

## Article

# Do Inquiry Letters Curb Corporate Catering Motives of High Sustainable R&D Investment? Empirical Evidence from China

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**Abstract:** Sustainable R&D investment is an important issue for enterprises to obtain core competitiveness in modern society. Government supervision can play a guiding role in the process of developing a competitive advantage in innovation in developing countries. This paper analyzes the impact of the government's proactive regulatory model, represented by the R&D expense inquiry letters (hereafter, RDILs), on the corporate catering motives of high sustainable R&D investment. The results show that the RDILs have a regulatory effect on the listed companies' catering motives of high sustainable R&D investment, but this effect is weakened by higher stock price crash risk, lower stock liquidity, and greater market short-selling pressure. Further analysis shows that the regulatory effect of RDILs is achieved by reducing the subsequent level of strategic R&D classification manipulation by the company. Overall, our study finds a monitoring role for inquiry letter supervision on the sustainability of corporate R&D investments. Exchanges in other countries should consider their use.

**Keywords:** R&D expense inquiry letter (RDIL); high sustainable R&D investment; catering motive; market pressure



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## 1. Introduction

Sustainable R&D investment is an important issue for enterprises to obtain core competitiveness in modern society [1]. In transition economies, capital markets play a key role in the transformation and upgrading of national economies. In this context, stimulating innovation through capital markets has become an ideal option, and investors have begun to adopt price to R&D investment rates as an indicator for evaluating companies and assign very high valuations to companies with high sustainable R&D investments. However, there is the phenomenon whereby the company's managers choose false arrangements of high sustainable R&D investment to cater to the stock market for the benefit of a high market valuation.

At the same time, China's securities regulators are concerned about the sustainability of companies' R&D investments. Our data show that the percentage of companies inquired about their R&D expenses rose from 0.26% to 6.97% from 2015 to 2019, a 26.81-fold increase over the five years. Existing studies show that inquiry letters can play a regulatory role in curbing earnings management [2], reducing information asymmetry [3], restraining auditor behavior [4], and reducing internal control opinion buying behavior [5]. Therefore, whether the inquiry letter can affect the sustainability of high R&D investment of listed companies and inhibit the catering motives of high sustainable R&D investment of listed companies is a question worthy of study.

This paper examines the regulatory role of inquiry letters on companies' high sustainable R&D investment catering motive. Combining the theory of catering motives for high sustainable R&D investment and the theory of market pressure, this paper examines whether companies continue to execute a strategy of catering motives of high sustainable R&D investment after receiving RDILs by using Chinese A-share listed companies from

2015 to 2019. The results show that the RDILs have a regulatory effect on the catering motives of high sustainable R&D investment, but this effect is weakened by higher stock price crash risk, lower stock liquidity, and greater market short-selling pressure. Further analysis shows that the regulatory effect of RDILs is achieved by reducing the subsequent level of strategic R&D classification manipulation of the company.

Our study differs from the existing literature in several important aspects. First, our study considers the motives of corporate high sustainable R&D investment to cater to capital market pressure, and this paper adds to the existing studies by finding that higher market liquidity pressure reduces the regulatory effect of inquiry letters from market pressure theory. Most of the existing studies discuss the catering motives of innovation activities in terms of the motives of catering to government policies and obtaining tax incentives or subsidies [6,7] without considering the catering to capital market pressures. Second, this study explores the strategic arrangement of R&D investment from the perspective of innovation investment intensity and R&D investment sustainability relative to industry peers, which enriches the existing studies. Finally, sustainable corporate R&D investment is closely related to the future development of an economy [8], and this paper provides empirical evidence and theoretical support for how developing countries can guide corporate micro-entities to make sustainable R&D investments through government supervision as well.

The rest of the paper is organized in the following manner. Section 2 details the conceptual framework and hypothesis development. Section 3 outlines the description of data sources and research methods, Section 4 presents the empirical results, Section 5 presents the robustness test, and Section 6 concludes the paper.

## 2. Conceptual Framework and Hypothesis Development

### 2.1. RDILs Supervision and R&D Investment Strategy for Catering Motives

In recent years, the Chinese government has emphasized innovation, local governments have introduced patent award or subsidy policies [1,9,10], and the Chinese capital market is filled with a “cult of R&D innovation”. As a result, investors prefer companies with high R&D investment and give them a “high sustainable R&D investment premium” based on the company’s sustainable R&D investment. On the other hand, there are R&D investment strategies that aim to promote technological progress and maintain a company’s competitive advantage [11,12], but there are also R&D investment strategies that aim to obtain other benefits [13]. Rational managers will choose a specific R&D investment pattern to obtain a high valuation and to cater to the stock market. The company’s management has an incentive to mislead investors through the arrangement of accounting information [14,15], such as real earnings management [16]. It is generally believed that engaging in sustainable behaviors, such as sustainable R&D investment, is closely related to the sustainable success of the firm [17,18]. Thus, companies have a strong incentive to cater to the investors in the market to obtain a “high sustainable R&D investment premium” from the market. This manipulation of R&D investment and arranging the intensity and continuity of one’s R&D investment to achieve an image of aggressive innovation and promising prospects and to obtain high valuation levels are what we define as catering motives for high sustained R&D investment.

Existing studies have concluded that inquiry-letter supervision is an authoritative and effective regulatory tool for enhancing information disclosure, and it has good regulatory effects [19]. Receiving an inquiry letter increases the regulatory pressure and the cost of violation for the company, and therefore motivates the company to improve its information disclosure. Past studies have also shown that companies that receive inquiry letters have consequences such as adopting more stringent audit procedures [4], increasing audit fees [4], and improving the quality of disclosure [19]. This shows that inquiry letters have a significant supervisory effect.

