



How does Housing Wealth Impact Wealth Inequality among Families? ----- Experience Evidence from China

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Abstract. This paper focuses on the wealth inequality of families caused by social comparison at the micro level and constructs the index of relative deprivation of wealth. The findings are as follows: 1) high housing wealth has negative effect of wealth inequality, this conclusion has passed the robustness and endogeneity tests; 2) high housing wealth reduces wealth inequality by upgrading consumption; 3) urban areas can attenuate the impact of housing wealth on wealth inequality. This paper puts forward suggestions for China's housing policy, which can help alleviate wealth inequality and provide a reference for promoting social equity and common prosperity.

Keywords: Wealth inequality, Housing wealth, Consumption upgrading, Urban

1 Introduction

Wealth inequality is a serious social problem, which may lead to low economic efficiency and widen other inequalities on macro-level, also to restrain the poor's consuming desires and development opportunities. The global wealth report 2024 by United Bank of Switzerland (UBS)^[1] shows that wealth inequality is narrowing in regional at a global level and all classes, but growing in most counties, such as China. China became the second largest economy in the world in 2010, with forty trillion yuan of GDP at that time^[2]. Over the past fourteen years, its GDP reached 125 trillion yuan, three times more than then. As a developed country, China's rapid economic development has been accompanied by a significant increase in the wealth of its residents. According to UBS's report, the compound annual wealth growth rate of is about 8% from 2010 to 2023, the second in the world. In 2023, China has the second large number of millionaires in the world, after the United State. Also, China's average wealth per adult reached above 300% since 2008.

Serious wealth inequality is with rapid growth of wealth in China. From 2008 to 2023, the data from UBS shows that the Gini index of China rises from 0.55 to 0.6, well above the normal coefficient 0.4. The average of individual wealth is three times more than median wealth, highlighting significant wealth inequality. Also, in 2024, Mingyuan Zhang et al.^[3] indicate that regional wealth inequality is exacerbated by the

Matthew effect of wealth. Unlike other countries, China has its own unique wealth characteristics: high proportion of fixed asset. Fixed assets take up almost 70% of total assets and real estate is a huge part of it. China's real estate has created 107 people on the Hurun Global Rich List, exacerbating wealth inequality (Yumei Guo et al., 2017^[4]). Based on this background, this article uses family data from the Chinese Family Panel Studies (CFPS) and uses STATA to construct two-way fixed effects model to analyze the relationship between wealth inequality and housing wealth. In addition, the mediating and moderating effects are also studied to further analyze the mechanism behind this relationship.

This article discovers three findings: 1) high housing wealth has negative effect of wealth inequality; 2) high housing wealth reduces wealth inequality by upgrading consumption; 3) urban areas can attenuate the impact of housing wealth on wealth inequality. The possible innovations of this paper are as follows: 1) This paper focuses on the wealth inequality of families caused by social comparison at the micro level and constructs the index of relative deprivation of wealth, so it is innovative in research perspective. 2) This paper takes age, household income per capita and regional housing price heterogeneity into the analysis structure to further explore the external effects of China's housing market. This paper puts forward suggestions for China's housing policy, which can help alleviate household wealth inequality and provide a reference for promoting social equity and common prosperity.

2 Literature Review

2.1 Wealth Inequality

Numerous scholars have conducted extensive research on the difference between China's wealth inequality and the global wealth inequality. Milanovic (2024)^[5] analyzes the data from 1820 to 2020 and finds that although global wealth inequality has diminished by the rise of Asia since 1950. However, Ziyang Zhang (2024)^[6] analyzes Chinese family database and concluded that wealth inequality seriously has increased since 1950. Some scholars analyze the data of Chinese on Hurun Global Rich List, which revealed significant levels of wealth inequality from 2000 to 2010 (Churen Sun et al., 2012^[7]). Milanovic (2024) and Piketty et al.^[8] summarizes that global wealth inequality can be attributed to income inequality, the rapid growth of high-income groups' earnings, and the surge in wealth due to technological innovation. The original causes of wealth inequality in China are like those worldwide. However, Yumei Guo et al (2017) argue that the vast wealth accumulation in China in recent years is primarily derived from real estate rather than technological innovation. Regarding methods for measuring wealth inequality, there is a difference between China and other countries. Zucman (2019)^[9] summarizes various approaches, including using wealth tax data, estate multiplier, income capitalization and combining the various data sources. Due to a lack of available data on wealth tax, inheritance & estate tax returns and income tax returns, scholars often resort to combining various data at a family level as their preferred method for proving their findings (Zucman, 2019; Ziyang Zhang, 2024).

