RESEARCH ON THE IMPACT OF LARGE SHAREHOLDERS' SELLING ON HIGH-TECH LISTED COMPANIES' MARKET VALUE BASED ON INNOVATION INVESTMENT MEDIATION EFFECTS[*]

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Abstract

Major shareholders of high-tech listed companies reduce their holdings frequently, which has an important impact on the company's market value. This paper takes A-share listed high-tech listed companies from 2011 to 2020 as a sample, and empirically studies the internal relationship between major shareholder reduction, company market value and innovation investment. The study found that: the frequency of major shareholder reduction and the proportion of major shareholder reduction have a negative impact on the company's market value; innovation investment intensity and innovation investment willingness play a partial intermediary role between major shareholder reduction and company market value.

Keywords: Major Shareholder Reduction, Company Market Value, Innovation Investment Intensity, Innovation Investment Willingness

Introduction

Major shareholders, as the main body of high-tech listed companies, their every move will have a certain impact on the market value of listed companies, the judgment of small and medium shareholders, and even on the financial market. Major shareholders are the decision makers of major matters of the company. They have the most accurate and core information of listed companies, and have a clear understanding of the company's operating conditions and development potential. Therefore, major shareholder transactions will reflect the company's value to some extent and reflect the company's future. Information about development prospects, so that the intrinsic value of the company is reflected in the stock market value. Due to the large shareholding ratio of major shareholders, their reduction of stock holdings will have a huge impact on the stock market value of listed companies. The reduction of holdings may arise from different backgrounds and motives, and thus the impact of the reduction of holdings is also different. The major shareholder's shareholding carries the confidence of small and medium investors in the listed company, and a large reduction in shareholding will affect the public's expectations of the company, which will have a huge impact on the market value of the listed company. Illegal reduction of holdings can even lead to financial market turmoil. The reduction behavior of major shareholders has always been the focus of scholars' research.

Objective of the Study

The objective of the study is to research the internal relationship between major shareholder reduction, company market value and innovation investment.

Related Literature Review

The impact of major shareholders' reduction on the company's market value

Lorie and Victor Niederhoffer (1968) found that the reduction of major shareholders' holdings will bring about a significant negative cumulative abnormal return, leading to a decline in stock prices. Wu Zhenxin and Zhang Xuefeng (2008) conducted an empirical study from the perspective of signal transmission theory. The study found that after major shareholders reduce their holdings, the company's stock price will fall, thus reducing the shareholding and reducing the enterprise value. Major shareholders will choose to reduce their holdings when the stock price is high, so as to obtain excess returns. However, the reduction of shares held by major shareholders sent a bad signal to small and medium investors in the market, so small and medium investors also reduced their holdings of stocks, resulting in a further decline in stock prices. The research environment at home and abroad is the early stock market. We need to verify the impact of the reduction of major shareholders of high-tech listed companies on the stock price under the new market environment of my country after the change of the reduction policy. Based on the above analysis, hypotheses are made. During the window period:

H1: The reduction of major shareholders has a negative impact on the company's market value.

H1a: The proportion of major shareholders' shareholding reduction has a negative impact on the company's market value

H1b: The frequency of major shareholder reductions has a negative impact on the company's market value

Innovation investment plays an intermediary role in the influence of major shareholders' reduction on the company's market value

Jensen and Ruback (1983) put forward the Entrenchment Hypothesis. The hypothesis points out that when managers' shareholding increases, the greater the security of their positions, they have the ability to seek personal gain, which will damage the company's value. In addition, managers with high stock holdings may use certain anti-takeover actions to consolidate their positions based on job security considerations, that is, insiders are worried that the company will lose their jobs after a merger, so Opposition to favorable mergers or equity acquisitions is negatively correlated with company value. Steiner (1996) put forward a theory contrary to the theory of interest convergence, arguing that the higher the shareholding ratio of major shareholders, the more likely it is to plunder the company's assets, and the company's performance will be worse and worse. The results of Fan and Wong (2002) found that in countries with more concentrated ownership structure, the agency problem of controlling shareholders will reduce the company value and is negatively related. Chen Lijuan (2004) studied that under different industries, the shareholding ratio of major shareholders in the textile industry is negatively correlated with the company's operating performance. In terms of the shareholding ratio of directors and supervisors, Yu Haiqin and Zhou Ben'e (1994) divided operators and non-operators into seven categories, and the shareholding ratio of directors and supervisors was negatively correlated with the company's operating performance. Hermalin and Weisbach (2001) compared business operators with non-manager-controlled companies, and the results show that non-managers have slightly better operating performance than managers.

