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Research on Housing Inequality in China—Empirical Analysis Based on CFPS 2018

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Abstract: *Based on household data in CFPS 2018, this article uses empirical analysis methods such as descriptive statistical analysis, OLS and Logit regression, and Sharpley value decomposition to study the issue of household housing inequality in China. The research results show that the issue of household housing inequality in China is reflected in three housing level indicators: housing value, housing area, and whether there is real estate ownership. The housing level is affected by regional factors and family factors, and the contribution rate of each factor is different for different housing level indicators.*

Keywords: *Housing level, Housing inequality, Unequal contribution rate*

1. Introduction

China has always attached great importance to the significance of housing. In the traditional consciousness of people in China, housing represents a person's scope of life, is the basis for reproduction, survival, and family growth, and even represents a family's status and identity in society. Many people in China regard housing as the epitome of their home, and having a comfortable and secure living condition is the goal that most people strive for. China's economy has leapfrogged one level after another and is constantly developing forward in 2022. However, in the process of development, various policies implemented by the government have supported the development of key regions and supported the growth of key industries. The issue of unequal distribution in China's economic society is gradually emerging. Premier Li Keqiang proposed in 2020 that the per capita annual disposable income of Chinese residents should reach 30,000 yuan, but there are still many middle and low income residents, with an average annual income of about 10,000 yuan. According to data released by the China Bureau of Statistics, the average annual disposable income of Chinese people is more than double that of urban and rural per capita income, see Table 1 for details[1].

Table 1: Average annual disposable income of urban and rural residents in China in the past decade.

Unit (yuan)	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
town	47,412	43,834	42,359	39,251	36,396	33,616	31,195	28,844	26,467	24,127
countryside	18,931	17,131	16,021	14,617	13,432	12,363	11,422	10,489	9,430	8,389
Rate	250.4%	255.9%	264.4%	268.5%	271.0%	271.9%	273.1%	275.0%	280.7%	287.6%

Various types of inequality are ultimately reflected in the "three major items" of residents' welfare in Billions of households in China--- housing, education, and medical care. The housing is one of the main necessities for everyone's survival. In recent years, the problem of housing inequality has become increasingly prominent. Words such as "foam in the housing market", "Unaffordable housing", "Heavenly priced toilets", "School district housing" and so on appear more and more frequently in people's lives. Some groups own multiple houses. The folk "Bao zu gong"(Man who have many houses to rent) and "Fnag jie"(Woman who have many houses to rent) are frequently heard, while some low-income groups live in one room all the year round, "Snail Dwelling" deserves its name[2].

In the development process of China's housing reform, various policy settings have been continuously adjusted and refined. From the perspective of housing types, the initial welfare housing distribution system ensured the basic housing issues for public officials in state organs and important enterprises and institutions. In the socialist market economy, commercial housing has expanded the property of housing from residence to residence and investment, especially the emergence of investment properties, making housing a stable investment product. This has also created basic conditions for the surge in housing prices

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in China after 2010. The subsequent government implementation of public rental housing and low-rent housing policies has to some extent addressed the issue of housing inequality.

This article aims to study the issue of housing inequality by studying current household housing data in China, explore various basic factors that lead to housing inequality, and analyze the contribution rate of inequality caused by different factors[3].

2. Literature Review

Currently, research on the level of family housing and its inequality in China is mainly analyzed from several aspects, such as policy factors, regional factors, family factors, and personal factors.

Starting from national policies and systems, Li Bin and others studied the inequality of family access to housing in China based on the changing point of China's transformation from a planned economy to a market economy. The article proposed two key capabilities: one is in the planned economy period, where housing is mainly obtained from t welfare housing distribution system is distributed according to the "positional ability" of residents engaged in occupational distribution; The other is the period of socialist market economy, in which the "market ability" is distributed according to the efforts of residents in various aspects, and the two abilities gradually increase and decrease. When housing has an investment properties, the appreciation of property due to economic development has led to an increase in inequality. Henley, Li Shi, Wei Zhong, and others have found that the investment income brought about by the rise in housing prices in China has a significant impact on household net assets and property distribution[4].

When China's market economic model gradually matures, the era of welfare housing distribution has passed. People mainly rely on market transactions to obtain housing, and the housing level and the purchasing power of families and individuals are closely related. Many studies have shown that the differences in housing size and value are influenced by market capacity factors such as the income level of families and individuals (Zhang Chuanchuan, 2016), the situation of urban and rural areas (Zhu Mengbing, Li Shi, 2018), and the type of occupation engaged in (Xu Yingkang, Wang Jun, 2014)[5].