2.2 Housing Wealth

High and rapidly rising housing prices have contributed to China's inequality. Since its establishment, China has experienced skyrocketing house prices due to housing shortages coupled with rapid individual economic development. The high house prices have stimulated investment consumption leading to an economic boom once again (Yanbing Chen et al. 2011^[10]). Housing has become a critical livelihood issue. The current housing on housing wealth is divided into two categories: distribution and influence. In terms of the distribution of housing wealth, Ximing Yue et al. (2022)^[11] indicates that there is a high level of inequality in housing wealth: the trend of inequality in rural areas first expands and then decreases, while the trend in urban areas gradually expands. As for its influence, it encompasses consumption and investment. Firstly, Yalin Zhang et al. (2022)^[12] points out that the lack of housing wealth among young groups exacerbates consumption inequality at the individual level. Similarly, Minxian Xu (2023)^[13] find that housing debt reduces the consumption and quality of life for young people objectively, weakens their subjective happiness and subsequently diminishes their subjective class identity. Additionally, Churen Sun et al. (2012) and Yumei Guo et al. (2017) finds that real estate has provided significantly higher returns to China's wealthy individuals on the Hurun Global Rich list compared to other industries. Furthermore, numerous studies have demonstrated that the housing debt associated with low housing wealth has adverse effects on various aspects: on the macro level, aggravating the financial fragility (Jorda et al. 2016)^[14], even affects the financial crisis (Mian & Sufi, 2009)^[15]; on the micro level, it has a negative impact on fertility (Ang et al., 2024)^[16], health (George, 2024)^[17].

2.3 Theoretical Analysis

The redistribution of housing wealth exacerbates social wealth inequality. Firstly, low housing wealth limits the funds available to family. High housing prices force families with low housing wealth to borrow money from officials or unofficial channels to make a down payment and pay monthly interest. The large down payment, high mortgage and high interest rates prevent them from investing in other financial assets (Choi, 2020^[18]; Yalin Zhang et al., 2022). Moreover, Richard et al. (2001)^[19] and Weida et al. (2020)^[20] find that there is a positive relationship between households' savings and housing price. Furthermore, housing debt significantly affects side effects on entrepreneurial activities (Brackle et al. (2018)^[21]). Due to the pressure from paying off debts, people do not have the extra energy to invest in assets with high returns. Conversely, real estate plays a significant role in wealth accumulation for individuals with high housing wealth. The construction of more houses and sale at higher price contributes to their wealth accumulation. Churen Sun et al. (2012) and Yumei Guo et al. (2017) suggest real estate generates more wealth compared to other industries. Moreover, affluent individuals invest in multiple properties and rent them out, further widening the wealth gap by collecting rental income. Above all, the imbalance of housing wealth exacerbates wealth inequality through the Matthew effect: makes the rich richer, makes the poor poorer.

The existing literature has made great progress in studying the impact of housing wealth on wealth inequality, but there is a limitation in general: existing relevant studies tend to measure wealth inequality from the macro dimension, while ignoring the relative deprivation of wealth at the individual level. Based on this, this paper takes the family as the research object, constructs the wealth inequality (relative wealth deprivation) index at the individual level, studies the relationship between wealth inequality and housing wealth, and explores the mediating and moderating effects, to strengthen the understanding of the connotation of wealth inequality and supplement the empirical evidence for relevant research.

3 Research Design

3.1 Data Sources

The family-level data utilized in this study is sourced from the Chinese Family Panel Studies (CFPS) conducted by Peking University's the China Social Science Survey. CFPS aims to collect data at the individual, family, and community levels through tracking, reflecting changes in China's society, economy, population, education, and health, and providing a data basis for academic research and public policy analysis. CFPS focuses on the economic and non-economic welfare of Chinese residents, as well as many research topics including economic activities, educational outcomes, family relations and family dynamics, population migration, health, etc. It is a national, large-scale, multi-disciplinary social tracking survey project. CFPS samples cover twenty-five provinces/ municipalities/ autonomous regions, and the target sample size is 16,000 households. CFPS questionnaire has four main types of questionnaires: community questionnaire, family questionnaire, adult questionnaire, and children questionnaire. The regional data is sourced from the China Statistical Yearbook by the National Bureau of Statistics. The micro-level sample data used for this paper are from the family data group and family & adult questionnaire in 2018 and 2020 within CFPS.

In term of data screening, the data is preprocessed as follows: 1) retention simple only if family members completely own the house, based on the question "who owns the house" in the family questionnaire; 2) removal simple of missing values of dependent variable or independent variable; 3) Logarithmic processing for part data. Following Yongai Jin&Yu Xie (2015)^[22], this paper processes large values variables by changing negative values to 0, adding one to all samples, and taking logarithm.

3.2 Model Setup

Based on the previous theoretical analysis, The model regarding wealth inequality and housing wealth is as follows:

$$W_inequality_{ijt} = \beta_0 + \beta_1 \ln house_{ijt} + \beta_2 X_{ijt} + \gamma_j + \varepsilon_{ijt} \quad (1)$$

The left part in model (1) is wealth inequality. In the right part, β_0 is constant term; β_1 represents the influence of 1% changes of housing wealth on wealth inequality; X

represents control variables; δ represents year fixed effect; θ represents family fixed effect; ε is random error term. In addition, i , j and t respectively represent the family sample, region, and year of survey, respectively.

