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Product Market Competition, Motivations of R&D Expenditure Capitalization and Earnings Management

Wenjin You*

School of Economics and Management, Xidian University, Xi'an 710126, China

*972421214@qq.com

Abstract

This paper takes the financial data of the A-share manufacturing listed companies in Shanghai and Shenzhen stock markets for 2011-2017 as the research object, empirically tests the relationship between the capitalization of R&D expenditures and earnings management, and joins the external governance mechanism of product market competition. From the perspective of the motive of capitalization of R&D expenditure, this paper deeply analyzes the adjustment effect of product market competition on the relationship between R&D expenditure capitalization and earnings management. The research results show that the capitalization of R&D expenditure is a means for enterprises to manage earnings. The more intense the competition in product market, the more likely managers are to use the capitalization of R&D expenditures for earnings management. Further analysis found that under the motive of debt contract and the motive of political cost of R&D expenditure capitalization, this regulation exists, but does not exist under the motive of compensation contract.

Keywords

product market competition, R&D expenditure capitalization, motivations, earnings management.

1. Introduction

Prahalad and Hame [1] pointed out that the difference between enterprise innovation ability and technology level is the root cause of enterprise heterogeneity. The development of the market economy is inseparable from competition. Enterprises want to be in an invincible position in the increasingly fierce market competition, and must have their own core competitiveness. R&D is one of the important ways to improve the independent innovation capability of enterprises.

In order to encourage enterprises to actively innovate, increase R & D investment, reduce short-term performance pressure caused by R & D investment, and improve the transparency of research and development information disclosure, China has drawn up the "Accounting Standards for Business Enterprises No. 6 - Intangible Assets" by reference to international accounting standards. The guidelines point out that the relevant expenditures of the internal research and development projects of the enterprise should be divided into the research phase and the development phase according to the relevant progress results. Expenditure in the research phase shall be included in the current profit and loss when incurred, and the expenditure in the development phase shall be recognized as intangible assets when the five conditions are met simultaneously. The conditional capitalization in the new accounting standards has inhibited the earnings management behavior of enterprises in reducing R&D investment to a certain extent, but it has greater selectivity and flexibility than the full cost processing of R&D expenditures in the old standards. In turn, it provides more flexibility and more control for the company's earnings management. Du Rui and Li Yanxi [2] found that

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corporate R&D investment will stimulate earnings management behavior. Huang Fuguang, Li Xiwen and Zhang Kaijun [3] pointed out that earnings management not only undermines the fairness, reliability and comparability of accounting information, but also has a major negative impact on enterprise development and economic stability, and increases the market's adverse selection cost. It is of great practical significance to analyze the relationship between research and development expenditure capitalization policy choice and earnings management.

At present, scholars are mostly research on the pairing factors of R&D expenditure, earnings management and product market competition. There are few mechanisms for the discussion of the three under the same framework. Scholars' research on earnings management and R&D expenditure capitalization mainly comes from two aspects: motivation and value correlation. Most of these studies imply the following assumptions: all companies face the same external environment, but in reality different industries face different levels of competition, and As an industry information gathering platform and an external influence mechanism of corporate behavior, the product market plays an irreplaceable role in the issue of earnings management behavior of listed companies. Based on this, on the basis of analyzing the impact of R&D expenditure capitalization on earnings management, the author further explores the regulatory effect of product market competition on the relationship between the two, and provides more reference for regulators to formulate corresponding regulatory measures and improve market competition mechanism. The contribution of this paper is mainly reflected in two aspects. One is to test the regulatory effect of the fierce competitive environment on the relationship between R&D capitalization and earnings management. The other is to further analyze the adjustment mechanism of product market competition from the perspective of the three motives of R&D expenditure capitalization. This rich existing theoretical framework.

2. Literature Review and Hypothesis

Earnings management has always been a research hot spot in accounting circles, and it is an opportunistic behavior implemented by company managers to obtain personal or local interests. In theory, the conditional capitalization of R&D expenditure processing methods can provide more objective and more realistic information for stakeholders, enabling investors to have a deeper understanding of the R&D activities , and to improve confidence of external investors[4], but in fact managers have the right to choose the accounting policy of conditional capitalization, and at the same time, in the case of irregularities in R&D expenditure disclosure, it is possible for enterprises to manage earnings. Baber et al. [5] found that the greater the gap between the current earnings and the target earnings before the company's R&D expenditures are capitalized, the greater the increase in the amount of R&D expenditure capitalization, indicating that the company will use the accounting policy choices of capitalization of R&D expenditures to avoid losses or excessive declines in profits.

2.1. Capitalization and Earnings Management of R&D Expenditure with Different Motivations

With the continuous acceleration of the capital market process and the increasing intensity of competition, the capitalized R&D selection policy with manipulative space has gradually become a tool for managers to manage earnings to achieve the desired goals. In an empirical study using French companies, Anne Cazava-Jeny et al. [6] found that company management would capitalize on R&D expenditures in order for the company to meet certain conditions or thresholds. Watts and Zimmerman [7] put forward three major assumptions about the economic motives of accounting policy choices: compensation plan assumptions, debt contract assumptions, and political cost assumptions. Later, the scholars combined the three hypotheses with the choice of research and development policies, tested the above three hypotheses, and further explored the potential motives for capitalization R&D policy choices.

