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## Empirical Research of the Cost Stickiness Behavior under Opportunism Incentives

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**Abstract:** Cost stickiness is an important economic phenomenon and an important factor that affects the business performance. Based on the classical Change Model of Anderson *et al.* (2003), this study analyzes and examines the impact of equity nature and the opportunism incentives from the management on the cost stickiness of listed companies in China. One of the features of this study is that it analyzes the influence of opportunism incentives on cost stickiness from the perspective of equity nature. According to the research results, the phenomenon of cost stickiness exists in most of the listed companies and the existence of opportunism incentives intensifies the cost stickiness behavior. Meanwhile, compared with the non-state-owned listed companies, the cost stickiness behaviors that happened in the state-owned companies are more serious, and thus are more likely to be influenced by the opportunism incentives.

**Key words:** Cost stickiness, the nature of equity, opportunism incentives

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### INTRODUCTION

Traditional theory of cost behavior argues that cost behavior is symmetric for activity increases and decreases, costs are proportional to the cost drivers, the basic model is  $y = a + bx$  (Noreen, 1991). But traditional cost behavior model is built on the ideal of production and operation; it is inconsistent with the reality of cost behavior. The impact that many objective and subjective factors of management behavior and expectations in reality have on cost management is not taken into account. Gradually, scholars have found that the limitations of cost behavior model are increasingly apparent in real businesses; more and more scholars have questioned the traditional cost theory (Banker and Johnston, 1993). Finally, by studying 7,629 United States listed company on "selling expenses, general expenses and administrative expenses (SG and A), Anderson *et al.* show that cost increases more when activity rises than decreases less when activity falls by an equivalent amount, thereby, they made it clear for the first time about the concept of "cost stickiness" (Anderson *et al.*, 2003). Cost stickiness is that the marginal rate of change of cost is asymmetric in the direction of business activity change. As inputs about business managers for production and business activities, cost directly reflects the situation of business decision-making. Therefore, cost control has become an important part of the daily management of the company; a study of cost behavior not only contributes

to having an insight into the effectiveness on the performance of enterprise cost management, but also provides reference for scientific decision-making of related interest groups. Because cost stickiness directly reflects managers' managerial behaviors and ultimately affects the performance of the company, therefore, cost stickiness behavior is a question which must be answered in the process of perfecting corporate governance and improving performance.

### LITERATURE REVIEW

The research of cost stickiness in abroad mainly reflects in the basic characteristics, causes, effect factors and economic consequences.

About the basic characteristics of cost stickiness, Subramanian and Weidenmier compare stickiness of cost across different industries; they find that manufacturing is the stickiest industry (Subramanian and Weidenmier, 2003). Using a sample of 3500 companies from 1988-2004, Thomas *et al.* find that costs of French and German firms are stickier than costs of UK and US firms (Calleja *et al.*, 2006). Analyzing a sample of 189 hospitals from 1986 to 1989, Balakrishnan *et al.* infer that costs related to core business exhibit greater stickiness relative to costs in other department (Balakrishnan and Gruca, 2008). In addition, cost stickiness has a characteristic of Anti-Stickiness (Weiss, 2010).

Concerning the causes and effect factors of cost stickiness. At present, foreign study mainly analyzes the causes of cost stickiness from transaction cost theory, agency theory and incomplete contract theory, it indicates that the key factors of cost stickiness are resource adjustment costs, management expectation and agency problem.

The economic consequences of cost stickiness: Banker and Chen established the model (CVCS) for predicting earnings based on cost variability and cost stickiness, the study finds that comparing to the traditional model with the use of the financial statements information of earnings forecast, CVCS model predicts profitability stronger, and have a higher information content (Banker and Chen, 2006).

The domestic research on cost stickiness mainly focuses on the existence, influence factors and causes. With the analysis of accounting data during 1994-2001 from 292 Chinese listed companies; Sun and Liu find that there is cost stickiness in Chinese listed companies indeed, arguing that cost stickiness of listed companies may exists "opportunism" factor (Sun and Liu, 2004). Cui *et al.*, through a study find that there is negative relation between cost stickiness and the degree of marketability, for state-owned enterprises, the negative correlation is more obvious (Cui, 2008).

From the existing literature, most foreign scholars on the cost stickiness of the studies, mainly from various aspects to extent the cost stickiness theory, but compared with foreign countries, domestic literatures are few about the study on cost stickiness. Although, current research on cost stickiness about the causes, impact factors and control measures has an achievement, but still has to constantly explore, to get more experience for support.