Innovation investment refers to the capital, manpower, etc. invested in the research and development process of new products, new processes or new technologies. For enterprises, the level of R&D expenditure can be used to judge whether enterprise managers are forward-looking and whether they attach importance to technological innovation. Generally speaking, R&D investment can measure the strength of an enterprise's R&D capability. R&D investment specifically includes investment in R&D expenses and investment in human capital. Regarding personnel, the details and categories of data disclosed by different companies at this stage are different. Some companies select the number of technical personnel and the proportion of the total number of employees. of enterprises directly select the number of employees with a master's degree or above and the proportion of the total number of employees to explain the personnel of the enterprise, and there is no unified quantitative normative format. In addition, companies have not maintained continuity when disclosing data on R&D personnel. Therefore, considering the reliability of the data, this paper takes the R&D investment intensity, that is, the proportion of the total investment in R&D activities of the enterprise in the annual operating income of the enterprise, as the basis for the level of innovation investment (Zhu Naiping, 2014), and uses the data of R&D personnel as a supplementary explanation. , and comprehensively describe the innovation investment of the case enterprises. Based on the above theoretical analysis, this paper proposes the following research hypotheses:

H2: Innovation investment plays a mediating role in the relationship between major shareholder reduction and company market value

H2a: The willingness to invest in innovation plays an intermediary role between the reduction ratio of major shareholders and the company's market value

H2b: The willingness to invest in innovation plays a mediating role between the reduction frequency of major shareholders and the company's market value

H2c: The intensity of innovation investment plays a mediating role between the proportion of major shareholders' reduction and the company's market value

H2d: The intensity of innovation input plays a mediating role between the frequency of reduction of major shareholders' holdings and the company's market value

Variable Measure

Dependent variable measure

The market value of a company refers to the total value of the issued shares of a listed company calculated at the market price, which is calculated by multiplying the market price of each share by the total number of issued shares. The total market value of all listed companies in the entire stock market is the total market value of the stock.

Independent Variable Measure

Shareholder Reduction Ratio

Liu Yali and Yu Lijuan (2011) found that the extent of reduction of major shareholders is related to corporate value. This study uses the ratio of major shareholders to reduce their holdings (ratio) as an independent variable, representing the extent of reduction. ratio of total equity. Ran Lun and Li Jinlin (2005) believed that the growth ability can significantly affect the value of the enterprise, and the growth ability of the company was measured by the year-on-year growth rate of total operating income (Growth), which was used as an independent variable to verify that the major shareholders of companies with different growth ability reduced their holdings. stock price impact. In this paper, the ratio of the total number of shareholders who publicly announced the reduction of their holdings in one year to the total

share capital is used as an independent variable to verify the impact of the reduction ratio of major shareholders on the company's market value.

ShareholderTeduction Frequency

The predecessors lacked the empirical research on the frequency of reduction of holdings and the company's market value. In this paper, the window period was extended to one year, and the number of reductions of major shareholders in one year represented the frequency of reductions, and the frequency of reductions of major shareholders (Lnnum) As an independent variable, verify the relationship between the frequency of major shareholder reduction and the company's market value.

Mediating Variable Measure

Innovation Investment Willingness

There are generally two ways to measure the willingness to invest in innovation. One is to judge whether the enterprise has R&D investment as the basis. It is believed that the enterprise that invests in R&D has the willingness to invest in innovation, while the enterprise that does not invest in R&D does not have the willingness to invest in innovation. 0-1 variables for measurement (Chen Shuangying, 2010; Sun Xiaohua et al., 2017). The second is to construct a scale to learn the willingness of enterprises to invest in innovation through questionnaires (Jong and Kemp, 2003; Choi, 2004; Zhao Zhuojia, 2017). Since the questionnaire survey method involves questions such as the questionnaire recovery rate and the reliability and validity of the scale, and this paper conducts analysis and research based on large sample data, we choose whether the company invests in R&D as a measure of innovation investment willingness. If there is investment, take the R&D investment. The natural logarithm of the cost.

