



Research article

House price, gender spatial allocation, and the change of marriage matching

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Abstract: We investigated the relationship between changes in housing prices and marriage patterns among Chinese residents, considering the evolving real estate market and increasing prevalence of homogamous marriages. Using microdata from the China Household Income Project (CHIP) and urban housing price data, our results showed the following: First, housing price levels significantly decreased the likelihood of residents engaging in hypergamous mating and marrying individuals from lower social strata. Second, regional fluctuations in housing prices could influence residents' marital matches by affecting the spatial distribution of genders. Specifically, the higher the level of urban house prices, the greater the crowding out effect on marriageable men, and the less likely men in that area were to match downwards and marry women from lower social classes. Third, heterogeneity analysis indicated that residents in the eastern regions, younger populations, and migrants faced greater housing price pressures in the process of marital matching, resulting in a more substantial impact on these groups. The study contributes to marriage matching theories and offers policy insights for real estate reforms.

Keywords: housing prices; gender spatial configuration; marital matching; homogamous mating

Mathematics Subject Classification: 91D20

1. Introduction

Marriage plays a significant role in the distribution of welfare among individuals and the intergenerational transmission of economic opportunities. The outcome of marriage matching is a direct reflection of people's marital views and becomes an important channel affecting the distribution

of family income and social class. Since the 1990s, both “achieved” homogamy (matching based on similar personal conditions of the couple) and “assigned” homogamy (matching based on similar fathers’ social and economic status) in China have shown a strengthening trend [1,2]. The industrialization theory of marriage matching suggests that with the development of industrialization and modernization, an individual’s economic potential shifts from depending on family socioeconomic characteristics to relying on personal education and career achievements [3,4]. That is, the criteria for marriage matching shift from “assigned” factors like social status to “self-perpetuating” factors. However, this theory explains only the recent rise in “achieved” assortative mating, not the resurgence of “assigned” matching, which essentially reflects a within-class marriage system. The strengthening of the concept of marrying within one’s social class not only reduces social mobility but also exacerbates household income inequality [5]. An in-depth exploration of marriage matching patterns is not only a window into cultural and social changes but also crucial for understanding economic inequality.

The rise in homogamous marriage coincides with the period of housing reform and intensification in China, with continuous increases in housing prices, especially in first-tier cities like Beijing and Shanghai. Changes in housing prices not only have a profound impact on macroeconomic operations [6] but also directly affect residents’ savings and consumption behaviors [7], settlement intentions and migration behaviors [8], and fertility decisions [9]. Marriage is not just a choice of affection but also an economic decision based on cost-benefit analysis [10,11]. Housing, characterized by its high value, fixity, and long-term nature, serves as a signal carrier of a man’s ability, family wealth, and social status [12]. Therefore, owning a house often becomes a prerequisite for marriage [4,13]. According to the 2017 PSCUS survey, 68.5% of Chinese post-90s university students agree with the notion of “no house, no marriage”. As housing is a necessary material condition for marriage formation and family organization, it inevitably affects people’s marriage decisions.

Is there an inevitable link between the rapid development of real estate and the rising trend of homogamous marriage in China? If the rise in housing prices leads to stronger homogamous marriage, what is the mechanism of its impact? Current research on how housing price changes affect marriage decisions mostly focuses on whether to marry, the age of first marriage, and marital views, with few studies exploring the impact of housing price fluctuations on marriage matching patterns. The literature discussing the impact of housing prices on the marriage market mostly includes two categories. The first category explores the relationship between rising housing prices and declining marriage rates and increasing divorce rates from a macro perspective. The second category studies the impact of rising housing prices on individual marriage decisions from a micro perspective using city-level house prices and census microdata, which found that rapid increases in housing prices in China significantly pressure young people’s marriage decisions, lowering the rate of first marriages [14]. Additionally, residents may increase the divorce rate to gain more opportunities for housing investment [15].

As part of marital decision-making, marriage matching decisions are evidently influenced by housing prices. The economic study of marriage matching originally stems from Becker’s use of economic models to explain the marriage market. Subsequently, Lam [16] incorporated public goods in families into the Becker’s household production model. Since both men and women are motivated to match upwards, seeking partners with higher educational levels, this leads to positive assortative matching. The theory of endogenous family bargaining argues that the marketization of housing supply allows individuals to demand higher bargaining power within the family, thereby narrowing the feasible set for marriage matching and exacerbating the imbalance in marriage matching [17]. Sun and Zhang [18]

found that rising housing prices significantly increase the correlation between the family backgrounds of both spouses, and the growing inequality in family housing is further transmitted to the next generation through marriage matching.

Building on Lam's [16] theoretical analysis, we posit that housing, as an important public good in families, enhances the utility of upward matching for both men and women, thereby intensifying the phenomenon of positive assortative matching. We then attempt to explore the theoretical mechanism of how housing prices affect residents' marriage matching decisions from the perspective of different gender spatial distributions. We use microdata from the China Household Income Project (CHIP) combined with regional housing price data for empirical testing. The results showed: First, housing prices change residents' marriage matching decisions to some extent. In areas with higher housing prices, residents have a stronger willingness for positive marriage matching. Specifically, in areas with higher housing prices, the differences in various conditions (including personal class and family background) between spouses are smaller, the probability of residents marrying down is lower, and people are less likely to marry residents of lower social classes. Second, housing prices affect the spatial distribution of different genders. In areas with higher housing prices, the crowding-out effect is greater for men who have higher housing needs, resulting in a lower marriageable age gender ratio¹. The relative scarcity of men in high housing price areas significantly narrows the differences in various conditions between spouses and reduces the likelihood of men marrying down or marrying women from lower social classes. This validates the channel of rising housing prices → decreasing in the sex ratio of marriageable men and women → increasing assortative mating in the Chinese context. Third, residents from eastern regions, younger residents, and migrants are more susceptible to housing price levels due to greater housing pressure, and their marriage matching patterns are more easily affected by housing prices.

The potential marginal contributions of this paper are as follows: First, for housing as a prevalent financial asset [19], this paper is significantly related to research on the impact of financial assets on individual decision-making [20,21]. Among the existing literature that investigates the influence of housing prices on micro-level individual decisions, there is a scarcity of discussions from the perspective of marriage matching. The findings of this paper contribute to a better understanding and awareness of the economic and social impacts of rising housing prices in China, which has significant implications for macroeconomic policy-making. Second, the empirical study shows that in the context of the Chinese reality where "no house, no marriage" and where men mostly bear the burden of purchasing a house for marriage, high housing prices have a significant crowding-out effect on men, leading to a deterioration in gender spatial distribution and exacerbating contradictions in the marriage market. Our results revealed that a considerable part of the impact of rising housing prices on residents' marriage matching patterns is through the mechanism of housing prices affecting gender spatial distribution, providing empirical evidence not previously addressed in the literature.

2. Theoretical hypotheses

2.1. Analysis of the effects and mechanisms of housing prices on marriage matching

In economic terms, the formation of a marital union serves as a pivotal mechanism for couples to collaborate on mitigating external risks, thereby enhancing utility. The uncertainty inherent in markets

¹ If not specified, the gender ratio refers to the number of males per female.

tends to solidify assortative mating patterns, constraining the openness of societal structures. It is evident that escalations in housing prices amplify the uncertainty faced by individuals regarding future prospects. The more these prices increase, the greater the future uncertainty, which in turn magnifies the incentive for individuals to seek spouses capable of countering external risks through positive assortative mating. Within the dynamics of marital market equilibrium, individuals generally aspire to unite with partners of higher economic stature (indicating a vertical preference for social strata); however, this aspiration is not universally attainable, culminating in a tendency towards assortative mating, or equivalently, homogeneity in spousal value [10].