ISSN: 2688-9323

Capitalization and earnings management of R&D expenditure under the motive of compensation contract. Agency Theory believes that people are rational economic people. When managers face the dual pressures of employment risk and business risk, they will use the information asymmetry of both parties in order to pursue personal self-interest and manipulate the profitability of enterprises. As Healy [8] pointed out, when CEO compensation increases the uncertainty of acquisition due to equity incentives, the CEO may conduct profit manipulation in the form of earnings management. Hazarika et al. [9] compared the relationship between corporate earnings management and CEO voluntary resignation and forced resignation. The study found that the mandatory resignation CEO has a significant positive correlation with corporate earnings management. Wang Kemin and Wang Zhichao [10] found that executive compensation is positively related to earnings management, indicating that the more compensation executives can get, the greater the degree of earnings management implemented. Xie Deren et al [11] research shows that the company will use the implicit choice of development expenditure accounting policy for earnings management, and one of its purposes is to carry out the current salary defense or enhance the future compensation defense space. Zhang Qianqian et al [12] empirical analysis found that: when the listed company implements the equity incentive plan or the CEO faces the pressure of leaving the company, the capitalization of R&D expenditure will weaken the value-added value of the company in the future, and the "signal transmission" mechanism will be invalid. The manager chooses the capitalization policy of R&D expenditure. On the one hand, it is accepted and recognized by the market in terms of policy. On the other hand, it can "beautify" the profit in a situation where it is difficult to be discovered, thus ensuring the legitimacy of the result of its own salary. Therefore, due to the incentives of the compensation contract, managers may use the capitalization of research and development expenditures to manage earnings and maximize their own interests.

Capitalization and earnings management of R&D expenditure under the motive of debt contract. Due to the characteristics of output uncertainty, revenue lag, and spillover, the information asymmetry and principal-agent problems in R&D activities are particularly serious, so it is difficult to obtain full support from external financing resources. Usually to protect the interests of creditors, the creditor and the owner, the manager will reach a contract including some restrictive clauses. At this time, the accounting method selection space exists in the accounting standards, so that the debtor has the opportunity to avoid breaching the debt contract by selecting certain accounting procedures, especially the procedure of increasing accounting profits, to meet the requirements of creditors and reduce the "agent cost". Sweeney [13] studied the impact of the debt contract on the company's use of accounting policy choices for earnings management, and found that in the years before the default, the companies that eventually defaulted on debts used more accounting policies that could increase their income. Zong Wenlong et al [14] and Wang Yan et al [15] found that the capitalization ratio of R&D expenditure of enterprises is affected by debt contract, and the higher the financial leverage, the more inclined to capitalize R&D expenditure. From the perspective of the debt contract motive, the manager chooses the R&D expenditure capitalization policy to soften the debt contract restrictions in the following two ways. First, if the debt contract is based on accounting profits, capitalization will increase accounting profits. Second, if the debt contract is based on the asset-liability ratio, capitalized accounting treatment will reduce this ratio.

Capitalization and earnings management of R&D expenditure under the motive of political costs. The political cost hypothesis holds that large-scale enterprises will choose to defer the current accounting surplus to future accounting policies in order to avoid government regulation of high profits. Daley and Vigeland [16] found that management's choices in whether to capitalize on R&D expenditures are related to contractual variables and firm size. Zong Wenlong et al [14] pointed out that the political cost factor is mainly reflected in the consideration of profitability,

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and the impact of firm size is weak. Usually, large-scale enterprises that occupy a monopoly position in the market are more susceptible to government regulation and external public opinion. In order to reduce the negative impact of multiple external regulations, large-scale enterprises usually shift their current profits to the future, and do not take the lead. In this context, large-scale enterprises will choose R&D expenditures more. On the contrary, smaller companies tend to maintain high profitability indicators and development indicators in order to communicate their good development to the market. Therefore, they tend to choose to capitalize on R&D expenditures and increase the total assets of enterprises. On the other hand, it also avoids reducing current profits due to the expense of R&D expenditures [17]. based on the above analysis, we propose the following assumptions:

H1:The capitalization options for R&D expenditure under different motives are positively correlated with earnings management.

2.2. The Regulating Effect of Product Market Competition under the Motivation of Different R&D Expenditure Capitalization

Product market competition as a very important external governance mechanism, domestic and foreign scholars have not reached a consensus conclusion about its role in the solution of earnings management issues.

