Low Fertility - the Challenge of Demographic Security of Georgia

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Abstract

Ensuring the demographic security of the country is an important component of the national security of the state. In recent years, among Georgia's demographic challenges, fertility issues have gained particular prominence. Based on the relevant indicators of demographic and statistical materials, the article considers the current state of fertility and its prospects. Based on the demographic and statistical materials of relevant indicators, the current situation of fertility and its prospects are considered. It is noted that fertility decline is a global phenomenon. Today, in 101 countries around the world, the total fertility rate is below the level of simple reproduction of the population (2.1). This process will continue in the future, and it will cover more countries. Georgia is in the fourth phase of the demographic transition. This phase is characterized by declining fertility and a reduction in the number of children in families. As a result of the negative events that have developed since the 1990s, the demographic system of Georgia dropped out of the natural course of development. In recent years, one of the most important elements of the natural movement of the population—fertility—has declined even more. In 2022, the crude birth rate was 11.4‰, which is the lowest rate since 2002 and significantly less than the level of simple population reproduction (15‰). The fact that only a small portion of generations born in the 1990s are now actively childbearing in Georgia complicates the issue. The fact that a small generation born in the 1990s entered the active childbearing age in Georgia complicates the issue. According to the medium variant of the 10th revision of the UN projections for 2022, by 2035, due to declining fertility, the number of children under the age of 15 will be less than the number of people aged 65 and over. This process is very dangerous for Georgia because it will worsen the functioning of the demographic system, which, without the implementation of a reasonable sociodemographic policy based on demographic security, will lead to serious social and economic problems in the future.

Keywords: Georgia, demographic security, low fertility, population

Introduction

Demographic security represents the protection of the state against threats such as depopulation, demographic aging, fertility decline, and emigration processes; the aforementioned also implies the state of health of the nation. The processes taking place in society have a socioeconomic character; therefore, demographic security affects almost all segments and spheres of human activity. At the same time, its provision depends on the state of the economic, environmental, food, social, and cultural spheres [1].

The main demographic threats to modern Georgia are low fertility, high mortality, depopulation, and unregulated migration processes. Self-flowing development with the mentioned processes poses a threat to the country's demographic security.

As a result of the negative events that have developed since the 1990s, the demographic system of Georgia has fallen out of its mainstream natural development. In recent years, fertility, one of the most important elements of the natural movement of the population, has further decreased, which has accordingly been reflected in the total population.

According to the medium variant of the 10th revision of UN projections for 2022, by 2035, the number of children under 15 years of age in Georgia will be less than the number of people aged 65 and over.

The process of fertility decline is an integral event in the demographic history of mankind, the first signs of which were observed in Europe at the end of the 18th century, and it is gradually spreading throughout the world.

Accordingly, the theory of demographic transition describes fertility decline as a global process. The mentioned theory includes four stages:

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In Stage 1, which applied to most of the world before the Industrial Revolution, both birth rates and death rates were high. As a result, population size remains fairly constant but can have major swings with events such as wars or pandemics.

In Stage 2, the introduction of modern medicine lowers death rates, especially among children, while birth rates remain high; the result is rapid population growth. Many of the least developed countries today are in Stage 2.

In Stage 3, birth rates gradually decrease, usually as a result of improved economic conditions, an increase in women's status, and access to contraception. Population growth continues, but at a lower rate. Most developing countries are in Stage 3.

In Stage 4, birth and death rates are both low, stabilizing the population. These countries tend to have stronger economies, higher levels of education, better healthcare, a higher proportion of working women, and a fertility rate hovering around two children per woman. Most developed countries are in Stage 4 [2].

In the mentioned stage, the process of demographic stabilization is completed. The crude birth and death coefficients are approximately 13‰.

The history of the development of demographic processes shows that the demographic transition will not end with population stabilization. After the end of the fourth phase, the fifth regressive phase is established [3].