We delineate the influence of housing price surges on patterns of marital matching into three distinct effects. First, the wealth effect [22]: Individuals possessing multiple properties prior to marriage experience an augmentation in personal wealth due to either capital gains from property or rental income, as housing prices rise. This asset appreciation induces a positive income effect, dampening the motivation to seek risk-averse marital alliances [23]. Conversely, for those bereft of substantial property prior to marriage, the increased future uncertainty propelled by soaring housing prices intensifies their inclination towards risk-averse marital alliances. Second, the expected return effect: The swift escalation of housing prices in recent years has fostered a pervasive belief within Chinese society that real estate constitutes a secure and lucrative investment. Property acquisition transcends mere consumption, representing a significant investment venture, especially in scenarios where housing investment yields surpass those of conventional assets. Individuals from affluent backgrounds may independently invest in property, aided by familial support. In contrast, those from lower-income backgrounds, unable to afford housing independently, are increasingly motivated to engage in positive assortative mating to widen their credit scope and partake in housing investments. Third, the budget constraint effect: Following the reform of the residential commodity housing system, a pronounced uptrend in housing prices has been observed across most major urban centers. For couples lacking property or possessing an essential need to purchase housing pre-marriage, this uptrend exacerbates the financial burden of home acquisition, necessitating substantial future expenditure. Particularly for individuals from lower-income families, stringent saving and consumption curtailment become imperative for home acquisition, significantly diminishing prospective utility. To circumvent severe future budget constraints, an elevated propensity towards positive assortative mating in spouse selection is observed.

The impact of rising housing prices on the inclination towards positive assortative mating is contingent on the interplay and relative magnitudes of the wealth effect, expected return effect, and budget constraint effect. Utilizing data from the 2015 Chinese General Social Survey (CGSS) reveals that a mere fraction of residents are capable of property acquisition pre-marriage. Over 75% of families own a single property, with less than 15% possessing more than one. Additionally, for the majority who own a single property and are willing to disclose acquisition timing, approximately 80% procured their property concurrent with or post their initial marriage. The continual escalation in housing prices is likely to further diminish the proportion of pre-marital property ownership. Consequently, we posit that the tangible wealth effect of rising housing prices is minimal, whereas the expected return and budget constraint effects are comparatively more pronounced. Hence, it is surmised that increasing housing prices predominantly augment the propensity for positive assortative mating among residents.

Hypothesis 1. The residents in areas with higher housing prices have a stronger willingness for positive matching.

2.2. Reinforcement of gender spatial configuration

An essential determinant of outcomes in the marriage market is the gender ratio or the proportion of males to females in the marriageable population [24]. A shortage of marriageable males or females quantitatively enhances their selection opportunities, thereby conferring a vested advantage in the marital market [25]. More specifically, the position of males (or females) in the marriage market improves (or deteriorates) with a decreasing gender ratio. The equilibrium state of marital matching is ultimately formulated through the marriage market participant's mate preferences in conjunction with the actual gender ratio of marriageable males and females.

In the context of traditional Chinese culture, Chinese society harbors the notion of “gender cognition²”. If a male marries a female with a superior socioeconomic background, it incurs additional psychological costs. Consequently, in real life, males are more inclined to accept wives whose overall conditions are not superior to themselves. In contrast, females are often predisposed to select a spouse whose characteristics are either equivalent to or superior to their own [26]. Gender cognition also implies that during the process of marriage formation in China, males typically bear the obligation of home purchase. The tradition of purchasing homes for sons pervades Chinese families [27]. Existing theories attribute the primary reason for the male responsibility of home purchase to China's gender imbalance, which exacerbates the relative position of unmarried males in the marriage market. Consequently, families with male offspring compete to increase property ownership to attract females, thereby escalating housing prices.

National-level data supports the conclusion that gender imbalance elevates housing prices. However, this is inconsistent with city-level data, as shown in Figure 1. Figure 1 shows a negative correlation between the gender ratio of registered urban populations and regional housing prices, based on data from the 2019 Statistical Yearbook of various Chinese cities. Since 2000, the gender ratio of registered populations in high housing price areas in China has shown a clear downward trend. In 2019, first-tier cities like Beijing and Shanghai even had a registered population gender ratio lower than 1, a stark contrast to the national gender ratio being high at 1.05³. In first- and second-tier cities, the proportion of young women buying houses is close to or even exceeds that of men. Analyses based on total scale ignore the individual migration decisions between regions. When faced with high housing price pressures, individuals may choose to “vote with their feet” and migrate to regions with lower housing prices for settlement.

Plantinga et al. [6] examined the relationship between housing costs and personal migration preferences in 291 U.S. cities, finding that rising housing prices reduce the likelihood of individuals choosing to settle in those areas. The differing pressures of housing prices in the marriage market for men and women determine the migration decisions of different genders, leading to the spatial sorting of sex. The cost for men to buy houses and settle in high housing price cities is far greater than for women. Gender cognition also results in men who rent being at a disadvantage in the marriage market, with marriage-seeking men in high housing price areas being significantly less likely to choose renting over marrying suitable women. Liu et al. [28] showed that high housing prices mean unaffordability of housing, exerting a significant crowding-out effect on the labor force, especially on high-skilled labor with stronger housing demands. Thus, high housing price areas more conspicuously crowd out male labor with greater housing demands and responsibilities.

² This entrenched belief dictates that a stable marital union requires husbands to bear a greater share of economic responsibility. Males generally assume more obligations within the family, whereas females tend to assume a subordinate role.

³ According to the Seventh National Population Census data from the National Bureau of Statistics, the national population gender ratio is 105.07.

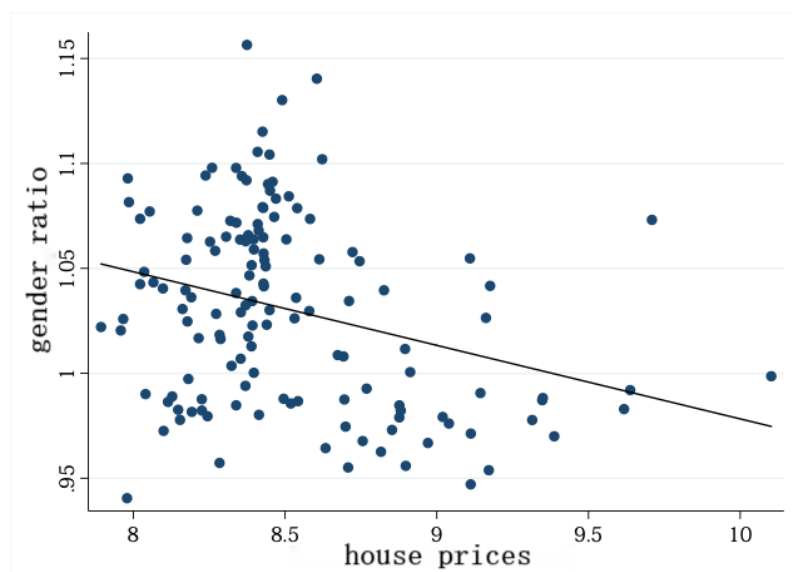


Figure 1. Relationship between residential sale prices and the gender ratio of the registered population in China.

