Complexity Thinking and China's Demography Within and Beyond Mainland China

A Geopolitical Overview

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Chapter 8

What Influences Fertility Plan of China Migrant?
Mechanism analysis based on house price perspective.

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Abstract: The demographic imbalance brought about by China low fertility rate in recent years is a matter of concern. This paper uses data from the 2018 China Migrants Dynamic Survey to estimate the impact of house price on the fertility plan of the migrant. After using instrumental variable and propensity score matching to mitigate potential endogeneity problems, the results show that the higher house price in the inflow cities, the less likelihood female migrant have fertility plan; if the housing pressure of the migrant is low, their fertility plan is less affected by house price. The sensitivity of the migrant's fertility plan to house price is also influenced by the infrastructure development in the inflow city. Heterogeneity analysis shows that the fertility plan of female migrant with larger family size, higher education level and younger age is more sensitive to house price. This paper fills the gap in the impact of house price on the fertility of migrant group and analyzed the mechanism of the impact of house price on the fertility plan.

Keywords: Migrant; House Price; Fertility; Moderating Effect; China

1 Introduction

Human capital is an important position in the process of economic development [Gennaioli et al., 2013]. In recent years, the stock and increment of human capital in China have gradually shown a tendency to be insufficient, and the average age of the working population is 38.8 years old, with a significant aging phenomenon [CUFE, 2021]. During the period, China total fertility rate was between 1.5 and 1.6, significantly lower than the level of generation replacement needed to achieve population stability [Yang et al., 2022]. One of the reasons for this phenomenon is China long-standing family planning policy [Wang et al., 2017]. In 2021, China natural population growth rate is only 0.34 per 1,000 and enter negative growth in 2022 [Lian and Xu, 2023]. At the same time, China expanding economy and market size still have high labor demand [Wu and Zhang, 2020]. The potential structural imbalance of human resource supply arising from low fertility rate and high labor demand in China is a matter of concern.

Migrant is an important part of China labor supply. Since the reform and opening up of

China resolved the institutional barriers to population mobility, the size of the migrants has been expanding, reaching 375.82 million by 2020, an increase of 69.73% in 10 years [Cai, 2018, Wang, 2023]. China rural outflow population provides an important human resource for urban development and plays a huge role in the urbanization process [Zhang and Song, 2003]. Improving the fertility intention of the migrants, alleviating the structural imbalance of human resource supply, and providing a stable labor supply for economic development are important conditions for promoting China sustained economic growth.

There are special policy and cultural contexts for exploring the fertility intention of China migrant from the perspective of house price. High house price can have an impact on families' financial situation, housing conditions and employment opportunities, which can affect their fertility decisions, causing some families to give up or postpone having children for financial, housing and employment reasons [Pan and Xu, 2012]. In addition, due to China long-standing dualistic urban-rural household registration system, migrants are often unable to receive local medical and educational resources from the inflow cities, making social integration difficult from an institutional perspective [Hao and Tang, 2015]. China household registration is highly tied to housing, and high house price make it impossible for the migrant laborer to settle down and obtain household registration in the inflow cities, which also affects their willingness to have children [Wang, 2006]. Moreover, traditional Chinese culture views housing as a necessity for marriage and children [Liu et al., 2020].

Based on the above background, this paper constructs the house price to household income ratio as the core explanatory variable using the China Migrants Dynamic Survey(CMDS) and empirically examines the impact of urban house price on the fertility plan of migrant. The results show that the higher house price in the inflow cities, the less likelihood female migrant have fertility plan; if the housing pressure of the migrant is low, their fertility plan is less affected by house price. The sensitivity of the migrant's fertility plan to house price is also influenced by the culture infrastructure development in the inflow city. Heterogeneity analysis shows that the fertility plan of female migrant with larger family size, higher education level and younger age is more sensitive to house price.

The paper is structured as follows: Part II conducts a literature review, Part III presents the research methodology, Part IV presents the empirical results, and Part V concludes.

2 Review of the Literature

The study of fertility is important in demography. Some research has examined the factors affecting the fertility intention of the population from a multidimensional perspective. For example, [Kim and Yeo, 2019] focus on the low fertility in Korea about how socio-environmental factors can influence fertility plan through individual environmental factors. [Arai, 2007] argues for the indirect role of social relationships on fertility intention through an empirical analysis of

the potential impact of community on fertility intention. It is worth noting that many scholars believe that high house price affect people's willingness to have children. Such as [Dettling and Kearney, 2014] defines fertility price as housing cost and argues that the real estate market has a more direct effect on fertility plan. [Lino, 2002] find a significant negative relationship between house price and fertility intention, suggesting that housing cost are the largest expense of raising children, and high house price is overwhelming many families, resulting in negative fertility behavior.

