

Research on Management Defense and Enterprise Innovation under Informatization

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ABSTRACT: The information development affects the Enterprise Management Defense, and then affects the enterprise innovation. This paper takes the non-financial listed companies in China's A-share market from 2013 to 2017 as samples to empirically study the impact of management defense on enterprise innovation. It is found that managerial defense inhibits enterprise innovation; compared with non-state-owned enterprises, managerial defense of state-owned enterprises has a more significant inhibitory effect on enterprise innovation. The results of this paper provide a basis for improving corporate governance structure, weakening management defense, promoting enterprise innovation, and help government departments deepen the reform of state-owned enterprises.

1 Introduction

Based on the theory of separation of two rights, when there is a conflict of interest between managers and shareholders, managers will take management defensive behavior in order to maintain their own job security and maximize their own interests^[1]. Management defense is a common phenomenon in China's Listed Companies, and it has an important impact on the company's capital structure, investment efficiency and dividend policy. Some scholars have found that management defense can cause short-sighted investment, leading to enterprises to reduce R & D Investment^[2]. There are also studies that show that in order to ensure the safety of their positions and maximize their effectiveness, managers will have risk aversion behavior, leading to the reduction of enterprise risk-taking level^[3]. The above analysis shows that management defense may indirectly affect enterprise innovation from R & D investment, enterprise risk-taking, innovation enthusiasm and other aspects, but few scholars directly investigate the impact of management defense on enterprise innovation from the perspective of innovation output.

This paper takes the number of patent applications of A-share listed companies from 2013 to 2017 as the analysis object, empirically tests the impact of management defense on enterprise innovation ability, and examines the moderating effect of institutional investor research. Compared with previous studies, the contributions of this paper are as follows: first, from the perspective of innovation output, it proves the inhibitory effect of managerial defense on enterprise innovation, enriches the relevant literature on managerial defense and enterprise innovation, helps enterprises to improve the governance mechanism, inhibit managerial defense behavior, and promote enterprise innovation and

long-term development; second, it distinguishes the nature of enterprises, and finds the relationship between managerial defense and enterprise innovation. The difference of enterprise innovation relationship between state-owned enterprises and non-state-owned enterprises provides the basis for deepening the reform of state-owned enterprises and improving the innovation ability of state-owned enterprises.

2 Theoretical Analysis and Research Hypothesis

Management defense refers to the behavior that the management chooses to consolidate their own position security and pursue the maximization of personal utility under the pressure of internal and external control mechanism of the enterprise. Due to the separation of the two rights and the existence of moral hazard, there is information asymmetry between the management and the shareholders. The management has more internal information about the company's operation than the shareholders. When there is a conflict of interest between the management and the shareholders, there will be defensive behavior of the management, which will damage the interests of the enterprise or shareholders^[4]. In addition, according to the risk aversion hypothesis, managers with management defense motivation also have a stronger risk aversion tendency, in order to reduce the risks faced by their positions and their own interests^[3], but it will lead to the reduction of enterprise risk-taking level. Because innovation itself has a certain risk, the reduction of risk-taking level will weaken the enthusiasm of enterprise innovation. However, innovation activities are the basis for enterprises to gain market competitive advantage, and the innovation ability

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of enterprises represents the future development potential of enterprises, which is in line with the long-term interests of enterprises and shareholders. To sum up, management defensive behavior is not conducive to enterprise innovation, and will damage the interests of enterprises and shareholders. Based on the above analysis, the following hypotheses are put forward:

H1: There is a negative correlation between managerial defense and enterprise innovation, that is, the enhancement of managerial defense will reduce enterprise innovation.

Management defense is a common phenomenon in China's listed companies, but in the context of China's special system, there are great differences in management defense among enterprises with different property rights^[2]. First of all, compared with non-state-owned enterprises, state-owned enterprises need to undertake more policy tasks, and executives of state-owned enterprises will more consider the influence of political factors when making business decisions^[5]. Secondly, state-owned enterprise executives are directly appointed by the government and have a short term of office. In order to meet the needs of government assessment in a short period of time and strive for promotion opportunities, they will pay more attention to short-term economic benefits and their own political goals in the business process, while non-state-owned enterprise executives are less affected by political factors and pay more attention to the long-term benefits and profit promotion of the enterprise^[6]. Thirdly, the compensation of state-owned enterprise executives can not benefit from the huge benefits brought by innovation due to the influence of "salary limit order". Therefore, compared with non-state-owned enterprise executives, state-owned enterprise executives have stronger management defense motivation. The owners of non-state-owned enterprises control the enterprises, so the supervision of the managers of state-owned enterprises is weaker than that of non-state-owned enterprises. Based on the above analysis, the following hypotheses are put forward:

H2: Compared with non-state-owned enterprises, the negative correlation between managerial defense and enterprise innovation is more significant.

