Can Non-controlling Large Shareholders' Exit Threats Promote Corporate Innovation Empirical Research Based on Corporate Governance

Xiyan Bai

Macao University of Science and Technology, Macao, 999078, China

Abstract: Traditional research believes that the threat of non-controlling major shareholders' withdrawal has an important impact on the effectiveness of corporate governance. However, the existing theoretical research lacks due attention to the influence mechanism contained in the above relationship, so this paper attempts to make up for this deficiency. This paper uses the data of A-share listed companies from 2007 to 2018 to study the relationship and impact mechanism between the exit threat of non-controlling major shareholders and enterprise innovation. The research finds that, first, the threat of non-controlling major shareholders' withdrawal can significantly enhance enterprise innovation. Secondly, from the analysis of adjustment mechanism, it is found that when more government subsidies are received, it will strengthen the positive effect of the withdrawal threat of non-controlling major shareholders and enterprise innovation. When enterprises face high industry concentration, it will weaken the positive effect of the exit threat of non-controlling major shareholders and enterprise innovation. This provides evidence support for the positive impact of the non-controlling major shareholders' withdrawal threat on the enterprise, thus deepening the research framework of the governance effect of non-controlling major shareholders.

1. Introduction

Enterprise innovation is the source of its ability to establish core competitive advantage and sustainable development [1], which is more significant for Chinese enterprises in the process of strategic transformation and adjustment. Since the goal of building an innovative country was put forward in 2006, our government has attached great importance to enterprise innovation. The report of the 19th National Congress of the Communist Party of China emphasized the need to firmly implement the innovation driven development strategy, and clearly pointed out that "innovation is the first driving force for development and the strategic support for the construction of a modern economic system." In addition, according to the 2018 Global Scientific and Technological Innovation Report released by KPMG, based on the effectiveness of the enterprise's operation mode and current practice, it is pointed out that innovation is the key element for enterprises to achieve sustainable development. However, in the context of the transformation and upgrading of enterprises in China, the cost advantage of the original labor force has gradually weakened, and the driving force for development is turning to rely on the ability of technological innovation. The importance of innovation is more important [5].

In fact, a reality that cannot be ignored is that although China's investment in R&D has been steadily increasing year by year, the overall innovation level still needs to be improved. According to the ranking of the "Global Innovation Index" released by the World Intellectual Property Organization in 2019, China ranks 14th. Although the ranking has steadily increased year by year, this ranking

is not commensurate with China's position as the world's second largest economy. Therefore, how to improve the innovation capability of enterprises is of great significance for innovation to drive the high-quality development of China's economy and promote the development of enterprises.

Looking back on the existing research, it is found that enterprise innovation has become the hot issue of general concern in academia [6]. The existing scholars study the internal and external factors that affect enterprise innovation from different perspectives. For example, the internal influencing factors in the existing literature include inter-generational inheritance [7], CEO risk bearing tendency 8, equity and control [5], state-owned equity participation [9], governance structure (such as the board of directors) [9], and capital market pressure [10], while the external influencing factors include institutional environment, degree of intellectual property protection [13], government policies, and institutional investors [14]. However, although the above existing research has promoted the development of the field of enterprise innovation, there are some improvements in the research on the influencing factors of enterprise innovation: firstly, non-controlling major shareholders in enterprises have an important influence on their management decisions, and play an important role in corporate governance [15]. Secondly, the ownership structure determines the equity allocation of the company, which is the logical starting point of corporate governance [16]. In addition, the traditional theory holds that the major shareholders play a major role in corporate governance through the supervision mechanism and withdrawal threat. However, for the impact of the withdrawal threat of non-controlling major shareholders on enterprise innovation, and the corresponding impact mechanism and other issues, there is little research on this in the existing literature. Therefore, based on the perspective of enterprise innovation, this paper discusses the relationship between the withdrawal threat of non-controlling major shareholders and enterprise innovation and its impact mechanism, which has important theoretical value.

In view of this, this paper uses all A-share listed companies from 2007 to 2018 as research samples, based on corporate governance theory, to empirically test the relationship between the exit threat of non-controlling major shareholders and enterprise innovation, and to examine the moderating effect of government subsidies and industry concentration on the above relationship. The theoretical significance of this paper is as follows: Firstly, it expands the understanding of the factors influencing

enterprise innovation from the perspective of governance effects of the withdrawal threat of non-controlling major shareholders, and enriches the literature research on enterprise innovation. Secondly, it provides empirical evidence from emerging capital market countries for the non-controlling shareholders' withdrawal threat as a corporate governance mechanism, and further enriches and develops the literature in the field of large shareholders' governance. Thirdly, this paper brings the situational factors of government subsidies and industry concentration into the analysis framework to explore their moderating effect on the relationship between the withdrawal threat of non-controlling major shareholders and enterprise innovation, making up for the limitations of previous literature that paid less attention to the discussion of situational mechanisms.

2. Theory and Hypothesis

(1) The threat of non-controlling majority shareholders' withdrawal and enterprise innovation

Traditional theories believe that the supervision of large shareholders over managers is the main mechanism for them to play their governance role [18]. In the real corporate governance activities, the credible threat of withdrawal of non-controlling major shareholders can also effectively play a governance role. According to the theory of exit threat governance, the majority shareholders in the position of information superiority will punish the managers' selfish behavior by means of "voting with their feet". Because the exit threat will change the cognition of enterprise decision makers, and then achieve corporate governance by influencing management decisions. As informed traders, non-controlling major shareholders hold more private information of the company, which has an important impact on the company's share price in the capital market. The withdrawal of non-controlling major shareholders will increase the information content of the stock, transmit negative signals to the market, trigger the decline of stock prices, and thus play a role in corporate governance [18]. Moreover, due to the high risk of innovation activities, their "technology spillover" effect will also lead to a high degree of disagreement [19]. At this time, how to reach consensus on the implementation of innovation activities is a key concern of managers. However, the key source of interest conflict between shareholders and management is the short-sighted behavior of management, which can be reduced through various corporate governance mechanisms [20]. Recent corporate governance research shows that non-controlling major shareholders

15

can effectively perform their governance role through their trading behavior or "foot voting" [21]. Therefore, non-controlling major shareholders can produce governance effects through the threat of withdrawal, which has an important impact on enterprise innovation decisions.