Some scholars have studied that product market competition as an effective external supervision and governance mechanism has a positive impact on management motivation. First of all, it can reduce the agency cost between the management and the owner, reduce the information asymmetry between the agent and the client, and effectively encourage and supervise the company manager through the bankruptcy threat generated by the pressure of product market competition.[18-20] Wang Hua and Liu Huifen [21] have shown that the introduction of product market competition mechanism is more conducive to the improvement of market information transparency. Secondly, in the face of fierce market competition, enterprises can obtain heterogeneous resources through R&D investment, and obtain greater market share with product differentiation and low cost [22]. Zhang et al. [23] pointed out that there is a significant and stable positive relationship between competition and innovation in the Chinese context, which indicates that improving competition can promote innovative R&D activities of Chinese enterprises.

Another group of scholars believe that due to the survival pressure and information disclosure risk caused by fierce competition in the market, managers have greater incentives to manipulate profits to affect stock prices. The more intense the competition in the product market, the greater the degree of earnings management [24-27].

Previous research by scholars has focused on product market competition and R&D investment (strength). In the context of the relationship between product market competition and capitalization of R&D expenditure, the conclusion may be different from the past. The mechanism is that R&D expenditure has the characteristics of large investment, long cycle, slow profit recovery and great uncertainty, and its capitalization confirms that there is a large hidden space, and the competition in the external environmental product market is intensifying. This has brought greater operational and development pressure to the company. Under such factors, the fierce competition in the product market has stimulated the motive of using the capitalization of R&D expenditures for earnings management.

Capitalization of R&D expenditure and competition in product market under the motive of compensation contract. The increase in the intensity of competition in the industry has reduced the profit margin of the same industry and reduced the level of enterprises' excess profits, which will cause enterprises to face greater liquidity risks and operational risks. If enterprises do not have a good response mechanism in the face of competition, there may be mergers or bankruptcy liquidation, and the top management of the company will also face the risk of being

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dismissed from unemployment. In a listed company in a competitive industry, the promotion of managers relies heavily on accounting contract-based performance. On the one hand, managers can only be promoted to higher positions if they get better performance, and on the other hand, because of the product market. when managers selectively disclose their company's operating performance at the end of the period, they often need to refer to the entire market environment and the profitability of competitors in the same industry, and accordingly adjust the corresponding performance. In order to achieve the above objectives. The easiest and most labor-saving method is to use earnings management. Therefore, the choice of R&D policy with adjustment space has become one of the means of managers. In a more competitive industry, corporate managers will face greater operational pressures and risk of loss of private rents. For career development and profitability, they may have a stronger compensation contract motive to implement earnings management behavior.

Capitalization of R&D expenditure and competition in product market under the motive of debt contract. Li Wei'an and Han Zhongxue [28] proposed that the impact of product market competition on corporate debt mainly has the following two transmission mechanisms. The first is the risk plunder mechanism. The more an enterprise is in an industry with fierce market competition, the greater the risk of market plundering, and the more the company needs sufficient capital reserves to stabilize the income and resist external competitive pressures, and reduce the uncertainty of business operations, which will greatly Increase the financial tension of enterprises. The second is the equilibrium profit mechanism. The more fierce the competition in the product market, the closer the average profit rate of the industry is to the average profit rate of the market, and the smaller the profit margin, the more likely it is to cause financial constraints. Therefore, in the face of fierce competition, in order to alleviate the financing constraints and ensure the stability of the income, under the motive of the debt contract, the manager will beautify the financial indicators through the accounting choice of capitalization of R&D expenditures, and obtain financial support, such as lowering assets and liabilities.

Capitalization of R&D expenditure and competition in product market under the motive of political cost. Managers will make multiple trade-offs when making information disclosures. When a company is in an advantageous position in the industry competition, the management's information disclosure to investors may disclose relevant information to competitors and damage the company's competitive advantage. Therefore, after considering their own career development and company performance, business managers will choose to disclose information that is not valid to avoid predatory threats from opponents. In order to maintain their competitive advantage and reduce the supervision of the government and the public, large-scale enterprises in a highly competitive industry will use earnings management to smooth profits or manipulate the disclosed information to confuse competitors and investors. It will be more inclined to spend on research and development expenses. Based on the above analysis, we propose the following assumptions:

H2:Under the different motives of R&D expenditure capitalization, product market competition has a regulatory effect on the relationship between R&D expenditure capitalization and earnings management.

3. Research Design

3.1. Data Selection

This paper selects the listed companies in the Shanghai and Shenzhen stock markets in 2011-2017 for a total of seven years as a research sample. In order to ensure the use and accuracy of the data, and to exclude the “noise” effect of the unrelated factors on the study, we screened according to the following criteria: (1)This paper selects the 2011-2017 sample interval to

ISSN: 2688-9323

disclose the amount of R&D expenditure capitalization; (2)This article excludes ST and * ST company and the sample with asset-liability ratio greater than 1; (3)According to the 2012 edition of the SFC industry classification, we exclude financial listed companies; (4)this article excludes the sample observations of less than 15 companies in the same industry in the same year; (5)in order to reduce data endogeneity, the result variables we selected are all delayed by one period.. The data in this paper are from CSMAR and the annual financial report of the listed company. After the above screening, 3796 sample observations were obtained. The processing of the data is done in EXCEL, and the regression analysis of the model is done in the software SPSS19.0.

