Major Shareholders' Equity Pledge and Investment Myopia

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Abstract: The paper examines the relationship between major shareholders' equity pledge and potential investment myopia. Taking reduction on R&D expenditure as a sign for investment myopia, it studies effect of equity pledge on corporate R&D input using data of listed companies in China between 2013 and 2018. Empirical results show that equity pledge by major shareholders negatively affect corporate input in R&D activities, and may be a cause of investment myopia. The negative effect is more evident among privately controlled companies and companies with CEO-Chairman duality. The results are robust as well with alternative measures of R&D, lagged explanatory variables, and the PSM sample.

1. Introduction

In recent years, equity pledge has become a commonplace financing method in China's capital market. Will equity pledge by major shareholders have any consequences on corporate investment behavior? In particular, under the pressure of maintaining pledged shares' market value, will it result in investment myopia? These are questions worth studying.

Investment myopia refers to the nearsightedness in investment. Firms with investment myopia tend to invest in projects that generate quick money, but may not maximize the corporate value or shareholders' wealth in the long run[1]. One of the most common manifestations of investment myopia is cutting high-risk, slow-return investment projects such as R&D projects[2-3]. Therefore, through analysis of Chinese listed companies' share pledge and R&D input between 2013 and 2018, this paper attempts to study the potential link between major shareholders' equity pledge and investment myopia so as to enrich empirical evidence on equity pledge study and provide relevant policy implications.

2. Theoretical Analysis and Research Hypotheses

2.1. Major Shareholders' Equity Pledge and R&D Input

Equity pledge facilitates shareholders' financing activities, and ease their financial constraint. However to control risk the lender will set up a cordon line and a liquidation line in the form of a ratio of the pledged stock market value to the loan principal. When the stock price falls so that the ratio drops below the cordon, the borrower has to instantly make up the collateral value gap. When the ratio drops to the liquidation line, the lender shall sell the pledged stock in time, and use the proceeds to repay the principal and interest. In other words, stock price decrease will put much pressure on the pledgor who has to either find more pledge or be deprived of shares and even lose control of the company. These are what they hate to see. Therefore major shareholders who have pledged shares care very much about the stock price. As a result, they may be reluctant upon R&D projects.

As we know, the output of R&D activities is highly uncertain. These activities often negatively affect current accounting profits and hence the stock price, in spite of potential long-term benefits.

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When major shareholders pledge shares, they have strong motives of maintaining the stock price within a safe zone. Investment on R&D could hardly satisfy their need.

In the meantime, R&D investment requires considerable financial input. Major shareholders who pledge shares are often faced with financial constraint, and so are the companies they control. According to previous study, funds raised by share pledge were seldom input into the share-issuing companies. In China, only 15.4% of share pledge announcements between 2007 and 2015 disclosed that shareholders would inject funds into the pledged firms[4]. Under this circumstance, the companies with pledged shares are likely to cut investments on R&D. Therefore we put forth the following hypothesis:

H1: All else equal, R&D input is negatively associated with major shareholders' equity pledge.

2.2. Equity Pledge, Controller Type and R&D Input

As previous study shows, financial constraint often leads to cut on R&D investment, while stable and sufficient cash flows help relieve this problem[5].In China, many listed companies used to be state owned enterprises, and now are still controlled by the state. Compared with companies with private controllers, they enjoy more political privilege, and have better access to external financing[6]. In other words, they are in a better position to overcome financial constraint. For state controlled companies with pledged shares, when margin call occurs because of stock price fall, they are more likely to be supported by financial institutions.

Besides, to prevent loss of state control, the law has set down some limitations on state ownership transfer, so that the major shareholders are less worried about potential loss of control.

Thus, we put forth the following hypothesis:

H2: For privately controlled companies, the negative effect of major shareholders' equity pledge on R&D input is more evident than for state-controlled companies.