Regarding the discussed issue, it is worth noting the five-stage modified model of demographic transition proposed by Georgian scientist V. Gujabidze in the 1970s of the last century. According to the author, in the fifth stage of the demographic transition, the death rate will exceed the birth rate [4; 5].

The recent history of demographic development shows that we must consider the famous scientist A. Carlson's symbolic expression as a reality—the conviction of demographers that the population of Western countries is stabilizing at the limit of simple reproduction or close to it has never been more than an unfulfilled dream [6].

In the historical past, with permanent wars, frequent pandemics, a low level of medicine and sanitary and hygienic conditions, mortality was very high. Twenty-seven percent of infants did not survive the first year of life, and approximately 47.5% of children did not survive puberty [7]. Due to the current situation, people were forced to focus on high fertility norms to save the population.

On a global scale, the initial impetus for the decline in fertility was the fall in mortality, especially infant mortality, as a result of improved nutrition and the impact of new discoveries in medical science, such as smallpox vaccination (Edward Jenner), the defeat of cholera (John Snow), germ theory of disease (Louis Pasteur), and the discovery of the pathogen of tuberculosis (Robert Koch) [8].

In addition to the aforementioned factors, the global reasons for the decrease in birth rate are urbanization processes, industrialization of countries, mass involvement of women in public production, lengthening of study periods for education, reduction of the influence of religion on the life of society, weakening the tradition of giving preference to boys, and the establishment of state pension and social security systems, as elderly people are no longer materially dependent on their children, which contributes to the decline in fertility.

Currently, the total birth rate in 101 countries in the world is less than 2.1, which does not ensure simple reproduction of the population [9]. The number of countries mentioned will increase even more in the future. By 2050, in 151 out of 195 countries in the world, the total fertility rate will be below the replacement level (<2.1), and by 2100, the number of these countries will reach 183 [10].

Modern Georgia is in Stage 4 of the demographic transition. This phase is characterized by the massive spread of fewer-child families. From 2016 to 2018, a small number of generations born in the 1990s entered the active childbearing age, which led to a lower absolute number of children.

Social and economic instability in the country has led to growing distrust in the future among a significant part of the population. which ultimately resulted in the postponement of childbearing in the desired order. In Georgia, the average age of first marriage and the number of divorces are increasing, which are also factors in decreasing fertility.

Methods and Materials

Methods of historical, comparative, descriptive, statistical analysis and evaluation were used for the study and to analyse the relevant materials. Based on official statistics, the corresponding coefficients were calculated.

For the calculation of total fertility rates, differentiated by the order of birth of children by the mother, we have used a matrix that has the following form:

$F_{15-19} = {}_1F_{15-19} + {}_2F_{15-19} + {}_3F_{15-19} + \ldots + {}_nF_{15-19}$

$F_{20-24} = {}_1F_{20-24} + {}_2F_{20-24} + {}_3F_{20-24} + \ldots + {}_nF_{20-24}$

$F_{25-29} = {}_1F_{25-29} + {}_2F_{25-29} + {}_3F_{25-29} + \ldots + {}_nF_{25-29}$

$F_{30-34} = {}_1F_{30-34} + {}_2F_{30-34} + {}_3F_{30-34} + \ldots + {}_nF_{30-34}$

$F_{35-39} = {}_1F_{35-39} + {}_2F_{35-39} + {}_3F_{35-39} + \ldots + {}_nF_{35-39}$

$F_{40-44} = {}_1F_{40-44} + {}_2F_{40-44} + {}_3F_{40-44} + \ldots + {}_nF_{40-44}$

$F_{40-44} = {}_1F_{40-44} + {}_2F_{40-44} + {}_3F_{40-44} + \ldots + {}_nF_{40-44}$

$\overline{\phantom{F_{40-44} = {}_1F_{40-44} + {}_2F_{40-44} + {}_3F_{40-44} + \ldots + {}_nF_{40-44}}}$

$\text{TFR} = {}_1\text{TFR} + {}_2\text{TFR} + {}_3\text{TFR} + \ldots + {}_n\text{TFR}$

where F x — age-specific fertility rates

${}_nFx$ - age-specific fertility rates, differentiated by order of birth - n (1,2, 3,...).

