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Housing Market and Household Consumption in Urban China: A Debt Perspective

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Abstract: Urbanization precipitates substantial economic transformations, with housing markets playing a pivotal role. The expansion of cities escalates housing demand, subsequently increasing housing debt, which is a crucial factor influencing household consumption. This study utilizes data from six rounds of the China Family Panel Studies (CFPS) spanning 2010 to 2020 to investigate the impact of housing debt on household consumption in urban China. Given the dynamics changes in housing debt status, as well as the endogeneity problems caused by reverse causality and selection bias between households' debt decisions and consumption behavior, this study employs both the difference-in differences with multiple periods and groups (DID_M) model and the two-way fixed effects model. The results show that the average consumption expenditure of households with housing debt is 14% higher than those without. A 1% increase in housing debt size correlates with a 0.011% rise in consumption. Moreover, this positive effect is more pronounced among low-income households and those with older household heads, as well as those owning multiple properties. Compared to non-durable consumption, the impact of housing debt is more substantial on durable consumption. Further mechanism analysis reveals that the effect of housing debt on household consumption is primarily driven by an increase in housing assets, spurred by the rising housing prices. This study underscores the importance of integrating housing debt management within the framework of sustainable urban development, which not only ensures equitable access to housing but also fosters the promotion of sustainable consumption.

Keywords: housing market; housing assets; housing prices; housing debt; household consumption; urban households

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1. Introduction

Over the past four decades, China has witnessed remarkable economic growth, primarily fueled by household consumption. In this context, household consumption is regarded as a critical driver for stimulating aggregate demand within the economy. This growth coincides with significant developments in China's housing market following the market-orientated housing policy reform initiated in 1998, making it a central pillar of the economy. As cities expand and urbanization intensifies, the housing demand has skyrocketed, driven by both essential living needs and investment ambitions. This surge has prompted more and more Chinese households to apply for loans from financial institutions and other lending companies, thus escalating housing debt. By the end of 2022, the housing debt among Chinese households reached CNY 38.8 trillion, accounting for 69.2% of consumer credit. While growing housing debt enables households to realize housing consumption in advance, enhancing household wealth and thereby increasing consumer confidence and capacity [1], it may also crowd out other types of consumption [2]. Therefore, understanding how housing consumption responds to housing debt has become an important issue of concern in recent years.

Some scholars have explored the impact of housing debt on household consumption from macroeconomic perspectives [3,4]. Conversely, others highlight the challenge of

accounting for household demographics and economic characteristics using macro data in profound studies on household consumption and have utilized micro data from household surveys to analyze the relationship between housing debt and household consumption [5]. It has been shown that housing debt has a significant negative impact on household consumption [6]. However, others argue that an increase in housing debt will stimulate household consumption [7]. While existing studies provide valuable insights into the impact of housing debt on household consumption, limitations related to data resources and methodologies persist. On the one hand, studies utilizing aggregated geographic or time-series data facilitate cross-country and temporal comparison but fail to conclusively link changes in consumption expenditures directly to changes in housing debt. Furthermore, such macro-level analyses are unable to capture cohort-specific attributes and may be compromised by omitted variables and endogeneity issues [8]. On the other hand, micro-level studies, with their detailed information on household heterogeneity—including age, income, wealth, and marital status—tend to be limited in scope, often restricted to brief time frames and singular countries or regions. Consequently, research based on micro data struggles to discern time- and country-specific characteristics. Additionally, the existing literature overlooks the perspective of emerging market countries, with only a limited focus on the role of housing debt in shaping household consumption behaviors and the underlying mechanisms. This is particularly significant for China, a country experiencing a rapid increase in housing debt.

Accordingly, this study aims to investigate the impact of housing debt on household consumption within the Chinese urban context and to explore the mechanism through which housing debt affects consumption. Using the China Family Panel Studies' (CFPS) microeconomic data collected in 2010, 2012, 2014, 2016, 2018, and 2020, this study first employs both the two-way fixed effects model and the difference-in differences with multiple periods and groups (DID_M) model to assess the extent to which housing debt influences household consumption and its structure and then explores the heterogeneity of this impact. It further reveals that the positive impact of housing debt on consumption is partially attributed to the wealth effect of housing assets, particularly when housing prices rise, as households accumulate wealth through housing assets acquired through housing debt.

The reminder of the study is organized as follows. The next section reviews the relevant literature. Section 3 outlines the empirical strategy. Section 4 details the household-level data and variables used in the empirical analysis, presenting summary statistics and a preliminary analysis. Section 5 discusses the empirical findings, including baseline results, robustness checks, a heterogeneity analysis, and a mechanism analysis. Section 6 discusses the contributions and limitations of the study. The final section presents the conclusions and policy implications.

2. Literature Review

2.1. Determinants of Housing Debt

Housing debt is defined as loans or other forms of borrowing undertaken by households for the purpose of purchasing or constructing housing. Specifically, it primarily comprises two components: firstly, loans obtained from banks for house purchases, encompassing both the principal and interest of housing loans not fully repaid; secondly, outstanding loans acquired from relatives, friends, or other lending organizations beyond traditional banks, such as non-bank financial institutions and private lending institutions, for the purpose of purchasing, constructing, or renovating housing. Housing debt is influenced by various factors, primarily categorized into microeconomic and macroeconomic dimensions.

At the microeconomic level, existing research studies generally indicate that housing debt is closely related to the financial circumstances of the family [9]. Chen and Li [10] proposed that higher household income may signify stronger debt repayment ability, which can increase the likelihood of obtaining loans and thus lead to higher debt size. Secondly,

demographic characteristics also have a significant impact on housing debt. Young persons are more inclined to borrow [11,12]. In addition, households with higher financial literacy tend to be more inclined to incur debt [13].

At the macroeconomic level, scholars primarily focus on the determining factors such as interest rate, housing prices, and financial innovation. Firstly, the interest rate on loans directly determines the cost of housing debt [14], and lower financing costs and relaxed credit conditions contribute to the expansion of debt levels [15,16]. Secondly, the majority of scholars have confirmed the positive effect of housing prices on household debt [6]. Ortalo-Magne and Rady [17] argued from the perspective of the "capital gains" that housing, serving as collateral for loans, increases in value with rising housing prices, thus increasing households' borrowing tendencies. As housing prices continue to rise, financial innovation not only enhances the availability of various credit products [18] but also lowers borrowing costs in the real estate and financial markets, further escalating debt levels [19]. Additionally, numerous scholars have also explored the impact of other macroeconomic factors, such as economic growth [20], income inequality [21], and financial systems [22], on housing debt.