For mediating effect, the models using consumption upgrading as mediating variable are as follows:

$$mpce_{ijt} = \beta_0 + \beta_1 lnhouse_{ijt} + \beta_2 X_{ijt} + \delta_t + \theta_{ijt} + \varepsilon_{ijt} \quad (2)$$

$$W_inequality_{ijt} = \beta_0 + \beta_1 mpce + \beta_2 lnhouse_{ijt} + \beta_3 X_{ijt} + \delta_t + \theta_{ijt} + \varepsilon_{ijt} \quad (3)$$

For regulation effect, the model using dummy variable, whether family locates in city, as regulation variable is as follows:

$$W_inequality_{ijt} = \beta_0 + \beta_1 lnhouse * urban_{ijt} + \beta_2 X_{ijt} + \delta_t + \theta_{ijt} + \varepsilon_{ijt} \quad (4)$$

3.3 Variables

3.3.1 Dependent Variable: Relative Deprivation Index of Wealth Inequality Kakwani

Inequality understood from the individual level is a kind of relative deprivation generated when individuals compare their own wealth level with other individuals in the reference group (Runciman, 1966)^[23]. This concept has gradually been applied to consumption, income, taxation and so on (Fehr & Schmidt, 1999^[24]; Domínguez & Soares, 2006^[25]; Mantovani, 2020^[26]). Indicators measured at the individual level include Yitzhaki index (Yitzhaki, 1979)^[27], Kakwani index (Kakwani, 1984)^[28], and Podder index (Podder, 1996)^[29]. Kakwani index has two advantages: dimensionlessness and normalization. This paper utilizes Kakwani Index, the relative deprivation index, to measure wealth inequality: the higher value of Kakwani Index, the lower wealth of the family, and the greater wealth inequality. This article uses family net worth from CPFS, comparing the family sample with higher wealth level: suppose the total number of group samples is n , the mean value of wealth is μ_x , the net wealth of n samples divided by province is given by, $x_1, x_2, \dots, x_n$, and satisfies inequality $x_1 \leq x_2 \leq \dots \leq x_n$; define the average of families' wealth which exceeded x_k is μ_{xk}^+ ; the net wealth exceeds the proportion of x_k sample in the total sample is α_{xk}^+ . The equation of Kakwani index is:

$$Wealth_RD(x, x_k) = \frac{1}{n\mu_x} \sum_{i=k+1}^n (x_i - x_k) = \alpha_{xk}^+ [(\mu_{xk}^+ - x_k) / \mu_x] \quad (5)$$

3.3.2 Independent Variable: Net House Asset Lnhouse

Net house asset is used to measure housing wealth. Following Yongai Jin & Yu Xie (2015)^[22], this paper processes this variable by changing negative house asset to zero, adding one to all samples, and taking logarithm.

3.3.3 Mediating Variable: Consumption Upgrading Mpce

According to the classification standard of China Statistical Yearbook, household consumption expenditure is divided into eight categories: food, clothing, housing,

household equipment and supplies, transportation and communication, culture, education and entertainment, medical care, and other supplies and services. Drawing on the practice of existing scholars, the expenditure on food, clothing and housing consumption is classified as subsistence consumption, and the remaining consumption expenditure is classified as developmental consumption and enjoyment consumption. This paper uses the ratio of developmental consumption and enjoyment consumption expenditure to household consumption expenditure to measure the upgrading of household consumption.

3.3.4 Regulation Variables: Urban Regulation Effect $\ln house * Urban$

This article uses the interaction term of the logarithm of net housing wealth and dummy variable, whether family locates in city, as regulation variable.

3.3.5 Control Variables: X

This paper references Yalin Zhang al et. (2022), divides control variables into three parts: demographics, socioeconomic features, and regional economic features. Demographics include the average family age and education years, and whether to work in agriculture or not. Socioeconomic features include urban registration or not, family income and family financial assets. Regional economic features include regional housing prices. Table 1 presents the definitions of variables.

Table 1. Definition of variables

Variable	Definition of Variable
fid	Define by CFPS, unique family tracking code
year	include 2018 and 2020
kakwani	relative deprivation of wealth
lnhouse	the log of family net housing wealth
lnwealth	the log of family net wealth
mpce	consumption upgrading
Mage	the average age of family
Medu	the average education year of family
agriculture	whether family members work in agriculture
urban	whether family locates in city
other_house	whether family has other houses
lnincome1~r	the log of per capita family income
lnfinance_~t	the log of family's total finance asset
lnhouse	the log of provincial housing price

4 Empirical Results and Analysis

4.1 Descriptive Statistics

Table 2 depicts the findings of descriptive statistics. Following preprocessing, a total of 14626 observations are obtained. The max Kakwani index is 0.999 and the least is

zero. The mean Kakwani index of 0.553 indicates the presence of wealth inequality. In term of net house value, the maximum is 823000 and the minimum is 0, highlighting significant housing wealth disparity due to the large gap between the maximum and mean values. The mean for the dummy variables, whether families have other houses, suggests that most families in the sample have low house wealth, with only 15% having other houses.