Innovation Investment Intensity

The measurement of innovation investment mainly includes absolute indicators and relative indicators. Among them, absolute indicators refer to the number of R&D personnel in enterprises to measure the intensity of innovation investment (Zhang Weiying et al., 2005; Bogliacino and Pianta, 2013; Li Ying et al., 2016). However, some scholars believe that due to differences in the scale and profitability of enterprises, using absolute indicators to measure innovation investment will lead to bias, which is not conducive to the comparative analysis between enterprises, so they propose to use relative indicators to measure. Relative indicators mainly include the proportion of R&D investment in main business income (Yasuda, 2005; Makri et al., 2006; Chen Shuangying et al., 2010; Wang Yanni and Wang Ying, 2012; Sun Xiaohua et al., 2017), the proportion of R&D investment in total assets (Zhou et al., 2017). Jian et al., 2012; Zhou Yusheng and Song Guanghui, 2016), the proportion of R&D investment in the number of employees (Nurmi, 2004; Falk, 2012), etc. This paper uses absolute indicators to measure the intensity of innovation investment, taking the natural logarithm of the number of R&D personnel.

Control Variable measure

Operating income growth rate (Profit): The operating income growth rate is an important indicator to measure the development ability of an enterprise. The higher the value, the faster the operating income of the enterprise and the stronger future development ability, reflecting to the public that the enterprise has investment value Therefore, this paper uses the growth rate of operating income as a control variable.

Nature of equity(State): the nature of the controlling shareholder (X), the state-owned equity is 1, and the non-state-owned equity is 0.

Company Size (Size): From one point of view, since larger-scale enterprises can draw more types of resources and their shareholding is relatively scattered, it is difficult for other shareholders except major shareholders to form a united front to resist the improper behavior of major shareholders, so major shareholders use funds to occupy The private interests obtained from activities such as encroaching on the interests of small and medium shareholders will continue to increase with the increase of the scale of the enterprise; from another perspective, securities analysts, institutional investors, and the government are all concerned about the development of large enterprises. Supervision and management activities are more intensive. Under this circumstance, corporate information is relatively transparent and development is relatively standardized, and the information asymmetry prevailing among small and medium investors is not very significant. Therefore, it is difficult to define the relationship between firm size and benefit transfer behavior. This paper selects the logarithm of the total assets of the enterprise as an indicator to measure the size of the enterprise.

Asset-liability ratio (Lev): This indicator is the asset-liability ratio of the enterprise in the late one year before the implementation of the private placement, which reflects the financial leverage of the enterprise and can evaluate the development quality of the listed enterprise. This indicator reflects the increase in the asset-liability ratio means that the company will face greater debt repayment pressure and is likely to face serious financial problems, and the implementation of large-scale private placement will significantly affect the company's asset-liability ratio , so that it is greatly reduced, thereby alleviating the financing difficulties of enterprises.

Return on Equity (ROE): Return on Equity is one of the commonly used measures in the world, and it is also an important data information in the DuPont analysis model, which can reflect the actual profit level of the capital owner of the enterprise. It is the ratio of a company's net profit after tax to its book net assets for the year.

Econometric Model

This paper discusses the role and mechanism of the relationship between major shareholder reduction and company market value, and whether there is a mediating effect between innovation investment as an intermediary variable between major shareholder reduction and company market value. Among them, the independent variable, intermediary variable and dependent variable are the reduction of major shareholders, innovation investment and company market value respectively; the control variables include operating income growth rate (Profit), equity (State), company size (Lnsize), asset-liability ratio (Lev) and return on assets (ROE). According to the research needs, this paper adopts the panel model for empirical analysis, and establishes the panel measurement model according to the theoretical assumptions proposed by the research as follows:

(1) In order to test the hypotheses H1, H1a, H1b, this study takes the company's market value (lnvalue) as the explanatory variable, the major shareholder reduction ratio (ratio) and the major shareholder reduction frequency (lnnum) as the explanatory variables. The variables were included in the study, and the linear regression model was established as follows:

$$lnvalue_{it} = \beta_0 + \beta_1 ratio_{it} + \beta_2 lnnum_{it} + \beta_3 Profit_{it} + \beta_4 state_{it} + \beta_5 lnsize_{it} + \beta_6 lev_{it} + \beta_7 ROE_{it} + \varepsilon_{it}$$