## RESEARCH HYPOTHESES AND TEST MODEL

The theory of free cash flow is proposed by American Raba baud, Johnson *et al.* (1980) of the 20th century. Free cash flow generated by the enterprise is the remaining cash flows after meeting the investment needs. Judging from the existing literature studies, the opportunism incentives as well as the empire state building incentives of management has used the free cash flow (Jensen, 1986; Shleifer and Vishny, 1986; Xu and Zhang, 2009). We propose the following hypothesis:

- H1: The degree of SG and A cost stickiness is positively associated with a company's FCF:

$$\ln(SG \text{ and } A_{i,t} / SG \text{ and } A_{i,t-1}) = \beta_0 + \beta_1 \ln(Rev_{i,t} / Rev_{i,t-1}) + \beta_2 \times D_{i,t} \times \ln(Rev_{i,t} / Rev_{i,t-1}) + \varepsilon_{i,t} \quad (1)$$

$$\ln(SG \text{ and } A_{i,t} / SG \text{ and } A_{i,t-1}) = \beta_0 + \beta_1 \ln(Rev_{i,t} / Rev_{i,t-1}) + \beta_2 \times D_{i,t} \times \ln(Rev_{i,t} / Rev_{i,t-1}) + \beta_3 \times FCF_{i,t-1} \times D_{i,t} \times \ln(Rev_{i,t} / Rev_{i,t-1}) + \varepsilon_{i,t} \quad (2)$$

The coefficient  $\beta_1$  in model (1) measures the percentage increase in the dependent variable with one percent increase in sales revenue;  $D_{i,t}$  is a dummy variable which takes the value 1 when revenues decrease and the value 0 otherwise, so  $\beta_1 + \beta_2$  measures the percentage decrease of selling and administrative expenses in the dependent variable with a one percent decrease in sales revenue. According to the definition of cost stickiness, under condition of  $\beta_1 > \beta_1 + \beta_2$ , there is cost stickiness in the enterprise. The model (2) adds the variable of free cash flow, if the cost stickiness behavior contains the opportunism incentive factors, then  $\beta_3 < 0$ , that is  $\beta_1 > \beta_1 + \beta_2 + \beta_3$ .

Theory of property rights argues that property owners of private enterprises have right to possess the remaining profits of enterprises, they have a strong incentive to improve the economic efficiency of enterprises, therefore, private enterprises is stronger than state-owned enterprises to improve the economic efficiency of enterprises on the profit incentive. Different corporate property will generate different types of corporate performance and agency cost, cost stickiness is reflections of hidden agency costs, therefore, different ownership of enterprises, there must be different cost stickiness (Zhou, 2008). we propose the following hypothesis:

- H2: Compared with non-listed state-owned companies, State-owned listed companies cost stickiness affected by opportunism incentives more greater

To test the above hypotheses, we built the following models:

$$\begin{aligned} \ln(SG \text{ \& } A_{i,t} / SG \text{ \& } A_{i,t-1}) = & \\ \beta_0 + \beta_1 \ln(Rev_{i,t} / Rev_{i,t-1}) & \\ + \beta_2 \times D_{i,t} \times \ln(Rev_{i,t} / Rev_{i,t-1}) & \\ + \beta_3 \times FCF_{i,t-1} \times D_{i,t} \times \ln(Rev_{i,t} / Rev_{i,t-1}) & \\ + \sum_{n=4}^9 \beta_n \times Control_{i,t} \times D_{i,t} \times \ln(Rev_{i,t} / Rev_{i,t-1}) + \varepsilon_{i,t} & \end{aligned} \quad (3)$$

We define explained variables as the log of the ratio of the SG and A cost in the current period to the SG and A in the previous period; explanatory variables are defined as the log of the ratio of the current sales revenue to the previous sales revenue;  $D_{i,t}$  is a dummy variable, which takes 1 when  $Rev_{i,t}$  is lower than  $Rev_{i,t-1}$ , otherwise takes 0;  $FCF_{i,t-1}$  is equal to the ratio of net cash flow from operating activities and the total assets.

On the basis of existing literature analysis, this study considers the equity; board governance; financial; corporate governance and industry, the model (1) controls the following elements.

CR means the ownership concentration; SIZE refers to the size of the Board; it is equal to the total number of the Board; MH is equal to the shareholding.

In addition, from the financial level, this study controls the variable of capital denseness and dummy variables of IND and YEAR.

