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The Impact of Real Earnings Management on Innovation: The Role of Top Executive Compensation

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Abstract: Innovation is the key factor to improve the competitiveness of company, with large amount of investment and high risk. Therefore, when facing the pressure of profitability, reducing research and development expenditure is a real earnings management method commonly used by top executives. R&D cuts related to real earnings management belongs to the suboptimal decision-making. Various frictions and high adjustment costs in reduction process may lead to the decline of follow-up innovation. Compensation contract is a governance mechanism for the board of directors to motivate and supervise top executives. Based on the study of the impact of real earnings management on innovation, this paper also analyzes how to design a compensation contract to better mobilize the innovation initiative of executives. This paper chooses the data of Chinese A-share listed companies from 2007 to 2019 to test the economic consequences of real earnings management from innovation perspective by using tobit model. The empirical results show that R&D cuts related to real earnings management can obstruct companies' innovation, top executive performance pay of non-state-owned enterprises has a negative impact on innovation, and equity incentive can encourage state-owned enterprise executives to improve innovation output. The conclusions highlight the potential costs of managerial manipulation of R&D expenditures to alter reported earnings, and can help to formulate economic policies and top executive compensation contracts to promote innovation.

Keywords: Real Earnings Management, Innovation, Performance Pay, Equity Incentive

1. Introduction

Real earnings management is a management decision that top executives deviate from operating activities in order to meet financial reporting objectives [1], which usually changes the understanding of stakeholders on company's performance or affects the contract results based on accounting earnings. In addition to the capital market and contractual motivation, the rules of China securities regulatory commission and the securities exchanges may also trigger earnings management that caters to the benchmark. In order to maximize personal utility, top executives of listed companies try their best to take various means of earnings management to avoid loss or continuous loss. Compared with accrual earnings management, top executives are more willing to conduct real earnings management, because the latter is a business decision, although it may hurt the value of the company, it does not violate the accounting standards [2], and it is difficult for regulators and auditors to accurately judge the nature of the transaction [3], so it is often used to meet the earnings benchmark. The most frequently mentioned behavior is to reduce the controllable expenditure, such as reducing the expenditure on R&D and advertising, delaying the implementation of new projects, etc. the existence of such upward earnings management behavior has been confirmed by a large number of literatures [1, 4, 5]. However, there are few studies on the economic consequences of real earnings management. One important reason is that the operating output needs to be closely related to the input under the influence of real activities manipulation. Choosing an innovative perspective can solve this problem.

Innovation is a high-risk activity, with long investment cycle, huge resources required and highly uncertain future returns [6], which easily makes top executives underestimate the value of the project. When top executives are faced with earnings benchmark pressure, they are likely to choose those short-term behaviors to improve the current performance, such as reducing R&D expenditure. However, innovation is the key factor to promote

the sustainable growth of the company. The company must maintain the ability to break the existing balance through innovation activities. If the innovation ability declines, the company will face the risk of being forced to withdraw from the competition. The ability of independent innovation determines the future value of the company. High-value patent output can be help to promote industrial upgrading. Under the influence of knowledge economy, it is difficult to sustain the extensive growth mode of profit-making by lowering factor prices and environmental regulation costs. In 2006, the Chinese government issued the national medium- and long-term science and technology development plan (2006-2020), emphasizing that it is necessary to improve the ability of innovation as a national long-term strategy and cultivate a number of enterprises with international competitiveness. Top executives hold residual control right of company, not only make decisions to reduce R&D expenditure, but also their operating ability and effort will affect the innovation output. When executives face the pressure of earnings benchmark, they are likely to improve the current performance through real earnings management and give up the R&D activities that are conducive to long-term performance.

Compensation contract is a governance mechanism to motivate and supervise top executives. With the help of the study on the economic consequences of real earnings management, this paper analyzes how to design a compensation contract to better mobilize the innovation initiative of executives. To answer these questions is of great significance for the government and listed companies to adjust economic policies more effectively, avoid the short-term behavior of top executives endangering the sustainable competitiveness of the company, and promote economic transformation.

