

REPRODUCTIVE BEHAVIOR OF THE RA POPULATION IN MODERN CONDITIONS

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Abstract

The relevance of the article is determined by the importance of the modern demographic policy, which is a necessary and important element of the general policy implemented by the state.

The demographic policy represents an integral part of the socio-economic policy of the state. The policy is being implemented when the task is to make an influence on the demographic development.

The principal peculiarity of the demographic policy is that the system of these measures affects the dynamics of demographic processes not directly, but indirectly, as a result of which married couples decide whether to have or not to have a certain number of children.

The new model of demographic behavior, which is the decline in the global fertility rates or regulation, is becoming more and more relevant.

The demographic behavior, which includes decisions related to fertility, mortality, marriages, divorces, migration, and family formation is being formed not only under the influence of the biological, but also the socio-economic, the cultural, the psychological and the political factors. The study of demographic behavior is especially relevant in the countries, which are facing demographic challenges, such as the Republic of Armenia. The determinants of the demographic behavior are the matrimonial behavior, reproductive, self-defense, and migratory behaviors.

In this article an attempt to combine the quantitative and the qualitative data, in order to fully present the multifaceted nature of demographic behavior as a specific reproductive behavior was made.

Keywords: Demographic policy, reproductive behavior, total fertility rate, ideal, desired and expected numbers of children, factor analysis, correlation analysis.

The demographic behavior represents a system of actions and relationships, which mediates the birth of a child or the refusal to give birth to a child. The demographic behavior is related to with the conception, the pregnancy development, the childbirth, as well as the family planning. It is characterized by birth rates (the birth intensity and the birth schedule) and by the attitude towards artificial abortions and the use of contraceptives for birth planning purposes[8].

Many factors influence the demographic behavior of the population, among which are: the national and religious composition, the material well-being, the level of urbanization of the place of residence, etc.[7]. In order to evaluate the quantitative and qualitative demographic characteristics of the population there are

many indicators that exist, of which the Total Fertility Rate (TFR) per woman is used quite often. The value of this indicator does not depend on the age composition of the population, because it describes the average number of children to whom one woman will give birth in her childbearing years provided that the fertility rate of a given year is maintained throughout life.

For simple reproduction of the number of the population it is necessary for the fertility rate of the woman to be around 2.15. In Armenia since 1990 this coefficient rapidly decreased from the critical value, reaching its critical low value in 2002 in urban and rural areas, making up to 1.18 and 1.27 respectively.

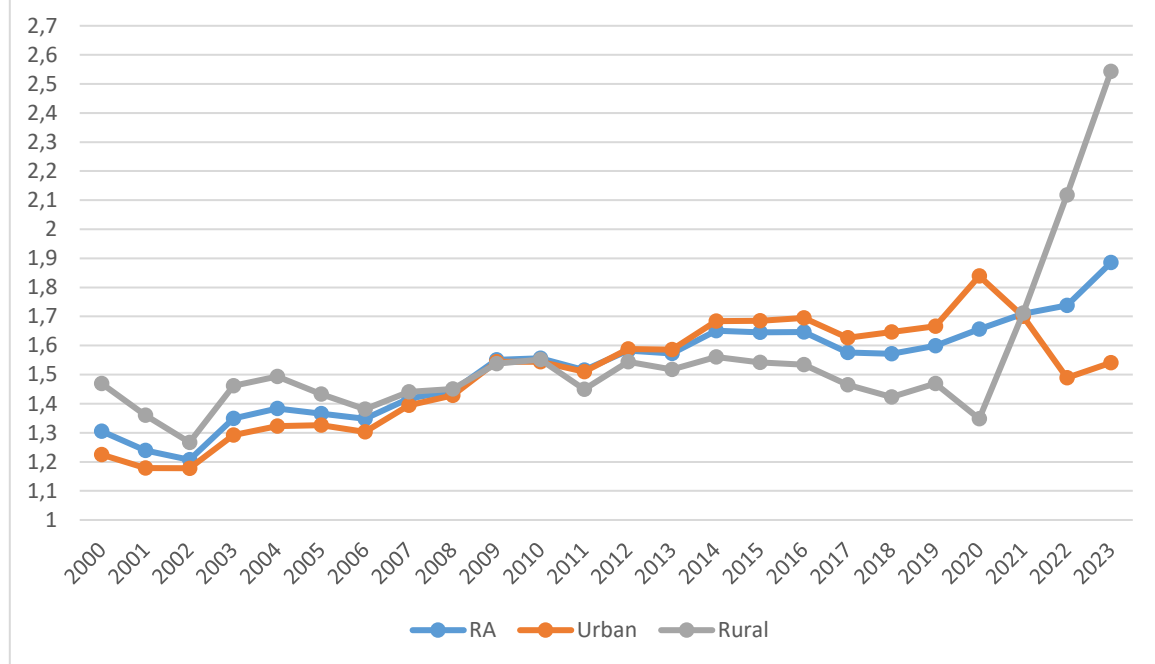


Figure 1. The dynamics of the total fertility rate in the Republic of Armenia, in the context of urban /rural, during 2000-2023, ‰ [4, p. 75]

