Research on the Influence of Free Cash Flow and Board Governance on the Stickiness of Expenses in State Owned Enterprises under Mixed Reform

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Abstract: The economy has flourished since China's reformation and opening up, as it has progressively intensified and thoroughly reformed businesses owned by the state. In recent years, the reformation of businesses with mixed ownership has been central to numerous guidelines and the focal point of that of enterprises owned by the state. The reformation of board governance brought about by this hybrid reform is crucial to enhancing the efficacy of state-owned enterprise governance. As one of corporate governance's crucial elements, board governance will have a certain impact on cost control. Based on the adjustment ABJ expense stickiness test model, this paper empirics studies how the board of directors controls and supervises the management's self-interested behavior on free cash flow resources through the governance structure, thus affecting expense stickiness. The findings indicate that cost stickiness exists in companies owned by the Chinese government and undergoing mixed reformation. Free cash flow can enhance the stickiness of expenses. In the case of abundant free cash flow, improving board governance has the effect of restraining the stickiness of expenses. The outcomes of the research have significant policy implications to enhance the conversion and improvement of businesses owned by the state and the progression of high-quality enterprises.

Keywords: Mixed Reform of State-owned Enterprises; Expense Stickiness; Board Governance; Free Cash Flow

1. Introduction

State-owned enterprises bear too much policy burden due to government intervention, leading to diversification of business objectives. This kind of government-enterprise relationship is more likely to lead to management opportunism and agency problems in the context of absence of owners [1], making the reform of SOEs essential to the reform of mixed ownership. In businesses' reformation, especially those owned by the state the introduction of non-state capital by state-owned enterprises leads to the development of corporate governance supervision mechanism by private enterprises for their own interests, thus constrains the self-interested behavior of management, promotes the internal information symmetry of enterprises, and weakens the opportunism and agency problems of management.

Prior research has demonstrated that agency conflict and managerial opportunism are crucial determinants of the persistence of fees in the reform of state-owned enterprises [2].When enterprise income declines, the proportion of cost reduction is smaller than the proportion of cost increase when income increases. This asymmetry between income and cost is called the "cost stickiness" phenomenon [3]. In 2004, "cost stickiness" was proposed for the first time in the country, and the aspect that influence this concept are contract, opportunism, and efficiency [4].The opportunist view is based on the principal-agent theory, which holds that the management will still invest resources when the business income declines out of self-interest and consideration of its own interests and controllable resources when making cost management decisions. It can be seen that the cost stickiness reflects the resource allocation of enterprises and will affect the decision-making and performance of enterprises. Through the mixed reform, state-owned enterprises introduce the resources of non-state-owned enterprises, and

the psychology of shareholders of non-state-owned enterprises who tend to benefit will prompt enterprises to optimize the resource allocation, restrain the agency problem, and inhibit the cost stickiness.

Cost is the focus of state-owned enterprise reform, which has realized its essence in China's superb progress at the present time. The state-owned enterprise reform's association with cost stickiness has piqued the interest of scholars. Numerous academics concur that hybrid reforms of businesses owned by the state can reduce cost stickiness. Such type of reform has portrayed a significant function in mitigating agency issues, limiting cost stickiness, enhancing governance, and developing the formation of decisions [5]. Particularly, a constraining influence exists on a high degree of cost stickiness among enterprises owned by the state [6], and the greater the level of this reform, cost stickiness ensues [7]. State-owned enterprises that choose differentiation strategy will enhance the cost stickiness by exacerbating the problem of manager agency; Nevertheless, such hybrid reform among enterprises owned by the state can mitigate cost stickiness by limiting managers' agent-related issues [8]. In the hybrid reform of state-owned enterprises, the board of directors' governance has a significant impact on the enterprise's control of its internal governance. According to Hao Ying [9], board governance optimization has a substantial moderating influence on mixed ownership development's association with a company's performance. Specifically, the size of the board of directors, the independence of the board of directors and the degree of diligence are important channels to improve the performance of mixed-reform enterprises. Free cash flow is one of the indicators to measure enterprise performance. The scale of the board is detrimental to regulating free cash flow and increasing the expense stickiness. In contrast, segregating two top positions and increasing independent directors' share in the board can assist in controlling free cash flow and thereby reducing the such stickiness [10].

