

The Relationship between Income and House Prices on People's Consumption

Shuchang Yu*

Shenghua Zizhu Academy, Shanghai, 200241, China

*Corresponding author: sunxq@zizhu-edu.com

Abstract. This study aims to explore the factors that influence consumer spending, particularly focusing on the relationship between income levels and housing price fluctuations. Using Univariate regression analysis, the research draws on data samples from three major cities in China, covering the period from 2007 to 2024. According to the assumptions, three variables were selected to symbolize income levels (rate of increase in disposable income), house price volatility (second-hand house sales price index), and consumption expenditure (rate of growth in sales of all consumer retail goods). The study examines the connection between these factors by calculating R^2 and beta values. The findings indicate a clear and consistent connection between disposable income and consumption expenditure, whereas the influence of fluctuations in house prices on consumption expenditure does not reach statistical significance. Generally, the amount of money people earn has a greater influence on their spending habits compared to changes in housing prices.

Keywords: Consumer spending; income; house price; relation.

1. Introduction

The increase in consumption levels is widely acknowledged as a key factor in driving economic growth. The growth of the economy largely depends on how fast people are spending and how much their spending affects the overall economy [1]. In the realm of economic research, experts commonly categorize the determinants of consumer spending into three main groups: disposable income, wealth, and permanent income.

Initially, an increase in disposable income directly enhances an individual's purchasing power, leading to a rise in consumption growth. Additionally, the growth of real estate assets, especially the appreciation of properties, plays a significant role in boosting personal wealth, which in turn supports higher levels of consumption. Lastly, alterations in long-term income have a substantial impact on the choices individuals make regarding their consumption. When people believe that their income changes are long-lasting, they tend to spend a significant amount of the extra money on goods and services. Conversely, if income changes are considered temporary, there is a tendency to save a larger portion of the additional income [2]. Among these factors, disposable income and wealth are often regarded as the most influential on consumer behavior [3].

Several studies have proposed that lower housing prices may be more effective in promoting consumer spending. For instance, research by Dynan et al., utilizing microdata from U.S. Households between 2007 and 2009, found that rising housing prices lead to increased mortgage burdens, which consume a larger proportion of disposable income and consequently suppress household consumption—a phenomenon referred to as the "crowding-out effect" [4]. Empirical studies by Chen and Yang have reached similar conclusions, suggesting that rising housing prices are detrimental to savings, thereby diminishing consumption and exerting a crowding-out effect on overall consumer expenditure [5]. As a result, these researchers advocate for the regulation of housing prices as a mean to stimulate consumption growth.

On the other hand, some scholars have offered a different viewpoint on the matter. In recent times, the changes in housing prices within China have become a significant subject of conversation in economic debates. Some economists argue that rising housing prices may stimulate consumption through the "wealth effect." generally, fluctuations in housing prices lead to corresponding changes in personal wealth, which can directly or indirectly influence income distribution, consumption

decisions, and other economic behaviors. As housing prices rise, personal wealth expands, benefiting individuals by increasing their purchasing power and the value of their assets, thereby enabling easier access to credit and encouraging further consumption. Research conducted by Case et al. and Ludwig and Siqueira supported the notion that increasing housing prices play a role in personal wealth accumulation, leading to higher levels of personal consumption [6, 7]. Tan and Vos conducted research in Australia, which supports the findings of the previous study, indicating that the impact of real estate on wealth is substantial in both the short and long run [8]. From this viewpoint, the potential increase in housing prices could serve as a driving force behind higher levels of consumption.