3 Research Design

3.1 Sample Selection and Data Sources

Based on the sample of China's A-share listed companies from 2013 to 2017, this paper conducts the following screening according to the research practice: ① excluding ST and * ST companies; ② excluding financial companies; ③ excluding the samples with missing values in the observation samples; ④ in order to avoid the influence of extreme values, 1% and 99% Winsor treatment is carried out for all continuous variables in the samples; ⑤ according to the nature of the actual controllers of listed companies The samples are divided into state-owned and non-state-owned enterprises. After screening, 4998 effective observations

were obtained. The above survey data of institutional investors are from wind database, and other data are from CSMAR database. Stata 15.0 statistical analysis software is used for data processing and empirical analysis.

3.2 Variable Definition

(1) Management defense (MEI). This paper uses Li Bingxiang et al. (2018)^[7] as reference to the construction of management defense index. Without considering external control mechanism, the construction of defense degree variable of management is shown in Table 1. Six variables are selected from three aspects: personal characteristics of managers, incentive mechanism of managers and constraint mechanism of managers. The average value of these six variables is taken as the indicator of the defense level of management Mark, i.e. $MEI = (Age + Degree + Tenure + Share + Independent + Dua) / 6$

Table 1 Construction of Management Defense Index

Variable classification	Variable name	Variable definition
Personal characteristics of managers	Age of general manager	0 for those under 45 years old; 1 for those between 45 and 55 years old; 2 for those over 55 years old
	Degree of general manager	2 for specialty and below; 1 for undergraduate course; 0 for master's degree and above
	Tenure of general manager	0 for less than 3 years, 1 for 3 to 6 years and 2 for more than 6 years
The characteristics of incentive mechanism of managers	Shares held by general manager	If the shareholding ratio is greater than 0, take 0; if the shareholding ratio is 0, take 2
The characteristics of manager restraint mechanism	Proportion of independent directors	2 for less than 30%, 1 for 30% to 40% for 0 for more than 40%
	The chairman and the general manager are in one position	If the general manager concurrently serves as the chairman of the board, the assignment is 2; otherwise, it is 0

(2) Enterprise innovation (INNO). Referring to Zhou Donghua et al. (2019)^[8] for the definition of enterprise innovation (INNO) variable, this paper uses the natural logarithm of the number of patent applications plus one to measure enterprise innovation.

(3) Control variables. Referring to the relevant literature, this paper selects the company size (size), asset liability ratio (Lev), return on equity (ROE), growth opportunity (growth), investment opportunity (tobinq), equity concentration (first), board size (b size), enterprise establishment period (age), year factor, industry factor as

the control variables. The details are shown in Table 1.

Table 2 Variable Definition

Variable name	Variable code	Definition
Enterprise innovation	INNO	ln(Number of patent applications+1)
Management defense	MEI	See Table 1
Company size	Size	Natural logarithm of total assets at the end of the year
Asset liability ratio	Lev	Total liabilities / Total assets
Return on net assets	Roe	Net profit / balance of shareholders' equity
Growth opportunities	Growth	Growth rate of operating revenue (amount of operating revenue in current period of this year - amount of operating revenue in the same period of last year) / (amount of operating revenue in the same period of last year)
Investment opportunity	TobinQ	Market value / total assets
Ownership concentration	First	Shareholding ratio of the largest shareholder
Board size	Bsize	ln (number of directors)
Years of establishment	Age	Difference between sample year and establishment year
Particular year	Year	Control year
Industry	Industry	Control industry

3.3 Model Building

Based on the above analysis, in order to test the impact of management defense on enterprise innovation and the impact of institutional investor research on the relationship between management defense and enterprise innovation, this paper constructs the following model with reference to the research design of Yan Zhenli et al. (2019)^[9].

(1) Management defense and the return of enterprise innovation. In order to test hypothesis 1 and 2, we use formula (1) to study the relationship between managerial defense and enterprise innovation.

$$Ln(1 + INNO_{i,t+1}) = \alpha_0 + \alpha_1 MEI_{i,t} + \alpha_2 Size_{i,t} + \alpha_3 Lev_{i,t} + \alpha_4 Roe_{i,t} + \alpha_5 Growth_{i,t} + \alpha_6 TobinQ_{i,t} + \alpha_7 First_{i,t} + \alpha_8 Bsize_{i,t} + \alpha_9 Age_{i,t} + \alpha_{10} Industry_i + \alpha_{11} Year_t + \varepsilon \quad (1)$$

4 Empirical Analysis

4.1 Descriptive Statistics

Descriptive statistics of variables are reported in Table 3. The maximum value of management defense (MEI) is 1.500, and the minimum value is 0.167, which indicates that different enterprises have different degrees of management defense. Through the investigation of the average and median of the financial degree of Listed Companies in China, it is found that there is a large gap in the financial degree of Listed Companies in China. The descriptive statistics of other variables were in the normal range.