3.2. Variable Definitions

The proxy variables of the degree of earnings management

This paper uses the discretionary accruals (DA) to measure the degree of earnings management. Based on the research of Du Rui and Li Yanxi [2], the extension model of Lu Jianqiao is selected to calculate the discretionary accruals. The specific calculation process is as follows: Firstly, the model (1) is used to estimate the industry characteristic parameters , then the estimated coefficients are substituted into the model (2) to calculate the non-discretionary accruals (NDA), finally, the model (3) is calculated to calculate the discretionary accruals (DA).

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \alpha_4 \frac{IA_{i,t}}{A_{i,t-1}} + \alpha_5 \frac{RD_{i,t}}{A_{i,t-1}} + \varepsilon \quad (1)$$

$$\frac{NDA_{i,t}}{A_{i,t-1}} = \hat{\alpha}_1 \frac{1}{A_{i,t-1}} + \hat{\alpha}_2 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} + \hat{\alpha}_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \hat{\alpha}_4 \frac{IA_{i,t}}{A_{i,t-1}} + \hat{\alpha}_5 \frac{RD_{i,t}}{A_{i,t-1}} \quad (2)$$

$$DA_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - \frac{NDA_{i,t}}{A_{i,t-1}} \quad (3)$$

$TA_{i,t}$ is the total accrued profit of the company i for the t-year, which is equal to the difference between net profit and cash flow from operating activities.

$A_{i,t-1}$ is the total assets of the company i at the end of the t-1 year.

$\Delta REV_{i,t}$ is the difference between the business income of the company at the end of the t-year and the end of the t-1 year.

$\Delta REC_{i,t}$ is the difference between the accounts receivable of the company at the end of the t-year and the end of the t-1 year.

$PPE_{i,t}$ is the total fixed asset value of the company at the end of the t-year.

$IA_{i,t}$ is the sum of the value of intangible assets and other long-term assets at the end of the year t.

$RD_{i,t}$ is the research and development investment of the company i at the end of the t-year.

The proxy variable for capitalization of R&D expenditure

This paper uses R&D expenditure capitalization ratio (CAP), which is measured by the ratio of R&D expenditure capitalization to total R&D expenditure.

The proxy variable for product market competition

ISSN: 2688-9323

Drawing on Chen Jun and Xu Yude [24] and other research, this paper mainly measures the degree of competition in the product market from the competition between industries. According to the natural logarithm (COMPNUB) of the number of listed companies in the industry in the same year, the larger the value, the higher the competition in the industry.

The proxy variable of the three major motives of R&D expenditure capitalization

After reading a large amount of literature, the author draws on Zong Wenlong et al. [14] to measure the motivation of the compensation contract by ROA, which is defined as the net profit after eliminating the capitalization effect divided by the total assets before capitalization. The debt contract motivation is measured by LEV, which is defined as the total debt of the enterprise divided by the total assets before capitalization. The motivation for measuring political costs by SIZE, which is defined as the natural logarithm of the total assets before the capitalization of the enterprise.

Control variable

In order to control the influence of other related variables on the analysis results, this paper studies the impact of product market competition on the relationship between R&D expenditure capitalization and earnings management as accurately as possible. According to the existing literature, this paper introduces the following control variables in the empirical model: avoiding losses dummy variables (LOSS), refinancing dummy variables (SEO), cash flow (CASH), previous profit margin (Profit), revenue growth rate (Growth), equity concentration (Cr) and equity balance (SHRZ), etc. The specific variables are defined as shown in Table 1.

3.3. Model Building

In order to analyze the relationship between R&D expenditure capitalization and earnings management, and the adjustment effect of product market competition on the relationship between the two, based on the previous research results, the regression model set in this paper is as follows:

$$DA = \alpha_0 + \alpha_1 CAP + \alpha_2 CONTROL + \varepsilon_1 \quad (4)$$

$$DA = \beta_0 + \beta_1 CAP + \beta_2 COMPNUB + \beta_3 CAP * COMPNUB + \beta_4 CONTROL + \varepsilon_2 \quad (5)$$

Model (4) adds the R&D expenditure capitalization ratio (CAP) based on the control variables to test the relationship between R&D expenditure capitalization and earnings management, and tests hypothesis 1.

Model (5) is included in the product market competition (COMPNUB) and the interaction between product market competition and R&D expenditure capitalization (CAP × COMPNUB) on the basis of model (4) to test the regulation of product market competition. In order to test the regulatory role of product market competition under the three motives of R&D expenditure capitalization policy selection, the sample is grouped according to the median of total return on assets (ROA), asset-liability ratio (LEV), and firm size (SIZE) to test hypothesis 2.