Table 2. Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
kakwani	14,626	0.5527	0.1722	0	0.9991
lnhouse	14,626	10.9926	3.6183	0	15.9233
house	14,626	374,077	752,465	0	8230000
Mage	14,626	46.4024	14.5786	10	94
Medu	14,626	3.8079	4.7744	0	24
agriculture	14,626	0.4867	0.4998	0	1
urban	14,626	0.4617	0.4985	0	1
lnfincome1~r	14,626	9.6573	1.0567	0	15.5489
lnfinance_~t	14,626	7.6819	4.5439	0	15.7614
lnphouse	14,626	9.0354	0.4540	8.4629	10.6616
other house	14,626	0.1582	0.3650	0	1

Source: CFPS and China Statistical Yearbook

Figure 1 shows the kernel density curve of kakwani index, indicating that most data falls between 0.5 and 0.8. Figure 2 displays the scatter plots and fits line of kakwani index and housing wealth, revealing a negative relationship between housing wealth and wealth inequality.

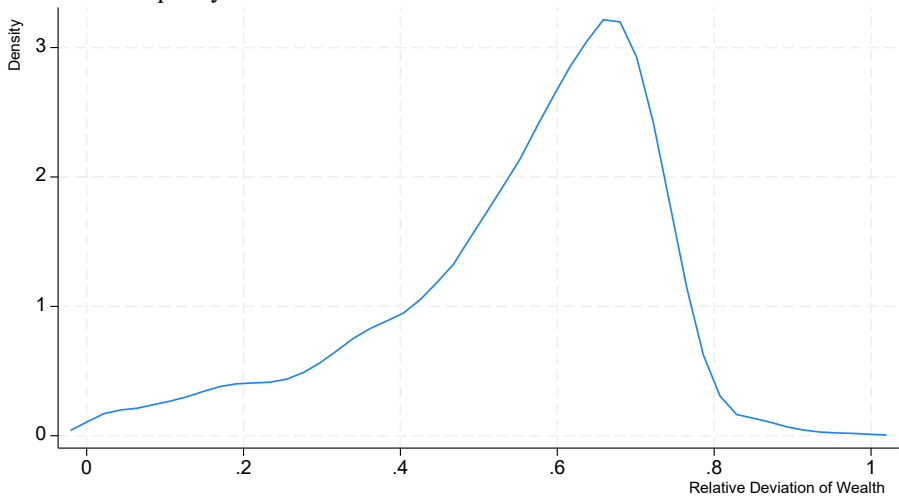


Fig. 1. The kernel density curve of kakwani index

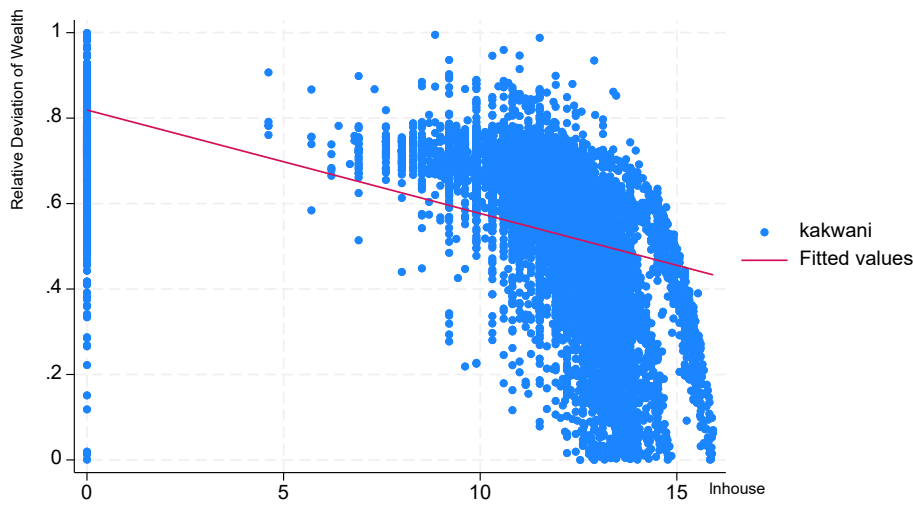


Fig. 2. The scatter plots and fits line of kakwani index and housing wealth

Overall, there is evident wealth inequality in the sample, while wealth is negatively correlated with house wealth. However, further research into the underlying reason and mechanisms is necessary.

4.2 Baseline Result

Table 3 presents the results derived from the model (1), illustrating the relationship between relative deprivation of wealth and housing wealth. Column (1) displays a regression analysis that includes only the independent variable, *lnhouse*. In column (2) through (4), demographic features, socioeconomic features and regional economic features variables are progressively incorporated to enhance the reliability of the research conclusion. The regression results in columns (1) to (4) indicate that the coefficient for housing wealth, *lnhouse*, is significantly negative. This finding suggests that an increased housing wealth correlates with a reduction in the relative deprivation of wealth. Conversely, low levels of housing wealth contribute to heightening the relative deprivation. The property of consumer goods and investment goods of houses are inseparable, and the interaction will affect the relative deprivation of wealth. The investment attribute of house makes someone increase wealth, while the consumption attribute makes others saving even borrow for house. The gap between these increased the wealth inequality.

