

Research and Analysis on the Current Situation of post-90s Marriage Rate in China

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Abstract. In recent years, based on the Data of the National Bureau of Statistics on the marital status, the marriage rate in China is declining year by year. The change in the marriage rate will bring multiple layers of impact to the society. The decline in marriage rate will lead to a decline in the birth rate and the serious aging of the population. Based on the research data of the *Chinese Statistical Yearbook* on marital status from 2010 to 2020, and the post-90s group is selected as the research object to analyze the relationship between various influencing factors and marriage rates. Through the standardization of data, this paper analyzes the four influencing factors of birth rate, sex ratio, resident consumption level, and number of students in higher education. Linear regression and Pearson correlation analysis between these four aspects and the marriage rate are carried out. The results of the study showed that birth rates, sex ratios, household consumption levels and the number of students enrolled in higher education were significantly correlated with marriage rates. The reasons for the decline in the marriage rate are discussed and provide research significance for solving the problem of current marital status.

Keywords: Post-90s, marriage rate, factor analysis, linear regression.

1. Introduction

In today's social environment, the post-90s generation has gradually entered the year of marriage. With the continuous growth of China's economic level, the continuous improvement of social living standards, and the popularization of higher education, people's concept of marriage has also changed. However, changes in marriage rates have an impact on both demographics and the labor force. Therefore, the study of the marriage rate of the post-90s is crucial.

In recent years, changes in the marriage rate have attracted widespread attention from society. Zhai et al. use sampling surveys. The factors of population flow, economic and social development and population education level are analyzed. The study found that marriage age was delayed, and divorce and remarriage were increased^[1]. Gobena et al. use the Cox model for the determinants of age at first marriage in Ethiopian women. Studies have shown that residence, work, and education have significant effects on marriage among Ethiopian women^[2]. Zhang found that a lower marriage rate was significantly associated with economics. The economic gap in the various regions has greatly affected the young people's conception of marriage and the pressure of marriage^[3]. Yang found a clear geographic gap in the marriage rate in China. Economic level is inversely proportional to the decline in the marriage rate and the number of marriageable groups^[4]. Chu and Liu used China's heating policy to investigate how non-labor income affects marriage. Non-labor income can promote marriage^[5]. Zheng analyzed the three aspects of income level, education level and marital pressure, which are inseparable from the continuous decline in marriage rate^[6]. What people use the contribution rate of factors to compare the contribution degree of different regions (city, town, countryside) to the overall late marriage of our population. Research found that the largest contribution rate to late marriage is in urban areas^[7]. Zhu and Zhao established the IV-Tobit model, and based on the Cox and IV-Tobit models, estimated that higher education had a significant impact

on the age of first marriage [8]. Jiang found that the sex ratio was positively correlated with the proportion of unmarried males and negatively correlated with the proportion of unmarried females [9]. Jia et al. conducted a sample survey of in-service young people in Nanjing, Jiangsu province and Baoding, Hebei Province from March to May 2014. The study found that gender, age, marital status, education and whether the only child were the most significant factors for the ideal marriage age [10]. Yang et al., by conducting two-stage least squares estimation, found that access to education was positively correlated with the age of first marriage for residents [11].

Most of the previous studies were conducted based on sampling surveys. Studies have found the marriage rates to be influenced by multiple factors. Less marriageable number and too high the cost of marriage can bring great pressure to marriage. The influence of gender ratio imbalance and the concept of marriage and childbearing is also obvious. Therefore, this paper will study the post-90s related data from 2010 to 2020. From the birth ratio, sex ratio, household consumption level, the number of higher education analysis. Dedicated to solving social problems such as lower marriage rates. In this paper, factor analysis and PCA are used to establish multiple linear regression models. The study analyzed the correlation of these four aspects with the marriage rate. Find ways to change it by studying the current situation of the marriage rate. Take practical measures to alleviate it, so that the marriage and childbearing rate will return to a reasonable level. Help China to raise the birth rate, improve the population structure, and promote social development.