In studies about the effect of house price on the migrants in China, [Liu et al., 2020] confirmed the negative effect of high house price on fertility among the household population in China using census data. [Clark et al., 2020] analyzed the negative relationship between house price and fertility in China using data from the China Household Finance Survey and using land premiums as an instrumental variable for house price, and group tests were conducted for different levels of cities.

Regarding the mechanism of the effect of house price on the fertility plan of the migrants, the existing studies focus on both the willingness to integrate and the financial ability. On the one hand, the high or low house price is related to the strength of the social integration intention of the migrants. When house price is higher, the migrants' willingness to integrate socially decreases and the likelihood of having fertility plan subsequently decreases. According to [Entzinger and Biezeveld, 2003], social integration includes psychological integration, cultural integration, economic integration, and political integration. House price as specific quantification of property rights is an important indicator of the migrants' integration into the society of the place of migration in many ways, which in turn affects the willingness to stay. Since the migration of the migrants is a short-term decision-making behavior [Du et al., 2014], lowering the threshold of ownership of their property rights is a key initiative to promote long-term residence of the migrants and thus increase the likelihood of having children. High house price mean that it is more difficult for the migrants to integrate subjectively into the local area, and accordingly, their willingness to have children decreases.

On the other hand, house price is also a test of the economic capacity of migrants. In China, housing is highly tied to household registration. The series of thresholds imposed by the household registration system makes the migrants relatively less able to afford house price and leads to a greater reluctance to bear the various cost arising from childbearing. The direction of population movement is mainly from rural to urban areas [Lewis et al., 1954]. However, under the influence of China dual economic structure between urban and rural areas and the household registration system, the migrants are not only disadvantaged in the job market but also suffer from financial constraints and a lack of public protection. The household registration system provides a natural barrier to entry into the job market, and self-employment is the rational choice for this group to deal with employment discrimination as opposed to wage employment [Banerjee, 1983, Roberts, 2001, Song and Appleton, 2008]. However, the precari-

ousness of self-employment reduces migrants' ability to take economic risks and reduces their willingness to have children. [Oates, 1969] highlights the role of public services in the utility model of population migration, arguing that a good social security system reduces expenditure in a number of ways. As the migrants do not benefit from the range of social security that comes with a household registration system, they have higher security expenditures relative to the local population, further reducing the ability to bear the potential economic risks associated with childbearing.

Although studies have been conducted to analyze the relationship between house price and fertility, there is no detailed analysis of the mechanisms. Also, there are gaps in research on samples of China migrants, and this paper will add to the existing research from these two perspectives.

3 Data Sources and Variables

3.1 Data Sources

This study uses data from the 2018 China Migrants Dynamic Survey (CMDS). The survey was conducted by the National Health Commission of China and adopted the stratified, multi-stage, large-scale PPS sampling method, covering 31 provinces (municipalities and autonomous regions) in mainland China. The average age of the sample used in this paper is 16-50 years old, and the sample size of this paper is 45,593 (married female migrants). The data relating to urban control variables is from the China City Statistic Yearbook.

3.2 Variable Selection

The dependent variable of this paper is the fertility plan, which is estimated using the CMDS questionnaire "Do you plan to have children in the near future?". The independent variable in this paper is the house price, which is the ratio of the house price in the sample inflow city to the sample average monthly household income. Household income is measured by the CMDS questionnaire "What is your total monthly household income", which is a clearer indicator of the difficulty of access to urban property rights for the migrants than the house price constructed from urban per capita disposable income or only city average house price.

The control variables in this paper include urban control variables and individual control variables. In existing empirical studies of fertility, indicators such as years of education, family size, age, employment situation, and health status usually set as demographic control variables. In addition to the above variables, this paper also chooses household registration (hukou) as the control variable, based on the unique context of China dualistic urban-rural household registration policy. This paper also selects industrial structure, urban green space, education and medical resources as control variables. The detailed description of the variables is in Table 1.