Previous studies on the situation of household housing inequality in China provide the basis for the research’s methods and results. This study intends to use China's household data in CFPS for 2018 to study the impact of factors such as region, family income, and occupation on the issue of household housing inequality in China, starting from three housing level indicators: household housing value, housing area, and whether there is real estate ownership, to analyze the difference in the contribution rate of different factors to housing inequality[6].

3. Data Analysis

3.1. Data source

This article uses microscopic data to analyze various factors that affect household housing inequality in China, and uses the Sharpley value decomposition method to analyze the contribution rate of various factors to the impact of housing inequality. Select the household data from CFPS in 2018. CFPS is a nationwide, large-scale, multidisciplinary social tracking survey project that focuses on the household survey model to meet the research needs of this article on household housing issues. The data records key variables such as household housing net assets, housing area, and ownership. This article uses the financial respondents in the questionnaire as household heads, extracts research related variables, eliminates vacancy values, and obtains a total of 11,826 valid samples[7].

3.2. Variable description

This article aims to analyze the impact of regional and family factors on housing inequality by studying three housing level indicators: household housing value, housing area, and whether there is real estate ownership.

Therefore, the independent variables selected from the data include the household net real estate (10,000 yuan), the current housing area (square meters), and whether there is housing property rights (binary variable), respectively corresponding to the three housing level indicators. The question "Who owns your current house?" was asked in the questionnaire, and the answer was: "(1) Family members have full property rights. (2) Family members have partial property rights. (3) Public housing (houses

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provided by units). (4) Low-rent housing. (5) Public rental housing. (6) Commercial housing rented on the market. (8) Houses owned by relatives and friends. 77. Others." In this article, the families selected in answers 1 and 2 will be considered to have housing property rights[8].

The selection of regional factors in the explanatory variables is based on the urban-rural classification published by the National Bureau of Statistics (including 52.41% of urban household samples) and the distribution of residential cities (dividing 34 provinces and cities across the country into eastern coastal areas, central inland areas, and western remote areas, including 46.19% of eastern coastal household samples); The family factor selection data include family size (number of people), per capita net income of the family (10,000 yuan), whether they have experienced demolition, age, gender, marital status, education level (years), and work status of the householder (whether the work unit is a government agency, public institution, or state-owned enterprise), see Table 2 for details.

Table 2: Descriptive Statistics of Variables.

Descriptive statistics of variables				
	Variable	**N**	**Mean**	**Variable Description**
Dependent Variable	housea	11,826	63.84	Net household property (10,000 yuan)
	area	3,814	124.64	Current housing construction area (square meters) extracted from 2014 to 2018 retained data
	property	11,826	0.817	Family member has full ownership or family member has partial ownership=1
Independent Variable (Regional Factors)	urban18	11,826	0.524	Urban=1, Rural=0
	East	11,826	0.462	Eastern coastal areas: Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Guangxi, Hainan, Chongqing (13 provinces, regions, and cities)=1, others=0
Independent Variable (Family Factors)	fml_count	11,826	3.606	Number of household residents in 2018
	inc_p	11,826	3.018	Per capita net income of households (10,000 yuan)
	Chaiqian	11,826	0.0178	Families experiencing demolition=1, others=0
Independent Variable (Householder Factor)	cfps2018eduy	11,826	8.064	Number of years of education for the householder as of 2018
	Marige	11,826	0.830	Spouse or cohabitation=1, others=0
	Zfjob	11,826	0.105	Government departments/party and government organs/people's organizations, public institutions, state-owned enterprises=1, others=0
	Age	11,826	50.47	Age of householder (years)
	gender	11,826	0.524	Gender of householder, male=1, female=0

3.3. Model

3.3.1. OLS and Logit regression

Based on the CFPS 2018 survey data, the OLS regression method is used to regress the two variables of household housing value and housing area in China. To reflect the economic implications, the two dependent variables and per capita income are logarithmically treated. The independent variables include regional factors, family factors, and individual factors of the householder, and the interaction between whether to demolish and the eastern coastal area is added. Considering that the demolition behavior will cause a sudden increase in household assets, it is necessary for the original demolished assets to have certain value.

$$\text{Log (household net assets/housing area)} =$$

$$\alpha+\beta^{*}\text{ Regional factors}+\gamma^{*}\text{ Family factors}+\theta^{*}\text{ Householder factors}+\sigma$$

For the indicator of ownership of real estate, Logit model regression is used to estimate the impact of various factors on whether a household owns property rights. The coefficient of the independent variable cannot be directly used to explain marginal changes. Instead, the coefficient needs to be indexed to obtain an advantage ratio, that is, the ratio of ownership to non-ownership, to explain the possibility of ownership.

$$\text{Logit (ownership or not)}=\alpha+\beta^{*}\text{ Regional factors}+\gamma^{*}\text{ Family factors}+\theta^{*}\text{ Householder factors}+\sigma$$

3.3.2. Sharpley value decomposition

The regression based Sharpley value decomposition can decompose the inequality of the target variable into a combination of contribution rates of influencing factors. Shapley value decomposition can be applied to various regression model forms, applicable to OLS and Logit regression, and can meet the contribution rate requirements of various factors of housing inequality in this study. Therefore, the

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Sharpley value decomposition is used to study the impact of various factors on the contribution rate of the three housing level indicators of household housing value, housing area, and whether there is real estate ownership in China[9].