This paper argues that the withdrawal threat of non-controlling major shareholders, as an effective governance mechanism, can promote controlling shareholders to implement enterprise innovation activities. On one hand, the governance mechanism believes that the withdrawal threat of non-controlling major shareholders can alleviate the short-sighted behavior of the management, alleviate the agency problem, and thus promote enterprise innovation. On the other hand, the information mechanism believes that the non-controlling major shareholders can alleviate the information asymmetry between the enterprise and external investors. In particular, the non-controlling major shareholders have more information and control advantages at the enterprise level. As informed traders, the withdrawal of major shareholders will send adverse signals to the market and have a negative impact on the company's stock price. Under the centralized ownership structure, although the decline of share price is difficult to lead to the transfer of control [22], it will directly damage the interests of the controlling shareholders who hold more shares of the company. In a word, when the non-controlling major shareholders have the threat of withdrawal, their competitive role will lead to more information being included in the company's shared price, and the enterprise will face higher risk of control transfer, which will have an adverse impact on the company's share price. Therefore, the threatened managers and controlling shareholders will have strong motivation to reduce their private interest behavior in advance, which will help the enterprise management to choose long-term risk projects with positive net present value, thus promoting the enterprise's innovation decision-making [23]. For example, Helling using large American enterprises as data, the study found that the threat of non-controlling major shareholders' withdrawal can restrain managers' short-sighted behavior, reduce agency problems, and promote enterprise innovation.

From the above analysis, it can be seen that with the increase of the withdrawal threat of non-controlling large shareholders, the myopic behavior of managers is constrained. At the same time, the withdrawal of non- controlling large shares will send adverse signals to the external capital market, which will have a negative impact on the company's share price. Therefore, it urges enterprises to

enhance their willingness to innovate. Driven by the innovation willingness of managers, the innovation level of enterprises will inevitably be improved. Based on the above analysis, this paper proposes the following assumptions.

H1: The threat of non-controlling major shareholders' withdrawal has a significant positive impact on enterprise innovation.

(2) Regulatory role of government subsidies: supervisory effect

Government subsidies are financial funds that the government grants to enterprises free of charge to achieve specific economic and social development goals [25]. This policy is manifested in enriching the cash flow of the micro market entities, increasing the income and profits of the micro market entities. The subsidy income is deterministic, and the government and its financial departments will designate and guide the use of income. In order to promote R&D innovation of enterprises, the government generally adopts financial subsidies as the main policy tool.

On one hand, when the government grants more subsidies to enterprises, it shows that the government as an external force has more significant "support behavior" for enterprises, correspondingly, the higher degree of concern, and the stronger the regulatory role of enterprises, which will promote the governance effect of non-controlling major shareholders to withdraw from the threat more obvious. This is because when the exit threat increases, it will face higher control transfer risk and equity decline effect, which will have a greater adverse impact on the enterprise, thus strengthening the promotion effect of the exit threat on enterprise innovation to deal with possible adverse economic consequences. Therefore, this paper believes that government subsidies will affect the intensity of the government's attention to corporate governance, promote managers to have a more long-term oriented will and behavior, and thus affect the effect of the withdrawal threat of non-controlling major shareholders on corporate governance. On the other hand, support for enterprise innovation projects will be affected by government subsidies. When the government subsidies are more, the enterprises will get more government funds, which is conducive to directly reducing the R&D costs of enterprises, encouraging enterprises to carry out new product R&D, making enterprises face the threat of non-controlling major shareholders' withdrawal will have more funds to invest in enterprise innovation, easing the financing difficulties of enterprises, and improving the innovation ability of enterprises. Therefore, the government subsidy provides an important source of funds for enter-

prise innovation, enhances the redundancy of enterprise innovation resources, and thus strengthens the positive effect of the withdrawal threat of non-controlling major shareholders on enterprise innovation. Based on this, the following assumptions are proposed.

H2: When the government subsidies are more, it will strengthen the positive effect of the withdrawal threat of non-controlling major shareholders on enterprise innovation.

(3) Regulation of industry concentration: competition effect

The characteristics of the external environment in which the enterprise is located, especially the degree of industry concentration in the environment, are important external factors that affect the effectiveness of corporate governance [26]. With the improvement of industry concentration, market monopoly gradually replaces market competition. When the concentration of external industries is higher, the lack of full competition among companies, the increase of information asymmetry, and the agency problem are accompanied by the relatively centralized industry structure. At this time, the competition elimination mechanism is not conducive to the exertion of the governance effect of the non-controlling major shareholders' withdrawal threat [33], thus weakening the promotion effect of the withdrawal threat on enterprise innovation. On the contrary, the lower the concentration of external industries, the more intense the competition of external enterprises. In order to obtain the legitimacy of survival and improve the development ability of enterprises, the governance effect of the withdrawal threat of non-controlling major shareholders is more obvious, prompting managers to conduct long-term innovative investment behavior, which is conducive to the improvement of enterprise innovation level. Therefore, this paper believes that the external industry concentration will affect the governance effect of the exit threat of non-controlling major shareholders, change the innovation attitude and willingness of management decision makers, and then affect the innovation activities of enterprises. The higher the industry concentration, the weaker the relationship between the exit threat and enterprise innovation. Accordingly, the following assumptions are made:

H3: When the industry concentration is higher, it will weaken the positive effect of the exit threat of non-controlling major shareholders on enterprise innovation.