To ensure the integrity of research data, before extracting Shenzhen and Shanghai A-share listed companies sample data for the period 1999-2008, we filter the list excluding the following companies: (1) Companies in the finance and insurance industries, (2) Companies that issue both A-shares and B-shares, (3) Companies that delisted or conversed in 2012, (4) Companies marked with \*ST or ST, (5) Companies whose revenue, sales costs and management costs are less than or equal to zero and revenue is less than or equal to SG and A, (6) Companies which have not reported relevant information. Through the above processing, we obtain 3332 sample values. All sample data utilized in this article are extracted from the database CSMAR and check some data with the annual report of the enterprise. Industry classification refers to the industry classification standard of China Securities Regulatory Commission (CSRC), excluding the financial industry, there are 12 industries. Because the scale of manufacturing listed companies is too large. Therefore, this article makes a classification for the manufacturing industry classification. Finally, the study uses the first letter of industry code to classify companies' industry, dividing them into 19 industries.

## EMPIRICAL TEST RESULTS

Table 1 reports the regression results of the total sample, the model 1 that free cash flow is not taken into

consideration, the estimated value of  $\beta_1$  of  $\ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$  is 0.690, this indicates that SG and A cost increase by 0.69 percent per 1 percent increase in sales revenues; the estimated value of  $\beta_2$  of  $D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$  is -0.562 for the total sample. The combined value of  $\beta_1 + \beta_2 = 0.128$  indicates that SG&A cost decrease by about 0.128 percent per one percent decrease in sales revenues; moreover,  $\beta_1$  and  $\beta_2$  are significant under one percent level. The results indicate that SG and A cost stickiness is robust in total sample. Seeing the model 2 in Table1, the coefficient on the FCF interaction term is significantly negative at the 1 percent level with a one-tailed test (coefficient = -0.037,  $t = -2.135$ ). The result is consistent with hypothesis 1.

Table 2 reports the sub-sample regression results. The coefficient of  $\text{FCF}_{i,t-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$  for the state-owned listed companies subsample is -0.075 and is significant under one percent level, this indicates that SG&A cost increase by 0.688 percent per one percent increase in sales revenues; the combined value of  $\beta_1 + \beta_2 + \beta_3 = -0.021$  indicates that SG&A cost decrease by about -0.021 percent per 1% decrease in sales revenue. Namely when revenues decrease, SG and A cost of state-owned listed companies does not decline but shows a small growth, and shows strong cost stickiness. The coefficient of  $\text{FCF}_{i,t-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$  for the non-state-owned listed companies subsample is -0.047 and is significant under five percent level, is significant under one percent level, this indicates that SG and A cost increase by 0.684% per 1% increase in sales revenues; the combined value of  $\beta_1 + \beta_2 + \beta_3 = 0.284$  indicates that SG and A cost decrease by about 0.284% per 1% decrease in sales revenue. Therefore, regardless of the state-owned listed companies and non-state-owned listed companies, the effect of FCF on SG and A cost stickiness is positive, but the free cash flow impact on the cost stickiness of state-owned listed companies is significantly higher than that of non-state-owned listed companies, which is consistent with hypothesis 2.

Table 1: Regression results of the total sample

Variables	Model 1		Model 2	
	Coefficient	t-value	Coefficient	t-value
$\ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$	0.690	35.724***	0.691	35.750***
$D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$	-0.562	-5.063***	-0.459	-3.791***
$\text{FCF}_{i,t-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$			-0.037	-2.135**
$\text{CapRation} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$	-0.031	-1.251	-0.037	-1.490
$\text{SIZE}_{i,t-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$	0.310	3.088***	0.237	2.240**
$\text{MH}_{i,t-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$	-0.210	-1.513	-0.022	-1.569
$\text{CR}_{i,t-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{i,t-1})$	0.084	2.444**	0.072	2.047**
IND	Control	Control		
YEAR	Control	Control		
Sample size	833	833		
F value	293.622	252.597		
Adjusted R <sup>2</sup>	0.345	0.346		

\*Correlation is significant at the 0.01 level (1-tailed), \*\*Correlation is significant at the 0.05 level (1-tailed), \*\*\*Correlation is significant at the 0.1 level (1-tailed)