Table 1: Variable description

Variables	Description
fertility	Planing to have children = 1, No = 0
hp	Inflow city house price/individual household income
job	Civil service career = 2, Other career = 1, Unemployed = 0
health	Unhealthy=1, Fair=2, Fairly healthy=3, Healthy=4
age	Age of sample
family	Number of family members
edu	Years of education
hukou	Urban household = 1, Agricultural household = 0
tgdp	Share of tertiary sector in total GDP. (%)
green	Percentage of green space in the city (%)
book	Book collection per capita
teacher	Number of primary school teachers per 10,000 population
medical	Number of physicians per 10,000 population

3.3 Descriptive Statistics

The descriptive statistic is reported in Table 2. As can be seen from the table, female migrants with fertility plan (fertility) for approximately 12% of the total sample. The mean value of the core explanatory variable, the ratio of the house price in the sample inflow city to the sample average monthly household income (hp) is 1.635, and its economic significance is that the average household income of the respondents needs 1.6 months to buy one square meter of property. In the hypothesis of this paper, high house prices significantly reduce the fertility intention of female migrants. The average household (family) size of the sample is 3.479, and the smaller household size is related to the long-standing family planning policy in China. The average years of education (edu) of the sample are around 10 years, and the average age (age) is about 34 years. The majority of the respondents were in agricultural household registration (hukou), a dualistic household registration system that divided Chinese citizens into agricultural household registration and non-agricultural household registration until 2015, and the large differences in the rights and benefits attached to the two types of household registration have had a profound impact on the regional labor endowment allocation in China.

Table 2: Descriptive statistics results

Variables	N	Mean	SD	Min	Max
fertility	45,355	0.120	0.325	0	1
hp	45,355	1.635	1.506	0.0169	140.6
job	45,355	0.747	0.557	0	2
health	45,355	1.118	0.359	1	4
age	45,355	34.70	7.436	16	50
family	45,355	3.479	0.878	2	11
edu	45,355	10.32	3.482	0	19
hukou	45,355	0.323	0.468	0	1
tgdp	45,355	55.00	11.59	26.54	80.98
green	45,355	41.81	3.465	23	93.81
book	45,355	1.607	1.510	0.0793	8.742
teacher	45,355	42.96	8.907	18.54	85.70
medical	45,355	64.64	21.62	19.69	128.2

4 Methodology

4.1 Research Hypothesis

This paper proposes the following hypotheses on the mechanism by which house price affect the fertility intention of the migrants.

Hypothesis 1: The probability of having fertility plan among the migrants and urban house price is negatively correlated.

High house price will not only bring huge economic pressure to the migrants but also affect the social integration of the migrants in the inflow city, leading to a decrease in their fertility intention. House price as a quantitative indicator of the difficulty of acquiring residential property rights, is an important indicator of whether the migrants can be institutionally integrated into the place of migration. In China, housing ownership is linked to household registration and children's eligibility for schooling, medical insurance and other related social benefits. High house price mean that it is more difficult for the migrants to integrate economically and institutionally into the incoming region, leading to a decrease in fertility intention.

Hypothesis 2: The sensitivity of migrant fertility plan to house price is influenced by the availability of culture infrastructure in inflow cities.

The preference of the migrants for local property rights depends on the economic environment and infrastructure development of the inflow city. When making fertility decisions, the migrants will consider the impact of local culture resources on the future life of their children. This is also reflected in their willingness to have children, i.e., there are moderating effects be-

tween the construction of culture infrastructure services on the willingness to have children and the sensitivity to house price.

Hypothesis 3: The sensitivity of fertility intention to house price is influenced by the amount of housing pressure on the migrants.

High house price imposes a huge financial burden on the migrants. The huge financial pressure of housing expenses on the migrants will squeeze their ability to bear various costs arising from childbirth and affect their fertility intention, but this mechanism is affected by the housing pressure of the migrants. That is, the fertility intention of the migrants with housing pressure is vulnerable to house price, and the fertility intention of the migrants without housing pressure is not necessarily sensitive to house price.

Among them, hypothesis 1 can be proved by the results of the baseline regression. For hypothesis 2, this paper examines the possible moderating effects by using the interaction term between culture infrastructure variable and house price.

To address hypothesis 3, this paper regresses all samples in groups according to housing pressure status. The CMDS questionnaire does not contain questions about the housing pressure status of housing for the migrants, and this paper uses the sample household housing expenditure as a proxy variable for housing pressure status - the group with zero household housing expenditure is regressed in a separate group to examine the effect of migrants housing pressure on the mechanism.

