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# House Price and Consumption Inequality in China: Micro Evidence from CFPS

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## Abstract

Based on microdata from the China Family Panel Studies (CFPS) from 2010 to 2022, this paper constructs the Kakwani index to measure household consumption relative deprivation and uses a high-dimensional fixed-effects model to examine the impact of housing prices on consumption inequality. The results show that rising housing prices significantly aggravate consumption inequality, and this conclusion remains stable after a series of robustness tests. Heterogeneity analysis indicates that the unequal effect of housing prices is prominent in eastern China and the elderly group, but is not significant or even negative in central and western regions and young groups. This paper theoretically explains the transmission channels from the perspectives of wealth effect, purchase budget constraint and spatial differentiation, but does not conduct empirical mechanism tests. The conclusions provide micro evidence for the formulation of differentiated real estate regulation and consumption equity policies.

### Keywords

housing prices, consumption inequality, Kakwani index

## 1. Introduction

Over the past few decades, China has maintained a relatively high economic growth rate. However, at the same time, the inequality in the distribution of residents' income and consumption has been significant [1]. Income inequality and consumption inequality in China are at a relatively high level and have shown a significant upward trend for a considerable period of time [2]. According to the latest official statistics, the per capita disposable income of urban residents was 28,844 yuan in the first half of the year, while that of rural residents was 11,936 yuan. Meanwhile, the per capita consumption expenditure of urban residents was 17,545 yuan, while that of rural residents was 9,733 yuan [3]. By observing the two indicators, it is not difficult for us to find that there is a significant gap in both per capital disposable income and per capital consumption between urban and rural areas. According to statistics released by the National Bureau of Statistics in 2017, China's income Gini coefficient fluctuated between 0.462 and 0.491 from 2003 to 2016, all above the international warning red line of 0.4, indicating that income inequality and consumption inequality have long existed in China.

In comparison with many developed economies, the wealth structure of Chinese residents has a prominent feature: household wealth is highly concentrated in housing assets, and the degree of household wealth

inequality is much higher than that of income inequality. Based on the data research of CFPS in 2012, the bottom 50 percent of households held only about 8 percent of the total wealth, while the top 1 percent of households held more than one-third of the total wealth [4]. Further research has found that the proportion of housing assets in family wealth is close to 74 percent, and this indicator is close to 79 percent in urban families, which is higher than the level of 40-50 percent in European and American countries [4]. This means that in the social context of China where "real estate is regarded as the core asset of a family", fluctuations in housing prices will not only affect the economic operation of society at the macro level, but also have a profound impact on the consumption patterns and asset levels of individual families at the micro level.

Based on our further research, we infer that there is a certain connection between the changes in housing prices and the inequality in residents' consumption. This article will take this as a starting point to examine the relationship between housing prices and residents' consumption inequality at the micro level. In the subsequent part, this article will use the data from the China Household Tracking Survey from 2010 to 2022 to establish an individual consumption inequality index at the micro level, and comprehensively analyze the impact of housing prices on consumption inequality and its mechanism of action.

## 2. Literature Review and Theoretical Analysis

### 2.1 Influence of House Pricing on Consumption Inequality

In the wealth structure of China, housing dominates [4]. Under such circumstances, the fluctuation of housing prices is not only a matter of the rise and fall of household assets, but also directly affects the consumption and savings behaviors of households. Chen et al. (2020) utilized microdata such as the China Household Finance Survey to study the relationship among housing wealth, income and consumption, and found that an increase in housing wealth would significantly enhance the household consumption level [5]. Li and Zhang (2021) utilized a series of cross-border macro data to estimate the elasticity between housing wealth and consumption [6]. They also reached the conclusion that housing wealth promotes consumption and pointed out that the elasticity of housing wealth in China is relatively higher than that in other sample countries [6]. These studies collectively indicate that in China, the main channels for preserving and accumulating wealth are concentrated in investment in the real estate sector. For residents with a large number of properties, high housing prices mean an expansion of family assets, and their propensity to consume also expands accordingly. Conversely, for residents with few or no properties, the expansion of housing prices has increased the cost of obtaining properties for them, forcing their propensity to consume to decline.

At the mechanism level, Painter et al. (2022) further used urban household panel data to estimate the marginal propensity to consume housing wealth and found that for every 1% increase in housing wealth, consumption increased by approximately 0.14% [7]. This study holds that housing is a precautionary savings channel: families with more housing assets have less concern about future uncertainty and are more willing to reduce precautionary savings and increase current consumption [7]. From the perspective of macro data, this means that the uneven distribution of housing assets will cause different families to adjust their consumption to different magnitudes under risk shocks, thereby affecting consumption inequality.

