age at first birth among women born in 1967−1969 (22.69 years), which indirectly indicates the absence of timing shifts at the birth of the first child at that period. We should point this out as in subsequent years, as we will show below, the average maternal age at first birth significantly differed in real generations and in the corresponding calendar years.

Starting with the generation born in 1970, the average maternal age at first birth increases. This again corresponds quite well to the beginning of an increase in this indicator value by calendar years since 1995. We can now talk about the total value of the average maternal age at first birth only in relation to the generations born in 1970 and 1971. However, its further increase can also be traced in the case of younger generations (*Tab. 4*), bearing in mind that the value of this indicator will increase (it is clear that it can no longer decrease).

As of the beginning of 2020 (i.e., taking into account the age-related birth rates for first births up to and including 2019), the average maternal age at first birth in Russia increases

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[6] Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/country.php?country=RUS&tab=si

Table 4. Average maternal age at first birth among women born in 1972–1985 in Russia
(at the beginning of 2020), years

Birth year	Average maternal age at first birth	Birth year	Average maternal age at first birth	Birth year	Average maternal age at first birth
1972	22.97	1977	23.93	1982	24.53
1973	23.11	1978	24.13	1983	24.59
1974	23.28	1979	24.29	1984	24.57
1975	23.44	1980	24.36	1985	24.47
1976	23.67	1981	24.44		

Sources: Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/country.php?country=RUS&tab=si; Rosstat data.

to the value of the generation born in 1983, reaching the level of 24.59 years. At the beginning of 2020, these women were 36 years old, and up to the end of their reproductive period, their indicator is likely to increase significantly. If the age-related birth rates for first births are maintained at the level of 2019, the average age at first birth of women born in 1975 may be 23.46 years, born in 1980 – 24.50 years, born in 1985 – 25.07 years. In subsequent generations, under the specified calculation condition, the value of this indicator stabilizes and it begins to increase again only starting from the generation born in 1993 (25.14 years), reaching 25.23 years for women born in 1995 and 25.86 years for women born in 2000.

We have noted above that the average mother's age at first birth among women born in 1967−1969 was close to that which took place in Russia in the early 1990s. In the following years, the situation changed somewhat. The average maternal age at fist birth among women, starting from the generation born in 1978, exceeds 24 years (see Tab. 4). However, by calendar years (conditional generations), this milestone was surpassed only in 2005 (24.11 years). While in generations of women, starting from the birth year of 1980, the total average age at first birth is likely to be at least 24.50 years. By calendar years, this milestone was passed only in 2009 in the value of this indicator (24.61 years). Such differences in the value of the indicator by calendar years in

real generations, apparently, may be evidence of timing shifts, manifested in the postponement of first births in the second half of the 1990s and early 2000s. It is clear that the current statistics take into account the age at first birth only in case of those women who gave birth to their firs child in a given year. Those who postponed the birth of their first child can't get into it. A significantly lower value of the average maternal age at first birth by calendar years compared to its value in real generations who were at the age of active child birth during this period may probably indicate first births postponement. This is indirectly evidenced by a significant decrease in the total birth rate for first births in the 1990s (in 1990 it made up 0.996, in 1995 − 0.803, in 1999 − 0.678[7]).

In recent years, on the contrary, the average mother's age at first birth by calendar years is higher than in real generations who were at the age of the highest birth rates for first births during this period. In 2013, it was 25.20 years, which is more than the calculated total value of the average maternal age at first birth in the real generations born in 1987−1994 (25.07−25.18; in older generations, it is even less). In 2015, the average mother's age at first birth was 25.46 years, and in real generations, the calculated total value of this indicator reaches this or higher level only in generations of women born in 1997 and younger. In 2018−

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[7] Human Fertility Database. Available at: https://www.humanfertility.org/cgi-bin/country.php?country=RUS&tab=si.

2019, the average maternal age at first birth was more than 25.9 years. In none of the real generations of women born in 2000 and older, the calculated total value of this indicator reaches this level (1990 year of birth − 25.06; 1993 − 25.14; 1996 − 25.37; 1998 − 25.59; 2000 − 25.86). If in the second half of the 1990s and early 2000s, it is highly likely that there were delays in the first births, then a higher value of the average maternal age at first birth in recent years compared to the corresponding real generations may be indicative of delayed births. For the time being, this can probably be put forward as a hypothesis, which requires additional, primarily sociological research to be confirmed or rejected.

