

ANALYSIS OF FACTORS AFFECTING THE MARRIAGE RATE IN ARMENIA USING THE REGRESSION METHOD

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Abstract

The purpose of this article is to present and analyze the fundamental components of the demographic situation in the Republic of Armenia, as defined by the main indicators of marriages and divorces. It should be noted that the institution of marriage serves as an important indicator not only of social but also of economic and demographic processes; therefore, an adequate analysis is possible only within the framework of multifactorial observation. The article presents an empirical study of socio-economic and demographic factors influencing the dynamics of marriages, using regression analysis methods. As a result of the analysis, factors that have a statistically significant impact on the formation of the marriage rate were identified. At the same time, a forecast of the number of marriages and divorces for 2024–2027 was developed, allowing for an assessment of possible future developments and trends. The Durbin–Watson test was applied to detect autocorrelation in the time series, leading to the identification of the main patterns and trends.

The findings of the study can serve as a basis for developing policies aimed at strengthening the institution of marriage and family, as well as for improving demographic forecasting.

Keywords: marriage, divorce, regression analysis, prediction, Durbin-Watson criterion, socioeconomic factors, demographic factors.

In modern socio-economic conditions, the study of demographic processes—particularly the analysis of the dynamics of marriages and divorces—plays an important role in ensuring the sustainable development of society. The trends observed in Armenia and worldwide in recent years—such as delayed marriage, the spread of cohabitation, emigration, declining youth employment, and income inequality—are transforming the structure and value system of the traditional family. These changes may have a long-term impact on the country's demographic situation and fertility rate [7,8]. Marriage is a legally recognized, free, and voluntary union between a man and a woman, the purpose of which is the creation of a family, and which establishes mutual personal and property rights and obligations. Under the conditions of socio-economic development in modern society, the statistical assessment of marriage and divorce rates is particularly important, as they are among the key indicators characterizing the demographic situation of a country [5].

Under current conditions, a comprehensive study of the factors influencing the number of marriages, based on statistical and econometric methods, is becoming increasingly relevant. The use of regression analysis makes it possible not only to assess the direction and strength of factor influence but also to develop

forecasting models for evaluating future trends. The research also includes a forecast of the number of marriages and divorces for the period 2024–2027.

To quantitatively assess the impact of various factors on the number of marriages, regression analysis was applied. The essence of this method lies in the fact that, when including the selected factors in the model, the significance of their impact on the dependent variable and the relevance of the results are evaluated at each stage.

The following factors were selected for the regression analysis:

- Y – marriage rate (‰)
- X_1 – divorce rate (‰)
- X_2 – average life expectancy of men (years)
- X_3 – average life expectancy of women (years)
- X_4 – share of men of marriageable age in the total population of marriageable age (%)
- X_5 – sex ratio coefficient (number of men per 100 women)
- X_6 – share of employed persons in the total labor force (%)
- X_7 – housing provision per resident (square meters)
- X_8 – average monthly nominal salary (AMD)

Table 1

Main indicators characterizing marriages in the population of the RA 2000-2023 [1,2,3]

	Y	X ₁	X ₂	X ₃	X ₄ *	X ₅ *	X ₆ *	X ₇	X ₈
2000	3,4	0,4	70,1	75,8	48,1	92	54,2	17,5	22706
2001	3,8	0,6	70	76,1	48,2	92	52,6	17,7	24483
2002	4,3	0,5	69,8	75,9	48,2	92	56	21	27324
2003	4,8	0,6	69,9	75,8	48,5	92	55,1	21,1	34783
2004	5,3	0,6	70,3	76,4	48,6	93	53	21,7	43445
2005	5,2	0,8	70,3	76,5	48,7	93	53	23,1	52060
2006	5,4	0,9	70	76,4	48,9	93	51,7	23,6	62293
2007	5,8	0,9	70,2	76,6	49	93	50,7	26,2	74227
2008	6	0,9	70,4	76,9	49,1	94	49,8	26,3	87406
2009	6,1	0,9	70,6	77	49,3	94	48,1	26,7	96019
2010	6	1	70,6	77,2	49,4	94	49,6	27,2	102652
2011	6,5	1,1	70,7	77,5	48,4	92	51,4	28,3	108092
2012	6,3	1,1	70,9	77,5	48,4	92	51,9	30,9	140739
2013	6,1	1,2	71,5	77,9	48,5	92	53,2	31,3	146524
2014	6,3	1,5	71,8	78,1	48,4	92	52	31,6	158580
2015	5,9	1,2	71,7	78,2	48,4	91	51	31,5	171615
2016	5,5	1,2	71,6	78,3	48,3	91	50	31,4	174445
2017	5,1	1,3	71,9	78,7	48,2	90	50,1	31,9	177817
2018	5	1,3	72,4	76,1	47,9	90	47,7	31,6	172727
2019	5,3	1,3	73,1	76,7	47,8	89	48,9	32,6	182673
2020	4,1	1,1	68,4	72,9	47,6	89	47,8	33,3	189716
2021	5,8	1,5	67,4	71,6	47,5	89	48,9	33,9	204048
2022	5,7	1,5	71,4	74,9	47,4	89	50,9	35,5	235576
2023	5,5	1,5	74,1	77,8	47,5	90	52,8	36,4	269994