ISSN: 2688-9323

Table 1. Variable Definition and Description

Variable Nature	Variable Name	Variable Symbol	Variable Definitions
Explained Variable	Earnings Management	DA	Discretionary Accrual
Explanatory Variables	Capitalization Ratio	CAP	R&D Expenditure Capitalization Amount/Total R&D Expenditure
Moderator	Product Market Competition	COMPNUB	The natural logarithm of the number of listed companies in the industry
Control Variable	Return on Total Assets	ROA	Return on assets before capitalization
	Asset-liability Ratio	LEV	Asset-liability ratio before capitalization
	Enterprise Scale	SIZE	Natural logarithm of total assets before capitalization
	Avoid Losses	LOSS	ROE takes 1 in (10%~12%), otherwise takes 0
	Refinancing	SEO	If the total profit for the current period is greater than zero, and less than zero after subtracting the current R&D capitalization amount, take 1; otherwise take 0.
	Cash Flow	CASH	Cash flow from operating activities/Total assets
	Previous Profit Margin	PROFIT	Previous net profit/Total assets at the beginning of the year
	Revenue Growth Rate	GROWTH	（Operating income for the year - operating income for the previous period）/Last year's operating income
	Equity Concentration	CR	The proportion of the 1st largest shareholder
	Equity Balance	SHRZ	2-10 major shareholding ratio / 1st largest shareholder ratio
	YEAR	YEAR	Annual dummy variable, which belongs to 1 for the year, otherwise 0
	INDU	INDU	Industry dummy variables, according to the 2012 SFC classification, which belong to this industry to take 1, otherwise 0

4. Empirical Test and Result Analysis

4.1. Descriptive Statistical Analysis

Table 2 lists descriptive statistics for the main variables. We can see from Table 2 that the maximum and minimum values of DA are 1.640 and -0.437, and the average value is 0.003. The above data indicates that most listed companies have implemented upward earnings management. The average of the capitalization of research and development expenditure（CAP）is 10.31%. In general, the proportion of the total assets successfully converted into research results is still relatively low, and the research effect needs to be improved. The maximum value of COMPNUB for measuring market competition is 5.572, and the minimum value is 2.708. The above values reflect the large difference in competition among various industries. The maximum and minimum values of total return on assets (ROA) and asset-liability ratio (LEV)

ISSN: 2688-9323

are extreme, indicating that there are large differences in profitability and debt ratio among different companies. The average values of the sample companies LOSS and SEO are 0.110 and 0.080, reflecting the fact that sample companies with a risk of avoiding losses and refinancing in the capitalization of R&D expenditures do not account for the majority. The mean values of the LOSS and SEO indicators are 0.110 and 0.080, reflecting the fact that the sample companies that capitalize on R&D expenditures to avoid losses and refinance are not in the majority.

Table 2. Descriptive Statistics of Each Variable

Variable	N	Minimum	Maximum	Mean	Standard Deviation
DA	3796	-0.437	1.640	0.003	0.079
CAP	3796	-0.149	1.336	0.103	0.204
COMPNUB	3796	2.708	5.572	4.725	0.676
ROA	3796	-0.962	0.339	0.037	0.060
LEV	3796	0.014	0.982	0.383	0.191
SIZE	3796	18.113	27.307	22.035	1.169
LOSS	3796	0.000	1.000	0.110	0.316
SEO	3796	0.000	1.000	0.080	0.272
CASH	3796	-0.463	0.487	0.045	0.065
PROFIT	3796	-2.555	0.863	0.049	0.078
GROWTH	3796	-0.738	17.738	0.149	0.4598
CR	3796	3.390	89.850	34.011	14.349
SHRZ	3796	0.010	7.187	0.981	0.862

4.2. Analysis of Regression Results

Table 3 shows the regression test results of the relationship between R&D expenditure capitalization and earnings management under different motives. Model 1 is the total sample regression result. The results show that the capitalization of R&D expenditure and earnings management are significantly positively correlated at the 1% level, indicating that the greater the proportion of R&D expenditure capitalization, the higher the degree of earnings management. This shows that the conditional capitalization accounting policy with implicit selection space is one of the important means for enterprises to manage earnings. This paper has carried out three major motivational tests, which are the (2)-(7) columns in the table below. The above results are still valid and the hypothesis 1 is verified.

ISSN: 2688-9323

Table 3. Regression Results of R&D Expenditure Capitalization and Earnings Management under Different Motives

