

Macroeconomic, Macro policy and Cost stickiness-- Based on the Empirical Evidence of China's Listed Real Estate Companies

Taozhu Feng¹ and Jie baijie^{2*}

¹ School of Management, Xi'an University of Science and Technology, Xi'an, Shaanxi , 710054, China

² School of Management, Xi'an University of Science and Technology, Xi'an, Shaanxi , 710054, China

*Corresponding author's e-mail: 7285973@qq.com

Abstract. The real estate industry is an important part of the national economy, which is restricted by the development level of the whole national economy and plays a role of promoting the new economic growth point of the national economy. Cost management plays an important role in the business activities of enterprises. It has an important impact on enterprises to achieve the goal of open source, economize on the flow, and refine the cost control. Based on this, the article listed on the Shanghai and Shenzhen A shares in 2007, before 104 real estate companies as the research object, the selection of 2007-2017 financial index, combining with the macro economy and macro policy for empirical research cost stickiness. Research findings :(1) there is fee stickiness in real estate listed companies;(2) the upward trend of macro-economy will inhibit the stickiness of costs; Inflation promotes stickiness;(3) tight control policies and prudent monetary policies will inhibit the stickiness of expenses.

1. Introduction

The real estate industry is one of the industries greatly affected by the national economy. Affected by the subprime mortgage crisis in 2008, the government to avoid market risks, the stability of the overall economy, national four trillion investment plan, but don't match the macro policy and the financial system, causing a lot of money into real estate industry, thereby deepening the degree of real estate bubbles. The implementation of the supply-side reform is guided by the macro-policy and gradually digests the real estate bubble, thus driving economic growth. In addition, as China's real estate market mechanism is not yet mature, the government will issue a targeted industrial policy to directly intervene in the real estate market, so as to force the market supply and demand closer to the policy expectations. As a result, the real estate market is usually affected by the national macro-economy and policies. At the macro economy and macro policy under the condition of changing, real estate enterprises in order to stand out in a constantly changing market environment, need for daily operation of the cost management put forward higher requirements. In practice, due to external and internal factors, the marginal cost in business fall reduction and the marginal increase of business volume rises appear asymmetric phenomenon, scholars known as "sticky". Real estate listed companies can effectively restrain agency costs and adjust costs by strengthening fine control of expenses, so as to



reduce the stickiness effect of expenses and improve the overall profitability. Therefore, it is of great significance to clarify the relationship between economic development, policy change and fee stickiness for the real estate listed companies to conduct cost management.

2. Theoretical analysis and research hypothesis

2.1. Cost stickiness

The traditional management accounting considers the relationship between cost and business volume as a simple linear relationship from the perspective of constitutive state. Anderson Banker, and Janakiraman (ABJ)(2003)^[1] studied American listed companies from the perspective of management fees and sales expenses and found that as the company's business volume increased by 1%, its expenses increased by 0.55%. The concept of cost stickiness was proposed when the cost was reduced by only 0.35% for a 1% reduction in business volume. Threinen, Byzalov and Banker (2013)^[2] selected 20 developing and developed countries for their studies, and 19 countries had sticky operating costs, which proved the ubiquitous existence of sticky costs. Domestic research started late. Liu Hao and Sun Zheng (2004)^[3] analyzed the financial data of China's listed companies from 1994 to 2001 and found that the stickiness of expenses existed in China's listed companies. Based on the research, this paper puts forward the hypothesis:

H1: Real estate listed companies have the characteristics of sticky cost.

2.2. The impact of macroeconomics on the stickiness of costs

Calleja et al. (2006)^[4] will be multiple countries listed companies as the research object, the comparison study found that due to different national and political social environment, economic policy is different, lead to the existence of viscosity differences. Hui Lili and Xie Huobao (2016)^[5] found that the operation, financing and investment of the company were all affected by the macro-economy through the analysis of the financial data of the listed companies listed on the a-share of the manufacturing industry. However, the non-efficient investment will cause the company to accelerate the increase of expenses in the condition of uncertain future earnings, making the cost stickiness rise.

On macroeconomic environment, if enterprises operating income fell, the management based on the expected macroeconomic situation, will defer to resources scale down measures, slow down the cost to reduce the speed, thus causing cost viscous deterioration. On the contrary, in the macro-economic downturn environment, the management will quickly adjust the existing resources of the enterprise, reasonably allocate them, and reduce the cost, thus restraining the cost stickiness. Therefore, the hypothesis is proposed:

H2a: Macroeconomics and cost stickiness are positively correlated

In the environment of high inflation, the cost of materials, labor and other costs of real estate enterprises will also be higher than that of low inflation. So, if inflation is high, enterprise revenue declines, due to the high limit of material, human and other cost level, degree of decline than in the low level of inflation is small, the cost of loss when the cost to meet the management goal, lead to cost increase viscosity. Therefore, the hypothesis is proposed:

H2b: There is a positive correlation between inflation and cost stickiness.