Internal control cost management is influenced by board governance and free cash flow. The principal-agent theory supports the free cash flow hypothesis. The conflict between management and shareholders for a large number of free cash flow will generate agency costs [11]. When an enterprise has rich funds, shareholders hope to use them for dividend distribution, while managers, driven by self-interest, hope to retain abundant cash flow in the enterprise as their controllable resources because their compensation is linked to the scale of the company. When enterprise sales decline, managers are unwilling to significantly reduce previously increased costs in order to maximize their controllable resources, resulting in expense stickiness. Board governance is a set of arrangements made by the institution regarding the board's composition and operation based on corporate governance that promotes its efficiency, ensures a methodical creation of decisions, and oversees management. Perfect board governance can more effectively supervise and restrict the behavior of management, so as to reduce the stickiness level of expenses

Despite the fact that numerous studies have examined cost stickiness's association with state-owned enterprises' mixed reform, a dearth of research still exists regarding the influence of board governance and free cash flow on cost stickiness in the context of the mixed reform of state-owned enterprises, leaving this study with a research gap. This study thus investigates the interrelationship between board governance, free cash flow, and expense stickiness in China's first three cohorts of listed state-owned enterprises while undergoing reformation with mixed ownership.

2. Theoretical Analysis and Research Hypothesis

2.1 Analysis of the Impact of Free Cash Flow on Expense Stickiness

Free cash flow is essential for determining a business's financial risk and value, and it is the cash that an enterprise can freely use. Due to agency problems, managers tend to keep free cash in the enterprise as a controllable resource to facilitate the development of various business activities, while owners are more inclined to use free cash for dividend distribution. In the case of intensified agency conflicts, managers will increase self-interested behaviors, resulting in higher expenses than expected, and unreasonable expenses will not be reduced when business volume declines. Resulting in increased cost

stickiness. A high free cash flow indicates that an enterprise is in good operating and financial condition without significant risks. Therefore, managers will be lazy and neglect cost control. Instead, they will focus more on the selection of high-quality investment projects, resulting in increased stickiness of costs. Therefore, the first hypothesis of this paper is put forward: Hypothesis 1: Rich free cash flow has an enhanced effect on expense stickiness.

2.2 Analysis of the Impact of Board Governance on Expense Stickiness

Rich free cash flow will cause agency problems, and imperfect corporate governance will lead to self-serving behaviors of management, resulting in expense stickiness. Board governance refers to a set of arrangements made by the institution regarding the directors' composition, performance and operation based on corporate governance that promotes its efficiency, ensures methodical creation of decision, and oversees management. It can be enhanced on four aspects: size, independent directors' proportion, the frequency of meetings, and the separation between the chairman and chief executive officer. An appropriately sized board can grant businesses with decisions that are efficient yet methodical. If it is excessively vast, there will be too many opinions and decisions, which increases the difficulty of communication, and also leads to some directors not expressing their opinions and drifting with the tide, unable to play a positive role in supervision and decision-making, which is not conducive to corporate governance. The ratio of independent directors denotes board independence. With a higher proportion of independent directors, the more stringent management behavior becomes. In addition, a reasonable number of board meetings can enable directors to actively participate in the company's operation, fully understand the company's situation, effectively and timely supervise the management's behavior, alleviate agency problems, and restrain the stickiness of expenses. Finally, the separation of the roles of chairman and CEO is an important criterion to measure the independence of the board of directors. When the chairman concurrently serves as CEO, it is more convenient for him to control the resources of the enterprise to pursue his own interests rather than to maximize the value of the enterprise. In this case, the supervisory board and the board of directors lack binding and supervising authority, thereby increasing expense stickiness.

Thus, this paper's next hypothesis is as follows: Hypothesis 2: With plentiful free cash flow, enhanced board governance decreases expense stickiness.