2.3. Equity pledge, duality and R&D input

In capital budgeting process, the roles of CEO and the chairman of the board of directors cannot be neglected. Investment on innovation is often expensive and involves a lot of risk. As a key operation decision, it needs CEO's backup as well as approval by the board. In most cases, the chairman of the board is appointed by the major shareholder and therefore acts as the spokesman of the latter. When the chairman works as CEO, he can realize the major shareholder's proposal more easily; on the contrary, if CEO is not the chairman himself, the two may have certain conflict, which may reduce the major shareholders' influence upon R&D input.

Therefore we put forth the hypothesis as follows:

H3: When duality occurs, the negative effect of major shareholders' equity pledge on R&D input is more evident.

3. Sample,Data and Research Model

3.1. Sample and data

This paper takes China's A-share listed companies from 2013 to 2018 as the initial samples. The reason is that in 2012, the CSRC (China Securities Regulatory Commission)issued a new version of the Guidelines on Information Disclosure Content and Format of Companies Publicly Issuing Securities (No. 2), which requires listed companies to separately explain their R&D investment. Some companies were excluded from the initial sample, namely: financial companies,companies with observations of less than one year, companies with missing observations, and companies with special treatment.In order to avoid the influence of extreme values, winsorizing is applied to all continuous variables by 1%. The data of R&D investment, equity pledge and other research data were collected from RESSET Securities Market Database and CSMAR Database of Guotai 'an. In this study, the major shareholder refers to the biggest shareholder.

3.2. Model and variables

To test the potential effect of share pledge on R&D input, the following multiple regression

model is constructed:

$$rd_{it} = a_0 + b_1 P_{it} + \Sigma_m b_m X_{it} + \varepsilon_i \quad (1)$$

Rd is the explained variable, which stands for the R&D investment of the sample companies. R&D is typical long-term strategic investment, which is a selective behavior of the management. Referring to previous study[7],the ratio of current R&D expenditure to operating income rd1 is used to measure the level of R&D input. Considering possible non-normal distribution problem, the ratio is logarithmized yielding rd2, used as an alternative measure of R&D investment.

The explanatory variable P represents the intensity of major shareholders' equity pledge which is measured by the ratio of major shareholders' year-end number of pledged shares compared with their total shares holding as indicated in Table 1.

Previous literature[7-8] shows that corporate cash-flows, operation efficiency, financial leverage, operation scale, growth opportunity and age of operation may have certain effect on corporate R&D input. Therefore the research model includes X, a series of control variables, to reflect potential effect by these factors. The firm and year are also controlled.

The model is also used to test H2 and H3, by classifying the total sample into two groups according to their controller type and duality status respectively.

Table 1 shows the variables used in the model, their definitions and measurement.

Table 1 Variables, Definition and Measurement.

Variable	Definition	Measurement
rd1	R&D input	R&D expenditure/operating income (%)
rd2	R&D input	Ln(R&D expenditure/operating income+1)
P	Major shareholder equity pledge	year-end number of pledged shares/ total shares holding
cf	Cash-flow level	Cash-flows from operation/total assets (%)
roa	Return over assets	Net income/total assets (%)
lev	Debt/asset ratio	Debt/total assets (%)
size	Operation scale	Ln (year-end total assets)
q	Growth opportunity	Year-end firm market value/total assets
age	Firm age	Ln (years of operation)

Table 2 shows the descriptive statistics of the variables and the Pearson correlation matrix.

As Table 2 Panel B shows, both measures of R&D input are negatively related with the pledge measure P, at the significance level of 0.01, which provides initial evidence for H1.

Table 2 Summary Statistics and Correlation Matrix.

Panel A Summary statistics

Variable	Obs	Mean	Std.Dev	Min	Max
rd1	13,858	4.607	4.491	0.030	26.240
rd2	13,858	1.474	0.710	0.030	3.305
P	13,858	0.035	0.082	0.000	0.436
cf	13,858	4.636	6.871	-14.668	25.469
roa	13,858	4.705	6.827	-25.145	23.305
lev	13,858	39.942	20.010	5.556	91.320
size	13,858	21.991	1.222	19.652	25.631
q	13,858	2.159	1.295	0.896	8.320
age	13,858	8.720	0.302	7.836	9.337