In the aftermath of the covid-19 pandemic in 2020, China's economic landscape underwent unprecedented turbulence, leading to substantial alterations in the overall economic environment. In this context, comprehending how to efficiently steer economic recovery, harness the advantages of economic development, and capitalize on growth prospects has become an urgent challenge [9]. As a result, the control of housing prices has become a significant policy concern. In China, the value of real estate has a substantial impact on the overall wealth of households. According to the 2021 China household wealth survey report published by China economic trends research institute, the average per capita household wealth is primarily composed of 65.61 percent in the form of real estate. This statistic implies that rising housing prices could potentially boost consumption through the "wealth effect." Nevertheless, it is important to recognize that the ratio of housing prices to average income in China remains alarmingly high. On July 31, 2018, the political bureau of the central committee of the communist party of China (CPC) explicitly addressed the need to resolve issues in the real estate market, emphasizing the importance of balancing supply and demand and curbing the rapid rise in housing prices [10]. By 2022, the average housing price in China had skyrocketed to 12.4 times the average household income, making it nearly impossible for a household to afford a home in just 12.4 years of income. The rising prices of homes are expected to worsen the financial strain on consumers, leading to a decrease in their spending.

Motivated by economic reforms, the economy of Zhejiang province has experienced rapid growth, with its gross domestic product (GDP) projected to reach 8.26 trillion yuan in 2023. The real estate sector in Zhejiang is highly focused on the market, making it an excellent area to study the connection between income, housing prices, and consumption. Therefore, this study selects three cities within Zhejiang province as research samples, employing a linear regression model to systematically examine the effects of income and housing prices on consumption levels across different regions of China, ultimately aiming to draw comprehensive conclusions regarding the relationships between these variables.

2. Methods

2.1. Data Source

This study analyses the annual changes in second-hand house prices, disposable income and total retail sales of consumer goods in Hangzhou, Wenzhou and Lishui, using data from the China statistical information network's residential sales price statistics survey. The second-hand house price survey utilizes a combination of targeted and standard survey methods, drawing data from real estate agent reports, information from real estate management departments, and on-site collection by surveyors. Gross retail sales of consumer goods, which is a significant measure of domestic consumer demand, represents the overall value of goods bought by individuals and social groups for personal use (e.g., income from food and beverage services).

2.2. Variable Selection

Total retail sales of consumer goods and the increase in second-hand property prices in three cities by year are listed as Table 1, 2 and 3 show. Table 1, 2 and 3 represent data from Hangzhou, Wenzhou, and Jinhua, covering 17 sets of data from 2007 to 2024. Each chart lists three representative indicators for each year, which are used for regression analysis. This comparative analysis helps to understand

how economic factors in different regions influence the growth rate of total retail sales of consumer goods.

Table 1. Data for second-hand houses and growth rate of disposable income in Hangzhou

Years	total retail sales of consumer goods growth rate	the selling price index for second-hand homes	The rate of increasing disposable income
2007	16.5	10.3	14.0
2008	20.2	-1.8	11.1
2009	14.4	13.9	11.5
2010	22.0	4.2	11.8
2011	21.7	-4.4	13.4
2012	15.9	-1.8	10.1
2013	19.9	2.9	9.1
2014	7.8	-5.1	9.1
2015	11.0	3.7	8.3
2016	10.4	21.7	8.0
2017	10.2	7.2	7.8
2018	8.8	4.6	8.7
2019	8.7	3.0	8
2021	11.4	5.2	8.8
2022	5.8	-0.9	3.1
2023	5.2	-2.1	4.6
2024	5.3	-6.1	3.3

Table 2. Data for second-hand houses and growth rate of disposable income in WenZhou

Years	total retail sales of consumer goods growth rate	the selling price index for second-hand homes	The rate of increasing disposable income
2007	16.3	10.1	10.4
2008	19.5	-3.7	9.2
2009	16.8	19.2	7.1
2010	18.9	14.2	11.4
2011	18.1	-11.3	13.5
2012	9.1	-5.4	9.7
2013	11.2	-7.2	8.7
2014	12.8	-9.5	8.7
2015	11.1	1.6	8.7
2016	12.3	3.1	8.5
2017	10.6	6.4	8.5
2018	9.0	0.8	8.2
2019	9.6	3.5	8.7
2021	8.9	3.0	9.8
2022	3.6	-4.8	5.2
2023	7.9	-5.6	6.3
2024	4.4	2.1	4.2

It is important to note that total retail sales of consumer goods may be influenced by other factors, such as population growth. However, as the population increases, both the demand for second-hand properties and their prices tend to rise, resulting in simultaneous effects that are therefore excluded from consideration. Additionally, the global COVID-19 pandemic in 2020 significantly disrupted China's economy, causing substantial fluctuations in both consumer spending and the secondary housing market; hence, data from that year are excluded from the analysis.