Variable	Model1	Compensation Contract		Debt Contract		Political Cost	
	(1)	LROA (2)	HROA (3)	LLEV (4)	HLEV (5)	LSIZE (6)	HSIZE (7)
Constant Term	1.865E-10(0.000)	-0.020*** (-10.810)	0.001 (1.165)	0.003** (2.482)	-0.002** (-1.661)	-0.005***(-3.918)	0.004*** (3.306)
CAP	0.056*** (5.099)	0.070*** (4.624)	0.032** (2.386)	0.048*** (2.895)	0.062*** (4.331)	0.067***(4.537)	0.053*** (3.469)
ROA	0.135*** (10.712)			0.271*** (13.589)	0.045*** (3.036)	0.129*** (7.793)	0.132*** (7.002)
LEV	-0.038*** (-2.785)	-0.006 (-0.332)	-0.038** (-2.322)			-0.024 (-1.593)	0.013 (0.746)
SIZE	0.071*** (5.526)	0.081*** (4.349)	0.085*** (5.488)	0.078*** (4.734)	0.049*** (3.522)		
LOSS	-0.259*** (-22.511)	-0.305*** (-18.873)	-0.176*** (-13.164)	-0.230*** (-13.326)	-0.262*** (-17.630)	-0.328*** (-20.724)	-0.184*** (-11.378)
SEO	0.029*** (2.712)	0.056*** (3.521)	0.000 (-0.016)	0.043*** (2.672)	0.019 (1.357)	0.063*** (4.375)	0.001 (0.076)
CASH	-0.806*** (-69.253)	-0.737*** (-48.056)	-0.840*** (-59.617)	-0.838*** (-44.966)	-0.777*** (-54.527)	-0.834*** (-53.500)	-0.792*** (-47.632)
PROFIT	0.206*** (17.320)	0.068*** (4.447)	0.390*** (25.796)	0.145*** (8.061)	0.230*** (15.716)	0.149*** (9.411)	0.309*** (17.655)
GROWTH	0.099*** (9.240)	0.110*** (7.201)	0.093*** (6.965)	0.077*** (4.736)	0.104*** (7.491)	0.062*** (4.189)	0.117*** (7.877)
CR	0.073*** (4.930)	0.061*** (2.929)	0.002 (0.106)	0.091*** (3.854)	0.046** (2.509)	0.135*** (6.504)	0.033 (1.640)
SHRZ	0.051*** (3.492)	0.068*** (3.261)	-0.038** (-2.043)	0.024 (1.044)	0.064*** (3.488)	0.098*** (4.770)	0.022 (1.123)
YEAR	Control	Control		Control		Control	
INDU							
Adj-R^2	0.588	0.596	0.664	0.552	0.638	0.641	0.579
F	493.300***	266.710***	395.790***	222.610***	353.650***	322.400***	275.910***

Note: 1) *** means significantly correlated at 1%, ** means significantly correlated at 5%, and * means significantly correlated at 10%; 2) t value in brackets.

ISSN: 2688-9323

Table 4 shows the test results of the regulation of product market competition under the motives of capitalization of different R&D expenditures. Model (2) is the regression result of the regulation of product market competition under the whole sample. It can be observed from the table that on the premise that other conditions remain unchanged, product market competition (COMPNUB) is significantly negatively correlated with earnings management at the level of 1%, that is, fierce product market competition environment will inhibit the degree of enterprise earnings management. However, the interaction item (CAP×COMPNUB) between product market competition and capitalization of R&D expenditure is significantly positively correlated with earnings management at the level of 5%, indicating that in order to achieve the expected goal, the management will choose capitalization of R&D expenditure as the means of earnings management.

Columns (2)-(7) of Table 4 show the test results of the regulation of product market competition under the motives of the three conditional capitalization policies. We note that in low asset-liability ratio (LLEV) and low political cost (LSIZE), the interaction items (CAP×COMPNUB) of product market competition and capitalization of R&D expenditure are positively correlated with earnings management, and have passed significance tests of 10% and 1%, supporting the debt contract hypothesis and political cost hypothesis. It shows that under the motivation of debt contract, in order to relieve the capital shortage, ensure the stability of income and reduce the impact brought by the fierce competitive environment, managers will choose the capitalization of R&D expenditure to beautify the financial indicators required by creditors and reduce the asset-liability ratio to confuse investors and creditors. Under the motivation of political cost, in order to avoid more stringent government regulation due to the enhancement of monopoly position and to avoid being threatened by predatory competitors due to the disclosure of R&D information, large-scale enterprises will choose the policy of R&D expense to confuse competitors and the market. In the fierce market environment, small-scale enterprises are more likely to choose the capitalization policy of R&D expenditure in order to show good prospects for their development and enhance market confidence. First, it can increase profits; second, it can beautify statements and increase the total amount of assets. Therefore, product market competition makes it easier for small enterprises to capitalize R&D expenditure for earnings management.

It was observed from column (2) - (3) that high and low return on assets (ROA) did not pass the significance test and rejected the salary contract hypothesis. On the one hand, the sample data may be too small to verify the relevant results. On the other hand, under different profit levels, enterprises will choose two different paths for capitalization of R&D expenditure under the motivation of salary contract in order to reach the target of stakeholders. Second, in a year with poor profits, the management is more likely to capitalize R&D expenditure to improve the relevant profit indicators in order to make the performance appraisal indicators meet the requirements of the compensation contract.