2.3. The influence of industrial policy and monetary policy on cost stickiness

Wu Junmin et al.(2012)^[6] took China's listed companies as the research objects. Through the analysis of ten years' financial data, they found that the looser monetary policy is, the greater the stickiness of enterprise expenses. Jiang Feitao et al.(2010)^[7] believed that the government would intervene in the market through macro-control and replace the free mechanism of the market itself. Bi Xiaofang (2015)^[8] believe that the government in formulating industrial policies, related signaling to the capital markets, investors and management to industry estimate is higher than the actual optimistic about the future.

For industrial policy perspective, as China's real estate market is not perfect, the government will directly intervene in the market in the form of industrial policy and replace the market mechanism with the government's choice. Industrial policy, however, can not affect the property market supply and demand mechanism, therefore, in the industrial policy did not reach expected effect of regulation, the government will be a short period of time continuous guidance policy, forced in the direction of market development direction to the industrial policy adjustment, such as table 1. Therefore, the direction of industrial policy control is finally reflected by the sales area and the sales price of the real estate market. On the other hand, when the market gets cold, with the introduction of stimulus industrial policies, it will send a positive signal to the market, causing the management to make overly optimistic industry estimates, resulting in excessive investment. When the market is overheating, the government will adopt more stringent industry standards such as tight industrial policy, the moderate slowed the rate of increase in sales area and the sales price, to cool the market and management based on negative expectations, will adjust the configuration of resources, reduce costs, their viscosity decreases. Therefore, the hypothesis is proposed:

H3a: Tight industrial policy will inhibit the cost stickiness; Stimulative industrial policy can aggravate cost stickiness.

For monetary policy perspective, under the loose monetary policy environment, on the one hand, the money supply will increase, the enterprise from the money market, capital market and other different channels are more likely to get more money, with the hands of management can control the amount of capital increases, will be lessened to the enthusiasm of cost management, cost increase viscosity. On the other hand, the currency is likely to overshoot, driving up inflation, making it more difficult for enterprises to manage expenses and increasing the stickiness of expenses. Therefore, the hypothesis is proposed:

H3b: Tight monetary policy will inhibit the stickiness of costs; Loose monetary policy will increase the stickiness of fees.

Table1. Market sales and price performance under the control of industrial policy and monetary policy

YEAR	Policy Direction	The Main Policy	Control Purpose	Sales Volume, Housing Price Changes	Whether the policy direction is consistent with the market performance
2007-2008	Tighten/steady	2007.3-8 The central bank raised interest rates four times 2007.9 second home down payment limit of 40%	Stable house prices	House prices fell sharply after a brief pause	YES
2009-2010	Stimulus/loose	2008.10 The central bank's new policies support real estate 2008.12 《Some opinions on promoting the healthy development of the real estate market》 2010.9 Limit the purchase	The government changed from "controlling the housing market" to "saving the housing market"	Prices and trading volumes rose	YES
2011-2013	Tighten/steady	2011.1 Down payments on second homes rose to 60%, 1.1 times the benchmark rate 2013 strengthen housing construction	Curb price rises	House prices have been suppressed, but the pressure is still on	YES
2014-2016	Stimulus/stability	2014.9 "930" Mortgages New Deal 2016.3 The "two sessions" regulation and control will be adjusted for the city's policy to remove inventory	Destocking, the establishment of real estate control long-term mechanism	Prices and trading volumes first fell, then rose as never before	YES
2016-2017	Tighten/Tighten	2016.9 "930" New Deal 2016.10 Limit purchases limit loans	To curb the rapid rise of housing prices in first - and second-tier cities and discourage speculation	Prices and trading volumes were subdued	YES

Source: Founder Securities

3. Study Design

3.1. Sample selection and data sources

This paper samples the company's financial indicators selection in the CSMAR data in the database, macro economic growth (GDP), the consumer Price index (CPI), commercial housing sales Area (Area), commodity house average sales Price (Price) selection in China statistical yearbook, broad money supply (M_2) selection of the people's bank of China survey statistics division statistics. Among them, the procedures for selecting the sample company's management and marketing expenses and operating revenue are as follows:

1. Data of real estate listed companies listed in Shanghai and Shenzhen A shares before 2007 from 2007 to 2017;
2. Sample enterprises of ST and *ST during the period of elimination;
3. Sample enterprises with abnormal and missing observation values during this period are excluded.

After screening, the final sample of real estate listed companies is 104, a total of 1,144 sample observation values.

