# Forecasting the Length of Grandparenthood With Limited Information Resources: Evidence From Russia

Oksana Shubat[1] and Anna Bagirova[1]*

[1] Ural Federal University, Russia
* Anna Bagirova, corresponding author. Email: a.p.bagirova@urfu.ru
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## Abstract

The study aims to develop and implement methodological approaches for forecasting the length of grandparenthood with limited information resources. Such approaches are in demand in many countries with poor statistics about grandparenthood. The authors use methods of mathematical modeling and trend extrapolation based on time series analysis. Data from official Russian statistics and the statistical databases of the world's leading institutes of demography are used as the information base. According to forecasts, the length of grandparenthood in Russia will increase in 2021–2025. The predicted growth rate of length of grandparenthood among men is higher than among women. The obtained results develop the methodology of demographic forecasting and contribute to developing the demography of grandparenthood. Moreover, considering the benefits that families receive from intergenerational interaction, the forecast of the length of grandparenthood is vital for understanding the society's prospects of obtaining social, economic, and demographic effects directly related to active intrafamily interaction between grandparents and grandchildren.

## Keywords

Age of entry into grandparenthood; demography of grandparenthood; grandparenthood projections; length of grandparenthood

# Introduction

The demography of grandparenthood is a new area of modern demography. Its development is associated with an increase in life expectancy and the share of older people in the population. The results of numerous studies demonstrate the benefits of interaction between grandparents and grandchildren. The leading indicators used by the demography of grandparenthood are as follows: the average number of grandchildren per grandparent (Margolis & Verdery, 2019), the age of entry into grandparenthood (Leopold & Skopek, 2015), probability of becoming a grandparent at the ages of 45, 50, 55, 60, 65, and 70 in different countries (Leopold & Skopek, 2015), and the share of children with at least one living grandparent at birth (Chapman et al., 2017).

Scientists also use a broader approach to the study of grandparenthood, considering it in the context of the life cycle and the evolution of the family. They carry out comparative assessments of various territories according to a number of life events: age at birth of first child, end of reproductive age, family acquiring the status of an 'empty nest,' death of first grandparent, retirement, grandparenthood, and death of the second grandparent (Leopold & Skopek, 2015). Noting the relative underdevelopment of the demography of grandparenthood, we supposed the development of its methodology would expand the number of indicators. For example, the specialized literature did not provide us with the average number of grandparents per grandchild, which can be assessed both in general and for different ages of grandchildren.

The researchers note that the intensity of the effects of grandparenthood depends on the number of years during which the grandchild has a living grandparent—the length of the shared period of grandparents and grandchildren or the length of grandparenthood. According to studies, the heterogeneity of the effects of such intergenerational interaction is primarily explained by the variation of this indicator (Chapman et al., 2017). Thus, several studies confirmed that grandparents' participation in grandchildren's lives is higher in those societies where the shared life period of grandparents and grandchildren is longer. Consequently, international demographers argue that the length of grandparenthood, i.e., the shared life period of grandparents and grandchildren, directly predetermines the possibilities of intergenerational transfers, which, in turn, is essential in several areas, including public health, demography, economics, sociology, and biology (Leopold & Skopek, 2015).

The initial premise of this reasoning is that the length of grandparenthood increases over time due to an increase in life expectancy in general and a healthier life in particular. For example, Uhlenberg and Kirby (1998) noted that generations of families living in the twentieth century gradually increased the number of years spent together. However, Leopold and Skopek (2015) argued that the tendency to postpone the first child's birth, which is characteristic of many advanced economies, may influence the length of grandparenthood. This influence is negative and just as powerful. Consequently, an increase in life expectancy in general and a healthier life in particular, may be leveled by a later entry into grandparenthood. The length of grandparenthood increases only if life expectancy increases faster than the average age of mothers at the birth of their first child.

The search for the definition of the length of grandparenthood occupies a prominent place in theoretical discussions. Applying the period measure to the study of this category, we, like many researchers, define it as the period between the total life expectancy and the age of entry

into grandparenthood. Unfortunately, in conditions of data deficiency, we could not apply cohort measures. Besides, according to Margolis and Verdery (2019, p. 1497), despite all the benefits of cohort measures in the study of grandparenthood, "no research has elaborated a cohort perspective on grandparenthood or how it is changing."

The demography uses different approaches to assessing the length of grandparenthood: based on the life expectancy of real cohorts (Leopold & Skopek, 2015), assessments for conditional cohorts using the Sullivan index (Margolis, 2016; Yahirun et al., 2018), microsimulation (demographic modeling) (Margolis & Verdery, 2019), and assessments based on retrospective data (Chapman et al., 2017). The characteristic of these methods is presented in more detail in Table 1.