ISSN: 2688-9323

Table 4. Test Results of the Regulation Effect of Product Market Competition under the Different Motives of Capitalizing R&D Expenditures

Variable	Model2 (1)	Compensation Contract		Debt Contract		Political Cost	
		LROA (2)	HROA (3)	LLEV (4)	HLEV (5)	LSIZE (6)	HSIZE (7)
Constant Term	-5.601E-5(-0.068)	-0.018*** (-10.996)	0.002 (1.506)	0.003** (2.549)	-0.002 (-1.610)	-0.005***(-3.890)	0.004*** (3.321)
CAP	0.058*** (5.279)	0.076*** (4.813)	0.036*** (2.656)	0.046*** (2.735)	0.065*** (4.574)	0.066***(4.473)	0.056*** (3.688)
COMPNUB	-0.053*** (-5.012)	-0.044*** (-2.853)	-0.075*** (-5.310)	-0.058*** (-3.595)	-0.050*** (-3.641)	-0.058*** (-4.040)	-0.058*** (-3.893)
CAP×COMPNUB	0.019* (1.815)	0.018 (1.211)	-0.001 (-0.052)	0.029* (1.822)	0.012 (0.872)	0.039*** (2.696)	0.005 (0.356)
ROA	0.137*** (10.888)			0.273*** (13.739)	0.047*** (3.199)	0.131*** (7.959)	0.134*** (7.121)
LEV	-0.040*** (-2.918)	-0.008 (-0.424)	-0.039** (-2.426)			-0.023 (-1.548)	0.007 (0.436)
SIZE	0.068*** (5.320)	0.079*** (4.224)	0.082*** (5.343)	0.078*** (4.779)	0.044*** (3.157)		
LOSS	-0.261*** (-22.723)	-0.307*** (-18.926)	-0.178*** (-13.364)	-0.228*** (-13.226)	-0.266*** (-17.845)	-0.329*** (-20.974)	-0.185*** (-11.450)
SEO	0.029*** (2.765)	0.053*** (3.522)	0.001 (0.063)	0.043*** (2.716)	0.019 (1.389)	0.063*** (4.426)	0.003 (0.179)
CASH	-0.809*** (-69.685)	-0.739*** (-48.234)	-0.844***(-60.285)	-0.842*** (-45.344)	-0.779*** (-54.787)	-0.836*** (-54.038)	-0.797*** (-47.947)
PROFIT	0.209*** (17.673)	0.071*** (4.658)	0.391*** (26.039)	0.149*** (8.319)	0.233*** (15.979)	0.152*** (9.667)	0.313*** (17.920)
GROWTH	0.105*** (9.748)	0.115*** (7.440)	0.100*** (7.554)	0.083*** (5.076)	0.109*** (7.867)	0.066*** (4.492)	0.125*** (8.359)
CR	0.068*** (4.593)	0.056*** (2.656)	-0.003 (-0.142)	0.088*** (3.726)	0.040** (2.175)	0.132*** (6.423)	0.025 (1.251)

ISSN: 2688-9323

Variable	Model2	Compensation Contract		Debt Contract		Political Cost	
	(1)	LROA (2)	HROA (3)	LLEV (4)	HLEV (5)	LSIZE (6)	HSIZE (7)
SHRZ	0.050***	0.067***	-0.040**	0.025	0.062***	0.100***	0.019
	(3.431)	(3.247)	(-2.178)	(1.073)	(3.409)	(4.916)	(0.940)
YEAR	Control	Control		Control		Control	
INDU							
Adj-R^2	0.591	0.598	0.669	0.556	0.641	0.647	0.582
F	422.870***	223.870***	337.680***	188.870***	297.680***	275.110***	232.730***

Note: 1) *** means significantly correlated at 1%, ** means significantly correlated at 5%, and * means significantly correlated at 10%; 2) t value in brackets.

4.3. Robustness Test

In order to enhance the credibility of the conclusion, we make the following robustness test for the above conclusion. The results of the main variables are listed in table 5 and table 6.

(1) According to the research of Wang Hua and Liu Huifen [21] and Zhou Xiaofei and Zhou Qianlong [26], this paper adopts the reciprocal of the number of sample enterprises in a specific industry in a certain year times (-1) (recorded as COMPREC) as a substitute variable for the degree of industry competition. The greater the COMPREC value, the more intense the competition in the product market.

(2) Referring to the research of Zou Wenlong et al. [14], ROE (return on equity) is taken as the substitution variable of SIZE (enterprise scale) in this paper. Where ROE is defined as the ratio of net profit minus capitalization of R&D expenses to owner's equity.

From table 5 and table 6, we can see that the explanatory power of the model is still very strong. In table 5, the correlation between CAP and DA is significantly positive, both for the whole sample and the sub-samples of the three motives, which strongly supports hypothesis 1. In table 6, the relevant regression results are not materially different from the above conclusion, which also strongly supports the motivation of debt contract and political cost.