The spatial sorting of sex, in turn, impacts the marriage market. Residents, when matching for marriage, often base their decisions on the local rather than national gender ratio, giving the numerically scarce gender a greater advantage in the marriage market. To date, considerable literature has explored the impact of gender ratio on marriage matching from both theoretical and empirical perspectives. The relevant economic theory originates from Becker's [25] model of marriage and family formation, which posits the gender ratio as a key variable determining the distribution of marriage gains, concluding that an increase in gender ratio raises men's demand for spouses, thereby increasing women's marriage rates. Building on this, Grossbard-Shechtman [29,30] considered wives as "household products" with market substitutes, arguing that an increase in gender ratio boosts the demand for this "household product." Other theoretical analyses generally concur that changes in gender ratio make the marriage market conditions more favorable to the gender in scarcity, increasing their marriage rates. Empirical studies have also verified the relative advantage of the gender in scarcity in the marriage market, with an increased gender ratio raising the likelihood of women getting married and enabling them to marry upwards. Abramitzky et al. [24] used the negative impact of World War I on the number of French men and a difference-in-differences approach to analyze the effect of a declining gender ratio on positive assortative matching in the marriage market. Their findings indicated that areas more impacted by the war had a lower post-war gender ratio, and in these areas, men were less likely to marry spouses from lower social classes, the age difference between spouses was smaller, and men were more likely to marry than women.

Most studies related to China are based on the long-term skewed sex ratio at birth, examining the impact of gender imbalance on marriage matching. The gender imbalance caused by a preference for male children results in social issues of marriage squeeze. Du et al. [31] using data from the 2006 CGSS, found that gender imbalance increases the probability of women engaging in upward marriage matching. Porter [32] utilizing data from the China Health and Nutrition Survey (CHNS), discovered that an increase in gender ratio delays the age of marriage for men and enhances post-marriage bargaining power for women.

Based on this comprehensive analysis, to truly understand the impact and mechanisms of housing prices on marriage matching, it is necessary to consider the gender spatial mismatch caused by housing prices. The effects of housing prices on the migration and fertility intentions of different gender populations significantly influence the spatial distribution of gender. Specifically, in the Chinese context where men bear greater responsibility for purchasing homes, there is a noticeable difference in the gender ratio of eligible men and women between high and low housing price areas. The higher the housing prices, the stronger the crowding-out effect on men, and the lower the gender ratio of eligible populations. The apparent gender spatial mismatch caused by high housing prices will evidently affect residents' marriage matching. Under the constraints of gender cognitive concepts in China, the preference for unions where men are superior in all aspects is less pronounced. When both men and women strongly desire upward matching, and if women are relatively scarce in the marriage market, it leads to more marriages with higher-status men and lower-status women, widening the gap between spouses. Therefore, for eligible individuals in high housing price areas, they will face a situation where men have a relatively higher status in the marriage market, making such areas more favorable for positive matching for men. Consequently, this leads to the transmission mechanism fitting the Chinese context: higher regional house prices → lower sex ratio → increased assortative mating, where the rise in housing prices, by crowding out men and reducing the gender ratio, intensifies the level of homogamous marriage.

Hypothesis 2. High housing prices can enhance men's relative advantage by lowering the gender ratio of marriageable men and women in the marriage market, ultimately leading to a higher degree of homogamous marriage⁴ under equilibrium marriage market conditions.

3. Data, variables, and econometric models

3.1. Variables and empirical strategy

3.1.1. Modeling: house price and homotypic marriage

To explore the research hypothesis of this paper, the first step is to ascertain the relative social status of both individuals in a marriage and their respective parental backgrounds, constructing variables related to endogenous and exogenous marital matching. Subsequently, we employ an econometric model to assess the impact of housing prices on marital matching.

Given the considerable uncertainties in career and income, particularly across different life stages, an increasing number of studies on marital matching are selecting more stable variables that can represent individual economic characteristics, such as educational attainment. First, educational attainment is closely linked to an individual's future career development and income. Second, the level of education is generally established before marriage and seldom changes thereafter⁵. Third, while some respondents may prefer to conceal their income and occupation, the information provided about educational levels is usually more reliable and credible. Therefore, using individual educational levels

⁴ Including assortative and pre-assigned homogamous marriages. In the current era of high housing prices, where most children require parental assistance to purchase marital homes, the influence of pre-assigned factors on the potential economic capacity of individuals has increased, making the trend towards family-background-based pre-assigned marriages inevitable.

⁵ According to the baseline data of the China Family Panel Studies (CFPS) 2010, less than 1% of individuals continue their education after marriage.

to categorize people into specific social strata is feasible.

Drawing on the study by Abramitzky et al. [24] and the Chinese reality, we categorize social classes into seven types and construct a multidimensional marital matching situation. We classify individuals' educational levels into five categories (with 1 being the lowest and 7 the highest):

Level 1: Illiterate, including those who have never attended school.

Level 2: Elementary, including those with an elementary education.

Level 3: Junior High School, including those with a junior high school education.

Level 4: High School, including those with a high school or vocational/technical school education.

Level 5: Above high school but below college, including those with junior college or associate degree education.

Level 6: Bachelor's degree, including those with an undergraduate degree.

Level 7: Graduate degree, including those with a graduate degree.

To further investigate the net impact of housing price growth on individual marital matching decisions, this paper constructs the following econometric model [33,34]:

$$Y_{ilct} = \beta_0 + \beta_1 hp_{lct} + \gamma X_{ilct} + \eta Z_{lct} + \mu_c + \mu_t + \varepsilon_{ilct}. \quad (1)$$

In Eq (1), i denotes an individual, c refers to the prefecture-level city where the individual resides, and t signifies the survey year, l representing the individual's age. Y_{ilct} is the dependent variable, and we define three different dimensions of marital matching-related dependent variables: First, the absolute difference in social class between a husband and his wife, with a smaller gap indicating greater similarity between the spouses, thus representing a higher degree of assortative mating. Second, whether the husband has married downward (i.e., married a spouse of a lower social class), coded as 1 for yes, and 0 for no. Third, whether the husband has married a spouse of a lower social class (defined as having junior high school education or lower), also coded as 1 for yes, and 0 for no. The three variables related to "achieved" marital matching are represented as $diff_z$, $down_z$, and low_z , respectively. Similarly, when comparing the differences in family background between spouses, i.e., the highest educational attainment of both sets of parents, we derive three variables related to "assigned" marital matching patterns: $diff_x$, $down_x$, and low_x .

The core explanatory variable $lnhp_{lct}$ is the expected housing price level in the survey year for residents living in cities c at a specific age l . Since the CHIP data do not provide the year of marriage for residents, following the existing literature [18,35], we construct the expected housing price at the time of marriage decision for each respondent based on the probability of marriage at each age segment and the housing prices in their respective cities during that year. The specific construction method is as follows:

$$hp_{lct} = \frac{\sum_{k=17}^l \text{age_specific_marry_rate}_k \times hp_{c,t-l+k}}{\text{prob}(\text{marry no later than age } l)}. \quad (2)$$

First, using the data from the Fifth National Population Census of China in 2005, we calculate $\text{age_specific_marry_rate}_k$ the marriage rate for specific ages, which is the proportion of individuals getting married at that age k relative to the total population. The earliest marriage age in the data is 17 years. Our analysis sample consists of married individuals. If a respondent is of age l in the survey year, then it is understood that the individual's age at marriage is at most, which is the upper bound of the age of making marriage decisions. If an individual is of age l in the survey year, this implies that the marriage probability for age l in the population census needs to be adjusted using, a conditional

probability that changes with age $\frac{\text{age_specific_birth1_rate}_k}{\text{prob}(\text{marry no later than age } l)}$. $hp_{c,t-l+k}$ represents the housing price level in the city faced by respondents of age in the survey year.