Each of these methods has its advantages and limitations. The first approach is the simplest one, as it calculates the length of grandparenthood based on data on the life expectancy and data on the age of entry into grandparenthood, which is collected in several national population surveys. However, this approach has two main limitations: firstly, the life expectancy is calculated for the entire population, but not all population performs grandparental roles; and secondly, it records the situation only at the time of the survey and does not consider that the entry into grandparenthood may occur after the survey.

Moreover, Leopold and Skopek (2015, p. 15), who used this method to estimate the length of grandparenthood, recognized that the second approach based on the hypothetical cohorts is more accurate. The third and fourth methods are limited by the specificity of the information base. The third approach requires current data on the population with information about grandchildren, and years of birth of grandchildren and grandparents. The fourth approach requires a simulated data panel. The limited information resources are why the demographics of many countries have not yet provided such estimates. For example, an attempt to estimate the length of grandparenthood in Russia was made only once—in 2004. It was based on survey data obtained during the multi-country panel survey coordinated by the Generations and Gender Programme (Vikat et al., 2007). Since then, there have been no such studies. Any other methods noted in Table 1 were also not applied in Russia.

Considering the limited information base, we have previously developed an approach to estimating the length of grandparenthood in Russia. This approach calculates the length of grandparenthood as the difference between life expectancy and the age of entry into grandparenthood, where the age of entry into grandparenthood is calculated as the sum of two indicators: the average age of a mother at the birth of her first child in the current year and the average age of a mother at the birth of her first child in the previous generation (Shubat & Bagirova, 2020). Note that our approach to calculating the length of grandparenthood only seems similar to the first approach presented in Table 1. We used exclusively statistical sources of information, while Leopold and Skopek (2015) used sociological research data.

**Table 1:** Methods of Assessing the Length of Grandparenthood and the Results of Their Application in Different Countries

| Method of assessing | Essence of the method | Research Example | | |
|---|---|---|---|---|
| | | Source | Initial data | Conclusion |
| Calculations based on life expectancy of real cohorts | Length of grandparenthood – the difference between life expectancy and the median age of entry into grandparenthood | Leopold & Skopek, 2015 | WHO data on life expectancy in 26 countries, data from population surveys: Generations and Gender Survey (GGS), European Social Survey (ESS), German Aging Survey (DEAS), and National Survey of Families and Households (NSFH). | In countries with lower life expectancy, the length of grandparenthood is longer, which is associated with later entry into grandparenthood. This fact negates the 'award' that countries with a higher life expectancy receive in most of the surveyed countries, with the exception of the USA and East Germany, which are leaders in the length of shared lifetime between grandparents and grandchildren. |
| The method based the calculations of the Sullivan index | Estimation of the expected length of grandparenthood for hypothetical cohorts according to a one-time slice. It uses the Sullivan method, which involves calculating the number of years in a certain state based on mortality tables. | Margolis, 2016 | Life expectancy and age-specific mortality information from a period life table | From 1985 to 2011, the average length of grandparenthood in Canada decreased for women (from 24.7 to 24.3 years) but increased for men (from 17 to 18.9 years). |
| Microsimulation (demographic modeling) | Creating an agent data panel based on simulated behavior and life circumstances: childbearing, marriage, divorce, remarriage, and death; the probability is determined for each event. After modeling, the obtained data are similar to census data with accurate information about the time of birth, death, childbearing, marriage, divorce, | Margolis & Verdery, 2019 | Demographic Data Panel for the USA, 1880s–1960s (*Socsim*, 2016) | An increase in the length of grandparenthood is more noticeable for women than men, and for white people rather than black people: the increase in the average length of grandparenthood for black men was from 22 to 26 years, for black women was 27 to 34 years, for white men was 23 to 29 years, and for white women was from 28 to 36 years. The dynamics recorded the divergence of the length of grandparenthood in black and white men. |

| Method of assessing | Essence of the method | Research Example | | |
|---|---|---|---|---|
| | | Source | Initial data | Conclusion |
| | remarriage, and other demographic characteristics of each agent. | | | |
| Calculations based on retrospective data | The totality of indicators of the length of grandparenthood:<br>1) from the point of view of grandchildren–the number of years that the grandchild shared with the grandparent who lived longer;<br>2) from the point of view of grandparents:<br>- the number of years of grandparenthood is the sum of all the years during which the grandparent was alive and had at least one grandchild;<br>- cumulative number of years of grandparenthood–the total length of grandparenthood, considering all grandchildren (in this case, the year in which grandparent had two grandchildren is counted as two years). | Chapman et al., 2017 | Records of the Lutheran Church's church books about people born between 1790 and 1959, for whom the identities of both grandmothers and, in most cases, grandfathers were known. | From the point of view of grandchildren–the length of grandparenthood ranged from 0 to 49 years for grandmothers, from 0 to 42 years for grandfathers. The length of grandparenthood among grandmothers was mainly 5 years; an increase was recorded only starting from the cohort of 1870–1879 years of birth; a maximum of 24 years was recorded for the cohort of 1950–1959 years of birth. The length of grandparenthood among grandfathers was about 2–3 years; a maximum of 16 years was recorded for the cohort of 1920–1929 and 1930–1939 years of birth. |

In addition, it is essential to emphasize that the issues of forecasting grandparenthood have not been addressed either. However, grandparenthood projections in general and projections of its length as one of the key indicators is exceptionally relevant today both for Russia and for many other countries. This relevance is due to a number of reasons.