2. Methodology

The data in this article is all derived from the China Statistical Yearbook, and then calculated by the following formula.

The marriage rate refers to the ratio of the logarithmic number of marriages in China in one year to the average total population in the same year, multiplied by 1000 %.

$$\text{Marriage} = \frac{\text{Number of marriage registrations}}{\text{Average annual population}} \times 1000\% \quad (1)$$

The birth rate refers to the ratio of the number of people born in China in one year to the average total population in the same year, multiplied by 1000 %.

$$\text{Birth rate} = \frac{\text{Number of births}}{\text{Average annual population}} \times 1000\% \quad (2)$$

The sex ratio is the ratio of the number of boys in the same year to the number of girls in the same year.

$$\text{Sex ratio} = \frac{\text{Number of boys}}{\text{Number of girls}} \quad (3)$$

The level of resident consumption refers to the ratio of the total consumption of Residents in China in the same year to the average total population in the same year.

$$\text{Resident consumption level} = \frac{\text{Total household consumption}}{\text{Average annual population}} \quad (4)$$

The number of students enrolled in higher education refers to the total number of students enrolled in educational institutions such as postgraduate training institutions, general universities and scientific research institutions.

This article analyzes the impact on the marriage rate from four aspects: birth rate, sex ratio, household consumption level, and number of students enrolled in higher education. Since the dimensional difference between variables is large, this paper first standardizes all variables, eliminates the dimensions of all variables, and makes the variables comparable. Second, the correlation analysis is carried out to see the degree of association between the variables and the variables. In this article, Pearson correlation analysis is selected to look at the linear relationship between variables and variables. By establishing a linear regression equation, the relationship

between the dependent variable and the independent variable is analyzed. In this paper, the marriage rate is set as the dependent variable y . The independent variable birth rate is x_1 . The sex ratio is x_2 . The household consumption level is x_3 . The number of students in higher education is x_4 . To establish a linear regression equation:

$$y = \beta_0 + F_0 \quad (5)$$

β_0 is constant. F_0 is the common factor.

In this paper, the independent variables are reduced by factor analysis, and a small number of independent variables are synthesized into a small number of common factors F_0 . Based on the correlation between the arguments and the arguments. Through principal component analysis, orthogonal transformations are used to re-transform variables that may have correlations into a new set of uncorrelated variables. Thus, the relationship between the common factor and the independent variable can be obtained:

$$F_0 = b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 \quad (6)$$

b_1, b_2, b_3, b_4 are partial regression coefficients. x_1, x_2, x_3, x_4 are independent variables.

Finally, a multi-component linear regression equation can be used to derive the relationship between birth rate, sex ratio, household consumption level, number of students in higher education and marriage rate.

$$y = \beta_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 \quad (7)$$

3. Results And Discussion

The data in this paper is based on the China Statistical Yearbook, focusing on the analysis of the current situation of the marriage rate of China's post-90s generation. This article is based on the principle that the legal age of marriage in China is that girls must not be earlier than 20 years old and boys must not be earlier than 22 years old. This article will use the age of 20 as a benchmark to count the number of marriage registrations from 2010 to 2020, and the marriage rate. As can be observed from Figure 1, the marriage rate showed an upward trend from 2010 to 2013, and the growth rate was relatively flat. From 2013 onwards, the marriage rate will show an overall downward trend through 2020. Compared with the growth rate from 2010 to 2013, the decline rate from 2013 to 2020 is faster. From 2013 to 2020, the marriage rate fell for 7 consecutive years. In this regard, this paper will study and analyze its impact on the marriage rate from four aspects: birth rate, sex ratio, resident consumption level, and number of students in higher education. In this paper, the marriage rate is set as the dependent variable y . The independent variable birth rate is x_1 . The sex ratio is x_2 . The household consumption level is x_3 . The number of students in higher education is x_4 .