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Table 5. Robustness test results (ROE replacement SIZE)

Variable	Model1 (1)	Compensation Contract		Debt Contract		Political Cost	
		LROA (2)	HROA (3)	LLEV (4)	HLEV (5)	LROE (6)	HROE (7)
Constant Term	1.904E-10(0.000)	-0.018*** (-10.849)	0.014*** (-8.876)	-0.001 (-1.033)	-0.000 (-0.300)	-0.016***(-9.489)	-0.010*** (-7.328)
CAP	0.065*** (5.893)	0.081*** (5.134)	0.050** (3.989)	0.056*** (3.366)	0.069*** (4.904)	0.075***(4.606)	0.051*** (4.195)
ROA	0.149*** (11.743)			0.464*** (4.389)	0.050*** (3.316)	-0.005 (-0.342)	0.272*** (17.073)
LEV	0.005 (0.417)	-0.040** (2.560)	-0.087* (-5.958)			0.030* (1.833)	0.051*** (3.514)
ROE	-0.017 (-1.581)	-0.002 (-0.166)	0.227*** (15.163)	-0.181* (-1.732)	-0.008 (-0.556)		
Control	Control	Control		Control		Control	
Adj-R^2	0.585	0.592	0.694	0.547	0.636	0.583	0.707
F	487.180***	262.050***	454.650***	218.310***	350.310***	251.950***	482.130***

Note: 1) *** means significantly correlated at 1%, ** means significantly correlated at 5%, and * means significantly correlated at 10%; 2) t value in brackets.

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Table 6. Results of Robustness Test (COMPREC replaces COMPNUB)

Variable	Model2 (1)	Compensation Contract		Debt Contract		Political Cost	
		LROA (2)	HROA (3)	LLEV (4)	HLEV (5)	LROE (6)	HROE (7)
Constant Term	-9.946E-5(-0.120)	-0.018*** (-10.996)	-0.013*** (-8.707)	-0.001 (-1.105)	0.000 (-0.363)	-0.016***(-9.619)	-0.010*** (-7.386)
CAP	0.065*** (5.915)	0.084*** (4.813)	0.054*** (4.128)	0.053*** (3.153)	0.071*** (5.044)	0.076***(4.681)	0.053*** (4.339)
COMPREC	-0.044*** (-4.091)	-0.044*** (-2.853)	-0.061*** (-4.293)	-0.042** (2.563)	-0.045*** (-3.242)	-0.042*** (-2.702)	-0.060*** (-4.659)
CAP ×COMPREC	0.025** (2.361)	0.029 (1.877)	-0.002 (-0.110)	0.037** (2.258)	0.017 (1.246)	0.027* (1.772)	0.006 (0.433)
ROA	0.151*** (11.891)			0.468*** (4.441)	0.052*** (3.447)	-0.004 (-0.283)	0.272*** (17.212)
LEV	0.003 (0.254)	0.037** (2.432)	-0.089*** (-6.096)			0.028* (1.727)	0.047*** (3.307)
ROE	-0.018* (-1.692)	-0.004 (-0.261)	0.227*** (15.228)	-0.183* (-1.754)	-0.010 (-0.696)		
Control	Control	Control		Control		Control	
Adj-R^2	0.587	0.594	0.697	0.550	0.638	0.584	0.710
F	416.630***	220.360***	384.860***	184.470***	294.480***	211.720***	408.890***

Note: 1) *** means significantly correlated at 1%, ** means significantly correlated at 5%, and * means significantly correlated at 10%; 2) t value in brackets.

5. Conclusions and Recommendations

This article from the database to select A shares in Shanghai and Shenzhen two city manufacturing revealed the capitalization of R&D spending A total of 3796 samples of listed companies as the observed value, take the empirical method, choose three motives from conditional capitalization policy perspective, to study the product market competition on the relationship between R&D spending capitalization and surplus management regulation mechanism. The empirical results show that :(1) capitalization of R&D expenditure is a means of earnings management. In the new accounting standards, although conditional capitalization has no explicit choice space, its operation is largely dependent on the subjective professional judgment of managers, so it has a high implicit choice space and creates opportunities for

earnings management. (2) under the regression results of the full sample, the product market competition positively regulates the correlation between R&D expenditure capitalization and earnings management, that is, the more intense the product market competition is, the more likely managers are to utilize R&D expenditure capitalization for earnings management. Then choose three motives from conditional capitalization policy perspective, points sample test the regulating function of product market competition, the results showed that the motivation on the debt contract and political cost motive, product market competition is more significant to adjust the relationship of the two, and the control effect is not significant under the compensation contracts motive, the above conclusion enriched product competition in the market regulation mechanism framework.

The rapid development of capital market puts forward higher requirements for enterprise innovation, but at the same time the imperfect accounting standards on conditional capitalization accounting treatment also provides enterprises with room for earnings management. In this context, in view of the above conclusions, this paper puts forward the following policy Suggestions :(1) strictly formulate the standards for the division of research stage and development stage, and improve relevant accounting policies. For example, different quantitative standards can be formulated according to the characteristics of different industries. (2) standardize the ways and contents of enterprise R&D expenditure information disclosure, and improve the transparency of financial information. When investing, investors should pay special attention to the R&D expenditures disclosed by companies in competitive markets to make more rational investment decisions. (3) the government should minimize market intervention, give full play to the market's role in determining resource allocation, deepen economic restructuring and promote the building of a fair, transparent and open market environment.

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