Firstly, forecasting the length of grandparenthood is relevant because the life cycle conditions of grandparents may change during the period of grandparenthood. Therefore, grandparents may be involved in the life of their grandchildren in different ways. For example, grandparents may have a number of competing social roles and different amounts of time and desire to implement grandparental functions, or they may have higher or lower levels of physical and mental health (Kalachikova & Gruzdeva, 2018; Krasnova, 2002). Considering the benefits that both grandchildren and grandparents receive from intergenerational interaction (e.g., Burn & Szoeke, 2015; Fomby et al., 2014; Kemp, 2007; Sarti, 2010), as well as the potential amount of social and cultural capital that can be the subject of intergenerational transfer, the forecast of the length of grandparenthood is extremely important for understanding the society's prospects of obtaining positive social, economic, and demographic effects, which are directly related to active intrafamily interaction between grandparents and grandchildren.

Secondly, forecasting the length of grandparenthood may be necessary for organizations whose activities are related to the provision of specific insurance, medical, banking, and recreational services for people with grandparent status. If the length of grandparenthood increases, the market supply of such services may become higher, and the corresponding products may be targeted for a more extended period.

Thirdly, an increase in the length of grandparenthood may increase the stability of family ties in society, and the level of support for family values.

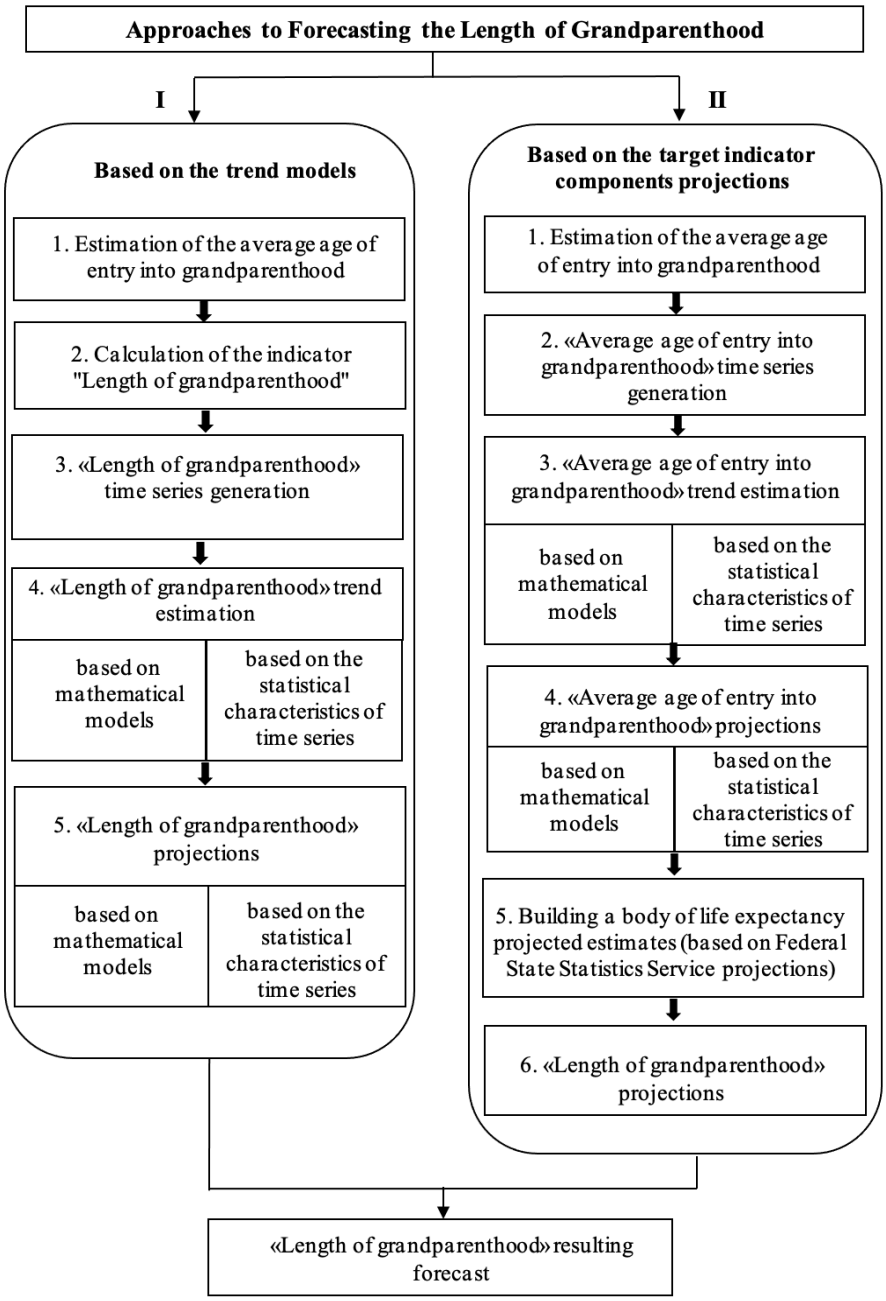
Additionally, countries may have their specific reasons for the importance of grandparenthood projections. For example, Russia has been implementing the national project 'Demography' since 2019. In Russia, national projects are state programs aimed at achieving specific strategic goals of the country's development. They act as a guide for the activities of various levels of public administration. They include a whole system of measures and ensure the allocation of resources for their implementation by the Russian government. In accordance with one of the national projects, Demography, Russian society has recently begun to pay great attention to older people and their involvement in labor activity, social activity, and physical education. Predictions of the length of grandparenthood could enhance information support for implementing this national project.