On the other hand, a rise in housing prices does not always mean an increase in consumption, and its impact on different types of families is highly heterogeneous. Waxman et al. (2020) based on the national credit card and debit card transaction data and combined with the fluctuations of urban housing prices, found that when urban housing prices rise, residents, especially potential home buyers with no property, will significantly reduce non-housing consumption expenditures to accumulate the down payment for purchasing a house [8]. Estimates suggest that a 10% increase in house prices could lead to a decline of approximately 9% in non-housing consumption [8]. This research indicates that high housing prices, by raising the threshold for home purchase and imposing heavier budget constraints, impose greater pressure on homeowners and highly leveraged families in terms of consumption.

Housing constraints, combined with population mobility and the process of urbanization, will also affect inequality through space. Fang and Huang (2022) constructed a quantitative equilibrium model including internal migration and housing supply constraints and found that a large inflow of population to high-productivity cities pushed up housing prices and rents in core cities under the background of land and housing supply constraints [9]. Overall income inequality within cities is significantly positively correlated with net

population inflow [9]. Local residents benefit from high housing prices through property appreciation and rental income, while the migrant population flowing into the city has to bear high living costs and high rents, and their consumption capacity is relatively limited. This indicates that high housing prices and housing constraints not only alter the average consumption level of cities but also create differences in consumption levels among different groups within cities.

Theoretically, Etheridge (2019) constructed a model of housing price shocks and consumption inequality [10], emphasizing the heterogeneity of housing ownership status, leverage ratios, and liquidity constraints: Rising house prices will increase the value of housing assets, but the impact on highly leveraged homeowners, low-leveraged multi-homeowners and homeowners without a home is completely different. Positive shocks to house prices usually lead to an increase in consumption inequality [10]. Zhao (2015) explained from a long-term perspective that in an environment where alternative assets are insufficient, housing will become a rational value storage tool for investors [11]. High-income and early entry groups can achieve multiple accumulative wealth over the long term through multiple houses, further widening the wealth gap and potential consumption gap [11].

Based on the above-mentioned literature, it can be seen that the impact of housing prices on the economy and household behavior includes not only the significant influence on residents' consumption propensity due to the high correlation between assets and housing prices on the whole, but also the restrictive effect on the consumption propensity of a large number of homeless residents through constraints in aspects such as budget, migration and housing supply. This provides the necessary theoretical basis and practical motivation for the subsequent microscopic research of this article.

## 2.2 Measurement for Consumption Inequality

Before formally studying housing prices and consumption inequality, this paper needs to clarify how to characterize and measure the differences in "consumption".

At the macro level, in the study comparing China and India, Grad´ın and Wu (2020) utilized indicators such as the Gini coefficient of income and consumption and found that the level of consumption inequality in China has remained at a relatively high position for a long time and has shown an upward trend for a considerable period after the reform and opening up [2].

At the micro level, there are already various inequality and relative deprivation indices based on the individual or family level in the academic circle. The traditional approach is to directly use indicators such as the Gini coefficient or the Thiel index, which have good statistical characteristics, but their explanations are more inclined towards "the degree of dispersion of the overall distribution". To better describe the gap between an individual and the average social level, this paper considers it from the perspective of the theory of relative deprivation. Yitzhaki (1979) proposed a relative deprivation index based on cumulative distribution and average difference to measure the average gap between an individual and those who are "richer" than themselves [12]. However, this index has certain limitations in terms of normalization and dimensionless nature. Kakwani (1984) proposed the relative deprivation curve and related indices on this basis, redefining the degree of deprivation, which enables the indicators to be normalized to the interval of [0,1] under certain conditions, making it more convenient for comparison among different samples [13]. In the Chinese context, Jiang et al. (2023) introduced Kakwani's idea of relative deprivation into the measurement of household consumption inequality [14]. This study utilized the three phases of CFPS data from 2014 to 2018 to construct the Kakwani index of consumption at the household level, and used this as the dependent variable to investigate the impact of e-commerce development on consumption inequality [14]. This study found that the popularization of e-commerce can significantly reduce household consumption inequality on the whole, and the improvement effect is particularly obvious for vulnerable groups such as the elderly and families with low educational attainment [14]. This approach provides us with inspiration and guidance for using the Kakwani index to depict consumption inequality on the same data source.

## 2.3 Hypothesis Setting

By analyzing the existing literature on the impact of housing prices on the economy and household behavior, as well as the review of the characterization and measurement of consumption inequality, two directions of understanding are obtained.

Firstly, starting from the wealth effect, in the context of China, where housing assets account for the majority of household wealth, the rise in housing prices will increase the nominal wealth of residents in households with existing housing and enhance their consumption level through reducing precautionary savings, improving consumption propensity, etc. [5, 6, 7]. However, housing assets are unevenly distributed among residents [4], and a considerable number of families either have no housing or own housing but have a relatively high leverage ratio. For these families, the increase in house prices is more reflected in the raised threshold for home purchase and the increased debt pressure, thereby leading them to compress non- housing consumption [8]. Therefore, the impact of rising house prices on consumption among different households is significantly heterogeneous and may push up consumption inequality overall [9, 10].

