Housing Wealth and Household Consumption: Evidence from Urban China

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Motivation

- Housing is the primary component of many households' financial resource around the world.
  - In U.S., home ownership rate is around **65.1%** (2010 census)
  - In China, home ownership experienced dramatic increasing among urban households during the past two decades (Chen, Yang, and Zhong, 2019).
    - In 2009, home ownership has reached **90%** among urban households, which is one of the highest in the world.

Literature Review

- Substantial evidence on housing wealth effects Evidence in the U.S. and other developed countries:
  - Engelhardt (1996); Lehnert (2004); Campbell and Cocco (2007); Muellbauer (2007); Bostic, Gabriel, and Painter (2009); Gan (2010); Carroll, Otsuka, and Slacalek (2011); Mian and Sufi (2011); Mian, Rao, and Sufi (2013); Cooper (2013); Iacoviello and Pavan (2013); Atalay, Whelan, and Yates (2016); Windsor, Jääskelä, and Finlay (2015); Bhatia and Mitchell (2016); and Aladangady (2017), and so on.

- What is missing in this literature:
  - **Mechanisms behind the housing wealth are still not clear.**
  - **Evidence in China is limited.**

This Paper

- We use household level panel data (UHS) to estimate the size of the housing wealth effect in China.
- We make use of a unique feature in China's housing market to identify the size of the precautionary savings mechanism in the housing wealth effect.

Mechanisms

- Three theoretical mechanisms have been brought up in the literature
  - 1. Pure wealth effect
  - 2. Collateral effect
  - 3. Precautionary saving effect

Mechanisms

- 1. Pure wealth effect
  - Rising housing wealth raises household lifetime wealth.
  - Case, Quigley, and Shiller 2005; Campbell and Cocco (2007)
  - Test in the literature: Older households are more likely to downsize their houses and be more responsive to housing wealth changes.

Mechanisms

- 2. Collateral effect
  - Rising housing wealth increase household borrowing capacity.
  - Mian, Rao, and Sufi (2013); Cooper (2013); DeFusco (2017); Aladangady (2017).
  - During our sample period (2002–2009), homeowners in China were not allowed to extract equity from their homes, which limits any collateral effects of house price appreciation in China.

Mechanisms

- **3. Precautionary Saving Channel**
  - Rising housing wealth reduces precautionary saving, and thus, increases household consumption
  - Limited evidence on this mechanism: Gan (2010)
  - $\Longrightarrow$ The focus of this paper.

Tests of Precautionary Saving Channel

- Idea I: Consumption responses should be greater among households facing greater income uncertainty:
  - Test 1. private sector vs. public sector
  - Test 2. non-college vs. college
- Idea II: Consumption responses should be greater for discretionary spending:
  - Test 3. Non-discretionary spending (essential and necessary consumption) vs. discretionary consumption (non-necessary and even luxury)

Results Preview

- Effect: Housing wealth has a strong **positive** impact on consumption in sample Chinese urban households. Every 1 percent increase in housing wealth leads to 0.14 percent increase in household consumption.
- Mechanisms: Our empirical tests suggest that **precautionary saving** mechanism is the main driving force behind this positive impact.
  - Consumption responses are stronger among private-sector employees and among non-college workers who usually have stronger precautionary saving motives.
  - Consumption responses are stronger for non-discretionary spending which is more likely to increase when people feel more financially secure.

Data

- Urban Household Survey (2002-2009)
  - It is collected by China's National Bureau of Statistics (15 provinces and about 110 cities in China)
  - It provides comprehensive information regarding detailed household **consumption and wealth**.
    - Self-reported housing wealth (City-level housing price index)
    - Total and detailed categories of consumption
  - It has a panel data structure.
    - Enable household fixed effect to help address the endogeneity issue caused by time-invariant unobserved factors such as household preference and financial conditions.

Sample

- Restrict our sample to
  - homeowners
  - between the ages of 21 and 65
  - appear in the survey for at least three years (fixed effect model)
- Final sample: 45,119 observations for 12,878 households.
  - This is about 36.5% of the the raw sample which include 123,658 observations.

Estimation Method

$$logC_{it} = \beta_1 logHW_{it} + \beta_2 X_{it} + \eta_i + \epsilon_{it}. \quad (1)$$

- $logC_{it}$: log of the household consumption
- $logHW_{it}$: log of the household housing wealth
- X_{it}: household and household head level characteristics
  - Household: income, size, and dependency ratio
  - Household head: age, gender, education, marriage status, industry, and occupation.
  - City-level variables and province-year dummies
- η_i: Household fixed effect

Overall Effect of Housing Wealth

Table 3. Primary Model Results

	1	2
	OLS	Fixed Effect
Log (Housing Wealth)	0.2903***	0.1433***
	[0.0031]	[0.0059]
Observation	45,119	45,119
Number of Households	12,878	12,878
R Squared	0.2964	0.1361

Overall Effect of Housing Wealth

- For every 1 percent increase in housing wealth, household consumption increases by 0.14 percent. The implied marginal propensity to consume (MPC) is 0.023. This MPC is to the lower end of range estimated in the literature (0.02-0.07)
    - Many existing studies fail to control for household fixed effects
    - The absence of the collateral channel in China can lower the overall MPC