The results of the regression analysis show that the values of the multiple correlation and determination coefficients are quite high ($R = 0.934$, $R^2 = 0.873$), indicating a significant influence of the independent variables included in the model on the marriage rate. The

determination coefficient of the resulting model suggests that 87.3% of the variation in the number of marriages is explained by changes in the factors included in the model. Table 2 presents the results of the analysis of variance and the corresponding F-statistic value, confirming the statistical significance of the model.

Table 2

ANOVA

	df	SS	MS	F	Significance
Regression	8	13,38688	1,67336	12,89548	1.87E-05
Residual	15	1,94645	0,129763		
Total	23	15,33333			

Table 3 presents the estimated regression coefficients, their standard errors, t-statistics, and significance levels [4]. The analysis of the parametric estimation results of the linear regression model shows that

the effects of two factors are statistically significant. Therefore, it is advisable to construct a linear regression model including only factors X_1 and X_7 .

Results of the linear regression model estimation

	<i>Coefficients</i>	<i>Standard error</i>	<i>t-statistic</i>	<i>Significance level</i>
intercept	-34,8521	17,78144	-1,96003	0,068841
X ₁	1,44206	0,764076	2,544519	0,02244
X ₂	0,000118	0,124726	0,00095	0,999255
X ₃	-0,0087	0,119796	-0,07265	0,943044
X ₄	-0,02853	0,657702	-0,04339	0,965967
X ₅	0,358797	0,192086	1,867899	0,081438
X ₆	0,053108	0,061279	0,86665	0,399785
X ₇	0,232343	0,086916	2,673184	0,017367
X ₈	-1,5E-05	7,27E-06	-2,04817	0,058467

By including the obtained estimates in the regression model, we will have the following regression equation:

$$Y = -34,852 + 1,442X_1 + 0,232X_7$$

The results of the obtained regression equation can be interpreted as follows: if the divorce rate increases by 1%, the marriage rate will, on average, increase by 1.44%. Similarly, an increase in the population's living area by 1 square meter per person leads to an average increase of 0.23% in the marriage rate.

For a more in-depth analysis of marriages and divorces, as well as for forecasting purposes, it is necessary to identify trends in the dynamics of the number of marriages and divorces using the analytical smoothing method. Figures 1 and 2 present the linear, logarithmic, and second-order parabolic trend lines, along with their corresponding equations and coefficients of determination, which characterize the dynamics of the number of marriages and divorces.