In conclusion, the growing housing debt reflects households' comprehensive consideration of their financial circumstances, demographic characteristics of family members, and their investment inclinations towards real estate and financial assets, which are also influenced by various macroeconomic factors. Notably, since the mid-1990s, the confluence of lower interest rates, continuously rising housing prices, and the swift advancement of financial innovation has become the main driver of the surge in housing debt. Considering the potential for further decreases in interest rate and the continued rise in housing prices, it is plausible that housing debt may further expand.

2.2. Determinets of Household Consumption

Household consumption encompasses consumption activities carried out on a household basis, primarily involving personal consumption to satisfy the daily living needs of family members. It is characterized by regular and diverse expenditures. Existing research studies mainly explore the determinants of household consumption from two perspectives: the external environment and the family's inherent endowments.

Regarding the external environment, macroeconomic policies are the most extensively researched determinants. Scholars point out that property tax policy [23], and economic policy uncertainty [24], can significantly influence household consumption. Other external environmental determinants of household consumption encompass housing prices [25], transportation infrastructure [26], urbanization [27], and population structure [28].

In terms of the family's inherent endowments, income is recognized as the primary determinant of household consumption, and rational consumers will reduce their expenditure in response to income reductions [29]. Furthermore, the consumption demand of residents tends to decline with the widening of the income gap [30]. On the impact of household assets, scholars mainly focus on the differential impact of different types of assets on consumption. For example, Jappelli and Pistaferri [31] highlighted that liquid assets held by households have a significant impact on consumption. In contrast, households with a majority of low-liquidity assets display increased sensitivity to temporary income fluctuations. Concerning household liquidity constraints, Guerrieri and Lorenzoni [32] pointed out that households facing liquidity constraints respond to both anticipated and unanticipated income fluctuations by increasing their precautionary savings and reducing consumption.

2.3. The Impact of Housing Debt on Household Consumption

Some studies have identified a negative impact of housing debt on household consumption [6]. It is believed that the motivation to purchase a house and the pressure to repay housing loans are the two primary mechanisms through which housing debt suppresses household consumption [33]. In terms of heterogeneity studies, the negative impact of housing debt on household consumption is especially significant among urban

households, attributable to the investment goods characteristic of real estate in China [34]. Dynan et al. [35] found that the negative impact of housing debt on consumption is more pronounced in regions with high housing prices.

Others argue that an increase in housing debt might stimulate household consumption [7]. Benjamin and Chinloy [4] demonstrated a positive correlation between the marginal propensity to consume out of net wealth and housing debt. Additionally, the mortgage effect of housing is also recognized as an important factor in promoting household consumption growth [36]. Chen and Wang [37] used micro household survey data and found that housing debt mitigates household credit constraints and promotes consumption, particularly in rural regions and low-income households. On this basis, Han and Du [38] focused on the differences in how housing debt affects household consumption and identified significant regional heterogeneities. While in the eastern region, there was no significant correlation between the two, a significant positive correlation was found between housing debt and consumption in the western region.

In summary, while existing research studies offer valuable insights into the impact of housing debt on household consumption, the findings have not achieved a consensus. This ambiguity likely arises because the relationship between housing debt and household consumption does not follow a simple linear pattern. Instead, it varies with changes in debt size and economic circumstances [39].

3. Empirical Strategy

This study first investigates whether household consumption differs between those with and without housing debt. The impact of housing debt on household consumption may vary across different time periods and households. Temporal heterogeneity may arise from unmeasured, time-varying factors, such as a big inheritance or changes in family size. Similarly, household-specific heterogeneity may stem from unobserved characteristics like households' risk tolerance or financial literacy. Moreover, the dynamic nature of households' debt status—wherein a household may transition between indebtedness and being debt-free within the survey period—raises concerns that traditional analysis methods may produce biased estimates.

To mitigate potential bias, this study uses the difference-in differences with multiple periods and groups (DID_M) estimator proposed by De Chaisemartin and D'Haultforuille [40]. Unlike traditional methods, the DID_M estimator does not assume a constant treatment across observations. It computes the switching effects during the years in which households experience changes in their housing debt status. The calculations are as follows:

For each pair of consecutive time periods $t-1$ and t, it first computes the switching effect for households transitioning from debt-free to indebted ($DID_{+,t}$), and for those moving from indebted to debt-free ($DID_{-,t}$), respectively:

$$DID_{+,t} = \sum_{i:\mathrm{D\_if}_{i,t}=1,\mathrm{D\_if}_{i,t-1}=0} \frac{1}{N_{1,0,t}}(C_{i,t} - C_{i,t-1}) - \sum_{i:\mathrm{D\_if}_{i,t}=\mathrm{D\_if}_{i,t-1}=0} \frac{1}{N_{0,0,t}}(C_{i,t} - C_{i,t-1}) \quad (1)$$

$$DID_{-,t} = \sum_{i:\mathrm{D\_if}_{i,t}=\mathrm{D\_if}_{i,t-1}=1} \frac{1}{N_{1,1,t}}(C_{i,t} - C_{i,t-1}) - \sum_{i:\mathrm{D\_if}_{i,t}=0,\mathrm{D\_if}_{i,t-1}=1} \frac{1}{N_{0,1,t}}(C_{i,t} - C_{i,t-1}) \quad (2)$$

where C_{it} denotes the consumption of household i at year t; D_if_{it} is the housing debt status of household i at year t, which equals 1 when households have housing debt and equals 0 otherwise; and $N_{d,d',t}$ is the number of households with housing debt status d' at year $t-1$ and d at year t. The estimator $DID_{+,t}$ compares the changes in outcomes between $t-1$ and t among two distinct groups: the 'joiners' that transition from debt-free to indebted, and those that remain debt-free in both periods. Similarly, the estimator $DID_{-,t}$ compares the changes in outcomes between $t-1$ and t for two other groups: households that remain indebted across both $t-1$ and t, and the 'leavers' that transition from indebted

to debt-free. De Chaisemartin and D'Haultforuille [40] then define the DID_M estimator as the weighted average of $DID_{+,t}$ and $DID_{-,t}$:

$$DID_M = \sum_{t=2}^{T} \left(\frac{N_{1,0,t}}{N_s} DID_{+,t} + \frac{N_{0,1,t}}{N_s} DID_{-,t} \right) \quad (3)$$

where N_S is the number of households that switch housing debt status at any given year $t \geq 2$.

In this study, the DID_M estimator relies on two assumptions. The first requires that in any given period with switchers, there exists at least one household whose housing debt status remains unchanged. This condition is satisfied because the research sample includes households that consistently remain debt-free. The second extends the parallel trends assumption common to traditional difference-in differences analyses. Specifically, it posits that the consumption of households, regardless of their housing debt status, would be the same over time. To validate this assumption, it estimates placebo effects for the changes in consumption between two consecutive periods prior to the initiation of treatment. And under the parallel trend assumption, the placebo estimators should not significantly differ from zero.