Regional differences in the maternal age at first birth can be considered for conditional generations by calendar years and for real generations according to the 2010 census.

The average maternal age at first birth can be calculated by conditional generations for the regions. In 2019, the value of this indicator in Russia as a whole was 25.94 years.

The lowest average maternal age at first birth in 2019 was observed in the Republic of Tuva (23.44 years). In four other constituent entities of the Russian Federation, it was less than 24 years: the Republic of Dagestan (23.52; see articles by K.I. Kazenin and V.A. Kozlov [17; 18] for the possible factors of low average maternal age in this region) and the Chechen Republic (23.72), the Zabaykalsky Krai (23.97), and the Chukotka Autonomous Okrug (23.94).

The value of this indicator in the republics of Altai, Buryatia, Sakha (Yakutia) and Khakassia, Astrakhan and Kemerovo oblasts, the Jewish Autonomous Oblast and the Nenets Autonomous Okrug is in the range from 24 to 25 years.

The average maternal age at first birth in the republics of Adygea, Ingushetia, Kabardino-Balkar and Kalmykia, Altai, Primorsky and Stavropol territories, Amur, Vladimir, Volgograd, Irkutsk, Kurgan, Magadan, Orenburg and Tambov oblasts made up from 25 to 25.5 years in 2019.

37 out of 85 constituent entities of the Russian Federation are included in the group with the average maternal age at first birth from 25.5 to 26 years in 2019: the republics of Karachay-Cherkess, Komi, Crimea, Mari El, Mordovia, Udmurt and Chuvash, Kamchatka, Krasnodar, Krasnoyarsk, Perm and Khabarovsk territories, Belgorod, Bryansk, Vologda, Ivanovo, Kaluga, Kostroma, Kursk, Lipetsk, Novgorod, Novosibirsk, Omsk, Oryol, Penza, Pskov, Rostov, Saratov, Sakhalin, Smolensk, Tver, Tula, Tyumen, Ulyanovsk and Chelyabinsk oblasts, Khanty-Mansiysk − Yugra and Yamalo-Nenets Autonomous okrugs.

In 15 regions, the average maternal age at first birth in 2019 ranged from 26 to 26.5 years: the republics of Bashkortostan and Tatarstan, Arkhangelsk, Voronezh, Kaliningrad, Kirov, Leningrad, Moscow, Murmansk, Nizhny Novgorod, Ryazan, Samara, Sverdlovsk, Tomsk and Yaroslavl oblasts. In three other regions, it is slightly higher: the Republic of Karelia (26.67 years) and North Ossetia-Alania (26.57), Sevastopol (26.91).

The residents of Moscow (27.76 years) and Saint Petersburg (28.06) give birth to their first child the latest, on average[8].

The distribution by the maternal age at first birth in the constituent entities of the Russian Federation, according to the 2010 census, should be carried out for generations that have completed their reproductive period or are close to its completion. They are unlikely to have their first child.

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[8] Source: Rosstat data.

The relatively earlier average age at first birth among women who were 40−44 years old at the time of the 2010 census was characteristic of most regions of Siberia and the Far East. And this is not related to the birth rate, as one might assume. The largest share of women who gave birth to their first child at the age of 25 years and older among the Siberian and far Eastern regions is in the republics of Sakha (Yakutia) and Tyva (where birth rates are among the highest in Russia). On the other hand, on average, a later birth of the first child among women of this generation occurred not only in Moscow and St. Petersburg, as expected, but also in all the republics of the North Caucasus, including those with a relatively high birth rate.

In the Zabaykalsky Krai, the Amur Oblast, and the Jewish Autonomous Oblast, more than a third of women aged 40−44 at the time of the 2010 census gave birth to their first child under the age of 20. Slightly less, but more than 30% of such cases were observed in the Kamchatka and Khabarovsk territories, the Magadan and Sakhalin Oblasts, and the Chukotka Autonomous Okrug. On the other hand, less than 20% of first births by women under 20 in this generation are in the republics of Bashkortostan, Dagestan, Ingushetia, Karachay-Cherkess, Mari El, Tatarstan and Chuvash, in Moscow and St. Petersburg, and less than 15% are in North Ossetia − Alania (14.2%).

