

The impact of high house prices on marriage rate: Empirical evidence from China

Junyi Wang*, Linchi Qu

School of Economics and Management, Shanghai Maritime University, Shanghai, China

*Corresponding author: guanfeng123123@163.com

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Abstract: With the advent of the ageing era, the continuous decline of the marriage rate in China has become the focus of academic attention. This paper investigates the effect of high house prices on marriage rate in China over the period 2011-2019. The conclusion of the empirical analysis argues that, generally, the average effect of high house prices on marriage rate is small; however, high house prices can significantly reduce marriage rates in economically developed regions. The study of this paper can provide better insight for improving the marriage rate.

1. Introduction

Since China's reform and opening up, the domestic market-oriented reform has been carried out continuously, and the real estate market has entered the era of commercialization and property rights. The domestic real estate market was affected by the international financial crisis in 2008, and the sales volume and price were seriously hit. Later, in order to stimulate the economic recovery, China adopted loose policies to stimulate the domestic real estate price. Since 2008, China's real estate prices have skyrocketed, especially in a large number of first tier cities. Today's house prices have risen several times compared with earlier years. In order to promote the steady and healthy development of the real estate market, the central economic work conference held in mid December 2016 proposed to adhere to the positioning of "houses are for living, not for speculation", and required to return to the property of housing.

As a kind of fixed assets, the rapid rise of house price has brought considerable appreciation of fixed assets to many families with real estate, but it has caused great pressure to the new generation of young people. As the main body of housing demand, most of the house purchase decisions are made at the beginning of the establishment of the family [1]. Owning housing in China not only means that families have a stable place to live, but also has more added value. For example, Shanghai and other first tier cities have linked housing to the school allocation of their children. Such policies have further improved the added value of real estate. In previous literature, it has also been pointed out that real estate has a signalling effect on both parties to a marriage, increasing the possibility of finding potential mates. As a new generation of young people, both parties must take real estate as a major consideration when considering marriage planning. Whether there is a house has become a major consideration for the quality of the marriage partner. China's unique "mother-in-law phenomenon" ¹requires newlyweds to have their own housing [2]. The cost of marriage housing accounts for a large proportion in the total cost of marriage. In the eastern rural areas, the cost of marriage and house purchase accounts for more than 60% of the total cost of marriage, while in the central and western regions with relatively low house prices, the proportion also reaches about 50% [3]. Due to the close correlation between housing and marriage in China, this paper has raised the question of whether the rise in housing prices will affect the marriage rate? Will high housing prices have different effects on marriage rates in regions with different levels of economic development?

The average selling price of commercial housing in China in 2010 was 5,032 yuan/square meter. After ten years, the national average sales price of commercial housing in 2019 rose to 9,310

¹ Mother-in-law phenomenon: in China, mother-in-law will require a man to have a wedding room when he gets married.

yuan/square meter, 185% of that in 2010. At the same time, the national crude marriage rate in China has decreased year by year since 2013 and has decreased to 1.32% in 2019.

China is currently facing severe pressure from an aging society, especially in first-tier cities, which have seen a trend of serious aging. In this case, if the marriage rate continues to decline, it will put further pressure on China's future population structure. In recent years, public opinion has also generally focused on various problems caused by high house prices. Among them, marriage related words such as "older leftover women" and "marriage phobia" appear frequently in major media. In the existing research, most scholars have made in-depth research on the reasons for the decline in the marriage rate, but there is still less research on the relationship between housing prices and the marriage rate. As an important issue in social development, exploring the impact of house price growth on marriage rate has certain practical significance.

From the perspective of economics, this paper collects relevant data from 31 provinces, municipalities and autonomous regions in China from 2011 to 2019, and studies the impact of housing price growth on the marriage rate. This study found that the impact of high house prices on the marriage rate is small, but the negative impact on economically developed regions is more significant.

The remainder of the paper is organized as follows: Section 2 is literature review and theoretical analysis, Section 3 presents the empirical strategy and the data used for the analysis, Section 4 discusses the main empirical results while the main conclusions and policy implications are presented in Section 5.

2. Literature review and theoretical analysis

2.1 Literature Review

The research content of this paper is closely related to two types of literature: one is the research on the economic effects of housing prices, and the other is the research on factors affecting marriage behavior.