3. Research Design

3.1 Data Source and Sample Selection

The research sample of this paper is selected from Shanghai and Shenzhen A-share listed companies from 2007 to 2018. The data mainly come from the CSMAR database, including financial data, corporate governance data and R&D innovation data. In order to ensure the rationality and representativeness of the sample, with reference to the research of Li Chuntao et al. (2020) [27], the sample screening is as follows: (1) ST share companies with very poor performance and delisted companies are excluded. (2) Exclude listed companies in banking, securities, insurance and other financial industries. (3) Eliminate the data with serious missing. (4) In order to eliminate the influence of outliers, all continuous variables used in this paper are subject to 1% Winsor processing. The sample involves 25253 annual observations from 2007 to 2018.

3.2 Variable Definition

1) Dependent variable

Enterprise innovation. Referring to existing research, this paper uses patent application indicators to measure enterprise innovation, because the number of patents applied by enterprises reflects the utilization efficiency of input resources, and can better reflect the ability of technological innovation [28]. It uses the natural logarithm of the total number of enterprise patent applications plus 1 to measure the innovation output (Patent) of enterprises. Considering that the annual number of patent applications of many sample enterprises is 0, the enterprise innovation needs to add 1 to the number of patents to take the natural logarithm. Refer to the classification of patents by Li Wenjing and Zheng Manni (2016) [29] to investigate the impact of the withdrawal threat of non-controlling major shareholders on different types of patents. Therefore, this paper uses the natural logarithm of the enterprise's invention patent plus 1 to measure the enterprise's invention patent innovation (Patent l), and uses the natural logarithm of the sum of the number of utility model patents and design patents plus 1 to measure the enterprise's non invention patent innovation (Patent 2).

2) Independent variable

Exit threat of non-controlling major shareholders (NET). This paper draws on the methods of Chen Kejing (2019) [18] and Dou et al. First, stock liquidity (SL): Drawing on the ideas of Dou et al. (2018) [30], the average daily turnover rate of tradable shares is used as the proxy variable of liquidity. Second, the degree of competition of major shareholders (BHC) is constructed as follows:

$$BHC_{i,t} = \sum_{k=1}^{N} \left(\frac{NCLS_{k,i,t}}{SSBH_{i,t}} \right)^2 \tag{1}$$

Among them, it is the degree of competition of the

non-controlling major shareholder of the I enterprise in year T, and it is the K non-controlling major shareholder of the I enterprise in year The shareholding ratio of is the sum of the shareholding ratios of all major shareholders of the I enterprise in year T. The shareholding ratio here refers to the proportion of outstanding shares held.

Finally, build a measurement model of the exit threat of non-controlling major shareholders, as follows:

$$NET_{it} = SL_{it} \times BHC_{it} \qquad (2)$$

3) Regulating variable

This paper further discusses the regulatory mechanism of the threat of non-controlling major shareholders' withdrawal affecting enterprise innovation, and tests the regulatory effects of government subsidies and industry concentration respectively. The specific variables are as follows: The government subsidies (Sub) refer to the research of Yang Zhiqing et al. (2019) [31], and use the ratio of the total value of government subsidies to the total assets of enterprises to measure. In the above "total value of government subsidies", including the total amount of tax incentives, the total assets are the total assets at the end of the period; For the measurement of industry concentration (HHI), refer to the research of Yang Xingquan (2015) [32], and use the Huffindall index (company operating income/total industry operating income) to measure industry concentration. The larger the value, the higher the industry concentration.

4) Control variable

With reference to the research of Chen Kejing (2019) [18], Qian et al. Cash flow (CF) and current ratio (Liquidity), etc. Variable definitions are shown in Table 1.

Table 1. Definition of main variables.

Variable Type	Variable Symbolic	Variable Name	Variable Definition
Interpreted variable	*Patent*	Total number of patent applications	Total number of patent applications (invention, utility model and design)
	Patent1	Number of invention patent applications	Number of invention patent applications
	Patent2	Number of non-invention patent applications	Number of non-invention patent applications
Explanatory variable	*NET*	Threat of withdrawal of non-controlling major shareholders	Stock liquidity and competition degree of non-controlling major shareholders Number of invention patent applications Number of non-invention patent applications
Regulating variable	*Sub*	government grants	Total government subsidies/total assets
	HHI	Industry concentration	Measured by Herfindahl index
control variable	*Size*	Enterprise scale	Natural logarithm of total assets
	Top1	Ownership of actual controller	Shareholding ratio of actual controller
	Dualiy	Integration of two positions	When the CEO concurrently serves as the chairman, take 1; otherwise, take 0
	Board	Board size	Natural logarithm of the number of directors
	Inde	Independent director ratio	Number of Independent Directors/Number of Directors
	CF	cash flow	Net cash flow from operating activities/total assets
	Lev	Asset liability ratio	Total liabilities/total assets
	Liquidity	Current ratio	Current assets/current liabilities
	Roa	Return on assets	Net profit/total assets
	Growth	Corporate growth	Growth rate of total assets at the end of the year

3.3 Model Construction

For testing the impact of the exit threat of non-controlling major shareholders on enterprise innovation, the explained variable of this study, enterprise innovation (the logarithm of patent data), presents a mixed feature of zero value accumulation (Pile) and positive continuous distribution. For this data structure, with reference to the method of Zhu Bing et al. (2018) [33], the following Tobit regression model is constructed [because the dependent variable - the number of patent applications is the data with 0 as the lower limit.] Conduct empirical analysis. In order to mitigate the impact of endogenous problems to a certain extent, the independent variables in the model are delayed by one period. In addition to the consideration of endogenous problems, according to the 2015 China Patent Survey Data Report issued by the State Intellectual Property Administration, 67.3% of enterprises' patent research and development cycles are less than 2 years. Considering the lagging effect of the threat of non-controlling major shareholders' withdrawal on enterprise innovation, the independent variables are delayed in this paper.