Only in the Republic of Ingushetia, less than half of first births (44.1%) occurred in this generation at the age between 20 and 25. In all other regions, more than half of women had their first child at this age. The largest share of them was in the Vologda (60.3%), Kirov (60.3%) and Kostroma (61.3%) oblasts, the republics of Bashkortostan (60.9%), Chuvash (61.3%) and Mari El (61.9%).

The lowest proportion of women who gave birth to their first child at the age of 25 years and older in the generation of women aged 40-44 at the time of the 2010 census was observed in the Jewish Autonomous Oblast (12.1%), the Amur Oblast (12.9%), and the Zabaykalsky Krai (13.4%). On the other hand, more than a quarter of first births by women of this generation occurred at the age of 25 and older in the republics of Karachay-Cherkess and Chechen, in Moscow and St. Petersburg, and more than a third − in the republics of North Ossetia − Alania (33.8%) and Ingushetia (40.1%).

Determinants of maternal age. Most first births occur in a registered marriage. In recent years, their share in the total number of first births is over 75%: in 2014 − 75.5%, 2015 − 76.4%, 2016 − 77.1%, 2017 − 77.4%, 2018 − 76.8%, 2019 − 76.9%[9]. In this regard, the average mother's age at first birth in a registered marriage significantly influences on its value in general for all first births.

Average maternal age at first birth in wedlock is determined by two components: the average age of first marriage for women and the interval between marriage and first birth (protogenetic interval).

Between the 2002 and 2010 censuses, the average age of first marriage in Russia was increasing, as evidenced by the growth in the proportion of women aged 20 to 35 who have never been married (*Tab. 5*).

According to the 2010 census, the percentage of never-married women was 4.6 percentage points higher in the 20−24 age group, 4.5 percentage points higher in the 25−29 age group, and 3.8 percentage points higher in the 30−34 age group, compared to the 2002 census.

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[9] Source: Rosstat data.

Table 5. Proportion of never-married women aged 20–34 in Russia, %

Age (years)	2002	2010	2015
20–24	52.6	57.2	53.9
25–29	21.8	26.3	24.1
30–34	10.9	14.7	13.6
Sources: *Results of the 2002 all-Russian population census. Vol. 2. Age and gender composition and marital status.* Available at: http://www.perepis2002.ru/index.html?id=31; *Results of the 2010 all-Russian population census. Vol. 2. Age and gender composition and marital status.* Pp. 294-295. Available at: https://gks.ru/free_doc/new_site/perepis2010/croc/Documents/Vol2/pub-02-01.pdf; *Results of the 2015 micro-census. Section 1. Age and gender composition of the population participated in the micro-census, and marital status.* Available at: https://gks.ru/free_doc/new_site/population/demo/micro-perepis/finish/micro-perepis.html			

However, data from the 2015 micro–census showed a slightly lower proportion of women who have never been married in these age groups than in the 2010 census (see Tab. 5). This may indirectly indicate a slight decrease in the average age of first marriage among women at the period between 2010 and 2015. The 2015 micro-census also revealed a higher proportion of women who were in a registered marriage than at the time of the 2010 census: 20—24 years – by 1.4 percentage points; 25—29 years – by 1.5 percentage points; 30—34 years – by 2.3 percentage points[10]. It should be borne in mind of course, that we are talking here about those who were in a registered marriage in general, and not necessarily in the first one. However, the results of comparing the 2010 census and the 2015 micro-census should be interpreted with caution, bearing in mind that they are somewhat incompatible, since the micro-census covered only 1.5% of the population.

Current statistics show a slight increase in the average age of women registering their first marriage since the 2010 census. According to the calculations of S.V. Zakharov based on Rosstat data, the average age of women when registering their first marriage, among those who registered it under the age of 50, was 0.34 years higher in 2016 compared to 2011: in 2011 – 24.97 years; 2012 – 25.06; 2013 – 25.17; 2014 – 25.26; 2015 – 25.24; 2016 – 25.31 [19]. In 2017, the average age of first marriage for women was 25.44 years, in 2018 – 25.46, in 2019 – 25.55[11], which is significantly higher than, for example, in 1995 (21.99 years)[12].