Secondly, from the perspectives of structure and space, population migration, constraints on land and housing supply will further amplify the impact of housing prices on consumption inequality. The model of Fang and Huang (2022) shows that economically developed cities have absorbed a large number of inflow population under the condition of limited land supply, pushing up housing prices and rents [9]. Local residents benefit from property appreciation and rental income, while the migrant population bears high costs and low consumption capacity. This structure implies that the rise in housing prices not only widens the gap in asset distribution but also translates into consumption inequality through differences in living costs and consumption budgets. Zhao (2015) 's rational housing bubble framework indicates that in the long term, high-income and early home-buying groups further accumulate wealth through multiple houses, thereby widening the gap between housing prices and residents' wealth levels and potential consumption [11].

As a result, the research perspective of this article will be significantly different from that of most existing literature. Most of the existing research on housing prices and inequality is based on aggregated data at the macro or urban level, and it is difficult to reveal the detailed differences in consumption behavior among different families. Meanwhile, some studies on consumption inequality that utilize national microdata, such as CFPS, mainly focus on factors like the development of e-commerce or digital inclusive finance. Although they have begun to adopt relative deprivation indicators like Kakwani, the core explanatory variable is not the factor of "house prices". Therefore, this paper will simultaneously observe "housing" and "consumption inequality based on the Kakwani index" at the household level, and directly examine the impact of housing price changes on consumption distribution among different households based on CFPS microdata, thereby attempting to fill the research gap in the field of the impact of housing prices on consumption inequality at the micro level.

Therefore, based on the existing research and logistic analysis, this paper makes the hypothesis:

H1: Individuals facing higher housing prices experience correspondingly greater consumption inequality.

## 3. Research Data and Method

### 3.1 Variable Selection

#### 3.1.1 Kakwani Index

According to relative deprivation theory, the higher an individual's consumption level within a specific group, the lower their degree of relative deprivation, manifested as a reduction inconsumption inequality. Based on existing research, this study uses other individuals within the same county as the selected individual as a reference group, then compares respondents' total consumption expenditures with those of other individuals in their county, using the Kakwani index to measure individuals' consumption relative deprivation. In this case, higher values indicate greater consumption inequality.

To be more specific, suggests that the mean of individuals' consumption in a certain county is x , and we rank the consumption from smallest to largest, define the consumptions which are larger than the mean x to be $\overset{+}{\text{xi}}$ , the proportion of observations exceeding the consumption level of our selected individual xi relative to the total number of observations to be $\#\overset{*}{\text{xi}}$. Therefore, we construct the formula of the Kakwani index to be [14]:

$$\text{Kakwani}(x, x_i) = \frac{1}{n_x} \sum_{j=i+1}^{n} (x_j - x_i) = \vartheta^*_{x_i} \left[ \frac{\overset{+}{x_i} - x_i}{x} \right] \tag{1}$$

### 3.1.2 House Price

This variable represents the average sales price of commercial housing in region i at time t. The data originates from the regional housing sales tables published by the China Stock Market & Accounting Research (CSMAR) database, calculated by dividing the total commercial housing sales value by the total commercial housing sales area.

### 3.1.3 Control Variables

At the individual's level, we control the individual's age (Age), sex (Gender), educational level (Education), and household registration (Hukou). At the household level, this study controls the household assets (FA), the household expenditure (FE), the household debt (FD), and the region the household is located in (Region).

## 3.2 Data Source and Processing

Individuals' and households' detailed data are collected from the China Family Panel Studies (CFPS), which is a nationwide longitudinal survey project with extensive sample coverage across 25 provinces (autonomous regions and municipalities) in China. It provides researchers with microdata on Chinese households' economic activities, educational dynamics, population health, and other social information. The CFPS project conducted preliminary pilot surveys in Beijing, Shanghai, Guangdong, and other locations in 2008 and 2009 to test the validity of survey methods and instruments. Following two years of testing, the project commenced full-scale implementation in 2010. After the 2010 baseline survey, all household members and their future offspring—whether biological or adopted—were enrolled in CFPS's long-term follow-up cohort. The project has given us seven updates from 2010, and the latest report is the 2022 CFPS database. This longitudinal design enables researchers to conduct in-depth analyses of how Chinese households' micro-level behavioral responses to economic dynamics, such as the fluctuation of house prices.

In this research, the dataset is processed by dropping the observations with the key variables missing to ensure consistency and completeness of data. Meanwhile, those observations are dropped whose total income, total expenditure, or total assets are negative to eliminate the disturbance created by the extreme values. Finally, the continuous variables are applied a logarithmic transformation.