$$Patent_t = \beta_0 + \beta_1 \times NET_{t-1} + \beta_2 \times SL_t + \beta_2 \times BHC_t + \gamma \times Controls_t + \varepsilon_t \quad (3)$$

Among them, the explained variable represents the enterprise innovation level in the year, which is measured by the logarithm of the number of enterprise patent applications plus 1; Explanatory variable indicates the withdrawal threat of the non-controlling major shareholders in the year of the enterprise, based on the stock liquidity and the degree of competition of the non-controlling major shareholders (SL×BHC) measurement; It refers to the control variable at the enterprise level. Represents a random error term. In order to avoid the impact of clustering effect on the standard error of regression coefficient at the individual level of the company, this paper also conducts cluster processing at the company level.

For test the impact of government subsidies and concentration levels of different industries on the relationship between the exit threat of non-controlling major shareholders and enterprise innovation, this paper adds the variables of government subsidies (Sub), industry concentration (HHI) and their respective cross terms NETS and NETH with the exit threat of non-controlling major shareholders (NET) as indicators to examine the regulatory effect. Therefore, based on this, the regression model is established as follows:

$$Patent(Patent1, Patent2)_t = \beta_0 + \beta_1 \times NET_{t-1} + \beta_2 \times SL_t + \beta_3 \times BHC_t + \beta_4 \times Sub_{t-1} + \beta_5 \times NET_{t-1} \times Sub_{t-1} + \gamma \times Controls_t + \varepsilon_t \quad (4)$$

$$Patent(Patent1, Patent2)_t = \beta_0 + \beta_1 \times NET_{t-1} + \beta_2 \times SL_t + \beta_3 \times BHC_t + \beta_4 \times HHI_{t-1} + \beta_5 \times NET_{t-1} \times HHI_{t-1} + \gamma \times Controls_t + \varepsilon_t \quad (5)$$

In the above formula, variables such as government subsidies (Sub) and industry concentration (HHI) lag by one period. In addition to considering endogenous issues, there is a lag of one period here, because senior executives' financial background, organizational redundancy and equity concentration may have a lag of about one year in influencing enterprise patent output. In order to alleviate endogenous problems. This paper mainly investigates the significance of the regression coefficient of the across multiplication term. Other variables are the same as Equation (3).

3.4 Descriptive Statistics

This paper first makes descriptive statistics on the main variables, and the analysis results are shown in Table 2. Then, this paper compares the mean difference of the main variables with and without the exit threat of non-controlling major shareholders, and the analysis results are shown in Table 3. It can be seen from Table 2 that in the sample period, the average value of the total number of patent applications (Patent) in the innovation output variables of enterprises is 1.2071, the minimum value is 0, and the maximum value is 8.8642, which is similar to the research results in the previous literature [14]. The average value of the non-controlling major shareholders' withdrawal threat (NET) is 0.2284, which indicates that the non-controlling major shareholders' withdrawal threat is widespread in China's listed enterprises. Other control variables are shown in Table 2 and will not be described.

Table 3 shows that under the influence of the withdrawal threat of non-controlling major shareholders, the average value of Patent is 1.250. Without the influence of the withdrawal threat of non-controlling major shareholders, the average value of Patent is 1.130, the difference between the two is -0.12, and it is significant at the 1% level. The results of mean difference analysis preliminarily support the conclusion that the withdrawal threat of non-controlling major shareholders will promote enterprise innovation.

In addition, this paper also conducted Patent correlation test, as shown in Table 4, no multiple collinearity problem was found between the explained variable and the explanatory variable, and the correlation coefficient between the exit threat of non-controlling major shareholders () and enterprise innovation () was 0.026, which was significant at the level of 1%, further supporting the conclusion that the exit threat of non-controlling major shareholders would promote enterprise innovation.

Table 2. Basic Statistical Characteristics of Main Variable.

Variable name	Observations	Mean value	Standard deviation	Minimum	Median	Maximum
Patent	25253	1.2071	1.5615	0.0000	0.0000	8.8642
Patent1	25253	0.8221	1.2387	0.0000	0.0000	8.5694
Patent2	25253	0.8753	1.3526	0.0000	0.0000	8.3018
NET	25253	0.2284	0.3697	0.0000	0.0779	2.0253
SL	25253	3.3565	3.2297	0.1929	2.3163	17.6879
BHC	25253	0.0654	0.0689	0.0000	0.0439	0.2400
Size	25253	22.0540	1.4199	19.1137	21.8478	27.0010
Board	25253	2.1480	0.2075	1.6094	2.1972	2.7081
Inde	25253	0.3727	0.0527	0.3077	0.3333	0.5714
Duality	25253	1.7149	0.4875	0.0000	2.0000	2.0000
Top1	25253	34.8965	14.9936	8.9912	32.9000	75.1600
Lev	25253	0.4463	0.2233	0.0482	0.4353	1.0325
Liquidity	25253	2.3949	2.7049	0.0000	1.5725	18.0746
Growth	25253	0.4578	1.4642	-0.7904	0.1208	11.4549
CF	25253	0.0389	0.0764	-0.2150	0.0398	0.2520

Table 3. Results of mean difference test.

Variable name	G1(0)	Mean value1	G2(1)	Mean value2	Mean difference
Patent	8684	1.130	16569	1.250	-0.12***
Patent1	8684	0.780	16569	0.840	-0.06***
Patent2	8684	0.830	16569	0.900	-0.07***
Size	8684	22.15	16569	22	0.15***
Board	8684	2.150	16569	2.150	0
Inde	8684	0.370	16569	0.370	0
Duality	8684	1.760	16569	1.690	0.08***
Top1	8684	40.70	16569	31.85	8.85***
Lev	8684	0.490	16569	0.430	0.06***
Liquidity	8684	1.970	16569	2.620	-0.65***
Growth	8684	0.480	16569	0.440	0.04**
CF	8684	0.0400	16569	0.0400	0.00**
Roa	8684	0.0300	16569	0.0400	-0.01***

Table 4. Correlation coefficient between variables.