(2) In order to test the hypotheses H2, H2a, H2b, H2c, H2d, this study takes the company's market value (lnvalue) as the explanatory variable, the major shareholder reduction ratio or the major shareholder reduction frequency (Decrease) as the explanatory variable, and the R&D willingness (LnRDSpend) and R&D intensity (LnPOP) are mediating variables, and

the above control variables are included in the study, and the linear regression model is established as follows:

$$lnvalue_{it} = \beta_0 + \beta_1 \text{decrease}_{it} + \beta_2 \text{Profit}_{it} + \beta_3 \text{state}_{it} + \beta_4 lnsize_{it} + \beta_5 lev_{it} + \beta_6 ROE_{it} + \varepsilon_{it}$$

$$Invest_{it} = \beta_0 + \beta_1 \text{decrease}_{it} + \beta_2 \text{Profit}_{it} + \beta_3 \text{state}_{it} + \beta_4 lnsize_{it} + \beta_5 lev_{it} + \beta_6 ROE_{it} + \varepsilon_{it}$$

$$lnvalue_{it} = \beta_0 + \beta_1 decrease_{it} + \beta_2 \text{Invest}_{it} + \beta_3 \text{Profit}_{it} + \beta_4 \text{state}_{it} + \beta_5 lnsize_{it} + \beta_6 lev_{it} + \beta_7 ROE_{it} + \varepsilon_{it}$$

Research Result

Descriptive Statistics

Before the actual empirical test, stata16 is used for analysis, and the Winsor2 command is used to smooth the 1% quantile of continuous variables to reduce the influence of outliers on the regression results. First, descriptive statistical analysis was carried out on the main variables, the purpose is to initially grasp the main research variables mean (Mean), standard deviation (Sd), maximum value (Max), minimum value (Min), median (P50) and other data distribution. The final descriptive statistics are shown in Table 2:

Table 1 Descriptive Statistics

Variable	N	Mean	Sd	P50	Min	Max
Lnvalue	8111	22.80	1.130	22.70	21	27.20
Ratio	8111	8.500	19.90	1.360	8.59e-09	84.80
Lnnum	8111	1.650	1.280	1.610	0	5.230
LnPOP	8111	5.660	1.460	5.560	2.640	10.20
LnRDSpend	8111	18	2.430	18	7.770	24.60
Profit	8111	0.340	0.692	0.161	-0.712	4.200
State	8111	0.170	0.375	0	0	1
Lnsize	8111	22	1.100	21.90	20.10	25.60
Lev	8111	0.392	0.187	0.383	0.0614	0.859
ROE	8111	0.0417	0.191	0.0686	-1.240	0.309

The descriptive statistical results of the samples in Table 2 show that: (1) For the company's market value Lnvalue, the mean and median are 22.80 and 22.70, respectively. It can be seen that the market value of the research sample companies is generally at 22.80, and the market value of the companies in the general sample is greater than 22.70, and the maximum value is 22.80. It is 27.20 and the minimum value is 21, indicating that the market value of most companies is relatively evenly distributed. (2) The average value of Ratio of major shareholders' shareholding reduction and the frequency of major shareholders' shareholding reduction Lnnum are 8.500 and 1.650, respectively, indicating that the phenomenon of major shareholders' shareholding reduction in high-tech listed companies is relatively common. (3) The mean value of innovation investment willingness LnRDSpend is 18, the median value is 18, the minimum value is 7.770, and the maximum value is 24.60. The

mean value of innovation investment intensity LnPOP is 5.660, the median value is 5.560, the minimum value is 2.640, and the maximum value is 10.20, indicating the innovation of the sample companies. The distribution of investment willingness and intensity is uniform and obeys the normal distribution.