Housing debt constitutes a significant portion of household debt and can serve as a part of disposable income, thereby smoothing intertemporal consumption and increasing current consumption by alleviating liquidity constraints [41]. Once households acquire housing assets through housing debt, a rise in housing prices can stimulate their consumption as a result of wealth appreciation [1]. And increased housing wealth enables households to obtain additional housing mortgage loans, further increasing their consumption [42]. Therefore, this study examines the impact of housing debt size on household consumption, by estimating the following two-way fixed effects model, which can effectively control for both time-invariant confounders and time-varying trends that may result from omitted variables. The regression model is as follows:

$$\ln(C)_{it} = \alpha + \beta ln(D\_size)_{it} + \gamma X_{it} + u_i + \tau_t + \varepsilon_{it} \quad (4)$$

where D_size_{it} denotes the housing debt size of household i at year t; u_i is the household-specific fixed effects accounting for potential time-invariant confounders that could influence household consumption; τ_t represents year-specific fixed effects controlling for general time trends associated with consumption; ε_{it} is the error term; and the vector X_{it} represents controls variables that might also affect household consumption (detailed in Section 4.2.3).

4. Data and Variables

4.1. Data

This study uses the latest six rounds of data from the China Family Panel Study (CFPS) spanning 2010 to 2020, which was initiated by the Institute of Social Science Survey (ISSS) at Peking University in 2010 and is conducted biennially, covering 25 province-level administrative districts[1]. The CFPS offers comprehensive and reliable data on household income, expenditure, debt, and assets. This rich database enables the identification of determinants influencing household consumption and facilitates the control of household characteristics, mitigating potential endogeneity issues arising from unobserved and omitted variables.

In every round of the survey, the former households are tracked. For instance, the 2020 follow-up survey is based on the households interviewed in the 2010–2018 surveys, which not only includes all households surveyed in 2018 but also includes those surveyed between 2010 and 2016 but were not successfully tracked in 2016. As a result, the panel data used in this study include 14,797 households in 2010, 13,315 in 2012, 13,946 in 2014, 14,019 in 2016, 14,218 in 2018, and 11,620 in 2020. The study conducts a cautious data cleaning procedure. Firstly, households lacking province information are excluded. Secondly, observations with missing or abnormal values in critical variables, such as those reporting negative income or consumption expenditure, are removed[2]. Thirdly, the sample is further restricted to

urban households because of the sharp differences in housing and consumption patterns between urban and rural settings[3]. Additionally, considering the potential confounding effects associated with consumption behavior in schooling, and the fact that consumption behavior may be complex due to failing health or bequests motives for household heads over 70, the sample is also narrowed to household heads aged between 22 and 70 [43]. Finally, outliers are removed by trimming the values of consumption, income, and assets within the 4nd and 96th percentiles. The refined dataset contains 18,486 household-year observations. To ensure comparability across different survey waves, all financial variables are adjusted for inflation by converting nominal values to real terms using the national Consumer Price Index (CPI), with 2010 serving as the base year.

4.2. Variables

4.2.1. Dependent Variables

The main dependent variable is household consumption. Following the existing research, this study defines the household consumption variable by using "total consumption" data from the survey. Based on the classification framework established by the National Bureau of Statistics of China, household consumption includes expenditures on food and beverages, clothing, housing, articles and services, transportation, communication, education, culture activities, entertainment, and medical services[4]. Furthermore, this study analyzes the structure of household consumption by categorizing total consumption into non-durable and durable consumption to examine the comprehensive impact of housing debt. Specifically, non-durable consumption includes expenditures on food and beverages, clothing, and housing, which meet the immediate needs of households. In contrast, durable consumption comprises expenditures on articles and services, transportation, communication, education, culture activities, entertainment, and medical services, addressing the long-term needs of households and reflecting consumption upgrading.

4.2.2. Independent Variables

The key independent variable in this study is the housing debt status. If household i has housing debt in period t, the value equals 1, otherwise it equals 0. In this study, housing debt contains outstanding housing loans from banks for the purchase, construction, or renovation of homes, as well as any outstanding housing-related debts from non-bank sources, including private credit institutions, relatives and friends, and acquaintances. Additionally, this study focuses on 'housing debt size' as another independent variable, referring to the total outstanding balance of a household's housing debt in the survey year, as documented in the CFPS.

4.2.3. Control Variables

This study includes several control variables from the survey data to mitigate potential confounding effects. Specifically, it first includes household-level information, such as household income, assets, and household size, given their significant influence on household consumption behavior. Additionally, this study controls the characteristics of the household head, given their leading role in family decision-making and the confounding effects of demographic factors, such as health status, age, education, gender, and marriage status. These variables are believed to affect both the total consumption and the structure of consumption [44]. And in the subsequent regression analyses, logarithmic transformations of income, assets, debt, and consumption variables are applied to address heteroscedasticity within the regression model.

A detailed definition of the aforementioned variables is provided in Table 1.

Table 1. Variable definitions.

Dimension	Variable	Definition	Unit
Dependent Variable	Consumption	Household consumption, including food and beverages, clothing, housing expenditures, expenditures on articles and services, transportation, communication, education, culture, entertainment, and medical care.	CNY/household
	Non-durable Consumption	Household non-durable consumption, including food and beverages, clothing, and housing expenditures.	CNY/household
	Durable Consumption	Household durable consumption, including expenditures on articles and services, transportation, communication, education, culture, entertainment, and medical care.	CNY/household
Independent Variable	Housing Debt Dummy	Whether household has housing debt (with housing debt = 1, without housing debt = 0).	-
	Housing Debt Size	The outstanding housing debt of household in the survey year.	CNY/household
Control Variable	Gender	Gender of household head (male = 1, female = 0).	-
	Age	Age of household head.	Year
	Education	Schooling years of household head (0 = below primary school, 6 = primary school, 9 = middle school, 12 = high school, vocational high school and polytechnic school, 12 = technical school, 15 = junior college and higher vocational college, 16 = undergraduate, 19 = postgraduate, 22 = PHD).	Year
	Marriage Status	Marital status of household head (1 = married, 0 = unmarried).	-
	Health Status	Self-assessed health status of household head (1 = healthy, 0 = otherwise).	-
	Household Size	Household size.	Person/household
	Household Income	Household income, including wage income, business income, property income, transfer income, and other income.	CNY/household
	Household Assets	Total household assets minus housing assets.	CNY/household

4.3. Description Statistics

Table 2 presents the descriptive statistics for each variable. Overall, 16% of the households in our sample have housing debt. Though this proportion is relatively modest, the significance of housing debt should not be underestimated. According to the 2019 Survey of Assets and Liabilities of Urban Households in China, 56.5% of urban households have debt, with housing debt constituting the predominant portion of this, representing about 75.9% of total household debt. Additionally, the average housing debt size is CNY 14,055, with a substantial standard deviation of CNY 110,000, indicating a considerable variation in housing debt size among urban households in China. Additionally, the average consumption is CNY 43,657, with non-durable and durable consumption averaging at CNY 24,507and CNY 19,147, respectively.