3. Empirical Research and Analysis

3.1 Sample Selection and Data Sources

The sample data in this paper are from the database of CSMAR. State-owned enterprises listed before January 1, 2015 under the mixed reform of Shanghai and Shenzhen A-shares are selected and samples are selected according to the following:

(1) S, ST and *ST listed companies are excluded to avoid the impact of incomplete stock reform or companies with poor financial status on the research.

(2) Excluding listed companies that issue both A-shares and B-shares.

(3) Data extreme companies whose selling expenses, administrative expenses, operating income are negative and operating income is less than the sum of marketing and control expenses during the sample period are excluded.

(4) Companies with missing or incomplete data for each variable are excluded. Through the above sample screening, the final sample is 50 mixed-reform state-owned enterprises listed on Shenzhen and Shanghai A-shares. Based on the financial data of four consecutive fiscal years from 2018 to 2021, SPSS statistical software is used for data processing.

3.2 Definition of Variables

(1) In Growth rates of marketing expenses' association with operating income in this paper illustrates expense stickiness. In addition, marketing expense in this paper is the sum of selling expense and administrative expense, and the growth rate of marketing expense is calculated in the form of natural logarithm with the formula: Marketing expense growth rate =ln(current year's marketing expense/previous year's marketing expense).

(2)Explanatory variables are used to test the above research hypothesis. The free cash flow, operating income growth rate, and board

governance are included as explanatory variables in this paper. Board governance variables include size, independent directors' proportion, frequency of meetings, and separation of CEO and chairman.

①Growth rate of operating revenue This paper calculates the revenue growth rate in the form of natural logarithm, keeping the same unit as the growth rate of marketing and control expenses. The calculation formula is: Growth rate of operating revenue =ln (operating revenue of the current year/operating revenue of the previous year).

②Free cash flow variable

The following is the free cash flow formula that was applied in this paper: FCF is equal to the following: cash paid for the construction of fixed assets, intangible assets, and other long-term assets in the prior year; cash paid for the distribution of dividends, profits, or interest repayment in the prior year; net cash flow generated from operating activities in the prior year plus net cash recovered from the disposal of fixed assets, intangible assets, and other long-term assets in the prior year.

③ Board governance variables The board governance variables are selected from the level of the composition, structure, procedure and independence of the board of directors, respectively, the number of board meetings, the size of the board, the percentage of independent directors, and the separation of the roles of chairman and CEO.

(3)Control variable

The control variable d reflects the change of operating revenue. When the operating revenue in year t is lower than t-1, it is 1; otherwise, it is 0.

Table 1. Variable Definitions

Variable Category	Variable Level	Variable	Variable Code	Variable Definition
Explained Variable	Growth rate of sales and management expenses	Growth rate of sales and management expenses	ln(Expi,t/Expi,t-1)	ln(Current year's sales and management expenses/Last year's sales and management expenses)
Explanatory Variable	Operating revenue	Growth rate of operating revenue	ln(Revi,t/Revi,t-1)	ln(Current year's operating expenses/Last year's operating expenses)
	Free cash flow	Free cash flow	FCF	FCF=(Net cash flow generated from operating activities in the previous year+net cash received from disposal of fixed assets, intangible assets, and other long-term assets in the previous year-Cash paid for the construction of fixed assets, intangible assets, and other long-term assets in the previous year-Cash paid for dividends, profits or interest payments in the previous year)/Assets at the end of the last year
	Board governance	Board size	SIZE	The total number of directors on the board of directors
		Rate of independent directors	IDR	Number of independent directors/number of directors
		Number of board meetings	FR	Number of board meetings held by the company every year
		CEO duality	DUA	CEO duality=0; CEO separate=1
		CEO separate		
Control Variable	Decrease in operating income		d	When the operating income in year t is lower than year t-1, take 1; Otherwise, its value is 0

The above variable definitions and calculation formulas are shown in Table 1.

3.3 Model Construction

ABJ model is a common model for testing cost stickiness in academic circles. This paper uses ABJ model for reference and makes some modifications.

