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Original Paper

Governance Mechanism of Non-state-owned Shareholders and Enterprise Investment

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Abstract

The participation of non-state shareholders in governance, as a key aspect of deepening the mixed-ownership reform of state-owned enterprises, holds significant importance in improving corporate governance, particularly in corporate investment. This paper manually compiles a unique dataset of non-state shareholder governance indices for state-owned enterprises listed on the Shanghai and Shenzhen A-share markets from 2010 to 2024, considering multidimensional governance at three levels: equity governance, top management governance, and network governance. It examines the impact of non-state shareholder participation in governance on corporate investment. The research indicates that the participation of non-state shareholders in governance can enhance corporate investment efficiency. Specifically, this enhancement is primarily achieved by increasing the level of compensation incentives and capital allocation efficiency. This paper expands the research on non-state shareholder governance mechanisms and corporate investment, providing empirical evidence for improving internal governance and investment levels of state-owned enterprises in the context of mixed-ownership reform.

Keywords

Mixed ownership reform, Non-state shareholder governance mechanism, Corporate investment, Level of compensation incentives, Capital allocation efficiency

1. Introduction

In the overall national economic system, state-owned enterprises (SOEs) play a pivotal role in the development of socialist economy as the primary contributor to national fiscal revenue. However, due to their unique institutional attributes, a series of principal-agent contradictions within SOEs have become increasingly prominent, negatively impacting corporate operational efficiency, especially investment efficiency. In the current crucial period of economic transformation, how SOEs balance

their political functions and economic benefits to achieve high-quality and sustainable development has become an important issue in corporate governance reform. Meanwhile, corporate investment, as a crucial module in corporate management, has a pivotal impact on the long-term sustainable development of enterprises. Both theory and practice have widely confirmed that the mixed ownership reform of SOEs, by introducing non-state capital and promoting the integration of governance experience and factor resources through equity integration, influences corporate investment decisions and efficiency. Based on this, analyzing and discussing the governance effects of non-state shareholders in corporate governance, especially in corporate investment, is key to exploring investment issues of SOEs in the context of mixed reform.

The potential research contributions of this paper lie in the following aspects: Firstly, this paper takes the participation of non-state shareholders in governance as a starting point to explore the mixed governance and investment activities of state-owned enterprises (SOEs) in the context of mixed ownership reform, thereby enriching the theoretical research on internal governance in the context of SOE mixed reform. Secondly, this paper empirically examines the impact of non-state shareholder governance mechanisms on corporate investment efficiency from three dimensions: equity governance, top management governance, and network governance, expanding previous literature that only explored non-state shareholder governance and corporate investment based on formal institutions. Furthermore, this paper explores the mechanism by which non-state shareholder governance affects corporate investment from the perspectives of governance effects and resource effects, filling a gap in existing literature that has seldom focused on the resource effects of non-state shareholder participation in governance.

2. Theoretical Analysis and Research Hypotheses

2.1 Non-state Shareholders' Participation in Governance and Corporate Investment

Based on the managerial perspective, non-state shareholders mitigate principal-agent conflicts by strengthening internal supervision and incentives, leveraging market experience and relational networks to reduce information asymmetry and enhance decision-making quality, thereby maximizing investment returns and economic benefits. In the equity governance dimension, non-state shareholders can participate in equity checks and balances with state shareholders, representing non-state capital to exert supervisory functions. In the senior management governance dimension, non-state shareholders fully obtain internal information through the appointment of senior executives to participate in governance, effectively alleviating the "absence of owners and control by insiders". In the network governance dimension, non-state shareholders possess keen market insight and rich market experience, providing corporate governance with market information, innovative talents, social networks, and other idiosyncratic resources, thereby improving investment efficiency.

Based on political perspectives, the participation of non-state shareholders in governance can weaken the inherent political connections determined by the property rights nature of state-owned enterprises

and reduce rent-seeking behavior driven by management's political motivations. This can enhance corporate investment efficiency by curbing politically driven inefficient investments and improving market-oriented investment decisions driven by economic benefits. From the perspective of equity governance, the participation of non-state shareholders in governance dilutes the ownership of state shareholders and the political connections of state-owned enterprises, leading the management to favor reducing rent-seeking behavior and lowering inefficient investments. From the perspective of top management governance, non-state shareholders place greater emphasis on enhancing the economic benefits of the enterprise. They can rectify inefficient investment structures by appointing senior executives, thereby improving corporate investment returns. From the perspective of network governance, the participation of non-state shareholders in network governance can leverage their unique information advantages, reducing the cost and difficulty of information acquisition to formulate investments that are more aligned with the market, thereby enhancing corporate investment levels.

Based on the above analysis, this paper proposes the following hypothesis.

Hypothesis 1: The participation of non-state shareholders in corporate governance can enhance corporate investment efficiency.