Table 3. Data for second-hand houses and growth rate of disposable income in JinHua

years	total retail sales of consumer goods growth rate	the selling price index for second-hand homes	The rate of increasing disposable income
2007	17.5	2.15	11.5
2008	20.8	2.4	7.8
2009	14.6	12.1	7.0
2010	19	2.7	13.6
2011	22	-2.9	14.1
2012	13.3	-2.5	11.6
2013	10.4	5.1	9.8
2014	13	-6.7	9.4
2015	12.2	0.5	8.5
2016	11.6	4.7	7.8
2017	11.3	7.7	8.8
2018	6.4	4.9	8.4
2019	7.7	1.5	8.1
2021	10.3	3.2	9.5
2022	2.9	-6.1	3.3
2023	6.0	-4.8	5.8
2024	7.2	-4.8	4.5

2.3. Method Introduction

The objective of this study is to examine the connection between house price fluctuations and consumption fluctuations using linear regression analysis and develops a one-dimensional linear regression model using the collected data. Linear regression is a statistical technique that investigates the linear connection between two or more variables, with the goal of predicting or explaining how one variable (the dependent variable) changes in relation to changes in another variable (the independent variable). One-dimensional linear regression is a statistical technique that examines the linear relationship between a single independent variable (x) and a dependent variable (y).

3. Results and Discussion

3.1. Correlation Analysis

Through the above table, it can draw scatter plots of the impact of second-hand house price and disposable income on consumption in the three cities respectively, and carry out linear regression analyses (Figure 1, 2, 3, 4, 5 and 6). Figure 1 shows the impact of disposable income on consumption in Hangzhou. Figure 2 shows the impact of second-hand property prices on consumption in Hangzhou.