3.2. Model design and variable definition

3.2.1. Cost viscosity measurement model

This paper uses Anderson et al.(2003) proposed the cost stickiness test model to test whether there is cost stickiness in real estate listed companies. The specific model is as follows:

$$\ln\left(\frac{SG \& A_{i,t}}{SG \& A_{i,t-1}}\right) = \alpha + \beta_1 \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) + \beta_2 \cdot dummy \cdot \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) + \varepsilon_{i,t} \quad (1)$$

In model (1), if there is cost stickiness, then $\beta_1 > \beta_1 + \beta_2$, that is, $\beta_2 < 0$, and the greater the $|\beta_2|$, the greater the cost stickiness.

3.2.2. The influence model of macroeconomics on cost stickiness

In order to test H2, on the basis of logarithmic model, the measurement indicators of macro-economy are added: annual GDP growth rate (GDP), inflation rate (CPI). Therefore, The specific model is as follows:

$$\begin{aligned} \ln\left(\frac{SG \& A_{i,t}}{SG \& A_{i,t-1}}\right) = & \alpha + \beta_1 \cdot \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) + \beta_2 \cdot dummy \cdot \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) \\ & + \beta_3 \cdot GDP \cdot dummy \cdot \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) + \beta_4 \cdot CPI \cdot dummy \cdot \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) + \varepsilon_{i,t} \end{aligned} \quad (2)$$

In model (2), β_3 and β_4 are respectively negative, H2a and H2b are supported.

3.2.3. The influence model of industrial policy and monetary policy on cost stickiness

To test the H3, adding industrial policy measures: commercial housing sales Area of growth (Area), the growth rate of commercial house average sales Price (Price), measurement of monetary policy: broad money growth rate (M_2). So the specific model is as follows:

$$\begin{aligned} \ln\left(\frac{SG \& A_{i,t}}{SG \& A_{i,t-1}}\right) = & \alpha + \beta_1 \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) + \beta_2 \cdot dummy \cdot \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) + \\ & \beta_3 \cdot Area \cdot dummy \cdot \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) + \beta_4 \cdot Price \cdot dummy \cdot \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) \\ & + \beta_5 \cdot M_2 \cdot dummy \cdot \ln\left(\frac{Re \ v_{i,t}}{Re \ v_{i,t-1}}\right) + \varepsilon_{i,t} \end{aligned} \quad (3)$$

In model (3), β_3 , β_4 and β_5 are respectively negative Numbers, H3a and H3b are supported. The definition and calculation of related variables involved in this paper are shown in table 2.

Table2. Correlation Variable Definition

Variable Symbol	The Variable Name	Variable Definitions
$\ln(SG\&A_{i,t})/\ln(SG\&A_{i,t-1})$	The change range of SG&A	$\ln(\text{The sum of sales and management expenses of annual} / \text{The sum of sales and management expenses of the previous year})$
$\ln(Rev_{i,t})/\ln(Rev_{i,t-1})$ dummy	The change range of operating income Virtual variable	$\ln(\text{Annual operating income} / \text{Operating income last year})$ When the Annual operating income is less than the previous year's operating income, take 1, otherwise take 0
GDP	Macroeconomic growth rate	The growth rate of gross domestic product represents the macroeconomic situation
CPI	Inflation rate	The inflation rate represents the macroeconomic situation
M ₂	Broad money supply	Broad money supply represents monetary policy
Price	Housing price growth rate	The rate of increase in housing prices represents industrial policy
Area	Sales area growth rate	The growth rate of sales area represents the industrial policy

4. Sample descriptive descriptions

4.1. Sample descriptive description

Table 3. Descriptive Statistics

Unit: ten thousand yuan

	Variable symbol	Valid data	The average	The median	The standard deviation	The minimum value	The maximum value
Operating income	Rev	1144	640422.9019	189590.6796	2118300.164	75.72	29017415.2
Sale and management expense	SG&A	1144	45585.4731	15894.303	115712.9386	443.8	1512769.54
Expense/income	SG&A/Rev	1144	0.2395	0.0823	1.62775	0.01	44.55
The change range of operating income	$\frac{\ln(Rev_{i,t})}{\ln(Rev_{i,t-1})}$	1040	0.1393	0.1049	0.38635	-1.86	4.06
The change range of SG&A	$\frac{\ln(SG\&A_{i,t})}{\ln(SG\&A_{i,t-1})}$	1040	0.1522	0.1246	0.76248	-4.16	7.54

Table 2 shows the descriptive statistics of the study variables involved. Of the 1,144 effective observation data, the average business revenue was RMB 6,404.23 million and the average

management and marketing expenses were RMB 455.85 million. The average proportion of management and sales expenses in sales revenue is 23.95%, the median is 8.23%, and the standard deviation is 1.627. The average change of management and sales expenses and operating income was 15.22% and 13.93% respectively, indicating that the listed real estate companies had certain fee stickiness.