4. Empirical Analysis

4.1. Empirical regression analysis

Table 3: OLS and LOGIT regression results.

Variable		OLS		Logit
		Ln (family net real estate)	Ln (Family Housing Area)	Whether there is real estate ownership
Independent Variable (Regional Factors)	urban18	0.754***	-0.195***	-0.719***
		(29.88)	(-7.54)	(-11.84)
	east	0.355***	-0.191***	-0.236***
		(15.12)	(-7.95)	(-4.29)
Independent Variable (Family Factors)	fml_count	0.170***	0.141***	0.484***
		(25.79)	(18.93)	(22.02)
	lginc_p	0.586***	0.070***	-0.005
		(43.95)	(5.11)	(-0.17)
	chaiqian	-0.354***	-0.315***	-1.524***
		(-3.40)	(-4.42)	(-7.89)
Independent Variable (Householder Factor)	gender	-0.137***	-0.070***	-0.127**
		(-5.94)	(-3.05)	(-2.38)
	age	0.005***	0.009***	0.043***
		(5.32)	(10.54)	(21.05)
	cfps2018eduy	0.037***	0.005	0.018**
		(11.89)	(1.59)	(2.43)
	marige	0.072**	0.194***	0.384***
		(2.26)	(6.17)	(5.57)
	zfjob	0.020	-0.021	0.364***
		(0.52)	(-0.61)	(4.17)
Interactive item	chaiqian_east	0.179	0.229*	0.970***
		(0.98)	(1.86)	(2.79)
Intercept	Constant	1.064***	3.658***	-1.975***
		(16.22)	(57.21)	(-12.64)
Observations		11,622	3,814	11,807
R-squared		0.381	0.221	-
t-statistics in parentheses				Correctly classified=85.15%
*** p<0.01, ** p<0.05, * p<0.1				

According to the empirical analysis results in Table 3, it can be concluded that regional factors, family factors, and householder factors have significant impacts on the three housing level indicators of household housing value, housing area, and whether there is real estate ownership in China to varying degrees.

From the perspective of regional factors, the net real estate value of urban households and households in the eastern coastal area is significantly higher than that of rural and other areas, but the housing area and ownership of urban households and households in the eastern coastal area are lower than those of rural and other areas. This is because the average assets of households in developed areas are higher, and the housing price is correspondingly higher, so the marginal purchase willingness for housing area will not increase. The threshold for obtaining property rights is also relatively high.

From the perspective of family factors, both per capita income and household size have a significant positive impact on household net property and household housing area. This result can indicate to some extent that per capita income can affect people's housing quality indicators such as housing assets and housing area, but it does not affect their likelihood of owning a house; Whether or not they have experienced demolition has a negative impact on their net property and household housing area, but the net property of households who have experienced demolition is significantly lower than that of households who have not experienced demolition, which indicates that the compensation behavior of demolition does not directly improve the level of household housing. Considering the impact of interaction, it is found that demolition in the eastern coastal areas will have a significant positive impact on household housing area and the possibility of acquiring property rights, This is also due to the higher average asset value in developed regions, and higher compensation is more likely to lead to an improvement in housing standards[10].

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From the perspective of householder factors, the three housing level indicators of male householder are significantly lower than those of female householder. With the growth of age and educational years, the three housing level indicators will be significantly and positively affected; Married householder have a significant positive impact on the level of housing conditions compared to unmarried householder, indicating that the concept of "home" still exists among Chinese household residents, and marriage means starting a family, so it is necessary to ensure a certain level of housing; For householder who work in government departments, party and government organs, people's organizations, public institutions, and state-owned enterprises, there is only a positive impact on the possibility of owning property rights, which indicates that such jobs currently do not bring better living quality, but there is a certain guarantee for owning real estate, with a 43.91% higher probability of acquiring real estate than those who work in other industries.

4.2. Analysis of unequal contribution rate

Table 4: Sharpley value decomposition of housing inequality.