Considering that residents' marital matching decisions are clearly influenced by factors other than housing prices, the econometric model in this paper also needs to control for other factors that may affect marital matching. X_{ilct} are individual-level control variables, mainly including age, age squared, household registration (hukou) status, political affiliation, ethnicity, and educational attainment. Second, considering that differences in social, economic, and cultural factors of residents' locations could lead to variations in their marriage matching decisions. Especially, population mobility is often non-random, with highly skilled labor preferring to move to areas with high housing prices, as such areas typically also signify economically developed regions. We utilize urban-level data collected through various channels, attempting to distinguish the impact of housing price fluctuations on the marriage market from concurrent regional factors to avoid the spurious correlation between high housing prices and individual marriage market outcomes that arises because highly skilled labor prefers areas with high housing prices. Z_{lct} represents urban-level characteristic variables, including regional per capita GDP and crude divorce rate. μ_c represents prefecture-level city fixed effects; μ_t represents survey year fixed effects; ε_{ilct} represents the random error term. Clustered robust standard errors are used at the prefecture-level city.

3.1.2. Transmission mechanism: housing prices and gender ratio

Higher housing prices in an area exert a stronger crowding-out effect on marriageable men, reducing the gender ratio in the marriage market and making men scarcer, thereby allowing men's preferences for spouses to be realized, ultimately leading to a higher degree of assortative mating under the equilibrium conditions of the marriage market in that area. To confirm this transmission mechanism, we established the model shown in Eq (3), where the gender ratio at marriageable age is the dependent variable. However, the gender ratios provided in statistical yearbooks are generally stable between 1.05 and 1.07, with little variation, and the observed relationship between the gender ratio and socio-economic variables has a serious endogeneity problem. Directly studying the effect of city housing prices on the marriageable age gender ratio is relatively difficult. We use the differences in long-term living intentions between marriageable migrant populations of different genders to indirectly measure the gender ratio at marriageable age in the marriage market. Existing theories of marital matching often assume no population mobility in local marriage markets, but marriageable, unmarried migrants choosing to reside long-term locally, will inevitably affect the local marriage market. Housing prices have a heterogeneous effect on the migration of different genders. Since men bear more responsibility for purchasing houses, young men with a strong need to buy a house will be more inclined to make migration decisions when faced with high housing prices, thus reducing the gender ratio in the local marriage market. If higher housing prices lead to a lower gender ratio of marriageable, unmarried migrants choosing to reside long-term locally, then housing prices will inevitably also reduce the gender ratio at marriageable age in the local marriage market.

$$\text{sexratio}_{ct} = \gamma_0 + \gamma_1 \ln hp_{ct-1} + \eta Z_{ct} + \varphi_c + \varphi_t + \varepsilon_{lct} \quad (3)$$

where sexratio_{ct} denoted as the gender ratio of marriageable, unmarried migrant populations planning to reside long-term in a given area, is the ratio of the number of marriageable, unmarried male migrants choosing to reside long-term in an area to the number of their female counterparts. The

specific calculation formula is as follows:

$$\text{sexratio}_{ct} = \frac{\text{male settle amount}_{ct}}{\text{female settle amount}_{ct}}. \quad (4)$$

It is important to note that to avoid the influence of outliers on the results, we excluded samples from areas where the number of either male or female migrants choosing to reside long-term is less than 10. Z_{ct} represents regional-level control variables, φ_c denotes regional dummy variables, and φ_t represents year dummy variables. The coefficient γ_1 measures the overall impact of housing prices on the gender ratio of migrants choosing to stay locally. The control variables in Eq (3) are basically consistent with those in Eq (1), except that the individual-level control variables are excluded. Equation (3) does not suffer from serious reverse causality issues, as the logic of high housing prices driving out males and reducing the gender ratio contradicts the logic mechanism found in existing research, which suggests that a rise in the gender ratio increases housing prices. However, Eq (3) faces endogeneity issues due to omitted variables. Therefore, we use an instrumental variable estimation method to obtain more reliable conclusions.

3.2. Data and descriptive statistics

Before conducting rigorous empirical tests, we provide, in Figure 2, the distribution of actual marital matching gaps and counterfactual random matching gaps among couples with different educational levels in the CHIP survey sample. Under the assumption of random matching, we used the Bootstrapping method to construct the 95% confidence interval for the distribution of marital matching gaps. Specifically, N represents the set of matched couples, and assuming that marital matching is random rather than selective implies replacing $\{f_{ij}\}$ and $(i, j) \in N$ with a random matching set $\{f_{ij}^*\}$. We then calculate the social class gap between husbands and wives after random matching, simulating the distribution of social hierarchy gaps in random marriages. This process is repeated 1,000 times to construct a 95% confidence interval. For example, in Figure 2, the observed points show the actual distribution of social hierarchy gaps between couples in the sample. For husbands and wives of the same social class, the observed proportion is almost twice the upper limit of the confidence interval. The proportion of wives one social class lower than their husbands is also significantly higher than the upper limit of the confidence interval. The actual proportion of couples with an absolute social class gap greater than 4 is almost zero, indicating that Chinese residents generally do not choose spouses with a significant social class difference. Figure 3 shows the difference between actual matches based on family background and random matches. Overall, Figures 2 and 3 firmly reject the assumption of random matching based on individual or family background in the Chinese marriage market, with clear evidence of homogamous marriages, and the proportion of exogenous assortative mating being higher than the proportion under the random matching assumption.

To estimate the empirical model constructed, this paper uses three levels of data: First, based on the Chinese Household Income Survey (CHIP) data, which has been widely used in social science research. CHIP is a large-scale national and comprehensive social survey project in China, mainly covering basic family demographics, income, and expenditures. It was first published in 1988, and after the addition of the “Basic Situation of Household Heads and Their Spouses’ Parents” section in 2002, the survey content includes the education level and job types of the household heads and their spouses’ parents. CHIP data provides the basic content for our study of marital matching. To maximize the sample size, we selected the 2008 and 2013 CHIP data for our study. As the CHIP database does

not track individuals longitudinally, the data from 2008 and 2013 have been merged to form a pooled cross-sectional dataset than panel data; second, city-level information based on urban statistical yearbooks, including urban economic conditions and marital status; third, the gender ratio indicator of marriageable, unmarried migrant populations choosing to reside long-term locally, constructed based on the National Migrant Population Dynamic Monitoring Survey questionnaire data. Table 1 provides a statistical description of the relevant variables in this paper.

Table 1. Descriptive statistics of the main variables.