Correlation Analysis

Table 2 Pearson correlation analysis

	lnvalue	ratio	lnnum	lnPOP	lnRDSp~d	Profit	state	lnsize	lev	ROE
Lnvalue	1									
Ratio	-0.301***	1								
Lnnum	-0.127***	0.420***	1							
LnPOP	0.467***	-0.338***	-0.138***	1						
LnRDSpend	0.373***	-0.535***	-0.309***	0.823***	1					
Profit	-0.035***	0.019*	0.021*	0.014	-0.023**	1				
State	0.210***	-0.097***	-0.163***	0.082***	0.076***	0.053***	1			
Lnsize	0.775***	-0.229***	-0.117***	0.432***	0.337***	-0.055***	0.264***	1		
Lev	0.314***	-0.091***	-0.068***	0.152***	0.118***	-0.003	0.197***	0.486***	1	
ROE	0.118***	-0.002	-0.009	0.073***	0.061***	0.046***	-0.012	0.067***	-0.243***	1

Note: ***p<0.01, **p<0.05, *p<0.1

It can be seen from the above table that the correlation analysis results of the samples show that (1) the reduction ratio of major shareholders (Ratio) has statistical significance on the company's market value (Lnvalue) at the 1% confidence level, and the coefficient is -0.301, which is less than 0, which is negative correlation. (2) The frequency of major shareholder reduction (Lnnum) has statistical significance on the company's market value (Lnvalue) at the 1% confidence level, and the coefficient is -0.127, less than 0, which is a negative correlation. (3) The innovation investment intensity (LnPOP) has statistical significance on the company's market value (Lnvalue) at the 1% confidence level, and the coefficient is 0.467, which is greater than 0, which is a positive correlation. (4) The willingness to invest in innovation (LnRDSpend) has statistical significance on the company's market value (Lnvalue) at the 1% confidence level, and the coefficient is 0.373*, greater than 0, it is a positive correlation. (5) The operating income growth rate (Profit) has statistical significance on the company's market value (Lnvalue) at the 1% confidence level, and the coefficient is -0.035, which is less than 0, which is a positive correlation. (6) The nature of equity (State) has statistical significance on the company's market value (Lnvalue) at the 1% confidence level, and the coefficient is 0.210, which is greater than 0, which is a positive correlation.

Hypothetical Test

1. An empirical analysis of the relationship between the reduction of major shareholders of high-tech listed companies and the company's market value

Table 3 Regression results of the proportion of major shareholders' shareholding reduction and the frequency of major shareholders' shareholding reduction on the company's market value

	(1)	(2)	(3)
	m1	m2	m3
VARIABLES	Lnvalue	Lnvalue	Lnvalue
Ratio		-0.00954***	-0.00888***
		(-10.27)	(-10.43)
Lnnum			-0.0194*
			(-1.928)
Profit	-0.0281	-0.0260	-0.0266
	(-1.270)	(-1.255)	(-1.282)
State	-0.130***	-0.0957**	-0.0968**
	(-2.933)	(-2.271)	(-2.289)
Lnsize	0.784***	0.768***	0.776***
	(26.06)	(25.97)	(26.11)
Lev	-0.0418	-0.0433	-0.0466
	(-0.372)	(-0.393)	(-0.424)
ROE	0.129**	0.131**	0.126**
	(2.079)	(2.347)	(2.265)
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Constant	4.516***	4.915***	4.753***
	(7.302)	(8.072)	(7.773)
Observations	8,111	8,111	8,111
R-squared	0.174	0.231	0.231
Number of id	2,636	2,636	2,636

Robust t-statistics in parentheses *** $p<0.01$, **$p<0.05$, *$p<0.1$

       The regression results of the fixed effect model in Table 4 show that: in column (2), the influence of the proportion of major shareholders' reduction on the company's market value is statistically significant at the 1% confidence level, and the coefficient value is -0.00954, which is less than 0, indicating that major shareholders The shareholding reduction ratio has a negative impact on the company's market value, which proves the hypothesis H1a; the influence of the major shareholder's shareholding reduction frequency on the company's market value in the table (3) is statistically significant at the 10% confidence level, with a coefficient value of -0.0194, If it is less than 0, it indicates that the frequency of major shareholders' reduction has a negative impact on the company's market value, which proves the hypothesis H1b; combined with H1a and H1b, it proves that H1: major shareholders' reduction has a negative impact on the company's market value.