The order-specific birth rate was obtained by the formula (to illustrate the calculation, we present the age group of 15-19 years) [11]:

$$F_{15-19} = F_{15-19} \times \left(\frac{1_{15-19}^N}{N_{15-19}} + \frac{2_{15-19}^N}{N_{15-19}} + \frac{3_{15-19}^N}{N_{15-19}} \right) etc.$$

The gross growth potential of women is calculated according to J. Bourgeois-Pisha's formula, which has the following form:

$$V_b = \frac{(\sum_0^{39} SK) \times 16}{N}$$

where:

V_b - Gross growth potential of women;

S - Number of women by five-year age groups from 0 to 39 years;

N - Total number of women;

K - The averaged value of the special function G up to 39 years, showing the effect of age on the potential value [12; 13].

E. The Coale formula is used to calculate the intrinsic natural increase rate [14]:

$$r = \frac{lnR_0}{T} \times 1000$$

where:

r -Intrinsic natural increase rate;

l_nR_0 - Natural logarithm of the net reproduction rate;

T - Female generation length.

In E. Coale's formula, the length of the generation of women is calculated by the formula:

$$T = \left(\sum f_x \times L_x \times X \right) / \left(\sum f_x \times L_x \right)$$

where:

T - Female generation length;

$\sum f_x$ - Age-specific fertility rates;

L_x - Number of person-years lived between exact ages x and x+n (from female mortality table);

X - Age.

Results

In recent years (2014-2022), the absolute number of births has been permanently decreasing in Georgia. In this period, the number of births decreased by 30.2%. The mentioned indicator diminished in rural settlements (35.1%), and in urban settlements, the decrease was 26.7%. Correspondingly, the crude birth rates declined (Table 1). In 2022, a very low level of the marked indicator was recorded (11.4‰), which was significantly lower than the level of simple reproduction of the population (15‰). In recent years, along with the real reasons for the decline in fertility, the COVID-19 virus pandemic has played an important role.

Table 1. Dynamics of the absolute number of births and the total birth rates in Georgia by types of settlement[2] (2014-2022)

Years	Absolute number of births			Crude birth rates		
	Georgia	Urban Population	Rural population	Georgia	Urban Population	Rural population
2014	60635	35079	25556	16.3	16.5	16.1
2015	59249	33898	25351	15.9	15.8	16.0
2016	56569	32227	24342	15.2	14.9	15.5
2017	53293	30326	22967	14.3	14.0	14.7
2018	51138	30206	20932	13.7	13.9	13.5
2019	48296	29271	19025	13.0	13.4	12.4
2020	46520	27912	18608	12.5	12.7	12.3
2021	45946	27470	18476	12.4	12.4	12.3
2022	42319	25722	16597	11.4	11.5	11.2

An analysis of the considered coefficients in the context of city-village showed that its indicator was higher in the cities of Georgia. In general, in the country since 1975, the number of people born in cities has always exceeded the number of people born in villages. In 2022, fewer children were born in Georgian villages than during the Second World War in 1943 (20928) [15].

Although the crude birth rate fixed in Georgia in recent years is below the level of simple reproduction of the population, among European states in 2022, it was behind only Iceland (12.3‰), Moldova (12.1‰) and Ireland (11.5‰). The lowest level of this indicator was recorded in Spain (7.5‰), Greece (7.4‰) and Italy (6.9‰) [16].

Compared to the crude birth rate, the total fertility rate is a more accurate indicator of fertility, which does not depend on the age structure.

In Georgia since 2020, the negative natural increase has been fixed. From the point of view of demographic security, the achievement of zero natural increases today's minimum target.

Based on the appropriate methodology [17], according to our calculation, to achieve zero natural increase of the population, the total fertility rate should be 2.11. In 2022, the mentioned indicator was 1.82. To reach the specified number, it is necessary to activate the demographic policy.

