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Research on the Impact of Controlling Shareholders' Equity Pledges on Firm Performance from the Perspective of Corporate Governance

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Abstract: In recent years, as companies face increasing financing difficulties due to factors such as stringent lending conditions and high interest rates, new financing methods have emerged. Among these, equity pledges have gained attention due to their simple approval process, low cost, and ability to maintain shareholder control. As a result, equity pledges have become a preferred financing option for shareholders of many listed companies. This paper examines the equity pledge behavior of major shareholders and its potential impact on company performance. It begins by introducing the background of the equity pledge market, then reviews relevant literature on the economic impacts of equity pledges, which are classified into positive synergistic effects and negative encroachment effects. Additionally, corporate governance theories suggest that internal and external governance mechanisms influence the relationship between equity pledges and firm performance, and the nature of equity in different firms also affects post-pledge outcomes. Based on these theoretical insights, three research hypotheses are proposed for empirical analysis, with reliable conclusions drawn through multiple regression analyses, heterogeneity, and robustness tests. By incorporating corporate governance as a moderating variable, this paper expands on previous research on equity pledges and offers recommendations for market regulators to enhance equity pledge regulation and use corporate governance tools for positive outcomes.

Keywords: equity pledge; corporate performance; corporate governance

1. Introduction

In recent years, capital markets in China and other emerging economies have made significant progress, with various financing methods emerging, including bank loans and equity financing. Among them, equity pledge financing — where shareholders use their equity as collateral to obtain funds from brokers and banks — has become popular due to its simple approval process and minimal impact on control rights. The legalization of equity pledges began with China's Guarantee Law in 1995, and the 2013 Measures for the Settlement of Stock Pledge Repurchase Transactions further regulated this practice. As of December 31, 2022, 2481 A-share listed companies had pledged shares, accounting for 53% of all A-share firms, with a total pledged value of RMB 3.20 trillion and a pledge ratio of 4.39%. Although the market value of pledged shares declined due to regulatory tightening in 2018, equity pledges remain a key financing tool, attracting continued market interest and regulatory oversight.

However, due to a challenging external trade environment and domestic deleveraging efforts, the A-share market has faced downward pressure. Since 2017, there have been numerous cases of equity pledge defaults, where shareholders with high pledge ratios were forced to sell shares due to falling stock prices. This selling pressure further exacerbated the price decline, creating a negative feedback loop that harmed company operations. Additionally, controlling shareholders may exploit information asymmetry and leverage to harm minority shareholders and debt investors, with some even cashing out and exiting, damaging company interests. While equity pledges offer quicker financing than traditional bank loans, their negative effects cannot be ignored.

Existing literature highlights the ambivalent role of large shareholders in corporate governance: a positive monitoring effect that reduces agency costs and a negative expropriation effect that harms minority shareholders. The impact of equity pledges on firm performance is also influenced by corporate governance mechanisms, such as equity concentration (internal governance) and institutional investor shareholding (external governance), which moderate this relationship.

In summary, equity pledges make up a significant portion of China's market (Figure 1), with profound implications for company development and the capital market. While regulatory progress has been made, there is still room for improvement in oversight. Exploring whether internal and external governance tools can mitigate the negative effects of large shareholders' equity pledges is crucial. This paper examines the impact of controlling shareholders' equity pledges on firm performance, incorporating a corporate governance perspective.

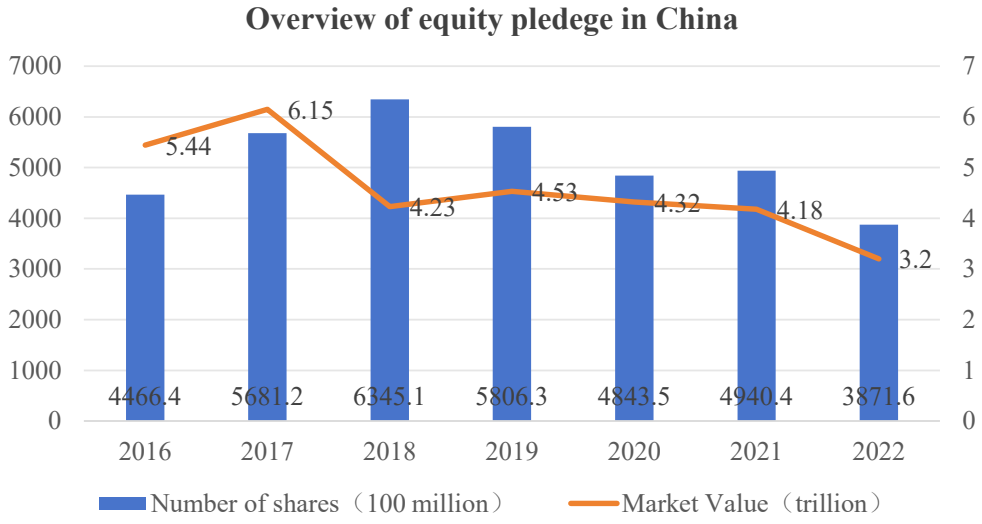

Figure 1. Overview of equity pledege in China.