Regarding the control variables, approximately 68% of household heads are males, with an average age of the household head of around 51 years old, indicating the potential life-cycle effect on consumption. Moreover, 91% of household heads are married, and more than half consider themselves healthy. Given that China is a developing country, the prevalent education level of household head in the sample is junior high school, suggesting potential limitations in financial literacy and decision-making rationality. Additionally, the average household size is about four members. The mean household income is CNY 51,971, and the average value of assets is CNY 92,393.

Regarding the differences between indebted and debt-free groups, households with housing debt exhibit significantly higher consumption levels compared to those without housing debt. Additionally, both groups show similar characteristics in their consumption structure. With respect to household head characteristics, those who are male, younger, healthier, married, and with a higher education level have greater propensity toward

acquiring housing debt. Additionally, in terms of household characteristics, those with housing debt seem to have larger household size, as well as higher income.

Table 2. Descriptive statistics.

Variable	Full Sample			Indebted Sample			Debt-Free Sample		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Consumption	43,657	29,320	18,486	51,850	32,675	2926	42,116	28,384	15,560
Non-durable Consumption	24,507	17,601	18,486	29,239	21,672	2926	23,617	16,576	15,560
Durable Consumption	19,147	18,983	18,486	22,611	20,334	2926	18,496	18,647	15,560
Housing Debt Dummy	0.160	0.370	18,486	-	-	2926	-	-	15,560
Housing Debt Size	14,055	43,686	18,486	88,797	73,634	2926	-	-	15,560
Gender	0.680	0.470	18,486	0.710	0.450	2926	0.680	0.470	15,560
Age	51.29	10.39	18,486	49.56	10.30	2926	51.62	10.37	15,560
Education	8.720	4.240	18,486	9.050	4.360	2926	8.660	4.210	15,560
Marriage Status	0.910	0.290	18,486	0.920	0.270	2926	0.910	0.290	15,560
Health Status	0.630	0.480	18,486	0.660	0.470	2926	0.620	0.490	15,560
Household Size	3.590	1.610	18,486	3.830	1.600	2926	3.550	1.610	15,560
Household Income	51,971	36,432	18,486	56,698	38,784	2926	51,083	35,905	15,560
Household Assets	92,393	120,000	18,486	88,733	110,000	2926	93,081	120,000	15,560

Note: The values of the continuous variables reported in the table are all numerical characteristics before taking into account logarithms.

Table 3 further presents the dynamic summary statistics of key variables over time. It can be seen that the household housing debt participation rate was only 7% in 2010, which surged to 20% in 2014 and continued to rise in subsequent years, reaching 24% by 2020. This upward trend indicates a growing inclination among households to take on housing debt. Moreover, the housing debt size presented a substantial increase, from CNY 4516 in 2010 to CNY 26,121 in 2020, marking an approximate 5.8-fold rise. This significant growth highlights the burgeoning activity in the housing market and increasing demand for housing debt. Concurrently, there was a marked increase in both total and categorized consumption. In general, household consumption expanded by approximately 62% from 2010 to 2020, which was mainly driven by a 96% increase in non-durable consumption. To some degree, this reflects an enhancement in the consumption capacity of Chinese urban households.

Table 3. Time-variance descriptive statistics.

Year	Variable	Mean	SD	Min	Max	N
2010	Consumption	31,180	21,814	7910	170,000	3250
	Non-durable Consumption	14,867	9993	300	160,000	3250
	Durable Consumption	16,313	16,305	352	160,000	3250
	Housing Debt Dummy	0.0700	0.260	0	1	3250
	Housing Debt Size	4516	22,721	0	250,000	3250
2012	Consumption	38,776	25,719	7916	170,000	3175
	Non-durable Consumption	21,048	13,378	591.8	100,000	3175
	Durable Consumption	17,729	19,078	55.48	140,000	3175
	Housing Debt Dummy	0.0700	0.260	0	1	3175
	Housing Debt Size	6873	29,936	0	270,000	3175
2014	Consumption	45,162	30,226	7953	170,000	3103
	Non-durable Consumption	26,646	18,956	381.7	160,000	3103
	Durable Consumption	18,502	18,784	219.1	150,000	3103
	Housing Debt Dummy	0.200	0.400	0	1	3103
	Housing Debt Size	14,007	39,803	0	270,000	3103

Table 3. *Cont.*

Year	Variable	Mean	SD	Min	Max	N
2016	Consumption	47,283	30,492	7997	170,000	2972
	Non-durable Consumption	27,231	19,077	1948	140,000	2972
	Durable Consumption	20,052	19,361	389.6	140,000	2972
	Housing Debt Dummy	0.220	0.420	0	1	2972
	Housing Debt Size	19,435	50,579	0	270,000	2972
2018	Consumption	50,434	31,272	7972	170,000	3851
	Non-durable Consumption	29,115	19,024	494.1	150,000	3851
	Durable Consumption	21,319	20,254	266.8	160,000	3851
	Housing Debt Dummy	0.180	0.380	0	1	3851
	Housing Debt Size	17,223	49,749	0	280,000	3851
2020	Consumption	50,447	30,469	7926	170,000	2135
	Non-durable Consumption	29,116	18,641	1096	150,000	2135
	Durable Consumption	21,331	19,243	646.5	150,000	2135
	Housing Debt Dummy	0.240	0.430	0	1	2135
	Housing Debt Size	26,121	60,530	0	270,000	2135

Note: The values of the continuous variables reported in the table are all numerical characteristics before taking into account logarithms.

5. Empirical Results

5.1. Baseline Results

5.1.1. The Role of Having Housing Debt

Table 4 presents the results of our baseline regression analysis, which investigates the impact of housing debt on household consumption. The odd-numbered columns include only household-year fixed effects, whereas the even-numbered columns include additional control variables.

Panel A presents the estimates derived from Equation (3). Column (2) reveals that the DID_M estimator is 0.140, indicating that households with housing debt exhibit a significant 14% increase in their consumption. Additionally, the analysis indicates that households with housing debt increase both non-durable and durable consumption, with the effect being more pronounced in durable consumption.