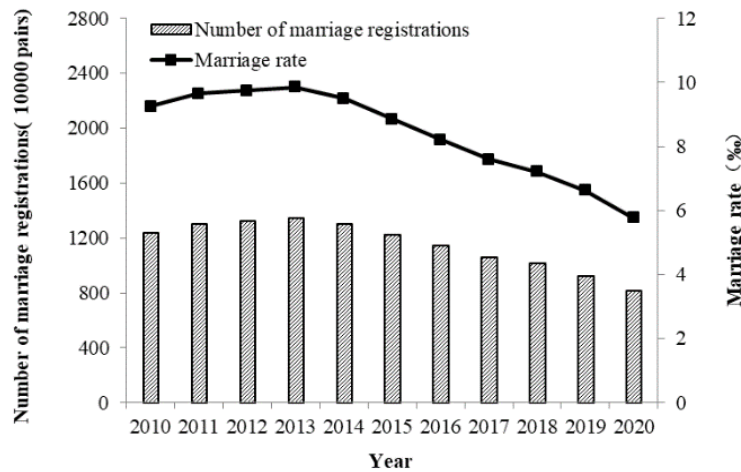


Figure 1. Number of marriages registered and marriage rates from 2010 to 2020.

Table 1. Describes statistics.

| Variable | N | Mean | Median | Minimum | Maximum | Standard deviation |
|------------------------|----|-------|--------|---------|---------|--------------------|
| x_1 (‰) | 11 | 12.24 | 12.64 | 8.52 | 14.57 | 1.76 |
| x_2 | 11 | 1.05 | 1.05 | 1.04 | 1.05 | 0.00 |
| x_3 (thousand yuan) | 11 | 19.36 | 18.86 | 10.58 | 27.50 | 5.92 |
| x_4 (million people) | 11 | 41.76 | 41.40 | 34.17 | 52.23 | 53.14 |
| y (‰) | 11 | 8.38 | 8.85 | 5.77 | 9.85 | 1.41 |

Table 1 shows that sex ratios are the most stable and least dispersed between 2010 and 2020. The data show that the sex ratio has been almost the same for 11 years, and the annual gap is small. The number of students enrolled in higher education is the most dispersed. These data can be interpreted as a large difference between the number of students enrolled in higher education each year.

Table 2. Pearson correlation.

| Variable | | x_1 | x_2 | x_3 | x_4 | y |
|----------|----------------------|----------|----------|----------|----------|----------|
| x_1 | Pearson Correlations | 1 | 0.555 | -0.844** | -0.904** | 0.901** |
| | | - | (0.096) | (0.002) | (0) | (0) |
| x_2 | Pearson Correlations | 0.555 | 1 | -0.806** | -0.644* | 0.712* |
| | | (0.096) | - | (0.005) | (0.044) | (0.021) |
| x_3 | Pearson Correlations | -0.844** | -0.806** | 1 | 0.957** | -0.965** |
| | | (0.002) | (0.005) | - | (0) | (0) |
| x_4 | Pearson Correlations | -0.904** | -0.644* | 0.957** | 1 | -0.944** |
| | | (0) | (0.044) | (0) | - | (0) |
| y | Pearson Correlations | 0.901** | 0.712* | -0.965** | -0.944** | 1 |
| | | (0) | (0.021) | (0) | (0) | - |

After normalizing the data in Table 1, the iterative method eliminates the self-correlation to obtain Table 2. ** indicates that there is a strong significance between the independent variable and the dependent variable. * indicates significance between the independent variable and the dependent variable. Both the ** and * variables indicate a strong correlation between the two quantities. As can be seen from Table 2, the Sig. values of the four arguments are less than 0.05. It can be seen that the four influencing variables are significantly related to the marriage rate and have a linear relationship. That is to say, changes in these four independent variables affect changes in marriage rates. The Pearson correlation coefficients of birth rate and sex ratio were 0.901 and 0.712, respectively, as

positive correlations. This shows that when the birth rate is higher and the sex ratio is higher, the marriage rate also increases, and vice versa. The Pearson correlation coefficients for household consumption levels and the number of students enrolled in higher education were negatively correlated with -0.965 and -0.944, respectively. This shows that when the level of consumption of residents and the number of students receiving higher education are higher, the marriage rate decreases with it.