In this paper, an RDIL is defined as an inquiry letter that asks questions about a company’s “research expenses”, “development expenses”, “R&D expenses”, and other related issues. The RDILs can play a regulatory role on the company’s catering motive of

high sustainable R&D investment from two aspects: first, it raises the cost for the company to continue catering. On the one hand, after receiving the RDILs, the company needs to respond to the questions mentioned in the inquiry letter in a timely and detailed manner, and the company is also required to show the reasonableness of the treatment of R&D expenses in the reply letter and to compare it with the industry peer. These increase the cost for the company to continue to implement the catering policy. On the other hand, some inquiry letters request the appropriate legal opinions from the company's auditors and lawyers in the response letter. Such requirements have an impact on the auditing behavior of the company [4]. If a company is still bent on manipulating the amount of R&D investment to cater to the market, there is a high probability of receiving a non-standard audit opinion. Second, inquiry letters may invalidate a company's catering behavior. Past research has shown that inquiry letters can identify potential company risks, improve the quality of company information disclosure [10], and increase investors' attention to listed companies with suspicions [4]. When a company is inquired about its R&D expenses, the inquiry letter will require the company to disclose its treatment of R&D expenses in detail, and will even ask it to compare with its peers and explain the reasonableness of its treatment. Based on the questions in the inquiry letter, investors will recognize that the company's high sustainable R&D investment is merely catering to the market, which in turn will lead to the company's catering strategy no longer being effective. Based on the questions in the inquiry letter, investors will recognize that the company's high sustainable R&D investment is merely catering to the market, which in turn will lead to the company's catering strategy no longer being effective. Therefore, we believe that the RDILs have a regulatory effect on the company's catering motive of high sustainable R&D investment. We formalize this prediction in the following hypothesis:

**Hypothesis 1.** *RDILs have a regulatory effect on the catering motive of R&D investment; that is, receiving RDILs in the current year raises the possibility of suspending the implementation of high sustainable R&D investment in the following year.*

## 2.2. Market Pressure and the Regulatory Effect of RDILs

Whether a company adopts a catering strategy for R&D investment depends on the trade-off between the risk of loss from being regulated and the benefits from continued catering. We refer to the "market pressure" hypothesis as the weakening effect of supervision due to the fear of market pressure and the unwillingness to adjust their high ongoing R&D investment for catering purposes even after being inquired. In the following, we discuss the impact of market pressure on the regulatory effect of RDILs in three dimensions: market pressure related to stock price crash risk pressure, liquidity pressure, and short-selling pressure.

In past studies, it has been argued that a greater risk of stock price crash risk can lead to negative effects such as downward audit adjustments by auditors [20] and reduced speed of balance sheet adjustment [21]. Therefore, a greater crash risk of the share price would imply that the company faces greater market pressure [22]. Given the high level of crash risk, if the company changes its strategy of high sustainable R&D investment after receiving the inquiry letter, the authenticity of its R&D activities will be questioned by the market, and the negative information that has been accumulated will be released, leading to negative stock price fluctuations. Therefore, companies with a high crash risk will continue hiding the catering motive behind their high sustainable R&D investment after being inquired about R&D expenses. This ultimately leads to the weakening of the regulatory effect of the inquiry letter on the catering motive of R&D investment. We formalize this prediction in the following hypothesis:

**Hypothesis 2.** *The greater the crash risk of a company's share price, the weaker the regulatory effect of the RDILs on the catering motive of R&D investment.*

When a company's stock is illiquid, investors raise their attention to changes in accounting information such as the company's R&D investment [23]. Therefore, for companies with less liquidity, changes in information about the company's R&D investments are more important. For less liquid companies, a change in the company's strategy of high sustainable investment in R&D after receiving an RDIL would be perceived by investors as a correction of past false R&D investment arrangements under regulatory pressure. Such corrections would bring about a more negative market reaction and lead to a greater loss of share price valuation. Therefore, even if a company's R&D expenses are investigated, to avoid a stock price crash, the company tends to hide its true situation and maintain its image of high sustainable R&D investment to continue to cater to market investors, thus weakening the regulatory effect of the RDILs. We formalize this prediction in the following hypothesis:

**Hypothesis 3.** *The lower the liquidity level of a company's stock, the weaker the regulatory effect of the RDILs on the catering motive of R&D investment.*

Short-selling risk amplifies investors' reactions to negative news and magnifies the magnitude of stock price declines [24]. The increase in market demand for negative information occurs when a company is the subject of short-selling. If a company discontinues high sustainable R&D investment once it receives an inquiry letter, it may expose the catering motive and make itself a trading target for short-selling investors. On the other hand, when a company fails to meet market expectations, management fears negative market reactions and acts opportunistically to meet or exceed market expectations [25]. Under the pressure of short-selling, companies will be more inclined to hide their catering motives for their R&D investment. Therefore, we would observe that the higher the short-selling pressure of the company, the weaker the regulatory effect of the inquiry letter on the catering motive of the high sustainable R&D investment. We formalize this prediction in the following hypothesis:

**Hypothesis 4.** *The greater the short-selling pressure on the company, the weaker the regulatory effect of the RDILs on the catering motive for high sustainable R&D investment.*

### 3. Research Design, Data Sources, and Variable Measurements

#### 3.1. Data Sources and Sample Selection

In this paper, we select A-share listed companies in mainland China from 2015 to 2019 as the sample. The data of the inquiry letters are obtained from the "Regulatory Inquiries" section of the website of the Shanghai Stock Exchange and the "Inquiry Letters" section of the website of the Shenzhen Stock Exchange. The period is from 2015 to 2019. We remove ST companies, listed financial institutions, and companies with incomplete financial data. The remaining financial data are obtained from the CSMAR (China Stock Market & Accounting Research) database. Also, we perform 1% and 99% winsorized processing on all continuous variables to ensure that the results are not influenced by extreme values.

#### 3.2. Variable Measurement and Model Set

We built the following baseline model to test Hypothesis 1:

$$\text{Logit}(rds_{i,t+1}) = \delta_0 + \delta_1 \text{inqrd}_{i,t} + \sum \delta_j \text{ControlVariable}_{j,i,t} + \varepsilon_{i,t} \quad (1)$$

where catering motivation of high sustainable R&D investment ( $rds_{i,t+1}$ ) is the main explanatory variable of this paper.  $rds_{i,t+1}$  is a dummy variable that takes the value of 1, which is the ratio of R&D expenses to operating income, if the company is above the industry average in each of the three consecutive years from year  $t - 2$  to year  $t$ , but below the industry average in year  $t + 1$ ; otherwise, the ratio is 0. The independent variable is  $\text{Inqrd}_{i,t}$ , which is defined as a value of 1 if the company received an inquiry letter on R&D expenses during this year, and 0 otherwise.

Based on model (1), we developed the following empirical model to test hypotheses 2 through 4:

$$\text{Logit}(rds_{i,t+1}) = \delta_0 + \delta_1 \text{Inqrd}_{i,t} + \delta_2 \text{Char}_{i,t} + \delta_3 \text{Inqrd}_{i,t} \times \text{Char}_{i,t} + \sum \delta_j \text{ControlVariable}_{j,i,t} + \varepsilon_{i,t} \quad (2)$$

where  $\text{Char}_{i,t}$  refers to market stress variables. This paper measures market stress in three dimensions: crash risk pressure, liquidity pressure, and market short-selling pressure.