2. Literature Review

2.1. Literature Review on Equity Pledge

Research on equity pledges in China mainly explores motives, influencing factors, and economic consequences. Regarding motives, Shleifer suggests that controlling shareholders may use pledges in ways that could potentially transfer assets at the expense of minority shareholders' interests [1]. Heugens argues shareholders pledge equity to secure financing while retaining control through active governance participation, often due to poor operating conditions [2].

For influencing factors, Hu highlight the influence of equity concentration and structure [3]. Luong applies machine learning to identify key factors like cumulative pledge ratios, equity concentration, and net asset growth rates, aiding variable selection [4].

The economic consequences are still under debate, with studies divided into negative encroachment effects and positive synergies. Ren notes equity pledges can exacerbate agency conflicts by separating control and cash flow rights [5]. Xiao finds pledged shareholders often engage in "tunneling" behaviors, transferring assets for personal benefit [6]. Cornett shows they intensify tunneling to compensate for lost cash flow rights [7]. Graves empirically links equity pledges to financial distress risks, prompting opportunistic behaviors [8]. Cai and Hu find pledged shareholders may manipulate financial statements or make strategic donations to inflate share prices and avoid liquidation [3,9]. Chen highlights risks of bad-faith pledges, where shareholders cash out during price declines, shifting risks to financial institutions [10].

On the positive side, Ma argues equity pledges alleviate financial pressure and enhance governance [11]. Zhang suggests pledged funds often improve operations, while Wang finds shareholders adopt risk-prevention measures to secure lower financing costs [12,13].

Lastly, Shen H differentiates between SOEs and private firms [14]. Due to the nature of their financial backing, SOEs may have different performance incentives compared to private firms, which may drive different governance strategies. Hao notes regulatory preferences favor SOEs in fundraising, leading private firms to rely more on equity pledges [15]. Heugens finds private firms more motivated to maintain share prices and enhance performance post-pledge [2].

In summary, equity pledges in China present both risks and benefits. While they offer financing opportunities, they also pose significant governance challenges, such as potential expropriation of minority shareholders, increased financial distress risks, and the possibility of market instability due to high pledge ratios and default behaviors. The distinct motivations and consequences for SOEs and private firms highlight the need for targeted regulatory measures.

2.2. Literature Review on Corporate Governance

2.2.1. Internal Corporate Governance and Firm Performance

In China, research on internal corporate governance mainly focuses on equity concentration, equity checks and balances, and governance structure.

Regarding shareholding structure, Shleifer and Vishny proposed the "majority shareholder monitoring" theory, suggesting that majority shareholders can oversee managerial decisions, reduce agency costs, and enhance firm performance [1]. Heugens et al. found a weak positive correlation between equity concentration and financial performance in Asia, particularly in regions with underdeveloped legal frameworks, where higher equity concentration serves as an effective governance strategy [2].

Chinese scholars report similar findings. Li et al. found a significant positive correlation between equity concentration and firm performance in 373 manufacturing firms [16]. Gan reached the same conclusion in Nigerian commercial banks, while Mu and Zhou also confirmed that increasing equity concentration benefits firm growth [17,18]. Conversely, Wang suggested an inverted U-shaped relationship, where moderate equity concentration improves performance, but excessive or insufficient concentration is detrimental [19]. Yang found industry-specific variations: positive correlations in manufacturing, extractive industries, and construction, but negative correlations in social services and retail [20].

2.2.2. Research on the Relationship between External Corporate Governance and Firm Perform-Mance

External governance mainly involves regulatory mechanisms like institutional investors and creditor oversight. Yanping argues that institutional investors, with specialized governance knowledge and financial resources, help optimize shareholding structures and mitigate agency problems [21].

However, the impact of institutional investors remains debated. Cornett suggests they reduce market information asymmetry and aid decision-making [7]. Li and Zhang found that firms with institutional investors perform better, with foreign investors acting as active monitors [22,23].

Conversely, Graves and Waddock argued that institutional investors may prioritize short-term gains, potentially harming long-term interests [8]. Hao found no significant improvement in firm performance due to institutional shareholding, while Wang noted that effects vary by investor type [24,25]. Guo found that stress-sensitive institutional investors fail to participate effectively in governance, negatively affecting firm performance [26].