2. Analysis of the mediating effect of innovation investment between major shareholders' reduction and company market value

Test method of mediation effect

A mediator is a variable that is caused by an independent variable and affects the dependent variable through it. Considering the influence of independent variables X to Y, adding the independent variable X is affected by the influence variable M, which has an impact on the dependent variable Y, then M is called the mediating variable (Wen Zhonglin, 2004). If the relationship between independent variables and dependent variables cannot be determined, the substantive and intrinsic reasons for the influence between the two can be revealed by introducing mediating variables. It can be seen that the mediator variable plays a very important role in explaining the causal relationship.

It can be expressed by the following formula:

$$Y=cX+e1$$
$$M=aX+e2$$
$$Y=c'X+bM+e3$$

In the above formula, the independent variable X acts on the dependent variable Y, c represents the path coefficient, and the total effect of X on Y is represented by c; M represents the mediator variable, and the effect of X on M is represented by a; M acts on Y The effect of is represented by b; after fully considering the mediating variable M, the effect of X acting on Y is represented by c'; the total effect can be obtained by adding all the mediating effects, that is, c = ab + c'. where c is the total effect, c' is the direct effect after considering the mediating effect, and ab is the mediating (indirect) effect. By analyzing the regression model, it can be seen that ab = c-c'. It should be noted that in other models, the values of the two may be different (MacKinnon, 2008; Wen Zhonglin et al., 2012).

There are many ways to verify the mediating effect. This study adopts the most commonly used stepwise test method (Baron & Kenny, 1986). The specific steps are as follows: The independent variable is significantly correlated with the dependent variable (the regression coefficient e1 is significant, and the P value is in the 0.05 or 0.01 confidence interval). , under this premise, the independent variable is significantly correlated with the intermediary variable (regression coefficient e2 is significant, and the P value is in the 0.05 or 0.01 confidence interval); the intermediary variable is significantly correlated with the dependent variable; when the intermediary variable exists, the influence of the independent variable on the dependent variable decrease or disappear. If the effect is significantly reduced to disappear (the coefficients c, a, b are significant, the coefficient c' is not significant), it will play a complete mediating role (Judd & Kenny, 1981); if the effect is reduced but still reaches a significant level (coefficients c, a, b significant, and the coefficient c' is significant), it plays a partial mediating role (Baron, Kenny, 1986).

Table 5 The regression results of the mediating effect between the willingness to invest in innovation and the proportion of major shareholders' reduction and the company's market value

	(1)	(2)	(3)
	m1	m2	m3
VARIABLES	lnvalue	lnRDSpend	lnvalue
LnRDSpend			0.0337**
			(2.178)
Ratio	-0.00954***	-0.0954***	-0.00633***
	(-10.27)	(-25.55)	(-3.942)
Profit	-0.0260	0.0236	-0.0268
	(-1.255)	(0.464)	(-1.335)
State	-0.0957**	0.105	-0.0992**
	(-2.271)	(0.923)	(-2.399)
Lnsize	0.768***	0.360***	0.756***
	(25.97)	(3.022)	(24.18)
Lev	-0.0433	-0.226	-0.0357
	(-0.393)	(-0.729)	(-0.327)
ROE	0.131**	-0.0872	0.133**
	(2.347)	(-0.458)	(2.435)
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Constant	4.915***	9.587***	4.592***
	(8.072)	(3.903)	(7.288)
Observations	8,111	8,111	8,111
R-squared	0.231	0.473	0.238
Number of id	2,636	2,636	2,636

Robust t-statistics in parentheses*** $p<0.01$, ** $p<0.05$, * $p<0.1$

In column (1), the influence of the proportion of major shareholders' shareholding reduction on the company's market value has passed the 1% significant level test, and the coefficient c is -0.00954, indicating that the proportion of major shareholders' shareholding reduction has a negative impact on the company's market value; In column(2), the influence of the proportion of major shareholders' shareholding reduction on the willingness to invest in innovation has passed the test at the 1% significant level, and the coefficient a is -0.0954, indicating that the proportion of major shareholders' shareholding reduction has a negative impact on the willingness to invest in innovation; In the column(3), the influence of the independent variable major shareholder reduction ratio and the intermediary variable innovation investment willingness on the company's market value has passed the 1% significant level test, the coefficient c' is -0.00633, the coefficient b is 0.0337, ab=c'-c, indicating that the The shareholding reduction ratio of shareholders can affect the company's market value through the willingness to invest in innovation, and the absolute value of the influence coefficient is smaller than the absolute value of the direct effect coefficient, indicating that the willingness to invest in innovation plays a partial intermediary role, that is,

the company's innovation investment can weaken the shareholding ratio of major shareholders. The effect on the company's market value, which validates Hypothesis H2a.