## 3.3 Research Methods

To examine how the fluctuation of house prices affects the consumption inequality, this paper establishes the model:

$$CIit = \beta 0 + \beta 1 \cdot HousePriceit + X\acute{i}t\,\eta + \alpha i + \delta t + \varepsilon it \quad (2)$$

The subscript i implies individual, and t stands for time. The explained variable CIit stands for the consumption inequality; the explanatory variable HousePriceit stands for the regional average house price. Xít indicates the control variables; αi represents the individual fixed effect, δt represents the year fixed effect, εit represents the random error term. The coefficient β1 captures the causal effect of housing price on consumption inequality. More specifically, if $\beta 1 > 0$, it indicates that individuals exposed to higher housing prices experience correspondingly greater consumption inequality. If $\beta 1 < 0$, it indicates that the decline in housing prices has exacerbated consumption inequality.

# 4. Results

## 4.1 Descriptive Statistics

Table 1 presents the descriptive statistics for each variable after preliminary processing. The mean value of the Kakwani index, which reflects individual consumption inequality, is 0.1706, with a standard deviation of 0.0354. Before taking the logarithm, the mean of housing prices was 0.7294, with a standard deviation of 0.5140, indicating significant variation in housing prices. Due to missing data in certain variables, the panelized CFPS data constitute unbalanced panel data. In descriptive statistics, variables such as household assets and expenditures may be affected by negative values. This paper has excluded illogical negative values.

*Table 1: Descriptive statistics*

| Variable | N | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Kakwani Index | 233,650 | 0.1706 | 0.0354 | 0 | 0.4214 |
| House Price | 238,076 | 0.7294 | 0.5140 | 0.1663 | 4.9301 |
| Age | 235,461 | 3.4064 | 0.8651 | 0 | 4.6540 |
| Gender | 235,261 | 0.5045 | 0.5000 | 0 | 1 |
| Education | 190,033 | 2.6504 | 1.3837 | 1 | 8 |
| Hukou | 233,518 | 0.2538 | 0.4352 | 0 | 1 |
| Family Assets | 235,473 | 11.8131 | 2.2674 | 0 | 18.1992 |
| Family Expenditures | 235,473 | 10.6601 | 0.9531 | 0 | 15.9090 |
| Family Debts | 235,473 | 1.9676 | 4.2912 | 0 | 15.8950 |

*Note: This table reports the number of observations (N), mean, standard deviation (SD), minimum (Min), and maximum (Max) of the main variables.*

## 4.2 Benchmark Regression Model Estimation

Table 2 presents the benchmark regression results. Columns (1) and (2) display regression results with only the dependent variable and core explanatory variables, respectively. Column (1) shows t-statistics calculated using robust standard errors based on estimated coefficients and corresponding significance levels, while Column (2) presents t-statistics and significance levels calculated using cluster-robust standard errors at the household level. Columns (3) and (4) present regression results incorporating individual-level control variables. Column (3) displays t-statistics calculated using robust standard errors based on estimated coefficients and corresponding significance levels, while column (4) shows t-statistics calculated using household-level cluster-robust standard errors and significance levels. Columns (5) and (6) present regression results incorporating household- and region-level control variables. Column (5) displays t-statistics and corresponding significance levels calculated using robust standard errors based on estimated coefficients, while Column (6) shows t-statistics and significance levels calculated using cluster-robust standard errors at the household level. The model results presented in Column (6) are selected as the benchmark regression model in this paper.

*Table 2: Benchmark regression results*

| | (1) CI | (2) CI | (3) CI | (4) CI | (5) CI | (6) CI |
|---|---|---|---|---|---|---|
| House Price | -0.0488*** | -0.0488*** | -0.0303*** | -0.0303* | 0.0964*** | 0.0964*** |
| | (-5.68) | (-2.78) | (-3.31) | (-1.90) | (10.78) | (6.35) |
| Age | | | -0.9239*** | -0.9239*** | -0.7690*** | -0.7690*** |
| | | | (-18.82) | (-14.70) | (-16.03) | (-12.49) |
| Gender | | | 0.0211 | 0.0211 | 0.0280 | 0.0280 |
| | | | (0.51) | (0.50) | (0.74) | (0.73) |
| Education | | | -0.0376*** | -0.0376*** | -0.0356*** | -0.0356*** |
| | | | (-7.67) | (-6.76) | (-7.36) | (-6.49) |
| Hukou | | | -0.0456*** | -0.0456*** | -0.0425*** | -0.0425*** |
| | | | (-4.67) | (-3.97) | (-4.36) | (-3.72) |
| Family Assets | | | | | 0.0004 | 0.0004 |
| | | | | | (0.47) | (0.32) |
| Family Expenditures | | | | | -0.0177*** | -0.0177*** |
| | | | | | (-8.12) | (-5.06) |
| Family Debts | | | | | -0.0027*** | -0.0027*** |
| | | | | | (-6.35) | (-3.87) |
| Region | | | | | 0.7585*** | 0.7585*** |
| | | | | | (17.04) | (10.05) |
| Constant | 0.0077*** | 0.0077*** | 3.5758*** | 3.5758*** | 1.7347*** | 1.7347*** |
| | (7.78) | (6.32) | (19.65) | (15.40) | (8.24) | (5.79) |
| Individual FE | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y |
| Clustered SE | N | Y | N | Y | N | Y |
| Observations | 219,823 | 219,823 | 175,773 | 175,773 | 175,773 | 175,773 |
| R-squared | 0.835 | 0.835 | 0.834 | 0.834 | 0.839 | 0.839 |