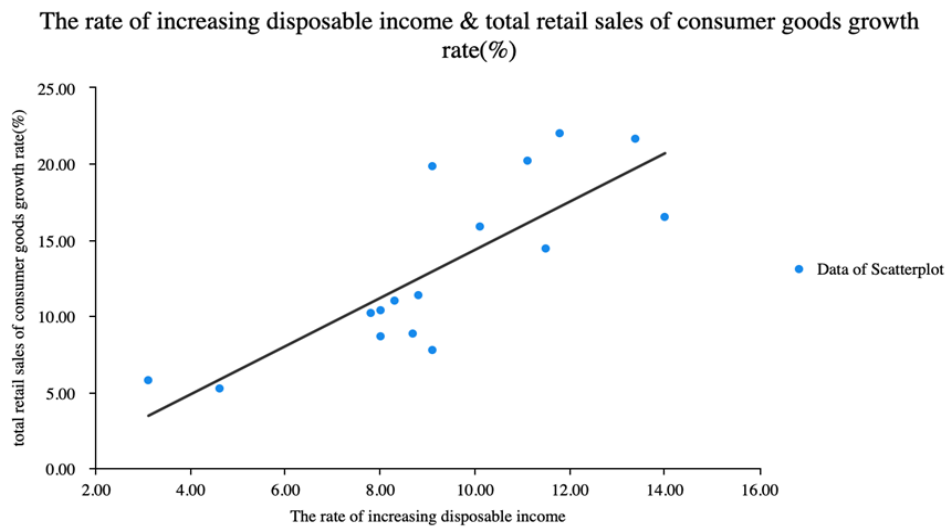


Fig. 1 Impact of disposable income on consumption in Hangzhou

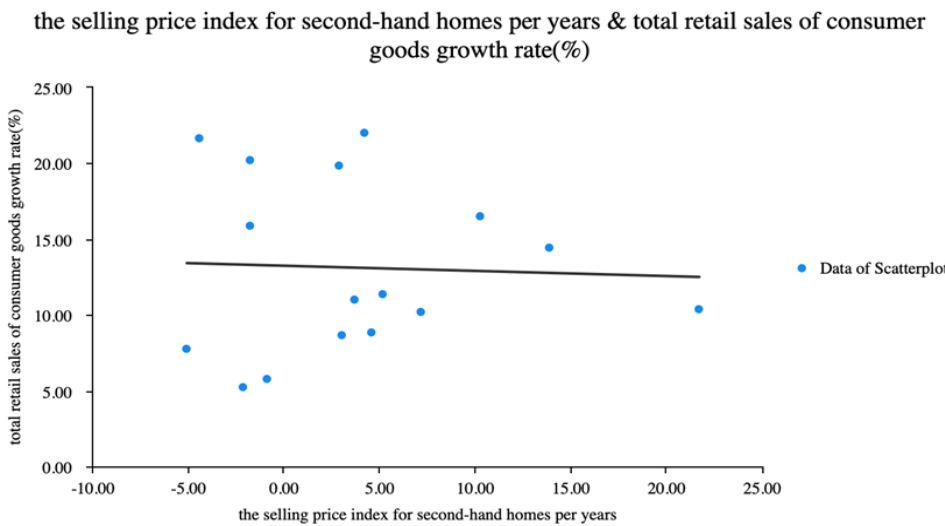


Fig. 2 Impact of second-hand property prices on consumption in Hangzhou

Figure 3 shows the impact of disposable income on consumption in Wenzhou. Figure 4 shows the impact of second-hand property prices on consumption in Wenzhou.

