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Empirical Analysis of the Impact of Commercial Housing Prices on Consumption in Hangzhou City

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Abstract

With the deepening of China's reform and opening up policy, the national economy has maintained stable growth, and the quality of life of the people is also constantly improving. In this process, urbanization construction, as an important component of the modernization process, has also received unprecedented attention. The housing renovation implemented since 1998 has led to the formation of a new housing system in China, which has led to changes in the sales area and price of commercial housing. However, in the process of urbanization, residents' consumption shows a decreasing trend, which is closely related to the promotion of urbanization and economic development. With the acceleration of urbanization, the position of the real estate market in the national economy is becoming increasingly prominent. In China, the issue of housing prices has always been a focus of public attention, especially the impact of fluctuations in housing prices on residents' consumption. Although there is currently a large amount of research literature, most studies are based on national data, focusing on the impact of changes in housing prices nationwide on household consumption. However, this nationwide study cannot fully reflect the true impact of housing price fluctuations on urban residents' consumption, as the impact of housing price fluctuations on residents' consumption may vary in different regions. In order to fill this research gap, this article conducted an in-depth analysis using Hangzhou city as an example. By exploring the relationship between housing price fluctuations and residents' consumption in Hangzhou, the aim is to provide useful experience for stable economic development.This article establishes a panel fixed effect model to reveal the key factors affecting housing prices in Hangzhou, providing scientific basis for the formulation of relevant policies and the adjustment of market behavior.

Keywords

Commercial Housing; Price Fluctuations; Resident Consumption; Wealth Effect.

1. Introduction

In the second half of 1998, the State Council of China made an important decision, which was to stop the physical distribution of housing in cities and towns nationwide and gradually promote the monetization of housing distribution. This is a significant change in China's housing system, marking a new stage in the country's housing system. The housing system reform in 1998 was not only a major adjustment of China's housing system, but also an important measure taken by the Chinese government to actively respond to social needs and promote social fairness and harmony. With the transformation of housing policies, the demand for housing by the public has rapidly exploded in the short term. However, the real estate market has the characteristic of long development cycles, which has led to the disruption of the supply and demand balance in the commodity housing market, and the sustained rapid growth of domestic housing prices over the past two decades. The long-term high housing prices have brought many pressures to China's economic development and people's livelihoods. The Chinese government has adopted a diversified strategy to address this issue. One of the most important measures is to vigorously

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promote the construction of affordable housing, aiming to meet the basic housing needs of the general public. In addition, the government also implemented the real estate market regulation policy to guide the market in an orderly manner and prevent excessive foam in the market. The ultimate goal of these measures is to ensure the sustained, stable, and healthy development of the real estate market, and to make positive contributions to the prosperity of China's economy.

2. Empirical Analysis of the Impact of Commercial Housing Prices on Consumption in Hangzhou City

2.1. Model Building

The purpose of this section is to study the impact of housing prices on residents' consumption expenditures. To this end, the following panel fixed effect model is constructed for verification:

$$LNEXP_{it} = \alpha_0 + \alpha_1 LNHPRICE_{it} + \alpha_2 LNINCOME_{it} + \alpha_3 URBAN_{it} + \alpha_4 AGING_{it} + \alpha_5 CPI_{it} + \alpha_6 DIRATE_{it} + \gamma_i + \delta_t + \mu_{it} \quad (1)$$

In equation (1), $LNEXP_{it}$ represents the level of consumer expenditure of residents in year t of district/county i, which is the dependent variable of this article.$LNINCOME_{it}$, $URBAN_{it}$, $AGING_{it}$, CPI_{it} and $DIRATE_{it}$ all are control variables,represent the income level of residents, urbanization rate, population aging degree, inflation degree, and bank deposit interest rate of district/county i in year t. In addition, there is significant heterogeneity between different districts and counties, which is difficult to measure through variables. These factors may be related to the explanatory variable and may affect the dependent variable, leading to endogeneity issues caused by missing variables.Therefore, this article further incorporates the fixed effects of districts and counties in the model γ_i , used to control the impact of district/county heterogeneity that does not change over time on residents' consumption levels. μ_{it} is a random disturbance term that represents the impact of factors other than variables in the model on residents' consumption levels.$\delta_t$is a time trend variable used to control the impact of certain macro trends on residents' consumption levels.α_0 is a constant term.$\alpha_i (i = 1, 2, 3, 4, 5, 6)$are parameter to be estimated for the corresponding variable.The basic information of each variable in the model is shown in Table 1.