2.1.1 The economic effect of house prices

This type of literature mainly discusses the economic effects of housing prices from a macroeconomic perspective. Duan (2012)^[4] found that the impact of housing prices on future output and inflation has a threshold effect. When housing prices are in a low growth stage, the growth rate of housing prices has a significant positive impact on inflation and output; when housing prices are in a high growth stage, this effect of housing prices is not significant. Gong and Gao(2014)^[5] found that the impact of housing prices on inflation varies greatly in different periods.

In recent years, many literatures have analyzed the economic effects of housing prices from the perspective of micro-individuals. Chen and Yang (2013)^[18] found that rising housing prices make residents have to "save for buying a house", thereby increasing the household savings rate. Zhang et al. (2017)^[6] found that housing prices do have an "inverted U-shaped" impact on labor mobility. When housing prices are low, housing prices promote labor inflows, while when housing prices are high, the benefits of permanent income brought by rising housing prices will decline and then suppress the inflow of labor.

2.1.2 Factors affecting marriage behavior

Becker et al. (1973)^[7] proposed the economics of marriage and discussed the influencing factors of marriage decision-making, arguing that the main reason why people get married is that the expected utility of marriage is greater than that of being single. Complementary effects and the cost of marriage are important factors influencing marriage decisions. Since then, a large number of scholars have studied marriage behavior from the perspective of economics. Zhang and Shi(2020)^[8] studied the impact of overtime on marriage from the perspective of work pressure. The study found that the main purpose of overtime is to maintain livelihood and improve the quality of life of the family, and will not affect the decision to marry.

Housing is also an important factor influencing marriage decisions. J.F. Ermisch (1981)^[9] indicated

that housing is an important factor affecting marriage for couples who want to get married. Hu and Li (2019)^[10] found that among post-90s college students in China, 2/3 of the college students agree with "no house and no marriage", and owning their own house is a prerequisite for marriage; 1/3 of college students agree to get married without your own house.

2.2 Theoretical analysis

2.2.1 High house prices increase the cost of marriage

Because of the traditional Chinese concept or the benefits after marriage, such as mutual help, mutual support and joint decision-making after forming a family, the positive utility brought by marriage is often greater than the negative utility caused by marriage. Therefore, most people in China still get married [11]. But getting married means moving from the "home" where you used to live with your parents to your own small "home" [12]. At this time, housing has become a rigid demand. However, buying a wedding house requires a lot of money, and it has become the main cost of marriage at present. In the eastern rural areas, the cost of getting married and buying a house accounts for more than 60% of the total cost of marriage, while in the central and western regions where house prices are relatively low, the proportion also reaches about 50%. If marriage is a normal good, the income effect is positive. When house prices continue to rise, more income needs to be invested in buying properties, crowding out a lot of money. At this time, the increase in housing prices will reduce the positive utility caused by marriage, and will also increase the negative utility caused by the crowding out of funds. When the positive utility brought by marriage is less than the negative utility caused by marriage, both parties will choose to suspend or give up marriage, so the marriage rate will decrease.

2.2.2 High house prices increase search costs

In addition to the residential function of housing, the availability of housing and the quality of housing are the external manifestations of one's own economic level and family conditions [13]. The rise in housing prices will weaken the external signal sent, thereby causing marriage mismatch and lowering the marriage rate. In the early days, most marriages were introduced through acquaintances, and both parties knew each other's family conditions and social background. However, with the increasing frequency of population mobility, the "marriage circle" has lost its original closedness, and marriages are often concluded within a larger geographical area. At this time, there is a serious information asymmetry in the marriage market, similar to a used car market. Compared with cash, housing is more likely to be a signal to distinguish the economic level of the other party to solve the problems caused by information asymmetry, because the specificity of assets can solve the problem of a lack of trust in some cooperation. High house prices will make the original accumulated funds unable to buy the current house, thus unable to release a signal to attract a matching partner, and the utility of marriage will be greatly reduced, which will cause people to suspend their decision to marry and keep searching.

2.2.3 High house prices lead to rising price levels and the cost of living

The rapid rise in house prices means that the cost of buying a house in full or the down payment that needs to be paid and the pressure of repayment later is increased. Because house prices are the present value of rent [14], high house prices will also increase rental prices. In addition, real estate will also stimulate the upstream and downstream industries, increase the total social demand and total investment, thereby raising the price level [5].

The work-family conflict theory believes that people's energy and physical strength are limited, which are distributed between work and family. High house prices can cause individuals to spend more time and energy at work to offset the negative impact on their lives due to high house prices. This will not only reduce the leisure dating time to meet the opposite sex and narrow the social circle, but also reduce the attraction to the opposite sex due to overwork and reduce the willingness to marry.