(1) Cost stickiness existence test model

$$\ln\frac{Exp_{i,t}}{Exp_{i,t-1}} = \beta_0 + \beta_1 \times \ln\frac{Rev_{i,t}}{Rev_{i,t-1}} + \beta_2 \times d_{i,t} \times \ln\frac{Rev_{i,t}}{Rev_{i,t-1}} + \varepsilon_{i,t} \quad (1)$$

According to model (1), when the operating income increases, that is, d=0, and the operating income increases by 1%, the marketing expense increases by β2;When operating income declines, di,t=1, operating income decreases by 1%, and marketing expenses decrease (β1+β2).If there is a cost viscosity, then β1 > (β1+β2), that is, β2 < 0.Therefore, if β1 is significantly negative at the confidence interval level, the existence of cost stickiness is demonstrated, and the smaller the β2, the greater the cost stickiness.

(2) Free cash flow and expense stickiness model

$$\ln\frac{Exp_{i,t}}{Exp_{i,t-1}} = \beta_0' + \beta_1' \times \ln\frac{Rev_{i,t}}{Rev_{i,t-1}} + \beta_2' \times d_{i,t} \times \ln\frac{Rev_{i,t}}{Rev_{i,t-1}} + \beta_3' \times d_{i,t} \times \ln\frac{Rev_{i,t}}{Rev_{i,t-1}} \times FCF_{i,t-1} + \beta_4' \times FCF_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

According to model (2), the free cash flow intersection coefficient β3′ is mainly observed to analyze the effect of free cash flow on expense stickiness.When the free cash flow cross-multipliers coefficient β3′ < 0, it indicates that free cash flow will enhance the expense stickiness level, and the smaller the β3′, the more significant the enhancement effect.

(3) Board governance and expense stickiness model

$$\ln\frac{Exp_{i,t}}{Exp_{i,t-1}} = \beta_0'' + \beta_1'' \times \ln\frac{Rev_{i,t}}{Rev_{i,t-1}} + \beta_2'' \times d_{i,t} \times \ln\frac{Rev_{i,t}}{Rev_{i,t-1}} + \sum_{n=3}^{6}\beta_n'' \times d_{i,t} \times \ln\frac{Rev_{i,t}}{Rev_{i,t-1}} \times GOV_{i,t,n} + \sum_{m=7}^{10}\beta_m'' \times GOV_{i,t,m} + \varepsilon_{i,t} \quad (3)$$

Where, GOVi,t, n represents the board governance level of the i company in the t year. This paper selects board SIZE (SIZE), proportion of independent directors (IDR), number of board meetings (FR) and separation of chairman /CEO (DUA) to measure the board governance level of the company.This paper analyzes the influence of board governance on cost stickiness by observing three cross-multiplying coefficients of four variables.If β "3 < 0, β" 4 > 0, β "5 > 0, β" 6 > 0, it can be verified that perfect board governance has an inhibitory effect on expense stickiness, that is, appropriate board size, high proportion of independent directors, appropriate number of board meetings and separation of chairman /CEO can inhibit expense stickiness.

3.4 Empirical Results and Analysis

3.4.1 Descriptive statistical analysis

(1) A statistical analysis of the development rates of operating income and marketing and administrative expenses Table 2 displays descriptive statistics regarding the rates of growth among operating income, marketing expenses, and control expenses.

Table 2. Descriptive Statistical Analysis of Growth Rates of Operating Income and sales and Control Expenses

Variable	Mean value	Standard deviation	Minimum	Maximum
Sales expense growth rate	0.0224	0.204	-0.818	0.957
Revenue growth rate	0.0857	0.206	-0.678	0.873

As shown in Table 2, the mean operating income growth rate for the sample businesses is 0.0857. The income development of companies owned by the state undergoing hybrid reform is generally stable. However, from the perspective of the maximum and minimum values, there is a big difference in the operating income growth rate of the sample companies. The average growth rate of PIN control expenses is 0.0224, indicating that

the PIN control expenses of sample companies are increasing. At the same time, there is a large difference in the growth rate of PIN control expenses of sample companies from the perspective of its maximum and minimum. From the average comparison of the two, the growth rate of marketing and management expenses is not equal to the growth rate of operating income, which directly reflects the existence of expense stickiness. In addition, compared with the results of Sun Zheng and Liu Hao in 2004, the stickiness of the cost has decreased.