It is evident that the birth rate begins to decline not when the next "demographic wave" arrives, but when the TFR decreases. Despite the fact that the TFR began to grow at a slow rate since 2005, which was due to the fact that those people, who were born in the 1980s entered reproductive age, anyway the value of the coefficient did not reach the level of 1990, more precisely 2.3 in the city and 3.2 in the village. After the 44-day war and the pandemic, a tendency of the increase of the value of the coefficient was observed in the republic, reaching 2.54 in rural areas and 1.54 in urban areas.

The biological prerequisites of the reproductive behavior of the population in the Republic of Armenia determine the changes in the age composition.

During the observed period the growth of the share of the youth in the total number of the population is associated with the implementation of the population born in the 1980s and will have a short-term effect. A decrease in the number of this cohort is predicted in the near future, which will lead to the changes in the other

age groups. The decrease of the birth rate from now on will lead to a decrease in the population of working-age, the growth of the share of the population of retirement age and as result to an increase in the workload of the population of working-age.

During 2000-2023, an increase in the share of the population above working age was observed both in the Republic of Armenia in general and in urban and rural areas by 5.05, 7.09, 1.54 percentage points, respectively, and a decrease in the share of the population below working age by 6.49, 5.51, 7.06 percentage points, respectively.

According to the calculations of the experts, the age structure of the population that ensures the principle of generational replacement should be as follows: the share of the population below working age should be 33% of the population, those of working age should be more than 57%, and those above that age should be no more than 10%.

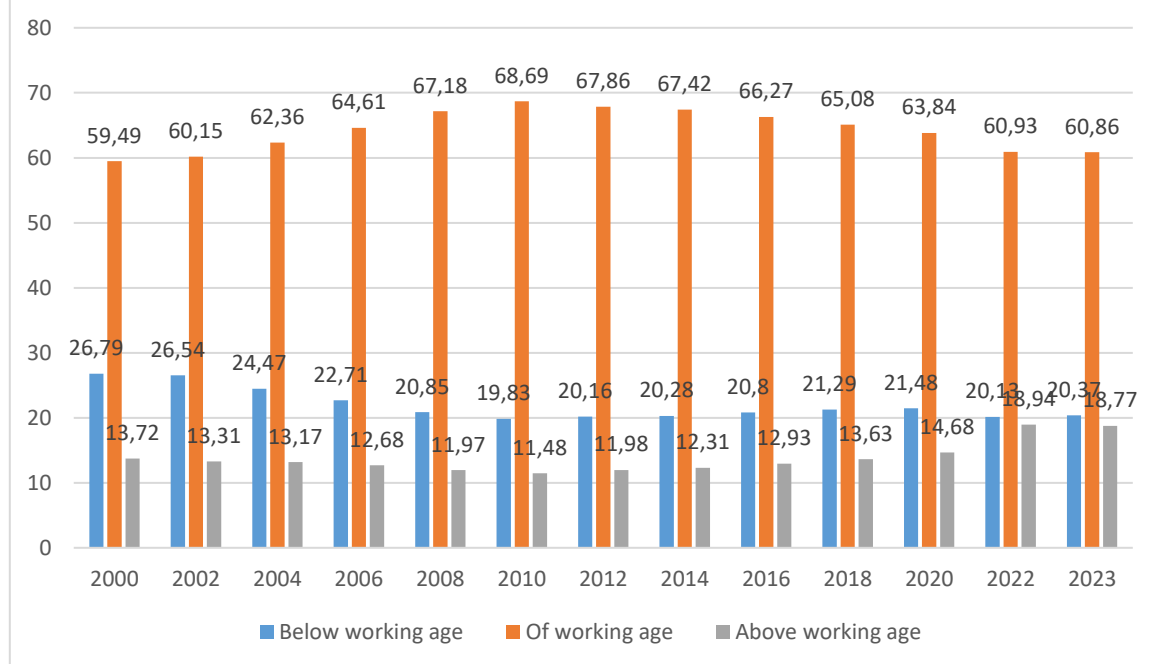


Figure 2. The age structure of the population in the Republic of Armenia during 2000-2023, % [1, pp. 32-34, 2, p. 29, 3, pp. 27-28]