According to column (1) of Table 6.2, the estimated coefficient of the natural logarithm of housing price per square meter, LNHPRICE, is 0.351 and can pass the statistical significance test at the 1% significance level. This means that under the control of income, urbanization rate, aging, inflation, and deposit interest rates, housing price and consumption expenditure show a significant positive correlation.

Table 1. Descriptive Statistical Results Table

variable name	meaning	Observations	mean value	standard deviation	minimum value	Maximum value
LNEXPk	Consumption expenditure level	169	10.0574	0.5656	9.0157	10.9048
LNHPRICE	House price level	169	9.4178	0.8352	7.9267	10.7145
LNINCOME	Residents' income level	169	10.7774	0.5452	9.1842	11.2324
URBAN	Urbanization rate	169	71.6740	7.4890	59.6200	83.2900
AGING	Degree of population aging	169	17.6588	4.9117	10.2000	26.2400
CPI	Inflation level	169	1.2129	0.1797	0.9949	1.5039
DIRATE	Bank deposit interest rate	169	2.2047	0.6416	1.5000	3.5000

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In Table 1, the level of consumption expenditure is measured by the natural logarithm of the amount of household consumption expenditure. The level of housing prices is measured by the natural logarithm of residential prices per square meter. The income level of residents is measured by the natural logarithm of their income. The degree of population aging is measured by the proportion of the population aged 60 and above to the total population. The degree of inflation is measured by the consumer price index of residents. The values of each variable are within a reasonable range.

Under further control of fixed effects in districts and counties, the estimated coefficient of LNHPRICE has been expanded to 0.620 and can still pass the statistical significance test at the 1% significance level. The fact that the estimated coefficient has expanded reflects that under the setting of column (1), the random disturbance term includes heterogeneity factors in districts and counties that are both positively (negatively) correlated with housing prices and negatively (positively) influencing household consumption expenditures. In column (3) that includes time trends, the estimated coefficient of LNHPRICE further narrows to 0.228, indicating that excluding trend factors will exaggerate the positive impact of housing prices on household consumption expenditure.

2.2. Empirical Results

2.2.1. Benchmark Regression

This article uses a fixed effects model to empirically test the impact of housing prices on household consumption expenditure. At the same time, for the purpose of comparison, the estimated results without adding fixed effects and only adding fixed effects in districts and counties without considering time trends are also provided, as shown in Table 2.

Table 2. Benchmark Regression Results Table

	(1) LNEXP	(2) LNEXP	(3) LNEXP
LNHPRICE	0.354***	0.620***	0.228***
	(0.038)	(0.067)	(0.066)
LNINCOME	-0.119***	-0.183***	-0.174***
	(0.034)	(0.034)	(0.027)
URBAN	0.046***	0.036***	-0.012*
	(0.006)	(0.005)	(0.006)
AGING	0.003	0.006	-0.003
	(0.003)	(0.006)	(0.004)
CPI	-0.239	-0.824***	-1.803***
	(0.267)	(0.237)	(0.211)
DIRATE	-0.011	0.014	0.025*
	(0.021)	(0.017)	(0.014)
Fixed effects in districts and counties	uncontrolled	control	control
Time Trend	uncontrolled	uncontrolled	control
Constant	4.941***	4.438***	-252.027***
	(0.237)	(0.416)	(25.724)
N	176	176	176
R squared within the group		0.968	0.980

According to column (1) of Table 6.2, the estimated coefficient of the natural logarithm of housing price per square meter, LNHPRICE, is 0.351 and can pass the statistical significance

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test at the 1% significance level. This means that under the control of income, urbanization rate, aging, inflation, and deposit interest rates, housing price and consumption expenditure show a significant positive correlation. Under further control of fixed effects in districts and counties, the estimated coefficient of LNHPRICE has been expanded to 0.620 and can still pass the statistical significance test at the 1% significance level. The fact that the estimated coefficient has expanded reflects that under the setting of column (1), the random disturbance term includes heterogeneity factors in districts and counties that are both positively (negatively) correlated with housing prices and negatively (positively) influencing household consumption expenditures. In column (3) that includes time trends, the estimated coefficient of LNHPRICE further narrows to 0.228, indicating that excluding trend factors will exaggerate the positive impact of housing prices on household consumption expenditure.