Thus, the purpose of our study is to develop and implement methodological approaches for forecasting the length of grandparenthood based on the totality of available data from Russian statistics. The novelty of our research is manifested in several aspects: 1) such projections are made for the first time, and 2) the projections are made within the framework of two authors' methodological approaches, the joint use of which allows us to increase the accuracy of projections. The practical relevance of our results lies in the fact that our calculations of the length of grandparenthood indicators, which formed the basis of the forecast, are specific not only for limited Russian data. Such approaches to calculating the length of grandparenthood and its forecasting may be in demand in other countries with poor statistics of grandparenthood.

# Methodological issues of forecasting the length of grandparenthood

Considering the data available in Russian demographic statistics, we believe that forecasting the length of grandparenthood is possible based on two methodological approaches. The projected estimates can be considered complementary and used to derive the final (generalized) projected estimates. The methodological approaches developed by us are presented in Figure 1.

**Figure 1:** Methodological Approaches to Forecasting the Length of Grandparenthood in Russia



There is an essential methodological feature of forecasting, which is characteristic of both methodological approaches. Historically, a marked difference in the life expectancy of men and women in Russia strongly influenced the length of grandparenthood. Women's life expectancy was noticeably greater than men's. For example, in 2020, the average life expectancy for men was 66.49 years, and for women was 76.43 years (Federal State Statistics Service, 2020a). Consequently, shared time with the generation of grandchildren among Russian grandmothers is, on average, 10 years longer than among grandfathers. Thus, it is expedient to give separate projections of the length of grandparenthood for men and women.

***The first methodological approach*** includes several forecasting stages. At the first stage, it is necessary to obtain estimates of the age at which Russian men and women become grandparents. As noted earlier, Russian information resources do not have such data. Due to this, the age of entry into grandparenthood can only be estimated based on indirect calculations.

As beforehand, we presented the detailed methodology for obtaining such estimates (Bagirova & Shubat, 2020; Shubat & Bagirova, 2020). This methodology uses statistical data about the woman's age at the birth of her first child for two adjacent generations of women. The sum of these ages can be considered an estimate of the age at which a woman enters grandparenthood. Table 2 shows an example of calculating this age for Russian women in 2015. The international statistical database, The Human Fertility Database, which was developed by the Max Planck Institute for Demographic Research (Rostock, Germany) and the Vienna Institute of Demography (Vienna, Austria), can be used as a source of information (MPIDR & VID, 2021).

**Table 2:** An Example of Calculating the Average Age of Entry Into Grandparenthood of Russian Women in 2015

| **Indicators** | **Average age of mother at birth of her first child** | **The year of the previous generation of mothers (2015-value in column 1)** | **Average age of mother at birth of her first child in the previous generation of mothers** | **Average age of entry into grandparenthood (value in column 1 + value in column 3)** |
|---|---|---|---|---|
| Column | 1 | 2 | 3 | 4 |
| Value | 25.45 | 1990 | 22.65 | 48.10 |

Additional calculations are required to obtain estimates of the age at which a Russian man enters into grandparenthood. Neither Russian nor international statistics have data on the age at which a Russian man has his first child. Such estimates can be obtained indirectly, based on the women's age of entry into grandparenthood and the age difference of men and women at marriage.

The statistical database formed by the Institute of Demography of the National Research University Higher School of Economics can be used as an information source (Vishnevsky Institute of Demography, 2021). This resource presents a collection of indicators of the annual demographic report "Population of Russia," which includes an indicator of the age at first marriage.

Table 3 shows an example of calculating the average age of entry into the grandparenthood of Russian men in 2015.