	Patent	Patent1	Patent2	NET_{t-1}	SL	BHC	Size	Board
Patent	1							
Patent1	0.912***	1						
Patent2	0.922***	0.741***	1					
NET_{t-1}	0.026***	0.008	0.019**	1				
SL	0.057***	0.022***	0.049***	0.328***	1			
BHC	0.015**	0.017***	0.00400	0.585***	0.057***	1		
Size	0.059***	0.104***	0.070***	-0.242***	-0.341***	-0.032***	1	
Board	0.017***	0.034***	0.011*	-0.055***	-0.114***	0.033***	0.304***	1
Inde	0.00400	0.00700	0.00800	0.00100	0.012*	-0.00700	0.00600	-0.499***
Duality	-0.027***	-0.023***	-0.018***	-0.083***	-0.122***	-0.038***	0.144***	0.166***
Top1	0.047***	0.032***	0.064***	-0.313***	-0.024***	-0.501***	0.188***	0.016**
Lev	-0.106***	-0.077***	-0.067***	-0.173***	-0.215***	-0.074***	0.448***	0.188***
Liquidity	0.066***	0.052***	0.031***	0.163***	0.216***	0.080***	-0.317***	-0.146***
Growth	-0.088***	-0.073***	-0.080***	-0.00900	-0.020***	-0.023***	-0.00800	-0.042***
CF	0.055***	0.056***	0.045***	-0.039***	-0.036***	-0.018***	0.035***	0.043***
Roa	0.122***	0.113***	0.096***	0.039***	0.074***	0.00300	0.00300	0.014**

4. Empirical Test Results

(1) Basic regression results

Table 5 reports the results of the impact of the exit threat of non-controlling major shareholders on enterprise innovation. Control variables are added to each regression column. It can be seen from the table that, for example, the regression coefficient of the exit threat () of non-controlling major shareholders in column 1 is 0.3781, which is significant at the 1% level. This shows that the threat of non-controlling major shareholders' withdrawal has a significant positive impact on enterprise innovation. It shows that the threat of non-controlling major shareholders' withdrawal makes enterprises make innovation oriented decisions, which is conducive to improving the level of enterprise innovation output. The coefficients of columns (2) and (3) NET_{t-1} are 0.2303 and 0.4782, respectively, and both are significant at the 1% level, which further illustrates that the threat of non controlling major shareholders' withdrawal can effectively promote enterprise innovation. Hypothesis 1 of this paper passes the test. In addition, there is a significant positive correlation between stock liquidity (SL_t) and enterprise innovation ($Patent_t$) at the level of 5%, indicating that good liquidity can enhance enterprise innovation, while the degree of competition between non-controlling major shareholders and enterprise innovation coefficient is not significant, indicating that the corporate governance effect of exit threats is more caused by stock liquidity factors, while the competition between controlling major shareholders does not have a direct impact on innovation. From the perspective of control variables, when the company (Size) is larger, the performance is better (Roa), and the asset liability ratio is lower (Lev), the enterprise innovation performance is better, which is basically similar to the research [9,14] results in the existing literature.

(2) Regulation effect analysis

This paper further tests the moderating effect of government subsidies (Sub) and industry concentration (HHI). The empirical results are shown in Table 6. It can be seen from the table that the regression coefficients of the NETS in columns (1) to (3) are positive and significant at the level of 1%, which means that when more government subsidies are given, more attention will be paid to innovation activities by non-controlling major shareholders' withdrawal threats, which means that government subsidies not only provide enterprises with sources of capital innovation funds, but also serve as an external regulatory mechanism to supervise enterprise managers and improve the willingness and long-term orientation of innovation, This is conducive to giving play to the effect of exit threat governance, thus promoting enterprise innovation decision-making. Therefore, government subsidies can strengthen the promotion effect of the withdrawal threat of non-controlling major shareholders on enterprise innovation. Hypothesis 2 passed the test. Similarly, the regression coefficients of the intersection item (NETH) in columns (4) to (6) are significantly negative. When the concentration of external industries is higher, it will weaken the positive impact of the withdrawal threat of non-controlling major shareholders on enterprise inno-

vation, which indicates that the relatively concentrated industrial competition structure is accompanied by a lack of full competition between companies, increased information asymmetry, and more prominent agency problems, And enterprises in highly concentrated industries tend to adopt "collusion", which is not conducive to enterprise innovation. Therefore, the increase of industry concentration will weaken the positive relationship between the exit threat of non-controlling major shareholders and enterprise innovation. Hypothesis 3 passed the test. In general, the moderating effect of this study has passed the empirical test, that is, government subsidies and industry concentration as the scenario mechanism have a significant moderating effect on the relationship between the withdrawal threat of non-controlling major shareholders and enterprise innovation.