Table 6 The regression results of the mediating effect between the willingness to invest in innovation and the frequency of major shareholders' reduction and the company's market value

	(1)	(2)	(3)
	m1	m2	m3
VARIABLES	lnvalue	lnRDSpend	lnvalue
LnRDSpend			0.0567***
			(4.910)
Lnnum	-0.0878***	-0.899***	-0.0368***
	(-6.811)	(-17.38)	(-2.611)
Profit	-0.0301	-0.0176	-0.0291
	(-1.384)	(-0.290)	(-1.434)
State	-0.124***	-0.177	-0.114***
	(-2.791)	(-1.114)	(-2.728)
Lnsize	0.814***	0.827***	0.767***
	(26.83)	(6.682)	(22.99)
Llev	-0.0576	-0.373	-0.0364
	(-0.517)	(-1.070)	(-0.335)
ROE	0.107*	-0.323	0.126**
	(1.809)	(-1.406)	(2.237)
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Constant	3.909***	-0.616	3.944***
	(6.269)	(-0.241)	(6.074)
Observations	8,111	8,111	8,111
R-squared	0.195	0.202	0.228
Number of id	2,636	2,636	2,636

Robust t-statistics in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$

        In column (1), the influence of the frequency of major shareholder reduction on the company's market value passed the 1% significant level test, with a coefficient of -0.0878, indicating that the frequency of major shareholder reduction has a negative impact on the company's market value; In the column (2), the influence of the frequency of major shareholders' shareholding reduction on the willingness to invest in innovation has passed the test at the 1% significant level, and the coefficient is -0.304, indicating that the frequency of major shareholders' shareholding reduction has a negative impact on the willingness to invest in innovation; in column (3) , the influence of the independent variable major shareholder reduction frequency and the intermediary variable innovation investment willingness on the company's market value passed the 1% significant level test, with coefficients of -0.0368 and 0.0567, indicating that the major shareholder reduction frequency can affect the company's market value through innovation investment willingness, and also It can directly affect the company's market value, so the willingness to invest in innovation plays a part of the intermediary role, which verifies the hypothesis H2b.

Table 7 Regression results of the mediating effect of innovation investment intensity between major shareholders' reduction ratio and company market value

	(1)	(2)	(3)
	m1	m2	m3
VARIABLES	lnvalue	lnPOP	lnvalue
LnPOP			0.117***
			(4.566)
Ratio	-0.00954***	-0.0335***	-0.00563***
	(-10.27)	(-20.85)	(-5.238)
Profit	-0.0260	0.0112	-0.0274
	(-1.255)	(0.379)	(-1.433)
State	-0.0957**	-0.0207	-0.0933**
	(-2.271)	(-0.292)	(-2.272)
Lnsize	0.768***	0.432***	0.718***
	(25.97)	(6.390)	(21.47)
Llev	-0.0433	-0.0917	-0.0325
	(-0.393)	(-0.474)	(-0.304)
ROE	0.131**	-0.0588	0.137**
	(2.347)	(-0.527)	(2.522)
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Constant	4.915***	-4.424***	5.432***
	(8.072)	(-3.173)	(8.393)
Observations	8,111	8,111	8,111
R-squared	0.231	0.285	0.258
Number of id	2,636	2,636	2,636

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

The first step, in column (1), the influence of the major shareholder's shareholding reduction ratio on the company's market value has passed the 1% significant level test, and the coefficient is -0.00954, indicating that the major shareholder's shareholding reduction ratio has a negative impact on the company's market value; In the second step, in column (2), the influence of the proportion of major shareholders' shareholding reduction on innovation investment intensity passed the 1% significant level test, and the coefficient was -0.0335, indicating that the proportion of major shareholders' shareholding reduction had a negative effect on innovation investment intensity. In the third step, in column (3), the influence of the independent variable major shareholder reduction ratio and the intermediary variable innovation input intensity on the company's market value passed the test at the 1% significant level, with coefficients of 0.117 and -0.00563, indicating that major shareholders The shareholding reduction ratio can affect the company's market value through innovation investment intensity, and can also directly affect the company's market value. Therefore, innovation investment intensity plays a part of the intermediary role, which verifies H2c.