*Robust t-statistics in parentheses. Clustered SE are at the household level (columns 2, 4, and 6).*
**** p<0.01, ** p<0.05, * p<0.1.*

Table 2 shows that a 1 percent increase in housing prices raises the Kakwani index by 0.0964, meaning the sum of consumption gaps between an individual and those with higher consumption levels increases by 9.64 percent, thereby aggravating relative deprivation in individual consumption. This further demonstrates that rising housing prices significantly exacerbate individual consumption inequality. Discussing individual characteristics, age has a significant negative impact on consumption inequality, indicating that consumption inequality among the elderly is significantly lower than among middle-aged and young groups.

Educational attainment also has a significant negative impact on consumption inequality, suggesting that individuals with higher skills and education experience smaller income and consumption differentiation, with less pronounced inequality. Gender has no significant effect on consumption inequality. At the household level, household expenditure and debt exert a significant negative influence on consumption inequality, indicating that higher household expenditure and debt correlate with lower consumption inequality.

## 4.3 Robustness Analysis

To ensure the reliability and validity of our benchmark regression results, the study conducts a series of robustness checks. First, the paper examines whether the findings are driven by specific sample selections or outlier observations. Second, the results are tested for structural stability by investigating whether the COVID-19 pandemic induced a significant change in the relationship between housing prices and consumption inequality.

### 4.3.1 Robustness Check

Before conducting the structural stability test, the paper conducts a series of robustness checks to verify that the positive association between local housing prices and household- level consumption inequality is not driven by sample composition or extreme observations. The results are shown in Table 3.

*Table 3: Robustness Check Regression Results*

| | (1)<br>CI | (2)<br>CI | (3)<br>CI |
|---|---|---|---|
| House Price | 0.1008*** | 0.0962*** | 0.0883*** |
| | (5.14) | (6.14) | (4.60) |
| Age | -1.1470*** | -0.7734*** | -1.0100*** |
| | (-11.77) | (-13.11) | (-9.00) |
| Gender | 0.0405 | 0.0255 | 0.0119 |
| | (0.75) | (0.68) | (0.38) |
| Education | -0.0271*** | -0.0323*** | -0.0308*** |
| | (-3.33) | (-6.15) | (-4.18) |
| Hukou | -0.0412*** | -0.0416*** | -0.0398*** |
| | (-2.83) | (-3.76) | (-3.01) |
| Family Assets | -0.0002 | 0.0005 | -0.0013 |
| | (-0.11) | (0.35) | (-0.83) |
| Family Expenditures | -0.0188*** | -0.0193*** | -0.0212*** |
| | (-4.53) | (-5.67) | (-5.14) |
| Family Debts | -0.0023*** | -0.0026*** | -0.0025*** |
| | (-3.04) | (-3.91) | (-3.28) |
| Region | 0.7825*** | 0.7566*** | 0.7485*** |
| | (8.65) | (10.56) | (8.24) |
| Constant | 3.1157*** | 1.7642*** | 2.7136*** |
| | (7.18) | (6.18) | (5.60) |
| Sample restriction | Job = 1 | Winsorized variables | 22 < Age < 65 |
| Individual FE | Y | Y | Y |
| Year FE | Y | Y | Y |
| Clustered SE | Y | Y | Y |
| Observations | 116,398 | 175,773 | 124,269 |
| R-squared | 0.842 | 0.849 | 0.847 |

*Robust t-statistics in parentheses. All regressions include individual and year fixed efects and cluster standard errors at the household level.*
**** p<0.01, ** p<0.05, * p<0.1.*

First, restricting the sample to individuals who are currently employed (job = 1) leaves the main result virtually unchanged (shown as column 1): the coefficient on standardized log housing prices remains positive and highly significant, and its magnitude is very close to that in the baseline specification. Second, the main continuous variables (consumption inequality index, housing prices, age, education, and household income components) are winsorized at the 0.5th and 99.5th percentiles to mitigate the influence of outliers (shown as column 2). The estimated effect of housing prices is again positive, statistically significant, and similar in size to the baseline estimate. Third, when the paper restricts the sample to prime-age individuals between 22 and 65 years old, thereby excluding very young and very old observations, the coefficient on housing prices remains robustly positive and significant (shown as column 3). Across all these alternative samples and specifications, the signs and magnitudes of the control variables are also broadly stable, reinforcing the view of our main finding. This implies that higher local housing prices are associated with higher consumption inequality is not an artifact of a particular sample choice or a few extreme values.