**Table 3**: An Example of Calculating the Average Age of Entry Into Grandparenthood of Russian Men in 2015

| Indicator | Average age of mother at birth of her first child | Average age at first marriage for men | Average age at first marriage for women | Age difference at marriage (Value in column 2 – | Average age of father at birth of his first child (Value in column 1 + value in column 4) | The year of the previous generation of fathers (2015- value in column 5) | Average age of father at birth of his first child in the previous generation of fathers (calculated from the values of | Average age of entry into grandparenthood (Value in column 5 + + value in column 7) |
|---|---|---|---|---|---|---|---|---|
| Column | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Value | 25.46 | 27.72 | 25.24 | 2.48 | 27.94 | 1987 | 25.02 | 52.97 |

The second stage involves carrying out a calculation of the length of grandparenthood of the first methodological approach. It can be calculated as the difference between the life expectancy and the age of entry into grandparenthood. For example, according to Rosstat [Federal State Statistics Service (Russia)], the life expectancy of women in 2015 was 76.71 years, and for men was 65.92 years (Federal State Statistics Service, 2020a). Using the data about the age of entry into grandparenthood presented in Tables 2 and 3, we calculate the following:

- the length of grandparenthood for women in 2015 = 76.71 - 48.10 = 28.61 years

- the length of grandparenthood for men in 2015 = 68.92 - 52.97 = 12.95 years.

The third stage involves the «Length of grandparenthood» time series generation for men and women separately. In this case, the time series length is determined by the depth of the available statistical data.

The fourth stage of the first methodological approach is the «Length of grandparenthood» trend estimation. We believe that two variants of trend analysis are possible here, depending on the features of the studied time series: based on mathematical modeling and the statistical characteristics of the time series, such as average absolute growth or average growth rate.

The «Length of grandparenthood» projections based on the parameters of trend models were developed separately for men and women at the next stage of the first methodological approach. We believe that forecasting, in this case, is possible only for a short-term period (up to 5–10 years). For several reasons, projections for a more extended period will have extremely low reliability. Firstly, the demographic trends emerging in Russia are extremely unstable, while the periods with a unidirectional upward or downward trend are short. Secondly, the state is actively implementing various measures to solve the country's demographic problems and reverse negative demographic trends. For example, a whole range of measures aimed at increasing life expectancy is being introduced within the framework of the national project,

Demography. Under the active external influence, demographic projections for the medium term (up to 25 years) and long term (more than 25 years) can hardly be considered reliable.

***The second methodological approach*** is based on the «Length of parenthood» components forecasts. In our case, these are the age of entry into grandparenthood and life expectancy at birth.

The first stage in the implementation of this methodological approach involves the average age of entry into grandparenthood estimations for men and women separately. The same calculation techniques are used here as in the first methodological approach.

The second stage is the «Average age of entry into grandparenthood» time series generation. In this case, the length of the time series is determined by the depth of available statistical data.

At the third stage, there is trend estimation of the «Average age of entry into grandparenthood», based on mathematical modeling or statistical characteristics of time series—average absolute growth or average growth rate.

The fourth stage of this methodological approach is the «Average age of entry into grandparenthood» forecasts for men and women separately. The parameters of the trends identified at the previous stage are used as a basis for such estimates. We also believe that forecasts are only possible for the short term here.

At the fifth stage of the methodological approach, we built a body of life expectancy projected estimates (based on Federal State Statistics Service projections). Life expectancy at birth is one of the scenario variables used to predict the total population of a country. Scenarios are developed every two years by experts (Federal State Statistics Service, 2020b). The Federal State Statistics Service develops three variants of projections: high, medium, and low. Accordingly, there are three variants of projections of the length of grandparenthood.

At the final stage of the second methodological approach, projected estimates of the length of grandparenthood are calculated as the difference between the projected estimates of life expectancy (results of the fifth stage) and the projected estimates of the average age of entry into grandparenthood (results of the fourth stage).

Table 4 summarizes the available statistical data sources used in the developed methodological approaches.

**Table 4**: Available Data Sources for Forecasting the Length of Grandparenthood in Russia Based on the Developed Methodological Approaches

| Data Source | Data Source Description | Data used in the forecasting process | Access |
|---|---|---|---|
| The Human Fertility Database | • a joint project of the Max Planck Institute for Demographic Research in Rostock, Germany and the Vienna Institute of Demography in Vienna, Austria;<br>• provides free access to detailed and high-quality data on period and cohort fertility;<br>• based on official vital statistics | mean age at first birth | https://www.humanfertility.org/cgi-bin/main.php |
| A collection of indicators from the Annual Demographic Report 'Population of Russia' | • formed by the Institute of Demography of the National Research University Higher School of Economics<br>• based on official data of the Federal State Statistics Service, ministries and departments of the Russian Federation, international organizations and national statistical services of other countries, own metrics calculated using these data, the results of special sample surveys | age difference of men and women at marriage | http://www.demoscope.ru/weekly/edd/edd_tab.php |
| Federal State Statistics Service | • federal executive body responsible for developing government policy and legal regulation of official statistics;<br>• provides the collection of official statistical information in the Russian Federation | - life expectancy at birth;<br>- life expectancy at birth: projections | https://rosstat.gov.ru/storage/mediabank/R80ZmXzD/demo26.xlsx<br>https://rosstat.gov.ru/storage/mediabank/progn7.xls |

# Projected estimates of the length of grandparenthood in Russia

Both methodological approaches were implemented.

