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The Impact of Controlling Shareholder Equity Pledge on Corporate Performance

-- Based on the Mediating Effect of Innovation Investment

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Abstract

The government has made investment in R&D a key strategic objective. Against the backdrop of active encouragement and strong support from the government, the amount of R&D investment by listed companies in China has been on the rise, which shows that R&D investment activities are increasingly valued by enterprises. While innovation is important for increasing the value of a company, it is also a high-risk, large expense. Innovative investment decisions are partially determined by shareholders. However, shareholders' judgement is linked to their personal risk appetite and funding position. Currently, equity pledges are popular in the financial markets. In this context, shareholders' attitudes towards risk are beginning to change. The control position of shareholders also began to be linked to the performance of the company. This paper selects the public data of A-share listed companies from 2015 to 2020. It investigates and analyses the relationship among controlling shareholders' equity pledges, R&D investment and corporate performance by means of the mediating effect analysis method and Bootstrap test. The study found that controlling shareholder equity pledges have a negative impact on firm performance and there is a masking effect of R&D investment between equity pledges and corporate performance. In response to the above findings, there are some suggestions put forward such as improving the equity pledge disclosure system and strengthening internal governance.

Keywords

Equity Pledge; R&D Investment; Corporate Performance.

1. Introduction

1.1. Research Background

The government has made innovation investment a key strategic goal and has also announced corresponding measures, providing resources for corporate R&D through various means such as tax cuts, financial support, and funding. In 2018, the Ministry of Science and Technology and the State-owned Assets Supervision and Administration Commission jointly issued a document, clarifying policies to support state-owned enterprises in participating in science and technology projects, and further implementing the policy of additional deductions for innovation investment expenses to promote corporate innovation investment. In May 2019, the State Taxation Administration introduced preferential policies, implementing more tax reductions for high-tech companies. With strong incentives and support from the state, the scale of innovation investment by listed companies in China continues to grow, and the proportion in operating income is also increasing year by year, indicating that enterprises are increasingly valuing R&D innovation. If companies wish to achieve a long-term competitive advantage and long-term development, they must focus on innovation and continuously develop new products and services. Innovation plays a pivotal role in enhancing the value of a

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company, but it also implies the significant risks and substantial expenditures associated with innovation activities. The success or failure of a company's innovation directly affects its performance and future value.

Typically, investors and corporate executives jointly make innovation investment decisions for the company, but many factors, such as the risk preferences and capital conditions of shareholders, will affect the final decision outcome. Currently, many company shareholders choose to mortgage their shares to improve their own capital conditions. For controlling shareholders, this method also does not affect their control over the company, which is a multifaceted benefit. Therefore, in the financial market, the equity pledge method has gained much favor from investors and has been rapidly popularized.

Under the background of equity pledge, shareholders' attitudes towards risk begin to change, and the decision-making direction shifts. The position of shareholders' control rights is directly linked to the company's performance and stock price. Affected by the equity pledge, investors will be forced to face the risks of asset devaluation and transfer of control rights. Innovation investment is characterized by high risk, long cycles, and uncertainty, which is likely to affect the company's stock price. When the company's stock price declines, if additional collateral or margin cannot be increased, the pledgee has the right to freeze and sell shares. At this time, controlling shareholders will face the problem of being forcibly liquidated and even losing control rights. In this situation, shareholders will have a strong motive to influence the company's investment decisions, reduce innovation investment, and thus affect corporate performance. On the other hand, as the greatest beneficiaries of the interests of listed companies, controlling shareholders are very sensitive to the long-term value of the company and will not necessarily ignore the role of innovation capabilities in enhancing the value of listed companies. Therefore, after the equity pledge, controlling shareholders have a strong motive to strengthen the incentive and supervision of the management, improve the innovation efficiency of listed companies, and enhance corporate value. In summary, this paper will attempt to start from the behavior of controlling shareholders' equity pledges, study their impact on innovation investment, and then study their impact on corporate performance.

1.2. Research Content

This paper, after reviewing relevant studies and considering the situation of listed companies on China's A-share market, will conduct research on the following contents: (1) Analyze the relationship between controlling shareholders' equity pledges and corporate performance; (2) Analyze the relationship between controlling shareholders' equity pledges and innovation investment; (3) Further explore the mediating effect of innovation investment between controlling shareholders' equity pledges and corporate performance.

1.3. Research Significance

This paper studies and analyzes the mediating effect of innovation investment in the path of how controlling shareholders' equity pledges affect corporate performance, and further understands the transmission paths and influencing factors between them, which has certain practical significance.