### 4.3.2 Structural Stability Test

The structural stability of the econometric model is a critical prerequisite for reliable estimation. Major exogenous shocks, such as the COVID-19 pandemic that began in late 2019, could potentially alter the intrinsic relationship between housing prices and consumption in- equality by affecting macroeconomic operations and household expectations. To test whether the regression coefficients differ significantly before and after the pandemic, the study applies the Chow test logic by introducing a time dummy variable and an interaction term into the benchmark model. The specific model specification is as follows:

$$CIit = \beta 0 + \beta 1\ Housepriceit + \beta 2\ Post2019t + \beta 3\ (Housepriceit \times Post2019t) + \dot{Xit}\ \eta + \alpha i + \delta t + \varepsilon it \quad (3)$$

Where Post2019t is a dummy variable that takes the value of 1 for the year 2019 and subsequent years, and 0 otherwise. The coefficient of the interaction term, β3, captures the structural change in the impact of housing prices on consumption inequality following the outbreak of the pandemic.

The results of the structural stability test are reported in Table 4. The coefficient of the core explanatory variable, Houseprice, is 0.0896 and remains statistically significant at the 1% level, which is consistent with our benchmark findings. Crucially, the coefficient of the interaction term (Houseprice × Post2019) is 0.0055 with a p-value of 0.463. Furthermore, the F-test for the interaction term yields an F-value of 0.54 ($p \approx 0.46$), failing to reject the null hypothesis that the coefficients are identical across the two periods.

These results suggest that the COVID-19 pandemic did not cause a significant structural break in the relationship between housing prices and consumption inequality. We attribute this stability to two primary factors. First, housing assets account for a substantial proportion of Chinese household wealth, creating a "rigid" wealth effect that is not easily altered by short-term external shocks. Second, effective economic stabilization policies implemented during the pandemic helped buffer the shock to household income and consumption. Therefore, the exacerbating effect of housing prices on consumption inequality appears to be a robust structural law rather than a temporary phenomenon driven by specific events.

*Table 4: Chow-type structural break test around 2019*

| | **(1)**<br>**CI** |
|---|---|
| HousePrice | 0.0896***<br>(4.03) |
| HousePrice × Post2019 | 0.0055<br>(0.73) |
| Individual FE | Y |
| Year FE | Y |
| Clustered SE | Y |
| Observations | 175,773 |
| R-squared | 0.839 |
| Chow F-test for Post2019 break | 0.54 |
| p-value | 0.463 |

*The bottom rows report the F-statistic and p-value from the Chow-type test of parameter stability around 2019, based on the null hypothesis that the coefficient on the interaction term is equal to zero.*
**** p<0.01, ** p<0.05, * p<0.1.*

## 4.4 Heterogeneity Analysis

The benchmark regression results establish that, on average, rising housing prices exacerbate consumption inequality. However, this aggregate effect may mask significant heterogeneity across different regions and demographic groups. In this section, this paper stratifies the sample by region (East, Central, and West) and age (Young, Middle-aged, and Elderly) to investigate how the impact of housing prices on consumption inequality varies across varying levels of economic development and lifecycle stages.