Drawing on the existing literature [26], we take the following approach to calculate the crash risk pressure ( $\text{Crash}_{it}$ ). First, we regress the following model:

$$r_{i,t} = \delta_0 + \delta_1 r_{m,t-2} + \delta_2 r_{m,t-1} + \delta_3 r_{m,t} + \delta_4 r_{m,t+1} + \delta_5 r_{m,t+2} + \varepsilon_{i,t} \quad (3)$$

where  $r_{j,t}$  is the return of stock  $j$  at week  $t$  in each year, and  $r_{m,t}$  is the market return of the whole market weighted by market capitalization outstanding at week  $t$  in each year. To control for the effect of non-synchronous stock trading, a two-period lagged term ( $r_{m,t-2}$ ,  $r_{m,t-1}$ ) and a two-period ahead term ( $r_{m,t+1}$ ,  $r_{m,t+2}$ ) of the overall stock market weekly returns are included in the regression of model (3). Based on the regression residuals  $\varepsilon_{i,t}$ , the unique weekly return ( $w_{i,t}$ ) for each listed company stock  $i$  in week  $t$  is obtained, where  $w_{i,t} = \ln(1 + \varepsilon_{i,t})$ .

Based on these calculations, the crash risk pressure is measured as a dummy variable, where the unique weekly return ( $w_{i,t}$ ) of a company's stock in a week of the year is 1 if it is below the mean of its distribution by 2.58 standard deviations, and 0 otherwise.

We measure the firm's liquidity risk ( $\text{Illiqd}_{it}$ ) using the Amihud measure [14], which is calculated as:

$$\text{Illiqd}_{i,t} = \frac{1}{\text{Day}_{i,t}} \sum_{d=1}^{\text{Day}_{i,t}} \frac{|R_{i,t,d}|}{V_{i,t,d}} \quad (4)$$

where  $|R_{i,t,d}|$  is the absolute value of the return of stock  $i$  on the trading day  $d$  of year  $t$ ,  $V_{i,t,d}$  refers to the transaction amount of stock  $i$  on trading day  $d$  in year  $t$ ,  $\text{Day}_{i,t}$  is the number of trading days of stock  $i$  in year  $t$ . After summing up and taking the average value, the illiquidity indicator is obtained. Moreover, we multiply this illiquidity indicator by  $10^8$ .

Short-selling pressure ( $\text{Short}_{it}$ ) is measured by taking 1 when a company becomes a short-selling target for the first time in the year and 0 otherwise.

For the control variables, we follow the existing literature [27] and control for the basic characteristics of the firm:

- (1)  $\text{Size}_{it}$ , the total assets of the company in year  $t$ , and take the natural logarithm.
- (2)  $\text{Lev}_{it}$ , total liabilities of the company in year  $t$  divided by total assets.
- (3)  $\text{Roe}_{it}$ , the roe of the company in year  $t$ , expressed as net income divided by total equity.
- (4)  $\text{Mag}_{it}$ , the percentage of management shareholding in the company in year  $t$ , expressed as a percentage of the company's shares held by the company's management.
- (5)  $\text{Age}_{it}$ , the number of years the company has been listed in year  $t$ , expressed as the difference between the current year and the IPO year.
- (6)  $\text{Tobinq}_{it}$ , the Tobin's Q ratio of the firm in year  $t$ , expressed as the ratio of the sum of the market value of equity and debt to the book value of total assets.
- (7)  $\text{Cash}_{it}$ , the firm's cash holdings in year  $t$ , expressed as the percentage of cash holdings to the firm's total assets.
- (8)  $\text{State}_{it}$ , the ownership variable of the firm in year  $t$ , taking 1 if the ultimate controller is state-owned, and 0 otherwise.
- (9)  $\text{Inq}_{it}$ , the variable whether the company receives other kinds of inquiry letters in year  $t$ . The company takes 1 if it receives other kinds of inquiry letters in the current year, and 0 otherwise.
- (10)  $\text{Em}_{it}$ , the variable of the quality of earnings information of the company in year  $t$ , expressed as the absolute value of the firm's manipulative accrual for the current year; the Jones model was used for this calculation [28].
- (11)  $\text{Rd}_{it}$ , the ratio of the company's R&D expenses to total assets in the year  $t$ .



In addition, we control for the year and industry fixed effects and do clustering [29] by firm and year.

#### 4. Empirical Results

##### 4.1. Descriptive Statistics of Main Variables

Descriptive statistics are shown in Table 1. About 3.2% of the companies suspend the implementation of high sustainable R&D investment catering in year  $t+1$ , and 3.6% of the companies receive RDILs in year  $t$ . The mean of the crash risk pressure of the sample is 0.32, the mean of the illiquidity pressure is 0.61, 5.9% of the companies become short-selling targets for the first time in the year, and 5.9% of the companies become short-selling targets for the first time in the year. The company's leverage ratio in period  $t$  is 42.3%, ROE is 5.1%, management ownership is 14.2%, and cash holdings represent approximately 14.6% of the company's total assets at the beginning of the period. About 31.7% of the sample are state-owned companies, and about 21.5% of the companies have received various inquiry letters from the exchange in the year.

**Table 1.** Descriptive statistics of main variables.

Variable	N	Mean	Std. Dev.	Q1	Median	Q3
$rds_{it+1}$	11,822	0.032	0.176	0	0	0
$Inqrd_{it}$	11,822	0.036	0.186	0	0	0
$Crash_{it}$	11,822	0.320	0.466	0	0	1
$Illiqd_{it}$	11,822	0.610	0.853	0.164	0.327	0.692
$Short_{it}$	11,822	0.059	0.235	0	0	0
$Size_{it}$	11,822	22.340	1.293	21.439	22.179	23.062
$Lev_{it}$	11,822	0.423	0.201	0.263	0.414	0.569
$Roe_{it}$	11,822	0.051	0.160	0.029	0.067	0.111
$Mag_{it}$	11,822	0.142	0.196	0	0.014	0.269
$Age_{it}$	11,822	10.759	7.453	4	9	18
$Tobinq_{it}$	11,822	2.081	1.807	0.998	1.540	2.549
$Cash_{it}$	11,822	0.146	0.111	0.068	0.116	0.190
$State_{it}$	11,822	0.317	0.465	0	0	1
$Inq_{it}$	11,822	0.215	0.411	0	0	0
$Em_{it}$	11,822	0.055	0.057	0.017	0.038	0.070
$Rd_{it}$	11,822	0.002	0.010	0	0	0