	Variables	Variables descriptions	Mean	std	Sample
Dependent variables	diff_z	Gap between husband and his spouse's social class	0.471	0.644	1,898
	down_z	Whether matched downward	0.258	0.438	1,898
	low_z	Whether to combine with a wife from a lower social class	0.292	0.200	1,898
	diff_x	Gap between the social class of the husband's family and the spouse's family	0.586	0.793	1,898
	down_x	Whether married to a wife from a lower social class family	0.191	0.394	1,898
	low_x	Whether married to a wife from a lower social class household	0.065	0.247	1,898
Core explanatory	lnhp	Logarithm of house price at expected marriage	3.315	0.637	344
Channel	sexratio	Sex ratio of mobile population intending to reside permanently in the local area	0.962	0.270	344
Individual characteristics	age	Age	29.453	2.460	1,898
	age2	Age squared	873.494	143.271	1,898
	native	The place of registration of Hukou is outside the city or province = 1, the rest = 0	0.101	0.286	1,898
	urban	Whether the hukou is non-agricultural, agricultural hukou = 0, the rest = 1	0.896	0.302	1,898
	party	CPC member = 1, non-CPC.	0.095	0.293	1,898
	minzu	Han nationality=1, other ethnic minorities=0.	0.965	0.184	1,898
	edu	Education level	8.644	3.961	1,898
Area characteristics	health	Health status, 1-5 indicates very good-very bad respectively.	2.621	0.947	1,898
	lggdp	Logarithm of regional GDP per capita.	4.290	0.942	344
	divorce	Crude divorce rate (%).	2.437	0.867	344

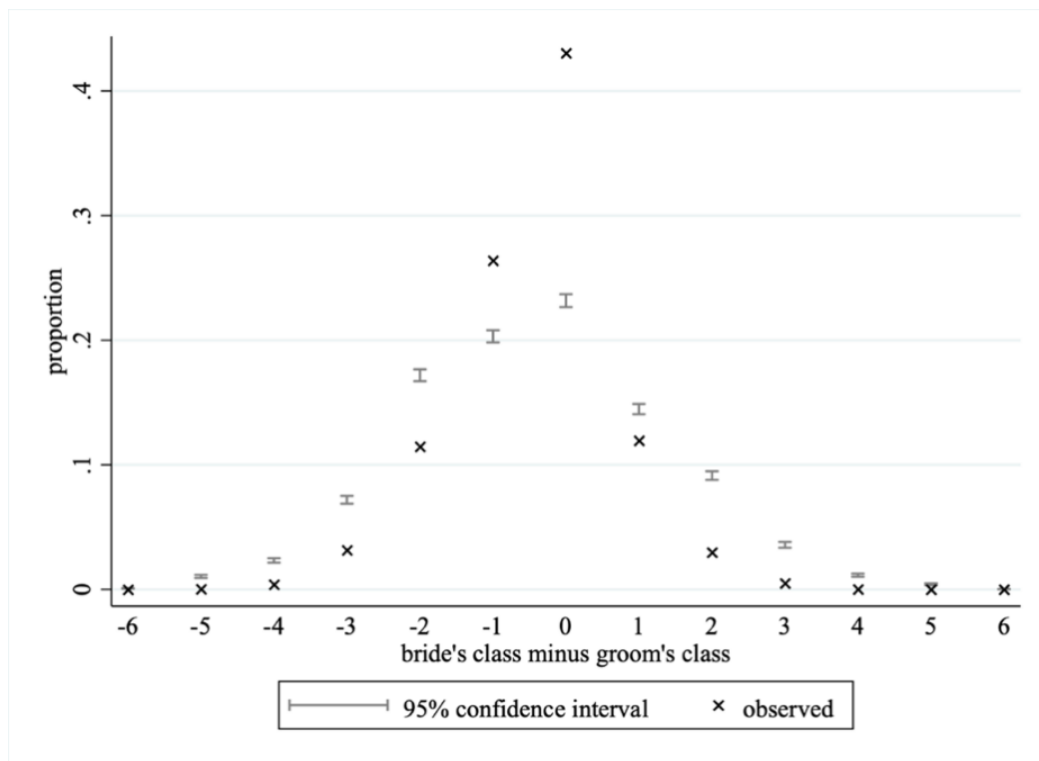


Figure 2. Actual vs. Random matches by individual class in the marriage market.

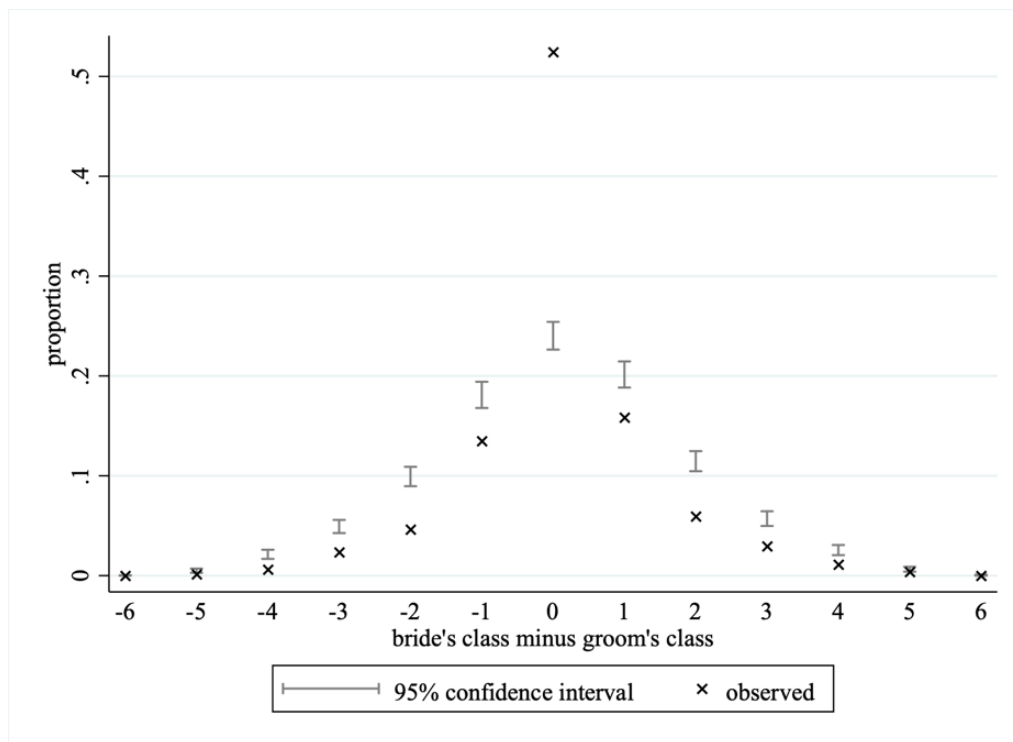


Figure 3. Actual vs. Random matches by family background in the marriage market.

In line with the objectives of this research and the existing literatures, the following treatments are applied to the raw data [36–38]. Considering that China’s housing system reform began in 1998 and, in reality, most residents marry before the age of 40, we first exclude samples born before 1958. Additionally, in accordance with the provisions of Chinese marriage law, we initially limit the sample to married men aged 20 and above. Then, since rural and migrant resident family information is relatively incomplete and often of a lower educational level, dividing social classes based on educational levels presents significant flaws. Therefore, we use only the urban household survey samples from the CHIP data. Finally, subsequent analyses require the use of educational levels of residents and their spouses to examine marital matching issues. Therefore, we exclude individuals with missing education level information and those in school. We match the individual characteristic data from the CHIP microdata with the relevant regional characteristic data obtained from the urban statistical yearbooks of various cities, according to regional and yearly information [39,40].

4. Results on the impact of housing prices on marriage matching

4.1. Baseline regression results

The baseline regression for Eq (1) is conducted initially, and Table 2 presents the results. Odd columns represent results for “achieved” homogamy, while even columns represent results for “assigned” marriage. Columns (1) and (2) present results obtained using Ordinary Least Squares (OLS), while columns (3) to (6) provide results obtained using Probit regression, considering that whether to marry and whether to marry a wife from a lower social class are binary dummy variables.