4.2 Baseline Model

In this paper, the explanatory variable "fertility plan of the migrants" is a dummy variable, and the models available include Linear probability model(LPM), Logit model, and Probit model. This paper chooses to use the Probit model for the empirical analysis, while reporting the estimation results of the Logit model for robustness check. The expression for the Probit model is.

$$Pr\left(F_{ij} = 1 \mid hp, X\right) = \frac{exp\left(\beta_0 + \beta_1 hp_{ij} + \beta X + \varepsilon_{ij}\right)}{1 + exp\left(\beta_0 + \beta_1 hp_{ij} + \beta X + \varepsilon_{ij}\right)} \tag{1}$$

In equation (2), F_{ij} is the fertility plan of the migrant. If the migrant i has fertility plan in the j inflow city, the value is 1, otherwise it is 0. $Pr\left(F_{ij} = 1 \mid hp, X\right)$ is the probability that the migrants i has fertility plan in the inflow city j. hp is house price to income ratio, X are other control variables, ε_{ij} are random disturbance term.

4.3 Robustness

4.3.1 Instrumental Variable

The fertility intention is influenced not only by house price in the inflow cities, but also by other potentially influential factors. The paper screens variables at the variable selection stage,

but it is still difficult to control for all potential influencing factors. Additionally, the high fertility intention of the migrants in a region may increase house price, thus creating a reverse causality, i.e. house price may be an endogenous variable. Considering potential problems of omitted variables and causal inference, it is necessary to find instrumental variable (IV).

Research on instrumental variables for house price is well established. Common instrumental variables include land development area [Peng and Du, 2016, Zhang et al., 2018], the product of long-term interest rate and land supply elasticity [Chaney et al., 2012] and land concession price [Waxman et al., 2020]. In this paper, the lagged land concession price is chosen as the instrumental variable for house price. Land concession prices directly affect house price, which is consistent with the instrumental variable correlation hypothesis; at the same time, the migrants does not actively consider addressing land concession prices in previous years when considering childbearing, which is consistent with the instrumental variable exogeneity hypothesis. In order to conform to the data structure of house price, this paper constructs the ratio of lagged land prices to lagged city disposable income per capita as an instrumental variable.

4.3.2 Propensity Score Matching

Although the base model controls for personal characteristics and regional factors, the fact that the fertility plan of individual female migrants is not necessarily randomly determined, e.g. those with higher economic and social status are usually more likely to stay in the local area and thus have higher fertility intention, leads to the fact that when estimating the effect of house price on the fertility plan of the sample, direct use of a binary choice model may lead to serious sample bias due to This leads to the possibility that direct use of a dichotomous choice model may lead to serious sample bias due to 'self-selection'. Therefore, this paper matches the untreated sample with the treated sample based on propensity score matching (PSM) to balance the data so that the personal characteristics of the matched treated group (above-median house price to income ratio group) and the control group (below-median house price to income ratio group) remain the same and statistical differences are reduced.

The first step was to estimate the propensity score $P(X)$ for each female migrant fertility plan through logit regression, expressed as:

$$P\left(X_i\right) = Pr\left(Fertility_i = 1 \mid X_i\right) \tag{2}$$

Where X is a set of factors affecting female migrants' fertility plan, also known as matching variables. The average treatment effect on the treated (ATT) is calculated by matching the treatment and control groups according to the common support region of the propensity score, followed by the corresponding matching method, and the expression is :

$$ATT = E\left(Y_i^T - Y_i^C \mid fertility_i = 1\right) = E\left(Y_i^T \mid fertility_i = 1\right) - E\left(Y_i^C \mid fertility_i = 1\right) \tag{3}$$

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The ATT is designed to compare the difference in fertility plan between high and low housing pressure migrants who are equally likely to have fertility plan, and to derive a specific effect of house price on the fertility plan of migrants.