Firstly, it helps to understand the impact of controlling shareholders' equity pledges. Controlling shareholders' equity pledges have a strategic impact on enterprises. They affect the financial performance of the enterprise and also influence investors' investment decisions. Therefore, even though equity pledges are the result of personal decisions by controlling shareholders, their potential negative impacts must be taken seriously and recognized deeply.

Secondly, an in-depth analysis of the factors affecting innovation investment helps to refine and enrich related research. In the past, most scholars have studied from aspects such as risk preference, government financial subsidies, equity concentration, and property rights nature.

This paper starts from the perspective of controlling shareholders' equity pledges to analyze their relationship with corporate innovation investment, which is valuable and meaningful for improving research on innovation investment by listed companies.

Next, innovation investment is an important factor affecting corporate performance. By analyzing the mediating role of corporate innovation investment in the impact of equity pledges on corporate performance, it can add theoretical contributions to the development of research on the equity pledge system, thereby enriching the theory of equity pledge systems and the factors affecting corporate performance.

Lastly, it has certain reference value for strengthening supervision and improving the institutional construction of government agencies. To protect the interests of small and medium shareholders and external investors, it is necessary to continue to improve China's stock pledge system and strengthen the quality supervision of information disclosure. At the same time, in the formulation and adjustment of monetary policy, it is important to enhance the level of information disclosure and play the guiding role of policy to promote the stable development of China's real economy.

2. Research Hypotheses

According to agency theory, after equity pledges, the interests of controlling shareholders and listed companies no longer remain completely aligned, and the second type of agency problem becomes more severe. La Porta (1999) began new research from the perspective of the separation of control rights and cash flow rights, arguing that the separation of control rights and cash flow rights provides motives and channels for controlling shareholders to seek control benefits. Moreover, because controlling shareholders have absolute or relative control over the company, they also have the ability to seek private benefits through various means, including related party transactions, excessive compensation for corporate executives, equity dilution, theft of the company's investment opportunities, low dividend payments, and manipulation of accounting reports, etc.[1]. After controlling shareholders pledge their equity, the scope of the pledgee's rights only includes property-based self-beneficial rights, while voting rights, management selection rights, and other co-beneficial rights still remain in the hands of the controlling shareholders, that is, the controlling shareholders' cash flow rights decrease while control rights remain unchanged. When the benefits of control rights to investors are greater than the loss caused by the loss of cash flow rights, investors are more likely to seek control benefits for themselves and no longer focus on enterprise value. Based on the above, the first hypothesis of this paper is proposed:

H1: There is a negative correlation between controlling shareholders' equity pledges and corporate performance.

Under the backdrop of a sluggish macroeconomy, if the pledger is required to repay the loan early and is unable to repay the debt, they will eventually transfer the shares. According to the provisions of the Securities Law, after controlling shareholders pledge shares to financial institutions, enterprises must disclose this in detail. Based on signal theory, this paper believes that the behavior of controlling shareholders' equity pledges sends a negative signal to the market, leading other investors to believe that there is a liquidity problem, investor confidence is weakened, and this leads to a sharp drop in the company's stock price. At the same time, a sharp drop in shareholder stock prices is very likely to further lead to controlling shareholders needing to repay debts early, and at this time, shareholders will face extremely high risks, making them reluctant to continue investing company funds in the high-risk field of innovation. Based on the above, the second hypothesis of this paper is proposed:

H2: There is a negative correlation between controlling shareholders' equity pledges and innovation investment.

After controlling shareholders pledge their equity, they need to repay the principal and interest within a specified period according to the contract, so there is a clear financial pressure after controlling shareholders pledge their equity. In addition, the equity pledge contract also details the base pledge rate, warning line, liquidation line, and other content. When the listed company's stock price falls to the warning line, the controlling shareholder needs to add collateral or redeem pledged stocks in advance, and under financial constraints, the controlling shareholder may not have sufficient funds to complete this operation. If the stock price further falls to the liquidation line, and the controlling shareholder cannot repay the principal, interest, and related fees within the specified time, the pledgee has the right to dispose of the pledged equity and its derived income according to the law, and the controlling shareholder will lose some of the control rights they value very much.

On the surface, equity pledge is just a financing behavior of the controlling shareholder and is unrelated to the listed company. However, because the controlling shareholder is the most important decision-maker of the listed company, their personal debt pressure and risk preference will have a direct and profound impact on the company's operational decisions, and at the same time, the company's operational income expectations will also affect the behavior of the controlling shareholder in return. Therefore, under the background of equity pledge, the trade-off between short-term financial pressure and long-term interest gains and losses of controlling shareholders will affect the innovation activities of listed companies by influencing management behavior, and innovation activities will affect the innovation capabilities and core competitiveness of listed companies, thereby affecting corporate performance. Based on the above, the third hypothesis of this paper is proposed:

H3: Innovation investment plays a mediating role in the impact of controlling shareholders' equity pledges on corporate performance, that is, controlling shareholders' equity pledges affect corporate performance through innovation investment.