3. Methodology

3.1 Data selection and sources

Due to the great differences in the social, economic, cultural and other aspects of the cities in the provinces and autonomous regions, it is better to use the real estate market data and marital status data of large and medium-sized cities for empirical analysis. However, the empirical research on family and marital status in China is relatively late compared to European and American countries, and there is no complete city-level data. In each yearbook, there is no establishment of marriage registration data that distinguishes between urban and rural areas. It is difficult to find continuous marriage registration data even in large and medium-sized cities [19]. This paper constructs panel data of 31 provinces, municipalities and autonomous regions in China from 2011 to 2019. Although the number of samples will be greatly reduced and the validity of the estimation will be weakened, the impact of macro-control policies in different regions of the country is basically synchronized. Therefore, it can roughly reflect the relationship between variables.

The data are all from the National Bureau of statistics, China Civil Affairs statistical yearbook, China Statistical Yearbook and local statistical yearbooks.

3.2 Variable selection

3.2.1 Dependent variable

Based on existing research, this paper uses the crude marriage rate (*mar*) to measure the frequency of marriage. The marriage rate refers to the ratio of the number of marriages in a certain period (usually a year) to the population of a certain range in the same period. The specific calculation formula is as follows:

$$\text{crude marriage rate} = \frac{\text{annual number of marriages}}{\text{average annual population}} \quad (1)$$

3.2.2 Independent variable

Referring to the practice of Chen et al. (2013) [15], this paper uses the average sales price of residential commercial housing (*house*) as an indicator to measure housing prices. We use the log-transformation of the variable.

3.2.3 Control variable

With reference to Hong (2012) [19], Fan et al. (2015) [2] and other related studies on the marriage rate, this paper selects the following variables as control variables.

(1) Crude divorce rate (*div*). The crude divorce rate is measured by the ratio of the number of divorces in the year to the average annual population. This variable mainly represents the expected cost of marriage. Although China currently pursues the principle of freedom of marriage, driven by traditional concepts, there will be some prejudice against some divorced groups, which may lead to an increase in the hidden cost of marriage. The higher the crude divorce rate, the higher the acceptance of divorce in the local society, and the lower the hidden cost of marriage.

(2) GDP per capita (*pGDP*). It represents local economic factors. We use the log-transformation of the variable.

(3) Sex difference (*sex*). It is measured by the absolute value of the sex ratio minus 100 to control the possible "marriage squeezing effect"².

(4) Female higher education level (*education*), It is measured by the ratio of female population with college degree or above to female population over 6 years old.

(5) The total dependency ratio (*dep*). It is measured by the ratio of the non-working-age population to the working-age population. This mainly reflects the regional demographics. The higher the total dependency ratio, the lower the proportion of the labor force in the population, and the labor force, especially the young labor force, is the main force of registered marriages, so the marriage rate will be

² Marriage squeeze effect: Due to the large gap between men and women at marriage age, it is possible that a large number of people of one gender cannot find a spouse.

lower.

3.3 Model specification

Based on the theoretical justifications mentioned, the model to be estimated is specified as follows:

$$mar_{it} = \alpha_0 + \alpha_1 house_{it} + \beta X_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

where, the subscript *i* denotes the province (municipality, autonomous region). The subscript *t* denotes the time period. X_{it} denotes the control variables. μ_i denotes regional fixed effects. Finally, equation (2) contains α_0 and ε_{it} indicating constant and classical error term respectively.

4. Results and discussion

4.1 The effect of high house prices on marriage rate

As explained above, our aim is to investigate the impact of high house prices on marriage rate, using fixed effects model. From the estimation results in column (1) of Table 1, it can be seen that without adding any control variables, high housing prices are significantly negative. After adding the control variable in column (2) of the table, the coefficient is still significantly negative at the 5% significance level, which means that high housing prices significantly inhibit the willingness to marry and then reduce the marriage rate. However, from the coefficient before house prices in column (2), high house prices have little impact on the marriage rate. Specifically, for every 1% increase in house prices, the marriage rate only decreases by 0.00006. There may be two reasons for this. On the one hand, people who want to get married in China rely on their parents to buy a house. On the other hand, high housing prices force couples to choose relatively cheap houses to avoid the negative impact of high housing prices.