Panel B Pearson correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) rd1	1.000								
(2) rd2	0.877***	1.000							
(3) P	-0.039***	-0.035***	1.000						
(4) cf	-0.025***	-0.015*	-0.069***	1.000					
(5) roa	0.035***	0.092***	-0.082***	0.420***	1.000				
(6) lev	-0.295***	-0.347***	0.057***	-0.152***	-0.384***	1.000			
(7) size	-0.267***	-0.352***	0.034***	0.008	-0.122***	0.509***	1.000		
(8) q	0.236***	0.227***	0.020**	0.053***	0.082***	-0.248***	-0.351***	1.000	
(9) age	-0.109***	-0.139***	0.022**	-0.026***	-0.159***	0.182***	0.226***	-0.012	1.000

*** p<0.01, ** p<0.05, * p<0.1.

4. Results and analysis

4.1. Equity pledge and R&D input

Table 3 Column (1)-(2) presents the regression results of the fixed effect model (1) using the full sample. The explained variables are rd1 and rd2 respectively. In both regressions, major shareholders' pledge ratios are negatively associated with firms' R&D input at the 1% significance level, which is in line with H1 suggesting a negative effect by share pledge on corporate long-term investment. As for control variables, corporate growth opportunity q has a significant and positive effect on R&D expenditure, which shows that firms tend to make major investment on research activities when they feel bright business prospects. Other controls all have negative effects at different significance levels on R&D expenditure.

Table 3. Share Pledge and R&D Input.

Column	(1)	(2)	(3)	(4)
Dependant Variable	rd1	rd2	rd1	rd2
P	-1.690***	-0.212***	-1.450***	-0.165**
	(-4.292)	(-3.719)	(-3.100)	(-2.502)
cf	-0.00142	-0.000321	-0.0139**	-0.00150*
	(-0.272)	(-0.427)	(-2.268)	(-1.732)
roa	-0.0523***	-0.00339***	-0.00966	0.00225**
	(-9.351)	(-4.188)	(-1.331)	(2.192)
lev	-0.0449***	-0.00691***	-0.0424***	-0.00669***
	(-22.13)	(-23.56)	(-17.72)	(-19.80)
size	-0.125***	-0.0599***	-0.111***	-0.0560***
	(-3.741)	(-12.42)	(-2.811)	(-10.02)
q	0.452***	0.0453***	0.406***	0.0413***
	(15.59)	(10.80)	(12.77)	(9.180)
age	-0.998***	-0.160***	-0.786***	-0.121***
	(-8.727)	(-9.702)	(-5.900)	(-6.446)
Constant	15.21***	3.853***	13.12***	3.488***
	(13.19)	(23.11)	(9.658)	(18.18)
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Obs	13,858	13,858	10,544	10,544
R^2	0.319	0.431	0.314	0.432
Ajusted R^2	0.429	0.429	0.429	0.429

**** p<0.01, ** p<0.05, * p<0.1; t statistics are in parentheses.*

4.2. Equity pledge, controller type and R&D input

To compare potential effect of controller type, we divided the sample into two groups, namely state-controlled group and privately controlled group, and tested model (1) again.

Table 4. Controller type, Share Pledge and R&D Input (total sample).

	rd1		rd2	
	State controlled	Privately controlled	State controlled	Privately controlled
P	0.678	-2.493***	0.102	-0.342***
	-0.881	(-5.419)	-0.762	(-5.498)
cf	-0.0251***	0.00442	-0.00374**	0.00074
	(-2.624)	-0.718	(-2.255)	-0.889
roa	-0.0320***	-0.0642***	-0.000291	-0.00536***
	(-2.942)	(-9.756)	(-0.154)	(-6.016)
lev	-0.0379***	-0.0502***	-0.00715***	-0.00721***
	(-10.75)	(-20.16)	(-11.69)	(-21.41)
size	-0.066	-0.0617	-0.0346***	-0.0537***
	(-1.140)	(-1.434)	(-3.444)	(-9.213)
q	0.368***	0.510***	0.0405***	0.0525***
	-6.816	-14.77	-4.317	-11.23
age	-0.404*	-1.100***	-0.0700*	-0.164***
	(-1.937)	(-7.982)	(-1.932)	(-8.811)
Constant	8.151***	15.11***	2.489***	3.780***
	-3.65	-10.73	-6.423	-19.83
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Obs	3,634	10,224	3,634	10,224
R^2	0.317	0.315	0.407	0.43
Ajusted R^2	0.341	0.341	0.464	0.464