3. Research design

3.1. Sample Selection and Data Sources

The research samples for this paper are derived from the Guotai Ann Database (CSMAR) and the WIND database, with the data selection scope being Chinese A-share listed companies from 2015 to 2020. To ensure the accuracy of the selected samples, the following processing was applied to the raw data of the samples:

(1) Excluded companies with incomplete financial data disclosure;

(2) Excluded financial and insurance company data;

(3) Excluded companies with missing key variable data, such as those not disclosing R&D expenses;

(4) Excluded companies with ST or *ST status within the scope of the study.

After data processing, a total of 13,739 observations were selected. The main data analysis software used in this paper is EXCEL 2010 and STATA 16.0.

3.2. Modelling

Based on the mediation analysis model and testing method proposed by Wen Zhonglin (2004)[2], the following model is constructed:

To test Hypothesis 1, Model 1 is constructed as follows:

$$\mathrm{ROA}_{i,t} = \beta_0 + c\mathrm{PLEDGE}_{i,t} + \beta_1\mathrm{LEV}_{i,t} + \beta_2\mathrm{CF}_{i,t} + \beta_3\mathrm{H10}_{i,t} + \beta_4\mathrm{SIZE}_{i,t} + \beta_5\mathrm{BODI}_{i,t} + \sum\mathrm{IND} + \sum\mathrm{YEAR} + \varepsilon_{i,t} \quad (1)$$

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In Model 1, the dependent variable is corporate performance (ROA), representing the corporate performance of firm i in year t, and the independent variable is the controlling shareholder's equity pledge (PLEDGE), representing the equity pledge ratio of firm i in year t. Based on the analysis of Hypothesis 1 in this paper, we therefore expect the regression coefficient c of PLEDGE on ROA to be significantly negative.

To test Hypothesis 2, Model 2 is constructed as follows:

$$RD_{i,t} = \beta_0 + aPLEDGE_{i,t} + \beta_1 LEV_{i,t} + \beta_2 CF_{i,t} + \beta_3 H10_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 BODI_{i,t} + \sum IND + \sum YEAR + \varepsilon_{i,t} \quad (2)$$

In Model 2, the dependent variable is innovation investment (RD), representing the proportion of innovation investment to operating income for firm i in year t, and the independent variable is the controlling shareholder's equity pledge (PLEDGE), representing the equity pledge ratio of firm i in year t. Based on the analysis of Hypothesis 2 in this paper, we expect the regression coefficient a of PLEDGE on RD to be significantly negative.

To test Hypothesis 3, Model 3 is constructed as follows:

$$ROA_{i,t} = \beta_0 + c'PLEDGE_{i,t} + bRD_{i,t} + \beta_1 LEV_{i,t} + \beta_2 CF_{i,t} + \beta_3 H10_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 BODI_{i,t} + \sum IND + \sum YEAR + \varepsilon_{i,t} \quad (3)$$

In Model 3, the dependent variable is corporate performance (ROA), and the core independent variables are controlling shareholder equity pledge (PLEDGE) and innovation investment (RD). Based on the analysis of Hypothesis 3 in this paper, innovation investment is expected to play a mediating role in the relationship between controlling shareholder equity pledge and corporate performance. Therefore, we anticipate that the regression coefficients b and c' will both be significant.

Table 1. Variable Definition Table

Variable Nature	Variable Symbol	Variable Name	Variable Definition
Dependent Variable	ROA	Corporate Performance	Net Profit / Total Assets * 100%
Independent Variable	PLEDGE	Equity Pledge Ratio	Number of Shares Pledged by Controlling Shareholders at Year-End / Total Shares Held by Shareholders * 100%
Mediating Variable	RD	Innovation Investment	Innovation Investment / Operating Revenue * 100%
Control Variables	LEV	Debt-to-Asset Ratio	Total Liabilities at Period End / Total Assets at Period End * 100%
	CF	Cash Flow	Net Cash Flow from Operating Activities / Total Assets * 100%
	H10	Equity Concentration	Shares Held by the Top Ten Shareholders / Total Number of Shares * 100%
	SIZE	Firm Size	Total Assets at Year-End
	BODI	Independent Director Ratio	Number of Independent Directors / Total Number of Board Directors * 100%
	IND	Industry Variable	Industry Dummy Variable Excluding Financial and Insurance Industries
	YEAR	Year Variable	Year Dummy Variable