Table 5. Exit Threat of Non-controlling Major Shareholders and Enterprise Innovation

	(1)	(2)	(3)
	$Patent_t$	$Patent2_t$	$Patent3_t$
NET_{t-1}	**0.3781*****	**0.2303*****	**0.4782*****
	(4.6071)	**(2.9725)**	**(5.2386)**
SL_t	0.0287**	0.0189	0.0396***
	(2.1068)	(1.4707)	(2.7075)
BHC_t	-0.1758	-0.0648	-0.4701
	(-0.2633)	(-0.1028)	(-0.6430)
$Size_t$	0.5438***	0.5349***	0.5335***
	(11.5321)	(11.9269)	(11.0792)
$Board_t$	0.4486*	0.4647**	0.2344
	(1.8921)	(2.0971)	(0.9257)
$Inde_t$	0.3952	0.6002	0.1692
	(0.5298)	(0.8629)	(0.2093)
$Duality_t$	-0.0689	-0.0918	-0.0366
	(-1.0504)	(-1.4912)	(-0.5011)
$Top1_t$	0.0075**	0.0029	0.0101***
	(2.4260)	(0.9924)	(3.1004)
Lev_t	-1.0817***	-0.7187***	-0.9260***
	(-4.2018)	(-3.1041)	(-3.3459)
$Liquidity_t$	-0.0137	0.0058	-0.0252
	(-0.9670)	(0.4632)	(-1.4757)
$Growth_t$	-0.0885***	-0.0785***	-0.0893***
	(-3.9006)	(-3.5215)	(-3.7777)
CF_t	0.0449	0.0846	-0.1474
	(0.1098)	(0.2207)	(-0.3357)
Roa_t	3.2758***	3.3014***	2.5805***
	(5.8176)	(6.1969)	(4.2437)
$Constant_t$	-14.0669***	-14.2081***	-14.3830***
	(-12.1377)	(-12.8207)	(-11.9502)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
N	17738	17738	17738
Pseudo R^2	0.2147	0.2060	0.1868

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ The value in parentheses is t; The following tables are the same.

Table 6. Adjustment Effect of Government Subsidies and Industry Concentration.

	(1)	(2)	(3)	(4)	(5)	(6)
	$Patent_t$	$Patent1_t$	$Patent2_t$	$Patent_t$	$Patent1_t$	$Patent2_t$
NET_{t-1}	0.3820***	0.2342***	0.4928***	0.3810***	0.2320***	0.4693***
	(4.7005)	(3.0414)	(5.4273)	(4.6589)	(3.0012)	(5.1515)
SL_t	0.0227*	0.0140	0.0343**	0.0277**	0.0182	0.0385***
	(1.6833)	(1.0982)	(2.3541)	(2.0380)	(1.4221)	(2.6391)
BHC_t	-0.4463	-0.3679	-0.7057	-0.2138	-0.0902	-0.5104
	(-0.6803)	(-0.5937)	(-0.9710)	(-0.3207)	(-0.1432)	(-0.6994)
Sub_{t-1}	5.8177***	7.8800***	3.4255			
	(2.9741)	(4.0499)	(1.5243)			
NETS	**23.9843*****	**24.5780*****	**15.2893****			
	(4.6219)	**(4.6850)**	**(2.2447)**			
HHI_{t-1}				2.0554***	1.4301***	2.6356***
NETH				**-1.4796****	**-1.0023***	**-2.1152*****
				(-2.4995)	**(-1.7307)**	**(-3.0811)**
$Size_t$	0.5058***	0.5094***	0.4998***	0.5455***	0.5362***	0.5359***
	(10.3805)	(11.0950)	(9.9806)	(11.5494)	(11.9319)	(11.1213)
$Board_t$	0.4013*	0.4071*	0.2066	0.4412*	0.4591**	0.2268
	(1.6878)	(1.8420)	(0.8052)	(1.8643)	(2.0753)	(0.8980)
$Inde_t$	0.2983	0.5016	0.1131	0.3628	0.5771	0.1316
	(0.3993)	(0.7198)	(0.1388)	(0.4877)	(0.8312)	(0.1630)
$Duality_t$	-0.0739	-0.0940	-0.0430	-0.0711	-0.0934	-0.0380
	(-1.1284)	(-1.5295)	(-0.5869)	(-1.0868)	(-1.5187)	(-0.5217)
$Top1_t$	0.0063**	0.0016	0.0092***	0.0074**	0.0028	0.0099***
	(2.0697)	(0.5704)	(2.8189)	(2.3914)	(0.9628)	(3.0515)
Lev_t	-1.0534***	-0.7452***	-0.8852***	-1.0851***	-0.7214***	-0.9307***
	(-4.0422)	(-3.1766)	(-3.1556)	(-4.2239)	(-3.1199)	(-3.3704)
$Liquidity_t$	-0.0181	0.0008	-0.0288*	-0.0152	0.0048	-0.0271
	(-1.2944)	(0.0661)	(-1.6833)	(-1.0796)	(0.3829)	(-1.5971)
$Growth_t$	-0.0820***	-0.0735***	-0.0835***	-0.0898***	-0.0795***	-0.0912***
	(-3.4725)	(-3.1878)	(-3.3783)	(-3.9501)	(-3.5574)	(-3.8406)
CF_t	-0.1372	-0.0606	-0.3326	-0.0114	0.0460	-0.2158
	(-0.3292)	(-0.1553)	(-0.7386)	(-0.0279)	(0.1199)	(-0.4908)
Roa_t	3.4830***	3.4518***	2.7181***	3.2545***	3.2863***	2.5606***
	(6.0899)	(6.3356)	(4.3910)	(5.7790)	(6.1641)	(4.2089)
$Constan_t$	-12.8069***	-13.2509***	-13.2481***	-13.9955***	-14.1670***	-14.2987***
	(-10.9471)	(-12.0085)	(-10.7988)	(-12.1028)	(-12.8093)	(-11.9136)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	16821	16821	16821	17738	17738	17738
Pseudo R^2	0.2110	0.2021	0.1819	0.2152	0.2062	0.1875