Nowadays, the abovementioned proportions, except the working age, are deviated both in urban and rural areas. The severity of the changes taking place must be noted specifically in terms of the fact that rural areas are also included in the process of demographic changes. The current situation indicates that the reproduction of the rural population is almost similar to that of the urban population, which in turn contributes to the

reduction of the reproductive capabilities of the rural population.

The reproductive potential of the population of any territory mainly depends on the number of women of reproductive age (15-49 years old) and fertility activity. In order to analyze in details, the age characteristics of women of fertile age in the Republic of Armenia, it is proposed to separate and observe the following age groups.

Table 1

The age structure of women of childbearing (fertile) age in the Republic of Armenia, % [4, p. 47]

Age	1990	2000	2010	2023
15-19	15,6	17,0	15,1	11,9
20-24	16,1	14,6	17,2	11,4
25-29	19,2	13,3	16,1	13,0
30-34	18,5	13,1	13,6	17,2
35-39	14,0	15,4	11,6	17,2
40-44	9,4	15,2	11,6	15,8
45-49	7,2	11,4	14,7	13,6

Thus, in 2023 compared to 1990, the share of women of the early reproductive age group (15-19 years old) decreased by 24% or 3.7 percentage points. The low share of this cohort is currently one of the most important factors that may lead to a reduction in the demographically active population group in the future. At the same time, a significant decrease is noticed in the

share of women in the 20-24 and 25-29 age groups, which determine the main indicators of the reproduction of the population, by 29.2 (or 4.7 percentage points) and 32.3% (or 4.7 percentage points) respectively. Nowadays, the shares of these cohorts are quite close to each other.

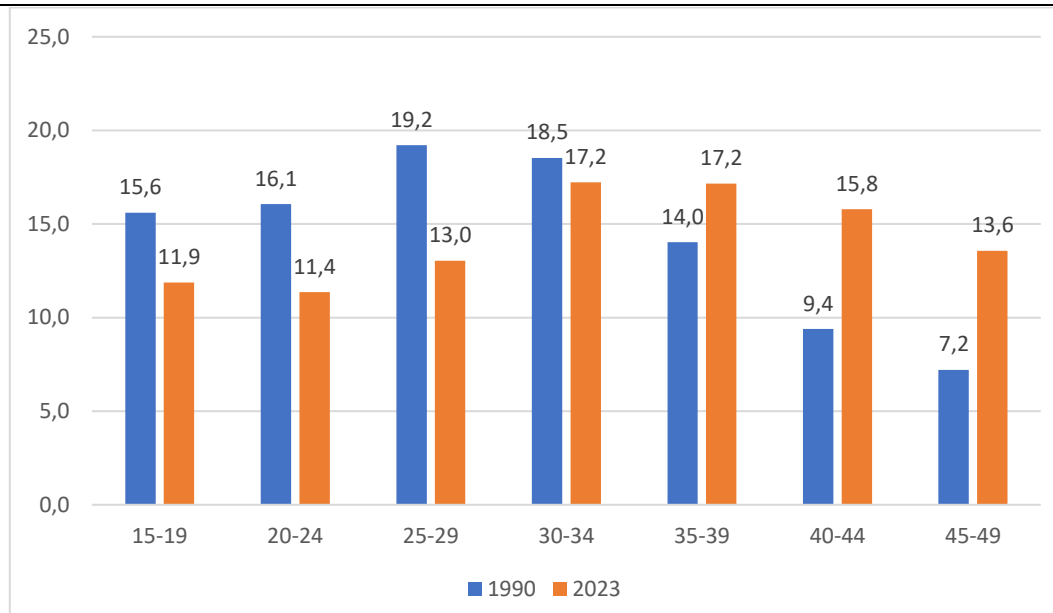


Figure 3. The age structure of women of childbearing (fertile) age in the Republic of Armenia, %[5]

In 2023 compared to 2000 the share of women in the 30-34 and 35-39 age groups has also increased significantly, by around 31.3 and 11.7%, respectively. This means that the 20-29 age group is gradually giving its way to the 30-39 age group. The share of women in the 40-44 age group increased by only 3.9% compared to 2000, and by 68.1% compared to 1990. The share of the 45-49 age group increased by 19.3 and 88.9%, respectively. As we can see, a significant increase in fertility rates was recorded, especially among women over 40.