4. Empirical Testing and Analysis

4.1. Regression Analysis

4.1.1. Equity Pledges and Corporate Performance

Table 2 presents the basic regression results of controlling shareholders' equity pledges and corporate performance. According to Table 2, the regression coefficient between equity pledge (PLEDGE) and corporate performance (ROA) for the full sample is -0.001, which is significant at the 1% confidence level, indicating that the former has a significantly negative effect on the latter, thus confirming the first hypothesis H1 of this paper. Among the control variables, the independent director ratio (BODI) is not significant, while cash flow (CF), firm size (SIZE), and equity concentration (H10) are significantly positively correlated with corporate performance at the 1% confidence level. The debt-to-asset ratio (LEV) is significantly negatively correlated with corporate performance (ROA) at the 1% confidence level, meaning that equity pledge has a greater impact on corporate performance for enterprises with high cash flow, large scale, low debt ratio, concentrated equity, and a lower proportion of independent directors.

Table 2. Basic regression results of equity pledges and firm performance

	ROA
PLEDGE	-0.001***
	(-6.93)
CF	0.317***
	(19.94)
LEV	-0.252***
	(50.08)
SIZE	0.019***
	(19.11)
H10	0.001***
	(10.02)
	(10.02)
BODI	-0.000
	(-0.50)
IND	Control
YEAR	Control
N	13738
R^2	0.241
Adjusted R^2	0.236

4.1.2. Equity Pledges and Innovation Inputs

According to Table 3, the regression coefficient between equity pledge (PLEDGE) and innovation investment (RD) is -0.004, but it is not significantly correlated, which is inconsistent with Hypothesis 2. Among the control variables, the debt-to-asset ratio (LEV), cash flow (CF), firm size (SIZE), and equity concentration (H10) are significantly negatively correlated with innovation investment (RD) at the 1% confidence level, while the independent director ratio (BODI) is significantly positively correlated with innovation investment (RD) at the 1% confidence level.

On one hand, after equity pledge, controlling shareholders may reduce their willingness to invest in R&D capabilities. Innovation and R&D inherently carry certain risks, and the results require a longer time to materialize. After the equity is pledged, controlling shareholders need to repay the principal and interest within a specified period according to the contract, and if the

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stock price falls to the liquidation line, and shareholders cannot add collateral or redeem the pledged stocks in advance, they will lose part of their control rights, thus creating clear financial pressure for the shareholders. This will cause major shareholders to focus less on the growth and long-term value realization of the enterprise, and instead concentrate on the company's current profits. Therefore, the willingness of major shareholders to invest in R&D and innovation activities will significantly decrease, thereby affecting the enterprise's innovation capabilities. On the other hand, equity pledge may lead controlling shareholders to manipulate stock prices through excessive investment. Against the backdrop of the widespread adoption of equity pledge in the financial market, shareholders are sometimes forced to increase margin due to the decline in stock prices, and since they often pledge equity due to a shortage of funds, these strong investors are likely unable to pay the margin. If the pledgee sells the pledged stocks in the secondary market at this time, it will have a new negative impact on the company's stock price, and this downward trend is difficult to reverse in the short term. Once the company's stock price approaches the warning line, other investors will realize that the controlling shareholders are very likely to be forcibly liquidated, leading to panic and further sale of stocks, causing a significant drop in stock prices. Therefore, in order not to let the stock price fall below the liquidation line, controlling shareholders will try every means to raise the company's stock price. However, they tend to choose projects that are more conducive to personal gain, such as obtaining personal benefits from projects with a negative net present value. As a result, major shareholders can seek new profit growth points through excessive investment, thereby gaining more profits and the attention of other investors, driving up stock prices. Therefore, stock pledging is very likely to lead to speculation by controlling shareholders, thereby causing excessive investment.

Table 3. Basic regression results on equity pledges and innovation inputs

	RD
PLEDGE	-0.004
	(-1.08)
CF	-2.908***
	(-3.70)
LEV	-1.622***
	(-6.54)
SIZE	-0.531***
	(-10.81)
H10	-0.016***
	(-4.27)
BODI	0.034***
	(3.63)
IND	Control
YEAR	Control
N	13738
R2	0.175
Adjusted R2	0.169

4.1.3. Equity Pledge, Innovation Investment, and Corporate Performance

Table 4 presents the basic regression results for controlling shareholders' equity pledges, innovation investment, and corporate performance. Model 3 is used to test the relationships among the independent variable, mediating variable, and dependent variable. According to the regression results in Table 4, the coefficients for equity pledge (PLEDGE) and innovation investment (RD) with respect to corporate performance (ROA) for the full sample are -0.001 and -0.002, respectively, and both are significantly negatively correlated at the 1% confidence level. Among the control variables, the debt-to-asset ratio (LEV) and cash flow (CF) are significantly negatively correlated with corporate performance (ROA) at the 1% confidence level, while firm size (SIZE) and equity concentration (H10) are significantly positively correlated with corporate performance (ROA) at the 1% confidence level, and the independent director ratio (BODI) is not significant.