5   Regssion Results and Discussion

5.1   Baseline Regression

Table 3 shows the results of the baseline regression. Models (1) to (5) are the stepwise regression results of the Probit model. Model (1) shows that, conditional on the exclusion of control variables, the coefficient of the house price to income ratio on fertility intention is -0.0437, which is significant at the 99% level, indicating that there is a significant negative relationship between house price and the fertility plan of the migrants. The higher the house price to household income ratio in the inflow cities, the lower the probability of having fertility plan among the female migrants. Model (5) includes city and individual control variables, along with provincial fixed effects. The coefficient increases slightly (-0.0522) compared to the results without including the control variables. The Logit model has similar estimation results. Model (6) shows the regression coefficient of -0.0858 for the house price to income ratio on fertility intention when no other control variables are included. Model (7) includes urban and individual control variables, with the coefficient -0.0927.

High house price can put enormous financial pressure on migrants, while home ownership is a necessary condition for childbearing in Chinese culture. Higher house price to income ratios makes it difficult for the migrants to obtain housing ownership and the various social security entitlements represented by household registration in the city to which they move, leading to a decline in their fertility intention.

5.2   Robustness

Table 4 depicts the results of instrument variable. It can be seen from the first-stage regression results that the regression result of instrumental variable on endogenous variables is significant at the 99% confidence level (Model 9), proving that instrumental variable has strong explanatory power on endogenous variables and there is no weak instrumental variable problem. Compared to the baseline results, the absolute value of the coefficient on the instrument variable in the Model (8) increases, indicating that the endogeneity problem tends to underestimate the effect of house price on the intention to have children among the migrants.

The sample size of the data used in this paper is large, and to avoid endogeneity issues due to potential sample selection bias, this paper uses propensity score matching for robustness testing. Kernel density plots before and after using propensity score matching are reported in this paper (Figures 1 and 2). The quality of the data is significantly higher after matching

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Probit	Probit	Probit	Probit	Probit	Logit	Logit
hp	-0.0437***	-0.0394***	-0.0866***	-0.0475***	-0.0522***	-0.0858***	-0.0927***
	(0.00728)	(0.00906)	(0.00951)	(0.0109)	(0.0118)	(0.0142)	(0.0203)
job		-0.0205		-0.0270*	-0.0294*		-0.0521*
		(0.0161)		(0.0162)	(0.0163)		(0.0295)
health		-0.0107		-0.0139	-0.0165		-0.0437
		(0.0293)		(0.0294)	(0.0296)		(0.0553)
old		-0.0684***		-0.0680***	-0.0681***		-0.119***
		(0.00140)		(0.00141)	(0.00143)		(0.00258)
family		-0.658***		-0.673***	-0.687***		-1.400***
		(0.0173)		(0.0177)	(0.0181)		(0.0342)
edu		0.0376***		0.0389***	0.0393***		0.0706***
		(0.00316)		(0.00330)	(0.00341)		(0.00597)
hukou		0.0410**		0.0398**	0.00973		0.0690*
		(0.0195)		(0.0196)	(0.0217)		(0.0357)
green			0.000645	0.000200	-0.000957		0.00217
			(0.00230)	(0.00276)	(0.00424)		(0.00511)
book			0.00283	-0.0125	-0.0201		-0.0244
			(0.00713)	(0.00828)	(0.0176)		(0.0153)
teacher			0.00394***	0.0112***	0.00778***		0.0214***
			(0.000882)	(0.000999)	(0.00169)		(0.00183)
medical			-0.000128	-0.00214***	-0.0021**		-0.0038***
			(0.000468)	(0.000561)	(0.000874)		(0.00103)
tgdp			0.00840***	0.00334***	0.000931		0.00542**
			(0.00101)	(0.00119)	(0.00171)		(0.00220)
constant	-1.106***	2.796***	-1.696***	2.324***	2.452***	-1.857***	4.623***
	(0.0137)	(0.0924)	(0.104)	(0.150)	(0.217)	(0.0262)	(0.276)
Urban Variable	No	No	Yes	Yes	Yes	No	Yes
Individual Variable	No	Yes	No	Yes	Yes	No	Yes
Provincial FE	No	No	No	No	Yes	No	No
N	45355	45355	45355	45355	45355	45355	45355
Pseudo R^2	0.0013	0.1434	0.1867	0.2489	0.2860	0.0013	0.2576

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. The following table is the same.