The quantitative changes in the age structure of women found their reflection in the reproductive processes that are taking place.

It is a noteworthy fact that at the end of the last century, the main demographic burden fell on women in the 25-34 age group, and nowadays it is borne by women in the 30-39 age group.

The structure of reproductive behavior can be represented with the help of psychological components: the reproductive need, attitude, motivations, interest, plan, decision, results of action.

The main external indicators of reproductive attitudes are the ideal, desired and expected (planned) average numbers of children.[9,10].

The ideal average number of children reflects the perceptions of the respondent about the optimal number of children in families in general, but does not imply that this number should coincide with the number of children he or she actually has.

The number of children the respondent wants to have, in case when there are no obstacles for a realization of his or her intentions envisages to reveal the question of the **desired number of children**. The researchers formulate the question in such a way that it

does not express any dependence on environmental conditions.

And finally, **the average expected (or planned) number of children** express the realistic reproductive plans for families and individuals based on their level of the vital sustenance and the competition between reproductive and other intentions in life.

The formation of reproductive attitudes begins at an early age and throughout the lifetime of a generation remains mainly unchanged, having only minor changes. For this reason, the value of the indicator of the desired average number of children is less sensitive to the changes in social status than the anticipated average number of children. It more accurately describes the demographic behavior of families than the actual value of the indicator of children.

In March-April of 2025 a survey on the ideal, desired and expected number of children was conducted among women and men. 220 people participated in the survey.

In order to understand the perceptions of the respondents on the ideal size of the family, they were asked the following question: "In your opinion, what should be the ideal number of children in a family?", without taking into account the fact, whether respondents have children or not.

The majority of the respondents, the 39.5%, considers to be ideal having three children. The next largest share making up to the 28.6% fell on those, who find two children is the ideal number of children in a family. Only 1.4% of respondents said that the absence of children in the family or one child is ideal. As for women and men, the 38.9% and 41.4% of them, respectively, answered that three children is ideal, while 2% of women said that no children is ideal.

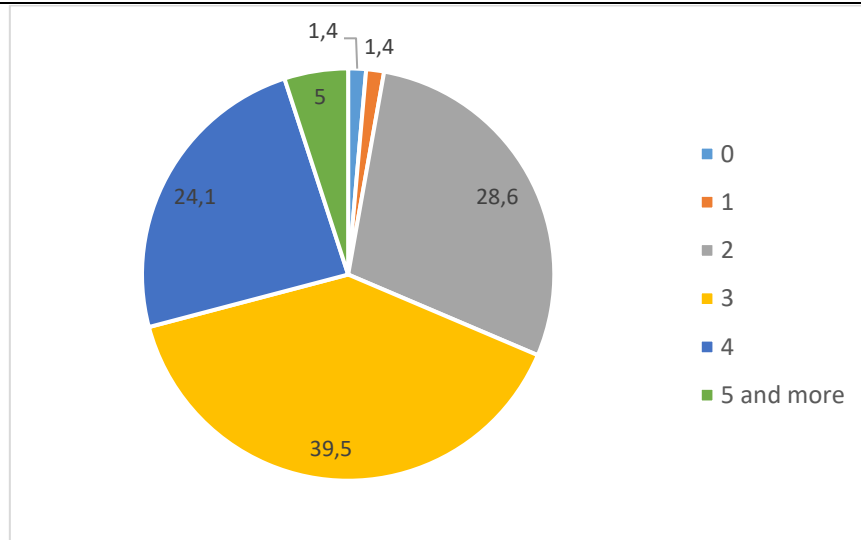


Figure 4. Distribution of respondents by ideal number of children,%¹

Table 2

The distribution of women and men aged 15-49 according to the ideal number of children, %

Number of children	Total	Including:	
		Men	Women
0	1,4	1,9	0
1	1,4	1,2	1,7
2	28,6	30,9	22,4
3	39,5	38,9	41,4
4	24,1	24,7	22,4
5 and more	5	2,5	12,1
The average desired number of children	2,880	2,854	2,961

The 30.9% of women consider 2 children to be the ideal number. The 14.7% of women consider 4 children to be the ideal number, the 2.5% consider 5 or more children, and only 1.2% consider 1 child.