Table 4. Equity pledge, innovation investment and firm performance

	ROA
RD	-0.002***
	(-8.99)
PLEDGE	-0.001***
	(-7.03)
CF	0.313***
	(19.70)
LEV	-0.254***
	(-50.65)
SIZE	0.018***
	(18.25)
H10	0.001***
	(9.72)
BODI	-0.000
	(-0.22)
IND	Control
YEAR	Control
N	13738
R2	0.245
Adjusted R2	0.240

4.2. Bootstrap Test

From the second step, it is known that the regression coefficient between equity pledge (PLEDGE) and innovation investment (RD) in Model 2 is not significant, necessitating a Bootstrap test. This paper uses STATA 16.0 statistical software to conduct the Bootstrap test, with a sample size set at 500.

The results of the Bootstrap test are shown in Table 5. If the confidence interval does not include 0, then the direct effect of innovation investment is significant, with the direct effect size being 0.00058402; if the confidence interval does not include 0, it indicates that the indirect effect is significant, with the indirect effect size being 0.0001522. Combining the results from the above four steps of testing, both the direct and indirect effects are significant, suggesting that innovation investment has a partial mediating effect or a masking effect between controlling shareholders' equity pledges and corporate performance. The direct effect (and indirect effect) have opposite signs. According to the judgment method for partial mediating effects and masking effects, it indicates that the indirect role of innovation investment between controlling shareholders' equity pledges and corporate performance is a masking effect, not a partial mediating effect. The indirect and direct effects are 0.00001522 and -0.00058402, respectively, and the absolute value of their ratio is 2.61%, meaning that 2.61% of the impact of controlling shareholders' equity pledges on corporate performance is masked by innovation investment.

After equity pledging, controlling shareholders, who are sensitive to the long-term value of the enterprise, may have the motivation to reduce corporate R&D investment due to financial pressure. However, they also have a strong motivation to compensate by strengthening supervision of the company's operations and improving innovation efficiency. Therefore, when shareholders reduce investment in R&D, they will carefully review and manage R&D projects, eliminating unnecessary innovation investment while ensuring innovation capabilities, reducing corporate financial and operational risks, and enhancing corporate performance. At the same time, R&D activities are characterized by high risk and lag. A reduction in innovation investment will not lead to a decrease in corporate performance in the short term; on the contrary, it will provide a stable cash flow for the enterprise in the short term, improve operational efficiency, and thereby enhance corporate performance. Based on this, innovation investment plays a masking role in the relationship between controlling shareholders' equity pledges and corporate performance.

Table 5. Bootstrap test results

	Observed Coef.	Bias	Std.Err	[95% Conf. Interval]	
a*b	.00001522	4.45e-07	7.019e-06	3.64e-06	.0000311
c’	-.00058402	6.22e-06	.00008162	-.0007391	-.0004218

5. Literature References

5.1. Equity Pledge Motivations

Equity pledge refers to the act of pledging shares as collateral. Gong Junqiong (2015) points out that under normal circumstances, the motives for equity pledging mainly include: first, shareholders can obtain funds through this method to meet financing needs and enhance the level of financing; second, after pledging their shares, investors may use the funds to increase their holdings in the company to strengthen control over the enterprise[3]. At the same time, Hao Xiangchao (2009) notes that shareholders can cash out through equity pledging, which can significantly damage the company's value[4].

5.2. Equity Pledge and Corporate Performance

Currently, there is no consensus in the academic community on the relationship between corporate performance and equity pledges, with researchers proposing the following main viewpoints.

Some researchers point out that equity pledges can have a negative impact on corporate performance. Scholars from Western countries mention that after major shareholders implement equity pledges, the second type of agency problem will continue to intensify. Major shareholders, for their personal interests, will arbitrarily encroach on the interests of the enterprise, which will have a negative impact on the operation and development of the enterprise, leading to a decline in corporate performance. There is a close relationship between the ratio of equity pledges and the operational risk of the enterprise, and they have a positive correlation, that is, as the ratio of equity pledges continues to rise, the enterprise will face huge risks when carrying out operational activities. Chen Y and Hu S (2001) proposed that after controlling shareholders implement equity pledges in an economic downturn, corporate performance will be adversely affected, and performance levels will continue to decline[5]. Ai Dali and Wang Bin (2012) stated that after investors pledge their equity, they may need to bear the risk of control rights transfer, and both corporate and personal leverage risks will increase, thereby triggering the risk of corporate management chaos and reducing corporate performance[6]. Wang Xinhong (2018) concluded that corporate performance is affected by the equity pledges of controlling shareholders, and the higher the proportion, the greater the decline in corporate performance[7]. Yeh Y H, Ko C E, and Su Y H (2003) pointed out that the higher the proportion of equity pledges, the deeper the negative impact on corporate performance[8].