First, we examine the impact of housing prices on “achieved” homogamy. The estimated results in Table 2 show that the coefficients for housing prices in models related to the impact on “achieved” marriage patterns are all negative and significant at conventional statistical significance levels. This indicates that, compared to areas with low housing prices, in areas with high housing prices, the differences in social class between spouses are smaller. The rise in housing prices significantly deepens the degree of “achieved” marriage among residents. The probability of men marrying down or marrying residents from a lower social class is also smaller. Second, we investigate the impact of housing prices on “assigned” (family background) marriage patterns. The estimated results in Table 2 indicate that housing prices have a significant negative impact on differences in family background between couples. From the coefficient estimates, compared to areas with low housing prices, men in areas with high housing prices are more inclined to marry spouses with smaller differences in family background. The increase in housing prices significantly intensifies the degree of “matching doors and social status”, with the impact coefficient of housing prices on “matching doors” being noticeably larger than the impact on “achieved” marriage. In high-priced areas, residents are also less willing to marry spouses with family backgrounds lower than themselves or from lower social class families.

Table 2. The effect of house price on marriage matching: benchmark regression.

Variables	(1) diff_z	(2) diff_x	(3) down_z	(4) down_x	(5) low_z	(6) low_x
lnhp	-0.018** (0.008)	-0.087** (0.035)	-0.037** (0.018)	-0.033** (0.014)	-0.143*** (0.015)	-0.106*** (0.014)
age	0.023 (0.051)	0.034 (0.049)	0.009 (0.008)	0.002 (0.010)	-0.061*** (0.008)	-0.107*** (0.012)
age ²	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	0.001*** (0.000)	0.002*** (0.000)
native	-0.106** (0.048)	-0.106** (0.048)	-0.049** (0.023)	0.038* (0.023)	-0.080*** (0.021)	0.003 (0.021)
urban	-0.033 (0.038)	-0.084** (0.040)	0.051 (0.049)	0.000 (0.045)	-0.010 (0.039)	-0.002 (0.038)
party	0.014 (0.044)	0.064 (0.066)	0.033 (0.026)	0.067** (0.033)	-0.191*** (0.021)	-0.158*** (0.023)
minzu	-0.021 (0.039)	-0.039 (0.051)	-0.043 (0.033)	-0.037 (0.025)	-0.072** (0.029)	-0.044* (0.025)
edu	0.088*** (0.018)	0.120*** (0.020)	0.018*** (0.002)	0.014*** (0.002)	-0.027*** (0.001)	-0.025*** (0.001)
health	-0.102 (0.160)	-0.063 (0.200)	0.001 (0.002)	-0.003 (0.002)	-0.006*** (0.002)	-0.013*** (0.002)
lggdp	0.054 (0.196)	0.217 (0.241)	0.018 (0.011)	0.013 (0.009)	0.001 (0.010)	0.002 (0.010)
divorce	0.044 (0.057)	0.044 (0.057)	0.021 (0.029)	-0.006 (0.021)	0.022 (0.026)	0.057** (0.023)
constant	1.485 (0.955)	0.764 (0.907)	0.005 (0.143)	0.135 (0.137)	2.437*** (0.133)	2.851*** (0.158)
area fixed effects	control	control	control	control	control	control
year fixed effects	control	control	control	control	control	control
observation	1,898	1,898	1,898	1,898	1,898	1,898
R ²	0.094	0.100	0.058	0.036	0.247	0.227

Note: Where the robust standard errors clustered to the prefecture level are in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

4.2. Instrumental variable approach

There may be endogeneity issues between housing prices in various cities in China and the marriage matching patterns of local residents. One issue is the endogeneity problem caused by the simultaneity of regional housing prices and marriage decisions. After positive matching between men and women, there may be an increase in investment in housing due to expected wealth effects, further pushing up regional housing prices. There may be a circular and cumulative bidirectional causal relationship between housing prices and resident marriage matching, leading to bias in the estimated coefficients obtained based on traditional OLS models. The second issue is the endogeneity problem caused by omitting important variables. For example, the continuously rising housing prices may reflect a higher income level in the region, which may be related to the composition of the local

population and thus affect the local marriage market conditions. Although we have controlled for a series of city-level characteristic variables related to resident marriage matching decisions in the above models, such as per capita GDP and the crude divorce rate, it cannot completely solve the potential endogeneity issues theoretically. Therefore, this study attempts to find instrumental variables for regional housing prices to alleviate the estimation bias caused by endogeneity in Eq (1).

The selection of instrumental variables needs to satisfy the principles of “relevance” and “exogeneity” simultaneously. In other words, it is necessary to find an exogenous variable that is only inherently related to housing prices in various cities in China and has no direct connection with marriage matching patterns as instrumental variables. To this end, we follow the recent studies [27,34,41] and use the completed area of housing construction by real estate development enterprises as instrumental variables. This is mainly because, on the one hand, housing prices are obviously influenced by supply factors [42], and the less government land supply, the higher the level of housing prices. On the other hand, from the reality of China, under the public ownership of land, strict land use control is implemented, and the land indicators of various cities have exogenous characteristics driven by government policies. Factors related to the supply side of the real estate market are obviously unrelated to residents’ marriage and fertility decisions, conforming to the basic logic of selecting instrumental variables.

Based on the regression results using the instrumental variable method, it can be seen that the coefficients of the housing price level on the dependent variables measuring marriage matching are significantly negative, and other variable coefficients are relatively robust. The above series of regression results provide empirical evidence for the first research hypothesis of this study from different perspectives. these indicate that the higher the regional housing price level, the smaller the differences in various conditions between spouses, and the greater the degree of “achieved” marriage.

Table 3. The effect of house price on marriage matching: instrumental variable approach.

Variables	(1) diff_z	(2) diff_x	(3) down_z	(4) down_x	(5) low_z	(6) low_x
lnhp	-0.019*** (0.008)	-0.094*** (0.035)	-0.040** (0.018)	-0.033** (0.014)	-0.145*** (0.015)	-0.104*** (0.015)
constant	1.180 (0.717)	0.243 (0.310)	0.007 (0.142)	0.135 (0.137)	2.438*** (0.133)	2.847*** (0.158)
control variables	control	control	control	control	control	control
area fixed effects	control	control	control	control	control	control
year fixed effects	control	control	control	control	control	control
observation	1,898	1,898	1,898	1,898	1,898	1,898
R ²	0.126	0.128	0.145	0.178	0.334	0.302
Stage I F-value	131.73	145.43	146.87	164.66	147.04	165.59
DWH Chi ² /F-value	35.32***	37.10***				
Wald’s test			44.59***	47.26***	44.79***	47.91***

Note: Where, in parentheses, are robust standard errors clustered to the prefecture level, *** p<0.01, ** p<0.05, * p<0.1.

5. Patterns of housing price-marriage matching: a mechanistic analysis

In this section, we further examine how the rise in housing prices affects residents' homogamous marriage patterns through the transmission mechanism of gender spatial distribution in various cities in China. Influenced by traditional gender perceptions in China, eligible men and women bear different responsibilities in purchasing matrimonial homes. Therefore, the impact of high housing prices on the migration decisions of young adults eligible for marriage is heterogeneous. Compared to men, a greater number of women choose to reside long-term in their locale. The sex ratio is an important determinant of marriage matching in the marriage market. A decline in the sex ratio gives men a relative advantage in the marriage market, thus increasing the degree of homogamous marriage (Abramitzky et al. [24]). Hence, it is hypothesized that housing prices affect marriage matching patterns through influencing the intermediate link of the sex ratio.