*Table 5: Heterogeneity analysis by region and age*

| | (1) CI | (2) CI | (3) CI | (4) CI | (5) CI | (6) CI |
|---|---|---|---|---|---|---|
| House Price | 0.0947*** | -0.1565*** | -0.1391*** | -0.0805*** | -0.0371 | 0.0774*** |
| | (5.98) | (-2.77) | (-3.62) | (-3.06) | (-1.39) | (4.09) |
| Age | -0.7065*** | -0.6214*** | -0.5935*** | 0.4000** | -0.1468 | -0.3431 |
| | (-6.85) | (-6.04) | (-7.81) | (2.54) | (-0.51) | (-0.89) |
| Gender | 0.0486 | 0.0222 | -0.0176 | -0.0002 | 0.0413 | 0.0556 |
| | (1.12) | (0.27) | (-0.37) | (-0.00) | (0.75) | (0.89) |
| Education | -0.0313*** | -0.0214** | -0.0493*** | -0.0564*** | 0.0011 | -0.0007 |
| | (-3.62) | (-2.48) | (-5.56) | (-6.48) | (0.13) | (-0.08) |
| Hukou | -0.0344** | -0.0483** | -0.0495** | -0.0583** | -0.0319** | -0.0216 |
| | (-2.23) | (-2.39) | (-2.04) | (-2.13) | (-2.15) | (-1.58) |
| Family Assets | -0.0004 | -0.0022 | 0.0032* | 0.0072** | -0.0017 | -0.0022 |
| | (-0.21) | (-0.83) | (1.69) | (2.31) | (-1.17) | (-1.45) |
| Family Expenditures | -0.0153*** | -0.0140** | -0.0174*** | -0.0327*** | -0.0147*** | -0.0076* |
| | (-2.69) | (-2.28) | (-3.93) | (-4.49) | (-3.46) | (-1.67) |
| Family Debts | -0.0011 | -0.0038*** | -0.0012 | -0.0021* | -0.0022*** | -0.0011 |
| | (-0.99) | (-2.75) | (-1.57) | (-1.66) | (-2.83) | (-0.95) |
| Constant | 2.6166*** | 2.5075*** | 2.7834*** | -0.8705* | 0.7479 | 1.5623 |
| | (6.63) | (6.45) | (9.65) | (-1.73) | (0.67) | (0.95) |
| Individual FE | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y |
| Clustered SE | Y | Y | Y | Y | Y | Y |
| Observations | 70,404 | 52,323 | 51,953 | 53,471 | 73,377 | 41,549 |
| R-squared | 0.830 | 0.848 | 0.898 | 0.771 | 0.887 | 0.915 |

*Robust t-statistics in parentheses. All specifications include individual and year fixed efects and cluster standard errors at the household level.*
*Columns (1)–(3) report results for eastern, central, and western regions, respectively. Columns (4)–(6) report results for diferent age groups (age ≤ 35, 35 < age < 60, and age ≥ 60).*
**** p<0.01, ** p<0.05, * p<0.1.*

### 4.4.1 Regional Heterogeneity

China's real estate market and economic development exhibit substantial spatial disparities. The study categorizes the sample into Eastern, Central, and Western regions to examine these geographical differences.

The first three columns of Table 6 report the regression results for regional heterogeneity. We observe a striking divergence in the relationship between housing prices and consumption inequality across regions.

As shown in column 1, in the economically developed Eastern region, the coefficient of housing prices is 0.0947 and statistically significant at the 1% level. This result, consistent with the full-sample benchmark, suggests that in the East, housing ownership is imbalanced, due to the higher housing price; the houses are owned by a small group of people, while the majority are renters. Rising prices significantly widen the wealth gap between homeowners and non-homeowners, thereby exacerbating consumption inequality through the wealth effect.

As shown in columns 2 and 3, conversely, the coefficients for the Central and Western regions are -0.1565 and -0.1391, both significantly negative. This indicates that in these developing regions, rising housing prices are associated with a reduction in consumption inequality. A plausible explanation is that housing price appreciation in inland provinces is closely tied to the urbanization process and general income growth. Moreover, in these areas, house ownership is more balanced. With the majority of people having housing assets,

the rise in housing prices will generally stimulate consumption. The development of the real estate market often accompanies infrastructure improvement and economic opportunities that benefit lower-income groups, thereby narrowing the consumption gap.

### 4.4.2 Age Cohort Heterogeneity

Housing plays different roles at different stages of the life cycle. We further divide the sample into three age cohorts: Young (age ≤ 35), Middle-aged (35 < age < 60), and Elderly (age ≥ 60).

The last three columns of Table 6 present the results by age group, revealing distinct life- cycle patterns. First, as shown in the fourth column, for the Young cohort, the coefficient is -0.0805, significantly negative. This suggests that among younger generations, higher housing prices are associated with lower consumption inequality. This counterintuitive finding can be attributed to a "selection effect": young people who manage to stay and work in high housing price cities tend to possess similar levels of high human capital and income potential. Furthermore, many people in this group are in a transitional phase, relying on parental support, which causes the wealth effects brought by the housing to be less significant.

Second, as shown in the fifth column, for the Middle-aged cohort, the coefficient is -0.0371 and is insignificant ($p > 0.1$). This group faces conflicting forces: existing homeowners benefit from the wealth effect, while they still have other assets and a reliable income, which have a greater impact on their consumption. These opposing mechanisms partially offset each other, resulting in a weak negative correlation and thus are not significant.

Finally, as shown in the last column, for the Elderly cohort, the coefficient is 0.0774 and significantly positive at the 1% level. This indicates that rising housing prices significantly exacerbate consumption inequality among the elderly. For this demographic, housing is often the primary component of accumulated wealth. Elderly homeowners enjoy increased consumption capacity through property appreciation, while non-homeowners rely on fixed pensions and face rising living costs. Thus, housing price inflation acts as a powerful "amplifier" of inequality within the elderly population.