4.2. Testing and analysis of hypotheses

4.2.1. Testing and analysis of hypothesis H1

The regression results are shown in table 4:

Table 4. the Stickiness of Management and Marketing Expenses Regression Results

$\alpha(\text{constant})$	β_1	β_2	Adj-R ²	F-value
0.076*** (5.951)	0.585*** (17.07)	-0.115** (-3.35)	0.569	492.377

Note: T test values are shown in brackets. ***, ** and * respectively represent significant at the confidence level of 1%, 5% and 10%.

In the model, the α 、 β_1 and β_2 all passed the significance test, and $\beta_2 < 0$. Through regression analysis, it can be seen that: $\beta_1 = 0.585$, while $\beta_2 = -0.115 < 0$. Conversely, when the operating income of real estate listed companies decreases by 1%, the corresponding management and marketing expenses will be reduced by 0.47%. The expected hypothesis H1 is validated.

4.2.2. Testing and analysis of hypothesis H2

The regression results are shown in table 5:

Table5. Regression Results of Macroeconomic Effect on the Stickiness of Management and Marketing Expenses

$\alpha(\text{constant})$	β_1	β_2	β_3	β_4	Adj-R ²	F-value
0.074*** (5.784)	0.588*** (17.144)	-0.355** (-2.226)	0.309* (1.825)	-0.084* (-1.788)	0.571	497.572

Note: T test values are shown in brackets. ***, ** and * respectively represent significant at the confidence level of 1%, 5% and 10%.

Among them, the $\beta_3 = 0.309 > 0$, the empirical results and assumptions H3a does not conform to, appear such reasons may be: macroeconomic situation upside, management form optimism for the future development, theoretical perspective will cost more. But, managers will make full use of the macroeconomic environment, follow the trend of development of enterprises, the management will pay more attention to improve the company's overall level of management, strengthen the cost management ability, fundamentally weaken the viscosity.

$\beta_4 = -0.084 < 0$, H3b is verified. Inflation rate at a higher level, the raw material (steel, cement, building materials, etc.), labor costs also increase, when enterprises operating income fell by a higher level of other fees such as materials, artificial constraints, thus it is difficult to achieve expected goal of cost management, lead to cost increase viscosity.

4.2.3. Testing and analysis of hypothesis H2

The regression results are shown in table 6:

Table6. Regression Results of Macro-policy on the Stickiness of Management and Marketing Expenses

$\alpha(\text{constant})$	β_1	β_2	β_3	β_4	β_5	Adj-R ²	F-value
0.075*** (5.955)	0.586*** (17.204)	-0.488*** (-5.235)	-0.371** (-3.257)	-0.084** (-3.209)	-0.221* (-2.367)	0.584	483.007

Note: T test values are shown in brackets. ***, ** and * respectively represent significant at the confidence level of 1%, 5% and 10%.

From the perspective of industrial policy, $\beta_3 = -0.371 < 0$, $\beta_4 = -0.452 < 0$, assuming H2a is verified. As the main impact of industrial policy as a result, when the stimulus of regulation and control policy compared with industrial policy tightening, sales area and the sales price growth rate increased, the enterprise the management of cash flow also will increase, the enterprise cash levels and is closely related to the enterprise agency problems, management often use improper handling of cash to seek personal interests and realize the managers self-interest behavior, and this agency problem is eroding the enthusiasm of the cost control management, lead to greater cost stickiness.

From the perspective of monetary policy, $\beta_5 = -0.221 < 0$, assuming H2b is verified. At the macro level, a higher growth rate of broad money supply will increase the probability of excess money and increase the risk of inflation, thus deepening the cost stickiness. At the enterprise level, real estate enterprises can obtain more capital, and the adjustment of idle capital will generate a new round of adjustment costs, thus increasing the cost stickiness of enterprises.

5. Conclusions

Based on the data of 104 real estate enterprises listed in Shanghai and Shenzhen from 2007 to 2017, the following conclusions are drawn:

1. During 2007-2017, there was a problem of stickiness in fees in real estate listed companies.
2. In terms of macro-economy, macro-economic growth and inflation have different effects on the stickiness of real estate listed companies. Among them, when the macro economy is good, the overall corporate governance level of real estate enterprises is significantly improved, the cost management ability is correspondingly improved, and the cost stickiness is decreased rather than increased. Inflation leads to increased stickiness in costs.
3. In terms of macro policies, different industrial policies and monetary policies have different effects on the stickiness of real estate listed companies. When the policy control tends to tighten and the monetary policy tends to be stable, so as to stabilize the market development, the cost stickiness will be weakened. On the contrary, when the regulation policy tends to stimulate and monetary policy tends to be loose, so as to accelerate the development, the cost stickiness increases greatly.

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