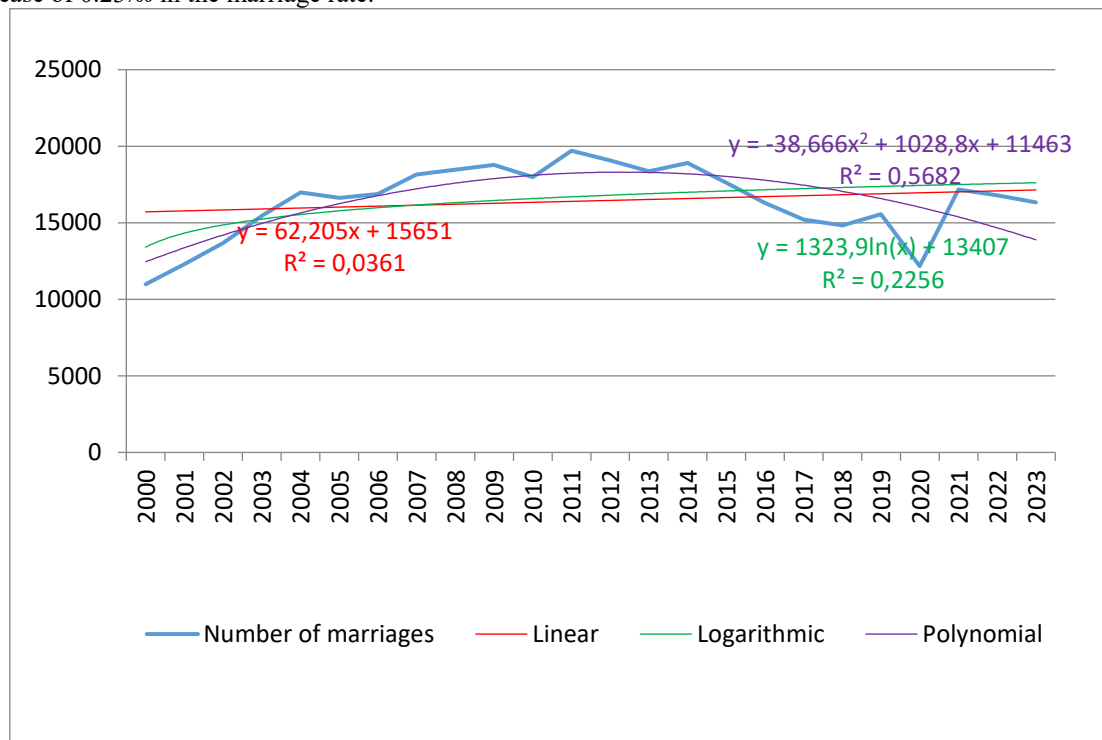


Figure 1. Different types of trends in the dynamics of the number of marriages, 2000-2023.

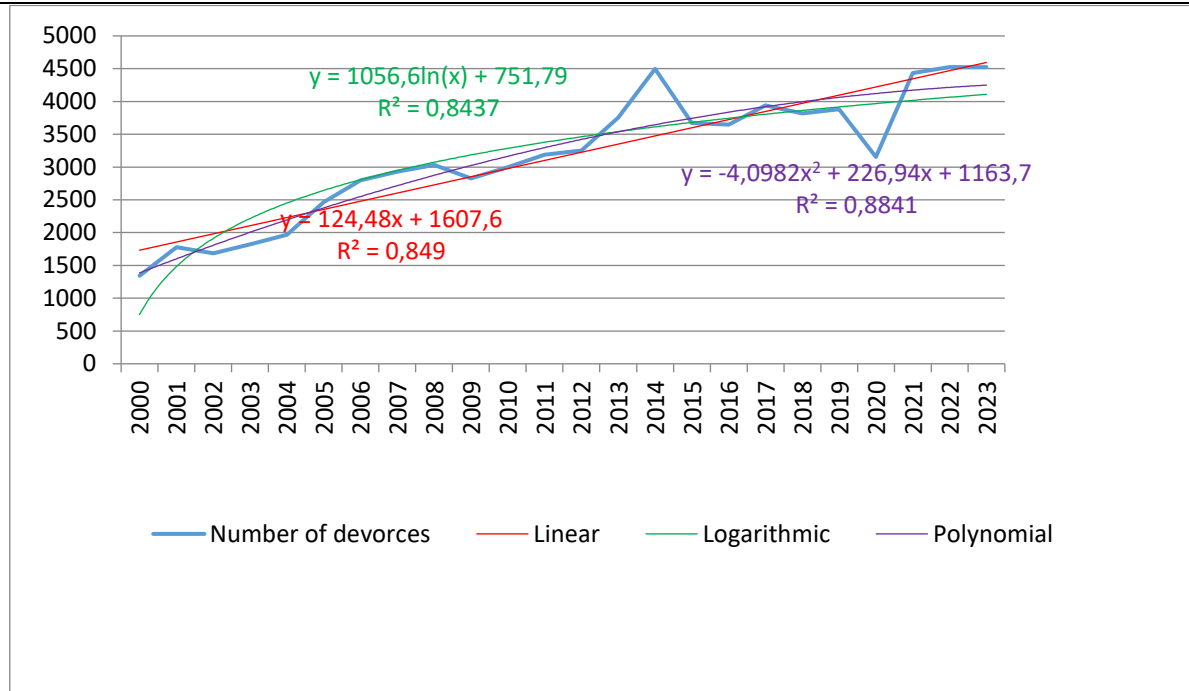


Figure 2. Different types of divorce rate trends, 2000-2023 1

Based on the dynamics of the number of marriages and divorces in the Republic of Armenia, and taking into account the coefficients of determination obtained from the above equations, it is appropriate to select the second-order parabolic function as the trend equation.

For marriages:

$$y = -38,666x^2 + 1028,8x + 11463$$

$$R^2 = 0,5682$$

For divorces:

$$y = -4,0982x^2 + 226,94x + 1163,7$$

$$R^2 = 0,8841$$

If the form of the function is chosen inappropriately, the successive values of the residual series may not exhibit independence, as they can be correlated with one another. In such cases, this phenomenon is referred to as autocorrelation of the residuals.

One of the most commonly used methods for detecting autocorrelation is the Durbin–Watson test. The obtained test statistic is compared with the critical limits determined by the authors of the method, which makes it possible to accept or reject the hypothesis of no autocorrelation in the residual series.