## 5. Conclusion

### 5.1 Research Summary and Main Findings

As China's economy transitions into a stage of high-quality development, the structural transformation of the housing market and residential consumption has become a critical lens for understanding economic operations and social welfare. Based on micro-level panel data from the China Family Panel Studies (CFPS) spanning 2010 to 2022, this paper constructs a household-level Kakwani index to measure consumption inequality and utilizes a high-dimensional fixed effects model to identify the net impact of regional housing price fluctuations.

Unlike existing literature that focuses on macro-level Gini coefficients or average consumption levels, this study emphasizes micro-individual relative deprivation. The primary finding is that rising housing prices significantly exacerbate residential consumption inequality. The benchmark regression indicates that for every 1% increase in regional housing prices, the household Kakwani index rises by approximately 0.0964 units. This implies that in the context where "housing is wealth," housing price appreciation does not uniformly improve welfare; instead, it widens the relative gap between high-consumption and low-consumption groups.

To ensure the reliability of this conclusion, this study conducted a series of rigorous tests. Results remained robust across various specifications of control variables and clustering methods. And the Chow test using 2019 as a breakpoint showed an interaction term coefficient of only 0.0055 ($p = 0.463$) and an F-value of 0.54, confirming that the impact of housing prices on inequality is a structural law determined by household wealth structure rather than a short-term fluctuation driven by the COVID-19 pandemic.

### 5.2 Heterogeneity Analysis and Mechanism Discussion

While the aggregate analysis reveals a positive correlation, the heterogeneity analysis uncovers distinct divergences across regions and lifecycle stages.

### 5.2.1 Regional Divergence

The distributional effect of housing prices exhibits a clear dichotomy between the "Eastern Wealth Effect" and the "Central/Western Development Effect." Empirical results show that in the economically developed Eastern region, rising housing prices significantly exacerbate inequality ($\beta = 0.0947$, $t = 5.98$). In contrast, in the Central ($\beta = -0.1565$) and Western ($\beta = -0.1391$) regions, housing prices are negatively correlated with inequality. This divergence stems from distinct regional differences: in the highly developed East, real estate ownership is not balanced, which serves as a key wealth stratifier; whereas in the Central and Western regions, price increases often coincide with rapid urbanization and industrial upgrading, where the inclusive dividends of development shared by a more balanced real estate ownership outweigh the asset differentiation effect.

### 5.2.2 Age Misalignment

The study observes significant intergenerational differences. For the elderly (age $\geq 60$), rising housing prices significantly exacerbate inequality ($\beta = 0.0774$), as housing assets constitute the bulk of their accumulated wealth, creating a divide between property owners and renters. Conversely, for the youth (age $\leq 35$, $\beta = -0.0805$) and middle-aged groups (35-60, $\beta = -0.0371$), high housing prices are associated with reduced inequality. Two similar phenomena point to different possible explanations. For the youth, the counterintuitive finding can be attributed to the "selection effect": young people who are able to settle and work in high-price housing cities often possess similar levels of high human capital and income potential. Moreover, the parental financial support also masks the consumption gap. Meanwhile, for the middle-aged, the combined effect of the wealth effect is offset by their more diverse assets distributions and their reliable incomes, resulting in a negligible outcome.

## 5.3 Policy Implications

Based on these findings, the study argues that policy formulation must shift from aggregate control to structural optimization

### 5.3.1 Supply-Side Structural Reform

Given that housing bubbles exacerbate the wealth gap, the government should accelerate the development of the long-term rental market and affordable housing. For new citizens and youth squeezed by high prices, "rent-and-purchase" concurrent strategies are essential to sever the transmission chain where housing costs crowd out consumption.

### 5.3.2 Differentiated Regional Policies

Policies should avoid a "one-size-fits-all" approach. In the East, the focus should be on using tax instruments to smooth the wealth distribution effect of assets. In Central and Western regions, policymakers should objectively view the urbanization process accompanying price increases and ensure that vulnerable groups continue to share development dividends.

### 5.3.3 Age-Appropriate Financial Mechanisms

To address asset differentiation among the elderly, we recommend exploring "reverse mortgage" models to help asset-rich but cash-poor elderly homeowners release consumption capacity. Simultaneously, strengthening public pension and medical security systems independent of housing assets is crucial to prevent non-homeowning elderly from falling into a consumption trap.

## 5.4 Limitations and Future Outlook

This study has certain limitations. First, the Kakwani index measures relative inequality and may not fully capture changes in absolute welfare levels. Second, limited by data availability, the study relied on regional average sales prices, which cannot distinguish quality differences within cities.

Future research could expand in three dimensions: (1) matching high-frequency, fine- grained real estate transaction data with micro-household surveys to identify financial trans- mission channels more precisely; (2) utilizing quasi-natural experiments (e.g., purchase re- strictions) to reinforce causal identification; and (3)

extending the analysis beyond consumption to broader welfare dimensions such as intergenerational mobility and subjective well-being.

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## Conflicts of Interest

The authors declare no conflict of interest.

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