##### 4.2. Main Results: RDILs Supervision on Catering Motives of High Sustainable R&D Investment

Table 2 provides results for regression (1). According to Hypothesis 1, we expect a significant positive relationship between the catering motives of the high sustainable R&D investment variable ( $rds_{it+1}$ ) and RDILs supervision variable ( $Inqrd_{it}$ ). Table 2 records the results of testing the above hypothesis. The first column of the table shows the coefficients of the regression; Results show that the coefficient between  $rds_{it+1}$  and  $Inqrd_{it}$  is 0.607 and significant at the 1% level. Column (2) shows that the marginal effect calculated at the mean of all variables is also significantly positive. It implies that if a company receives an RDIL in the current year, the likelihood of continuing to cater in the following year will drop by 2.2%. In our sample about 3.2% of the companies suspend the implementation of high sustainable R&D investment catering in year  $t+1$ . A 2.2% reduction means that 68.75% ( $=2.2\%/3.2\%$ ) of the companies will suspend catering after receiving an RDIL, which implies that our results are statistically significant and economically significant. These findings indicate that the RDILs have played a regulatory role in curbing the incentive for listed companies to cater to high sustainable R&D investment.

**Table 2.** RDILs supervision on catering motives of high sustainable R&D investment.

Variable	(1) Coeff.	(2) Marginal Effects
$Inqrd_{it}$	0.607 *** (2.96)	0.022 ** (2.29)
$Size_{it}$	−0.080 *** (−3.17)	−0.002 *** (−3.23)
$Lev_{it}$	−0.461 (−1.21)	−0.012 (−1.22)
$Roe_{it}$	−0.960 *** (−4.24)	−0.026 *** (−4.30)
$Mag_{it}$	0.201 (1.08)	0.005 (1.09)
$Age_{it}$	−0.006 (−0.40)	−0.000 (−0.40)
$Tobinq_{it}$	−0.071 * (−1.91)	−0.002 * (−1.93)
$Cash_{it}$	−0.159 (−0.28)	−0.004 (−0.28)
$State_{it}$	−0.226 * (−1.72)	−0.006 * (−1.78)
$Inq_{it}$	0.023 (0.22)	0.001 (0.22)
$Em_{it}$	−1.824 ** (−2.45)	−0.049 ** (−2.46)
$Rd_{it}$	5.222 (1.53)	0.141 (1.49)
Constant	−0.930 (−1.56)	
Industry	Yes	
Year	Yes	
Obs.	11,822	
PseudoR <sup>2</sup>	0.031	

Notes: *t*-statistics are given in the parentheses, and standard errors are clustered by firm and year. \*, \*\* and \*\*\* denote the significance of two-tailed tests at the 10%, 5%, and 1% level of significance respectively.

The regression results for the other variables show that the size of the company ( $Size_{it}$ ) and ROE ( $Roe_{it}$ ) are both significant and negatively correlated with  $rds_{it+1}$ . This suggests that larger companies and higher levels of profitability increase the likelihood of continuing to maintain high sustainable R&D investment. The variable of the company's future development level ( $Tobinq_{it}$ ) is also significant and negatively correlated with  $rds_{it+1}$ . This indicates that better future growth prospects increase the likelihood that a company will continue to maintain high sustainable R&D investment. These results show that the better the company's operating status, the more real the high sustainable R&D investment exhibit.

#### 4.3. Tests for Market Pressure and the Regulatory Effect of RDILs

We use regression (2) to test the “market pressure” hypothesis, and Table 3 provides results for these tests.

The results of column (1) in Table 3 show that the coefficient of the interaction term of crash risk pressure ( $Crash_{it}$ ) and RDILs' supervision variable ( $Inqrd_{it}$ ) is −0.718, and significant at the 5% level. Column (2) in Table 3 shows that the marginal effect calculated at the mean of all variables is also significantly negative. This means that the regulatory effect is reduced by 1.4% for higher crash risk companies receiving RDILs relative to companies with low crash risk. This result indicates that the higher crash risk will weaken the regulatory effect of the RDILs on the catering motive of R&D investment. This result is consistent with the prediction of Hypothesis 2.

**Table 3.** Tests for market pressure and the regulatory effect of RDILs.

Variable	<i>Char<sub>it</sub></i> = <i>Crash<sub>it</sub></i>		<i>Char<sub>it</sub></i> = <i>Illiq<sub>it</sub></i>		<i>Char<sub>it</sub></i> = <i>Short<sub>it</sub></i>	
	(1) Coeff.	(2) Marginal Effects	(3) Coeff.	(4) Marginal Effects	(5) Coeff.	(6) Marginal Effects
<i>Inqrd<sub>it</sub></i>	0.890 *** (4.42)	0.036 *** (3.05)	0.830 *** (3.75)	0.033 *** (2.65)	0.634 *** (2.89)	0.023 ** (2.20)
<i>Inqrd<sub>it</sub></i> × <i>Char<sub>it</sub></i>	−0.718 ** (−2.28)	−0.014 *** (−3.19)	−0.483 *** (−2.60)	−0.013 ** (−2.57)	−0.230 *** (−10.24)	−0.006 *** (−10.51)
<i>Char<sub>it</sub></i>	0.032 (0.41)	0.001 (0.41)	0.017 (0.17)	0.000 (0.17)	0.103 (0.45)	0.003 (0.44)
<i>Size<sub>it</sub></i>	−0.080 *** (−2.91)	−0.002 *** (−2.95)	−0.081 * (−1.91)	−0.002 * (−1.95)	−0.083 *** (−2.68)	−0.002 *** (−2.73)
<i>Lev<sub>it</sub></i>	−0.455 (−1.17)	−0.012 (−1.17)	−0.464 (−1.21)	−0.012 (−1.21)	−0.461 (−1.23)	−0.012 (−1.24)
<i>Roe<sub>it</sub></i>	−0.996 *** (−4.98)	−0.027 *** (−5.04)	−0.942 *** (−4.37)	−0.025 *** (−4.39)	−0.963 *** (−4.22)	−0.026 *** (−4.30)
<i>Mag<sub>it</sub></i>	0.196 (1.07)	0.005 (1.08)	0.189 (0.89)	0.005 (0.90)	0.203 (1.06)	0.005 (1.07)
<i>Age<sub>it</sub></i>	−0.006 (−0.42)	−0.000 (−0.42)	−0.006 (−0.42)	−0.000 (−0.42)	−0.006 (−0.40)	−0.000 (−0.40)
<i>Tobinq<sub>it</sub></i>	−0.071 * (−1.95)	−0.002 ** (−1.97)	−0.073 * (−1.89)	−0.002 * (−1.90)	−0.072 * (−1.80)	−0.002 * (−1.82)
<i>Cash<sub>it</sub></i>	−0.130 (−0.23)	−0.003 (−0.23)	−0.155 (−0.27)	−0.004 (−0.27)	−0.156 (−0.28)	−0.004 (−0.28)
<i>State<sub>it</sub></i>	−0.231 * (−1.72)	−0.006 * (−1.79)	−0.226 * (−1.74)	−0.006 * (−1.80)	−0.226 * (−1.72)	−0.006 * (−1.78)
<i>Inq<sub>it</sub></i>	0.018 (0.18)	0.000 (0.18)	0.024 (0.23)	0.001 (0.23)	0.022 (0.21)	0.001 (0.21)
<i>Em<sub>it</sub></i>	−1.839 ** (−2.42)	−0.049 ** (−2.43)	−1.806 ** (−2.45)	−0.049 ** (−2.46)	−1.837 ** (−2.52)	−0.050 ** (−2.53)
<i>Rd<sub>it</sub></i>	5.205 (1.45)	0.140 (1.42)	5.040 (1.45)	0.136 (1.42)	5.150 (1.50)	0.139 (1.47)
Constant	−0.933 (−1.31)		−0.890 (−0.87)		−0.877 (−1.36)	
Industry	Yes		Yes		Yes	
Year	Yes		Yes		Yes	
Obs.	11,822		11,822		11,822	
PseudoR <sup>2</sup>	0.031		0.031		0.031	