The mechanism behind the promotion effect of housing prices on consumer spending may include: firstly, the wealth effect. When housing prices rise, residents' property value increases and they may feel wealthier. This sense of wealth will stimulate them to be more willing to consume and purchase more goods and services to meet their increased desire for consumption. Secondly, mortgage financing. The rise in housing prices means that residents' property value has increased, making it easier for them to obtain mortgage loans. Residents can use mortgage loans to finance investments, consume, or expand their businesses. This will increase their spending and drive economic activity. Thirdly, consumer confidence. The rise in housing prices may enhance residents' consumer confidence. They may think that their economic situation is good, so they are more willing to spend money. The improvement of consumer confidence can help stimulate residents to increase consumption expenditure. Fourthly, the wealth effect. Rich people usually invest more in the real estate market. When housing prices rise, their wealth also increases, which may encourage them to increase their purchases of high-value goods and services, thereby driving consumption. Fifth, adverse effects. The rise in housing prices may lead residents to worry about further price increases in the future, so they may consume in advance to avoid paying higher housing prices in the future. This reverse effect may in some cases promote consumer spending.

2.2.2. Endogeneity Testing

This article controls for factors such as income, urbanization rate, aging, inflation, deposit interest rate, fixed effects in districts and counties, and time trend in Table 2, which can largely alleviate the bias of omitted variables. However, there may still be many difficult to measure factors that affect both housing prices and consumer spending, leading to endogeneity issues. In addition, there may be a causal relationship between housing prices and household consumption expenditures, where housing prices may affect household consumption expenditures, which in turn may affect housing prices, leading to endogeneity issues. If there are endogeneity issues in this article, the results of the benchmark regression section may not be reliable. Therefore, this article conducts endogeneity testing by searching for instrumental variables. If the endogeneity test passes, the core conclusion of this article is robust. Otherwise, instrumental variable regression needs to be used for re estimation. Drawing on existing research, this article uses the land supply area of each county as a tool variable for housing prices. Its rationality lies in that China's construction land indicators are strictly controlled by the central government, and the land supply meets exogenous conditions. Housing prices are closely related to land prices, and land prices are influenced by land supply and demand. When demand is constant, an increase in supply will lead to a decrease in land prices, which in turn affects housing prices. Therefore, the land supply area meets the relevant conditions. The results of endogeneity testing are shown in Table 3.

According to Table 3, it can be found that the statistical value of F in the first stage obtained by two-stage least squares regression is 446.18, which is much greater than the standard of 10. Therefore, there is a strong correlation between endogenous variables and instrumental

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variables. The P value of the Durbin Wu Hausman test is 0.2795, which is not statistically significant, indicating that the original hypothesis of exogenous housing prices cannot be rejected. Even so, the estimated results of 2SLS are still presented in Table 3. It can be found that in the second stage estimation, the coefficient of the explanatory variable LNHPRICE is 0.7625 and can pass the statistical significance test at the 10% significance level, indicating that the original hypothesis that housing prices play a promoting role in consumer spending is still valid.

Table 3. Endogeneity test results table

LNLAND	first phase -0.0186 **	IV-2SLS second phase	
	(0.0106)		
LNHPRICE		0.7625*	LNHPRICE
		(0.4463)	
control variable	control	control	control variable
First stage F-statistic	446.18		First stage F-statistic
Number of samples	100	100	Number of samples
R-squared	0.984	0.972	R-squared
DWH inspection/chi2 P-value		1.170 (0.2795)	DWH inspection/chi2 P-value
		IV-2SLS	
	first phase	second phase	