Table 3 Descriptive Statistics

	N	Min	Max	Mean	SD	P50
INNO	4998	0.000	7.276	3.115	1.395	3.178
MEI	4998	0.167	1.500	0.744	0.302	0.667
Size	4998	20.103	26.135	22.067	1.123	21.900
Lev	4998	0.050	0.849	0.397	0.190	0.384
Roe	4998	-0.325	0.270	0.066	0.070	0.064
Growth	4998	-0.456	2.166	0.162	0.307	0.113
TobinQ	4998	0.940	8.738	2.312	1.241	1.944
First	4998	0.085	0.748	0.342	0.138	0.327
Bsize	4998	1.792	2.708	2.153	0.165	2.197
Age	4998	5.000	29.000	15.258	4.961	15.000

4.2 Regression Analysis

(1)Regression analysis of managerial defense and enterprise innovation.

Table 4 reports the regression results of management defense (MEI) and enterprise innovation (INNO). From the regression results of the whole sample, we can see that the F value of the model is 64.520, and the R2 of the regression is 0.260, which is significant at the 1% level, indicating that the construction of the model is feasible, the fitting is good, and the empirical results are reliable. The regression coefficient of management defense (MEI) and enterprise innovation (INNO) is - 0.221, and it is significantly negative at the level of 1%. That is to say, the higher the defense level of the management, the easier the management to carry out self-interest behavior and reduce enterprise innovation, which supports hypothesis 1a. From the grouped regression samples, we can see that the regression coefficient of management defense (MEI) and enterprise innovation (INNO) in the state-owned samples is - 0.485, which is significantly negative at the 1% level, and the regression coefficient of

management defense (MEI) and enterprise innovation (INNO) in the non-state-owned samples is -0.115, which is significantly negative at the 10% level, which indicates that the management defense in the state-owned samples and the non-state-owned samples is opposite. However, compared with non-state-owned enterprises, the negative impact of state-owned enterprise management defense on enterprise innovation is more significant, which supports hypothesis 1b.

Table 4 Regression Analysis of managerial defense and enterprise innovation

Variable	Full sample	State owned sample	Non state owned sample
	regression coefficient	regression coefficient	regression coefficient
MEI	-0.211***	-0.485***	-0.115*
CVs	Yes	Yes	Yes
Annual effect	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes
R2	0.260	0.372	0.218
N	4998	1494	3504

The significance level is 1%. The significance level of * * is 5%, and the significance level of * * * is 10%.

5 Conclusion and Suggestion

With the development of information technology, we should use Internet technology such as blockchain to strengthen the supervision of management defense. Based on the relevant data of non-financial listed companies in A-share market from 2013 to 2017, this paper empirically analyzes the relationship between managerial defense and enterprise innovation, and further examines the differences of the above relationship among enterprises with different property rights, and draws the following conclusions: (1) in order to maintain their positions and maximize their own utility, managers will adopt managerial defense behavior, and managerial defense process is the most important. The enhancement of the degree of innovation will inhibit enterprise innovation. (2) Compared with non-state-owned enterprises, the negative correlation between managerial defense and enterprise innovation is more significant.

According to the above research conclusions, this paper puts forward the following policy suggestions: (1) the regulatory department should improve the understanding of management defense, guide enterprises to restrain management defense behavior and improve the innovation ability of enterprises by employing high-level management talents, designing reasonable salary mechanism and equity incentive system, and

improving the internal governance structure of the company. (2) Government departments should cultivate and improve the manager market of state-owned enterprises, establish a talent selection system, further deepen the reform of state-owned enterprises, promote the marketization process of China, give full play to the governance role of institutional investor research, restrain the defensive behavior of management, and improve the innovation ability of state-owned enterprises.

References

1. Morck Randall, Shleifer Andrei, Vishny Robert W. (1988) Management ownership and market valuation : An empirical analysis. *Journal of Financial Economics*, 20 (88):293-315.
2. Huang Guoliang, Yang Guang. (2018) Management defense, product market competition and R & D investment of enterprises. *Accounting communication*, (33): 82-84+102+129
3. Wu Jianxiang, Li Bingxiang. (2017) Management defense and risk bearing level of enterprises: the regulatory role of equity incentive. *Economic longitude*, 34 (05): 104-108
4. Wang Bing, Bao Shengying, Kan Jinghua. (2017) Can state audit restrain excessive investment of state-owned enterprises?. *Accounting research*, (09): 83-89 + 97
5. Zhang M , Lijun M , Zhang B , et al. (2016) Pyramidal structure, political intervention and firms' tax burden: Evidence from China's local SOEs. *Journal of Corporate Finance*, 36:15-25.
6. Shleifer A, Vishny R W.A. (1997) Survey of Corporate Governance. *The Journal of Finance*, 52 (2):737-783.
7. Li Bingxiang, Liu Shuxin, Chen Ying. (2018) Research on the influence of managerial defense on the choice of financial asset classification accounting policy -- Based on the moderating effect of separation of two rights. *Economic and management review*, 34 (01): 82-95
8. Zhou Donghua, Huang Jia, Zhao Yujie. (2019) Employee stock ownership plan and enterprise innovation. *Accounting research*, (03): 63-70
9. Yan Zhenli, Liang Shangkun, Yuan Chun. (2019) Vertical concurrent management, institutional environment and enterprise innovation. *Economic management*, 41 (10): 90-107