2.2 The Mechanism of Non-state Shareholders' Participation in Governance and Their Role in Corporate Investment

From the perspective of governance effects, the failure of internal checks and balances in state-owned enterprises is one of the main reasons affecting corporate investment efficiency. Non-state shareholders can effectively maintain internal checks and balances by improving corporate compensation incentives. The underlying motivation lies in the fact that under the traditional corporate governance structure, state-owned enterprises grant high-level decision-making autonomy to senior management due to the absence of owners. Therefore, high-level compensation incentives can promote executives to exert a positive influence on investment decisions. On the one hand, a sound compensation incentive system is an effective way to curb management's "over-acting", effectively restraining managers' "short-sighted" and "self-serving" behaviors in the governance process. On the other hand, positive compensation incentives can improve management's passive management of "inaction", and non-state shareholders' participation in governance is conducive to managers paying more attention to the sustainable improvement of the company's economic benefits. At the informal level, non-state shareholders can provide market-oriented experience and information through network governance, reduce investment risks brought about by information asymmetry and market factors, and enhance management's willingness to invest.

From the perspective of resource effects, the inefficient capital allocation of state-owned enterprises is another major factor affecting corporate investment efficiency. Non-state shareholders can effectively govern capital allocation by adjusting the company's capital structure. Firstly, non-state shareholders' supervision of state shareholders and management can strengthen financial earnings quality management, thereby reducing related expenses and increasing the company's free cash flow to

promote corporate investment. Secondly, non-state shareholders' participation in governance can harden soft budget constraints and inhibit political self-interest behavior, thus adjusting the capital structure to improve investment efficiency. Finally, non-state shareholders' participation in governance can inject new "market vitality" into state-owned enterprises, integrating the flexible business strategies and rich market experience of non-state-owned enterprises into capital and asset management. This is conducive to asset preservation and appreciation, driving the company's capital structure towards optimization, and thus better utilizing funds for investment activities. Therefore, non-state shareholders' participation in governance enhances financial earnings management, reduces political burdens and political "doting", and optimizes capital management, thereby improving capital allocation efficiency and thus corporate investment efficiency.

Based on the above analysis, this paper proposes the following hypothesis.

Hypothesis 2: The participation of non-state shareholders in governance can enhance corporate investment efficiency by increasing the level of compensation incentives.

Hypothesis 3: The participation of non-state shareholders in governance can enhance corporate investment efficiency by improving capital allocation efficiency.

3. Research Design

3.1 Sample Selection and Data Sources

In 2007, China's share-trading reform was essentially completed. Based on this, this paper selects state-owned listed companies that underwent mixed ownership reform in the Shanghai and Shenzhen A-share markets from 2010 to 2024, covering a total of 15 years, as the sample. The following screening processes were applied: (1) exclusion of PT, ST, and *ST companies; (2) exclusion of companies in the financial industry; (3) exclusion of companies with missing data for key variables; (4) 1% winsorization of continuous variables. A total of 942 listed companies with 13,000 valid data points were obtained. This paper uses Pajek 5.09 to measure the "network governance" index within the non-state shareholder governance index, and employs Stata 16 for data analysis. The raw data is sourced from CSMAR and RESSET databases.

3.2 Variable Definition

1. Dependent Variable

Drawing on the research conducted by Richardson (2006) and Liu Huilong et al. (2014), this paper employs the fixed-effects regression estimation of absolute residuals using formula 1 to measure corporate investment efficiency. Positive residuals indicate overinvestment, while negative residuals indicate underinvestment. This indicator is a contrarian one, meaning that a larger absolute value indicates that the company deviates more from optimal investment and has lower investment efficiency.

$$Inv_{it} = \beta_0 + \beta_1 Growth_{it-1} + \beta_2 Lev_{it-1} + \beta_3 Cash_{it-1} + \beta_4 Age_{it-1} + \beta_5 Size_{it-1} + \beta_6 Return_{it-1} + \beta_7 Inv_{it-1} + Industry + Year + \varepsilon_{it} \quad (1)$$

2. Explanatory Variables

Non-state Shareholder Governance Index (NSGPI). Based on the heterogeneous participation forms of non-state shareholders, this paper constructs six proxy variables under three indicators: equity governance, top management governance, and network governance, from the perspectives of formal and informal institutions. Factor analysis is used for dimensionality reduction to eliminate multicollinearity among variables. Common factors with eigenvalues greater than 1 are extracted and weighted by variance contribution rate to comprehensively measure the participation role of non-state shareholders in the governance of state-owned enterprises. The specific indicator calculations are as follows.

(1) Equity governance dimension (Gov_eb): This indicator is primarily used to measure the relative discourse power of non-state-owned capital among shareholders holding shares, reflecting the ownership basis for non-state-owned capital's participation in corporate governance. In this paper, the total shareholding ratio of private capital among the top ten shareholders of state-owned enterprises is selected for measurement.

