ADBI Working Paper Series

HOUSING AND HOUSEHOLD WEALTH INEQUALITY: EVIDENCE FROM THE PEOPLE'S REPUBLIC OF CHINA

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No.671
February 2017

Asian Development Bank Institute

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Abstract

We examine the issue of the widening wealth inequality in the People's Republic of China (PRC) from the perspective of housing. Using China Household Finance Survey (CHFS) data from 2011, we find that the PRC's wealth inequality including housing is much larger than income inequality. Housing value appreciation, in particular, contributes to wealth inequality by allowing households to enjoy equity market premium through investing more in equity markets and taking a higher position in risky assets.

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1. INTRODUCTION

The PRC's economic reform since 1978 has brought not only rapid economic growth, but also enlarged income inequality. The inequality problem started to get more serious in the mid-1980 when the government focused their reform efforts in the urban sector.[1] Based on the estimate in Wang and Sebastian (2011), there were 336 million Chinese people living on under $2 per day in 2008, while there were 960,000 millionaires in 2010, each with more than $1.6 million in personal wealth. The PRC has become one of the most unequal countries in the world, in a short period of less than 3 decades. Among the driving forces behind inequality, housing stands out as a significant one. Even in the early phase of housing reform transitioning from state allocation to market-determined supply, housing subsidies had become a major contributor to the PRC's urban inequality, according to the study of Khan and Riskin (1998) using data from the China Household Income Project (CHIP).[2]

Homeownership can be helpful in household wealth accumulation. Using longitudinal data from the Panel Study of Income Dynamics (PSID) between 1984 and 2001, Di et al. (2007) find that those who owned homes and owned for longer periods of time had significantly higher household net wealth by 2001. The findings are suggestive of a positive influence of ownership over long periods on net wealth. In addition, each year of ownership is associated with approximately 2% of increase in household income and doubling the length of ownership increases household income by about 11% (Di 2007). However, the impact of homeownership varies by income status, with each additional year of homeownership being associated with $15K more in wealth holdings for high-income households and roughly $6 to $10K more in wealth holdings for low- and middle-income households (Turner and Luea 2009).

Along this line of literature, we are interested in why homeownership may function differently in wealth accumulation, possibly widening income inequality. More specifically, we empirically test whether housing price appreciation can help household's financial market investment, particularly investment in equity markets. If this is the case, equity market premiums, coming along with housing price appreciation, leads to more inequality.

There are theories linking the distribution of wealth and financial market investment. In the model of Aghion and Bolton (1997), individuals are assumed to be able to engage in specific productive projects. Only entrepreneurs with sufficiently high levels of personal wealth will be able to finance their "project." With a simple indivisibility, the initial wealth distribution will determine how many individuals will be able to undertake such projects. In models with capital market imperfections, credit constraints will prevent the poor from undertaking profitable indivisible investments. Pastor and Veronesi (2016) examine the channels through which financial markets and business ownership affect inequality. In their model, investment risk and differences in financial market participation are the principal drivers of income inequality.

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[1] See Wang et al. (2015) and Knight (2013) for comprehensive review on the issue of the PRC's income inequality.

[2] See Wang (2011) for the discussion on how the PRC's removal of price distortions, originating from state misallocation, allowed households to increase their consumption of housing and led to an increase in equilibrium housing prices.

Investment- or asset-induced inequality tends to self-reinforce over time. There is a fundamental constraint on poverty reduction: the poor lack of access to the assets necessary for increased productivity and income. The World Bank, targeting poverty reduction, should put more emphasis on the distribution of assets, both physical and human capital (Birdsall and Londono 1997). In the meanwhile, this justifies the importance of asset inequality in the discussion of income inequality.[3]

Meanwhile, unlike stocks and bonds, owner-occupied housing provides significant consumption benefits (Henderson and Ioannides 1983). Acquisition of such housing is thus driven by both consumption and investment motives. Some experts argue that this dual role leads to an overinvestment in housing (Brueckner 1997). While the asset substitution argument explains why homeowners would lower their equity proportion in net worth, there is also diversification effect of owning two risky assets: home equity and stocks. Compared with a homeowner, a renter's risk exposure depends only on his holding of risky stocks. With a low return correlation between risky stocks and home equity, a homeowner reduces his stockholding in net worth but holds a riskier liquid financial portfolio (Yao and Zhang 2005).

We organize the paper as follows. The next section explains empirical model and data while section 3 contains empirical results. Section 4 uses decomposition method while the final section concludes.