5.1. Benchmarking the impact of house prices on the sex ratio

First, we regress Eq (3) to examine the relationship between housing prices and the long-term local sex ratio of the eligible unmarried floating population, with results presented in Table 4. Columns (1) and (2) in Table 4 are estimated using OLS regression, and columns (3) and (4) are estimated using instrumental variable methods to ensure the credibility of the baseline OLS analysis. Columns (1) and (3) consider only the housing price index, while columns (2) and (4) further control for characteristics of the locality. The estimated results in all columns of Table 4 show that the regression coefficients of the housing price variables in various cities are significantly negative, indicating that in areas with higher housing prices, the sex ratio of the eligible unmarried floating population choosing to stay locally is smaller. Against the backdrop of “no house, no marriage” in China and men bearing more responsibility for purchasing homes, the greater crowding-out effect of rising housing prices on mobile men makes the number of men in high housing price areas relatively scarcer. In the next subsection, we further test the conclusion that housing prices lower the local marriage market sex ratio by analyzing the different marriage decision-making behaviors of men and women in the marriage market.

Table 4. Impact of housing prices on the sex ratio in the marriage market.

Variables	(1)	(2)	(3)	(4)
lnhp	-0.046*** (0.003)	-0.022*** (0.002)	-0.055*** (0.003)	-0.031*** (0.003)
area characteristics	uncontrol	control	uncontrol	control
area fixed effects	control	control	control	control
year fixed effects	control	control	control	control
observation	344	344	344	344
R ²	0.124	0.147	0.179	0.235

Note: Where, in parentheses, are robust standard errors clustered to the prefecture level, *** p<0.01, ** p<0.05, * p<0.1.

5.2. Re-validation of the effect of house prices on the sex ratio

Previous analysis shows that the rise in housing prices leads to men and women in the eligible unmarried floating population making migration decisions in different proportions. The floating male population is more crowded out due to facing greater housing price pressure, resulting in a relative scarcity of men in high housing price areas. To deepen the understanding of the relationship between housing prices and the sex ratio in the marriage market, we further verify the impact of housing prices on the sex ratio through their different impacts on the marriage behaviors of men and women in the marriage market. The logic here is that if high housing prices lead to a lower sex ratio in the marriage market, then correspondingly in high housing price areas, men have a relative advantage and it is harder for women to get married.

We replace the dependent variable in Eq (1) with the percentage of men (or women) in a specific marital status (single or divorced) for regression estimation. Table 5 provides regression results for housing prices listed by gender and age group. The regression coefficients in columns (1) and (2) of Table 5 are both positive, indicating that in areas with higher housing prices, both women and men are more likely to remain single, with a greater impact on the 20–29 age group. Comparing the sizes of the coefficients in columns (2) and (1), it can be concluded that the rise in housing prices has a greater impact on the proportion of single women. The conclusion that women in high housing price areas are less likely to get married than men is consistent with the previous findings. In high housing price areas, the eligible sex ratio is lower, leading to a relative advantage for men in the marriage market, echoing the previous conclusions. According to column (3) of Table 5, in areas where high housing prices lead to a lower sex ratio, the proportion of men getting divorced also increases. This is consistent with the findings of Scott and Trent (1988); in societies with a lower sex ratio, men may be less faithful to their existing marital relationships and more likely to divorce after marriage.

Table 5. Impact of housing prices on marital behavior.

Age group	Single male	Single female	Divorced males	Divorced females
20–29	0.015*** (0.005)	0.021*** (0.004)	0.009*** (0.003)	0.001 (0.001)
30–39	0.010** (0.004)	0.022*** (0.005)	0.006*** (0.001)	0.001 (0.001)
40–49	0.009*** (0.003)	0.012*** (0.004)	0.005*** (0.001)	0.001 (0.001)

Note: Where the robust standard errors clustered to the prefecture level are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

6. Robustness tests and heterogeneity analysis

6.1. Robustness tests

To further ensure the reliability of the main conclusions of this article, we conduct robustness tests by replacing variables and samples used in the study.

In measuring multidimensional marriage matching patterns, the classification of social strata

becomes key to the robustness of this study. In the aforementioned analysis, a five-tier scale was used as the basis for measurement. In the robustness test, we will convert a seven-tier scale into a five-tier scale. The seven educational levels are transformed into five groups as follows:

Level 1: Illiterate (no formal education, private tutoring);

Level 2: Low to medium education (primary and junior high school);

Level 3: Medium education (high school);

Level 4: Medium to high education (technical secondary school and junior college);

Level 5: High education (undergraduate and graduate studies and above).

Using the five-tier scale, the regression results shown in Table 6 indicate that when the dependent variable is the difference between the social class of residents and their spouses, as well as whether they are married to a spouse of a lower social class, the coefficients of housing price levels remain significantly negative. However, the coefficient for marrying a spouse of a lower social class is negatively signed but not significant. The possible reason is that a finer classification of social strata implies a reduced scope for improvement in the sample marriages.

Table 6. Robustness test I: using different methods to measure dependent variables.

Variables	(1) diff_z	(2) diff_x	(3) down_z	(4) down_x	(5) low_z	(6) low_x
lnhp	-0.015*** (0.003)	-0.078** (0.031)	-0.021 (0.014)	-0.016 (0.015)	-0.148*** (0.016)	-0.106*** (0.015)
constant	0.808** (0.316)	0.808** (0.316)	1.113*** (0.133)	0.605*** (0.185)	3.082*** (0.164)	3.229*** (0.200)
control variables	control	control	control	control	control	control
area fixed effects	control	control	control	control	control	control
year fixed effects	control	control	control	control	control	control
observation	1,898	1,898	1,898	1,898	1,898	1,898
R ²	0.061	0.058	0.037	0.049	0.252	0.221

Note: Where the robust standard errors clustered to the prefecture level are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The sample with less room for marital improvement is also affected by house prices. Therefore, we anticipate that the influence of housing prices on marriage matching is greater for residents in the middle and lower classes. After excluding the top two levels (Levels 6 and 7) of residents, corresponding to the baseline regression mentioned earlier, we obtain Table 7. The coefficients in Table 7 are indeed larger than the corresponding coefficients obtained based on the complete sample in Table 2. The regression coefficients for housing price levels are consistently significant and negative across all models, indicating the robustness of the above conclusions.

Table 7. Robustness test II: replacing the sample.

Variables	(1) diff_z	(2) diff_x	(3) down_z	(4) down_x	(5) low_z	(6) low_x
lnhp	-0.014*** (0.004)	-0.110*** (0.036)	-0.053*** (0.020)	-0.028* (0.015)	-0.158*** (0.019)	-0.123*** (0.018)
constant	0.663** (0.332)	0.113 (0.334)	0.122 (0.153)	0.166 (0.141)	2.359*** (0.141)	2.759*** (0.166)
control variables	control	control	control	control	control	control
area fixed effects	control	control	control	control	control	control
year fixed effects	control	control	control	control	control	control
observation	1,538	1,538	1,538	1,538	1,538	1,538
R ²	0.075	0.055	0.058	0.036	0.247	0.227

Note: Where the robust standard errors clustered to the prefecture level are in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

6.2. Heterogeneity analysis

The impact of increasing housing prices on marital matching is subject to variation under diverse circumstances. A thorough examination of heterogeneity can amplify the efficacy of policy interventions. Considering the more substantial adverse effects of assortative mating (the pairing of individuals from similar socioeconomic backgrounds) on social mobility, the primary focus of the heterogeneity analysis is on delving into the patterns of such marital matching.