Notes: *t*-statistics are given in the parentheses, and standard errors are clustered by firm and year. \*, \*\* and \*\*\* denote the significance of two-tailed tests at the 10%, 5%, and 1% level of significance respectively.

The results of the test of liquidity risk on the regulatory effect of RDILs are shown in column (3) of Table 3. In column (3) we can see the coefficient of *Inqrd<sub>it</sub>* × *Illiq<sub>it</sub>* is −0.483, and significant at the 1% level. Column (4) in Table 3 shows that the marginal effect calculated at the mean of all variables is also significantly negative. This result indicates that, on average, *Illiq<sub>it</sub>* per unit increase will lead to a 1.3% increase in the likelihood of continuing to cater for high sustainable R&D investment in the following year. This result means that liquidity risk can weaken the regulatory effect of RDILs on catering motives of high sustainable R&D investment.

The impact of short-selling pressure on the regulatory effect of the inquiry letter is shown in Table 3, column (5). We can see the coefficient of *Inqrd<sub>it</sub>* × *Short<sub>it</sub>* is −0.230, and significant at the 1% level. Column (6) in Table 3 shows that the marginal effect calculated at the mean of all variables is also significantly negative. This means that, for the company that becomes a short-selling target for the first time in the year, the regulatory effect is reduced by 0.6%. The regression results are in line with the expectation of hypothesis 4 that market pressure from short sale deregulation will weaken the regulatory effect of the inquiry letter on the catering motive of high sustainable R&D investment.



The above regression results indicate that higher crash risk pressure, higher liquidity pressure, and higher short-selling pressure reduce the effectiveness of inquiry letter supervision, as shown by higher crash risk pressure, higher liquidity pressure, and higher short-selling pressure, which weaken the positive correlation between  $rd_{it+1}$  and  $Inqrd_{it}$ .

#### 4.4. Further Analysis: Impact of RDILs Supervision on the Strategic R&D Classification

In practice, companies may classify some overheads and costs as R&D expenses to cater to the market, obtaining tax incentives or obtaining government subsidies, etc. [30]. This behavior is called strategic R&D classification. If the RDILs do have a regulatory effect on the company's catering motives of high sustainable R&D investment, we should be able to observe a subsequent change in the strategic R&D classification, specifically in the form of a decrease in the level of strategic R&D classification.

Subsequently, we will examine the changes in the level of strategic R&D classification. Existing research suggests that [30], a company's R&D expenditure consists of a reasonable budget for R&D expenditure [31,32] and deviations from the budget [33]. Based on the concept of budget formation, R&D expenditures depend on (1) latent variables that represent firm  $i$ 's R&D budget expenditures in period  $t$  and (2) contemporaneous proxy variables that generate possible R&D budget deviation variables in period  $t$ . We have the following model:

$$RD_{i,t} = \alpha_0 + \beta_1 RD_{i,t-1} + \beta_2 Growth_{i,t-1} + \beta_3 Netcash_{i,t-1} + \beta_4 Profit_{i,t-1} + \beta_5 Size_{i,t-1} + \beta_6 Overi_{i,t-1} + \beta_7 Nonop\_CF_{i,t-1} + \varepsilon_{i,t} \quad (5)$$

where  $RD_{i,t}$  is the ratio of the company's R&D expenses to operating revenue for the year.  $Growth_{i,t-1}$  is the growth rate of operating income in the previous year. The combination of  $Netcash_{i,t-1}$ ,  $Profit_{i,t-1}$ , and  $Size_{i,t-1}$  is used to measure resources available for investment, where  $Netcash_{i,t-1}$  is prior year net working capital as a percentage of operating income,  $Profit_{i,t-1}$  is the ratio of operating profit to operating revenue in the previous year, and  $Size_{i,t-1}$  is the natural logarithm of the previous year's operating income plus one.  $Overi_{i,t-1}$  measured the company's R&D investment constraints, and  $Overi_{i,t-1}$  is the average of the scaled decile rank of cash and short-term investments divided by total assets and the decile rank of leverage multiplied by negative one [34]. Last, because prior research suggests that a firm's investment in R&D activities is directly related to the availability of cash [35,36], we include the sum of firm  $i$ 's contemporaneous net cash flows from investing activities plus net cash flows from financing activities, scaled by sales ( $Nonop\_CF_{i,t-1}$ ). The above model is regressed by year and industry, and finally, the residuals obtained by the regression are used as proxy variables for the level of strategic R&D classification (hereafter,  $Srdc$ ).