2. EMPIRICAL MODEL AND DATA

2.1 Empirical Model

To examine whether the rise of housing values may deteriorate the PRC's wealth inequality through extending homeowners' investment choices and further increasing their total wealth from the investment on other financial assets, we first construct a benchmark model to test if change of housing values may influence households' total wealth as below:

$$Wealth_i = \alpha_0 + \alpha_H Housing_i + \alpha_c Control_i + \epsilon_i \qquad (1)$$

where $Wealth_i$ is household's net wealth (in logarithm) in 2011. Based on different coverage, two kinds of net wealth are used in the paper, i.e., net wealth including all housing values (up to three housing units) ($Wealth\_all_i$) and non-housing net wealth ($Wealth\_nohouse_i$). $Housing_i$ is a proxy of changes of housing values, measured by either the change of total housing values (in logarithm) ($Housevalue_i$) that captures the real appreciation/depreciation of housing units by deducting housing units' initial acquisition cost from the current value reported by the respondent in 2011, or the rate of returns that capture the average annual yield of holding housing units ($Housereturn_i$).[4]

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[3] Deininger and Olinto (1999): Asset inequality—but not income inequality—has a relatively great negative impact on growth and also reduces the effectiveness of educational interventions. This means that policy makers should be more concerned about households' access to assets, and to the opportunities associated with them, than about the distribution of income.

[4] For some reasons, some respondents report the current housing value as zero. The minimum values of annual yield are thus calculated as −1, i.e. −100%. $Housereturn_i$ is calculated as the simple average of annual yields of households' total (up to 3) housing units.

Table 1: Gini Coefficients

	Household Head Labor Income	Household Net Wealth	Household Non-Housing Wealth
Total Sample	0.65 (8,381)	0.74 (8,205)	0.84 (7,749)
Region:			
East	0.67 (3,952)	0.71 (3,924)	0.82 (3,807)
Central	0.53 (2,498)	0.59 (2,444)	0.77 (2,280)
West	0.55 (1,931)	0.64 (1,837)	0.81 (1,662)
Development level:			
Urban	0.64 (5,171)	0.70 (5,099)	0.82 (4,967)
Rural	0.61 (3,210)	0.70 (3,106)	0.80 (2,782)

Note: The values in brackets are the number of observations with non-negative values that are used to draw the Lorenz curves in Figures 1–3 and the calculation of corresponding Gini coefficients.

Housing tenure choice is considered as a key determinant of household wealth accumulation (Di et al. 2007). In this study, we control the housing tenure choice by including a dummy variable of $Renter_i$. One would expect that a renter accumulates less wealth than a homeowner. $Multihousing_i$ is the dummy to further distinguish households with several housing units from households with one or no housing units. A homeowner with multiple housing units has the potential to accumulate more wealth than a homeowner with only one housing unit or renter. Considering the different types of housing units may influence the wealth accumulation, we define a dummy variable, $Commodity_i$, to separate commodity housing from the remaining types such as affordable housing, inheritance or gifts, purchased at below market prices, financed housing, self-built, demolition/relocation, and others. Both $Housingcost_i$ and $Loan_i$ are used to proxy households' budget constraint. While $Housingcost_i$ is the initial cost that households pay for the housing, $Loan_i$ is the unpaid loans for a household to acquire housing units, including mortgage and other loans. Both variables are in logarithm.

Moreover, the features of different households and households' head may also influence households' wealth accumulation and investment decision, and thus should be controlled in this study. These control variables include household head's age, gender, education level, marital status, migrant status, investment attitude, household size, income, and geographic location. According to life-cycle consumption theory (Modigliani 1966), the younger households like to borrow than save to smooth life-cycle consumption relative to the elder ones. Hence, we expect to observe a generalized inverted U pattern, indicating that household wealth peaks at middle age. To test this effect, Age_i and Age_i^2 are both added into the empirical model. In the model of estimating households' wealth, household head's permanent income is considered as an important impact factor (Choudhury 2002). Under the assumption that the head's permanent income is generally not accessible, his or her education achievement ($Education_i$) is taken as a proxy. $Gender_i$ is the dummy to identify household head's gender. $Divorce_i$ is the dummy variable to control for household head's marital status. One would expect a negative impact of divorce on household wealth since it is possible to split the wealth between divorced couple. $Income_i$ is household's income (in logarithm), used to control for differences in household income in determining household investment. We also expect that migrant households ($Migrant_i$) display different patterns from native households. Self-reported attitude to risk ($Riskattitude_i$) is considered as an important household demographic feature (Campbell 2006). The higher the value is, the more conservative risk attitude the household has. Household size ($Familysize_i$) is also controlled because the number of dependents may affect a

household's capacity to save and its motivation to save (Di et al. 2007). *Rural and Province* are all geographic control variables. Households living in rural areas may exhibit quite different wealth accumulation patterns than those in urban areas.