Overall, the average ideal number of children for women formed 2,854. Among men, the 22.4% mentioned that 2 to 4 children is ideal, and the 12.1% - 5 or

more children. None of the men who participated in the survey said that it is ideal, when there are no children in the family. Overall, the average ideal number of children for men was 2,961, which is not much different from the average ideal number of children for women.

Table 3

The average ideal number of children according to the sex and age, %

Age	Total	Including:	
		Women	Men
15-19	2,52	2,42	3,00
20-24	2,83	2,82	2,87
25-29	2,95	2,73	3,25
30-34	3,00	3,14	2,67
35-39	2,90	2,81	3,25
40-44	3,55	3,50	3,67
45-49	3,11	3,50	2,33

According to the results of the survey, women aged 15-19 consider the average ideal number of children to be around 2 children, and women aged 45-49 consider to be about 3 children. On average, men

aged 15-19 consider the ideal number to be 3 children, and men aged 45-49 to be around 2 children.

Respondents were also asked the question "How many children do you want to have?" in order to find out how many children they want to have.

¹ The table was compiled by the author based on the results of a personal survey.

Table 4

The distribution of women and men aged 15-49 according to the desired number of children, %

The number of children	Total	Including:	
		Women	Men
0	4,5	6,2	0
1	6,8	6,8	6,9
2	34,1	36,4	27,6
3	35,9	33,3	43,1
4	14,1	13,6	15,5
5 and more	4,5	3,7	6,9
The average desired number of children	2,505	2,414	2,722

Most women desire to have 2 or more children. The 36.4% of them said they wanted to have 2 children, and the 33.3% said they wanted to have 3. The 13.6% of women reported the desire to have 4 children, and only 3.7% reported the desire to have 5 or more children. Overall, the average desired number of children for women is 2,414. Men, unlike women, want to have

a larger number of children. The 43.1% of them mentioned that they want to have 3 children, the 27.6% - 2, the 15.5% - 4, and the 6.9% - 5 or more children. None of the men participated in the survey said they desire to have no children, but the 6.2% of women reported it. Overall, the average desired number of children for men was 2,722, which is higher than the average desired number of children for women.

Table 5

The average desired number of children according to the gender and age, %

Age	Total	Including:	
		Women	Men
15-19	2,05	1,89	2,75
20-24	2,51	2,44	2,70
25-29	2,58	2,36	2,88
30-34	2,58	2,62	2,50
35-39	2,55	2,50	2,75
40-44	2,83	2,75	3
45-49	2,62	2,63	2,60

According to the results of the survey, the average desired number of children for women aged 15-19 is 1.89, and for women aged 45-49 is 2.63. For men of the same age, the value of this indicator is 2.75 and 2.60.

In order to find out about the expected number of children, respondents were asked the following question: "How many children do you expect to have?"

The majority of women expect to have 2 or more children. The 39.5% of them indicated that they expect to have 2, and 28.4% - 3 children. The 11.1% of women

reported expecting to have 1 child, and only 1.9% - 5 or more children. Overall, the average expected number of children for women was 2,216. Men, unlike women, expect to have more children. The 34.5% of them indicated that they expect to have 3 children, the 32.8% - 2, the 12.1% - 4, and the 6.9% - 5 or more children. The 3.4% of men who participated in the survey indicated that they did not expect to have children, while 10.5% of women reported the same.

Table 6

The distribution of women and men aged 15-49 according to the expected number of children, %

Number of children	Total	Including:	
		Women	Men
0	8,6	10,5	3,4
1	10,9	11,1	10,3
2	37,7	39,5	32,8
3	30,0	28,4	34,5
4	9,5	8,6	12,1
5 and more	3,2	1,9	6,9
Desired average number of children	2,216	2,216	2,253

Overall, the average desired number of children for men was 2,253, which is not much different from the average expected number of children for women.

According to the results of the survey, the average expected number of children for women aged 15-19 is

1.83, and for women aged 45-49 is 1.88. For men aged 15-19 the average expected number of children is 2.75 and 2.00 for men aged 45-49, which exceeds the average expected number of children for women in both age groups.

Table 7

The average expected number of children according to the sex and age, %

Age	Total	Including:	
		Women	Men
15-19	2,00	1,83	2,75
20-24	2,37	2,28	2,67
25-29	2,42	2,27	2,63
30-34	2,10	2,21	1,83
35-39	1,90	1,94	1,75
40-44	1,92	1,63	2,50
45-49	1,92	1,88	2,00

To quantitatively assess the impact of various factors on the fertility rate, let's perform a multistep regression analysis [6, p.28]. The composition of fertility factors is presented below.

