The Influence of House Prices on Marriage in China

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Abstract. This Paper studies how house prices influence marriage in China through two perspectives: the age at first marriage and the marriage rate. For the age at first marriage rate, the results indicate that house prices have a significant delay effect on age at first marriage and this effect is also different for males and females, the delay effect will be greater for males. In terms of the marriage rate, house prices have an unexpectedly positive, albeit small, effect on the marriage rate. Examining this effect further by different provinces groups, the house prices have a negative effect on the marriage rate in more developed provinces, while the effect remains positive in developing provinces. Combining these results, this paper clearly shows that house prices are an important factor influencing marriage in China. Hence if the government wants to increase the marriage rate or early marriage age, it would be a good choice to focus on house prices.

Keywords: House Price; Age at First Marriage; Marriage Rate.

1. Introduction

Marriage is one of the most important factors of social well-being, it is highly correlated with population growth [1]. According to the data announced by the National Bureau of Statistics of China, the natural population growth rate in 2022 dropped to a negative value of -0.6‰, this is the first time China faces a negative growth rate of population in 61 years. Referring to Japan, a country with more than 10 years of negative population growth rate [2]. The long-term population stagnancy would drive the aging problem, decreasing the willingness to invest and eventually lowering the economic growth potential [3]. Decreasing fertility rate, marriage squeeze, higher divorce rate, and later marriage age, all these elements of marriage performed main characters on the negative population growth rate [4]. Many literatures studied about what drove marriage into these conditions, and they provided many explanations: higher education level, unbalanced sex ratio, and inequality in the labor market [5, 6, and 7]. Females with higher education levels are respected to put more effort into work, they are more likely to delay their marriage and have fewer children [5]. The son preference tradition and the 'one child policy' aggravate the male-skewed sex ratio in China, and this phenomenon squeezes the marriage market [6]. The inequality in the labor market will decrease the willingness of females to get married, and also raise the impact of wage change on male marriage possibility [7].

In this article, we will focus on a unique influencing factor in China: the rising house price. The property price-to-income ratio for China is 34, compared with developed countries like US, UK, Canada, and Germany with a value less than 10[8]; this high value indicates buying a house in China needs to work triple times that of these developed countries. Many literatures point out that purchasing a house prior to marriage is a typical Chinese social norm, hence the cost of marriage increases with the increasing house price [9, 10]. Young people with no house are discouraged from entering marriage, they will delay their first marriage time and maintain a high saving rate for affording the house. For example, one article using related Chinese data from 2000 through 2005 found that the initial marriage rates declined by 0.31% for a 1% increase in house prices [1]. Another study about the relationship between marriage rate and house price using a threshold regression point out that the marriage rate will decrease with higher house price after the house price exceeds the threshold level [11]. Some scholars are concerned about the implementation of land reform in China after 2002 and find evidence that this policy decreases the probability of marriage by 5.3% [12]. Instead of testing how house price influences marriage, some scholars also discover there is evidence showing the divorce rate can also affect house price [13]. All these literatures provide inspiration about the relationship between marriage and house prices, this article will continue to expand this

idea. This paper will illustrate the relationship between first marriage age and house price at the national level and compare the effect between urban households and rural households. Then using the province-specific data to compare the effect between provinces with different economic levels.

2. Data

The data used for analysis are all panel data collected from the Chinese National Bureau of Statistics, the data are officially displayed, so we are confident in their accuracy. The whole dataset can be separated into two parts: national-level data and provincial-level data. The national-level data were collected for the years 2003-2020; Including average age at first marriage(AFM), average house price(HP), education expenditure of the government, average salary, unemployment rate, consumption level, disposable income per capita, Engel coefficient, the density of population, percentage of tertiary education, sex ratio of age 20-24, and sex ratio of age 25-29. In this part, our main interest is the relationship between the AFM and HP, other variables are selected as control variables related to the AFM. For the AFM we collected data for all populations, as well as the data separated for males and females.

In the second part of analyzing, the paper collected provincial-level data for 31 different provinces. This paper dropped data for some provinces that contain many missing data and kept the other 25 provinces. In the second part, the dependent variable has changed to the marriage rate, which is calculated by the number of people registered for marriage divided by the total population in a year. This change of the dependent variable is not only because the government not providing the AFM at the provincial-level; but also because the paper wants to see more perspective on how HP affects marriage. The AFM and marriage rate are both important factors representing marriage, but they might have different impacts from the changing of HP and provide different perspectives for analysis. The other control variables are education expenditures, average salary, unemployment rate, percentage of tertiary education, and disposable income per capita. Besides analysis using the whole dataset, this paper also separated the data into more developed provinces and relatively poor provinces.