2.2 Data and Methodology

In this study, we use the data collected in the first round of the China Household Finance Survey (CHFS) in 2011. [5] The dataset provides micro-level financial information of more than 8,000 PRC households in 25 provinces. CHFS data allow us to have a comprehensive understanding of each respondent household's assets and liabilities, including the information associated with housing and financial assets. In the survey, a respondent may report detailed information of the housing unit he or she rents or as many as three housing units owned. In addition to the housing information, a household was also inquired to report the relevant information about the investment in other financial assets, such as checking, savings, stocks, bonds, etc.

Table 2: Household Portfolios of China Household Finance Survey Data

	Number of Households Holding the Asset	Percentage of Total Sample (%)	Mean Asset Share (%)
Owner-occupied housing	7,570	89.71	93.91
Other housings	1183	14.02	51.99
Housing mortgage	846	10.03	29.20
Checking account	4,364	51.72	9.87
Saving account	1,304	15.45	20.54
Stocks	622	7.37	11.72
Bonds	57	0.68	5.99
Funds	351	4.16	5.41
Derivatives	1	0.01	1.97
Bank financial products	76	0.90	9.78
Non-RMB assets	101	1.20	2.97
Gold	54	0.64	5.63
Other liabilities	2,929	34.71	44.23
Net wealth	8,438	100	100

Note: The data of net wealth reported only for households with non-negative net worth and households have ownership of the asset.

Households' net wealth ($Wealth\_all_i$) is calculated by adding the value of private business, value of at most three housing units,[6] value of all automobiles owned, value of 12 categories of durable goods, value of luxury goods, account balance of checking, saving, stock, bond, fund, future, warrant, other derivatives, financial product, non-RMB assets, gold, cash, lending, and eliminating bank and/or other loans for private

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business, housing units, education, or any other loans. [7,8] Non-housing wealth is households' net wealth excluding all the wealth values and liabilities generated from housing.

Table 3: The Average Value of Financial Assets and Net Wealth Held by PRC Households—by Wealth Level

Mean	<P10	P25	P50	P75	P90	>P90
Wealth_all	–24,719.44	24,439.86	106,067.00	286,219.90	776,921.30	2,905,972.00
Wealth_nohouse	–31,850.54	7,137.94	20,594.44	69,691.52	229,102.80	1,189,380.00
Housevalue	15,459.06	18,963.18	94,171.17	247,312.30	665,517.10	2,322,434.00
Housereturn	-0.02	0.01	0.06	0.12	0.16	0.21
Housingcost	22,757.09	41,105.03	67,194.90	130,076.50	245,337.10	708,453.80
Loan	62,873.59	3,726.47	10,454.90	19,730.06	45,388.76	124,265.40
Income	21,093.77	24,568.33	28,868.13	47,049.39	69,746.05	171,989.00
Riskattitude	4.05	4.09	3.95	3.75	3.72	3.47
Investchoices	0.32	0.52	0.67	1.00	1.33	1.81
Risk asset ratio	0.00	0.01	0.02	0.05	0.13	0.26
Checking	1,051.06	2,025.14	4,736.18	9,950.10	20,368.97	56,593.93
Saving	251.54	978.23	3,921.14	10,126.97	21,794.38	58,235.17
Stock	82.94	79.97	326.14	1,676.84	8,946.64	57,674.38
Bond	0.00	0.06	9.87	92.51	899.84	3,672.53
Funds	0.71	33.02	157.71	667.32	3,401.42	12,829.33
Bankproduct	0.00	3.96	94.92	66.11	2,006.33	7,117.04

Note: The definition of variables can be found in Table 4.

The initial acquisition cost of housing ($Housingcost_i$) is the total amount of acquisition cost from at most three housing units. All the acquisition costs are adjusted to the price level in 2011. Households can acquire the housing units from various sources. Besides purchasing housing units, households may build the housing by themselves, inherit from parents, or rent from the landlords. Therefore, the initial acquisition cost of housing units is not necessary to be the purchasing cost. Tables 4 and 5 summarize the definition and the descriptive statistics of the variables.

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[7] The durable goods include camera, BW/color TV, washing machine, refrigerator, air conditioner, computer, stereo, solar/electric water heater, furniture, satellite receiver, musical instruments and others. The luxury goods contain yacht/private plane, antiques, rare animals and plants, stamps/paintings/artwork, gold/silver/jewelry, and others. Bonds include treasury bills, local government bonds, financial bonds, corporate bonds, other bonds. Funds include stocks, bonds, money market funds, hybrids, and other funds. Non-RMB assets contain foreign currency deposits, foreign notes/foreign currency, B shares, H shares, bank forex products, nonbank forex products, foreign stocks and bonds, and others.

[8] Some households have negative net wealth. To log transform such a variable X including negative values, we choose to add a positive constant a so that $\min(X) + a = 1$. In the case of households' wealth, a is 44,801. The same transformation applies to the variables that contain negative values and need to take natural log, such as appreciation of housing values ($Housevalue_i$).