Table 2: Sub-sample regression results

Variables	State-owned listed companies		Non-state-owned listed companies	
	Coefficient	t-value	Coefficient	t-value
$\ln(\text{Rev}_{it}/\text{Rev}_{it-1})$	0.688	28.606***	0.684	22.749***
$D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{it-1})$	-0.634	-3.868***	-0.353	-1.828**
$\text{FCF}_{it-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{it-1})$	-0.075	-3.618***	-0.047	-1.657**
$\text{CapRation}_{it-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{it-1})$	-0.070	-3.281***	-0.111	-2.649***
$\text{SIZE}_{it-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{it-1})$	0.345	2.287**	0.271	1.672**
$\text{MH}_{it-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{it-1})$	-0.005	-0.260	-0.019	-0.885
$\text{CR}_{it-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{it-1})$	0.242	4.596***	-0.047	-0.909
IND	Control			
YEAR	Control			
Sample Size	1768	1564		
F Value	163.034	105.766		
Adjusted R2	0.391	0.319		

\*Correlation is significant at the 0.01 level (1-tailed), \*\*Correlation is significant at the 0.05 level (1-tailed), \*\*\*Correlation is significant at the 0.1 level (1-tailed)

In addition, from the point of control variables, the coefficient of  $\text{CapRation}_{it-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{it-1})$  for the state-owned listed companies subsample is -0.070, and the coefficient of  $\text{CapRation}_{it-1} \times D_{it} \times \ln(\text{rev}_{it}/\text{Rev}_{it-1})$  in non-state-owned listed companies is -0.111, they are all significant under one percent level. It shows that CapRation has played a catalytic role in SG and A for the two types of enterprises, which is the same as previous studies. The coefficients of  $\text{SIZE}_{it-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{it-1})$  for the state-owned listed companies subsample and the non-state-owned listed companies subsample are, respectively 0.345 and 0.271; they are all significant under 5% level. It shows that SIZE has played a weakening role in SG and A for the two types of enterprises, which is more obvious in the non-state-owned listed companies subsample. The coefficients of  $\text{MH}_{it-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{it-1})$  are all negative and insignificant, this may be due to shareholding ratio of executives in China's listed corporation is too low. The coefficient of  $\text{Cr}_{it-1} \times D_{it} \times \ln(\text{Rev}_{it}/\text{Rev}_{it-1})$  for the state-owned listed companies subsample is significantly positive at the five percent level with a one-tailed test (coefficient = 0.242,  $t = 4.596$ ). It indicates that the ownership concentration plays a suppressive role in state-owned listed companies, but does not play a suppressive role in non-state-owned listed companies. It also shows the way of reducing cost stickiness will be different while the nature of company is different.

## CONCLUSIONS AND ENLIGHTENMENT

The study found that: (1) Since 2008, cost stickiness phenomenon of listed companies in China has still existed. But compared with the previous years, the degree of cost stickiness decreased. However, compared with foreign countries, it is still strong. Sun and Liu carried on the analysis to the 1994-2001 year data of 292 listed Corporation, found that cost stickiness existed in China's

listed Corporation, SG and A cost increase by 0.559% per 1% increase in sales revenues; SG and A cost increase by 0.0578 percent per 1 percent increase in sales revenues (Sun and Liu, 2004); we can see from the full sample regression results, the conclusion of this study is that SG and A cost increase by 0.690% per 1% increase in sales revenues; SG and A cost increase by 0.128% per 1% increase in sales revenues. The reason for this phenomenon, on the one hand, may be due to the governance of listed companies in our country has improved; the government effect obtained the good display. On the other hand, it seems that the impact of the financial crisis in 2008, a sense of crisis of enterprise has been strengthened, while revenue increases slowly, enterprises prefer to reduce the daily management expenditure. Secondly, compared with the study result by Anderson that the studied corporations' stickiness of cost behavior, showing that the behavior of cost stickiness in China's listed corporations is more serious than U.S., which can be attributed to the differences of national supervision mechanism and corporate governance model. (2) On the basis of existing research results, we use empirical test to study that cost stickiness of the listed companies in our country, which are affected by the opportunism incentives. At the same time, because of the particularity of state-owned listed companies, opportunistic incentives are more prominent. So, compared with non-state-owned listed companies, its cost stickiness is affected more by the opportunism incentives.

The study also gives us some enlightenment. Due to the different nature of property rights of enterprises, the influence on the degree of cost stickiness is different, and therefore, the way of government also should be different. From the regression results of research, the behavior of cost stickiness in China's state-owned listed companies is more serious, because it is influenced by the free cash flow, ownership structure, the board governance and so on. Enterprises should make free cash flow management

and control, and should pay attention to adjust the ownership structure of state-owned enterprises and optimize the board size.

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