According to the data of the National Statistics Office of Georgia in 2014-2016, the total fertility rate in the country exceeded the level of simple reproduction (2.1) and ensured its expanded reproduction (Table 2). In recent years, the considered ratio has been decreasing. In 2022, it diminished to 1.82, which is an indication of narrow reproduction. Despite this fact, the value of the total fertility rate in Georgia is one of the highest in Europe (Fig. 1).

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[2] Here and further without the noncontrolled territories of Abkhazia and Tskhinvali region.
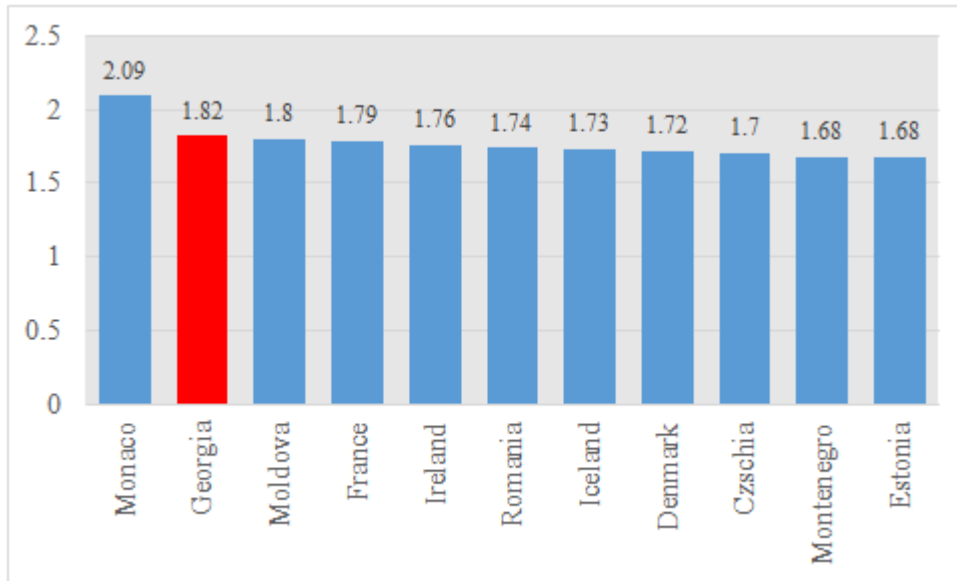Source: National Statistics Office of Georgia.

Figure 1. 10 European countries with the highest total birth rate and Georgia (2022 year) [18]

Significant changes have taken place in age-specific fertility rates. According to the official data of the National Statistical Service of Georgia, in 2014-2022, the mentioned indicator per thousand for women aged 15-19 years decreased by 2.4 times. It is a significant fact that since 2017, the ratio of women aged 25-29 exceeds the ratio of women aged 20-24 (see Table 2).

The fixed fact is due to the increase in the average age of the mother at the time of the child's birth. According to official data from 2014-2022. The average age of first birth increased by almost 2 years and amounted to 26.4 years (2022).

Table 2. Dynamics of age-specific birth rates, total fertility rates and net reproduction rates in Georgia in 2014-2022 (Source: National Statistics Office of Georgia)

Years	Mother's age							Total fertility rate	Net reproduction rate
	-20	20-24	25-29	30-34	35-39	40-44	45+		
2014	51.5	144.7	131.3	86.5	38.9	9.2	0.7	2.31	1.10
2015	48.4	144.1	128.0	87.7	41.5	10.6	0.7	2.31	1.08
2016	43.4	134.9	127.5	86.4	43.7	11.2	0.8	2.24	1.08
2017	36.2	126.1	126.9	84.5	44.0	10.5	0.5	2.14	1.01
2018	32.3	121.9	127.5	85.4	44.3	11.0	0.6	2.12	1.01
2019	29.4	112.1	121.3	81.2	44.6	12.4	1.5	2.01	0.96
2020	27.3	103.3	121.8	81.6	44.4	13.3	1.7	1.97	0.93
2021	24.8	100.4	126.7	86.9	44.8	12.1	0.8	1.98	0.94
2022	21.9	90.2	113.7	83.1	42.9	11.6	1.1	1.82	0.87