2.3. Synthesis of the Literature

Research on equity pledges focuses on their economic effects, particularly their impact on firm performance. Two perspectives exist: the negative encroachment effect argues that equity pledges exacerbate cash-outs and agency conflicts, harming performance, while the positive synergistic effect suggests they provide funds to alleviate financial distress, encouraging major shareholders to engage in governance and stabilize stock prices. The net impact requires empirical validation.

Corporate governance research highlights both internal and external mechanisms, such as institutional investors and ownership structures, in shaping firm performance. However, while most studies focus on the direct effects of these mechanisms, there has been limited exploration of how governance structures might moderate the relationship between equity pledges and firm performance.

Moreover, equity pledge research often links to legal frameworks, primarily through case studies. Empirical studies on its firm performance impact remain scarce, particularly from a governance perspective. This paper addresses these gaps by assessing corporate governance's role in regulating major shareholders' pledge behaviors. Effective governance could make equity pledges a more reliable financing tool, alleviating capital shortages. Additionally, given the incomplete regulatory frameworks in emerging markets, this study offers theoretical insights for policymakers to refine relevant policies.

3. Methods

3.1. Theory

1) Principal-Agent Theory (Type I and Type II)

Yi introduced principal-agent theory, highlighting the separation of ownership and control. While managers operate the firm, shareholders retain control, reducing governance burdens [27].

The first type of agency problem arises between shareholders and managers. Due to information asymmetry, managers may prioritize personal gains over shareholder interests, necessitating incentive alignment to minimize agency costs [28].

As shareholding structures evolve, major shareholders often pledge shares for financing, leading to a second agency problem. Controlling shareholders may pursue personal gains at the expense of firm performance and minority shareholders. Strengthening internal and external monitoring is crucial to mitigate these risks.

2) Information Asymmetry Theory

Efficient markets assume full information disclosure, but in reality, information asymmetry creates imbalances. The rise of the internet has further exacerbated this information asymmetry.

Controlling shareholders, with privileged information, may prioritize short-term gains, compromising financial stability. Post-equity pledge, they might engage in related-party transactions, transfer risks to minority shareholders and banks, or misappropriate profits, exacerbating asymmetry and harming firm performance.

Both theories underscore risks in equity pledges, particularly how controlling shareholders may exploit them for personal benefit. Effective governance mechanisms are essential to mitigate these risks.

3.2. Research Hypothesis

Corporate governance factors like equity concentration, institutional investors, and ownership structure directly influence firm performance. This paper examines how large shareholders' equity pledges affect performance and the moderating role of governance mechanisms.

After pledging equity, controlling shareholders face less supervision, which makes it more difficult to track the usage of funds. They may transfer benefits for personal gain, harming firm performance. From an investor's perspective, equity pledges signal risk, and if stock prices fall near the close-out line, control transfer risks increase, further impacting performance. Thus, the assumption:

H_1: The equity pledge ratio of controlling shareholders of listed companies is negatively correlated with firm performance, when the equity pledge ratio is high, it will harm firm performance.

Companies with highly concentrated shareholdings can improve the efficiency of corporate decision-making and operations. After pledging shares, major shareholders tend to maintain control and continue investing in the company's operations and development. This active involvement can improve firm performance and potentially mitigate the negative impacts of shareholding pledges. Hence the assumption:

H_2: Equity concentration positively influences firm performance and mitigates the negative impact of equity pledges.

Institutional investors' participation in corporate governance can effectively serve as external monitors. Additionally, controlling shareholders actively exercise their rights and participate in decision-making to maximize their interests, which may influence firm performance. Hence the assumption:

H_3: Institutional investor shareholding positively impacts firm performance and mitigates the negative effects of equity pledges.

3.3. Data

This study uses data from Chinese A-share listed companies (2016–2022) and processes the data as follows to ensure validity:

1) Excluding ST and *ST companies due to their financial instability.
2) Excluding financial industry firms, as their business models and financial indicators differ significantly.
3) Removing samples with missing values.
4) Winsor zing continuous variables at the 1%-99% level to limit the impact of extreme outliers.

Equity pledge and financial data are sourced from the China GuotaiAn database, a reliable and comprehensive source for Chinese market data, and processed using Stata17.

3.3.1. Explained Variables

Firm performance is measured as return on assets (ROA), return on equity (ROE), earnings per share (EPS), and Tobin's Q. ROA is the primary explained variable, while EPS is used for robustness testing.