Table 8 The regression results of the mediating effect of innovation investment intensity between the frequency of major shareholders' reduction and the company's market value

	(1)	(2)	(3)
	m1	m2	m3
VARIABLES	lnvalue	lnPOP	lnvalue
LnPOP			0.147***
			(19.67)
Lnnum	-0.0878***	-0.304***	-0.0432***
	(-6.811)	(-14.62)	(-5.850)
Profit	-0.0301	-0.00303	-0.0297*
	(-1.384)	(-0.0939)	(-1.888)
State	-0.124***	-0.120	-0.106*
	(-2.791)	(-1.639)	(-1.689)
Llnsize	0.814***	0.592***	0.727***
	(26.83)	(8.668)	(24.40)
Lev	-0.0576	-0.141	-0.0369
	(-0.517)	(-0.743)	(-0.345)
ROE	0.107*	-0.139	0.128**
	(1.809)	(-1.156)	(2.481)
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Constant	3.909***	-7.924***	5.070***
	(6.269)	(-5.627)	(5.714)
Observations	8,111	8,111	8,111
R-squared	0.195	0.129	0.248
Number of id	2,636	2,636	2,636

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

In column (1), the influence of the frequency of major shareholders' reduction on the company's market value has passed the 1% significant level test, and the coefficient is -0.0878, indicating that the frequency of major shareholders' reduction has a negative impact on the company's market value; (2) In the column, the influence of major shareholders' shareholding reduction frequency on innovation investment intensity passed the test at the 1% significant level, and the coefficient was -0.304, indicating that the major shareholders' shareholding reduction frequency had a negative impact on innovation investment intensity; in column (3) , the influence of the independent variable major shareholder reduction frequency and the intermediary variable innovation input intensity on the company's market value passed the 1% significant level test, with coefficients of -0.0432 and 0.147, indicating that the major shareholder reduction frequency can affect the company's market value through innovation input intensity, and also It can directly affect the company's market value, so the intensity of innovation investment plays a partial intermediary role, which verifies the hypothesis H2d.

Combined with H2a~H2d, it is verified that H2: innovation investment plays an intermediary role in the relationship between the reduction of major shareholders and the company's market value.

Conclusion and Discussion

After the split share structure reform in our country, the high reduction of shares has become a new way for major shareholders to hollow out, and it is also the focus of the theoretical and practical circles. In this paper, the reduction of major shareholders' holdings is tested by the two-dimensional test of the frequency of major shareholders' reduction and the proportion of major shareholders' reductions to the market value of high-tech listed companies. Market value has shrunk. In order to enable small and medium investors to make investment decisions in a more timely manner and protect the interests of small and medium investors, enterprises should improve the information disclosure system for the reduction of major shareholders' holdings and reduce the degree of information asymmetry. The regulatory authorities should strengthen the regulation and supervision of the voluntary performance forecast for listing and various information disclosures that may provide convenience for major shareholders to reduce their holdings. It is also necessary to increase the penalties for violations and increase the cost of violations. At the same time, this paper examines part of the intermediary role of innovation investment, and shows that after the reduction of major shareholders of the company, if the company has innovation investment, it will have a different impact on the company's market value. At the same time, enterprises should avoid the "one share dominance" ownership structure, and prevent major shareholders from making unilateral decisions and using related transactions to embezzle the company's interests and reduce the share of profits for other shareholders. A better shareholding check and balance mechanism and stronger shareholding checks and balances of major shareholders can increase the cost of reducing holdings, optimize the company's decision-making, and make the company's decision-making reflect the will of all shareholders. Enterprises need to increase the proportion of small and medium shareholders participating in shareholders' general meetings, so that large and small shareholders can actively participate in corporate governance, in order to truly improve the company's internal governance and promote the company's sustainable and stable development.

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