In recent years, the age pattern of birth has changed significantly. In the total number of births for 2014-2022, the share of mothers aged 20-24 years has significantly decreased (by 10.2 points), and the share of mothers aged 30-34 years has significantly increased (by 8.0 points) (Fig. 2).
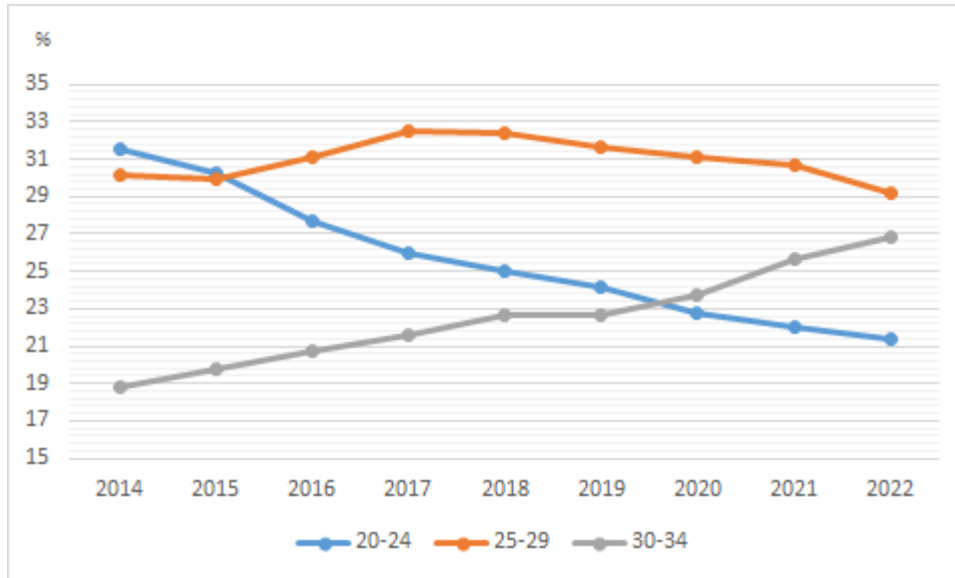
Figure 2. Dynamics of age groups of women 20-24, 25-29 and 30-34.
2014-2022 (Source: National Statistics Office of Georgia)

The net reproduction rate for Georgia in 2022 was 0.87 (Table 2). The indicated coefficient represents the average number of daughters a hypothetical cohort of women would have at the end of their reproductive period if they were subject during their whole lives to the fertility rates and the mortality rates of a given period. It is expressed as the number of daughters per woman [19]. Based on the value of the net reproduction rate (2022), the generation of girls will be 13% less than the generation of mothers.

The decomposition of total fertility rates by birth order of children provides important information about the dynamics of fertility. In particular, this concerns the total coefficients of the first order in cross-sectional generations. The value of the ratio of the specified order may deviate from 0.900-0.950 in any direction. These deviations contain important information about the causes of changes in fertility. If the coefficient exceeds 0.950, this indicates structural changes in the birth calendar, the accumulation of births of several adjacent real generations of women in one calendar year as a result of an increase in the marriages, a decrease in the mean age of women at first marriage, and a decrease in protogenetic (from marriage to birth first child) intervals. A similar situation was fixed in Georgia in 2014-2016 (Table 3). In the following years, the considered indicator fell below 0.900, which indicates the postponement of the birth of children in the birth calendar (timing), the increase in the age of marriage of women, etc. Since 2020, a mass postponement of the birth of first-order children began.