The contributions are mainly reflected in the following three points: firstly, from the perspective of innovation, it is confirmed that when top executives are under short-term performance pressure. It is difficult to take into account the long-term interests. The conclusions not only enrich the research on the determinants of innovation, but also deepen the understanding of the economic consequences of real earnings management. Secondly, combined with China's institutional background, this paper analyzes the impact of executive compensation on innovation, and finds that real earnings management behavior will further reduce innovation when executives' compensation performance sensitivity is high in non-state-owned enterprises, while equity incentive of executives in state-owned enterprises can alleviate the inhibition of real earnings management on innovation. Thirdly, this conclusion also has certain application value, and puts forward some suggestions for government departments to adjust economic policies, listed companies to improve top executive compensation contract in order to enhance innovation output.

2. Theoretical Analysis and Hypothesis Development

2.1. R&D Cut Related to REM and Innovation

The shareholders of listed companies employ top executives to make decision, grant corresponding powers and pay according to performance. Through the authorization of shareholders, top executives legally execute the residual control right of the company's assets and plays a leading role in the production, sales and technological innovation of the company. The problem of information asymmetry and interest inconsistency between shareholders and managers often leads to executives' concern for personal wealth and meet short-term earnings objectives by reducing R&D expenditure.

The R&D reduction related to REM based on reporting objectives is a suboptimal decision. First of all, in the process of reducing expenditure, the inherent complexity and uncertainty of technological innovation make top executives at an information disadvantage [7]. Under the pressure of earnings, the decision to reduce R&D expenditure is likely to be carried out in a hurry, information collected in advance is less than other well planned R&D reduction decisions, and there is a lack of rigorous planning. Under normal circumstances, the reduction of R&D expenditure only involves the reduction of projects with the lowest expected surplus. If the decision-making information is incomplete, all kinds of frictions may prevent the reduction of R&D projects with the lowest NPV, which will have a negative impact on innovation. Secondly, when top executives reduce R&D expenditure to meet the earnings benchmark, it is accompanied by other potential costs, such as the adjustment of key R&D personnel caused by project termination, which may be difficult to reemploy later [8]. What's more, the resistance of some managers and departments may affect executives' efforts to reduce R&D projects with the lowest value. This kind of short-term behavior of executives is easy to cause insufficient innovation investment and endanger the company's market competitive position [9]. Based on the above analysis, this leads to the following testable hypotheses:

H1: R&D cut related to REM has an inhibitory effect on the follow-up innovation of listed companies.

2.2. R&D Cut Related to REM, Top Executive Compensation and Innovation

Shareholders can use a diversified portfolio to disperse the adverse impact of the company's unique risks on personal wealth, while human capital investment in the company cannot disperse the investment, top executives bear a higher risk of the company, so they prefer to avoid risks. Innovation projects are not only high risk, but also highly professional and confidential. External stakeholders are difficult to accurately judge the performance trend of the company, and tend to underestimate the market value of the company with large R&D expenditure. From the two dimensions of increasing risk and reducing company value, technological innovation has a negative incentive to executives, prompting them to reduce R&D expenditure. Enterprises can be divided into two groups: state-owned companies and non-state-owned companies. There are significant differences in resource endowment and innovation willingness between the two groups, so there are also differences in R&D expenditure

reduction decisions.

From the perspective of resource endowment, compared with non-state-owned companies, the government and banks give more support to state-owned companies. The special relationship between the government and the state-owned companies stems from the fact that the governments at all levels are the investors of the state-owned companies, and they can supervise the state-owned companies as the owners, decide the income distribution plan, and appoint or remove top executives. The state-owned companies bear the policy burden transferred by the government. For the needs of local government's economic development, the state-owned companies are often supported by the government in terms of resource endowment. Compared with non-state-owned companies, state-owned companies get more subsidies. In terms of debt financing, state-owned companies not only have more plant and equipment to be used as collateral, but also the government's implicit guarantee may make state-owned companies continuously obtain loans from the banking system, even if the company's profit level is very low or even in a state of loss. Under the background of government subsidies and preferential loans, the risk aversion awareness of state-owned company executives has been alleviated, and they are more willing to invest in innovative projects. The development of non-state-owned companies depends on internal accumulation and external financing to a great extent, which makes them more vulnerable to discrimination and stronger financing constraints. Higher R&D expenditure is bound to bring extra burden to non-state-owned companies. Facing the possible financial difficulties and bankruptcy risk, innovation investment is more cautious. From the perspective of innovation willingness, top executives of state-owned company are more willing to invest in innovation projects than non-state-owned company. The salary and promotion of top executives in state-owned company are determined by political level, social contribution and company performance. At present, the key point of the government's work is to improve the level of company innovation. In 2010, the Chinese government announced the "national patent development strategy (2011-2020)", which requires to promote the stable growth of the number of patent applications and improve the quality of patents. In order to better promote the national development strategy, innovation output has become an important indicator of top executive evaluation in state-owned company. Therefore, the top executives of state-owned companies and non-state-owned companies have different preferences for innovation. State owned companies are more willing to invest in innovation projects, while non-state-owned companies are cautious about innovation projects.