By calculation, R^2 is 0.970. After adjustment R^2 is 0.947. Standard error of estimate is 0.271. The data show that the birth rate, sex ratio, household consumption level and number of students in higher education can explain the change in the marriage rate by 97%. Thus, a system of multivariate linear equations with high significance can be obtained.

Table 3. Analysis of variance.

| | Model | Square sum | d f | Mean square | F | Sig. |
|---|------------|------------|-----|-------------|--------|-------|
| 1 | Regression | 12.015 | 4 | 3.004 | 40.835 | 0.001 |
| | residual | 0.368 | 5 | 0.074 | | |
| | Total | 12.383 | 9 | | | |

The significance obtained from Table 3 is 0.01. The significance is less than 0.05, indicating a linear relationship between the birth rate, sex ratio, household consumption level, the number of students enrolled in higher education and the marriage rate. This means that on the whole, these 4 independent variables can be linearly fitted with the marriage rate of the dependent variable.

Table 4. Coefficient Analysis.

| Model | Non-standardized | | Standardized | t | Sig. |
|----------------|------------------|-------------------------|--------------|--------|-------|
| | B | Root Mean Squared Error | Beta | | |
| 1 (Constant) | 0.038 | 0.091 | - | 0.418 | 0.693 |
| x ₁ | 0.404 | 0.191 | 0.392 | 2.123 | 0.087 |
| x ₂ | -0.296 | 0.209 | -0.277 | -1.413 | 0.217 |
| x ₃ | -1.581 | 0.568 | -1.456 | -2.784 | 0.039 |
| x ₄ | 0.689 | 0.516 | 0.626 | 1.335 | 0.239 |

As can be seen from Table 4, the significance of the regression coefficients is not all less than 0.05. Therefore, it shows that the birth rate, sex ratio, household consumption level, and the number of students with higher education cannot have a significant impact on the marriage rate, respectively. In this paper, factor analysis is required to analyze the common factors between independent variables.

Table 5. Total variance interpretation.

| Ingredient | Initial eigenvalue | | | Extract the sum of load squares | | |
|------------|--------------------|-----------|-------------|---------------------------------|-----------|-------------|
| | Total | Variance% | Accumulate% | Total | Variance% | Accumulate% |
| 1 | 3.373 | 84.314 | 84.314 | 3.373 | 84.314 | 84.314 |
| 2 | 0.501 | 12.522 | 96.836 | | | |
| 3 | 0.115 | 2.868 | 99.703 | | | |
| 4 | 0.012 | 0.297 | 100 | | | |

Table 5 shows the analysis of the common factors between the independent variables. The first component extracted from it is a common factor of F_0 , and the cumulative contribution rate can reach more than 84%. It can be interpreted as a common factor F_0 that concentrates 84 % of the information of the four original variables. F_0 replaces all arguments.

Table 6. Component matrix A and component scoring coefficient matrix.

| The composition matrix A | | The component score coefficient matrix | |
|--------------------------|--------|--|--------|
| Composition 1 | | Composition 1 | |
| x ₁ | -0.907 | x ₁ | -0.269 |
| x ₂ | -0.808 | x ₂ | -0.24 |
| x ₃ | 0.985 | x ₃ | 0.292 |
| x ₄ | 0.962 | x ₄ | 0.285 |

Note: A indicates that an ingredient was extracted.

Principal component analysis is used to obtain the factor loading matrix as shown in Table 6. From Table 6, it can be concluded that F₀ has a strong correlation with the independent variable, and most of the components are above 0.9. The relationship between the common factor F₀ and the argument is:

$$F_0 = -0.269x_1 - 0.24x_2 + 0.292x_3 + 0.285x_4 \quad (8)$$

A linear regression of the common factor F₀ to y, it is calculated that R² is 0.964. After adjustment R² is 0.929. Standard error of estimate is 0.331. Representing independent variables can explain 93% of the change in the dependent variable, and can obtain a more significant system of linear equations.