Some scholars mention that equity pledges can play a positive role and improve corporate performance. Wang Bin, Cai Anhui, and Feng Yang (2013) showed that in order to avoid the transfer of control rights, major shareholders will pay more attention to corporate performance after implementing pledges, and they will use various methods to improve corporate performance to prevent the transfer of control rights[9]. Tan Yan (2013) pointed out that after major shareholders implement equity pledges, they will actively participate in market management activities to improve the company's operational situation, and they will not excessively encroach on the interests of the enterprise. If the proportion of major shareholders' holdings is high, the level of corporate governance will continue to improve after they use equity pledges[10]. Dou Y (2016) and others pointed out that in order to prevent changes in control rights, when major shareholders implement equity pledges, they will reject some high-risk investment projects, which can avoid the impact of risks on the enterprise and ensure the healthy development of the enterprise[11]. Wang Xiong (2018) pointed out that when major shareholders have a prediction that control rights may be transferred, they will reduce the risk of control rights transfer by avoiding taxes, and at this time, corporate performance will be effectively improved due to tax avoidance[12].

Regarding the relationship between the pledge ratio of listed companies and corporate value, some scholars have concluded that the relationship is somewhat complex and not a simple linear relationship, but an inverted U-shaped relationship. Zhu Wenli (2020) found that there is a critical point in the positive and negative correlation between corporate value and the pledge ratio, which is a pledge ratio of 36.53%. When the ratio is below this threshold, the two are positively correlated, and when the ratio is above this threshold, they are negatively correlated[13].

5.3. Equity Pledge and Innovation Investment

Zhang Ruijun (2017) conducted a study on equity pledges and innovation investment, and the results indicated that there is a negative correlation between equity pledges and corporate innovation investment. As the chain of corporate control rights extends, the degree of negative correlation also increases. When other investors in the enterprise adopt the same method to obtain funds, the negative impact on R&D investment becomes more severe, because investors are concerned that stock prices will decline, thereby adversely affecting the company's profits and subsequently damaging their own interests. Therefore, they will now increase their efforts to prevent R&D investment[14]. Li Changqing (2018) also studied the relationship between the pledge ratio and R&D investment, concluding that equity pledges have an adverse effect on the level of corporate R&D investment, and this effect becomes more significant as the pledges increase[15]. Zhou Chenxi (2019) focused on the frequency of pledges in his study, and his results showed that the more frequently investors pledge their shares, the greater the impact on the company's R&D investment. Frequent pledging implies an urgent demand for funds from shareholders, so at this time, the more cautious investors are in their risk preference, the less they invest in innovation.

5.4. Innovation Investment and Corporate Performance

Over the years, scholars from both domestic and international backgrounds have explored the relationship between corporate innovation investment and company performance, conducting in-depth theoretical and empirical research. They have recognized the crucial role of innovation

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investment in corporate performance and global economic development, establishing a relatively comprehensive set of theoretical and practical results.

Currently, scholars generally agree that corporate innovation investment can improve corporate performance and profits, but this growth has a certain lag effect. Some foreign studies believe that innovation investment can promote technological progress and increase productivity, thereby reducing production costs; R&D investment facilitates the introduction of high-quality products, helping companies gain a larger market in competition. Garner JL, Nam J, and Ottoo RE (2002) concluded that a company's R&D efficiency is closely related to its R&D investment, and R&D efficiency is an important factor in determining the value of a company[16]. Domestic scholar Zhang Yunfeng (2012), through the analysis of 341 high-tech enterprises, found that the more high-tech enterprises invest in innovation, the more significant the improvement in their corporate performance. Additionally, the impact of R&D investment on corporate performance is delayed, and it takes about two years to see the effect of performance improvement[17]. Wang Wei and Wang Yue (2018) studied 469 information technology companies and found that these companies' innovation investment and operational performance are significantly positively correlated[18].

However, there are other research findings regarding the relationship between innovation investment and corporate performance. A minority of studies have found a negative correlation or non-linear relationship between the two (especially for current corporate performance), and some studies have found that the relationship is not significant. Masulis R W et al. (1976) was the first researcher to propose that innovation investment would reduce the operational efficiency of companies, thereby adversely affecting the company's production and operations[19]. Paula F O et al. (2018), through model testing on data from 2810 Brazilian companies, found that there is a relationship between internal R&D, external R&D, innovation performance, and financial performance in Brazilian manufacturing companies. The conclusion was that strategic alliance external R&D is positively correlated with innovation performance, but innovation performance will have a negative impact on the company's future performance; the reason is that new products, new technologies, or new services in the current period cannot bring significant revenue growth to the company in the current period[20]. Yin Meiqun (2018), through empirical analysis of listed companies, confirmed that there is a significant negative correlation between innovation investment in period t and corporate performance in period t[21].