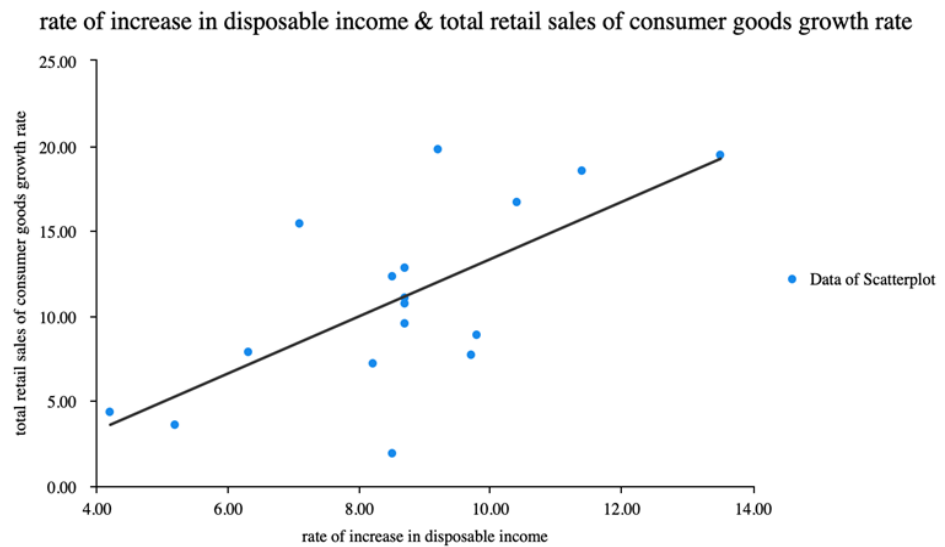


Fig. 3 Impact of disposable income on consumption in Wenzhou

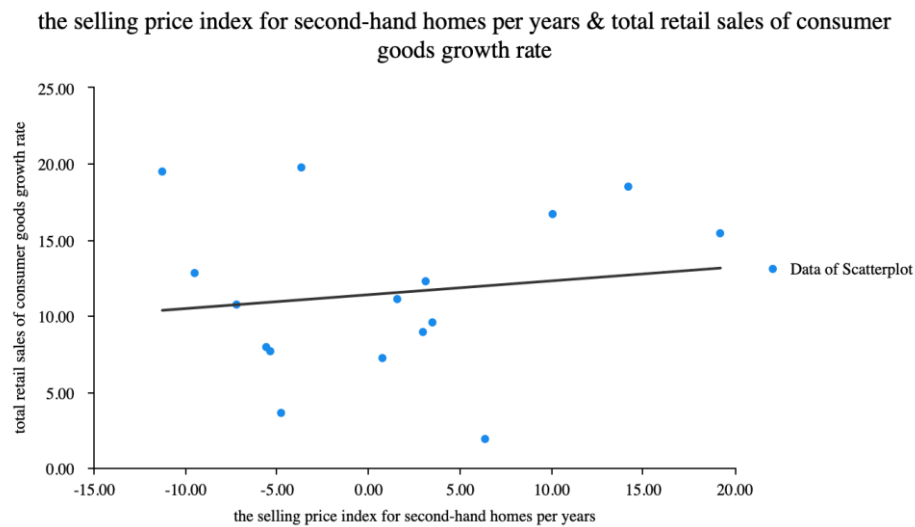


Fig. 4 Impact of second-hand property prices on consumption in Wenzhou

Figure 5 shows the impact of disposable income on consumption in Jinhua. Figure 6 shows the impact of second-hand property prices on consumption in Jinhua.