We first examine the change in  $Srdc$  of the company before and after 3 periods. The results are shown in Table 4. The results show that the overall mean value of  $Srdc$  is around  $-0.02$  for the companies that do not receive the RDILs and remains stable over the 3 periods before and after period  $t$ . The mean value of  $Srdc$  for companies that receive RDILs are around  $0.2$  from period  $t - 3$  to  $t - 2$ , implying a significant positive manipulation of R&D expenses, and raise to  $0.368$  in period  $t - 1$ , remaining higher than the group that does not receive RDILs. The mean value of  $Srdc$  drops to  $0.15$  in the year when the RDILs are received and stays low in periods  $t + 1$  and  $t + 2$ . We guess that the reason for the level of strategic R&D classification decline in the current year is that the annual financial report of the company is announced on April 30th of the following year, and the company receives the RDILs in the current year often addressing the previous year's annual report.

**Table 4.** Group test of the level of strategic R&D classification (*Srdc*).

Variable	(1) Non-Receiving Group	(2) Receiving Group	(3) Homogeneity Test of Variance (F Value)	(4) The Difference in Means (Unequal)	(5) Test for Differences in Means (t Value)
<i>Srdc<sub>it-3</sub></i>	−0.01	0.212	−0.538	−0.222 **	(−2.420)
<i>Srdc<sub>it-2</sub></i>	−0.035	0.188	−0.472	−0.223 **	(−2.497)
<i>Srdc<sub>it-1</sub></i>	−0.028	0.368	−0.345	−0.397 ***	(−3.836)
<i>Srdc<sub>it</sub></i>	−0.015	0.15	−0.374	−0.165	(−1.632)
<i>Srdc<sub>it+1</sub></i>	−0.02	0.144	−0.381	−0.164	(−1.609)
<i>Srdc<sub>it+2</sub></i>	−0.016	0.169	−0.364	−0.185	(−1.192)
<i>Srdc<sub>it+3</sub></i>	−0.027	0.323	−0.303	−0.35	(−1.388)

Notes: *t*-statistics are given in the parentheses for the mean difference test, and F-statistics are given in the parentheses for the homogeneity test of variance. \*\* and \*\*\* denote the significance of two-tailed tests at the 5%, and 1% level of significance, respectively.

After the homogeneity test of variance, it is found that none of the F-values is significant, so the difference between the means of the two groups is tested in the absence of chi-square. The results show that the level of strategic R&D classification is significantly higher in the  $t - 3$  to  $t - 1$  period than in the non-receiving group, but decreases in the year when the RDILs are received, and this level in the subsequent three periods is not significantly different from that of the non-receiving group. The above results further support the aforementioned view that RDILs supervision has a regulatory effect, possibly through the reduction of the company's subsequent level of strategic R&D classification.

In the following, we take a regression approach to examine the change in *Srdc* from period  $t$  to  $t + 3$  relative to *Srdc* in period  $t - 1$  after the firm receives the RDILs. Table 5 shows the regression results, in which the dependent variable is the *Srdc* of the firm from period  $t$  to  $t + 3$ , and the independent variables are the RDILs variable (*Inqrd<sub>it</sub>*), level of strategic R&D classification in period  $t - 1$  of the firm (*Srdc<sub>it-1</sub>*), and the interaction term of these two variables. If we observe that the coefficient of *Inqrd<sub>it</sub> × Srdc<sub>it-1</sub>* is negative, it means that R&D manipulation is suppressed after receiving the RDILs.

The regression results are shown in Table 5. We see that the coefficients of *Inqrd<sub>it</sub> × Srdc<sub>it-1</sub>* are significantly negative in both column (1) and column (2) of Table 5. Since the average level of *Srdc* after period  $t$  is lower than that in period  $t - 1$  for firms that receive RDILs in Table 4. Thus, the results in Table 5 indicate that *Srdc* decreases in periods  $t$  and  $t + 1$  for companies that are inquired about R&D expenses relative to companies that are not. In columns (3) and (4), Table 5, the regression coefficients of *Inqrd<sub>it</sub> × Srdc<sub>it-1</sub>* are also negative although they are not significant. Results in Table 5 indicate that after being inquired about R&D expenses, companies reduce their subsequent *Srdc* level. This result supports the previous finding that RDILs have a regulatory effect by reducing the inquired firm's catering motives of high sustainable R&D investment.

**Table 5.** R&D expense inquiry supervision and changes in the level of strategic R&D classification.

	(1)	(2)	(3)	(4)
Variable	$Srdc_{it}$	$Srdc_{it+1}$	$Srdc_{it+2}$	$Srdc_{it+3}$
$Inqrd_{it}$	0.047 (0.58)	0.111 (1.30)	0.131 (0.64)	0.436 *** (3.16)
$Inqrd_{it} \times$ $Srdc_{it-1}$	−0.086 *** (−3.57)	−0.164 *** (−4.63)	−0.184 (−1.17)	−0.039 (−0.28)
$Srdc_{it-1}$	−0.005 (−0.48)	0.028 * (1.93)	0.021 (0.74)	0.036 (0.84)
$Size_{it}$	0.025 (1.13)	0.034 ** (2.08)	0.022 ** (2.31)	0.022 ** (2.46)
$Lev_{it}$	−0.133 * (−1.91)	−0.145 ** (−2.03)	0.022 (0.15)	0.043 (0.33)
$Roe_{it}$	−0.945 *** (−9.76)	−0.285 ** (−2.13)	−0.056 (−0.19)	−0.057 (−0.38)
$Mag_{it}$	−0.035 (−0.73)	0.225 ** (2.11)	0.113 (0.60)	0.127 (0.48)
$Age_{it}$	−0.001 (−1.04)	0.002 (1.36)	−0.001 (−0.46)	−0.000 (−0.15)
$Tobinq_{it}$	0.028 * (1.77)	0.018 (1.00)	0.037 ** (2.17)	0.038 (1.33)
$Cash_{it}$	0.077 (0.59)	0.113 (0.98)	0.055 (0.21)	−0.373 ** (−2.15)
$State_{it}$	−0.045 *** (−2.70)	−0.065 ** (−2.00)	−0.082 ** (−2.22)	−0.084 *** (−4.09)
$Inq_{it}$	−0.032 (−0.99)	0.025 (0.47)	0.062 (0.63)	−0.066 (−1.43)
$Em_{it}$	0.486 (1.54)	0.528 *** (2.85)	0.260 (0.77)	−0.121 (−0.01)
$Rd_{it}$	18.307 *** (6.77)	11.279 *** (12.23)	7.955 * (1.90)	2.493 (0.71)
Constant	−0.619 (−1.27)	−0.777 ** (−2.00)	−0.396 (−1.18)	−0.323 (−1.17)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Obs.	10,066	10,041	7345	5068
Adj_R <sup>2</sup>	0.036	0.013	0.007	0.004

Notes: *t*-statistics are given in the parentheses, and standard errors are clustered by firm and year. \*, \*\* and \*\*\* denote the significance of two-tailed tests at the 10%, 5%, and 1% level of significance, respectively.