3.3.2. Explanatory Variables

The explanatory variable is the proportion of major shareholders' equity pledges ($PLEDGE$), defined as the ratio of pledged shares to the total shares held by major shareholders of a listed company.

3.3.3. Moderating Variables

This paper examines the impact of equity pledges on company performance from a corporate governance perspective, incorporating internal and external governance mechanisms as moderating variables. These include:

1) Equity Concentration ($CONC$): Measured by the shareholding ratio of the top three shareholders, equity concentration can enhance decision-making efficiency but may also increase the risk of controlling shareholders hollowing out the company.
2) Institutional Investor Governance ($INVE$): Defined by the institutional investor shareholding ratio, calculated as the shares held by institutional investors at year-end divided by the company's total share capital.

3.3.4. Control Variables

To ensure robust results, the following control variables are included:

1) Company Size ($SIZE$): Measured by the natural logarithm of total assets at year-end, reflecting differences in financing and operational capabilities.
2) Gearing Ratio (LEV): Calculated as total liabilities divided by total assets, indicating the company's financial leverage.
3) Operating Income Growth Rate ($GROWTH$): Reflects the company's growth potential, with higher growth often correlating with better performance.
4) Total Asset Turnover Ratio ($TURN$): Measures the efficiency of asset utilization, reflecting operational capacity.
5) Industry Dummy Variable (IND): Controls for industry-specific effects on performance.
6) Annual Dummy Variable ($YEAR$): Accounts for macroeconomic fluctuations and their impact on company performance.

By incorporating these variables, this study provides a comprehensive analysis of how equity pledges impact firm performance while controlling for key influencing factors (see Table 1).

Table 1. Variable Title, Variable Code and Variable Explanation.

Variable Type	Variable Name	Variable Symbol	Variable Definition
explained variables	Company performance	ROA	Net profit/total assets balance
explanatory variable	Controlling shareholders' equity pledge ratio	PLEDGE	Shares pledged by shareholders/Total shareholders Shares held
moderator variable	shareholding concentration	CONCE	Shareholding ratio of top three shareholders
	Institutional investor shareholding	INST	Number of shares held by institutional investors as a percentage of the total number of shares of listed companies
control variable	Company Size	SIZE	Natural logarithm of the company's total assets at the end of the year
	Revenue growth rate	GROWTH	(Operating income for the current period - Operating income for the previous period) / Operating income for the previous year
	gearing ratio	LEV	Total liabilities/total assets

otal asset turnover	TURN	Operating income/total assets
annual effect	YEAR	Annual dummy variables
industry effect	IND	Industry dummy variables

3.4. Two-Way Fixed Effect Model

To test the hypothesis that controlling shareholders' equity pledges negatively impact firm performance, this study constructs the following empirical model. ROA measures firm performance, the explanatory variable is the equity pledge ratio, control variables include company size, gearing ratio, growth rate, asset turnover, and year and industry effects. ε represents the residual term.

$$ROA = \beta_0 + \beta_1 PLEDGE + \beta_2 SIZE + \beta_3 LEV + \beta_4 GROWTH + \beta_5 TURN + \sum Year + \sum Ind + \varepsilon \quad (3\text{-}1)$$

In order to test Hypotheses 2 and 3, and to find out how each corporate governance tool affects the relationship between large shareholders' equity pledges and firm performance, a moderated effects model is constructed by adding the moderating variables themselves as well as the interaction term between the moderating variables and the equity pledge rate in turn.

The relationship between X and Y	$\beta 3$	Ajustment Effect
Positive correlation	+	Enhanced
Positive correlation	-	Weaken
Negative correlation	+	Weaken
Negative correlation	-	Enhanced

The following model is designed to test hypothesis 2:

$$ROA = \beta_0 + \beta_1 PLEDGE + \beta_2 CONCE + \beta_3 SIZE + \beta_4 LEV + \beta_5 GROWTH + \beta_6 TURN + \sum Year + \sum Ind + \varepsilon \quad (3\text{-}2)\ (1)$$

$$ROA = \beta_0 + \beta_1 PLEDGE + \beta_2 CONCE + \beta_3 PLEDGE \times CONCE + \beta_4 SIZE + \beta_5 LEV + \beta_6 GROWTH + \beta_7 TURN + \sum Year + \sum Ind + \varepsilon \quad (3\text{-}2)\ (2)$$