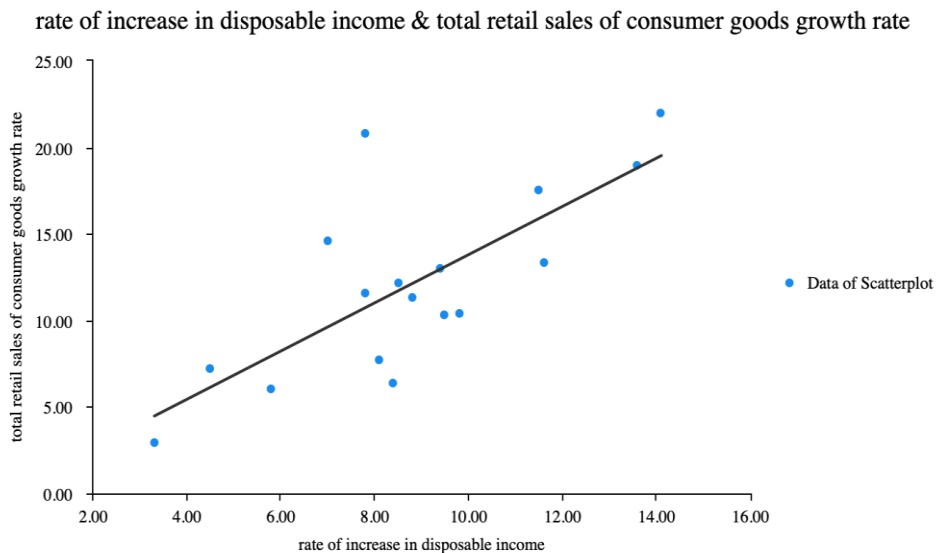


Fig. 5 Impact of disposable income on consumption in Jinhua

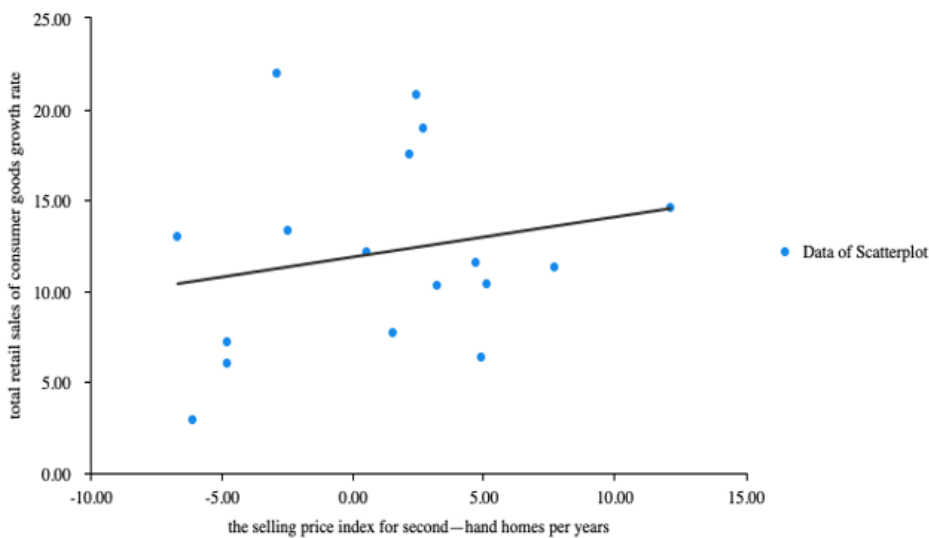


Fig. 6 Impact of second-hand property prices on consumption in Jinhua

3.2. Model Results

3.2.1 Analyse about Hangzhou

Through the Figure 1, a regression model can be analyzed to obtain the Table 1. Results show that when the "rate of increasing disposable income" is used as the independent variable, the model equation is: $\text{growth rate of total retail sales of consumer goods (\%)} = -1.473 + 1.584 \times \text{rate of increasing disposable income}$, with R^2 value of 0.641, indicating that this variable can explain 64.1% of the variation in the dependent variable. The f-test ($F=25.049$, $p=0.000<0.05$) shows that the model is significant, with a regression coefficient of 1.584 ($t=5.005$, $p=0.000<0.01$), demonstrating a significant positive impact of the "rate of increasing disposable income" on the "growth rate of total retail sales of consumer goods." this implies that as disposable income increases, total consumer spending also rises accordingly.

Table 1. Regression model between increase in disposable income index and total retail sales for consumer goods growth rate in Huangzhou

	Unstandardized Coefficients		Standardized Coefficients	t	p	Collinearity diagnosis	
	B	Std. Error	Beta			VIF	tolerance
Constant	-1.473	3.043	-	-0.484	0.636	-	-
The rate of increasing disposable income	1.584	0.316	0.801	5.005	0.000**	1.000	1.000
R^2			0.641				
Adj R^2			0.616				
F			F (1,14)=25.049,p=0.000				
D-W			2.337				

Notes: Dependent Variable=total retail sales of consumer goods growth rate(%)

* $p<0.05$ ** $p<0.01$

Trough Figure 2, the regression model can show on Table 2. In contrast, when the "annual selling price index of second-hand homes" is used as the independent variable, the model equation is: $\text{Growth Rate of Total Retail Sales of Consumer Goods} = 13.248 - 0.034\text{Selling Price}$.

But the R^2 value is only 0.002, indicating that this variable has very little explanatory power and almost no significant impact on the "growth rate of total retail sales of consumer goods".

Table 2. Regression model between the selling price index for second-hand homes per year and total retail sales for consumer goods growth rate in Hangzhou

	Unstandardized Coefficients		Standardized Coefficients	t	p	Collinearity diagnosis	
	B	Std. Error	Beta			VIF	tolerance
Constant	13.248	1.665	-	7.959	0.000**	-	-
the selling price index for second-hand homes per years	-0.034	0.213	-0.043	-0.160	0.875	1.000	1.000
R^2			0.002				
Adj R^2			-0.069				
F			F (1,14)=0.026,p=0.875				
D-W			0.741				

Notes: Dependent Variable=total retail sales of consumer goods growth rate(%)

* $p<0.05$ ** $p<0.01$

3.2.2 Analyse about Wenzhou

The regression model derived from the analysis in Figure 3 and 4 is summarized in Table 3 and Table 4. The results show that when the independent variable is 'growth rate of disposable income', the model equation is as follows: $\text{growth rate of retail sales of all consumer goods (\%)} = -1.473 + 1.584 \times \text{growth rate of disposable income}$, with a value of R^2 of 0.641. This

suggests that the factor explains 64.1% of the variation. F-test ($F=25.049$, $p=0.000<0.05$) confirms the significance of the model with a regression coefficient of 1.584 ($t=5.005$, $p=0.000<0.01$) indicating that the 'growth rate of disposable income' has a significant effect on these retail sales of consumer goods growth rate' has a significant positive effect. This indicates that as disposable income increases, consumer spending also increases.