Table 4: Instrumental variable regression results

	(8)	(9)
	IVProbit	First-Step Result
hp	-0.204**	-
	(0.0918)	-
Instrument variable	-	0.137***
	-	(0.00924)
Control Variables	Yes	Yes
N	45355	45355
Pseudo R^2	-	0.1866

Table 5: Propensity score matching results

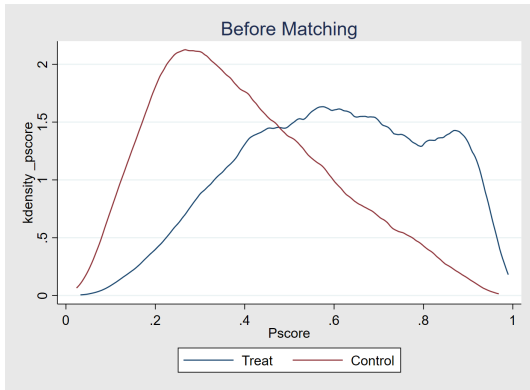| Matching Status	1:1 Matching		1:2 Matching		Radius Matching		Kernel Matching	
	ATT	t	ATT	t	ATT	t	ATT	t
Pre-match	-0.016***	-5.26	-0.016***	-5.26	-0.016***	-5.26	-0.016***	-5.26
Post-match	-0.025***	-4.08	-0.023***	-4.36	-0.022***	-4.25	-0.022***	-4.35

compared to before matching.
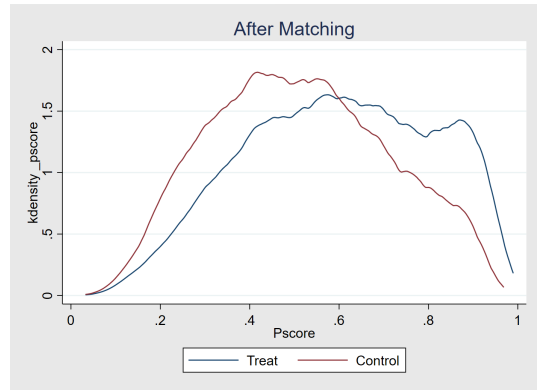

Figure 1: Before-matching kernel density

Figure 2: After-matching kernel density

In the PSM dummy variable setting, this paper chose to use the median grouping of house price to income ratio. Table 5 shows the results of the PSM estimation, with the treatment effect for the four matching methods being approximately -0.025 after matching the characteristics of the sample and significant at the 95% statistical level. This is the same conclusion as the baseline regression results and the IV regression results that there is a negative effect of high house price on the fertility intention of the migrants. In summary, Hypothesis 1: "The probability of having fertility plan among the migrants and urban house price is negatively correlated." is confirmed.

Table 6: Moderating effect of culture infrastructure

	(10)
	Probit
hp	-0.00593
	(0.00831)
hp*book	-0.00851**
	(0.00391)
pbook	0.000259
	(0.0109)
Control Variables	Yes
N	45355
Pseudo R^2	0.2509

5.3 Analysis of Mechanism

5.3.1 Moderating Effects of Culture Infrastructure

The effect of house price on the fertility plan of migrants is estimated above, Table 6 reports the moderating effects of culture infrastructure on the relationship between house price and the fertility decisions of migrants.

Model (10) is the result of the interaction between book collection per capita and house price, the interaction term is significant at the 90% level, demonstrating that the level of culture infrastructure has a moderating effect on house price affecting the fertility plan of the migrants. The coefficient of the main effect is negative, proving that the housing-income ratio has a negative impact on the migrant's fertility intention. The coefficient of the interaction term is negative, which is the same as the main effect, proving that cultural infrastructure strengthens the main effect. The preference of the migrants for local property rights also depends on the culture infrastructural development of the inflow city. When making fertility decision, migrants consider the impact of local culture resources on the future lives of their children.

5.3.2 The Effect of Housing Stress

In the hypothesis of this paper, house price is negatively related to the fertility intention of the migrants. Another intuitive manifestation of this logic is that when the migrants is not under housing pressure, their fertility plan will no longer be influenced or less influenced by house price.