Similarly, the following model is designed to test hypothesis 3:

$$ROA = \beta_0 + \beta_1 PLEDGE + \beta_2 INVE + \beta_3 SIZE + \beta_4 LEV + \beta_5 GROWTH + \beta_6 TURN + \sum Year + \sum Ind + \varepsilon \quad (3\text{-}3)\ (1)$$

$$ROA = \beta_0 + \beta_1 PLEDGE + \beta_2 INVE + \beta_3 PLEDGE \times INVE + \beta_4 SIZE + \beta_5 LEV + \beta_6 GROWTH + \beta_7 TURN + \sum Year + \sum Ind + \varepsilon \quad (3\text{-}3)\ (2)$$

Model 3-2 (1) includes equity concentration ($CONC$) as an internal corporate governance factor, while Model 3-2 (2) adds the interaction term between the proportion of equity pledged ($PLEDGE$) and equity concentration ($CONC$). Similarly, Model 3-3 includes external governance factors, such as the institutional investor shareholding ratio ($INVE$), and adds an interaction term between the two. By observing the coefficients and their significance, the impact of internal and external corporate governance tools on the relationship between equity pledges and firm performance can be assessed.

4. Results and Discussion

This Research initially identified the choice of a two-way fixed effects model through the F-test and hausman test.

4.1. Descriptive Statistics

The descriptive statistics and the results are as follows (Table 2):

Table 2. Descriptive Statistics for Variables (2016-2022).

Descriptive statistics						
Variable	***n***	**Mean**	**SD**	**p50**	**Min**	Max
ROA%	24,997	3.76	6.88	3.97	-46.8	22.2
EPS%	24,997	49.5	76.9	33.7	-174.8	418.2
PLEDEGE%	24,997	17.7	30.4	0	0	100
CONCEN%	24,997	48.66	15.31	48.09	16.02	86.83
INVE%	24,997	42.63	25.20	43.38	0.0995	92.70
SIZE	24,997	22.27	1.304	22.07	19.84	26.44
LEV%	24,997	40.4	19.9	39.4	5.28	91.7
TURN	24,997	0.593	0.390	0.510	0.0697	2.698
GROWTH%	24,997	16.5	37.5	10.8	-64.7	338.4

The explanatory variable ROA ranges from -46.8% to 22.2%, with a mean of 3.76% and a standard deviation of 6.88%, indicating significant performance variation. The controlling shareholders' equity pledge ratio spans 0% to 100%, with a standard deviation of 30.4%, suggesting diverse pledge levels. Among moderating variables, the mean shareholding ratio of the top three shareholders is 48.66%, highlighting a high level of shareholder concentration in Chinese firms. Institutional investors' shareholding ratios vary widely, ranging from 0.1% to 92.7%.

For control variables, firm size (logarithmic) ranges from 19.84 to 26.44, showing significant differences in growth across companies. The year-on-year growth rate of operating income varies from -64.7% to 338.4%, reflecting diverse conditions across industries and development stages. The average gearing ratio is 40.4%. These variations ensure a diverse and representative sample for this study.

4.2. Correlation Analysis

The correlation test shows that ROA is negatively correlated with the pledge ratio of major shareholders and gearing ratio (LEV), both significant at the 1% level. ROA is positively and significantly correlated with equity concentration ($CONCEN$), institutional investor ratio ($INVE$), company size, growth ($GROWTH$), and total asset turnover ($TURN$). Since all correlation coefficients are below 0.8, multicollinearity is not a concern. Further testing confirms this, as the variance inflation factor (VIF) is Table 3, ruling out multicollinearity.

Table 3. Correlation Analysis between Variables.

ROA	**EPS**	**PLEDEGE**	**CONCEN**	**INVE**	**SIZE**	**LEV**	
ROA	1						
EPS	0.701***	1					
PLEDEGE	-0.127***	-0.138***	1				
CONCEN	0.215***	0.196***	-0.166***	1			
INVE	0.113***	0.175***	-0.093***	0.500***	1		
SIZE	0.00200	0.189***	0.033***	0.129***	0.446***	1	
LEV	-0.338***	-0.150***	0.123***	-0.036***	0.176***	0.517***	1
TURN	0.131***	0.145***	-0.022***	0.057***	0.068***	0.059***	0.159***
GROWTH	0.250***	0.260***	-0.00700	0.019***	0.051***	0.058***	0.038***

TURN	GROWTH
TURN	1

GROWTH	0.116***	1

4.3. Empirical Findings and Discussions

4.3.1. Relationship between Major Shareholders' Equity Pledge and Company Performance

The regression results from Model 3-1 show a significant negative correlation between ROA and the major shareholders' equity pledge ratio ($Pledge$), with a coefficient of -0.1511, significant at the 1% level. This suggests that a higher pledge ratio negatively impacts company performance. Additionally, the high F-value indicates strong overall significance, confirming the reliability of the model and conclusions (Table 4).