(2) Top management governance dimension: This indicator is primarily used to measure the decision-making power of non-state shareholders in corporate management activities through the appointment of senior executives and shareholder participation in governance. This article selects two indicators for calculation: the proportion of directors appointed by non-state shareholders in the total board of directors (Gov_mr) and the proportion of senior executives appointed by non-state shareholders in the total senior management (Gov_sr).

(3) Network governance dimension: This indicator is primarily used to measure the ability of non-state shareholders to acquire, control, and maintain independence in information. Based on social network theory, this paper employs three indicators: degree centrality (Gov_de), betweenness centrality (Gov_be), and closeness centrality (Gov_cl) for measurement. Specifically, the calculation method for degree centrality (Gov_de) is as shown in Formula 2. Here, n represents the total number of top ten shareholders of state-owned enterprises in the sample of the corresponding year, and Xij denotes the association relationship between shareholder i and other shareholder j. When both i and j hold shares in a listed company, it is set to 1; otherwise, it is set to 0.

$$Gov_{de} = \frac{\sum_j x_{ij}}{n-1} (i \neq j) \quad (2)$$

The betweenness centrality is shown in Formula 3, where gik represents the number of shortcuts that need to be passed through for shareholders j and k to be connected, gik(i) represents the number of shareholders i passed through in the shortcuts connecting shareholders j and k, and other variables are the same as above.

$$Gov_{be} = \frac{\sum_{j<k} \frac{g_{jk(i)}}{g_{jk}}}{(n-1)(n-2)} \quad (3)$$

The closeness centrality is shown in Formula 4, where dij represents the node distance between shareholder i and another shareholder j, and other variables are the same as those mentioned above.

$$Gov\_cl = \frac{n-1}{\sum_j d_{ij}} (i \neq j) \quad (4)$$

3. Mediating variable (1) Pay. This paper selects the natural logarithm of the total compensation of the top three executives in the enterprise to measure the level of compensation incentives provided by state-owned enterprises to their management.

(2) Capital allocation efficiency (Eca). This paper adopts the measurement method proposed by Qi Huaijin (2019), using the "ratio of investment return rate to cost of capital rate" as the metric. Specifically, the investment return rate is calculated using the return on total assets, while the cost of capital rate is determined using the weighted average cost of capital (WACC).

4. Control variables Based on existing research, this paper references literature from Liu Yunguo (2016), Sun Shu (2019), and others, selecting control variables from company characteristics, corporate governance, and audit reports. Specific indicators are shown in Table 1. At the same time, industry effects (Industry) and year effects (Year) are controlled.

Table 1. Variable Definitions

Variable Type	Variable Name	Variable Symbol	Variable Definition
Explained variable	Firm investment efficiency	Inv	Enterprise investment efficiency, used for primary inspection (Richardson, 2006)
		Inv_Biddle	Corporate investment efficiency, used for robustness testing (Biddle, 2009)
		Inv_Chen	Corporate investment efficiency, used for robustness testing (Chen, 2011)
Explanatory variables	Non-state shareholder governance index	NSGPI	Factor analysis was used to extract common factors with eigenvalues greater than 1, and these factors were summed with weights based on their variance contribution rate.
Mediator variables	Compensation and Incentives	Pay	The total compensation of the top three executives is taken as the natural logarithm
	Capital allocation efficiency	Eca	Return on investment / Cost of capital
Control variables	Enterprise size	Size	The natural logarithm of a company's total assets

Company Age	Age	Sample observation year - Year of company establishment
Debt-to-asset ratio	Lev	Total Liabilities / Total Assets
Tobin Q	TobinQ	(Total stock market value + book value of debt) / Total asset book value
Two jobs combined	Dual	If the general manager also serves as the chairman, take 1; otherwise, take 0
Independent Director Ratio	Ind	Number of independent directors / Total number of directors
Shareholding concentration	TOP1	Shareholding ratio of the largest shareholder
Return on total assets	ROA	Net profit / Total assets
Price-to-Earnings Ratio	PE	The ratio of stock price to earnings per share
The Big Four accounting firms	Big4	A score of 1 is given if audited by one of the Big Four accounting firms; otherwise, a score of 0 is given
Industry	Industry	Company dummy variables
Year	Year	Year dummy variable

3.3 Formula Setting

To explore the impact of non-state shareholders' participation in governance on corporate investment efficiency, this paper constructs Formula 5, where Inv represents corporate investment efficiency, NSGPI represents the non-state shareholder governance index, Controls represents control variables, Year represents the year effect, and Industry represents the industry effect.