Panel B presents the estimates derived from Equation (1), examining the effects of transitioning from debt-free to indebted status on household consumption. For these households, the impact of housing debt on both total and classified consumption is significantly positive, with a notably larger increase in durable consumption.

Panel C presents the results derived from Equation (2), analyzing the effects of transitioning from indebted to debt-free status on household consumption. The analysis reveals significantly positive effects on household consumption, with pronounced effects on durable consumption. Notably, the coefficient in Column (14) is larger than that in Column (2) and Column (8), indicating that the effects of housing debt on consumption are more substantial for households that have repaid their housing debt. This occurs because after paying off housing debt, households' disposable income increases, which in turn enhances their propensity to consume.

The bottom rows of each panel in Table 4 present the results of the placebo tests, as proposed by De Chaisemartin and D'Haultfœuille [40]. These results reveal that all placebo estimators are small and not statistically significant, indicating that the DID_M estimators conform to the parallel trend assumption.

Table 4. Baseline estimates of the impact of having household debt on household consumption.

	Household Consumption		**Non-Durable Consumption**		**Durable Consumption**	
Panel A: DID_M	(1)	(2)	(3)	(4)	(5)	(6)
Housing debt dummy	0.135 ***	0.140 ***	0.095 ***	0.099 ***	0.163 ***	0.166 ***
	(0.024)	(0.024)	(0.027)	(0.028)	(0.034)	(0.032)
Placebo $(t = -1)$	0.001	0.019	0.006	0.020	−0.010	0.016
	(0.036)	(0.034)	(0.039)	(0.042)	(0.048)	(0.048)
Controls	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: $DID_{+,t}$	(7)	(8)	(9)	(10)	(11)	(12)
Housing debt dummy	0.108 ***	0.129 ***	0.084 ***	0.099 ***	0.108 ***	0.137 ***
	(0.027)	(0.026)	(0.030)	(0.032)	(0.038)	(0.032)
Placebo $(t = -1)$	0.020	0.043	0.007	0.026	0.022	0.052
	(0.040)	(0.037)	(0.044)	(0.045)	(0.052)	(0.056)
Controls	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Panel C: $DID_{-,t}$	(13)	(14)	(15)	(16)	(17)	(18)
Housing debt dummy	0.165 ***	0.153 ***	0.108 **	0.098 **	0.224 ***	0.198 ***
	(0.040)	(0.044)	(0.043)	(0.049)	(0.055)	(0.056)
Placebo $(t = -1)$	−0.049	−0.042	0.002	0.006	−0.090	−0.077
	(0.076)	(0.079)	(0.095)	(0.101)	(0.098)	(0.104)
Controls	No	Yes	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors are reported in parentheses, with *** and ** denoting statistical significance at 1% and 5% levels, respectively.

In summary, the baseline analysis reveals that housing debt significantly stimulates household consumption in urban China. Moreover, the results also indicate that housing debt plays a role in increasing durable consumption, implying that it might be an effective instrument for promoting consumption upgrading.

5.1.2. The Role of Housing Debt Size

In this section, the study examines the impact of housing debt size on consumption expenditure among households with housing debt, utilizing Equation (4) for our analysis. The findings are presented in Table 5.

The odd-numbered columns only include household-year fixed effects, while the even-numbered columns include controls for household characteristics and household head characteristics to mitigate the influence of other factors on household consumption. The results presented in Column (2) demonstrate a significantly positive impact of housing debt on household consumption, with a coefficient of 0.011 at the $p = 0.01$ significance level. This implies that, with other explanatory variables constant, a 1% increase in housing debt size corresponds to an approximate 0.011% rise in household consumption. Additionally, it reveals that a 1% increase in housing debt size is associated with a 0.009% surge in durable consumption, as shown in Column (6), as well as a 0.010% increase in non-durable consumption, as shown in Column (4).

Table 5. Baseline estimates of the impact of household debt size on household consumption.

Variables	Household Consumption		Non-Durable Consumption		Durable Consumption	
	(1)	(2)	(3)	(4)	(5)	(6)
Housing debt size	0.010 ***	0.011 ***	0.010 ***	0.010 ***	0.008 ***	0.009 ***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Household assets		0.076 ***		0.057 ***		0.109 ***
		(0.005)		(0.005)		(0.007)
Household income		0.100 ***		0.102 ***		0.089 ***
		(0.008)		(0.009)		(0.012)
Family size		0.094 ***		0.068 ***		0.146 ***
		(0.006)		(0.007)		(0.009)
Gender		0.073 ***		0.061 **		0.099 **
		(0.025)		(0.026)		(0.040)
Age		−0.001		−0.001		−0.002
		(0.002)		(0.002)		(0.002)
Education		0.003		0.002		0.008
		(0.004)		(0.004)		(0.007)
Marriage		0.088 ***		0.097 ***		0.084
		(0.032)		(0.035)		(0.051)
Health		−0.019 *		0.012		−0.058 ***
		(0.011)		(0.012)		(0.018)
Constant	10.075 ***	7.865 ***	9.330 ***	7.346 ***	9.260 ***	6.638 ***
	(0.009)	(0.130)	(0.010)	(0.142)	(0.015)	(0.200)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18,486	18,486	18,486	18,486	18,486	18,486
R^2	0.174	0.250	0.237	0.278	0.038	0.105
F	352.805	254.0035	531.173	283.796	58.360	80.171

Notes: Robust standard errors are reported in parentheses, with ***, **, and * denoting statistical significance at 1%, 5%, and 10% levels, respectively.

5.2. Robustness Checks

In this subsection, the study conducts two robustness checks to verify the previously discussed results. Table 6 summarizes the results, with Panel A, B, and C presenting the estimates of having housing debt, respectively, and Panel D providing the estimates associated with housing debt size.

Firstly, in the benchmark regression mentioned earlier, this study employed imbalanced panel data. This is because the CFPS, as a large tracking database, inevitably encounters issues with missing samples. Utilizing imbalanced panel data allows for a broader inclusion of samples, thereby maximizing the use of available data. However, if the missing data are non-random—for instance, if specific household types fail to report data—it could introduce sample selection bias. To address this concern, this study employs balanced panel data for regression to confirm that the baseline results remain robust against data balance and sample selection bias. The estimates presented in the odd-numbered columns confirm that the positive results are consistent.

Secondly, in the benchmark regression mentioned earlier, this study employed total variables (household consumption, income, assets, and housing debt size). However, when exploring the impact of housing debt on household consumption, including household size as a control variable might not fully account for all heterogeneity, particularly when considering varying consumption preferences, living costs, and regional differences across households. Thus, this study substitutes the variables for household consumption, income, assets, and housing debt size with corresponding per capita values to ensure that the baseline results are not compromised by the variable measurement methods. The results,

presented in the even-numbered columns, remain significantly positive and consistent with the baseline results in Tables 4 and 5. All these results further validate the robustness of the previous results.