Table 3. Baseline Result

	(1) Kakwani	(2) Kakwani	(3) Kakwani	(4) Kakwani
<i>lnhouse</i>	-0.1813*** (0.0042)	-0.1815*** (0.0042)	-0.1787*** (0.0041)	-0.1791*** (0.0041)
<i>Mage</i>		0.0086***	0.0053**	0.0053**

		(0.0023)	(0.0022)	(0.0022)
Medu		-0.0042	-0.0034	-0.0023
		(0.0046)	(0.0045)	(0.0044)
agriculture		-0.1892***	-0.1492***	-0.1370***
		(0.0442)	(0.0433)	(0.0431)
urban			-0.2174***	-0.2715***
			(0.0821)	(0.0805)
lnfincome1_per			-0.1931***	-0.1957***
			(0.0202)	(0.0203)
lnfinance_asset			-0.0463***	-0.0470***
			(0.0033)	(0.0033)
lnphouse				1.1324***
				(0.1404)
Family FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
_cons	7.5138***	7.2189***	9.6244***	-0.4686
	(0.0490)	(0.1195)	(0.2305)	(1.2646)
r2_a	0.2706	0.2738	0.3077	0.3153
N	14626	14626	14626	14626

Notes: 1) Robustness Standard errors in parentheses.

2) *, ** and *** indicate significance at 10, 5 and 1 percent level, respectively.

3) To be more intuitive, the Kakwani index was expanded tenfold in the empirical study without affecting the results

4.3 Endogeneity Check

In model (1), it may exist an endogenous problem: families with high housing wealth will increase the total wealth, reduce the relative deprivation of wealth; high wealth families also will buy more houses, increasing the housing wealth. Hence, this article makes endogeneity test: using average housing wealth beside itself in counties, $mean*lnhouse$, as instrument variable. Others' average housing wealth has no influence on the sample's wealth. Therefore, this variable satisfies the premise of instruction variables, which has no influence on dependent variable. Table 4 presents the result of the first stage and the second stage of endogeneity check. In the weak correlation test, the F-value is 170.757, which exceeds 10, indicating a strong correlation between the instrumental variable and the independent variable. The endogeneity test yields an F-value of 42.24, suggesting that there is no issue of endogeneity present. The coefficient of $mean*lnhouse$ is significantly positive in column (1), which meets that the second premise of instruction variable: relative with independent variable. The coefficient of $lnhouse$ is significantly negative in column (2), which proves the negative relationship between wealth inequality and housing wealth after solving the endogeneity issue.

Table 4. Endogeneity Check

	The first stage	The second stage
	(1)	(2)
	lnhouse	Kakwani
Mean*lnhouse	0.2948***	
	(0.0226)	
Mage	-0.0019	0.0032***

	(0.0022)	(0.0009)
Medu	-0.0705***	-0.0531***
	(0.0153)	(0.0053)
agriculture	0.3039***	0.1038***
	(0.0640)	(0.0309)
urban	0.4686***	-0.4038***
	(0.0677)	(0.0327)
lnfincome1_per	0.2411***	-0.3232***
	(0.0345)	(0.0179)
lnfinance_asset	0.0553***	-0.0590***
	(0.0067)	(0.0032)
lnphouse	0.3585***	0.8728***
	(0.0833)	(0.0376)
lnhouse		-0.3854***
		(0.0259)
Family FE	YES	YES
Year FE	YES	YES
_cons	2.3591***	5.6393***
	(0.7222)	(0.3124)
r2_a	0.0986	0.3239
N	14626	14626

Notes: 1) Robustness Standard errors in parentheses.

2) *, ** and *** indicate significance at 10, 5 and 1 percent level, respectively.

3) To be more intuitive, the Kakwani index was expanded tenfold in the empirical study without affecting the results

4.4 Robustness Checks

To ensure the reliability of the baseline regression results, robustness tests are conducted in various ways (Table 5). The first method involves changing the measurement regression method. During data preprocessing, housing wealth values less than zero are treated as zero. The column (1) employs a Tobit regression model to analyze this truncated data. The second method entails changing the dependent variable. In column (2), the logarithm of the family net wealth is used as a measure of wealth inequality, higher family net wealth corresponds to lower relative deprivation in terms of wealth. The third method focuses on modifying independent variables by replacing the logarithm of family housing wealth with a dummy variable for whether a family owns multiple houses. If the family possesses more than one house, it is coded as one, otherwise it is coded as zero. This fourth method introduces the joint fixed effect for time and region to rigorously control for potential interference from unobservable factors that may vary over time and across regions. The last method sets up difference in difference model to compare wealth inequality of family, which has no other houses in 2018, but has in 2020. The results presented in column (1) through (5) indicate that the estimation coefficients of independent variable, *lnwealth*, are significantly negative in all cases, thereby indicating that the baseline regression results are robust.