(2) Descriptive Statistical analysis of free cash flow Descriptive statistics are made for the variable of free cash flow, and the results are shown in Table 3.

Table 3. Descriptive Statistical Analysis of Free Cash Flow

Variable	Mean value	Standard deviation	Minimum	Maximum
Free cash flow	-0.0052	0.0526	-0.194	0.157

Maximum and minimum free cash flow values are 0.157 and -0.194, respectively, with a standard deviation of 0.0526, as shown in Table 3. There are substantial variations in free cash flow between the sample companies, and some enterprises are in a certain degree of cash shortage.The average value of 0.0526 indicates that the free cash flow of sample enterprises is at a low level.

(3) Descriptive Statistical analysis of Board governance variables Descriptive statistics are made on variables related to board governance, and the results are shown in Table 4.

Table 4. Descriptive Statistical Analysis of Board Governance Variables

variable	mean value	standard deviation	minimum	Maximum
Board size (people)	9.575	2.386	5	16
Proportion of independent directors (%)	38.2	0.0678	0.308	0.667
Number of Board meetings (times)	9.465	4.039	3	36
Separation of CEO/ chairman roles	0.5	0.218	0	1

As can be seen from Table 4, The average number of directors in the sample company is about 10, with significant differences between companies, ranging from a maximum of 16 to a minimum of 5. The average proportion of independent directors is 38.2%, indicating that the independent directors of most companies meet the requirements of the CSRC on the number of independent directors.The average number of board meetings is 9.465, but there is a large gap between enterprises, with the most being 36 times and the least being 3 times. The average value of separation of chairman/CEO is 0.5, signifying that around 50% of the sample enterprises use the separation, guaranteeing the chairman's independence and facilitating management oversight.

3.4.2 Analysis of regression results

(1) Cost stickiness existence regression analysis

The existence of cost inertia is examined using Model (1), and the regression results are presented in Table 5.

Table 5. Regression Results of Cost Viscosity Existence

Variable	Coefficient	t	Sig.	VIF
Constant term	-0.037	-1.55	0	
$\ln\frac{Rev_{i,t}}{Rev_{i,t-1}}$	0.619***	3.92	0.467	2.39
$d_{i,t}\times\ln\frac{Rev_{i,t}}{Rev_{i,t-1}}$	-0.176	-0.73	0.124	2.39
$\overline{R^2}$	0.3016			
F	15.7732			

As can be seen from Table 5 above, β1 is 0.619 > 0 and β2 is -0.176 < 0, that is, when operating income rises by 1 percent, marketing and control expenses increase by 0.619 percent. When operating income reduces by 1 percent, marketing management expenses decrease by 0.470 percent (the difference between 0.646 and 0.176), signifying that enterprises owned

by the state with mixed reforms have cost stickiness.

(2) Regression analysis of sticky correlation between free cash flow and expenses

Table 6. Influence of Free Cash Flow on Expense Stickiness

Variable	Coefficient	t	Sig.	VIF
Constant term	-0.0353	-1.48	0.142	
$\ln\frac{\mathrm{Rev}_{i,t}}{\mathrm{Rev}_{i,t-1}}$	0.06197***	3.91	0.000	2.47
$d_{i,t}\times\ln\frac{\mathrm{Rev}_{i,t}}{\mathrm{Rev}_{i,t-1}}$	-0.2024	-0.87	0.384	2.43
$d_{i,t}\times\ln\frac{\mathrm{Rev}_{i,t}}{\mathrm{Rev}_{i,t-1}}\times\mathrm{FCF}_{i,t}$	-2.8431	1.45	0.150	1.15
$\mathrm{FCF}_{i,t}$	0.0804	0.20	0.845	1.14
$\overline{R^2}$	0.3105			
F	8.6475			

As can be seen from Table 6, the coefficient of free cash flow cross-multiplication item β3′ is negative, but not significant, indicating that when free cash flow is rich, the expense stickiness will be enhanced to some extent, and hypothesis 1 is verified.