Executive compensation in Chinese company can be divided into performance pay and equity incentive. Different mechanisms for determining private benefits of top executives have different effects on executives' behavior. According to the principal-agent theory, contracts can clarify the rights and obligations of shareholders and executives. However, due to the existence of transaction costs and limited rationality, contracts are often incomplete, leaving room for interest game. Top executives first consider personal private benefits, and only consider the interests of shareholders when it is beneficial to themselves [10]. Top executives can make use of information advantages to seek personal benefits, but shareholders can not directly observe the behavior choice of executives, only observe some variables jointly affected by executives' behavior and other exogenous random factors, such as accounting earnings, and compensation contract is based on these observable results. Performance pay links the interests of executives with corporate performance. When top executives pursue private benefits, they have to bear the consequences of pay reduction caused by performance decline, so as to limit the opportunistic behavior of top executives. Equity incentive refers to the long-term incentive of listed companies to top executives based on their own shares. Theoretically, equity incentive can help executives who insist on innovation investment share the benefits of the company's future market value growth and alleviate agency costs. Different types of compensation have different mechanisms to determine the interests of top executives, which will inevitably affect the relationship between R&D reduction and innovation of real earnings management in state-owned companies and non-state-owned companies.

The state-owned enterprises undertake social tasks, and the performance noise is very large. Moreover, the high salary of top executives will attract public attention and cause pressure of public opinion. In reality, there is a salary control system, so the top executives of state-owned may be more concerned about non-monetary compensation such as promotion and on-the-job consumption. Compared with state-owned companies, non-state-owned companies have a single business objective, more concentrated in downstream of the industry chain, greater market competition pressure, and a closer relationship between executive compensation and corporate performance [11]. The remuneration of top executives of state-owned company is mainly linked to the business performance including the annual total profit and economic value added, according to “Measures for the Performance Evaluation of the Persons in Charge of Central Enterprises”. In addition, the reputation and job stability of top executives are also directly related to the company's performance. Performance pay system may lead to stronger motivation of real earnings management, and the success of innovation depends partly on the management ability and reasonable decision-making of top executives, which requires top executives to constantly update their knowledge structure, improve entrepreneurial ability and take greater supervision responsibility. The higher the degree of executives' performance-based pay, the more motivated they are to take short-term behavior. The reduction of real earnings management R&D in non-state-owned companies is more likely to reduce innovation.

Compared with state-owned companies, non-state-owned companies are more dependent on the capital market because of limited resources. Therefore, even if there are equity incentives, they have to consider the short-term earnings pressure. Top executives of non-state-owned company who implement equity incentive may not try their best to restrain real earnings management behavior. State-owned companies

are the main means for the government to regulate the operation of the market economy, and their business activities must be subject to the national development strategy. Whether they achieve major scientific and technological innovation achievements will also affect the assessment of state-owned company executives, and executives are more willing to invest in innovation projects. Equity incentive can link executives' personal wealth with long-term performance, and encourage executives to make innovative decisions that can improve enterprise value. In the face of earnings pressure, executives of state-owned enterprises who get equity incentive will be more cautious to reduce R&D expenditure and reduce the adverse impact on innovation. Therefore, this leads to the following testable hypotheses:

H2: when top executive performance pay of non-state-owned companies is high, the R&D cuts related to REM have an inhibitory effect on the follow-up innovation of listed companies.

H3: when the intensity of equity incentive in the executive compensation of state-owned enterprises is high, the R&D cuts related to REM can enhance the follow-up innovation of listed companies.

3. Data, Variables and Descriptive Statistics

3.1. Data

This paper starts with a sample of all A-share listed companies from 2007 to 2019, the sample data are from CSMAR database. The financial listed companies are then eliminated, because compared with other industries, the financial industry has obvious differences in classification of accounts, accounting standards and industry supervision; The data of IPO year are also excluded. Finally, this paper also excludes observations with missing values for the variables used in our benchmark analysis. All continuous variables are winsorized at the top and bottom 1% of the distribution in order to avoid the influence of extreme numbers. The final sample contains 22,585 firm-year observations.