3. Methods and Results

3.1 Age at First Marriage – National-level data

In the first part of the estimation, this paper focused on the relationship between age at first marriage and house price using national-level data. From the starting point, this paper runs an OLS model which specified as following:

$$age\ \ at\ \ first\ \ marriage_t = constant + \beta_1 house\ \ price_t + \beta_2 education\ \ expence_t + \beta_3 average\ \ salary_t + \cdots + \beta_{11} sex\ \ ratio\ \ 25-29_t + \varepsilon_i \quad (1)$$

As mentioned in the Data part, these data were collected from 2003 to 2020. Our main interest is the value for β_1, which will illustrate how house prices affect the age at first marriage. In the estimation, this paper used ln (HP) instead of HP to avoid heteroskedasticity caused by large differences in the values of variables. The β_2-β_{11} measures how the control variables affect the age at first marriage, the control variables are also stated in the Data part before. Many literatures are concerned with the endogeneity problem between AFM and HP [1, 9], so this paper constructs a 2SLS model by using the debt ratio and profitability of the real estate industry as instrumental variables. By performing a Hausman test on the two regression models, the result shows the OLS model is consistent and efficient. Hence this paper selects the OLS model, and both of the results are shown in Table 1.

Table 1. Results of OLS and 2SLS model and Hausman test.

Average Age at First Marriage		
	(B) OLS	(b) 2SLS
House Price	0.7081711**	0.8441312***
Education Expenditure	-1.093767***	-1.133645***
Average Salary	0.000693**	0.0006459***
Unemployment Rate	0.8874802***	0.8946629***
Consumption Level	0.0001167*	0.0001214***
Disposable Income	-0.0002835*	-0.0002652***
Engel Coefficient	0.0514571**	0.0543121***
Density of Population	0.0002151***	0.0002166***
Tertiary Education Percentage	3.158381	3.616637***
Sex Ratio 20-24	-0.0058609	-0.0053404*
Sex Ratio 25-29	-0.0331636***	-0.0359002***

NOTE: Significance level: *p<0.01, **p<0.05, ***p<0.01.

Hausman test:
2SLS consistent under H_0 and H_a
OLS inconsistent under H_a, efficient under H_0
Test: H_0: difference in coefficients not systematic
chi2 (8) = (b-B)'[(V_b-V_B)$^{-1}$] (b-B)
= 1.63
Prob>chi2 = 0.9903

Focus on the estimation result of the OLS model in Table 1, the coefficient of the HP is significant at the 5% level, it indicates a 100% increase in house price will associate with a 0.71 increase in the age at first marriage. This seems to be a small influence, but if we bring it back to the actual data, we can see it actually has a huge impact. The average house price in 2003 was 2197/m^2 and increased to 9980/m^2 in 2020, there was about a 450% increase in the value, which means it will cause about 3.2 years delay in the average age at first marriage. The coefficients of other control variables are also significant, the result shows the increase in average salary, unemployment rate, consumption level, Engel coefficient, population density, and percentage of tertiary education will also bring up the age of first marriage. However, the negative coefficient for education expense is surprising, it is widely believed that education should raise the age of marriage; and the coefficient on the percentage of tertiary education proved this perspective. This may be because the coefficient on the percentage of tertiary education already captures this delay effect on the marriage age.

This paper then constructed the OLS model using the average age at first marriage for males and females separately, the other independent variables are kept the same. Although variables like average salary and percentage of tertiary education might be different for different gender, this should not have much influence on the coefficient of the house price. The comparable results for these two OLS models are shown in Table 2.

Table 2. Results of OLS for Male and Female Age at First Marriage.

Average Age at First Marriage		
	Male	Female
House Price	0.8151858**	0.5736352***
Education Expenditure	-1.273795***	-0.9565442***
Average Salary	0.0008404**	0.000516*
Unemployment Rate	0.8868353***	0.904071***
Consumption Level	0.0001443**	0.0000993**
Disposable Income	-0.0003844*	-0.0001745
Engel Coefficient	0.0707017***	0.0357752***
Density of Population	0.0002602***	0.0001937***
Tertiary Education Percentage	2.413556	4.664914**
Sex Ratio 20-24	-0.0041737	-0.0054158*
Sex Ratio 25-29	-0.0348217***	-0.0320359***
Constant	38.3295***	33.72541***

NOTE: Significance level: *p<0.01, **p<0.05, ***p<0.01. Using robust standard error.

In estimation results in Table 2 clearly shows the coefficients are quite different between the two genders. The coefficient on house price for males 0.815 is 42% higher than the coefficient for females 0.574. This indicates if the house price increase by 100%, the age at first marriage for male will delay by 0.241 years more than for female. This result is in line with our expectation that in Chinese tradition the bridegroom should provide a house before marriage, so changes in house prices will have a greater impact on the age at first marriage for males. However, this also indicates that the increase in housing prices will lead to an increase in the marriage age gap between males and females, thus further squeezing the marriage market. There is also a very clear difference in the effect of tertiary education percentage in these two models. The coefficient of tertiary education percentage is only significant in the regression using data for females, and the value is almost double the coefficient for males. Higher education will make women more focused on their careers, thus making them enter the marriage market later because the impact of marriage on women's careers is much greater than that of men [5].