Table 5. Robustness Checks

	Tobit	Replacement of wealth in- equality	Replacement of housing wealth	Introduction the interac- tion Fix ef- fect	Difference in Differ- ence
	(1) Kakwani	(2) Kakwani	(3) lnwealth	(4) Kakwani	(5) Kakwani
main					
lnhouse	-0.2299*** (0.0033)	-0.1713*** (0.0040)	0.3280*** (0.0100)		
Mage	0.0027*** (0.0009)	0.0059*** (0.0021)	-0.0085** (0.0035)	0.0080*** (0.0024)	0.0080*** (0.0025)
Medu	-0.0425*** (0.0043)	-0.0051 (0.0043)	0.0177*** (0.0066)	0.0276*** (0.0051)	0.0321*** (0.0052)
agriculture	0.0418 (0.0274)	-0.1637*** (0.0416)	0.2789*** (0.0711)	-0.0966** (0.0468)	-0.1155** (0.0477)
urban	-0.4819*** (0.0286)	-0.1844** (0.0767)	0.1486 (0.1204)	-0.3349*** (0.0942)	-0.3260*** (0.0949)
lnfincome1_per	-0.3594*** (0.0162)	-0.1845*** (0.0191)	0.1508*** (0.0369)	-0.1874*** (0.0223)	-0.2037*** (0.0226)
lnfinance_asset	-0.0685*** (0.0026)	-0.0460*** (0.0032)	0.0768*** (0.0059)	-0.0496*** (0.0037)	-0.0508*** (0.0038)
lnphouse	0.7741*** (0.0325)	1.5574*** (0.4433)	-0.0353 (0.1866)	1.0696*** (0.1584)	1.0707*** (0.1592)
other_house				-1.1183*** (0.0559)	
did					-0.8357*** (0.0641)
Family FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	NO	YES
ProvcdfE*	NO	NO	NO	YES	NO
YearFE					
_cons	5.2015*** (0.2941)	-4.8701 (4.4152)	6.7106*** (1.7286)	-2.0217 (1.4297)	-2.0296 (1.4364)
r2_a		0.3836	0.3402	0.1539	0.1137
N	14626	14626	14626	14626	14626

Notes: 1) Robustness Standard errors in parentheses.

2) *, ** and *** indicate significance at 10, 5 and 1 percent level, respectively.

3) To be more intuitive, the Kakwani index was expanded tenfold in the empirical study without affecting the results

4.5 Heterogeneity Analysis

The factors in demographics, socioeconomic, regional features influence the accumulation of social wealth, but different levels yield varying results. This article conducts a heterogeneity analysis based on these characteristics: age, per capita family income, and regional house price. Furthermore, the sample is divided into three group in each characteristic: young (<30), middle (>30&<60), old (>60); low-income (<10000), middle-income (>10000&<50000), high-income (>50000); low-house price (<7000), middle-house price (>7000&<10000), high-house price (>10000).

4.5.1 Age

Tapper and Fenna (2019) [30] found wealth generally rise with age. In Table 6, it is obvious that the rise in wealth with reduced life pressure renders older household's wealth less sensitive to fluctuations in housing wealth. In contrast, younger group faces unstable income and work; middle-age group faces challenges such as raising children and supporting aging parents. Consequently, young, and middle-aged families' wealth exhibits greater sensitivity to changes in housing wealth.

Table 6. Heterogeneity analysis: Age

	Younger group	Middle-age group	Older group
	(1)	(2)	(3)
	Kakwani	Kakwani	Kakwani
lnhouse	-0.1926*** (0.0109)	-0.1821*** (0.0057)	-0.1574*** (0.0086)
Mage	-0.0762** (0.0321)	0.0068* (0.0036)	0.0090 (0.0099)
Medu	0.0273 (0.0168)	-0.0101 (0.0062)	0.0265*** (0.0094)
agriculture	0.2623 (0.1863)	-0.1505*** (0.0564)	-0.2495*** (0.0795)
urban	-0.5873*** (0.1943)	-0.1041 (0.1073)	-0.2358 (0.2592)
lnfincome1_per	-0.1241** (0.0488)	-0.2384*** (0.0308)	-0.1103*** (0.0349)
lnfinance_asset	-0.0527*** (0.0139)	-0.0496*** (0.0042)	-0.0395*** (0.0073)
lnphouse	1.0349*** (0.2215)	0.9999*** (0.2351)	3.0557*** (0.5034)
Family FE	YES	YES	YES
Year FE	YES	YES	YES
_cons	2.0788 (2.2536)	1.0418 (2.1118)	-19.1233*** (4.6137)
r2_a	0.4638	0.2757	0.3826
N	1995	9864	3056

Notes:1) Robustness Standard errors in parentheses.
2) *, **and *** indicate significance at 10, 5 and 1 percent level, respectively.
3) To be more intuitive, the Kakwani index was expanded tenfold in the empirical study without affecting the results

4.5.2 Per Capita Family Income

Table 7 shows that the relative derivation of high-income group's wealth is more sensitive to housing wealth. For high-income families, if there is no housing pressure, they have more stable and high funds to invest, to obtain more returns. On the contrary, low- and middle-income families have limited funds even if they have no housing pressure.