The second component, determining the average age of mother at first birth in a registered marriage, is the interval between first marriage and first birth (protogenetic interval). Unfortunately, there are no statistics on this interval. Every year, the statistical form p246 "Number of marital births by duration of marriage" is developed, but only for all births without differentiation by order.

The protogenetic interval can be calculated based on micro-data of birth certificate records. The available databases of such micro-data for Moscow show a significant difference in the average interval between the registration of marriage and first child birth for women with different levels of education (*Tab. 6*).

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[10] Sources: *Results of the 2002 all-Russian population census. Vol. 2. Age and gender composition and marital status.* Available at: http://www.perepis2002.ru/index.html?id=31; *Results of the 2010 all-Russian population census. Vol. 2. Age and gender composition and marital status.* Pp. 294–295. Available at: https://gks.ru/free_doc/new_site/perepis2010/croc/Documents/Vol2/pub-02-01.pdf; *Results of the 2015 micro-census. Section 1. Age and gender composition of the population participated in the micro-census, and marital status.* Available at: https://gks.ru/free_doc/new_site/population/demo/micro-perepis/finish/micro-perepis.html.

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[11] Source: Rosstat data.

[12] From 1997 to 2010, Russia lacked the necessary statistical information to correctly calculate the average age of marriage registration.

Table 6. Average interval between marriage registration and first child birth (protogenetic interval)
for women with different levels of education in Moscow, months

Level of education	2014	2015	2016	2017	2019
Higher professional	27.6	28.9	29.1	29.7	32.3
Incomplete higher professional	16.6	15.9	15.6	17.8	16.9
Secondary professional	19.9	21.1	20.3	20.5	20.8
General secondary (full)	16.3	17.9	17.7	18.2	18.6
Basic general	14.7	18.3	14.8	15.4	14.5

Table 7. Average interval between marriage registration and first child birth (protogenetic
interval) depending on the age of marriage registration in Moscow, months

Age of marriage registration, years	2015	2016	2017	2019
under 18	19.9	23.2	21.7	21.4
18–19	30.6	29.7	31.2	30.8
20–21	35.9	33.5	33.7	34.6
22–23	33.7	34.5	34.7	36.0
24–25	28.4	29.5	31.7	35.2
26–27	24.0	25.3	26.7	31.0
28–29	21.2	21.8	22.8	26.4
30–34	18.6	18.9	19.3	21.2
35–39	14.9	15.2	16.4	16.8
40–44	12.3	10.8	14.8	12.4

Women with higher professional education are on average more likely to delay their first child birth for a longer period after marriage registration. The average interval between these two demographic events is significantly longer for them than for those with a lower level of education (see Tab. 6).

The protogenetic interval for women in Moscow also differs depending on the age of marriage registration[13] (*Tab. 7*).

For those women who registered marriage before the age of 18, the average interval between marriage registration and first child birth is relatively small (in 2019 − 21.4 months). For those who registered marriage at an older age, the average protogenetic interval is longer. In 2015, it was the highest among those who registered marriage at the age of 20−21, and in 2016−2017 and 2019 − at the age of 22−23.

The older the age of marriage registration is, the smaller the average protogenetic interval. Those who registered marriage at the age over 30 have a shorter protogenetic interval than those who did it before the age of 18 (see Tab. 7).

The above-mentioned increase in the average maternal age at first birth for the generations of the 1970s − 1980s (see Tab. 4) is also proved by the results of sociological studies. For example, according to a sociological survey conducted by a research team supervised by Doctor of Sociological Sciences, Professor T.K. Rostovskaya, at the end of 2019 − the beginning of 2020 (hereinafter, the sociological survey 2019−2020)[14], this age is 23.75 years old among women born in 1970−1974, 24.07 − in 1975−1979, 24.38 − in 1980−1984. For women born in 1985−1989 it is still lower (23.85 years old), but at the time of the survey, they were

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[13] In this case, we are not necessarily talking about the age of the first marriage registration. This refers to a marriage in which a woman has her first child.

[14] 5616 people were interviewed in 10 regions (the republics of Bashkortostan and Tatarstan, Stavropol Krai, Volgograd, Vologda, Ivanovo, Moscow, Nizhny Novgorod and Sverdlovsk oblasts, Moscow).

only 30−35 years old, and by the end of the reproductive period, the average age at first birth in this generation of women is to increase significantly.