2.2.3. Robust Test

Table 4. Table of Results for Robustness and Heterogeneity Testing

	(1) LNEXP	(2) High Income	(3) low income
LNHPRICE		0.4025***	0.0478
		(0.0863)	(0.1261)
L1_LNHPRICE	0.1333*		
	(0.0711)		
LNINCOME	-0.1873***	-0.2954***	-0.2221***
	(0.0315)	(0.1103)	(0.0734)
URBAN	-0.0123*	-0.0087	-0.0149
	(0.0065)	(0.0074)	(0.0115)
AGING	-0.0016	0.0056	-0.0191**
	(0.0047)	(0.0049)	(0.0094)
CPI	-1.3845***	-1.6990***	-1.8146***
	(0.2861)	(0.2379)	(0.4027)
DIRATE	0.0207	0.0061	0.0288
	(0.0138)	(0.0157)	(0.0253)
year	0.1293***	0.1031***	0.1715***
	(0.0147)	(0.0167)	(0.0254)
control variable	control	control	control
Time Trend	control	control	control
	(1)	(2)	(3)
	LNEXP	High Income	low income
LNHPRICE		0.4025***	0.0478

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The above empirical results indicate that an increase in housing prices can significantly promote an increase in consumer spending among residents. However, the significance of LNHPRICE in Table 2 may come from the impact of LNEXP on LNHPRICE, rather than the impact of LNHPRICE on LNEXP. Therefore, this part takes a lag of one period for LNHPRICE and obtains L1_ LNHPRICE, re estimate L1_ The impact of LNHPRICE on LNEXP. The reason for doing so is that current consumption may affect current housing prices, but current consumption will not affect past housing prices. Therefore, the interference caused by current consumption on current housing prices can be ruled out. In this case, if L1_ LNHPRICE is still significantly positive, indicating that an increase in housing prices will indeed promote consumer spending. The estimated results are shown in column (1) of Table 4. The results show that L1_ Although the statistical significance and coefficients of LNHPRICE have decreased, they are still statistically significant, meaning that the previous period's housing prices will have a promoting effect on current consumer spending. The conclusion that housing prices have a positive impact on consumer spending still holds.

In column (1) of Table 4, the consumption expenditure level L with a lag of one order_ The estimated coefficient of LNEEP is positive and significant, which means that the current consumption expenditure level will be positively affected by the previous consumption expenditure level. Although the estimated coefficient of the explanatory variable housing price LNHPRICE is significantly greater than the estimated coefficient in Table 6.2, the conclusion that the increase in housing prices promotes residents' consumption expenditure still holds. Therefore, even with the setting of a dynamic panel model, the core conclusion that the increase in housing prices promotes residents' consumption expenditure remains valid.

2.2.4. Heterogeneity Analysis

There are significant differences among districts and counties in Hangzhou, and the impact of housing prices on residents' consumption expenditure may exhibit significant heterogeneity among these districts and counties. One type of heterogeneity may be reflected in whether the increase in housing prices can drive consumer spending depending on the income level of residents in the corresponding district or county. For example, the wealth effect brought about by rising housing prices is more commonly seen among high-income groups, as they have larger assets in the real estate market. Therefore, for districts and counties with lower incomes, the wealth effect may not be significant. Therefore, this article divides each district and county in Hangzhou into low income and high income categories based on the average income of residents, and estimates the impact of housing prices on residents' consumption expenditure. The test results are shown in columns (2) and (3) of Table 6.4. According to the results, it can be found that the housing price variable LNHPRICE is significantly positive in the high-income district and county samples, but not significant in the low-income samples. Therefore, this result verifies that the wealth effect brought by housing prices varies depending on income levels. High income groups often hold more real estate, so rising housing prices can significantly increase their income. However, for low-income groups, buying a house will require more funds, which suppresses their consumption.

The degree of aging in different districts and counties may also lead to differences in the impact of housing prices on consumer spending. Therefore, this article divides each district and county into two categories based on the average proportion of the elderly population aged 65 and above. Those above the average are defined as high aging groups, while those below the average are defined as low aging groups. The estimated results are shown in Table 5. According to Table 5, LNHPRICE is significantly positive in the high aging group, but not significant in the low aging group. This result means that the increase in housing prices has promoted consumer spending in high aging areas. The reason for this result may be that compared to young people, elderly people purchase property relatively early and experience greater wealth appreciation after rising house prices. At the same time, elderly people also have relatively less debt due to home

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purchases, which encourages them to consume more. And young people often carry high mortgage payments, which drives up housing prices and does not necessarily lead them to spend more.