Table 4: Variable Definitions

Variable	Definition
Dependent Variables	
$Wealth\_all_i$	Log of household net wealth in 2011
$Wealth\_nohouse_i$	Log of household non-housing wealth in 2011
$Investchoices_i$	Category variable, total number of categories of financial assets that a household has invested in
$Risky\ asset\ ratio_i$	The proportion of risky assets values over total household assets
$Checking_i$	Log of total amount of household checking account
$Saving_i$	Log of total amount of household saving account
$Stock_i$	Log of total amount of stock held by household, including both listed stocks and unlisted stocks
$Bond_i$	Log of bonds held by household, including central government bonds, local government bonds, financial bonds, corporate bonds, and other bonds
$Funds_i$	Log of funds held by household
$Bankproduct_i$	Log of financial products sold by banks that are purchased by household
Independent Variables	
$Housevalue_i$	Log of household's housing value appreciation/depreciation
$Housereturn_i$	Average annual yield rate of housing(s) if sold
$Housingcost_i$	Log of initial acquisition cost of housing units in 2011 value
$Loan_i$	Log of unpaid loan for a household to acquire housing unit, including the mortgage and other loan
$Renter_i$	1=renter; 0=homeowner
$Multihousing_i$	1=household owns multiple housing units; 0=household owns one housing unit or no housing
$Commodity_i$	1=any one of housing unit is a commodity housing; 0=none housing unit is a commodity housing
$Gender_i$	1=male household head; 0=female household head
Age_i	Age of household head in survey year
Age_i^2	The square of household head age in survey year
$Education_i$	Category variable, 1=no education; 2=elementary school; 3=middle school; 4=high school; 5=technical secondary school; 6=junior college; 7=college; 8=graduate with master's degree; 9=graduate with PhD degree
$Divorce_i$	1=divorce; 0=others
$Income_i$	Log of household income
$Migrant_i$	1=migrant without local Hukou; 0=resident with local Hukou
$Riskattitude_i$	Investment attitude of household head
$Familysize_i$	Total number of family members
$Rural_i$	1=household is in the rural area; 0=household is in the urban area
$Province_i$	Province dummies
$East_i$	1=eastern province; 0=middle or western province
$Middle_i$	1=middle province; 0=eastern or western province
$West_i$	1=western province; 0=eastern or middle province

Table 5: Summary Statistics

	Obs.	Mean	Median	S.D.	Min	Max
Dependent Variables						
$Wealth\_all_i$	8,427	506,160	167,950	1,056,942	−4,042,800	13,400,000
$Wealth\_nohouse_i$	8,427	102,375.5	14,000	439,707.1	−4,042,800	11,600,000
Independent Variables						
$Housevalue_i$	8,352	267,378.1	54,750.24	638,001.8	−179,354.7	9,303,344
$Housereturn_i$	7,678	0.090	0.054	0.174	−0.984	2.980
$Housingcost_i$	8,437	165,992.9	64,646.79	395,443.8	0	13,900,000
$Loan_i$	8,438	19,998.07	0	142,561.7	0	5,700,000
$Renter_i$	8,437	0.0920	0	0.289	0	1
$Multihousing_i$	8,438	0.143	0	0.350	0	1
$Commodity_i$	8,438	0.243	0	0.429	0	1
$Gender_i$	8,438	0.731	1	0.443	0	1
Age_i	8,437	52.946	52	14.071	7	114
$Education_i$	8,359	3.434	3	1.680	1	9
$Divorce_i$	8,351	0.026	0	0.160	0	1
$Income_i$	8,438	52,578.43	27,700	141,748.4	−500,000	3,000,000
$Migrant_i$	8,353	0.074	0	0.262	0	1
$Riskattitude_i$	8,295	3.847	4	1.234	1	5
$Familysize_i$	8,438	3.475	3	1.548	1	18
$Rural_i$	8,438	0.384	0	0.486	0	1
$East_i$	8,438	0.472	0	0.499	0	1
$Middle_i$	8,438	0.298	0	0.458	0	1
$West_i$	8,438	0.230	0	0.421	0	1

The benchmark model (1) examines the impact of appreciation of housing values on households' wealth. To further check if the appreciation of housing values may enlarge the PRC's income inequality, we use a quantile regression to examine the different impacts of housing value appreciation on households' wealth in different wealth levels.

3. EMPIRICAL RESULTS

The baseline model is designed to discover the impact of housing value appreciation on household net wealth and non-housing net wealth, respectively. The OLS estimation is reported in Table 6. The results indicate that the appreciation of housing value contributes to the rise of household wealth, no matter which definition of household wealth is used. We also replace the housing value appreciation with the average annual yield of housing units to account for the fact that households may have different holding periods and initial values for each of their housing units. The results also indicate that a rise of average return of housing units increases both net wealth and non-housing wealth. These positive and statistically significant impacts of housing values variables (in terms of both aggregate value appreciation and average return) on non-housing wealth may be the evidence that a rise of housing value may increase housing's collateral value, providing more credits and opportunities for households to invest in other financial assets, such as stocks, funds, and even another housing units. We will further investigate this issue in the next section.