The results of the study show a significantly higher average age at first birth among women with higher and postgraduate professional education (24.33 years). Among those having incomplete higher professional education, it is 23.08 years; secondary vocational education − 23.16; primary vocational, general secondary (full) and lower level of education − 21.81.

Similar differences in the average maternal age first birth were revealed by the results of the "Selective observation of reproductive plans of the population" conducted by Rosstat in 2012[15]. Among women with higher and postgraduate professional education, it is 24.05 years; incomplete higher professional education − 22.49; secondary professional education − 22.44; primary professional education − 22.16; general secondary (full) education − 21.41; basic general and lower − 20.49.

In 2014, the Laboratory of federal research methodology of the Ranepa Institute for Social Analysis and Forecasting under the President of the Russian Federation conducted a sociological study using semi-structured biographical interviews [20]. The interviewed women named getting education as one of the factors that affect postponing the birth of the first child.

According to 2019−2020 survey, women with higher and postgraduate professional education have higher average age at first marriage (23.32 years; incomplete higher professional education − 21,96 years; vocational education − 22,17 years; primary professional,

general secondary (full) and lower level of education − 22,42). Their average interval between marriage and first birth is also slightly longer (19.6 months; higher professional education − 14.1; vocational − 19.5; primary vocational, general secondary (full) and lower level of education − 6.6)[16].

The results of the "2012 Selective observation of reproductive plans of the population" also revealed an older age of first marriage registration and a longer protogenetic interval in case of more educated women. Women with higher and postgraduate professional education registered their first marriage, on average, at the age of 22.79; with incomplete higher professional education − 22.17; secondary professional − 21.72; primary professional − 21.68; general secondary (full) − 21.29; general basic and lower − 20.15. The average interval between marriage and first birth among women having higher and postgraduate professional education is 17.2 months; incomplete higher professional − 9.1; vocational − 10.7; primary professional − 12.9; general secondary (full) − 8.8; general basic and lower − 2.4[17].

However, the interpretation of the relationship between the level of education and the age of motherhood and marriage requires a deeper understanding. This should probably involve not so much the significant difference in life goals and need for children, but rather an objective difference in the period of achieving economic independence which is due to the longer duration of training. Women who complete higher education usually spend two years longer at school and / or two more years in vocational training.

Conclusions

Being one of the parameters of the population's demographic behavior motherhood age is a bright marker of the period of socio-economic maturity. Since the absolute majority of the Russians plan to have at least one child, the term of birth is determined by assessing the favorable conditions. Family nuclearization, the weakening of functional intergenerational ties [21], not always systematic social support for young families, high requirements for the conditions of child-rearing and its cost, and the availability of birth control method lead to the increased personal responsibility for the decision about giving birth to the first child. This is a generally positive trend, but it objectively entails a strict link with the achievement of economic independence of a young family. Motherhood age increases in parallel with the duration of education. And this is a global trend. The demographic risks of motherhood "aging" would not be so high if the Russians had stable orientations related to the average number of children. Theoretically, this would lead to a reduction in the intergenetic intervals. However, the confident majority is focused on 1-2 children, they believe that "there's no need to hurry" in becoming parents and first you need to "gain your foot". The calculation of the average maternal age at first birth for conditional and real generations showed that its value is growing during the last 20-30 years, but the situation is not so clear within the generations. In real generations of young women, it is lower, which means that demographic policy has contributed to the implementation of their reproductive plans. However, given the current low preferred number of children, this will not ensure further growth in the birth rate. Regional differentiation of motherhood age would seem to be able to give a hint about its determinants. The "youngest" regions in terms of conditional generations have relatively high birth rates. These are expected to be the republics of the Caucasus region, Tyva. However, the analysis of the situation in real generations, including by nationality, does not confirm this pattern unambiguously. Marriage (age of marriage) and the level of education remain to be the main factors determining motherhood age. These determinants reflect the potential parents' socio-economic maturity, their willingness to take responsibility for raising a child, and change their lives. In the conditions of mass higher education, the absence of which can significantly limit the employee's competitiveness in the labor market and career prospects, the focus on bachelor's and secondary vocational education, which can accelerate economic self-sufficiency, will give a positive result only in the case of providing well-paid jobs.

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