Estimation of the average age of entry into grandparenthood for men and women are the key calculations that make up the first step in both methodological approaches. The depth of available statistical data allowed us to estimate this indicator from 1983 to 2018 for women and from 2007 to 2016 and men.

In accordance with the first methodological approach, the length of grandparenthood was calculated based on the average age of entry into grandparenthood for the entire available period. The trend models of this indicator were estimated afterward. As the results of the analysis show, the length of grandparenthood for men was clearly described by a linear regression model with a coefficient of determination ($R^2$ = 95.1%). A linear trend in the dynamics of the length of grandparenthood for women is observed from 2003. Accordingly, the linear regression model for women was estimated based on data from this year, and it showed the coefficient of determination ($R^2$ = 97.5%). In addition, the features of the «Length of grandparenthood» time series over the same period allowed us to estimate the trend based on a model of average annual absolute growth.

Table 5 shows the main parameters of the regression models and the average annual absolute growth. Projected estimates of the length of grandparenthood for the period up to 2025 were obtained based on these models (Table 6).

**Table 5:** Main Parameters of the «Length of Grandparenthood» Trend Models

| Model | Linear Regression Model | | | | | Average annual absolute growth |
|---|---|---|---|---|---|---|
| | Model parameters | Unstandardized coefficients | | t-statistics | Significance level | |
| | | Coefficient | Standard error | | | |
| For men | Constant | -935.684 | 76.322 | -12.260 | 0.000 | 0.45 |
| | Years | 0.471 | 0.038 | 12.411 | 0.000 | |
| For women | Constant | -554.890 | 25.161 | -22.053 | 0.000 | 0.29 |
| | Years | 0.290 | 0.013 | 23.142 | 0.000 | |

**Table 6**: The «Length of Grandparenthood» Projections (First Methodological Approach)

| Years | Length of grandparenthood in years | | | |
|---|---|---|---|---|
| | Men | | Women | |
| | Estimates based on the regression model | Estimates based on the absolute growth | Estimates based on the regression model | Estimates based on the absolute growth |
| 2021 | 16.02 | 15.65 | 30.43 | 30.18 |
| 2022 | 16.49 | 16.10 | 30.72 | 30.46 |
| 2023 | 16.97 | 16.55 | 31.01 | 30.75 |
| 2024 | 17.44 | 17.00 | 31.30 | 31.04 |
| 2025 | 17.91 | 17.45 | 31.59 | 31.33 |

Forecasting the length of grandparenthood in the second methodological approach involves analyzing trends in the average age of entry into grandparenthood and obtaining its projected estimates. The analysis showed that this indicator in men increased throughout the entire time. The trend is approximated by linear regression with the coefficient of determination ($R^2$ = 70.2%) and the average annual absolute growth model. The trend for the annual increase in the average age of entry into grandparenthood in women has been established since 1994. Accordingly, for women, the linear regression model with the coefficient of determination ($R^2$ = 99.2%) and the model of average annual absolute growth were estimated based on data from this period. Table 7 shows the main parameters of the models.

**Table 7:** Main Parameters of the «Average Age of Entry Into Grandparenthood» Trend Models

| Model | Linear Regression Model | | | | | Average annual absolute growth |
|---|---|---|---|---|---|---|
| | Model parameters | Unstandardized coefficients | | t-statistics | Significance level | |
| | | Coefficient | Standard error | | | |
| For men | Constant | -130.278 | 42.062 | -3.097 | 0.015 | 0.11 |
| | Year | 0.091 | 0.021 | 4.346 | 0.002 | |
| For women | Constant | -157.834 | 3.742 | -42.181 | 0.000 | 0.10 |
| | Year | 0.102 | 0.002 | 54.811 | 0.000 | |

Projected estimates of the age of entry into grandparenthood for the period up to 2025 were obtained based on these models. The life expectancy projected estimates were obtained based on Federal State Statistics Service projections. The difference in projected estimates of the two indicators allowed us to determine the length of grandparenthood projections (Table 8).