Table 3. Total fertility rates
differentiated by the birth order 2014-2022 (Source: Calculated by the author, on the basis of data from the National
Statistics Office of Georgia)

Years	Birth order					
	1	2	3	4	5	Unknown
2014	1.025	0.872	0.327	0.062	0.025	0.004
2015	0.987	0.868	0.347	0.071	0.027	0.005
2016	0.941	0.842	0.356	0.074	0.027	0.000
2017	0.868	0.811	0.356	0.079	0.026	0.003
2018	0.837	0.798	0.364	0.080	0.028	0.008
2019	0.802	0.728	0.359	0.081	0.030	0.013
2020	0.781	0.699	0.361	0.086	0.031	0.009
2021	0.778	0.702	0.368	0.091	0.033	0.011
2022	0.748	0.607	0.331	0.086	0.035	0.016

One of the factors in the decline of fertility in Georgia is the decrease in the number of women of fertile age (15-49 years). In 1995-2023, the absolute number of noted women decreased by 32.5%, the reasons for which are large-scale emigration processes and declining fertility (Fig. 3).
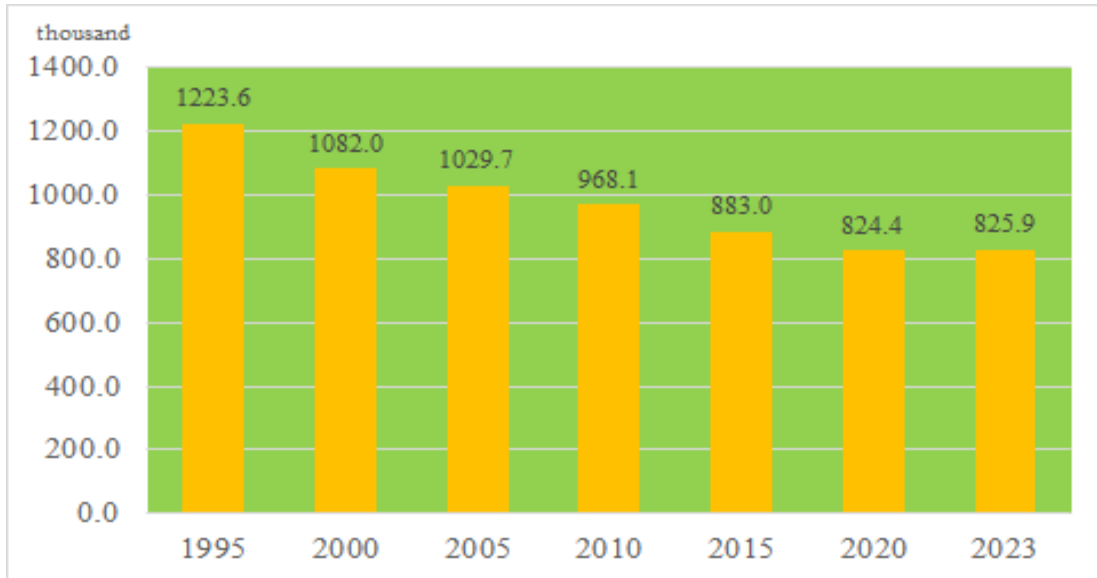
Figure 3. Dynamics of the number of women of fertile age in Georgia. 1995-2023 (Source: National Statistics Office of Georgia)

The reduction in the number of women affects the gross growth potential of women. This last one shows how much the number of women may change in the future only at the expense of the age structure.