Table 6. Results for robustness checks.

	Household Consumption	
Panel A: DID_M	(1)	(2)
Housing debt dummy	0.287 ***	0.135 ***
	(0.089)	(0.024)
Placebo $(t = -1)$	0.046	0.017
	(0.090)	(0.033)
Controls	Yes	Yes
Year FE	Yes	Yes
Household FE	Yes	Yes
Panel B: $DID_{+,t}$	(3)	(4)
Housing debt dummy	0.133 **	0.129 ***
	(0.072)	(0.026)
Placebo $(t = -1)$	0.089	0.037
	(0.087)	(0.032)
Controls	Yes	Yes
Year FE	Yes	Yes
Household FE	Yes	Yes
Panel C: $DID_{-,t}$	(5)	(6)
Housing debt dummy	0.471 ***	0.141 **
	(0.178)	(0.038)
Placebo $(t = -1)$	0.084	0.035
	(0.169)	(0.078)
Controls	Yes	Yes
Year FE	Yes	Yes
Household FE	Yes	Yes
Panel D: Housing debt size	(7)	(8)
Housing debt size	0.013 ***	0.012 ***
	(0.005)	(0.002)
Controls	Yes	Yes
Year FE	Yes	Yes
Household FE	Yes	Yes
Observations	1578	18,486
R^2	0.268	0.287
F	38.418	297.753

Notes: Robust standard errors are reported in parentheses, with *** and ** denoting statistical significance at 1% and 5% levels, respectively.

5.3. Heterogeneity Analysis

In the above discussion, the study has examined the average impact of housing debt on household consumption. However, the effect of housing debt may vary across households due to differences in their characteristics. It is important to identify these distinctions; thus, this study conducts the heterogeneity analyses in three aspects.

Firstly, given that housing debt may affect consumption through income [41], the effect of housing debt on household consumption is likely to differ among households of different income levels. Thus, this study divides the whole sample into low-income, middle-income, and high-income households according to the tertiles of household income

to examine whether the effect of housing debt is heterogeneous because of the differences in household income.

Secondly, economic individuals across different age groups may exhibit variations not only in asset accumulation, income levels, financial literacy, borrowing tendencies, and consumption preferences [45] but also in their housing needs. Therefore, this study divides the whole sample into young, middle-aged, and older households to investigate how the effect of housing debt on household consumption varies among different age groups.

Thirdly, housing assets, as a major component of household wealth, significantly impact household consumption [46]. Therefore, the study divides the sample into subgroups according to the number of properties to examine if the effect of housing debt on household consumption varies among households with different properties.

5.3.1. Heterogeneity Analysis by Different Incomes

The results of the heterogeneity analysis according to different incomes are presented in Column (1) to (3), (9) to (11), (17) to (19), and (25) to (27) of Table 7. In Panel A to C, it is observed that low-income households exhibit the most significant response to changes in housing debt status. And in Panel D, it can be seen that the effect of housing debt size on the household consumption of low-income households is the most pronounced. Firstly, relative to middle- and high-income households, low-income households are more vulnerable to credit constraints, making housing debt a more critical factor in influencing their marginal propensity to consume by relaxing credit constraints [47]. Secondly, low-income groups usually possess lower levels of financial literacy. Consequently, the perceived increase in wealth from housing appreciation often leads these households to consume more, primary due to challenges in utilizing wealth effectively for production and operation needs and financial asset allocation.

5.3.2. Heterogeneity Analysis by Different Ages

To investigate the age heterogeneity, households are classified based on the age of the household head into young (below 35), middle-aged (between 35 and 60), and older households (60 and above), following the categorization by Attanasio et al. [48]. The results are summarized in Column (4) to (6), (12) to (14), (20) to (22), and (28) to (30) of Table 7.

The results show that older households increase their consumption by 23.1% when holding housing debt (Column 6), while this increase is less pronounced in middle-aged households, with a coefficient of 0.149 (Column 5). However, the coefficient for young households is not statistically insignificant (Column 4), suggesting a negligible impact. And the coefficients in Column (12) to (14) and Column (20) to (22) show consistent results. And in Panel D, the results reveal that a 1% increase in housing debt size is associated with a 0.011% increase in consumption for the middle-aged group, and a 0.016% increase in consumption for the older group, while the effects are insignificant for the young group.

These findings are consistent with Lettau [49] and Cambell and Cocco [42], offering support for the wealth effect hypothesis. This hypothesis suggests that older households are more likely to own properties and thus benefit from capital gains. Furthermore, older groups are predisposed to realize their capital gains, given their comparatively shorter expected remaining lifespan to spend the gains. And the absence of primary income sources post-retirement further makes them rely on their capital gains for consumption. Additionally, in the Chinese context, there is a notable increase in housing debt among older households. This is largely driven by the cultural practice that older Chinese parents usually purchase homes through debt financing to provide matrimonial homes for their children, since younger generations are often credit-constrained and may not be able to afford expensive homes.

Table 7. Heterogeneity analysis.

	Household Consumption							
	Income			**Age**			**Properties**	
	Low	**Middle**	**High**	**Young**	**Middle-Aged**	**Old**	**Single**	**Multiple**
Panel A: DID_M	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Housing debt dummy	0.301 ***	0.131 *	0.090 **	0.121	0.149 ***	0.231 ***	0.119 ***	0.237 ***
	(0.080)	(0.071)	(0.045)	(0.146)	(0.030)	(0.079)	(0.033)	(0.079)
Placebo $(t = -1)$	0.046	0.057	0.038	−0.016	0.002	0.063	0.021	−0.218
	(0.106)	(0.118)	(0.102)	(0.161)	(0.044)	(0.140)	(0.045)	(0.161)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: $DID_{+,t}$	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Housing debt dummy	0.284 ***	0.054	0.065	0.118	0.125 ***	0.246 ***	0.115 ***	0.161 *
	(0.067)	(0.072)	(0.050)	(0.119)	(0.030)	(0.061)	(0.035)	(0.091)
Placebo $(t = -1)$	0.058	0.043	0.055	0.023	0.023	0.030	0.040	0.082
	(0.106)	(0.092)	(0.109)	(0.190)	(0.041)	(0.131)	(0.044)	(0.224)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel C: $DID_{-,t}$	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Housing debt dummy	0.326 ***	0.215 **	0.108	0.125	0.175 ***	0.217 *	0.124 **	0.294 ***
	(0.149)	(0.112)	(0.068)	(0.276)	(0.052)	(0.126)	(0.050)	(0.108)
Placebo $(t = -1)$	−0.010	0.101	0.008	−0.308	−0.056	0.117	−0.028	−0.458 **
	(0.257)	(0.408)	(0.230)	(0.301)	(0.111)	(0.308)	(0.103)	(0.193)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel D: Housing debt size	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
Housing debt size	0.024 ***	0.012 ***	0.003	−0.001	0.011 ***	0.016 ***	0.011 ***	0.008 **
	(0.004)	(0.003)	(0.002)	(0.005)	(0.002)	(0.004)	(0.002)	(0.003)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6166	6166	6166	1204	12,717	4565	14,341	3319
R^2	0.192	0.194	0.191	0.302	0.231	0.190	0.230	0.293
F	41.715	33.626	39.636	12.915	152.092	29.424	162.075	37.414