## 5. Robustness Checks

### 5.1. Robustness Checks of Alternative Measures to the Original Dependent Variable

In the previous section, we compare the company's R&D investment with the industry average to measure the catering motives underpinning a company's high sustainable R&D investment. For the reliability of the results, we replace the caliber of the comparison and take whether it is higher than the median value of the same industry ( $rds_{it+1(median)}$ ) and whether it is higher than the mean value of the same region ( $rds_{it+1(areat)}$ ) as proxy variables for the robustness checks. The results are shown in columns (1) and (2) in Table 6. The results show that the coefficients of  $Inqrd_{it}$  are 0.455 and 0.678, respectively, and the results are significant at the 10% and 5% levels, respectively. This indicates that the selection of the method of calculating the explanatory variables has no significant effect on the conclusions of this paper.

**Table 6.** Alternative measures to the original dependent variable.

Variables	(1)	(2)
	$rds_{it+1}(\text{median})$	$rds_{it+1}(\text{area})$
$Inqrd_{it}$	0.455 * (1.81)	0.678 ** (2.12)
$Size_{it}$	−0.077 (−0.98)	−0.163 *** (−4.45)
$Lev_{it}$	−0.053 (−0.29)	−0.055 (−0.26)
$Roe_{it}$	−0.944 *** (−3.42)	−0.739 *** (−2.89)
$Mag_{it}$	0.430 * (1.94)	0.586 (1.00)
$Age_{it}$	−0.005 (−1.19)	0.010 (0.68)
$Tobinq_{it}$	−0.054 ** (−2.03)	−0.090 * (−1.93)
$Cash_{it}$	−0.958 ** (−1.98)	−1.046 ** (−2.06)
$State_{it}$	0.103 (1.25)	0.096 (0.85)
$Inq_{it}$	−0.278 ** (−2.31)	−0.280 (−1.34)
$Em_{it}$	−0.741 * (−1.80)	1.236 *** (6.09)
$Rd_{it}$	−3.917 (−0.72)	−1.658 (−0.25)
Constant	−1.178 (−0.69)	0.398 (0.49)
Industry	Yes	Yes
Year	Yes	Yes
Obs.	11,822	11,822
PseudoR <sup>2</sup>	0.015	0.022

Notes: *t*-statistics are given in the parentheses, and standard errors are clustered by firm and year. \*, \*\* and \*\*\* denote the significance of two-tailed tests at the 10%, 5%, and 1% level of significance, respectively.

## 5.2. Self-Selection Issues

A possible concern here is that a certain characteristic of the firm may affect the firm's R&D investment and also lead to whether the firm is investigated through inquiry letters. Such a correlation between two variables due to common factors is known as the sample selection bias, and it can lead to self-selection issues. The Heckman two-stage model is applicable to solve the self-selection issues caused by sample selection bias [37]. In order to address the potential self-selection issue in the main tests in the previous section, we use the Heckman model. Whether a firm is inquired about its R&D expenses depends on the regulatory intensity of the exchange. And the regulatory intensity of the exchange is influenced by the regulatory pressure of the higher authority and the efficiency of implementation of the exchanges [38,39]. It is important to note here that the China Securities Regulatory Commission (CSRC) is the superior authority of the exchange. A larger number of staff in the CSRC means that more manpower is available for the supervision of exchanges. Therefore, the more staff in CSRC, the more intensity the exchange has for the supervision of listed companies and the more inquiry letters issued. In addition, a higher level of compensation for the exchange board also implies greater compensation incentives. The level of compensation is positively correlated with the degree of diligence work [40], and higher levels of compensation increase the willingness of exchanges to proactively regulate. Therefore, in the first stage of the Heckman model, we use the following two variables as instrumental variables for the regulatory pressure of the higher authority and the efficiency of implementation of the exchanges: the number of

recruits last year ( $Csec_{it}$ ), and the average board members' compensation from the exchange ( $Salary_{it}$ ). These two variables are not directly related to the corporate catering motives of high sustainable R&D investment. After the first stage of regression, we derive the Inverse Mills Ratio (IMR), which is then added to the regression in Table 3 as an additional control variable to control for the self-selection issue.

The results of the first stage regression of the Heckman model are shown in column (1) in Table 7, where we can see the coefficients of  $Inqrd_{it} \times Csec_{it}$ , and  $Salary_{it}$  are significantly positive. This result indicates that the greater the intensity of exchange regulation and the greater the willingness to proactively regulate, the greater the likelihood that a company will receive RDILs in the current year. The results of the second-stage regression are shown in column (2) in Table 7. We can see that the main results of this paper are unchanged after including IMR in the second-stage regression.

**Table 7.** Results of the Heckman two-stage model.

	(1)	(2)
Variable	$Inqrd_{it}$	$rds_{it+1}$
$Csec_{it}$	0.011 *** (4.53)	
$Salary_{it}$	0.008 * (1.72)	
$Inqrd_{it}$		0.609 *** (2.91)
$Size_{it}$	−0.105 *** (−3.79)	−0.050 (−0.33)
$Lev_{it}$	0.612 *** (4.17)	−0.633 (−0.81)
$Roe_{it}$	−0.612 *** (−5.25)	−0.801 (−0.74)
$Mag_{it}$	−0.373 ** (−2.41)	0.308 (0.40)
$Age_{it}$	0.011 *** (2.60)	−0.009 * (−1.84)
$Tobinq_{it}$	0.001 (0.06)	−0.071 * (−1.83)
$Cash_{it}$	−0.237 (−0.95)	−0.088 (−0.11)
$State_{it}$	−0.286 *** (−4.30)	−0.145 (−0.42)
$Em_{it}$	1.075 *** (2.74)	−2.121 (−1.13)
$Rd_{it}$	8.989 *** (5.86)	2.850 (0.24)
$Inq_{it}$		0.022 (0.20)
IMR		−0.321 (−0.17)
Constant	−0.546 (−0.71)	−0.915 (−1.32)
Industry	Yes	Yes
Year	Yes	Yes
Obs.	11,822	11,822
Adj_R <sup>2</sup>	0.132	0.031

Notes: *t*-statistics are given in the parentheses, and standard errors are clustered by firm and year. \*, \*\* and \*\*\* denote the significance of two-tailed tests at the 10%, 5%, and 1% level of significance, respectively.