**Table 8:** The «Length of Grandparenthood» Projections Based on Its Components Projections (Second Methodical Approach)

| Variant of Projections | Years | Length of grandparenthood in years | | | |
|---|---|---|---|---|---|
| | | Men | | Women | |
| | | Estimates based on the regression model | Estimates based on the absolute growth model | Estimates based on the regression model | Estimates based on the absolute growth model |
| Low | 2021 | 15.23 | 14.97 | 29.56 | 29.53 |
| | 2022 | 15.36 | 15.09 | 29.56 | 29.53 |
| | 2023 | 15.49 | 15.20 | 29.57 | 29.54 |
| | 2024 | 15.62 | 15.31 | 29.56 | 29.54 |
| | 2025 | 15.73 | 15.40 | 29.55 | 29.52 |
| Medium | 2021 | 15.99 | 15.73 | 30.20 | 30.17 |
| | 2022 | 16.37 | 16.10 | 30.40 | 30.37 |
| | 2023 | 16.74 | 16.45 | 30.60 | 30.57 |
| | 2024 | 17.10 | 16.79 | 30.78 | 30.76 |
| | 2025 | 17.46 | 17.13 | 30.96 | 30.93 |
| High | 2021 | 16.84 | 16.58 | 30.82 | 30.79 |
| | 2022 | 17.57 | 17.30 | 31.18 | 31.15 |
| | 2023 | 18.21 | 17.92 | 31.53 | 31.50 |
| | 2024 | 18.83 | 18.52 | 31.84 | 31.82 |
| | 2025 | 19.40 | 19.07 | 32.14 | 32.11 |

# Discussion

The projections show an increase in the majority of projections variants in the length of grandparenthood in the period from 2021 to 2025. The estimates obtained based on the two methodological approaches differ slightly. For example, the most pessimistic estimates for men range from 14.97 in 2021 to 15.40 in 2025 (the second methodological approach, low variant of projections, estimates based on the absolute growth model). The most optimistic estimates for men range from 16.84 in 2021 to 19.40 in 2025 (the second methodological approach, high variant of projections, estimates based on the regression model). The most pessimistic estimates for women range from 29.53 in 2021 to 29.52 in 2025 (the second methodological approach, low variant of projections, estimates based on the absolute growth model). The most optimistic estimates for women range from 30.82 in 2021 to 32.14 in 2025 (the second methodological approach, high variant of projections, estimates based on the regression model). In the low variant of projections (within the framework of the second methodological approach), women are not predicted to have an increase in the length of grandparenthood.

On the contrary, it may even slightly decrease. This decrease is due to the specific features of the prospective dynamics of life expectancy and the average age of entry into grandparenthood. Federal State Statistics Service forecasts a slowdown in the growth rate of women's life expectancy. In contrast, our estimates of the growth rate of women's average age of entry into grandparenthood remain unchanged (Table 9).

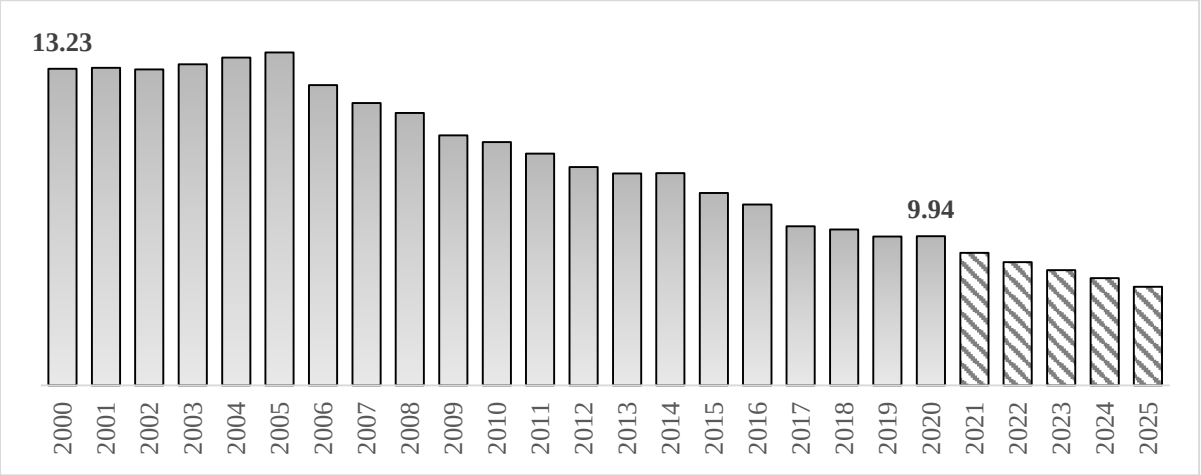
**Table 9**: Projections of Life Expectancy and Age of Entry Intro Grandparenthood for Women in the Low Variant of Projections

| Years | Life expectancy at birth | | Average age of entry into grandparenthood | |
|---|---|---|---|---|
| | Estimates of Rosstat in years | Growth rate in % | Estimates in years | Growth rate in % |
| 2021 | 78.35 | – | 48.82 | – |
| 2022 | 78.45 | 0.128 | 48.92 | 0.210 |
| 2022 | 78.56 | 0.140 | 49.02 | 0.209 |
| 2023 | 78.66 | 0.127 | 49.13 | 0.209 |
| 2024 | 78.75 | 0.114 | 49.23 | 0.208 |

Moreover, it is necessary to note other features of the obtained projected estimates.