Table 6: The Impacts of a Housing Value Appreciation on Households' Wealth

OLS	$Wealth\_all_i$		$Wealth\_nohouse_i$	
$Housevalue_i$	1.007***	–	0.243***	–
	[0.0198]		[0.0154]	
$Housereturn_i$	–	1.604***	–	0.220***
		[0.134]		[0.0447]
$Housingcost_i$	0.0760***	0.333***	0.0164***	0.0670***
	[0.00280]	[0.0169]	[0.00221]	[0.00832]
$Loan_i$	−0.00805***	−0.0284***	−0.0200***	−0.0236***
	[0.00174]	[0.00243]	[0.00223]	[0.00233]
$Renter_i$	−0.208***	2.207***	0.224***	0.654***
	[0.0427]	[0.193]	[0.0314]	[0.0924]
$Multihousing_i$	0.264***	0.390***	0.171***	0.250***
	[0.0210]	[0.0280]	[0.0236]	[0.0283]
$Commodity_i$	0.100***	0.0711***	0.128***	0.121***
	[0.0196]	[0.0265]	[0.0205]	[0.0219]
$Gender_i$	−0.0171	−0.0425**	0.00222	−0.00943
	[0.0152]	[0.0198]	[0.0150]	[0.0161]
Age_i	−0.00661**	0.0105**	−0.00494	−0.00172
	[0.00331]	[0.00424]	[0.00324]	[0.00357]
Age_i^2	0.00004	-0.00006*	0.00003	0.00002
	[2.89e-05]	[3.76e-05]	[2.70e-05]	[2.97e-05]
$Education_i$	0.0497***	0.0804***	0.0523***	0.0597***
	[0.00548]	[0.00711]	[0.00569]	[0.00606]
$Divorce_i$	−0.0493	0.00976	−0.045	−0.0118
	[0.0448]	[0.0610]	[0.0398]	[0.0461]
$Income_i$	0.115***	0.142***	0.114***	0.125***
	[0.00772]	[0.0105]	[0.00743]	[0.00834]
$Migrant_i$	0.0129	−0.178***	0.0649	0.0147
	[0.0349]	[0.0444]	[0.0443]	[0.0470]
$Riskattitude_i$	−0.0387***	−0.0415***	−0.0498***	−0.0496***
	[0.00628]	[0.00746]	[0.00595]	[0.00637]
$Familysize_i$	0.0109**	0.000847	−0.00964*	−0.0121**
	[0.00488]	[0.00628]	[0.00500]	[0.00533]
$Rural_i$	−0.266***	−0.466***	−0.00594	−0.0620***
	[0.0192]	[0.0248]	[0.0151]	[0.0161]
Constant	−1.934***	7.366***	7.480***	9.873***
	[0.266]	[0.229]	[0.234]	[0.157]
$Province_i$	Y	Y	Y	Y
Observations	7,719	7,107	7,720	7,112
R-squared	0.809	0.718	0.37	0.346

Note: Standard errors are reported in brackets. *, **, and *** indicated the significance level of 10%, 5%, and 1%, respectively.

Most control variables have the expected sign, except that the estimated coefficients of renter are mostly positive, indicating that a renter tends to have more wealth than a homeowner. This may be because most homeowners carry a housing mortgage as well while they hold the housing properties so their net wealth may not be as high as a renter who has no financial pressure from a mortgage and may invest more in other financial assets. Another interesting finding is that net wealth is lower when the

household head is male. This may be because being a female household head challenges patriarchal traditions of East Asia, and indicates that such a female may be more aggressive in investment and more capable of making money. The life-cycle theory is more significant in terms of total net wealth, but becomes insignificant after excluding housing values. Migrants tend to have less net wealth than native households but estimated coefficients for non-housing wealth become positive and insignificant, suggesting that locals generally have the advantage in accumulating real estate assets by inheriting or purchasing housing. This may particularly hold in the PRC since migrants tend to suffer from the real estate purchasing limitation (Logan et al. 2010), which may decrease the total net wealth but may increase a migrant household's non-housing investment. Moreover, the larger the family size is, the lower the non-housing wealth since the increasing members are generally dependents. However, households with large family size tend to buy more houses and result in higher total net wealth. Finally, rural households tend to have lower net wealth compared with urban households.