Notes: Robust standard errors are reported in parentheses, with ***, **, and * denoting statistical significance at 1%, 5%, and 10% levels, respectively.

5.3.3. Heterogeneity Analysis by Different Properties

The results of the heterogeneity analysis in terms of different properties are presented in Column (7) to (8), (15) to (16), (23) to (24), and (31) to (32) of Table 7. In Panel A to C, the results indicate that households owning multiple houses show a more pronounced response to housing debt than those with only a single house. And in Panel D, the coefficients in Column (31) and Column (32) are significantly positive, with only a very small difference.

This is consistent with a pure wealth effect, suggesting a stronger wealth effect in multiple-house owners[5]. One possible explanation is that households with multiple houses typically have higher average income and exhibit lower risk aversion. Consequently, housing debt is not a repayment burden for these households, and the liquidity constraint

they face is relatively low. In addition, households with a higher likelihood of capitalizing on potential capital gains are more likely to increase their consumption in anticipation of such profits. Ownership of multiple houses is identified as a factor facilitating ease in profit realization, especially during periods of housing market boom by selling some of their housing assets [50]. Furthermore, these households have the flexibility to monetize additional real estate assets during periods of significant economic shifts, beyond their primary residences. Meanwhile, households with multiple houses can broaden their loan financing options by mortgaging these properties, thereby maximizing the wealth effect associated with housing.

5.4. Mechanism Analysis

The results of benchmark regressions and robust checks demonstrated that housing debt significantly increases household consumption. However, an important question arises of how housing debt affects household consumption. Obviously, households acquire properties through housing debt, subsequently leading to an accumulation of housing assets. When housing prices rise, it will directly lead to an increase in the value of housing assets. On the one hand, households can transform the increased housing wealth into funds available for consumption through property sales, thereby allowing households to increase their consumption [1]. On the other hand, households may perceive an increase in their wealth and, as a result, increase their consumption, even if this increased wealth is not immediately transformed into available funds for consumption [51].

To substantiate the above hypothesis, the study constructs the following model:

$$\ln(C)_{it} = \alpha_0 + \alpha_1 D\_if_{it} + \alpha_2 X_{it} + u_i + \tau_t + \varepsilon_{it} \tag{5}$$

$$\ln(Ass\_house)_{it} = \beta_0 + \beta_1 D\_if_{it} + \beta_2 \ln(P)_{it} + \beta_3 X_{it} + u_i + \tau_t + \varepsilon_{it} \tag{6}$$

$$\ln(C)_{it} = \gamma_0 + \gamma_1 D\_if_{it} + \gamma_2 \ln(\widehat{Ass\_house})_{it} + \beta_3 X_{it} + u_i + \tau_t + \varepsilon_{it} \tag{7}$$

where Ass_house_{it} denotes housing assets of household i at year t; P_{it} denotes housing prices. To measure housing prices, this study uses household-level self-reported data regarding the market value of the current residence, normalized by its floorage. This measure differs from the prevailing methods in the existing literature, which employ regional indices at different levels of aggregation, considering that housing prices may exhibit nuanced variations across different districts, even within the same city. Using self-reported data at the household level has several advantages over aggregated measures. Firstly, it offers a more granular unit of analysis, thus enabling access to richer information. Secondly, it circumvents the limitations associated with indices derived from average purchase prices, which are influenced by the specific composition of the housing market in a particular period. Thirdly, it addresses the potential bias that individuals might hold in evaluating the market value of their residences.

The results are shown in Table 8. Column (1) only includes housing debt in the regression model, assessing the impact of housing debt on household consumption based on Equation (5). Column (2) evaluates the combined effects of housing debt and housing prices on housing assets based on Equation (6). And Column (3) further includes both housing debt and the estimated housing assets and then examines the moderating role of housing assets based on Equation (7).

Column (1) reveals that housing debt has a significantly positive effect on household consumption. Column (2) further demonstrates that both housing debt and housing prices significantly contribute to the increase in housing assets. And according to Column (3), both the coefficients of housing debt and housing assets are significantly positive, and the coefficient of housing debt in Column (3) is slightly smaller than that in Column (1), indicating that housing assets serve as a partial mediator in the relationship between housing debt and household consumption.

Table 8. Mechanism analysis.

Variables	Household Consumption	Housing Assets	Household Consumption
	(1)	(2)	(3)
Housing debt dummy	0.106 ***	0.205 ***	0.089 ***
	(0.018)	(0.019)	(0.018)
Housing Prices		0.856 ***	
		(0.015)	
Housing Assets			0.059 ***
			(0.011)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Household FE	Yes	Yes	Yes
Observations	15,514	15,514	15,514
R^2	0.272	0.692	0.275
F	237.948	462.488	225.333

Notes: Robust standard errors are reported in parentheses, with *** denoting statistical significance at 1% level. Note that the sample becomes a little smaller due to missing values in housing prices and housing assets variables.

6. Discussion

This study has three key contributions. Firstly, it uses the latest six rounds of CFPS microeconomic data from 2010, 2012, 2014, 2016, 2018, and 2020, providing a comprehensive dataset to analyze the evolution of debt and consumption patterns among Chinese households. The detailed data available not only facilitate controlling for confounding factors overlooked in earlier research, such as the specific household head characteristics, but also enables an exploration of differences across households with different characteristics.

Secondly, this study delves into the positive effect of housing debt on household consumption, exploring its heterogeneity across different household characteristics. It empirically examines the mediating role of housing assets in using housing debt to promote household consumption. This not only expands the research on the relationship between housing debt and household consumption but also provides new insights and offers valuable guidance for policy making.