Table 7. Heterogeneity analysis: per capita family income

	Low-income group	Middle-income group	High-income group
	(1)	(2)	(3)
	Kakwani	Kakwani	Kakwani
Inhouse	-0.1227*** (0.0086)	-0.1865*** (0.0059)	-0.2168*** (0.0133)
Mage	-0.0045 (0.0037)	0.0067* (0.0037)	0.0085 (0.0134)
Medu	0.0011 (0.0087)	-0.0088 (0.0069)	0.0316 (0.0217)
agriculture	-0.1612** (0.0696)	-0.1446** (0.0666)	-0.0633 (0.4256)
urban	-0.1074 (0.2701)	-0.1757 (0.1085)	-0.5360** (0.2552)
lnfincome1_per	-0.0867*** (0.0280)	-0.6027*** (0.0598)	-0.2299 (0.1449)
lnfinance_asset	-0.0284*** (0.0057)	-0.0464*** (0.0050)	-0.0821*** (0.0222)
lnphouse	-0.0047 (0.2996)	1.0923*** (0.2194)	1.6018*** (0.3392)
Family FE	YES	YES	YES
Year FE	YES	YES	YES
_cons	8.8021*** (2.6283)	3.8293* (2.0603)	-4.4790 (3.5098)
r2_a	0.2303	0.3076	0.4874
N	4585	9026	1689

Notes:1) Robustness Standard errors in parentheses.

2) *, **and *** indicate significance at 10, 5 and 1 percent level, respectively.

3) To be more intuitive, the Kakwani index was expanded tenfold in the empirical study without affecting the results

4.5.3 Regional House Price

Table 8 presents regression results for samples from low, middle, and high house price regions. The coefficients in column (1) and column (2) are similar but indicate more influence compared to column (3). A possible explanation is that the area with high house prices is typically associated with high prices for goods. Thus, families in these cities must allocate more of their wealth towards expenses related to other consumption, such as child-rearing and healthcare. Conversely, families residing in low or middle house price cities tend to spend a larger proportion of their income on housing costs. Therefore, their relative deprivation regarding overall wealth makes them more sensitive to variations in housing equity.

Table 8. Heterogeneity analysis: regional house price

	Low house price region	Middle house price region	High house price region
	(1)	(2)	(3)
	Kakwani	Kakwani	Kakwani
Inhouse	-0.1821*** (0.0077)	-0.1859*** (0.0081)	-0.1541*** (0.0076)

Mage	0.0049 (0.0034)	0.0060 (0.0043)	0.0048 (0.0047)
Medu	-0.0035 (0.0079)	-0.0216*** (0.0076)	0.0069 (0.0091)
agriculture	-0.0637 (0.0669)	-0.1148 (0.0752)	-0.1715* (0.0961)
urban	-0.3334** (0.1569)	-0.2960* (0.1609)	-0.2295* (0.1328)
lnfincome1_per	-0.2102*** (0.0360)	-0.1626*** (0.0300)	-0.1927*** (0.0471)
lnfinance_asset	-0.0405*** (0.0056)	-0.0461*** (0.0056)	-0.0409*** (0.0076)
lnphouse	-3.5531*** (0.5397)	6.4115*** (0.6021)	1.4100*** (0.5441)
Family FE	YES	YES	YES
Year FE	YES	YES	YES
_cons	40.4211*** (4.6778)	-47.6296*** (5.3695)	-4.1540 (5.2992)
r2_a	0.2996	0.3264	0.4294
N	6258	5439	2929

Notes: 1) Robustness Standard errors in parentheses.
2) *, **and *** indicate significance at 10, 5 and 1 percent level, respectively.
3) To be more intuitive, the Kakwani index was expanded tenfold in the empirical study without affecting the results

5 Further Analyses

This article analyzes the mediating effect based on model (2) and model (3), and regulation effect based on model (5).

5.1 Mediating Effect

Table 9 presents the regression result of mediating effect. The coefficient of *lnhouse* in column (1) is significantly positive and the coefficient of *mpce* in column is significantly negative, which proves that high housing wealth has positive influence on consumption upgrading, and consumption upgrading will reduce wealth inequality. Consumption upgrading makes family spend more on developmental and enjoyment consumption, which opting for greater expenditure in exchange for more sustainable returns or reducing potential risk. For example, the family going to gym may be healthier, reducing time to hospital and earning more wealth. Consequently, housing wealth can impact wealth inequality by affecting consumption upgrading.