To further examine how the housing value change contributes to wealth inequality, we apply quantile regression to the baseline model. The results of housing value appreciation and average return of housing investment are reported in Tables 7 and 8, respectively. The results in Table 7 show that housing value appreciation has a greater positive impact on non-housing wealth as households get wealthier, indicating that a housing value appreciation may enlarge non-housing wealth inequality. However, the impact of housing value appreciation on total net wealth is getting smaller as households get wealthier. This may be because housing takes a smaller portion of total net wealth for wealthy families. To standardize housing value appreciation, we use the average annual return of housing investment to proxy the housing value change. The results in Table 8 indicate that the average housing return has significantly positive impact on both total net wealth and non-housing wealth, and this positive effect is getter more intensive as the households get wealthier.

Table 7: The Impacts of a Housing Value Appreciation on Stratified Households' Wealth

Quantile Regression	$Wealth\_all_i$				
	10%	25%	50%	75%	90%
$Housevalue_i$	1.178***	1.145***	1.097***	0.970***	0.847***
	[0.0160]	[0.0103]	[0.00948]	[0.0132]	[0.0360]
$Control_i$	Y	Y	Y	Y	Y
$Province_i$	Y	Y	Y	Y	Y
Observations	7,719	7,719	7,719	7,719	7,719
Pseudo R2	0.5751	0.6279	0.6292	0.6161	0.5818
	$Wealth\_nohouse_i$				
	10%	25%	50%	75%	90%
$Housevalue_i$	0.0456***	0.101***	0.202***	0.251***	0.287***
	[0.00452]	[0.00381]	[0.00496]	[0.0141]	[0.0247]
$Control_i$	Y	Y	Y	Y	Y
$Province_i$	Y	Y	Y	Y	Y
Observations	7,720	7,720	7,720	7,720	7,720
Pseudo R2	0.0525	0.0969	0.206	0.3032	0.3494

Note: Standard errors are reported in brackets. *, **, and *** indicated the significance level of 10%, 5%, and 1%, respectively.

Table 8: The Impacts of Housing Returns on Stratified Households' Wealth

Quantile Regression	$Wealth\_all_i$				
	10%	**25%**	**50%**	**75%**	**90%**
$Housereturn_i$	1.360***	1.919***	2.662***	3.161***	3.093***
	[0.174]	[0.0848]	[0.0397]	[0.0436]	[0.0526]
$Control_i$	Y	Y	Y	Y	Y
$Province_i$	Y	Y	Y	Y	Y
Observations	7,107	7,107	7,107	7,107	7,107
Pseudo R2	0.4377	0.5246	0.5436	0.5479	0.528
	$Wealth\_nohouse_i$				
	10%	**25%**	**50%**	**75%**	**90%**
$Housereturn_i$	0.0748***	0.0986***	0.124***	0.204***	0.493***
	[0.0188]	[0.0152]	[0.0229]	[0.0354]	[0.0524]
$Control_i$	Y	Y	Y	Y	Y
$Province_i$	Y	Y	Y	Y	Y
Observations	7,112	7,112	7,112	7,112	7,112
Pseudo R2	0.0518	0.0894	0.1873	0.2868	0.3382

Note: Standard errors are reported in brackets. *, **, and *** indicated the significance level of 10%, 5%, and 1%, respectively.

The results from both tables show that the growing housing value benefits the wealthier households in accumulating more non-housing wealth than the poor ones, enlarging the wealth inequality in the PRC. However, a housing value appreciation contributes more wealth effect for the poor households. This may offset part of wealth inequality generated from non-housing wealth.

4. HOUSEHOLDS' WEALTH DECOMPOSITION

The relationship between overall wealth inequality and homeownership is analyzed in this study using the Yitzhaki decomposition (Yitzhaki 1994). This allows us to separate the overall inequality into within-group and between-group components.

As defined in section 2.2, households' net wealth ($Wealth\_all_i$) of urban households is composed by net asset of housing ($Housevalue_i$), household business, net value of automobile, durable goods and luxury goods, risk-free assets, and risky assets. These different assets are all expressed as the net value, being equal to the total value minus debts. Net wealth is then the sum of all assets minus liabilities. Table 9 presents the results from our decomposition analysis. Instead of following the conventional rule of dividing households into homeowners and renters [9], we divide all samples into two groups: households owning housing vs. those owning no housing. The mean(s) of all types of asset and loan of house-owning samples is higher than that of not-house-owning samples. However, when we turn to the Gini index, the index of the latter is 0.946, which is higher than the index of the former, 0.701. It implies the inequality among households owning no housing is more serious than that among households owning housing. The percentage change in the last column refers to the

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[9] Renters may invest in real property and own housing unit(s) that they do not occupy. In this paper, we focus on the housing assets owned by households, so it is reasonable for us to distinguish households by the housing assets they own instead of whether they own the housing units they currently occupy.

impact that a 1% change in the net asset of housing will decrease the inequality level among households who own housing by 2.76%. When we turn to the non-housing wealth, the difference between the impacts of small changes in the risky assets upon inequalities in these two groups is large. A 1% increase in risky assets lowers inequality for the group owning housing by only 0.82% but decreases inequality for the not-house-owning group by 6.66%.