After interpreting and summarizing the above literature, it is found that domestic and foreign researchers have conducted in-depth analysis on the impact of major shareholders' pledge of their equity on corporate performance and have achieved a wealth of results. However, there are significant differences in the conclusions drawn by researchers. Firstly, when discussing the impact of equity pledges on enterprises, some researchers have started their analysis with the separation of ownership and control, agency problems, etc. Researchers have different perspectives and choose different research methods, hence their conclusions also vary. Secondly, most studies on the relationship between equity pledges and innovation investment point to a negative correlation between the two, and scholars have studied the pathways and possible reasons from different perspectives. In addition, there are many differences in the research results concerning innovation investment and corporate performance. On the one hand, some studies point out that there is a significant positive correlation between innovation and corporate performance, and some researchers also point out the lag in such a relationship; on the other hand, a small number of empirical studies have shown a significant negative or non-linear correlation between the two, especially in studies related to current corporate performance. Moreover, some foreign researchers have found that the relationship between innovation investment and corporate performance is not significant during their research process. Lastly, most scholars have paid more attention to the relationship between equity pledges and corporate performance in their research work and usually do not add other factors into the research system, with very few studies conducted on the role of innovation investment. This study takes equity pledges as the starting point to analyze the mediating role of innovation investment in the relationship between equity pledges and corporate performance, which has certain practical significance and can provide new perspectives and references for subsequent research.

6. Conclusion

This paper, based on existing domestic and international literature, analyzes the mechanism relationship among controlling shareholders' equity pledges, innovation investment, and corporate performance through mediation analysis methods. The paper selects data from Chinese A-share listed companies from 2015 to 2020 as the research sample to empirically analyze the impact of controlling shareholders' equity pledges on innovation investment, corporate performance, and the relationship among the three. The main conclusions are as follows:

(1) There is a negative correlation between controlling shareholders' equity pledges and corporate performance, meaning that controlling shareholders' equity pledges hinder the growth of corporate performance. Although equity pledges are the shareholders' own decisions, they ultimately affect the enterprise as a whole through certain channels. Because controlling shareholders have a significant say in company decisions and may seek excessive profits for their own interests, if they do not have enough funds to solve financing problems when facing financial pressure, it is very likely that controlling shareholders will use equity pledges to embezzle company funds, reducing the company's value.

(2) Controlling shareholders' equity pledges have no significant impact on innovation investment. The reason may be that, on the one hand, equity pledges lead to a separation of control and ownership rights in enterprises. The difference in the attribution of these two rights may cause controlling shareholders to no longer focus on the long-term growth and value of the enterprise, and R&D innovation itself is a high-risk, long payback activity. At this time, the willingness of controlling shareholders to seek private profits increases, and they may no longer wish to increase innovation investment. At the same time, if controlling shareholders choose to finance through equity pledges, they will have to face various debt pressures. Driven by pressure, controlling shareholders may also focus on short-term benefits. Therefore, their willingness to take risks in innovative projects will significantly decrease. On the other hand, against the backdrop of the widespread adoption of equity pledges in the financial market, shareholders are sometimes forced to increase margin due to the decline in stock prices. Since they often pledge equity due to a shortage of funds, these strong investors are likely unable to pay the margin. If the pledgee sells the pledged stocks in the secondary market at this time, it will have a new negative impact on the company's stock price, and this downward trend is difficult to reverse in the short term. Once the company's stock price approaches the warning line, other investors will realize that controlling shareholders are very likely to be forcibly liquidated, leading to panic and further sale of stocks, causing a significant drop in stock prices. Therefore, to prevent the stock from falling below the liquidation line, controlling shareholders will try every means to raise the company's stock price. However, they tend to choose projects that are more conducive to personal gain, such as obtaining personal benefits from projects with a negative net present value. As a result, controlling shareholders can seek new profit growth points through excessive investment, thereby gaining more profits and the attention of other investors, driving up stock prices. Therefore, stock pledges are very likely to lead to speculation by controlling shareholders, thereby causing excessive investment.