Table 8

The system of statistical indicators for the study of fertility factors in the population of the Republic of Armenia

Performance indicators	Groups of indicators
Y1	$K_{Total\ fert.}$ – total fertility rate
Factor indicators	Groups of indicators
X1	The population density, people/sq. km
X2	The share of urban population in the total population, %
X3	The birth rate, per thousand, per 1000 population
X4	The marriage rate, per thousand, per 1000 population
X5	The infant mortality rate, per thousand
X6	The age-specific fertility rates for the age group of 20-24, per thousand
X7	The age-specific fertility rates for the age group of 25-29
X8	The proportion of women in the age group of 20-24 in the total number of women in the age group of 15-49 (of fertile age)
X9	The proportion of women in the age group of 29 in the total number of women in the age group of 15-49
X10	The life expectancy for women, years
X11	The life expectancy for men, years
X12	The female educational level, %
X13	The sex ratio (boys/girls, per 100 women)
X14	The share of population of working-age, %
X15	The share of the population above working age, %
X16	The GDP per capita, Armenian drams
X17	The unemployment rate among the economically active population, %
X18	The consumer spending per capita in household, average monthly, Armenian drams
X19	The average monthly nominal salary of employees, drams
X20	The share of food spending per capita in household in the consumer expenditure, %
X21	The poverty rate, %
X22	The provision of housing area per capita, m ²
X23	The enrollment of children in preschool institutions to the number of children of the corresponding age, %
X24	The population coverage by doctors, per 10,000 population, people
X25	The availability of the hospital beds for the population of the fertile age, per 10,000 population, units
X26	The average number of medical personnel per 10,000 population, people
X27	The atmospheric emissions per 1000 inhabitants, thousand tons
X28	The fresh water use, million m ³

Before performing the factor analysis, the factors between which there was a multicollinearity ($r_{x_i x_j} > 0,8$) and factors that had a weak correlation with the

outcome variable ($r_{xy} < 0,7$) were excluded from the correlation table. As a result, the following factors were extracted: X1, X2, X4, X8, X9, X11, X13, X14, X15.

Table 9

Total Variance Explained²

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12,579	66,208	66,208	12,579	66,208	66,208	11,942	62,855	62,855
2	2,935	15,449	81,656	2,935	15,449	81,656	2,413	12,702	75,557
3	1,006	5,296	86,952	1,006	5,296	86,952	2,165	11,396	86,952
4	,797	4,193	91,146						
5	,489	2,573	93,718						
6	,448	2,357	96,075						
7	,241	1,269	97,344						
8	,157	,828	98,172						
9	,148	,777	98,949						
10	,079	,418	99,367						
11	,044	,234	99,601						
12	,034	,180	99,781						
13	,022	,113	99,895						
14	,009	,049	99,943						
15	,005	,026	99,970						
16	,003	,016	99,986						
17	,002	,008	99,994						
18	,001	,004	99,998						
19	,000	,002	100,000						

As a result of the factor analysis, the 19 factors that were observed were grouped into 3 groups, of which the first group explains 62.855%, the two groups together explain 75.557%, and the three groups together explain 86.952% of the variation in Y (the total fertility rate).

With the next step it is important to examine the inverse matrix table of factorial coefficients, according to which, out of the 19 considered variables, 5 have a strong correlation with the first factor: the birth rate per 1,000 population (0.761), the infant mortality rate (-0.910), the age-specific fertility rates for the age group of 20-24 (-0.672), the age-specific fertility rates for the age group of 25-29 (0.912), and the life expectancy for women (0.917), with the second factor: the female educational level (0.985), the share of food spending per

capita in household in the consumer expenditure (-0.919), the poverty level (0.658), the provision of housing area per capita (0.955), the enrollment of children in preschool institutions to the number of children of the corresponding age (0.897), the population coverage by doctors (0.913), the availability of hospital beds for the population of the fertile age (-0.915), the average number of medical personnel (0.851), the atmospheric emissions per 1,000 population (0.890), and the fresh water use (-0.536), and with the third factor: the GDP per capita (0.924), the unemployment rate among the economically active population (0.668), the consumer spending per capita in household, (0.967) and the average monthly nominal salary of employees, drams (0.965).

² The table was generated using IBM SPSS software.