3.2. Variables

3.2.1. Innovation

Patents are often regarded as the best information source currently available to researchers for measuring innovation performance. Compared with the number of authorized patents, the number of patent applications more comprehensively reflects the successful utilization of R&D expenditures in the early stage of companies. Chinese patent law divides patents into three types: design patents, utility patents and invention patents. Among them, invention patents have the highest degree of innovation, which reflects the achievements of key core technology output of listed companies and best reflects the quality of innovation. Because the number of invention patent applications is discrete, ln (1 + number of invention patent applications) is used to measure innovation. In view of the lag effect of R&D activities, the innovation variable in the time window of t + 1 year is constructed in order to measure the innovation achievements of listed companies.

3.2.2. R&D Cuts Related to REM

According to the suggestions of Roychowdhury (2006) [1] and Gunny (2010) [5], the equation (1) is used to estimate the decrease of abnormal R&D expenditure of listed companies.

$$\frac{RD_{it}}{TA_{it-1}} = \alpha_0 + \alpha_1 \frac{1}{TA_{it-1}} + \alpha_2 MV_{it} + \alpha_3 Q_{it} + \alpha_4 \frac{INT_{it}}{TA_{it-1}} + \alpha_5 \frac{RD_{1,t-1}}{TA_{1,t-1}} + \varepsilon_{it}^{RD} \quad (1)$$

where $RD_{i,t}$ is the current R&D expenditure of focal company i in year t, Chinese listed companies began to disclose R&D expenditure in 2007, but few companies disclosed it. The current R&D expenditure needs to be expensed or capitalized at the end of the period, and the management expenses and intangible assets accounts contain more information about R&D expenditure, Therefore, the accounts related to R&D in intangible assets and management expenses are selected to measure the innovation investment of companies with missing R&D expenditure data. $TA_{i,t-1}$ is the total assets of focal firm i in year t-1, $MV_{i,t}$ is the natural log of focal company i's market value in year t, $Q_{i,t}$ is focal firm i's Tobin's Q in year t, and $INT_{i,t}$ is the internal funds of focal firm i in year t. Equation (1) is estimated for each year and industry, where there are at least 15 companies in the industry-year group, otherwise the equation (1) can't work out the residuals. The residual ε_{it}^{RD} calculated in equation (1) measures abnormal R&D expenditure, a lower value indicates a deeper, unexpected cut in company i's R&D expenditure in year t. This paper chooses to focus on abnormal cuts to R&D, where ε_{it}^{RD} is negative, that is the abnormal decrease of R&D expenditure, and define the following:

$$RDCut_{it} = -1 \times \varepsilon_{it}^{RD} \times Indicator$$

Where $Indicator$ is a variable that equals one if $\varepsilon_{it}^{RD} < 0$ and zero otherwise. A higher value of $RDCut_{i,t}$ reflects a deeper, unexpected cut in firm i's R&D expenditure in year t.

This paper focus on how REM affects innovation output through REM-driven cuts to R&D, but there are other motivations for the abnormal reduction of R & D expenditure, such as the lack of innovation opportunities. In order to identify R&D cut that are related to REM but not to other reasons, this paper first needs to define whether a company has the motivation to meet the earnings benchmarks in a certain year. Previous studies have shown that listed companies with "little profit" are likely to use real transactions to manage earnings upward [12, 13], so this paper reasonably presume that the reduction of abnormal R&D expenditure of such companies is the result of real earnings management, and the other abnormal R&D cuts is associated

with other motivations. That is, this paper refer to $RDCut_{i,t}$ as $REMCut_{i,t}$ if the company narrowly meets or beats an earnings benchmark, and $RDCut_{i,t}$ is $OtherCut_{i,t}$ in all other cases. So $RDCut_{i,t}$ is separated as follows:

$$RDCut_{it} = \begin{cases} REMCut_{it}, & \text{if } Benchmark = 1 \\ OtherCut_{it}, & if\ Benchmark = 0 \end{cases}$$

where *Benchmark* refers to the event of matching earnings benchmarks, according to the method reported in Bereskin et al. (2018) [14], which is defined in our baseline results as the level of *ROA* being greater than or equal to zero and less than one percent or the 1-year change in *ROA* (*ROA* is defined as income before extraordinary items scaled by assets) being greater than or equal to zero and less than one percent.