3.4.3 Regression analysis of the correlation between board governance and expense stickiness

Table 7. Influence of Board Governance on Expense Stickiness

Variable	Coefficient	t	Sig.	VIF
Constant term	-0.0353	-1.48	0.142	
$\ln\frac{\mathrm{Rev}_{i,t}}{\mathrm{Rev}_{i,t-1}}$	0.6074***	3.67	0.28	2.57
$d_{i,t}\times\ln\frac{\mathrm{Rev}_{i,t}}{\mathrm{Rev}_{i,t-1}}$	0.1312	0.1	-2.561	184.29
$d_{i,t}\times\ln\frac{\mathrm{Rev}_{i,t}}{\mathrm{Rev}_{i,t-1}}\times\mathrm{SIZE}_{i,t}$	-0.0302	-0.25	-0.269	68.61
$d_{i,t}\times\ln\frac{\mathrm{Rev}_{i,t}}{\mathrm{Rev}_{i,t-1}}\times\mathrm{IDR}_{i,t}$	0.4254	-0.32	-3.014	58.1
$d_{i,t}\times\ln\frac{\mathrm{Rev}_{i,t}}{\mathrm{Rev}_{i,t-1}}\times\mathrm{FR}_{i,t}$	0.0161	0.58	-0.39	18.76
$d_{i,t}\times\ln\frac{\mathrm{Rev}_{i,t}}{\mathrm{Rev}_{i,t-1}}\times\mathrm{DUA}_{i,t}$	0.3114*	-0.73	-1.155	5.02
SIZEi,t	0.005	0.63	-0.011	1.44
IDRi,t	-0.1799	-0.88	-0.584	1.87
FRi,t	0.0066*	1.87	0	1.34
DUAi,t	-0.0542*	-1.67	-0.118	1.44
$\overline{R^2}$	0.326			
F	19.6614			

It can be seen from Table 7 that β3 "is -0.0302, which is the same as the expected symbol assumed in the research, indicating that too large board size will enhance the degree of stickiness of expenses, that is, only an appropriate board size can restrict management behavior and reduce the stickiness of expenses.β4 "is 0.4254, which is consistent with the expected symbol assumed in the research, but not significant, indicating that a higher proportion of independent directors has no significant inhibiting effect on the stickiness of expenses, which may be due to the phenomenon of independent directors' inaction, leading to independent directors' failure to play their due role in corporate decision-making.β5 "is 0.0161, which is the same as the expected symbol assumed in the study, but not significant, indicating that the number of directors' meetings has little effect on the inhibitory effect of expense stickiness, which may be because the board meetings of

listed companies are superficial and do not play a due role of supervision and checks and balances on the management.β6 "is 0.3114, statistically significant at the 1% level of confidence and concurs alongside the expected sign, signifying that the separation between the two functions increases the chairman's independence, effectively restrains the self-interested behavior of management, and reduces the stickiness of expenses. To sum up, the improvement of board governance can, to a certain extent, restrain the expense stickiness caused by management's self-interested behavior caused by free cash flow. Hypothesis 2 is verified.

4. Conclusion

Based on the ABJ model, this paper selects the 2018-2021 financial data of state-owned enterprises listed in Shanghai and Shenzhen with mixed reform of A-shares as research samples and adopts multiple regression method to study the relationship between board governance, free cash flow and expense stickiness. The empirical findings demonstrate that state-owned businesses with mixed reform experience the cost stickiness phenomenon, and the cost stickiness degree has decreased compared with the past, indicating that the mixed reform has a certain inhibition effect on the cost stickiness. The free cash flow of the business will increase management's propensity for self-serving and raise the expense stickiness. Increasing board size will raise the cost stickiness, while raising independent directors' proportion, holding reasonable meeting frequency, and separating the functions of chairperson and chief executive officer can inhibit managers' self-interest and decrease the such stickiness.

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