Variable		Decomposition of household net property inequality		Decomposition of inequality in household housing area		Inequality decomposition of household housing property rights	
		Contribution degree	Shapley Value	Contribution degree	Shapley Value	Contribution degree	Shapley Value
Regional factors	**urban18**	**26.04%**	0.09916	7.78%	0.01720	9.82%	0.01707
	east	6.61%	0.02516	7.49%	0.01654	1.75%	0.00305
Family factors	**fml_count**	5.78%	0.02201	**46.83%**	0.10348	**39.14%**	0.06802
	lginc_p	**42.76%**	0.16282	3.07%	0.00679	6.08%	0.01057
	chaiqian	0.21%	0.00081	0.70%	0.00154	2.15%	0.00374
Householder factor	**gender**	0.56%	0.00215	0.65%	0.00144	0.14%	0.00025
	age	1.64%	0.00623	**13.35%**	0.02949	**24.74%**	0.04301
	cfps2018eduy	**13.44%**	0.05119	2.90%	0.00641	3.83%	0.00665
	marige	0.72%	0.00272	**16.71%**	0.03692	**11.46%**	0.01993
	zfjob	1.92%	0.00730	0.33%	0.00073	0.61%	0.00107
Interactive item	**chaiqian_east**	0.31%	0.00120	0.19%	0.00041	0.27%	0.00046

By combining the regression model in the previous article with the Sharpley decomposition method, the contribution of regional factors, family factors, and householder factors to the inequality of the three housing indicators can be quantitatively decomposed, see Table 4 for details. Based on the analysis results, it is found that for the decomposition of household net asset inequality, regional factors contribute 32.65%, family factors contribute 48.75%, and householder factors contribute 18.28%. The three most influential variables are household per capita income, urban or rural households, and the number of years of schooling of householder, with the contribution rate of household per capita income being the largest. This indicates that the difference in the ability of family members to pay for real estate leads to the greatest degree of inequality in housing net assets. For the decomposition of inequality in household housing area, regional factors contribute 15.27%, family factors contribute 50.60%, and householder factors contribute 33.94%. The three most influential variables are the number of household sizes, whether householder is in marital status, and the age of the householder. Among them, the number of household sizes has the largest contribution rate, indicating that the size of household residents largely measures the basic needs of households for housing area, The number of households living in different sizes leads to inequality in housing area[11].

For the decomposition of inequality in household housing property rights, regional factors contributed 11.57%, family factors contributed 47.37%, and householder factors contributed 29.32%. The three most influential variables were family size, age of household head, and marital status of household head, with the largest contribution rate of family size, This indicates that the scale of the number of households living largely measures the basic needs of households for housing property rights, and the number of households living in different sizes leads to inequality in whether they own housing property rights.

5. Research results

Based on the household survey data of CFPS in 2018 and the previous research and analysis, the following three conclusions can be drawn:

1) At present, the issue of housing equality in China still exists. Using the data in the article to calculate the Gini coefficient of household housing net assets is 0.709, and the Gini coefficient of household housing area is 0.406. However, the traditional calculation method of Gini coefficient shows

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that the Gini coefficient of per capita income is 0.549, indicating that the inequality of household housing net assets is more serious than the inequality of housing area[12].

2) Regional factors, family factors, and householder factors have significant impacts on the three housing level indicators of household housing value, housing area, and whether there is real estate ownership in China. Regarding the value of family housing in China, there is a significant positive impact on urban, eastern coastal, family size, age of the householder, years of education of the householder, and marital status of the householder; The experience of demolition and male householder has a significant negative impact. In view of the inequality of housing area and housing property rights in China, family size, age of the householder, years of education of the householder, and marital status of the householder have a significant positive impact; Cities and towns, eastern coastal areas, experienced demolition, and male householder have significant negative impacts, and the interaction between eastern coastal areas and demolition has significant positive impacts.

3) Different factors and variables have different contribution rates to the issue of family housing inequality in China. Regarding the issue of inequality in the value of household housing in China, the current mature market economic model has led to the fact that the net real estate of households is mainly determined by the affordability of family members, and the per capita income of households contributes the most to this inequality; In response to the inequality of household housing area and housing property rights in China, family size among family factors contributes the most to inequality.

According to the research results of this article, in order to solve the problem of housing inequality among families in China, the government should pay attention to the basic housing conditions of families. Although public and low-cost housing have to some extent alleviated the problem of housing inequality, some middle-income families living in developed cities find it difficult to bear the pressure of purchasing a house. First of all, we should stabilize the real estate market price, ensure that everyone has a house to live in, ensure the basic per capita housing area, increase efforts to suppress real estate speculation groups, and alleviate group conflicts caused by housing inequality and wealth inequality; Secondly, it is necessary to pay attention to the housing needs of households in underdeveloped areas. Due to the slow development of regional economy, the income of these households through housing capital growth is not high, and housing inequality exacerbates the issue of wealth inequality between regions.

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