**** p<0.01, ** p<0.05, * p<0.1; t statistics are in parentheses.*

Table 4 shows the regression results. Unlike previous test, for the state controlled group, the R&D expenditure is not significantly affected by pledge ratio; while for privately controlled companies, the negative relationship between share pledge and R&D expenditure is still significant. This result is supportive of hypotheses H2.

As mentioned above, in China state controllers are not allowed to transfer shares as easily as the private controllers. To a certain degree this mitigates their concerns over loss of control rights when they pledge shares. At the same time, state controlled firms enjoy more privilege while resorting to external finance. This may alleviate their financial constraint while investing in R&D projects, and makes the effect of share pledge less significant than privately controlled companies.

4.3. Equity pledge, duality and R&D input

We divided the total sample into two groups, namely companies with duality and companies without duality, and tested potential effects of equity pledge on R&D investment with model(1). The results are presented in Table 5.

For both groups, the pledge ratios of major shareholders have significant and negative effect on corporate R&D expenditure, but the effect in the duality group is apparently higher than that in the other group with higher absolute value of the coefficient of the variable P. This is in line with our H3 hypotheses. Since CEO is a key decision-maker in corporate strategic investments, it is not surprising that when he is also the chairman, namely the representative of major shareholders, he will act unanimously in the interest of the latter.

Table 5. Duality, Share Pledge and R&D Input (total sample).

	rd1		rd2	
	With Duality	Without Duality	With Duality	Without Duality
P	-2.221***	-1.557***	-0.237**	-0.229***
	(-2.911)	(-3.415)	(-2.453)	(-3.283)
cf	0.00528	-0.0038	0.000687	-0.000612
	-0.521	(-0.634)	-0.536	(-0.667)
roa	-0.0835***	-0.0408***	-0.00650***	-0.00241**
	(-7.665)	(-6.289)	(-4.721)	(-2.429)
lev	-0.0584***	-0.0393***	-0.00736***	-0.00669***
	(-14.15)	(-17.08)	(-14.09)	(-18.97)
size	0.103	-0.163***	-0.0305***	-0.0629***
	-1.459	(-4.280)	(-3.406)	(-10.80)
q	0.500***	0.439***	0.0504***	0.0444***
	-8.911	-13.02	-7.094	-8.593
age	-0.795***	-1.031***	-0.0876***	-0.185***
	(-3.537)	(-7.771)	(-3.081)	(-9.073)
Constant	8.905***	16.21***	2.554***	4.141***
	-3.976	-11.92	-9.012	-19.87
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Obs	4,276	9,582	4,276	9,582
R^2	0.327	0.312	0.436	0.424
Ajusted R^2	0.277	0.277	0.383	0.383

**** p<0.01, ** p<0.05, * p<0.1; t statistics are in parentheses.*

5. Robustness Check

Additional tests were conducted for robustness check.

Firstly, in case of potential endogenity, we used lagged variables P_{t-1} and X_{t-1} to replace P_t and X_t in the research model. The results are shown in Table 3 Column (3)-(4) and are consistent with previous results.

Secondly, while testing potential effects of controller type, we divided the total sample into two groups. As the number of state controlled firms is much smaller than that of privately controlled ones, to avoid sample selection bias, we performed a 1-to-1 nearest-neighbor matching to construct a sample consisting of state controlled firms (treatment group) and their matched privately controlled firms based on propensity scores. The similar method was also used to test H3 on a PSM

sample. The results using the PSM samples are reported in Table 6 and they are still supportive of H2 and H3 hypotheses respectively.

Regression results on the dependent variable rd2 are also consistent with those on rd1. They are omitted for space limit, but are available upon request.