Table 4. Regression Results on the Relationship between Controlling Shareholders' Equity Pledges and Firm Performance.

	Model3-1
	ROA
PLEDEGE	-0.01511***
	(0.00249)
SIZE	0.03132***
	(0.00125)
LEV	-0.22986***
	(0.00434)
TURN	0.04341***
	(0.00222)
GROWTH	0.03294***
	(0.00099)
_cons	-0.59012***
	(0.03160)
n	24,997
R^2	0.229
f	199.57992
p	0.00000

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.3.2. The Impact of Internal Corporate Governance on the Relationship between Major Shareholder Equity Pledges and Firm Performance

After introducing the moderator of internal corporate governance, equity concentration ($CONCE$), and adding the interaction term between equity concentration and equity pledge ratio ($PLEDGE \times CONCE$), it can be seen that the coefficients of Pledge, the ratio of equity pledge by the major shareholders, in Models 3-2 (1) and (2) are both negative and significant at the 1% level, which further validates Hypothesis 1.

Model 3-2 (1) shows a significant positive relationship between equity concentration and firm performance, suggesting that higher equity concentration enhances decision-making efficiency and performance. Model 3-2 (2) shows that the interaction term ($PLEDG \times CONC$) is positive and significant at the 10% level, suggesting that higher equity concentration reduces the negative impact of equity pledges on performance. Firms with higher shareholder ownership are more involved in governance and operations post-pledge, creating synergies rather than tunneling effects (see Table 5).

Table 5. Regression Results after Adding Internal Corporate Governance Moderating Variables.

	Model3-2 (1)	**Model3-2 (2)**
	ROA	ROA
PLEDEGE	-0.01443***	-0.02782***
	(0.00249)	(0.00717)
CONCEN	0.00050***	0.00044***
	(0.00008)	(0.00008)
SIZE	0.03094***	0.03091***
	(0.00125)	(0.00125)
LEV	-0.22843***	-0.22842***
	(0.00434)	(0.00434)
TURN	0.04346***	0.04356***
	(0.00222)	(0.00222)
GROWTH	0.03261***	0.03257***
	(0.00099)	(0.00099)
CONCEN_PLEDEGE		0.00029*
		(0.00015)
_cons	-0.60730***	-0.60387***
	(0.03169)	(0.03174)
n	24,982	24,982
R^2	0.230	0.231
f	194.59369	188.66434
p	0.00000	0.00000

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.3.3. Impact of External Corporate Governance on the Relationship between Major Share-Holders' Equity Pledges and Firm Performance

After introducing the moderator of external corporate governance, the proportion of external investors' shareholding, the coefficient for equity pledge ratio in Model 3-3 (1) (2) remains significantly negative, confirming Hypothesis One.

Model 3-3 (1) shows that the institutional investors' shareholding ratio positively affects firm performance, indicating that higher institutional investor shareholding improves performance. As external supervisors, institutional investors bring expertise and can make effective suggestions for company decision-making.

In Model 3-3 (2), the coefficient of the interaction term $PLEDGEINVE$ is significantly positive, suggesting that institutional investors' shareholding reduces the negative impact of equity pledge ratio on firm performance. A higher shareholding ratio enables institutional investors to supervise pledged funds, protecting minority shareholders' interests and reducing the negative impact of equity pledges on firm performance.

The high *F*-value of each model indicates strong overall significance (see Table 6).

Table 6. Regression Results after Adding External Corporate Governance Moderating Variables.

	Model3-3(1)	**Model3-2(2)**
	ROA	ROA
PLEDEGE	-0.01502***	-0.02291***
	(0.00248)	(0.00410)
INVE	0.00025***	0.00021***
	(0.00005)	(0.00005)
SIZE	0.02981***	0.02975***
	(0.00128)	(0.00128)

LEV	-0.22768***	-0.22741***
	(0.00436)	(0.00436)
TURN	0.04309***	0.04313***
	(0.00222)	(0.00222)
GROWTH	0.03260***	0.03258***
	(0.00100)	(0.00100)
INVE_PLEDEGE		0.00022*
		(0.00009)
_cons	-0.56897***	-0.56653***
	(0.03185)	(0.03186)
n	24,997	24,997
R^2	0.230	0.230
f	194.23272	188.38996
p	0.00000	0.00000

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.4. Further Subgroup Regressions Based on the Basic Regression

After adding the moderating variables of firms' external governance and internal governance, the significance levels of the coefficients of the interaction terms between the moderating variables and the proportion of equity pledges in Models 3.2 (2) and 3.3 (2) are not high, which is related to the specificity of the nature of equity in China. Therefore, we divide the sample into two groups, state-owned enterprises and private enterprises, and conduct regressions separately to further explore the relationship between equity pledges and firm performance.