Table 1. The effect of high house prices on marriage rate

variables	(1)	(2)
house	-0.0038** (-2.62)	-0.0060** (-2.22)
constant	0.0546*** (4.27)	0.0688*** (3.72)
control variables	No	Yes
R2	0.0247	0.0330
Observations	279	279

Notes: ***, **, * denote the significance at 1%, 5% and 10% levels respectively; t statistics in parentheses.

4.2 Robustness tests

4.2.1 Endogenous problem

Housing prices have an impact on marriage rates, and at the same time, rising marriage rates may also drive house price growth. In order to avoid the endogenous problem caused by the reverse causality, when testing the economic effect of housing prices, predetermined variables are generally selected for housing price data (Day, 1992) [16]. In addition, the selection of a lagged one-period variable can reflect the impact of high housing prices on the marriage rate after obtaining housing price information. Based on the existing literature, we use the house price with one lag period as the independent variable for regression.

The column (1) in Table 2 shows that the house price with one lag period is also significantly negative at the 5% significance level, which is consistent with the above conclusion.

4.2.2 Using different house price indicators

The housing price-to-income ratio is the ratio of the provincial housing price to the average annual wage of employees in each year, which measures the difficulty of people buying real estate in a given

province. The column (2) in Table 2 indicates that the above conclusion is robust.

Table 2. Robustness tests

variables	(1)	(2)
house	-0.0060** (-2.05)	-0.0063** (-2.26)
constant	0.0849*** (3.35)	0.0278** (4.11)
control variables	Yes	Yes
R2	0.0449	0.0235
Observations	248	279

Notes: ***, **, * denote the significance at 1%, 5% and 10% levels respectively; t statistics in parentheses.

4.3 Heterogeneity analysis

Due to differences in economic development, different province may experience differently the effects of high house prices. Analyzing such different results may do good to the formulation of relevant policies. Referring to the classification methods of Liu et al. (2018)^[17], this paper divides all regions of China into economically developed regions and economically catching up regions, and makes regression respectively, so as to investigate the impact of house prices on marriage rate in regions with different levels of economic development.

The results are shown in table 3. In developed regions, high house prices is significant at the 1% level of significance after adding all the control variables, but in economically catching up regions, high house prices have no significant impact. This may be because in economically developed areas, housing prices are higher, which increases the cost of marriage and living pressure, thereby inhibiting the willingness to marry. However, in economically catching up areas, the living pressure caused by high housing prices is far less than in developed areas. Owning real estate can increase the attractiveness to the opposite sex, thereby offsetting the negative effects of high housing prices.

Table 3. Heterogeneity analysis

variables	(1)	(2)
	Economically developed regions	Economically catching up regions
house	-0.0129*** (-3.56)	-0.0014 (-0.34)
constant	0.1218*** (4.94)	0.0308 (1.24)
control variables	Yes	Yes
R2	0.0491	0.0478
Observations	162	117

Notes: ***, **, * denote the significance at 1%, 5% and 10% levels respectively; t statistics in parentheses.

5. Conclusions and policy implications

In recent years, the rapid rise in housing prices has caused a series of social problems, such as a certain degree of inhibition of labor mobility, rising savings rate, and insufficient consumption. At the same time, China's marriage rate continues to decline, which may accelerate the aging process of China's population. From the perspective of marriage economics, this paper theoretically analyzes the impact of rising housing prices on marriage. Empirically, using the panel data of Chinese provinces, municipalities and autonomous regions from 2011 to 2019, it is verified that high housing prices will suppress the increase in the marriage rate, but the average impact is small. Further, we find that the negative impact of high housing prices on the marriage rate mainly exists in economically developed regions, and has little impact on economically catching up regions.

According to the research conclusions of this paper, the following policy implications are put forward.

(1) The state should introduce a series of more powerful and targeted policies to curb the rapid rise in housing prices and promote the steady and healthy development of the real estate market. Existing studies have shown that measures such as purchase restrictions introduced by the state may not be able to restrain the rapid rise in housing prices. People who want to buy houses may avoid policy restrictions by means of fake divorces. Therefore, decision makers must carefully consider the possible impact on other markets such as marriage before introducing relevant housing policies, and formulate appropriate housing policies to help rigid demanders alleviate their urgent needs and reduce the loss of social welfare caused by the policy.

(2) Appropriate housing subsidies can be given to couples who want to buy a house and get married, focusing on the first house of newlywed families, encouraging the purchase of self-occupied houses and cracking down on real estate speculation, so as to help young people adapt to the housing and living costs caused by high housing prices.

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