(3) Endeogeneity and robustness test

Firstly, consider potential sample selection errors. In order to reduce the impact of the self-selection effect between the exit threat of non-controlling major shareholders and enterprise innovation, this paper uses Heckman two-stage method to test. In Heckman's Probit regression model in the first stage, first set the interpreted variable as the dummy variable NET_ D. According to whether NET is greater than the median of the sample, 1 is taken if it is greater than the median, indicating that the enterprise has a high threat of non-controlling major shareholders' withdrawal, otherwise 0 is taken. At

the same time, referring to the research of scholars, this paper adds the proportion of companies with non-controlling majority shareholders' exit threat (IV ind) in the industry of the company last year to the first stage model as a tool variable of non-controlling majority shareholders' exit threat for two-stage regression. The empirical results of Heckman two-stage model are shown in Table 7. It can be seen from the results in Column 7 (1) of Table that in the first stage of Probit regression, the regression coefficient of the tool variable (IV ind) is 1.3875,

and it is significantly positively correlated with the endogenous explanatory variable (NET_{t-1}) at the 1% level, so there is no "weak tool variable" problem. Although Lambda's regression system in Heckman's second stage regression results The number is significantly negative, but at the same time, NET_{t-1} is still significantly positive at the level of 1%, indicating that the main results of this paper on the positive correlation between the exit threat of non-controlling major shareholders and the level of enterprise innovation are still stable.

Table 7. Exit Threat of Non-controlling Majority Shareholders and Enterprise Innovation: Hekman Two stage Model.

	(1)	(2)	(3)	(4)
	Phase I	Phase II		
	NET_D	$Patent_t$	$Patent1_t$	$Patent2_t$
NET_{t-1}		**0.3818*****	**0.2328*****	**0.4823*****
		(4.6560)	**(3.0075)**	**(5.2873)**
SL_t		0.0311**	0.0202	0.0424***
		(2.2765)	(1.5686)	(2.8864)
BHC_t		-0.0532	-0.0007	-0.3292
		(-0.0798)	(-0.0011)	(-0.4510)
$Size_t$	-0.0683***	0.6132***	0.5729***	0.6136***
	(-3.8997)	(11.8883)	(11.7296)	(11.5889)
$Board_t$	0.1276	0.3466	0.4093*	0.1180
	(1.2196)	(1.4462)	(1.8279)	(0.4619)
$Inde_t$	0.3388	0.1699	0.4763	-0.0862
	(0.9206)	(0.2271)	(0.6827)	(-0.1063)
$Duality_t$	-0.0876***	0.0044	-0.0523	0.0476
	(-2.8461)	(0.0616)	(-0.7889)	(0.6067)
$Top1_t$	-0.0465***	0.0478***	0.0247*	0.0564***
	(-32.8285)	(3.2978)	(1.8139)	(3.6324)
Lev_t	-0.3392***	-0.8213***	-0.5787**	-0.6296**
	(-2.9205)	(-2.9169)	(-2.2437)	(-2.0888)
$Liquidity_t$	0.0240***	-0.0310**	-0.0035	-0.0451**
	(2.6046)	(-2.0274)	(-0.2585)	(-2.4710)
$Growth_t$	0.0104	-0.0946***	-0.0817***	-0.0964***
Roa_t	0.5501**	2.7343***	3.0068***	1.9515***
	(2.4546)	(4.7551)	(5.5586)	(3.1298)
Iv_ind	1.3875***			
$Lambda$		-1.3074***	-0.7091	-1.4998***
		(-2.7704)	(-1.5937)	(-2.9894)
$Constant$	2.0081***	-15.5623***	-15.0226***	-16.1140***
	(4.3200)	(-12.5403)	(-12.6936)	(-12.4395)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	17738	17738	17738	17738
Pseudo R^2	0.1948	0.2151	0.2061	0.1873

Secondly, the method of preference score matching. This paper uses the propensity score matching method to find matching samples for the samples with the threat of non-controlling major shareholders' withdrawal, and uses the propensity score matching samples to retest the basic hypothesis. The empirical results show that the research conclusions are still valid. Thirdly, replace the regression model. This paper refers to the research of Li Chuntao et al. [28]. Because enterprise patent data has the characteristics of counting variables, Poisson model can better handle such data. At the same time, fixed effect model is selected to test the above conclusions. The empirical results show that the research conclusions are still valid. Fourthly, remove some factors. In this study, the time sample covers the period from 2007 to 2018, and then the typical financial shocks during this period are stock market disasters in 2008 and 2015. But objectively, it is difficult to measure such factors through specific variables. In view of this, the sample of China's stock market crash and its subsequent year is removed in this paper. The empirical results show that the research conclusion is still valid.

5. Conclusions and Enlightenment

In practice, investors have already widely used the "exit threat" to achieve the role of corporate governance, but the theoretical research in this area is still in its infancy [18]. Different from the existing literature, this paper, based on the governance background of micro enterprises, discusses the mechanism of the threat of non-controlling major shareholders' withdrawal on enterprise innovation based on enterprise innovation, and makes an expanded analysis in the context of the nature of property rights and different types of industries. This paper uses all A-share listed companies from 2007 to 2018 as research samples, and obtains key data such as the exit threat of non-controlling major shareholders, enterprise innovation, etc. according to relevant database materials, to investigate the relationship between the exit threat of non-controlling major shareholders and enterprise innovation and its impact mechanism. The main findings of this paper are that the withdrawal threat of non-controlling major shareholders has played a governance role and improved the level of enterprise innovation; At the same time, the more government subsidies, the stronger the governance effect of the exit threat, the more obvious the role of improving the level of enterprise innovation, and the higher the industry concentration, the weaker the positive effect of the exit threat on enterprise innovation. After considering the

robustness tests such as potential sample selection errors and propensity score matching method, the research conclusions of this paper are basically unchanged.

Based on the perspective of enterprise innovation, this paper not only provides empirical evidence that the exit threat of large shareholders is an effective corporate governance mechanism, but also further deepens the research framework of governance effects of non-controlling large shareholders. Not only that, the conclusions of this paper also have a strong enlightenment on how to improve corporate governance, improve innovation capability, and successfully implement the innovation driven development strategy in the country.