Significant variations in housing prices across different regions suggest that the influence of housing prices on residents' marital decisions varies. For example, residents in the eastern region contend with elevated housing prices, placing considerably more pressure on them compared to other regions. Conversely, the central and western regions experience more stable housing prices, alleviating the burden on residents in these areas. This paper categorizes regions outside the Northeast into Eastern, Central, and Western groups for distinct regression analyses, and the outcomes are detailed in Part A of Table 8.

Table 8. Heterogeneity analysis.

	diff_x		down_x		low_x	
	Coefficient	Std.	Coefficient	Std.	Coefficient	Std.
Part A						
East	-0.080*	(0.043)	-0.046**	(0.019)	-0.090***	(0.020)
Central	0.063	(0.150)	0.079	(0.066)	0.012	(0.066)
West	0.066	(0.150)	0.037	(0.063)	-0.036	(0.067)
Part B						
Youth	-0.188**	(0.092)	-0.083*	(0.046)	-0.227***	(0.047)
Middle	-0.061	(0.042)	-0.036**	(0.018)	-0.123***	(0.018)
Elderly	0.019	(0.072)	-0.005	(0.029)	-0.133***	(0.027)
Part C						
Foreign Residents	-0.134***	(0.048)	-0.066**	(0.031)	-0.180***	(0.026)
Local Residents	-0.126***	(0.037)	-0.001	(0.024)	-0.139***	(0.021)

Note: Where the robust standard errors clustered to the prefecture level are in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Results indicate that housing prices significantly impact marital decisions among residents in the eastern region. For every 1% increase in housing prices, the probability of residents marrying individuals from lower social classes decreases by 4.6%, and the likelihood of matching with lower social classes decreases by 9%. While the coefficients for the impact in the central and western regions are negative, they are not statistically significant at traditional levels. This could be explained by the relatively lower housing prices in these regions, resulting in less housing-related pressure on residents and, consequently, housing prices not being a major factor influencing marital decisions.

However, in the eastern region where housing prices are higher, the impact is more pronounced. Since the housing market reforms in the 1990s, China has experienced a significant rise in housing prices, making housing increasingly crucial in residents' lives. Different age groups experience varying housing price levels due to the era they live in, and thus, the influence of housing prices on marital decisions varies.

To analyze this, residents were grouped based on their birth dates. We defined residents below the age of 30 in the 2013 survey year as the youth group, those aged between 30 and 40 as the middle-aged group, and those aged 40 or above as the older group. Regression analyses were conducted for residents from different eras, and the results are presented in Table 8B.

The regression results indicate that for the youth group, rising housing prices significantly impact their marital decisions. However, for the older group, the influence of housing prices on marital decisions is smaller. This may be explained by the fact that the older group got married earlier when housing prices were much lower, resulting in smaller wealth and budget constraint effects from houses. Additionally, gender ratio changes are relatively slow, and the effects of housing prices on gender ratio spatial distribution take time to manifest. Considering the process of China's housing system reform, housing price trends, and gender ratio changes, it is logical that the marriage decisions of later-born cohorts are more likely to be adversely affected by housing prices.

In the context of continuously rising housing prices, an individual's migration status may also influence their partner selection decisions. In this study, residents with household registration in other cities or provinces were defined as migrants. From Table 8C, it is evident that rising housing prices significantly impact the positive marital decisions of migrants, with a noticeable but smaller coefficient for local residents. Comparatively, migrants face greater housing pressure than local residents, potentially leading to a more substantial impact on the marital decisions of migrants. This conclusion aligns with the findings of Ma Chao (2019), suggesting that for young individuals who migrate to urban areas for work but cannot buy a house and settle down, geographical mobility expands the exogamous circle; yet, there is no clear improvement in the social class of their prospective marital partners, resulting in a situation where geographical diffusion coexists with social class homogeneity.

7. Conclusions and recommendation

With the development of China's real estate market, housing has increasingly occupied a pivotal role in the family life of residents, profoundly impacting their behaviors and perceptions. Moreover, under the Chinese traditional marriage culture of "no house, no marriage," housing prices inevitably influence residents' marriage decisions. However, literature focusing on the impact of housing prices on individual marriage decisions mostly concentrates on the age of first marriage and marriage concepts, with a lack of in-depth, systematic study on how fluctuations in housing prices affect marriage matching decisions.

We, based on existing theoretical frameworks and using two waves of CHIP micro-survey cross-sectional data, employ the completed area of houses by real estate development companies as an instrumental variable for housing prices to conduct a rigorous empirical analysis. It delves into the heterogeneity and potential mechanisms involved. Our findings indicate that: First, in the Chinese context, the rapid rise in housing prices significantly impacts the marriage matching patterns of residents. Specifically, in cities with higher housing prices, residents tend to engage in positive assortative matching to mitigate the risks brought by high housing prices, with a lower probability of marrying spouses from lower or the lowest social classes. Second, given the reality in China where men bear more responsibility for buying houses, the rapid increase in housing prices also influences marriage matching patterns by affecting the spatial distribution of gender. In cities with rapid housing price increases and fast-declining gender ratios, there is a higher degree of homogamous marriage and a lower likelihood of downward matching or matching with lower social class spouses. Third, further analysis based on region, birth date, and whether one is a migrant reveals that facing higher housing pressures, residents in the eastern region, the youth group, and migrants show a deeper degree of matching with spouses of equal social status.

The increasingly prevalent trend of positive assortative mating within the populace serves to entrench rather than alleviate the rigidities of social class structures, thereby impeding the fluidity of intergenerational mobility. Additionally, in the context of China's long-term high birth sex ratio, the crowding-out effect of high housing prices on men exacerbates the gender ratio imbalance in low housing price areas, presenting more severe marriage squeeze issues for residents in these areas. The policy implications of this study are clear. First, considering the influence of housing prices on residents' marriage matching decisions, it is necessary to continue adhering to the position of "houses for living, not for speculation", and implement policies to weaken residents' expectations of continuous housing price increases. Keeping housing prices within a reasonable range is crucial to mitigating the crowding-out effect on men and is significant for reducing the influence of family background in the marriage matching process and expanding the mobility and openness of marriage choices. Second, it is important to cultivate and develop the housing rental market, establish a dual-track housing system of renting and buying, reduce the public services attached to housing, and advocate for gender equality and rational marriage concepts, gradually eliminating the materialistic tendencies in marriage relationships. Finally, in advancing housing policies, it is essential to strengthen screening mechanisms to ensure the optimal allocation of limited housing resources. Considering the greater negative impact of housing prices on the youth and migrant populations, appropriate housing subsidies and mortgage benefits should be provided to young couples planning to buy a house for marriage and to migrant residents.

This paper can be expanded in two aspects. First, by taking housing prices as the research focus and considering housing as a traditional financial asset, it lacks exploration into more novel financial assets like bitcoin [43,44], especially in the current era of the digital economy [45–47]. Future research could extend to the impact of digital financial assets on individual decision-making, providing a more accurate interpretation of the current practical situation. Second, while we consider the spatial distribution of gender as a channel, it is evident that the spatial configuration of gender also influences housing prices, posing challenges in addressing endogeneity issues. Future efforts could explore introducing the network structure of spatial configurations to more precisely consider the impact of endogenous structures [48], thereby offering a more accurate explanation of the mechanism through which housing prices affect marriage matching.

Use of AI tools declaration

The authors declare that they have not used Artificial Intelligence (AI) tools in the creation of this article.

Conflict of interest

All authors declare no conflicts of interest in this paper.

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