Table 7. Analysis of variance for F₀.

| Model | Square sum | d f | Mean square | F | Sig. |
|--------------|------------|-----|-------------|--------|-------|
| 1 Regression | 12.015 | 4 | 3.004 | 40.835 | 0.001 |
| residual | 0.368 | 5 | 0.074 | | |
| Total | 12.383 | 9 | | | |

As obtained from Table 7, the common factor F₀ is 40.835. The significance is 0.001, less than 0.05. The data show that the regression equation is valid and that the independent variable as a whole can be linearly fitted to the dependent variable.

Table 8. The coefficient analysis of F₀ on y.

| Model | Non-standardized | | Standardized | t | Sig. |
|----------------|------------------|-------------------------|--------------|---------|-------|
| | B | Root Mean Squared Error | Beta | | |
| 1 (Constant) | -0.029 | 0.105 | | -0.279 | 0.787 |
| F ₀ | -1.131 | 0.11 | -0.964 | -10.251 | 0 |

From Table 8, it is obtained that the marriage rate is y, which is:

$$y = -0.029 - 1.131F_0 \quad (9)$$

F₀ is a common factor.

Combine (8) the multivariate linear regression equation:

$$y = -0.029 + 0.303x_1 + 0.271x_2 - 0.330x_3 - 0.322x_4 \quad (10)$$

The constant term in this multiple linear regression equation is -0.029.

In summary, through the data research statistics of the *China Statistical Yearbook*, the marriage rate in China showed a small increase from 2010 to 2013, and continued to decline from 2013 to 2020. Based on the above-mentioned research, it is shown that the marriage rate is significantly correlated with the impact of birth rates, sex ratios, household consumption levels and the number of students enrolled in higher education. In recent years, China's birth rate has been declining, and the birth rate is positively correlated with the marriage rate, so the decline in the birth rate will also lead to a decline in the marriage rate. The birth rate and the marriage rate interact with each other and interact with

each other. The sex ratio was positively correlated with the marriage rate, and the trend was the same. In recent years, the level of residents' consumption has been increasing, and the continuous growth of per capita income can be seen from the side. The increase in per capita income has changed people's social mentality, and marriage is no longer regarded as the main goal of life. The higher the level of consumption, the lower people's expectations for marriage will decline, which will lead to a lower marriage rate. The number of students receiving higher education has increased year by year, which reflects the improvement of the education level of the masses in our country from the side. At the same time, it shows that in the environment of higher education, people's ideological level is more open. Therefore, the number of students enrolled in higher education is negatively correlated with the marriage rate, and the more people receiving higher education, the fewer people will marry.

4. Conclusion

In this paper, the data of *China Statistical Yearbook* are studied and counted. China's marriage rate showed a small increase from 2010 to 2013, and continued to decline from 2013 to 2020. The post-90s were studied. The current situation of marriage rate is analyzed from four aspects: birth rate, sex ratio, household consumption level, and the number of students receiving higher education. Studies have found marriage rates to be significantly associated with the impact of these four aspects. The birth rate was positively and marriage rate. The sex ratio was positively associated with the marriage rate. The level of household consumption was inversely associated with the marriage rate. The number of educational students was negatively associated with the marriage rate.

The decline in marriage rate directly affects the future population structure and has a certain negative effect on the policy of encouraging childbirth. If the birth rate continues to decline, it has a negative impact on China's social development. The lack of a large number of people leads to the shortage of labor force, which will naturally affect the economic development and the progress of The Times. So, even for the future of the country's development, the marriage rate needs to be on the rise. Due to the limited availability of data, this paper only analyzes the four aspects of birth rate, sex ratio, household consumption level, and the number of students enrolled in higher education. Other factors affecting the marriage rate could not be analyzed with more detailed data. Therefore, further other factors should be verified and studied. It is hoped that this paper can attract great attention from the government departments and the society. Take practical measures to relieve the pressure of young people, and make the marriage rate return to a reasonable level.

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