Rotated Component Matrix³

	Component		
	1	2	3
X3	,761	,376	,451
X5	-,910	,258	-,130
X6	-,672	,403	,329
X7	,912	-,165	,298
X10	,917	-,189	-,039
X12	-,048	,985	,100
X16	,013	-,336	,924
X17	,366	,387	,668
X18	,098	-,203	,967
X19	,056	-,192	,965
X20	,089	-,919	-,596
X21	-,421	,658	,104
X22	-,081	,955	,239
X23	-,223	,897	,177
X24	-,188	,913	,183
X25	-,172	-,915	,235
X26	-,023	,851	,001
X27	,301	,890	,149
X28	,509	-,536	-,427

Based on the above-mentioned characteristics of the factors, we have named the first factor "demographic," the second factor "social," and the third factor "economic."

Based on these results, let's perform a regression analysis with the created three factors. For this purpose, a null hypothesis is formulated, according to which there is no linear relationship between the factor and the

outcome variables. And as an alternative hypothesis, the view is accepted that at least one factor variable is linearly related to the outcome variable, which means that the linear model corresponds to reality.

$$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$$

$$H_1 : \beta_1 = \beta_2 = \beta_3 \neq 0$$

Table 11

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	586877,020	3	195625,673	66,387	.000 ^b
Residual	58934,938	20	2946,747		
Total	645811,958	23			

Setting the significance level, where $\alpha=0.05$, we see that the Sig. is smaller than that, and the F-value is quite large (66.387). This indicates that the model is significant.

The high values of the correlation and determination coefficients indicate that the factors

included in the model significantly affect the outcome variable. That means that the 90.9% of the variation in the total fertility rate is due to factors included in the model, and 9.1% is due to factors outside the model.

³ The table was generated using IBM SPSS software.

Table 12

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.953 ^a	.909	.895	54,284

According to Table 13, the factors of the second group, named “social group”, are not significant (Sig.=0.084>0.05), therefore we remove them from the model. However, it should be mentioned that each of

them separately has a strong relationship with Y, simply they have a greater impact on the fertility rate in the long-term dynamics, which is why it was considered not significant.

Table 13

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1521,458	11,081		137,308	,000
	REGR factor score 1 for analysis 1	153,676	11,319	,917	13,577	,000
	REGR factor score 2 for analysis 1	-20,568	11,319	-,123	-1,817	,084
	REGR factor score 3 for analysis 1	38,434	11,319	,229	3,395	,003

Based on Table 13, we can construct the regression equation:

$$\hat{Y} = 1521,458 + 153,676x_{demographic} + 38,434x_{economic} \\ R^2 = 0,909$$

Since in the group of factors that we obtained there are indexes which have different measurements, it would be correct to interpret the results of the equation as follows: demographic factors have a greater impact on “Y” than the economic factors, and the social factors, as we have already mentioned above, are not significant.

In order to determine the quality of our model and the presence of autocorrelation, we shall use the Durbin-Watson criterion. In our case, it is equal to 2.21, which is greater than 2, which means that the positive autocorrelation is absent. Its lowest (d_L) and highest (d_U) tabular values of $n=24$, $k=2$ and $\alpha=0.05$ are equal to 1.188 and 1.546.

In order to conduct in-depth analysis and forecasts of fertility rates, we shall use the smoothing analytical method. The figure 5 represents the dynamics of the total fertility rate by years, using different trending models: linear, logarithmic, and second-order parabolic.