References

[1] De Massis, A., Frattini, F., Lichtenthaler, U., 2013. Research on Technological Innovation in Family Firms. Family Business Review. 26(1), 10-31.

[2] Edmans, A., 2014. Blockholders and Corporate Governance. Annual Review of Financial Economics. 6(1), 23-50.

[3] Edmans, A., Holderness, C.G., 2016. Blockholders: A Survey of Theory and Evidence. Handbook of the Economics of Corporate Governance. 1, 541-636.

[4] Fattoum-Guedri, A., Guedri, Z., Delmar, F., 2017. Multiple Blockholder Structures and Family Firm Performance. Entrepreneurship Theory and Practice. 42(2), 231-251.

[5] Luo, H., Qin, J.D., 2019. Impact of state-owned equity participation on innovation investment of family enterprises. China Industrial Economy. 9(07), 174-192.

[6] Chen, J.L., Feng, X.J., Li, R.Q., 2018. Does family business promote innovation or hinder innovation—— Debate and integration. Foreign Economy and Management. 40(04), 140-152.

[7] Hauck, J., Prügl, R., 2015. Innovation activities during intra-family leadership succession in family firms: An empirical study from a socioemotional wealth perspective. Journal of Family Business Strategy. 6(2), 104-118.

[8] Feng, G.F., Wen, J., 2008. Empirical analysis on the relationship between corporate governance and technological innovation of listed companies in China. China Industrial Economics.

[9] Balsmeier, B., Fleming, L., Manso, G., 2017. Independent boards and innovation. Journal of Financial Economics. 123(3), 536-557.

[10] Lin, Zh.F., Long, X.X., 2019. Whether the threat of short selling can stimulate Chinese enterprises to innovate. World Economy. 42(09), 126-150.

[11] Shi, W., Connelly, B.L., Cirik, K., 2018. Short Seller Influence on Firm Growth: A Threat Rigidity Perspective. Academy of Management Journal. 61(5), 1892-1919.

[12] Kotlar, J., Massis, A.D., 2013. Goal Setting in Family Firms: Goal Diversity, Social Interactions, and Collective Commitment to Family-Centered Goals. Entrepreneurship Theory & Practice.

37(6), 1263-1288.

[13] Chemmanur, T.J., Loutskina, E., Tian, X., 2014. Corporate Venture Capital, Value Creation, and Innovation. Social Science Electronic Publishing. 27(8), 2434-2473.

[14] Zhu, B., Zhang, X.L., Zheng, X.J., 2018. Multiple major shareholders and enterprise innovation. Management World. 34(07), 151-165.

[15] Bar-Isaac, H., Shapiro, J., 2020. Blockholder voting. Journal of Financial Economics. 136(3), 695-717.

[16] Becht, M., Bolton, P., Roell, A., 2003. Corporate Governance and Control. Handbook of the Economics of Finance. (1), 1-109.

[17] Jiang, F.X., Ma, Y.X., Wang, Y.T., 2015. Can Exit Threat Restrain Controlling Shareholders' Selfish Behavior?. Management World. (05), 147-159.

[18] Chen, K.J., 2019. Can the threat of non controlling major shareholders' withdrawal reduce the agency cost of enterprises. Nankai Management Review. 22(04), 161-175.

[19] Zhu, L., Xu, X.T., Wang, Ch.Y., 2017. Industrial environment, tenure of managers and dual innovation investment of enterprises - empirical data from GEM. Securities Market Herald.

[20] Shleifer, A., Vishny, R.W., 1997. A Survey of Corporate Governance. Journal of Finance. 52.

[21] Edmans, A., Levit, D., Reilly, D., 2019. Governance Under Common Ownership. Review of Financial Studies. 32, 2673-2719.

[22] Jiang, F., Kim, K.A., 2015. Corporate governance in China: A modern perspective. Journal of Corporate Finance. 32, 190-216.

[23] Helling, A.R., Maury, B., Liljeblom, E., 2019. Exit as governance: do blockholders affect corporate innovation in large US firms?. Accounting & Finance.

[24] Edmans, A., 2009. Blockholders, Market Efficiency, and Managerial Myopia. The Journal of Finance. 64, 2481-2513.

[25] Liu, G.Q., 2016. Analysis on the incentive effect of tax incentives and financial subsidies -- an empirical study based on the theory of information asymmetry. (10), 62-71.

[26] Yang, X.Q., Yin, X.Q., 2015. Industry Concentration, Enterprise Competitive Position and Competitive Effect of Cash Holding. Economic Science. (06), 78-91.

[27] Li, Ch.T., Yan, X.W., Song, M., et al., 2020. Financial technology and enterprise innovation - evidence of listed companies on the New Third Board. China Industrial Economy. (1), 81-98.

[28] Jiang, X.Y., 2016. Decentralization of government and innovation of state-owned enterprises: a study based on the pyramid structure of local state-owned enterprises. Management World. (9), 120-135.

[29] Li, W.J., Zheng, M.N., 2016. Substantial innovation or strategic innovation——The impact of macro industrial policies on micro enterprise innovation. Economic Research. 51(4), 60-73.

[30] Dou, Y., Hope, O.R., Thomas, W.B., et al., 2018. Blockholder Exit Threats and Financial Reporting Quality. Contemporary Accounting Research. 35.

[31] Yang, Zh.Q., Zhang, F., Zhang, Y.D., 2019. How government subsidies in competitive fields affect enterprise innovation. Finance and Trade Economy. 40(09), 132-145.

[32] Qian, M., Yeung, B.Y., 2015. Bank financing and corporate governance. Journal of Corporate Finance. 32, 258-270.

[33] Yuan, J.G., Hou, Q.S., 2015. Cheng Chen Curse Effect of Enterprise Political Resources -- An Investigation Based on Political Relevance and Enterprise Technological Innovation. Management World. (1), 139-155.