This hypothesis is analysed in this paper using sample housing expenditure as a proxy variable for housing stress. In the CMDS questionnaire, the sample's household housing expenditure consists mainly of rent and housing loans. The paper runs a subgroup regression on

Table 7: The effect of housing stress

	(11)	(12)	(13)	(14)
	With Housing Expenses		Without Housing Expenses	
hp	-0.0258**	-0.0467**	-0.0514***	-0.0503***
	(0.0115)	(0.0188)	(0.00900)	(0.0135)
Control Variables	No	Yes	No	Yes
N	10965	10965	34390	34390
Pseudo R^2	0.0007	0.2457	0.0016	0.2553

Table 8: Heterogeneity analysis

	(15)	(16)	(17)	(18)	(19)	(20)
	Family size		Education		Age	
hp	-0.0269**	-0.0562**	-0.0403***	-0.0881***	-0.0593***	-0.0394***
	(0.0111)	(0.0241)	(0.0129)	(0.0214)	(0.0148)	(0.0140)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
N	24530	20825	36126	9229	13189	32166
Pseudo R^2	0.1240	0.1534	0.2387	0.1916	0.1826	0.1370
Differences	0.029		0.048		0.020	

the sample based on whether the sample's housing expenditure is zero. Table 7 reports the results of the subgroup regressions, Model (11) and Model (12) for the group without housing stress, and Model (13) and Model (14) for the group with housing stress. The coefficients for the group with housing stress are significantly higher than those for the group without housing stress, demonstrating that the fertility plan of the migrants with household housing expenditure are more likely to be influenced by house price.

5.4   Heterogeneity Analysis

To further understand the sensitivity of fertility intention to house price among the migrants with different characteristics, this paper conducts a heterogeneity analysis of the sample. Table 8 reports the regression results based on household size, education level and age grouping of the sample.

Model (15) shows the regression results for the sample with household size less than or equal to 3 persons, and its regression coefficient is smaller than that of the sample with household size greater than 3 persons (Model 16). Reasons for the larger household size in the sample may include supporting the elderly or already having children, both of which place a burden on the household economy, and the willingness to have a second child is also significantly lower than that of the first child. The fertility plan of female migrants with larger families are therefore

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more sensitive to house price.

Model (17) shows the regression results for the sample with no tertiary education, whose regression coefficients are smaller than those for the sample with tertiary education (Model 18). In general, highly educated female migrants tend to have higher income levels and lower fertility intention, and willing to purchase their own housing. They are more affected by changes in house price and have more sensitive fertility plan to house price.

Model (19) shows the regression results for the sample aged less than 30 years, and its regression coefficient is larger than the results for the sample aged more than 30 years (Model 20). The risk of childbearing increases with female age, so when women are older, their fertility plan is not susceptible to house price.

6 Conclusion

This paper uses Probit model to estimate the impact of house price on the fertility plan of the migrants based on data from the 2018 China Migrants Dynamic Survey. The results show that the higher house price in the inflow city, the less likelihood female migrants have fertility plan; when the housing pressure of the migrants is low, their fertility plan is less affected by house price; the sensitivity of the migrants' fertility plan to house price is also influenced by the moderating effect of culture infrastructure development; the fertility plan of female migrants with larger family size, lower education level and higher age are more sensitive to house price.

Although China economic growth has slowed down in recent years, the country's expanding economy and market size still require a large labor force. The migranta is a non-negligible group in China labour endowment structure, and increasing the fertility intention of the migranta is an important measure to optimize China labour force structure and mitigate aging. According to the empirical results of this paper, the government can improve the fertility intention of the migrants by improving the housing policies of the migrants and reducing housing costs. Addressing the institutional barriers to the education of the children of the migrants and guaranteeing the right to education for school-age children. Deepening the reform of the household registration system and guaranteeing basic public service resources for the migrants to increase the fertility intention of migrants.

References

[Arai, 2007] Arai, L. (2007). Peer and neighbourhood influences on teenage pregnancy and fertility: Qualitative findings from research in english communities. *Health & Place*, 13(1):87–98.

[Banerjee, 1983] Banerjee, J. (1983). An experimental study on the cold rolling of strips.

[Cai, 2018] Cai, F. (2018). Perceiving truth and ceasing doubts: What can we learn from 40 years of china's reform and opening up? *China & World Economy*, 26(2):1–22.

[Chaney et al., 2012] Chaney, T., Sraer, D., and Thesmar, D. (2012). The collateral channel: How real estate shocks affect corporate investment. *American Economic Review*, 102(6):2381–2409.

[Clark et al., 2020] Clark, W. A., Yi, D., and Zhang, X. (2020). Do house prices affect fertility behavior in china? an empirical examination. *International Regional Science Review*, 43(5):423–449.

[CUFE, 2021] CUFE (2021). China human capital report 2021(in chinese. *Central University of Finance and Economics Press*.