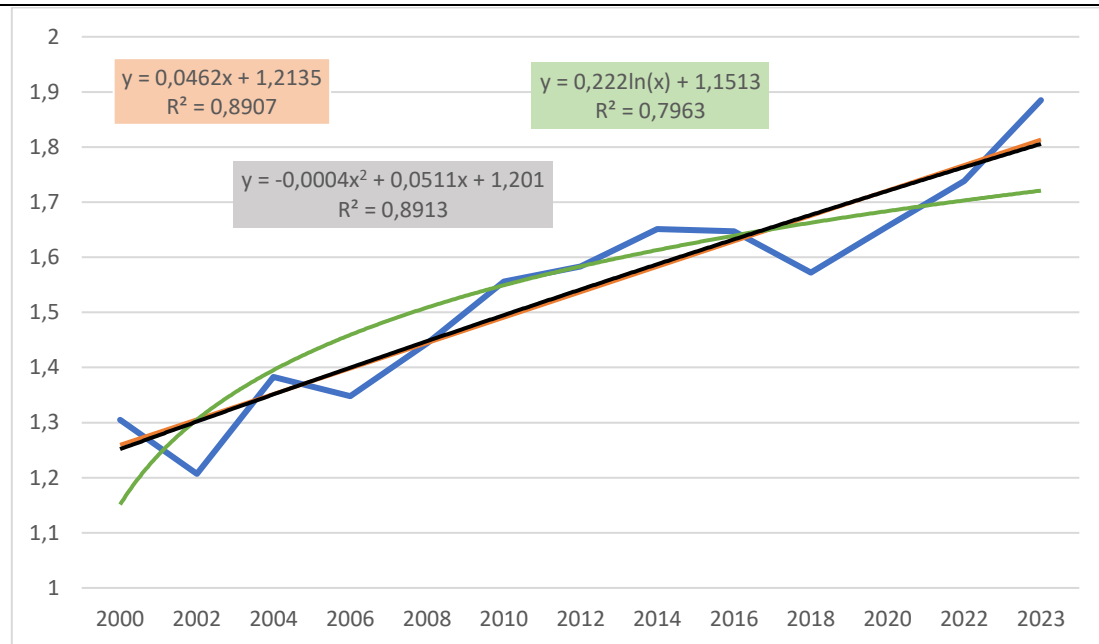


Figure 5. The different types of trends of the dynamics of the total fertility rate, during 2000-2023 ⁴

For each model, with the use of the Excel program the corresponding equations and coefficients of determination were obtained, which allow to evaluate the correspondence of the selected models to the real data.

Based on the following equations and taking into account the regularity of the dynamics and the values of the coefficients of determination of the total fertility rate, it is preferable take a second-order parabolic function as the trend equation.

$$Y = -0,0004x^2 + 0,0511x + 1,201$$

$$R^2 = 0,8913$$

One of the most popular approaches to evaluate the presence of autocorrelation is the method developed by Durbin-Watson. The obtained indicator is compared with the defined critical values, based on which it is evaluated whether it is possible to accept the hypothesis of the absence of autocorrelation in the e_t residuals or not. As a result of the calculations, we obtained 1.264.

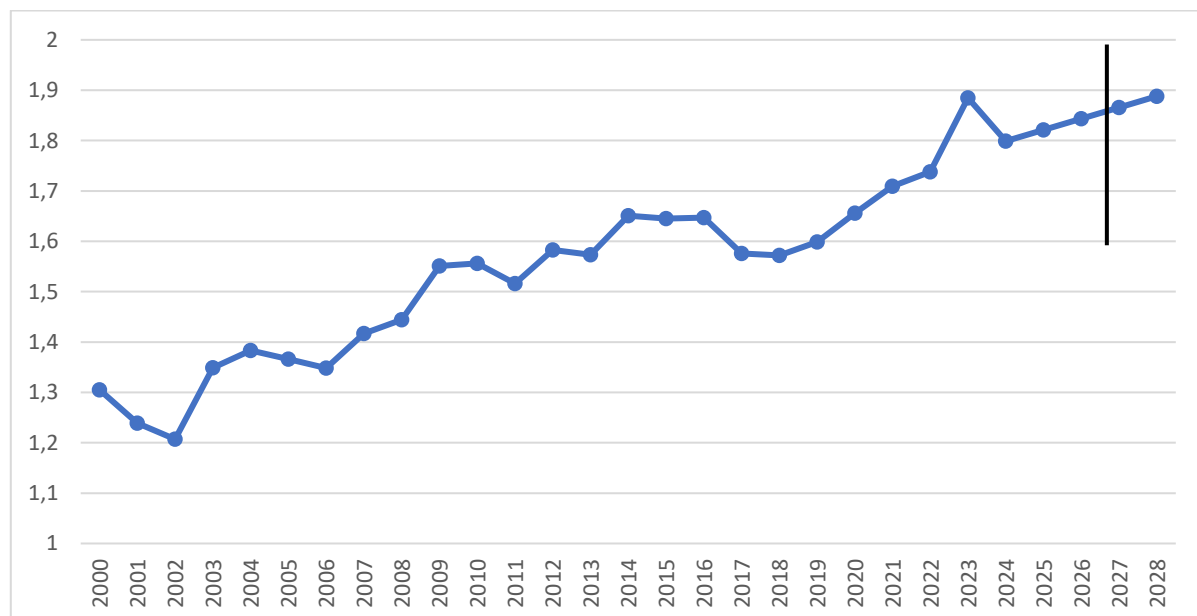


Figure 6. The total fertility rate forecast, during 2024-2028

From the forecast results it is visible that the total fertility rate has a tendency to grow.

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⁴ The chart was created by the author using MS Excel.

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