Table 9: The Distribution of Wealth and Its Decomposition by Factor in Urban PRC

	House-Owning Samples				
	Mean	**Share**	**%>0**	**Gini**	**% Change**
Wealth_all	549,932	1.000	97.86	0.701	–
Housevalue	444,810	0.839	98.71	0.689	–2.76
Wealth_nohouse	105,252	0.161	91.66	0.927	2.76
Income	52,619	0.437	96.39	0.630	–3.88
household business asset	22,972	0.026	11.50	1.432	2.44
automobile	15,282	0.011	14.66	0.939	0.17
durable and luxury goods	14,338	0.033	98.27	0.743	–0.38
risk free assets	15,940	0.011	96.31	0.965	0.59
risk assets	34,044	0.087	12.39	0.818	–0.82
Loan	–35,978	0.063	33.14	0.931	–3.62
Loan for housing	–22,026	0.049	21.55	0.951	–1.00
Loan for household business	–10,770	–0.009	9.96	0.986	–1.81
Loan for automobiles	–467	0.007	2.47	0.994	–0.05
Loan for durable and luxury goods	–16	0.000	0.04	1.000	0.00
Loan for risk assets	–89	0.000	0.16	0.999	0.00
Loan for education	–141	–0.006	1.32	0.994	–0.05
Other loan	–2,574	0.022	4.76	0.988	–0.71
	Not-House-Owning Samples				
	Mean	**Share**	**%>0**	**Gini**	**% Change**
Wealth_all	73,977	1.000	91.35	0.946	–
Housevalue	–	–	–	–	–
Wealth_nohouse	73,977	1.000	91.35	0.946	0
Income	52,209	6.511	92.26	0.708	–47.64
household business asset	15,989	0.070	11.35	1.253	5.46
automobile	8,522	0.037	8.90	0.982	–0.45
durable and luxury goods	7,230	0.356	94.45	0.704	–4.49
risk free assets	12,728	0.035	96.26	0.970	–0.49
risk assets	29,674	0.455	10.58	0.858	–6.66
Loan	–11,728	5.205	14.84	0.975	–27.07
Loan for housing	–	–	–	–	–
Loan for household business	–8,241	5.211	5.55	0.993	–18.26
Loan for automobiles	–528	0.014	1.55	0.996	–0.88
Loan for durable and luxury goods	0	0.000	0.00	.	.
Loan for risk assets	0	0.000	0.00	.	.
Loan for education	–122	–0.030	1.29	0.993	–0.27
Other loan	–2,837	0.010	6.97	0.977	–7.66

Note: "Share" accounts for the proportion of households with nonzero net wealth.

4.1 How Do Households Get Wealthier? Wealth Decomposition

To explore housing owning difference in household wealth, we apply a regression-based decomposition method of Blinder–Oaxaca-type decomposition (Blinder 1973; Oaxaca 1973), which allows the decomposition of housing owning difference in the amount of household wealth into a part that is caused by differences in observable characteristics and a part that is explained by differences in estimated coefficients.

Consider the following linear regression model, which is estimated separately for the groups $g = h, n$:

$$W_{ig} = X_{ig}\beta_g + \varepsilon_{ig} \tag{2}$$

where W_{ig} denotes wealth of household i in group g, X_{ig} is a vector of observable characteristics, β_g represents a vector of parameters to be estimated and ε_{ig} is a standard error term. For these models, classical Blinder–Oaxaca decomposition proposes the decomposition as:

$$\overline{W_h} - \overline{W_n} = \left[E_{\beta_h}(W_{ih}|X_{ih}) - E_{\beta_h}(W_{in}|X_{in})\right] + \left[E_{\beta_h}(W_{in}|X_{in}) - E_{\beta_n}(W_{in}|X_{in})\right] \tag{3}$$

where $\overline{W_g} = N_g^{-1}\sum_{i=1}^{N_g} W_{ig}$ and $\overline{X_g} = N_g^{-1}\sum_{i=1}^{N_g} X_{ig}$. $E_{\beta_g}(C_{ig}|X_{ig})$ refer to the conditional expectation of C_{ig} evaluated at the parameter vector β_g. The first term on the right-hand side of equation (3) is the component of the difference in household wealth between housing owner and non-housing owner households that is due to differences in observable characteristics. The second term represents the difference that is due to differences in coefficient estimates.