3.2 Marriage rate - provincial-level data

After confirming the relationship between house prices and age at first marriage, and how the relationship difference between males and females, the task in this part is to figure out the relationship between marriage rate and house price. The 25 provinces data collected for this part contains most of the areas in China, and this paper constructed a random effect model using these data. The panel data containing different provinces will have provinces' individual effects, hence we choose from the random effect model or fixed effect model. This paper tested both models using the Hausman test, and the random effect model will be more appropriate. The fixed effect mode is specified below:

$$marriage\ \ rate_{it} = constant + \beta_1 house\ \ Price_{it} + \beta_2 education\ \ expence_{it} + \beta_3 average\ \ salary_{it} + \cdots + \beta_6 tertiary\ \ education\ \ percentage_{it} + \varepsilon_i \quad (2)$$

The marriage rate is the explanatory variable, the independent variables had explained in the Data part, and the average house price was still taken as the ln value. The estimation result is shown in Table 3. The data are from different geographic areas, so there might be unobserved within clusters correlation in the data, hence this paper also uses the cluster standard error. The result is shown in Table 3.

Table 3. Random Effect Model.

Marriage Rate	
House Price	0.0027007**
Education Expenditure	0.0007923
Average Salary	7.05e-11
Unemployment Rate	-0.0004857*
Disposable Income	-3.67e-07***
Tertiary Education Percentage	0.0086113*
Constant	-0.0114725

NOTE: Significance level: *p<0.01, **p<0.05, ***p<0.01. Using cluster standard error.

The results obtained from the random effect model do not match the expectations, the coefficient of house price is 0.0027007. Although the value is quite small, it is a positive value. This illustrates the increase in house prices will surprisingly increase the marriage rate. We can interpret the result this way, although the rise in housing prices has delayed people's marriage age, it has increased their marriage rate by a small margin. This might be because when the house price increase, there are a small number of people who can only afford the house price together if they get married. The only two variables that have negative coefficients are the unemployment rate and disposable income per capita, which means an increase in these variables is associated with a decline in the marriage rate. The higher unemployment rate reduces marriage rates is relatively easy to understand and has been mentioned in several literatures [7]. The reason why higher disposable income per capita reduces marriage rates may be because people no longer have to marry for money, but more for love.

This paper then uses the same model but separates the dataset into a group of relatively developed provinces and a group of relatively developing provinces. The characteristics of the data for these two groups are quite different, especially since the house price in the developed area is much higher than in the developing area. The comparable results for these groups were shown in Table 4.

Table 4. Results of RE Model for Developed and Developing provinces.

Marriage Rate		
	Developed	Developing
House Price	-0.002811	0.0028287
Education Expenditure	0.0006677	0.0023675**
Average Salary	6.99e-09	-1.44e-07**
Unemployment Rate	-0.0012749	-0.0010205***
Disposable Income	-1.82e-07	-5.40e-07*
Tertiary Education Percentage	0.0118832	0.0631995***
Constant	0.0368797	-0.0737832***

NOTE: Significance level: *p<0.01, **p<0.05, ***p<0.01. Using cluster standard error.

From the result in table 4, the house price level has a completely different influence in different groups. The increase in house prices would have a negative effect on the marriage rate in developed provinces and a positive effect in developing provinces. There could be many reasons for this result; Firstly, the house prices in developed provinces may be too high and exceed a specific threshold, thus turn to have a negative effect on the marriage rate [11]; Secondly, combined with our previous thoughts, some people will choose to get married to share the burden when house prices are high, but when prices become too high it will also be harder to find someone to share this burden.

4. Conclusion

This paper applies OLS and random effect models to explore the relationship between house prices and marriage, the age at first marriage and marriage rate are the two factors used to analyze marriage. The results show a significant delay effect on age at first marriage, and this impact on males is 42%

higher than on females. From the marriage rate perspective, house prices have a very small positive impact on the marriage rate. The effect is completely different for developed provinces and developing provinces; for the developed provinces, house prices have a negative effect on the marriage rate, and for the developing provinces, the effect remains positive. The findings confirm that house prices have a significant effect on marriage from the perspectives of age at first marriage and marriage rate. Controlling house prices may be one solution for the government to improve the marriage condition. For example, balance the housing supply and demand with more punitive housing speculation policies to stabilize or even lower the house prices. The government can also introduce some marriage purchase benefits like lowering the property tax for married couples. The current work still has many limitations, the dataset covered all the regions in China and was not separated into urban and rural regions. There should be huge differences for every variable in urban and rural regions, and people in these two regions will have different concepts of marriage. A further study can be based on these distinctions between urban and rural regions.

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