Firstly, the average age of entry into grandparenthood is noticeably higher for men than for women because men usually get married later. Secondly, there is a tendency towards an increase in the average age of entry into grandparenthood for both men and women, and the rates of this growth are approximately the same. These results correlate with other demographic trends observed in Russian society, such as increased age at marriage and protogenetic interval (e.g., Federal State Statistics Service, 2017). Thirdly, although the length of grandparenthood among women is noticeably higher than among men, the growth rate of this indicator among men is noticeably higher. This rate is due to the fact that, according to official statistics, the life expectancy of men in Russia is growing at a faster rate than for women. For example, in 2000, the difference in life expectancy between women and men was 13.23 years, and in 2020, only 9.94 years, while official projections show a further reduction in this difference (Figure 2).

**Figure 2**: Difference in Life Expectancy of Men and Women in Russia in Years




*Note: Federal State Statistics Service (2020a, 2020c)*

A faster increase in the length of grandfatherhood generates several research questions that can become the subject of further sociological, psychological, and demographic research. The most important of the research questions, in our opinion, are the following. Firstly, will an increase in the time of potential grandfatherhood change the established models of men's participation in the life of grandchildren? Secondly, what are the socio-psychological effects of the increase in the length of grandparenthood, which is more noticeable in men, both for the family of the grandparents and for the families of their children? Thirdly, what could be the socioeconomic consequences of an increase in the length of grandparenthood in general and a faster increase in the length of grandfatherhood for society?

One limitation of our study is related to the fact that the obtained results reflect only the potential for involving grandparents in intergenerational interaction and caring for grandchildren, as well as the potential for a possible competition between different social roles in the life of people with grandchildren. The actual level of activity of grandparents depends on many objective and subjective factors (Bulygina & Komarova, 2019). In some countries, studies revealed that the level of involvement of grandparents in the life of grandchildren increases over time (Geurts et al., 2015). This data is a significant indicator that requires its assessment and forecasting, since it can be directly related to the social policy of supporting young families and families with children—for example, planning the scope of government childcare services (Hank & Buber, 2009), especially when developing new support tools (e.g., the institution of state nannies, grandparent schools). In this regard, we see the development of our research as the study of the social context of the length of grandparenthood.

Another limitation of our study is related to the short forecasting period. Even though the obtained models allow us to forecast for an extended period, we have shown the possibility of applying these methodological approaches only in the short term. This finding is primarily due to the specific features of the data available in Russian statistics that are necessary for the forecasting process. Estimates for an extended period require a stable and longer time series of indicators involved in the forecasting process. In our case, the time series were relatively short. For example, as we indicated earlier, the available statistical data allowed us to calculate the average age of entry into the grandparenthood of men only in the period from 2007 to 2016. In addition, the current demographic trends in Russia may change in the coming years because, as noted earlier, the state is actively implementing various measures to improve the

demographic situation. The potential effectiveness of such measures cannot be underestimated.

# Conclusions

The study proposes methodological approaches to forecasting the length of grandparenthood which is one of the critical indicators of the demography of grandparenthood. These approaches involve the formation of a forecast: 1) based on trend models of the length of grandparenthood; and 2) based on the projections of components of this indicator (average age of entry into grandparenthood and life expectancy at birth). Methods of mathematical modeling and trend extrapolation based on the statistical characteristics of time series were used for forecasting. Data from official Russian statistics, statistical databases of leading Russian and foreign institutes of demography served as an information resource for forecasting.

As forecasts show, the length of grandparenthood in Russia will increase from 2021 to 2025. For example, the most pessimistic estimates for men range from 14.97 in 2021 to 15.40 in 2025, for women from 29.53 in 2021 to 29.52 in 2025 (the second methodological approach, low variant of projections, estimates based on the absolute growth model). The most optimistic estimates for men range from 16.84 in 2021 to 19.40 in 2025, and for women from 30.82 in 2021 to 32.14 in 2025 (the second methodological approach, high variant of projections, estimates based on the regression model). The projected growth rate of length of grandparenthood among men is higher than among women.

The obtained results develop the methodology of demographic forecasting and contribute to developing the demography of grandparenthood. Moreover, considering the benefits that families receive from intergenerational interaction, the projections of the length of grandparenthood are essential for understanding the society's prospects of obtaining social, economic, and demographic effects directly related to active intrafamily interaction between grandparents and grandchildren. For Russia, such assessments are of high practical importance because they enhance the information support for implementing an effective state program, the national Demography project.

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