(3) Innovation investment has a masking effect between controlling shareholders' equity pledges and corporate performance. First, after equity pledges, controlling shareholders, who are sensitive to the long-term value of the enterprise, may have the motivation to reduce corporate R&D investment due to financial pressure, but at the same time, they also have a strong motivation to compensate by strengthening supervision of the company's operations and improving innovation efficiency. Therefore, when shareholders reduce investment in R&D, they will carefully review and manage R&D projects, eliminating unnecessary innovation investment while ensuring innovation capabilities, reducing corporate financial and operational risks, and enhancing corporate performance. Second, R&D activities are characterized by high risk and lag. A reduction in innovation investment will not lead to a decrease in corporate performance in the short term; on the contrary, it will provide a stable cash flow for the enterprise in the short term, improve operational efficiency, and thereby enhance corporate performance. In the impact of controlling shareholders' equity pledges on corporate performance, the masking effect of innovation investment accounts for 2.61% of the direct effect of controlling shareholders' equity pledges, that is, 2.61% of the effect of controlling shareholders' equity pledges on corporate performance is masked through innovation investment.

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References

[1] Spence M.: Job Market Signaling, Quarterly Journal of Economics, 87(1973), No.3, p.355-374.

[2] Wen Zhonglin, Zhang Lei, Hou Jietai, et al.: Mediation Effect Inspection Procedure and Its Application, Acta Psychologica Sinica, 2004, No.36, p.614-620.

[3] Gong Junqiong: The Motives and Consequences of Major Shareholders' Equity Pledge in China's Listed Companies, Contemporary Economy, 2015,No.20, p.12-13.

[4] Hao Xiangchao, Liang Qi: Does the Ultimate Controller's Equity Pledge Damage Company Value?, Accounting Research, 2009, No.07, p.57-63.

[5] Chen Y, Hu S: The Controlling Shareholders' Personal Stock Loan and Firm Performance, The Journal of Finance, 2001, No., p.12-15.

[6] Ai Dali, Wang Bin: On the Relationship between Major Shareholders' Equity Pledge and Listed Companies' Finance: Mechanism and Market Reaction, Journal of Beijing Technology and Business University (Social Sciences Edition), 27(2012), No.04, p.72-76.

[7] Wang Xinhong, Zhang Xing, Xue Zerong: The Impact of Major Shareholders' Equity Pledge on Corporate Performance: Based on the Moderating Role of Internal Control, Friends of Accounting, 2018, No.10, p.58-64.

[8] Yeh Y H, Ko C E, & Su Y H: Ultimate Control and Expropriation of Minority Shareholders: New Evidence from Taiwan, Academic Economic Papers, 2003, No.31, p.263-299.

[9] Tan Yan, Wu Jing: Does Equity Pledge Have Governance Utility? -Empirical Evidence from Chinese Listed Companies, Accounting Research, 2013, No.02, p.45-53.

[10] Dou Y, Masulis R W, & Zein J: Shareholders Wealth Consequences of Insider Pledging of Company Stock as Collateral for Personal Loans, Social Science Electronic Publishing, 2017, No.3, p.20-24.

ISSN: 2688-9323

[11] Wang Xiong, Ouyang Caiyue, Shi Zhenyang: Equity Pledge, Control Transfer Risk, and Tax Avoidance, Economic Research, 53(2018), No.01, p.138-152.

[12] Zhu Wenli, Chen Xinxin, Kan Lina: How Equity Pledge Affects the Value of Listed Companies, Finance and Accounting Monthly, 2020, No.2, p.48-55.

[13] Zhang Ruijun, Xu Xin, Wang Chaoen: The Impact of Controlling Shareholders' Equity Pledge on Corporate Innovation, Auditing and Economic Research, 32(2017), No.4, p.63-73.

[14] Li Changqing, Xing Wei: The Relationship between Controlling Shareholders' Equity Pledge and Information Disclosure of Listed Companies, Statistical Research, 34 (2017), No.12, p.75-86.

[15] Garner JL, Nam J, Ottoo RE: Determinants of Corporate Growth Opportunities of Emerging Firms, Journal of Economies and Business, 54 (2020), No.1, p.73.

[16] Zhang Yunfeng: A Literature Review on the Relationship between R&D Investment and Corporate Performance of High-tech Enterprises, Business Economics, 2012, No.6, p.83-92.

[17] Wang Wei, Wang Yue: The Relationship between Intellectual Capital, Innovation Investment, and Corporate Performance: An Empirical Study Based on Information Technology Industry Listed Companies, Management and Operation, 2018, No.5, p.103-105.

[18] Galai, Masulis R W: The Option Pricing Model and the Risk Factor of Stock, Journal of Financial Economics, 3 (1976), No.1, p.53-81.

[19] Paula F O, Silva J F: The Impact of Alliances and Internal R&D on the Firm's Innovation and Financial Performance, Brazilian Business Review, 2018, No.6, p.533-550.

[20] Yin Meiqun, Sheng Lei, Li Wenbo: Executive Incentives, Innovation Investment, and Corporate Performance: An Empirical Study from the Perspective of Endogeneity by Industry, Nankai Management Review, 21(2018), No.1, p.109-117.