In the Chinese stock market, state-owned enterprises have specific advantages over private enterprises [26]. In reality, if state-owned shares are sold, government departments provide financial support or negotiate on behalf of the shareholders.

However, the financing channels and advantages of private enterprises are not significant, and there is no role of government backing when facing control changes. Therefore, shareholders of private enterprises invest pledged funds into operations to improve performance. Thus, the impact of equity pledge on private enterprises' performance is more pronounced than on state-owned enterprises. It can also be seen from the regression results that the coefficient of the equity pledge rate of state-owned enterprises is 0.00471 (insignificant), while the coefficient of the equity pledge rate of private enterprises is -0.01616 and significant at the 1% level (see Table 7).

Table 7. Further Subgroup Regressions Categorized According to the Nature of the Shareholding.

Nature	**SOEs**	**Private**
	ROA	ROA
PLEDEGE	0.00471	-0.01616***
	(0.00545)	(0.00294)
SIZE	0.02512***	0.03392***
	(0.00186)	(0.00162)
LEV	-0.20388***	-0.23418***
	(0.00671)	(0.00556)
TURN	0.05015***	0.04098***
	(0.00289)	(0.00299)
GROWTH	0.01674***	0.03861***
	(0.00135)	(0.00130)
_cons	-0.49190***	-0.63711***

	(0.04283)	(0.03937)
n	7453	17,529
R^2	0.222	0.240
f	64.24481	150.16285
p	0.00000	0.00000

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.5. Model Robustness Tests

To test the robustness of the above results, two approaches are used in this paper:

1) Variable replacement method

Here, we replace the explanatory variable ROA, previously used to measure company performance, with earnings per share (EPS) and rerun the regression. From the results, it can be seen that there is still a significant negative correlation between the main explanatory variable ($PLEDGE$) and company performance, which is consistent with the assumptions and conclusions above. This confirms the robustness of the results (see Table 8).

Table 8. Replace the Explanatory Variable with EPS to Verify Model Robustness.

	3-1	**3-2(1)**	**3-2(2)**	**3-3(1)**	**3-3(2)**
	EPS	EPS	EPS	EPS	EPS
PLEDEGE	-0.15345***	-0.15040***	-0.15431*	-0.15216***	-0.15727***
	(0.02231)	(0.02232)	(0.06435)	(0.02227)	(0.03680)
SIZE	0.46467***	0.46315***	0.46314***	0.44314***	0.44310***
	(0.01118)	(0.01119)	(0.01119)	(0.01147)	(0.01147)
LEV	-1.65315***	-1.64793***	-1.64793***	-1.62197***	-1.62180***
	(0.03892)	(0.03897)	(0.03897)	(0.03904)	(0.03905)
TURN	0.48696***	0.48668***	0.48671***	0.48234***	0.48237***
	(0.01996)	(0.01995)	(0.01996)	(0.01994)	(0.01994)
GROWTH	0.28386***	0.28193***	0.28192***	0.27898***	0.27896***
	(0.00892)	(0.00893)	(0.00893)	(0.00892)	(0.00892)
CONCEN		0.00222**	0.00220**		
		(0.00068)	(0.00073)		
CONCEN_ PLEDEGE			0.00009		
			(0.00132)		
INVE				0.00359***	0.00356***
				(0.00044)	(0.00046)
INVE_PLE DEGE					0.00014
					(0.00080)
_cons	-9.43029***	-9.50973***	-9.50873***	-9.12807***	-9.12650***
	(0.28360)	(0.28449)	(0.28492)	(0.28554)	(0.28569)
n	24,997	24,982	24,982	24,997	24,997
R^2	0.218	0.219	0.219	0.221	0.221
f	187.61388	181.77752	176.08840	184.31033	178.54299
p	0.00000	0.00000	0.00000	0.00000	0.00000

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

2) Replacing the time frame of sample

The original sample data covers 2016-2022. However, due to a sharp shock in Chinese stock market in 2017, stock prices continued to fall, leading to a large number of equity pledge closures. Many brokerage firms also withdrew from the equity pledge business. To avoid the impact of specific years, we select data from 2019-2022 for further regression analysis.

The regression results show that the relationship between the equity pledge rate ($PLEDGE$) and company performance (ROA) remains significantly negatively correlated, consistent with the previous assumptions and conclusions (see Table 9).