For marriages $DW = 1.90$

For divorces $DW = 1.62$

The obtained values ($DW=1.90$, $DW=1.62$) are compared with the critical limits, which allows us to accept or reject the hypothesis of the absence of autocorrelation in the series of e_t residuals. Let's compare our obtained values with the values $dL=1.046$ and $dU=1.535$. It turns out that the obtained values are greater than the upper limit. Therefore, the hypothesis of the independence of random deviations is not rejected.

Based on the fact that the pattern of development of the phenomenon will be preserved in the future, let's make an extrapolation based on the selected model. The forecast period should not exceed 1/3 or a maximum of 1/2 of the base period. In the case of longer periods, the reliability of the forecast decreases.

The forecast up to 2027 indicates a decreasing trend in the number of marriages and an increasing trend in the number of divorces.

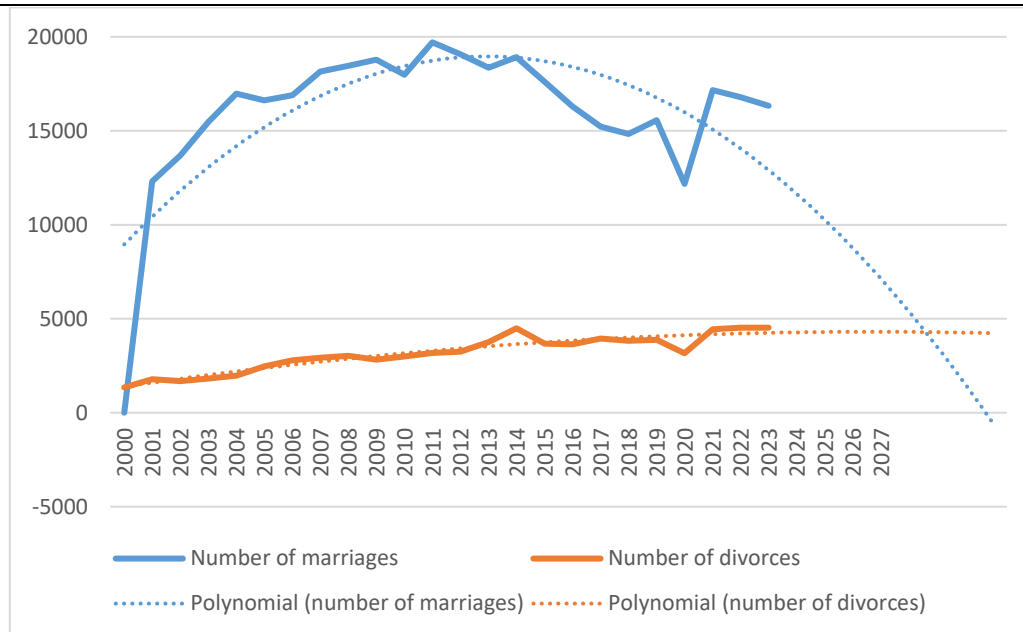


Figure 3. Forecast of the number of marriages and divorces for 2024-2027

The analysis revealed that several socio-economic and demographic factors—particularly the divorce rate and housing availability—have a significant impact on the number of marriages. The use of regression analysis allowed for a quantitative assessment of the strength and direction of these factors' influence, as well as the construction of a forecast model for marriages and divorces for 2024–2027. The forecast results show some fluctuations, but the overall trend indicates that the number of marriages largely depends on socio-economic conditions.

The autocorrelation of the model residuals was examined using the Durbin–Watson test, which confirmed the statistical reliability of the model and the accuracy of the predictions.

Overall, the analysis of marriage dynamics and the identification of influencing factors are important not only for assessing the demographic situation but also for informing social policy [6].

References:

1. Statistical Committee of the Republic of Armenia, Statistical Yearbooks of Armenia, 2000-2024
2. Statistical Committee of the Republic of Armenia, The Demographic Handbooks of Armenia, 2000-2024
3. Statistical Committee of the Republic of Armenia, Women and men of Armenia – 2024
4. A. Ktoyan, S. Khachikyan, M. Movsisyan, K. Hakobyan, Statistical analysis of economic problems using the SPSS package, Yeghegnadzor 2015, 126p.
5. Fahradyan M.V., Regional Problems of Population Structure and Reproduction in the Republic of Armenia, Yerevan 2010, 496 pages
6. Strategy for Improving the Demographic Situation of the Republic of Armenia for 2024-2040, October 17, 2024
7. Allison D., THE DEATH OF DEMOGRAPHICS: Valuegraphic Marketing for a Values-Driven World// 2022, p. 59, <https://oceanofpdf.com/authors/david-allison/pdf-epub-the-death-of-demographics-valuegraphic-marketing-for-a-values-driven-world-download/>
8. Thomas R. K., Demography: An Introduction to Population Studies, Springer Texts in Social Sciences// 2024, https://doi.org/10.1007/978-3-031-56623-3_1