Table 3. Regression model between increase in disposable income index and total retail sales for consumer goods growth rate in Wenzhou

	Unstandardized B	Std. Error	Standardized Beta	t	p	Collinearity VIF	tolerance
Constant	-1.717	3.482	-	-0.493	0.629	-	-
increase in disposable income index	1.562	0.392	0.717	3.989	0.001**	1.000	1.000
R ²				0.515			
Adj R ²				0.482			
F				F (1,15)=15.913,p=0.001			
D-W				0.651			

* $p<0.05$ ** $p<0.01$

Table 4. Regression model between the selling price index for second-hand homes per year and total retail sales for consumer goods growth rate in Wenzhou

	Unstandardized B	Std. Error	Standardized Beta	t	p	Collinearity VIF	tolerance
Constant	12.083	1.117	-	10.817	0.000**	-	-
the selling price index for second-hand homes per years	0.164	0.134	0.312	1.228	0.240	1.000	1.000
R ²				0.097			
Adj R ²				0.033			
F				F (1,14)=1.509,p=0.240			
D-W				0.926			

* $p<0.05$ ** $p<0.01$

3.2.3 Analyse about Jinhua

Based on the information presented in Figure 5 and 6, a regression model was created and Table 5 and 6 were generated. The formula for calculating the growth rate of total retail sales of consumer goods is: $-0.126 + 1.394 \times \text{growth rate of disposable income}$. This demonstrates that the 'rate of increase in disposable income' has a substantial positive impact on the 'rate of growth of retail sales of all consumer goods'. The R² of the model is 0.552, indicating that it accounts for 55.2% of the variability in the data. The f-test ($F=18.491$, $p=0.001$) is statistically significant, and the regression coefficient is 1.394 ($t=4.300$, $p=0.001<0.01$). In contrast, in the case of Hangzhou and Wenzhou, the "annual second home sales price index" has a much weaker explanatory power, with an r² of only 0.045 and explaining only 4.5% of the variance. Additionally, the f-test results do not show a significant relationship ($f=0.705$, $p=0.414>0.05$), suggesting that there is no significant association between these variables.

The scatter plot analysis for the three cities shows that the "disposable income growth rate" significantly and positively affects the total retail sales of consumer goods across various models, with strong explanatory power and significant regression coefficients. In contrast, the "second-hand housing price index" has a lower significance and explanatory power, with generally lower R² values and failed F-tests, a pattern observed in Hangzhou, Wenzhou, and Jinhua.

Overall, the data from Zhejiang's cities indicates that the "disposable income growth rate" is a key factor influencing retail sales growth, while the "second-hand housing price index" has a relatively minor impact. Thus, in China, disposable income has a greater effect on consumption than the wealth effect from housing prices.

Table 5. Regression model between increase in disposable income index and total retail sales for consumer goods growth rate in Jinhua

	Unstandardized Coefficients		Standardized Coefficients	t	p	Collinearity diagnosis	
	B	Std. Error	Beta			VIF	tolerance
Constant	-0.126	2.989	-	-0.042	0.967	-	-
increase in disposable income index	1.394	0.324	0.743	4.300	0.001**	1.000	1.000
R ²			0.552				
Adj R ²			0.522				
F			F (1,15)=18.491,p=0.001				
D-W			0.959				

Notes: Dependent Variable=total retail sales for consumer goods growth rate
* p<0.05 ** p<0.01

Table 6. Regression model between the selling price index for second-hand homes per year and total retail sales for consumer goods growth rate in Jinhua