Table 6. Controller Type/duality, Share Pledge and R&D Input (PSM sample)

	rd1		rd1	
	State controlled	Privately controlled	With Duality	Without Duality
P	0.704	-2.472***	-2.221***	-1.844**
	-0.914	(-3.049)	(-2.911)	(-2.090)
cf	-0.0258***	-0.019	0.00528	0.00684
	(-2.696)	(-1.612)	-0.521	-0.612
roa	-0.0308***	-0.0725***	-0.0835***	-0.0560***
	(-2.820)	(-6.077)	(-7.665)	(-4.342)
lev	-0.0379***	-0.0496***	-0.0584***	-0.0431***
	(-10.75)	(-10.70)	(-14.15)	(-9.932)
size	-0.0781	-0.0868	0.103	-0.133*
	(-1.341)	(-1.111)	-1.459	(-1.770)
q	0.362***	0.541***	0.500***	0.395***
	-6.693	-8.431	-8.911	-6.427
age	-0.432**	-1.325***	-0.795***	-1.160***
	(-2.066)	(-4.918)	(-3.537)	(-4.751)
Constant	8.674***	17.87***	8.905***	17.83***
	-3.861	-6.422	-3.976	-6.903
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	3,627	2,525	4,276	3,045
R^2	0.318	0.356	0.327	0.29
Ajusted R^2	0.341	0.341	0.277	0.277

**** p<0.01, ** p<0.05, * p<0.1; t statistics are in parentheses.*

6. Conclusion

Equity pledge is widely used in Chinese capital market. When major shareholders pledge shares, they have strong motives to maintain the stock price for fear of margin call or even loss of the pledged shares. Will this entail corporate investment myopia, such as rejecting high-risk but promising long-term projects? The relevant evidence is still scant.

This paper studied the major shareholders' equity pledge and R&D input of Chinese A Share companies between 2013 and 2018. By controlling firm and year fixed effect, introducing alternative measures of R&D input and lagged explanatory variables, and constructing PSM sample, the study came to robust conclusions that equity pledge by major shareholders negatively affect corporate investment in R&D activities; this negative effect is more evident among privately controlled companies and companies with CEO-Chairman duality.

The paper provides new evidence on the link between equity pledge and investment myopia, and is of great significance for both researchers and practitioners. Firstly, since shareholders' external financing behavior may affect corporate investment efficiency, corporate investors, management and regulatory bodies should closely watch and enhance disclosure requirement on this kind of financing behavior. Secondly, the study shows that privately controlled firms are more likely to be affected by equity pledge probably due to their disadvantaged financing status compared with their state controlled counterparts. Therefore to alleviate the problem, we need to build up a fairer and more efficient financial environment. Finally, the comparative study between companies with or without duality suggests the importance of keeping check and balance in corporate governance. Given top management and major shareholders work independently, the potential negative effect of pledge behavior may be reduced.

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References

[1] L.Lundstrum. Corporate Investment Myopia:A Horserace of the Theories.J. Corporate Finance 8(4):353-371(2002)

[2] G. Cao, J. Yang, C. Lin. CEO reputation and investment myopia behavior. J. Industrial engineering and engineering management 31 (4) : 45-51(2017)

[3] J. Shi, Y. Li. Investment myopia of listed companies with overconfident investors.systems engineering 29 (3) : 27-32 (2011)

[4] Q.Wang, M. Qiu, W. Tan. Does insiders share pledging stifle innovation? Evidence from China. Intl Rev of Financial Analysis 72: 101570(2020)

[5] J.R.Brown, B.C.Petersen.Cash holdings and R&D Smoothing.J.Corporate Finance,17(3):694-709(2011)

[6] Y.Lin, Z.Li. Policy burden,moral hazard and soft budget constraint. Economics Research 3:76-87(2004)

[7] C.Li, et al. controlling shareholder equity pledge and enterprise innovation investment . J. financial research 7 : 143-156(2018)

[8] W.Wen, Y.Chen,Y.Huang.Research on impact of controllers' share pledge on corporate innovation. Chinese J. Management 15(7):998-1008.(2018)