3.2.3. Executive Performance Pay Sensitivity

Executive performance pay sensitivity refers to the degree of executive compensation promotion brought by performance improvement. The higher the performance sensitivity is, the stronger the incentive effect of executive compensation is. Therefore, the dummy *Cer* is equal to one. When the executive compensation and enterprise performance (*ROA*) are higher or lower than industry-year medians, it means that the compensation is sensitive to performance, otherwise it is equal to zero. Executive compensation adopts the top three executive compensation data.

3.2.4. Executive Equity Incentive Intensity

Referring to the method of bergstresser and philippon (2006) [15], this paper uses the proportion of stock price rising by 1% and stock value increment in total compensation to measure the intensity of executive equity incentive, define *Incentive* as the following equation (2):

$$Incentive_{it} = \frac{0.01 \times Price_{it} \times (Option_{it} + Stock_{it})}{0.01 \times Price_{it} \times (Option_{it} + Stock_{it}) + CashPay_{it}} \quad (2)$$

where $Price_{i,t}$ is the closing price of stock of focal company i in year t, $Option_{i,t}$ and $Stock_{i,t}$ refer to the stock options and restricted stocks held by top executives of focal company i at the end of year t, $CashPay_{i,t}$ is the cash compensation of top executives of focal company i at the end of year t, computed by the cash compensation data of the top three executives.

3.2.5. Control Variables

The following variables are also controlled in the empirical model: *OtherCut*, *NormalRD*, *Size*, *LEV*, *ROA*, *MTB*, *Age*, *Dual*, *CFO*, *Topshare* and *SOE*. Specific variable definitions are shown in Table 1.

Table 1. *Variable definitions.*

Variable	Definition
Patent	Natural logarithm of one add number of invention patent applications
REMCut	When ROA or ΔROA of focal company-year was in the range of [0, 0.01], equal to RDCut, otherwise equal to zero
Cer	When the executive compensation and enterprise performance (ROA) are higher or lower than industry-year medians, equal to one, otherwise it is equal to zero
Incentive	The intensity of equity incentive calculated according to equation (2)
OtherCut	When ROA or ΔROA of focal company-year was out of the range of [0, 0.01], equal to RDCut, otherwise equal to 0
NormalRD	R&D expenditure expectation by equation (1) estimating in each industry-year group
Size	Natural logarithm of company's total asset
Lev	Asset liability ratio
ROA	Return on total assets
MTB	The company's market value at the end of t year divided by the book value of net assets
Age	Taking the natural logarithm after subtracting the listing year of the company from the current year
Dual	When the chairman of the board concurrently serves as the general manager, it is equal to one, otherwise it is equal to zero
CFO	Net operating cash flow divided by total assets at the end of t year
Topshare	Shareholding ratio of the largest shareholder
SOE	If the company is a state-owned company, it is equal to 1, otherwise it is equal to 0

Table 2. *Summary statistics.*

Variable	N	Mean	SD	Min	Median	Max
$Patent_{i,t+1}$	22,585	0.300	0.930	0	0	8.92
REMCut	22,585	0.000	0.002	0	0	0.061
Cer	22,585	0.567	0.495	0	1	1
Incentive	22,585	0.011	0.055	0	0	0.913
OtherCut	22,585	0.004	0.006	0	0.001	0.079
NormalRD	22,585	0.020	0.017	-0.023	0.015	0.119
Size	22,585	22.048	1.335	16.2	21.90	28.5
Lev	22,585	0.458	0.510	-0.195	0.446	64
ROA	22,585	0.038	0.105	-5.07	0.038	0.775
MTB	22,585	2.563	3.126	0.142	2	16.46
Age	22,585	2.656	0.442	0	2.710	7.610
Dual	22,585	0.235	0.424	0	0	1
CFO	22,585	0.043	0.112	-10.2	0.042	0.914
Topshare	22,585	0.352	0.152	0.002	0.333	0.9
SOE	22,585	0.437	0.496	0	0	1

3.3. Descriptive Statistics

Table 2 provides the descriptive statistical results of the main variables. The mean value of Patent was 0.3, the median was 0, and the minimum was 0; the mean value is larger than the median value, indicating that some companies have not applied for invention patents, and there is a large difference in innovation output among companies. The mean value and median value of *REMCut* are both 0, which indicates that there are few companies with the characteristics of small profit and R&D expenditure lower than the average level, with the maximum value of 0.061, showing a left bias.