Test 1 (Public vs. non-public) and Test 2 (College vs. Non-college)

Table 3. Primary Model Results

	1	2	3	4
	Public Sector	Non-public Sector	College-Educated	Non-College-Educated
Log (Housing Wealth)	0.0453***	0.1840***	0.0195*	0.1385***
	[0.0069]	[0.0144]	[0.0116]	[0.0080]
Observation	35,360	9,759	16,939	28,180
Number of Households	9,829	3,049	4,913	7,965
R Squared	0.2393	0.1236	0.1122	0.1069

Test 3 (Discretionary vs. non-discretionary)

Table 11. Robustness Checks: Different Types of Consumption

	1	2	3	4	5	6
	Non-Discretionary	Discretionary Spending				
	Rice and Flour	Dessert	Dining Out	Entertainment	Vacation	Health Care
Log(Housing Wealth)	-0.0230***	0.0649***	0.1856***	0.2947***	0.3587***	0.1793***
	[0.0074]	[0.0175]	[0.0218]	[0.0270]	[0.0423]	[0.0349]
Observation	45,119	45,119	45,119	45,119	45,119	45,119
Number of Households	12,878	12,878	12,878	12,878	12,878	12,878
R Squared	45,119	45,119	45,119	45,119	45,119	45,119

Interpretation of the Three Tests

- Non-public sector and non-college workers experienced much greater consumption responses to housing wealth
  - Public vs. non-public: 0.045 vs 0.184
  - College vs. non-college: 0.019 vs. 0.138
- Housing wealth effect is stronger among discretionary consumption
  - Non-discretionary: rice and flour (-0.023)
  - Discretionary: desert, dining out, entertainment, vacation, and health care (0.0649-0.3587)

Other Mechanisms

- So far, we provide evidence showing reduction in precautionary savings are an important mechanism. How about other mechanisms?

- Collateral Channel?
  - Households are not allowed to withdraw from housing equity (only 6 % in our sample reports having a mortgage), thus, the collateral channel is likely to be unimportant
  - Test 1: whether housing wealth increases household debt
  - Test 2: whether consumption responses are greater among household with debt (constrained households)

Other Mechanisms

Table 5. Housing Wealth Effects: The Collateral Channel

	1	2	3	4
	In Debt or Not	Debt Amount	Log (consumption)	
			With Debt	Without Debt
Log (Housing Wealth)	-0.0004	0.0045	0.0234	0.1501***
	[0.0042]	[0.0326]	[0.0381]	[0.0061]
Observation	45,119	45,119	3,759	41,360
Number of Households	12,878	12,878	2,597	10,281
R Squared	0.0133	0.0117	0.1318	0.1475

Other Mechanisms

- Pure wealth channel?
  - Test in the literature: older households are more likely to downsize their houses and be more responsive to housing wealth changes.
  - This test might not work in the context of China: older household face substantial uncertainty related to incomplete social security (SOE reform & one-child policy)
  - Our tests: subsample results among different age groups of households

Other Mechanisms

Table 6. Housing Wealth Effects: The Pure Wealth Effect

	1	3	4	5	6
	Full Sample	Public	Non-public	College-educated	Non-college-educated
Household Head's Age below 35					
Log (Housing Wealth)	0.0892***	0.0418	0.0511*	0.0473	0.0814*
	[0.0280]	[0.0673]	[0.0305]	[0.0389]	[0.0433]
R Squared	0.1415	0.2473	0.1802	0.1706	0.1680
Household Head's Age 35–50					
Log (Housing Wealth)	0.1208***	0.0246*	0.1547***	-0.0233	0.1229***
	[0.0150]	[0.0149]	[0.0425]	[0.0229]	[0.0212]
R Squared	0.1257	0.2482	0.1100	0.1353	0.1023
Household Head's Age above 50					
Log (Housing Wealth)	0.1454***	0.0789**	0.1930***	-0.0718	0.1513***
	[0.0282]	[0.0307]	[0.0519]	[0.0550]	[0.0322]
R Squared	0.0892	0.1640	0.1703	0.0927	0.0999

Robustness Checks

- Endogeneity issue caused by time-varying factors
  - Additional control variables: household's expectation of future economy.
    - Industry-level wage and wage growth
    - city-level GDP and GDP growth
  - Use of city-level housing price
    - Use city-level housing price as instrumental variable
    - Sample of renters (placebo test)

Conclusions

- **Positive** housing wealth effect on household consumption.
  - For every 1 percent increase in housing wealth, household consumption increases by 0.14 percent. The implied marginal propensity to consume (MPC) is 0.023.
- Further analysis suggests that reduction in **precautionary saving** is the most plausible explanation for this positive effect.
  - Consumption responses are stronger among private sector employees, among non-college workers, and for non-discretionary spending.

Conclusions

- Implications for other countries:
  - Household saving rates in developed countries are usually lower than those in China
  - But, they are far from completely insured and are subject to several sources of risks in earning, health, and mortality. (Choi, Lugauer, and Mark (2014) find that nearly all US saving arises from precautionary motives.)
  - Precautionary saving channel can be important in developed countries.
  - Housing price fluctuations can have particular a great impact on households face substantial risk.