Table 9. Mediating effect

	(1) mpce	(2) Kakwani
lnhouse	0.0022*** (0.0005)	-0.1982*** (0.0033)
Mage	-0.0012***	0.0008

	(0.0002)	(0.0012)
Medu	0.0029***	-0.0486***
	(0.0008)	(0.0049)
agriculture	0.0530***	0.0208
	(0.0059)	(0.0369)
urban	-0.0251***	-0.4424***
	(0.0057)	(0.0361)
lnincome1_per	0.0070**	-0.3372***
	(0.0031)	(0.0221)
lnfinance_asset	0.0005	-0.0769***
	(0.0006)	(0.0036)
lnphouse	-0.0289***	0.8841***
	(0.0057)	(0.0399)
mpce		-0.2090***
		(0.0748)
Family FE	YES	YES
Year FE	YES	YES
_cons	0.5664***	4.1176***
	(0.0540)	(0.3692)
r2_a	0.0424	0.4372
N	7313	7313

Notes: 1) Robustness Standard errors in parentheses.

2) *, ** and *** indicate significance at 10, 5 and 1 percent level, respectively.

3) To be more intuitive, the Kakwani index was expanded tenfold in the empirical study without affecting the results

5.2 Regulation Effect

Table 10 presents the regression results for the regulation effect of urban area. Column (1) displays a regression analysis that includes only the independent variable, *lnhouse*, and interaction term, *lnhouse*urban*. In column (2) through (4), demographic features, socioeconomic features and regional economic features variables are progressively incorporated to enhance the reliability of the research conclusion. The regression results in columns (1) to (4) indicate that the coefficients for housing wealth and interaction term are significantly negative. This finding suggests that urban areas play a moderating role: high housing wealth is more significant in reducing wealth inequality in urban areas. A possible explanation is that the circulation of houses in the city is greater than that of countryside. Urban Family can sell or take out a mortgage and invest or set up business to increase its wealth. Besides, families in urban areas always have high incomes. Moreover, urban areas are generally economically developed. In the economically developed regions, the increase of housing wealth has a more obvious effect on the reduction of wealth inequality.

Table 10. Regulation effect: urban

	(1)	(2)	(3)	(4)
	Kakwani	Kakwani	Kakwani	Kakwani
lnhouse	-0.1642*** (0.0051)	-0.1644*** (0.0051)	-0.1574*** (0.0056)	-0.1573*** (0.0057)
lnhouse*urban	-0.0288***	-0.0292***	-0.0373***	-0.0382***

	(0.0057)	(0.0057)	(0.0077)	(0.0077)
Mage		0.0082***	0.0052**	0.0051**
		(0.0023)	(0.0022)	(0.0022)
Medu		-0.0061	-0.0054	-0.0044
		(0.0046)	(0.0045)	(0.0044)
agriculture		-0.1928***	-0.1501***	-0.1378***
		(0.0440)	(0.0431)	(0.0429)
urban			0.1716	0.1265
			(0.1134)	(0.1125)
lnfincome1_per			-0.1935***	-0.1962***
			(0.0203)	(0.0204)
lnfinance_asset			-0.0463***	-0.0470***
			(0.0033)	(0.0033)
lnphouse				1.1420***
				(0.1406)
Family FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
_cons	7.4771***	7.2047***	9.4182***	-0.7654
	(0.0483)	(0.1192)	(0.2341)	(1.2695)
r2_a	0.2740	0.2773	0.3103	0.3180
N	14626	14626	14626	14626

Notes:1) Robustness Standard errors in parentheses.
2) *, **and *** indicate significance at 10, 5 and 1 percent level, respectively.
3) To be more intuitive, the Kakwani index was expanded tenfold in the empirical study without affecting the results

6 Conclusion and Inspiration

Based on the data of 2018 and 2020, this paper makes the following findings: the increase of housing wealth has a negative effect on wealth inequality (relative deprivation of wealth). The impact of housing wealth on wealth inequality varies with different household characteristics: the wealth inequality of households with average age less than 30 years old, households with per capita income more than 50,000 yuan, and households with regional housing price less than 10,000 yuan per square meter are more sensitive to the change of housing wealth. Further analysis shows that the increase in housing wealth reduces wealth inequality by promoting consumption upgrading. Consumption upgrading is a mediator between housing wealth and wealth inequality. In addition, the regional factors of cities strengthen the impact of housing wealth on wealth inequality. The area factor of the city acts as a moderator between housing wealth and wealth inequality.

Based on the above conclusions, this paper argues that to further reduce wealth inequality at the household level, increase people's well-being, and achieve common prosperity, people should focus on the groups lacking housing wealth. The government should take measures to reduce the burden on households with low housing wealth, such as lowering the interest rate of mortgage and the interest rate of existing mortgage. At the same time, the government should also adhere to the position of "housing speculation", implement policies such as property tax, promote the steady and healthy development and virtuous cycle of the housing market, and reduce the gap between the

rich and the poor. In addition, the government can promote the upgrading of household consumption by issuing consumption coupons and other forms and strengthen rural construction to reduce the problem of wealth inequality in urban and rural housing.

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