4. Empirical Results

Referring to the research of Bereskin et al. (2018) [14], equation (3) is used to test whether R&D cuts related to REM affects innovation, equation (4) tests the moderating effect of executive performance pay sensitivity, and equation (5) tests the moderating effect of executive equity incentive intensity. The equation also includes control variables, industry and year effects. In these equations, *Patent* cannot be less than zero, and the range is limited. It is a mixed distribution composed of a discrete point and a continuous distribution. Tobit model is selected in the empirical process.

$$Patent_{it+1} = \beta_0 + \beta_1 REMCut_{it} + \sum_{i=2}^{n} \beta_i cv_{it} + \varepsilon_{it} \tag{3}$$

$$Patent_{it+1} = \beta_0 + \beta_1 REMCut_{it} + \beta_2 REMCut_{it} \times Cer_{it} + \sum_{i=3}^{n} \beta_i cv_{it} + \varepsilon_{it} \tag{4}$$

$$Patent_{it+1} = \beta_0 + \beta_1 REMCut_{it} + \beta_2 REMCut_{it} \times Incentive_{it} + \sum_{i=3}^{n} \beta_i cv_{it} + \varepsilon_{it} \tag{5}$$

Table 3 presents estimates of this equation results in the five columns. In Columns (1), the coefficient of *REMCut* is significantly negative at the level of 1%, which indicates that R&D cut related to REM has an inhibitory effect on innovation output. Hypothesis 1 is verified. Columns (2) and (3) report the regression results of equation (4), the coefficient of *REMCut*×*Cer* is significantly negative in the group of non-state-owned companies, but not significant in the group of state-owned companies. In the non-state-owned companies with higher performance pay sensitivity, top executives' real earnings management motivation is stronger, which is more unfavorable to innovation output. Although state-owned companies are rich in resources, decision-making is constrained by multiple economic and social objectives, and top executive's evaluation measures are not limited to financial indicators. Political promotion and on-the-job consumption are also the rewards that top executives like, while performance pay has no significant inhibitory effect on innovation in the group of state-owned companies. Columns (4) and (5) report the coefficient of *REMCut*×*Incentive* is significantly positive in the group of state-owned companies, but not significant in the group of non-state-owned companies. The empirical results show that stock options encourage top executives to pursue high-risk innovation projects in order to maximize their personal wealth. Compared with state-owned companies, non-state-owned companies are more dependent on the capital market and have to consider the pressure of short-term earnings. Therefore, equity incentive has no significant effect on innovation in the group of non-state-owned companies. Hypothesis 2 and 3 are verified.

Table 3. *The effect of R&D cut related to REM on innovation.*

	(1)	(2)	(3)	(4)	(5)
	Patent $_{i,t+1}$				
	All Sample	***SOE*=1**	***SOE*=0**	***SOE*=1**	***SOE*=0**
REMCut	-72.68**	-57.46*	-122.48*	-102.02**	-49.03
	(-2.25)	(-1.77)	(-1.80)	(-2.02)	(-1.13)
REMCut×Cer		-7.49	-38.01*		
		(-0.25)	(-1.69)		
REMCut×Incentive				24.79**	-51.28
				(2.17)	(-1.24)
Control variables	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes
N	22585	9870	12715	9870	12715
Pseudo. R-Square	0.06	0.08	0.07	0.08	0.06

***, **, and * indicate that the *t* statistic is statistically significant at the 1, 5, and 10% levels, respectively. All the standard errors of regression coefficients in this paper are processed by cluster at the company level.

5. Conclusion

This paper examines the mechanism of the impact of R&D cut related to REM on innovation. Research shows that R&D cut related to of real earnings management can inhibit innovation output. The resource endowment and innovation willingness of non-state-owned companies are weak, and the higher pay performance sensitivity encourages top executives of non-state-owned companies to prefer real earnings management, which has a negative impact on innovation. Equity incentive can guide executives to pay attention to the long-term value of the company. The self-interest behavior of top executives in state-owned companies has been alleviated, which may optimize the real earnings management decisions and significantly improve the innovation output.

The conclusion is valuable for the government department to formulate policies, the suggestions are as follows: first, government departments should not blindly emphasize accounting earnings, especially relax the earnings pressure of non-state-owned companies, when formulating government subsidies, financial policies, IPO system and other economic policies. Second, when the shareholders and top executives sign the compensation contract, they should reduce the degree of compensation linked to performance and use equity incentive. Third, the board of company should appropriately increase the non-financial indicators such as innovation output when they sign a compensation contract with top executives.

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