### 5.3. Results of Propensity Score Matching

Since the data we obtained are from an observational study and not from a randomized controlled experiment, randomized grouping is not used. In addition, there is a small percentage of companies that received R&D expense inquiry letters compared to those that do not. Thus, the above regressions have the potential to produce systematic bias and cause potential endogeneity problems [41]. We use the Propensity Score Matching Method (PSM) to address the potential endogeneity problem [42]. First, we estimate the propensity score of whether the firm is inquired about R&D expenses in the current year. Then, for each company that is inquired about R&D expenses, we find the company with the closest propensity score that is not inquired about in the current year and treat it as a control group. After one-to-one matching, we end up with a total sample of 846. We use a re-regress model (1), and the results are shown in Table 8, where the  $Inqrd_{it}$  coefficient is significantly positive and the main conclusion remains robust.

**Table 8.** Results of propensity score matching.

Variable	$rds_{it+1}$	
	(1) Coeff.	(2) Marginal Effects
$Inqrd_{it}$	0.482 *** (4.01)	0.008 *** (6.08)
$Size_{it}$	−0.154 (−0.70)	−0.003 (−0.69)
$Lev_{it}$	−0.115 (−0.35)	−0.002 (−0.34)
$Roe_{it}$	−0.032 (−0.12)	−0.001 (−0.12)
$Mag_{it}$	0.345 (0.46)	0.006 (0.45)
$Age_{it}$	0.008 (0.37)	0.000 (0.37)
$Tobinq_{it}$	0.059 (0.63)	0.001 (0.64)
$Cash_{it}$	−0.102 (−0.05)	−0.002 (−0.05)
$State_{it}$	0.044 (0.78)	0.001 (0.85)
$Em_{it}$	−3.180 (−1.61)	−0.052 (−1.53)
$Rd_{it}$	6.926 (0.93)	0.114 (0.97)
Constant	−11.053 ** (−1.98)	
Industry	Yes	
Year	Yes	
Obs.	846	
PseudoR <sup>2</sup>	0.067	

Notes: t-statistics are given in the parentheses, and standard errors are clustered by firm and year. \*\* and \*\*\* denote the significance of two-tailed tests at the 5%, and 1% level of significance, respectively.

### 5.4. Results of Conditional Fixed Effects Logit Estimation

The results of model (1) may be caused by some unobservable factors, which are equivalent to the firm's fixed effects. To solve this problem, we use the conditional fixed effect logit estimation method, and try to solve it from the perspective of the fixed effects model [43]. The results after taking conditional fixed effects estimation are shown in Table 9 below. We can see that the coefficient of  $Inqrd_{it}$  is still significantly positive.



**Table 9.** Results of conditional fixed effects Logit estimation.

Variable	$rd_{it+1}$	
	(1) Coeff.	(2) Marginal Effects
$Inqrd_{it}$	0.594 * (1.89)	0.587 ** (2.40)
$Size_{it}$	−1.107 *** (−3.67)	−0.057 (−0.95)
$Lev_{it}$	0.932 (1.08)	−0.320 (0.348)
$Roe_{it}$	−0.599 (−1.33)	−0.915 *** (−2.77)
$Mag_{it}$	−0.106 (−0.10)	0.173 (0.55)
$Age_{it}$	−0.028 (−0.48)	−0.010 (−1.05)
$Tobinq_{it}$	−0.147 ** (−2.39)	0.004 (0.11)
$Cash_{it}$	0.335 (0.35)	−0.403 (−0.78)
$State_{it}$	0.545 (0.99)	−0.299 ** (−1.99)
$Inq_{it}$	−0.071 (−0.40)	−0.051 (0.72)
$Em_{it}$	−2.902 ** (−2.11)	−2.163 ** (−2.04)
$Rd_{it}$	5.769 (0.44)	5.330 (1.40)
Obs.	11,822	
PseudoR <sup>2</sup>	0.0289	

Notes: *t*-statistics are given in the parentheses, and standard errors are clustered by firm and year. \*, \*\* and \*\*\* denote the significance of two-tailed tests at the 10%, 5%, and 1% level of significance, respectively.

## 6. Conclusions and Discussion

### 6.1. Conclusions

Sustainable innovation is an important factor for enterprises to obtain core competitiveness in modern society [1], and government supervision can play a tremendous role in guiding the process of developing a competitive advantage in innovation in developing countries. This research paper takes Chinese A-share listed companies from 2015 to 2019 as the subject of the study. We analyze the effect of proactive regulatory models represented by inquiry letters on corporate catering motives for high sustainable R&D investment from the perspective of catering motives theory and market pressure theory. The results show that the RDILs have a regulatory effect on corporate catering motives of R&D investment. However, this regulatory effect is weakened under higher crash risk pressures, higher liquidity pressures, and greater short-selling pressures. Further analysis suggests that this regulatory effect is achieved specifically by reducing the level of subsequent strategic R&D classification manipulation of the company. The above results suggest that RDILs can reduce corporate catering incentives for high sustainable R&D investment and discourage corporate R&D expense manipulation, but the strength of the regulatory effect will be influenced by the capital market pressure faced by the companies.

### 6.2. Policy Implications

Our paper shows that it is necessary to formulate proactive regulatory models to guide enterprises to invest in R&D efficiently and sustainably, and we believe that our paper has the following policy implications.

First, this paper explores the sources of catering motives for high sustainable R&D investment and deepens the understanding of the motives for R&D investment of listed

companies. In the capital markets of developing countries, which are characterized by irrational investors and immature pricing mechanisms [44], corporate R&D investment catering behavior may lead to ineffective pricing mechanisms. This provides a new perspective that could improve our understanding of the significance of corporate sustainable R&D investment.

Second, the findings of this paper also have implications for how developing countries can rely on capital markets to stimulate innovation. The paper finds that inquiry-letter regulation can discourage corporate catering motives of R&D investment and improve the quality of firms' subsequent R&D investment. Therefore, this paper provides empirical evidence to support policy formulation on how developing country governments can better guide firms to make sustainable and healthy R&D investment decisions.

Finally, compared with developed countries, China's market economy is still imperfect [6]. The government should give greater scope to the basic role of the market in resource allocation and strengthen market competition. The findings of this paper also remind policymakers to fully respect and consider the realities of the market in the process of policy formulation and policy implementation.

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