The first step of our econometric methodology consists of estimating equation (1) using the benchmark model. In the previous wealth decomposition studies (Bodenhorn and Ruebeck 2007; Johns 1990; Juster et al. 2005), household heads' age, age square, marital status, immigrant status, employment status, education level, household size, geographic location, household income, and inheritances are considered as factors impacting households' wealth. In this study, we also include all these factors except for inheritances, which is not available in the survey. Estimated results are reported in Table 10.

The second step is the wealth decomposition. Results of the decomposition analysis are reported in Table 11. Although most factors that have impact on households' wealth used in the traditional wealth decomposition studies have been included, the model still does not do a good job in predicting the wealth difference between households owning housing and those owning non-housing. For the household net wealth in column 1, around 98% of the households' wealth difference is due to differences in coefficients (unexplained part) and only 2% by different observable characteristics. The results do not change much when we add in a few other factors such as $Housevalue_i, Housingcost_i, Loan_i, Multihousing_i, Commodity_i$. When we turn to household non-housing wealth in column 2, the increase of 0.024 indicates that the difference in all traditional factors listed account for about 1/4 non-housing wealth gap. The unexplained part accounts for around 3/4 of the non-housing wealth gap. These results confirm all these traditional factors play a less important role in determining households' wealth, but they do play a role in determining the non-housing wealth gap. It suggests housing tenure choice is essential to the gap of households' wealth in all.

Table 10: Determinants of Household Wealth in Urban PRC

OLS	House-Owning Households		Not-House-Owning Households	
	Wealth_all	Wealth_nohouse	Wealth_all	Wealth_nohouse
Gender	−0.0774***	−0.0134	−0.0473	−0.0314
	[0.0245]	[0.0169]	[0.0704]	[0.0495]
Age	0.00888	−0.00331	0.0244**	0.0153*
	[0.00546]	[0.00380]	[0.0120]	[0.00820]
Age2	−0.00007	0.00003	−0.000187*	−0.00011
	[4.88e-05]	[3.20e-05]	[9.99e-05]	[6.80e-05]
Education	0.145***	0.0803***	0.0699***	0.0485***
	[0.00846]	[0.00614]	[0.0255]	[0.0173]
Divorce	0.00492	0.004	−0.0946	−0.0716
	[0.0778]	[0.0485]	[0.151]	[0.0925]
Income	0.229***	0.151***	0.179***	0.103***
	[0.0122]	[0.00867]	[0.0313]	[0.0215]
Migrant	−0.335***	−0.00429	0.113	0.0801
	[0.0618]	[0.0539]	[0.107]	[0.0739]
Riskattitude	−0.0586***	−0.0541***	−0.0953***	−0.0809***
	[0.00908]	[0.00650]	[0.0304]	[0.0210]
Familysize	0.0257***	−0.0107*	0.0298	0.0289*
	[0.00785]	[0.00552]	[0.0273]	[0.0164]
Rural	−0.694***	−0.119***	−0.0321	−0.0247
	[0.0278]	[0.0162]	[0.0818]	[0.0539]
Constant	10.75***	10.44***	8.649***	10.34***
	[0.197]	[0.136]	[0.489]	[0.351]
Province	Y	Y	Y	Y
Observations	7,128	7,122	666	676
R-squared	0.542	0.305	0.302	0.251

Note: Standard errors are reported in brackets. *, **, and *** indicated the significance level of 10%, 5%, and 1%, respectively.

Table 11: Owning Housing Wealth Gap: Oaxaca–Blinder Decomposition Results

	Wealth_all		Wealth_nohouse	
	Coefficient	In % of Δ	Coefficient	In % of Δ
Δ	1.550***		0.093***	
	(0.040)		(0.0255)	
Explained	0.031	2	0.024	25.81
	(0.044)		(0.029)	
Unexplained	1.519***	98	0.069***	74.19
	(0.047)		(0.435)	

5. CONCLUSIONS

In this paper, we depict household income and wealth inequality status in the PRC. According to our calculations based on CHFS data of 2011, the Gini coefficients have reached a high level of 0.65 for household income, and a higher level of 0.74 for household net wealth. Income inequality is not the only contributor to the gap of households' wealth. Further exploration of the households' asset portfolio and homeownership reveals that housing assets account for the largest share of total household wealth for homeowners, and the national homeownership rate is about 90%. These stylized facts shed light on the possibility that housing value appreciation in the past decades may have contributed to enlarged household wealth gap.

We focus on analyzing whether and how housing value appreciation deteriorates the PRC's household wealth inequality. The empirical results confirm that housing value appreciation does contribute to household wealth inequality. The stratified analysis further indicates that housing value appreciation has a greater positive impact on non-housing wealth for wealthier households. The housing, after housing value appreciation, can be refinanced to pay for equity market investment, allowing households to enjoy more equity market premium. This may enlarge wealth inequality.

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