[Dettling and Kearney, 2014] Dettling, L. J. and Kearney, M. S. (2014). House prices and birth rates: The impact of the real estate market on the decision to have a baby. *Journal of Public Economics*, 110:82–100.

[Du et al., 2014] Du, Y., Cai, F., Qu, X., and JieChen (2014). Continuing the chinese miracle: Reaping the dividends of the household registration system reform. *Economic Research*, 8:4–13.

[Entzinger and Biezeveld, 2003] Entzinger, H. and Biezeveld, R. (2003). Benchmarking in immigrant integration.

[Gennaioli et al., 2013] Gennaioli, N., La Porta, R., Lopez-de Silanes, F., and Shleifer, A. (2013). Human capital and regional development. *The Quarterly journal of economics*, 128(1):105–164.

[Hao and Tang, 2015] Hao, P. and Tang, S. (2015). Floating or settling down: The effect of rural landholdings on the settlement intention of rural migrants in urban china. *Environment and Planning A*, 47(9):1979–1999.

[Kim and Yeo, 2019] Kim, J. S. and Yeo, Y. H. (2019). The relationship between family-friendly policy and intention of childbirth. *International Journal of IT-based Social Welfare Promotion and Management*, 6:1–6.

[Lewis et al., 1954] Lewis, W. A. et al. (1954). Economic development with unlimited supplies of labour.

[Lian and Xu, 2023] Lian, Y. and Xu, W. (2023). Analysis of information technology management development in the context of population aging–based on gray prediction algorithm.

[Lino, 2002] Lino, M. (2002). Expenditures on children by families. *Family Economics and Nutrition Review*, 14(2):3.

[Liu et al., 2020] Liu, J., Xing, C., and Zhang, Q. (2020). House price, fertility rates and reproductive intentions. *China Economic Review*, 62:101496.

[Oates, 1969] Oates, W. E. (1969). The effects of property taxes and local public spending on property values: An empirical study of tax capitalization and the tiebout hypothesis. *Journal of political economy*, 77(6):957–971.

[Pan and Xu, 2012] Pan, L. and Xu, J. (2012). Housing price and fertility rate. *China Economic Journal*, 5(2-3):97–111.

[Peng and Du, 2016] Peng, D. and Du, Y. (2016). Do high housing prices inhibit firms' exports-a theoretical and empirical analysis from chinese manufacturing firms. *China Economic Issues*, 5:3–15.

[Roberts, 2001] Roberts, K. D. (2001). The determinants of job choice by rural labor migrants in shanghai. *China Economic Review*, 12(1):15–39.

[Song and Appleton, 2008] Song, L. and Appleton, S. (2008). Social protection and migration in china: What can protect migrants from economic uncertainty. *Migration and social protection in China*, 14:138.

[Wang, 2006] Wang, C. (2006). Study on the "semi-urbanization" of rural migrant population. *Sociological Research(Chinese)*, 5(7):107–122.

[Wang et al., 2017] Wang, F., Zhao, L., and Zhao, Z. (2017). China's family planning policies and their labor market consequences. *Journal of Population Economics*, 30(1):31–68.

[Wang, 2023] Wang, S. (2023). Constructing children's psychological well-being: Sources of resilience for children left behind in northeast china. *International Migration*.

[Waxman et al., 2020] Waxman, A., Liang, Y., Li, S., Barwick, P. J., and Zhao, M. (2020). Tightening belts to buy a home: Consumption responses to rising housing prices in urban china. *Journal of Urban Economics*, 115:103190.

[Wu and Zhang, 2020] Wu, J. and Zhang, J. (2020). Barriers to school education for migrant children□ being left behind and urban labor supply. *Economic Research Journal(Chinese)*, 11:138–155.

[Yang et al., 2022] Yang, S., Jiang, Q., and Sánchez-Barricarte, J. J. (2022). China's fertility change: an analysis with multiple measures. *Population Health Metrics*, 20(1):1–14.

[Zhang and Song, 2003] Zhang, K. H. and Song, S. (2003). Rural–urban migration and urbanization in china: Evidence from time-series and cross-section analyses. *China Economic Review*, 14(4):386–400.

[Zhang et al., 2018] Zhang, W., Xu, J., and Yang, Z. (2018). House price, wage and resource allocation efficiency - an empirical analysis based on micro household data. *Financial Research*, 458(8):69–84.