	Unstandardized Coefficients		Standardized Coefficients	t	p	Collinearity diagnosis	
	B	Std. Error	Beta			VIF	tolerance
Constant	11.881	1.351	-	8.797	0.000**	-	-
the selling price index for second—hand homes per years	0.220	0.262	0.212	0.840	0.414	1.000	1.000
R ²			0.045				
Adj R ²			-0.019				
F			F (1,15)=0.705,p=0.414				
D-W			0.766				

Notes: Dependent Variable=total retail sales for consumer goods growth rate
* p<0.05 ** p<0.01

3.3. Further Results XEC

In this discourse, this paper introduced the concept of income elasticity of consumer expenditure (XEC), a crucial metric that quantifies the responsiveness of consumer expenditure to fluctuations in disposable income. Formally, this relationship can be articulated as:

$$XED = \frac{c\%}{x\%} = \frac{\frac{\Delta c}{c}}{\frac{\Delta x}{x}} \quad (1)$$

where $\frac{\Delta c}{c}$ denotes the change in consumer expenditure, and $\frac{\Delta x}{x}$ represents the change in disposable income. Deriving from the regression equation that models the relationship between consumer expenditure and disposable income, it is evident that, given the baseline condition $C\% = a + x\%$, this paper can deduce the following expression:

$$XEC = \frac{c\%}{x\%} = \frac{a}{x\%} + b \quad (2)$$

The empirical investigation further reveals that in regions such as Lishui, Wenzhou, and Jinhua, when the growth rate of disposable income reaches specified thresholds (Lishui 2%, Wenzhou 3%, Jinhua 3%), the XEC surpasses 1. This phenomenon indicates that increments in disposable income are associated with a more than proportional increase in consumer expenditure.

Over the past four decades, China's "Economic Reform and Opening-up" policy has engendered a profound transformation, elevating the nation from a state of economic scarcity to becoming the world's second-largest economy. The contemporary challenge lies in ensuring that this economic growth trajectory remains sustainable and inclusive.

In response to this challenge, the Chinese Central Government introduced the Internal Circular Economic Policy in 2020. This policy, designed to establish a virtuous cycle of income, seeks to augment household consumer expenditure by capitalizing on the vast domestic market. Even as an emerging economy, China's households exhibit a marked propensity to acquire high-quality goods.

The analysis substantiates that, with XEC consistently exceeding 1 across China, the pivotal determinant for the successful implementation of the Internal Circular Economic Policy lies in enhancing the disposable income of the general populace through equitable distribution of economic gains.

In summation, an increase in disposable income catalyzes a significant rise in consumer expenditure, thereby fostering a more sustainable and inclusive pathway for economic development in China.

4. Conclusion

According to the official website of the China Bureau of Statistics, this study gathers 18 datasets spanning from 2007 to 2024 and conducts a linear regression analysis. By comparing the volatility indices of second-hand housing prices and the impact of disposable income growth rates on total retail sales, the findings suggest that, despite mortgage loans constituting a substantial portion of household income, the wealth effect remains under-recognized in comparison to the influence of disposable income growth. As a result, the increase in disposable income seems to be a more influential factor in driving consumer spending in China.

Furthermore, the study provides valuable insights into the property cycle within the country. Despite real estate being the most significant form of household wealth in China, housing prices, whether they are rising or falling, do not have a substantial impact on the consumer function. In China, owning a home is considered the most valuable asset for a household, but it also comes with a significant financial responsibility. Between 2020 and 2022, mortgage interest rates in China reached a peak of 6%, resulting in a significant amount of interest being paid over the duration of the loan, almost equal to the initial principal amount. In the majority of households, monthly mortgage payments constitute a significant portion of the available disposable income. This implies that an increase in housing prices will lead to a higher mortgage amount, intensifying the financial strain on regular households, and consequently diminishing the amount of disposable income they have left after paying their mortgage. Additionally, the high monthly payments for a mortgage can decrease the desire to spend money. In summary, while real estate holds the largest share of household wealth in China, the high cost of housing and substantial mortgage obligations limits the capacity and motivation of consumer spending in the country.

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