Lastly, this study employs the difference-in differences with multiple periods and groups (DID_M) model, considering the dynamic changes in housing debt status within the observation period. The DID_M model can not only be used to identify the causal effects of housing debt on household consumption, even if the effects are heterogeneous across households or over time, but also effectively mitigates the endogeneity problems caused by omitted variables, making the results more reliable. Additionally, the DID_M model allows for an analysis of consumption changes among households transitioning from debt-free to indebtedness, and households transitioning from indebtedness to debt-free, respectively, contributing to a deeper understanding of consumption behavior associated with housing debt.

This study also has several limitations. Firstly, this study does not account for other factors that may affect household consumption in the empirical analysis, including consumption habits and consumers' psychological expectations, as well as macroeconomic factors like interest rates and housing loan policies. This limitation primarily arises from the constraints in data availability. To enhance the comprehensiveness and accuracy of the findings, future research should consider the potential impact of these factors.

Secondly, it is important to recognize that the findings are based on data collected up to 2020, during which the surge in household consumption was largely driven by the wealth effect resulting from the continuous appreciation of housing assets. Given the deceleration in terms of the growth in housing pricesin China in recent years, this may have yielded different conclusions. Therefore, future research should pay close attention to fluctuations

in housing prices, aiming to precisely evaluate the long-term effects of housing debt on household consumption.

Thirdly, due to data availability, this study only examines the mediating role of housing assets to understand the impact of housing debt on household consumption, potentially overlooking other mechanisms. Therefore, future research may utilize multiple databases to gather more data, such as the China Household Finance Survey (CHFS), which can enable a more comprehensive examination of the complex mechanisms by which housing debt affects household consumption.

7. Conclusions and Policy Implications

7.1. Conclusions

Utilizing household data from six waves of the CFPS spanning from 2010 to 2020, and both the DID_M and the two-way fixed effects regression estimators, this study investigates the impact of housing debt on household consumption in urban China. The main conclusions are summarized as follows:

Firstly, this study identifies a significantly positive impact of housing debt on household consumption. Specifically, the consumption of households with housing debt is 14% higher than those without housing debt. Notably, this effect is more pronounced among households that have repaid their housing debt compared to those still in debt. Moreover, for indebted households, a 1% increase in housing debt size is associated with an approximate 0.011% rise in household consumption.

Secondly, our findings reveal significant heterogeneity in the consumption responses to housing debt across different household characteristics. Specifically, this impact is more pronounced among households with low income, older household heads, and those owning multiple properties.

Thirdly, this study investigates the mediating effects of housing assets and housing prices in the relationship between housing debt and consumption. The results indicate that housing assets amplify the positive effect of housing debt on consumption, and a rise in housing prices further enhances this impact.

Lastly, our econometric analyses show that housing debt not only increases the levels of both non-durable and durable consumption but also exerts a more pronounced impact on enhancing durable consumption.

7.2. Policy Implications

The findings from this study have several important policy implications.

Firstly, emphasize the promoting role of sustainable development of the real estate market on economic growth. The real estate market plays an increasingly important role in propelling economic growth. As the industry flourishes, housing has become a source of primary assets and liabilities for most families, which is not only related to their wealth status but also has a profound impact on household consumption. Therefore, it is important for the government to strengthen its supervision of the real estate market, ensuring its healthy and stable development. Further, the government should implement effective policies to ensure balanced growth in housing debt, thereby stimulating domestic consumption and sustainable economic growth.

Secondly, establish a housing price warning mechanism. The mechanism analysis reveals that households can accumulate housing assets through housing debt, thereby benefiting from the wealth effect associated with rising housing prices. However, it is crucial to consider that a future decline in housing prices may result in reduced consumption due to the depreciation of housing assets, potentially initiating a vicious cycle. Thus, it is important for the government to establish a housing price warning mechanism and closely monitor fluctuations in housing prices. This can identify and prevent potential risks in the real estate market in a timely manner and ensure its stable development, thus supporting sustainable economic growth.

Lastly, implement differentiated housing loan policies. The heterogeneity analysis reveals that the positive effect of housing debt on household consumption is more pronounced in low-income households, older households, and those with multiple properties. Therefore, to fully leverage the positive role of housing debt in enhancing family consumption, it is crucial to implement differentiated housing loan policies according to the characteristics of different households to meet their diverse needs. For instance, for low-income households with urgent housing needs, the government could moderately relax credit conditions and offer policy incentives to financial institutions that provide loan support to these groups, ensuring that low-income households also have access to housing loans, thereby stimulating their consumption potential.

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Conflicts of Interest: The authors declare no conflicts of interest.

Notes

1 Excluding six provinces and autonomous regions, including Hainan, Tibet, Qinghai, Ningxia, Xinjiang, and Inner Mongolia.

2 Missing values are inevitable due to errors in respondents' knowledge and subjective attitudes. For example, during the CFPS data collection process, interviewers collect information on "consumption" by inquiring about "the total expenditure in the past 12 months". Respondents might choose the "do not know" or "refuse to answer" option in the questionnaire. Such responses are classified as missing values and are excluded to ensure the validity of the data.

3 There is no real estate market in rural areas. The Chinese government has not liberalized the rural real estate market for transactions, making rural houses non-tradable with lawful property rights. Except for rural houses in the suburban areas that may be demolished due to urban expansion—thereby generating compensation—the vast majority of rural houses have no market value. Therefore, it is difficult for rural households to consume capital gains from housing assets even if they acquire housing assets through housing debt.

4 Expenditures on food and beverages include dining out expenses, cigarette and alcohol expenses, food expenses, and self-produced agricultural products; expenditures on clothing include clothing, shoes and hats, pantyhose, gloves, scarves, etc.; living expenditures include water and electricity, fuel, heating, property management, and rent for current housing. (There is no rent expenditure for self-owned housing. Thus, the household consumption we use in this paper does not include housing expenditure, which is appropriate for the estimation of the effect of housing debt on non-housing consumption.); expenditures on articles and services include casts of labor, daily necessities, car purchase, purchase and maintenance of other transportation and communications, home appliance purchase, furniture purchase, and other durable goods; expenditures on transportation include local transportation fees; expenditures on communication include postal and telecommunications fees; expenditures on education include education and training expenses; expenditures on culture include culture expenses; expenditures on entertainment include entertainment expenses and tourism expenses; expenditures on medical care include medical expenses and health care expenses (including fitness and purchasing related products, equipment, health products, etc.).

5 A pure wealth effect is an effect due to changes in total life-time resources. One argument against a pure housing wealth effect, however, is that housing is a hedge against future rental increases, and as long as one lives in the house, there should not be any real impact on wealth (Sinai and Souleles, 2003). This argument suggests that the wealth effect should be stronger if a person owns two houses, since he/she could cash in on the wealth gain of one house and still live in the other house.

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