Table 5. Table of Heterogeneity Test Results for Population Aging

	(1) High aging	(2) Low aging
LNHPRICE	0.1984**	0.1200
	(0.0963)	(0.0764)
LNINCOME	-0.7383***	-0.1053***
	(0.1329)	(0.0311)
URBAN	0.0072	-0.0109
	(0.0082)	(0.0078)
AGING	0.0497***	0.0050
	(0.0116)	(0.0071)
CPI	-0.7360**	-1.6844***
	(0.3185)	(0.2477)
DIRATE	-0.0193	0.0080
	(0.0193)	(0.0163)
year	0.0611***	0.1343***
	(0.0183)	(0.0163)
Fixed effects in districts and counties	control	control
Time Trend	control	control
N	81	95
R squared within the group	0.983	0.985

2.2.5. Mechanism Analysis

Table 6. Table of Heterogeneity Test Results for Population Aging

	(1) LN(urban income)	(2) LN9(rural income)
LNHPRICE	0.0501**	0.0397
	(0.0225)	(0.0681)
LNINCOME	1.0027***	0.9012***
	(0.0091)	(0.0252)
URBAN	-0.0025	-0.0031
	(0.0022)	(0.0058)
AGING	0.0013	0.0059
	(0.0015)	(0.0045)
CPI	-0.1564**	0.4199**
	(0.0724)	(0.1984)
DIRATE	-0.0005	0.0224*
	(0.0046)	(0.0132)
year	0.0074	0.0033
	(0.0045)	(0.0139)
Fixed effects in districts and counties	control	control
Time Trend	control	control
N	176	88
R squared within the group	0.996	0.993

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This section tests the wealth effect mechanism brought by housing prices. The wealth effect brought about by housing prices may be enjoyed by both urban and rural residents. For urban residents, the rise in housing prices leads to an increase in the value of their properties, resulting in an income effect that increases their consumption expenses. For rural residents, the rise in housing prices has increased the value of land, generating significant income through rounds of demolition, increasing rural income, and thus promoting consumer spending. In this article, it is uncertain which of these two mechanisms is involved. Therefore, this article uses the natural logarithm of urban income and rural income as the dependent variables to test the impact of rising housing prices on these two variables. The estimated results are shown in Table 6.

According to Table 6, LNHPRICE was significantly positive in column (1), but failed the statistical significance test in column (2). This result means that an increase in housing prices will promote an increase in urban income, but the impact on rural income may not exist. Therefore, for Hangzhou, the promotion effect of rising housing prices on consumer spending may mainly come from the increase in urban income levels caused by housing prices. In terms of income level, the rise in housing prices has not brought benefits to rural areas.

3. Conclusion

This article focuses on various districts and counties in Hangzhou and empirically tests the impact of housing prices on consumer spending using a panel fixed effect model. The main conclusions are as follows: Firstly, while controlling income, urbanization rate, aging, inflation, and deposit interest rates, the rise in housing prices has significantly increased residents' consumption expenditure. Considering the existence of many difficult to measure factors that both affect housing prices and may affect household consumption expenditures, endogeneity issues arise. This article further adopts the land supply area of each county as the instrumental variable for housing prices, and conducts two-stage least squares estimation. The results show that the promoting effect of housing prices on residents' consumption expenditure is still valid. Even in the case of first-order lag in housing prices, the conclusion that housing prices promote consumer spending still holds. Secondly, the wealth effect brought about by housing prices will vary depending on income levels. High income groups often hold more real estate, so rising housing prices can significantly increase their income. However, for low-income groups, buying a house will require more funds, which suppresses their consumption. Thirdly, the increase in housing prices has promoted consumer spending in high aging areas. Compared to young people, elderly people purchase real estate relatively early and experience greater wealth appreciation after rising housing prices. At the same time, elderly people also have relatively less debt due to purchasing houses, which encourages them to consume more. And young people often carry high mortgage payments, which drives up housing prices and does not necessarily lead them to spend more. Fourthly, in the wealth effect mechanism of housing prices, the promotion effect of rising housing prices on consumer spending mainly comes from the increase in urban income level caused by housing prices, rather than the increase in rural income level.

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