Table 9. Replacing the Time Horizon to Test the Robustness of the Model (2019-2022).

	(1)	(2)	(3)	(4)	(5)
	ROA	ROA	ROA	ROA	ROA
PLEDEGE	-0.01153**	-0.01152**	-0.02993**	-0.01159**	-0.01959**
	(0.00388)	(0.00388)	(0.01160)	(0.00388)	(0.00640)
SIZE	0.03064***	0.03062***	0.03063***	0.02963***	0.02963***
	(0.00221)	(0.00221)	(0.00221)	(0.00224)	(0.00224)
LEV	-0.24823***	-0.24830***	-0.24839***	-0.24710***	-0.24709***
	(0.00671)	(0.00673)	(0.00673)	(0.00672)	(0.00672)
TURN	0.05364***	0.05357***	0.05360***	0.05351***	0.05355***
	(0.00359)	(0.00359)	(0.00359)	(0.00359)	(0.00359)
GROWTH	0.04070***	0.04068***	0.04069***	0.04049***	0.04049***
	(0.00150)	(0.00150)	(0.00150)	(0.00150)	(0.00150)
CONCEN		-0.00001	-0.00010		
		(0.00013)	(0.00013)		
CONCEN_ PLEDEGE			0.00040		
			(0.00024)		
INVE				0.00018*	0.00015
				(0.00007)	(0.00008)
INVE_PLE DEGE					0.00022
					(0.00014)
_cons	-0.61960***	-0.61834***	-0.61485***	-0.60666***	-0.60642***
	(0.05501)	(0.05543)	(0.05546)	(0.05523)	(0.05523)
n	16,058	16,043	16,043	16,058	16,058
R^2	0.219	0.219	0.219	0.219	0.220
f	116.76401	112.15146	108.39981	112.87865	109.08555
p	0.00000	0.00000	0.00000	0.00000	0.00000

Standard errors in parentheses.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5. Conclusion

In China, equity pledges have become a widely recognized financing method due to their simple approval process and lower costs. Since 2014, the scale of A-share equity pledges has grown significantly, making it a crucial financing tool for listed companies.

The impact of large shareholders' equity pledges on firm performance is twofold. On one hand, it demonstrates a positive synergistic effect, as equity pledges help alleviate funding shortages, directly improving company performance and incentivizing shareholders to play a more active role in corporate governance. By improving company performance and stabilizing share prices, shareholders aim to avoid the transfer of company

control. On the other hand, it exhibits a negative encroachment effect, where major shareholders may exploit the company for personal gain after obtaining financing. This includes transferring benefits or engaging in "tunneling" practices, both of which harm minority shareholders and negatively impact overall performance.

Internal and external corporate governance tools, such as equity concentration and institutional investors' shareholding ratios, may play a moderating role in this relationship. This study introduces these factors as moderating variables, proposes hypotheses, and establishes an empirical model. Using data from A-share listed companies (2016-2022), The analysis draws the following conclusions:

1) There is a significant negative correlation between firm performance and the proportion of major shareholders' equity pledges, indicating that the negative encroachment effect dominates as the pledge ratio increases.
2) Equity concentration, an internal governance factor, weakens the negative impact of equity pledges on firm performance. Companies with higher equity concentration are better able to mitigate the adverse effects of pledges.
3) Institutional investor shareholding, an external governance factor, also reduces the negative correlation between equity pledges and firm performance. Firms with higher institutional ownership experience less performance deterioration after pledging.
4) Private firms are more affected by equity pledges than state-owned firms, as they lack government subsidies and financial backing.

These findings underscore the importance of corporate governance mechanisms in mitigating the negative effects of equity pledges. They also provide valuable insights for policymakers to refine regulations and promote healthier financing practices in China's capital markets.

5.1. Suggestions

Before engaging in equity pledge financing, a listed company must carefully assess the use of the raised funds to ensure they contribute to the company's operations and development.

At the same time, companies should strengthen their corporate governance through measures like optimizing shareholding structures and improving external regulation. Institutional investors, leveraging their expertise, should actively participate in governance — not only by avoiding the "voting with feet" approach but also by engaging in governance and overseeing the flow of funds after controlling shareholders' equity pledges.

Regulators should enhance laws and regulations regarding equity pledges, improve information disclosure quality, and review the qualifications and creditworthiness of pledging companies. Regular reporting on the flow of pledged funds and standardizing information disclosure should also be improved.

Lastly, besides the controlling shareholders' pledge ratio, the pledge price — especially when the share price is near the closing price — may impact firm performance, as major shareholders may be incentivized to manipulate profits. Future research could focus on the impact of pledge price.

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