Calculations showed that the abovementioned potential in 1995-2023 had a decreasing trend (Figure 4). In 1995, due to the specifics of the age structure, the number of women could increase by 13.5%. According to 2023 data, it is expected to decrease by 5.3%.
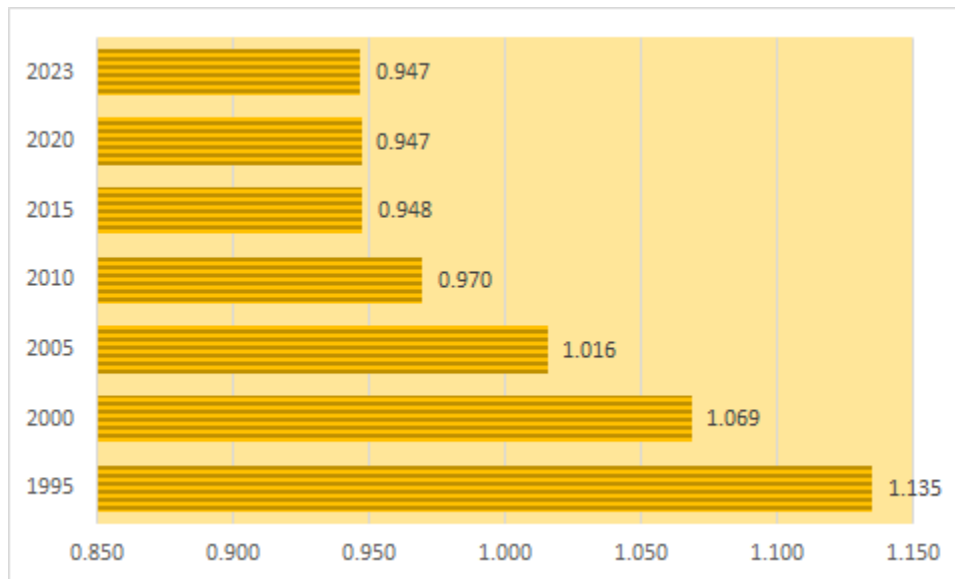

Figure 4. Dynamics of gross growth potential of women in Georgia, 1995-2023 (Source: Calculated by the author, on the basis of data from the National Statistics Office of Georgia)

The intrinsic natural increase rate shows how much the population would change after a period equal to the length of the female generation if birth rates, mortality rates, and the age and sex structure of the population remained unchanged.

According to our calculations, in 2022, the indicated coefficient was -5.3‰, and the length of the female generation was 25 years. Based on this, if the age structure of the population is in accordance with the current regime of population reproduction, after a quarter of a century, the population of Georgia will decrease by 0.5% due to natural decline.

In the considered year, the actual rate of natural increase of the population was equal to -1.8‰, the difference between them is because the actual age structure is relatively younger than the age structure that corresponds to the modern parameters of birth and death of a stable population, due to which in the population has accumulated a certain growth potential, more precisely, the potential to slow down population decline, which is why the population of Georgia is declining at a slower pace. Currently, small generations born after the second half of the 1990s of the last century are entering reproductive age; in the near future, this potential will be exhausted, and the natural decline of the population will increase.

Conclusion

The decline of fertility to the level of simple reproduction and to a lower value is a global phenomenon, and at the end of the 21st century, all countries in the world will face this problem.

In the near future, an increase in fertility is not expected in Georgia since the generation of women born in the second half of the 1990s, when fertility dropped sharply, entered childbearing age.

In the total number of births since 2020, there has been a mass postponement of children of the first order.

86.7% of the population will provide for the following generation in 2022, according to the total fertility rate value.

The analysis of the gross growth potential, net, and true coefficients of reproduction showed that the situation in the field of fertility is expected to worsen in the future.

It is likely that the coronavirus pandemic will not radically change the trajectory of fertility. This does not exclude the acceleration or deceleration of existing trends by the pandemic.

Under existing unstable economic conditions and in a situation of decreasing numbers of women of reproductive age, without the active support of families from the state, fertility will decline even more.

To alleviate the expected situation, at the level of state policy, value orientations in society should be changed. State priorities should be related not only to the momentary interests of the country but also to the continuity of generations and the transmission of values from one generation to another.

Special attention should be given to the formation of the needs of the third and subsequent generations of children in Georgian society. It is necessary to carry out work in a sociocultural, religious, and moral direction. This work should be supported by the media and public organizations. Of course, such work should also be carried out through state administrative institutions.

The 2016 vote by the Georgian Parliament to approve the concept of demographic security calls for revision in light of current circumstances.

The way that Georgia has to go out of the narrow reproduction regime zone is still very long and less realistic in the near future.

Competing interests

The author declares that there are no competing interests.

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