$$Inv = \alpha_0 + \alpha_1 NSGPI + \alpha_2 Controls + \sum Year + \sum Industry \quad (5)$$

4. Empirical Results and Analysis

4.1 Basic Test: Non-state Shareholders' Participation in Governance and Corporate Investment

From the perspective of the composite index, this paper conducts an empirical regression between the dependent variable, corporate investment efficiency (Inv), and the independent variable, the Non-State Shareholder Governance Index (NSGPI). Robust standard error treatment is also incorporated to control for year and industry effects. The results are presented in column (1) of Table 2. The coefficient of the Non-State Shareholder Governance Index (NSGPI) is -0.337, which is negatively significant at the 1% confidence level with respect to corporate inefficient investment. This indicates that the

participation of non-state shareholders in governance can inhibit corporate inefficient investment and thereby enhance corporate investment efficiency. Hypothesis 1 is supported.

4.2 Mechanism Test: The Mediating Effect of Non-state Shareholders' Participation in Governance on Corporate Investment

The aforementioned tests have demonstrated that the participation of non-state shareholders in governance can enhance corporate investment efficiency. To further explore the mechanism by which the degree of non-state shareholders' governance participation affects corporate investment efficiency, this paper adopts the mediation effect causal step method, drawing on the insights of Jiang Ting (2022), to analyze the impact mechanism of non-state shareholders' governance on improving corporate investment efficiency from the perspectives of governance effect and resource effect.

Column (2) of Table 2 reports the regression results of non-state shareholders' participation in governance on the level of compensation incentives. The non-state shareholders' participation in governance index is significantly positive at the 1% confidence level, indicating that non-state shareholders' participation in governance can significantly enhance the level of corporate compensation incentives, thus supporting Hypothesis 2. Column (3) of Table 2 reports the regression results of non-state shareholders' participation in governance on capital allocation efficiency. The non-state shareholders' participation in governance index is significantly positive at the 1% confidence level, indicating that non-state shareholders' participation in governance can significantly improve the efficiency of corporate capital allocation, thus supporting Hypothesis 3.

Table 2. Test Results of the Mediation Effect

Variable	(1) Inv	(2) Pay	(3) Eca
NSGPI	-0.337***	53.42***	0.117***
	(2.68)	(7.25)	(7.77)
Controls	Controls	Controls	Controls
Year	Controls	Controls	Controls
Industry	Controls	Controls	Controls
Intercept term	5.852***	-1140.9***	0.0185
	(4.84)	(-28.28)	(0.11)
N	10854	10812	10854
R^2	0.0904	0.398	0.908
Adjust R^2	0.0825	0.393	0.907

t statistics in parentheses

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

4.3 Robustness Test

1. Heckman's two-stage test

To prevent the impact of endogeneity issues caused by sample selection bias in the main hypothesis on the research results, this paper employs the Heckman two-stage formula for testing. We set whether the Non-State-Owned Governance Participation Index (NSGPI) is higher than the average level of non-state-owned shareholders' participation in governance in the industry (Gov_med) as a dummy variable (NSGPI_w), and use the lagged one-period dummy variable of the Non-State-Owned Governance Participation Index (LNSGPI_w) as an exogenous instrumental variable. Table 3 indicates that the original equation does not exhibit self-selection effects, and non-state-owned shareholders' participation in governance can inhibit inefficient investment in enterprises, thereby enhancing the level of investment efficiency.

Table 3. Results of Heckman's Two-stage Test

Variable	(1)	(2)
	NSGPI_w	Inv
LNSGPI_w	0.995***	
	(32.67)	
NSGPI		-0.375***
		(-3.02)
IMR		-0.102
		(-0.74)
Controls	Controls	Controls
Year	Controls	Controls
Industry	Controls	Controls
Intercept term	-2.514***	7.139***
	(-6.61)	(5.67)
N	10179	10020
R^2		0.0886
Adjust R^2		0.0800

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

2. Instrumental variable method

To address the issues of reverse causality and omitted variables, this paper employs the instrumental variable method to further conduct robustness checks on the research results. Firstly, this paper utilizes the Hausman-Wu method to test for the presence of endogeneity in the formula, illustrating the

necessity of estimation using the instrumental variable method. Referring to Liu Yunguo et al. (2016), this paper selects the logarithm of regional economic level (GDP) as the instrumental variable. As shown in Table 4, the test is conducted using the instrumental variable method.

Table 4. Results of the Instrumental Variable Method Test

Variable	(1) First stage NSGPI	(2) Second stage Inv
lnGDP	0.0437***	
	(0.006)	
NSGPI		-6.596***
		(-4.22)
Controls	Controls	Controls
Year	Controls	Controls
Industry	Controls	Controls
Intercept term	-2.2910***	-5.239
	(0.085)	(-1.64)
F-values containing only instrumental variables	61.329	
	(0.000)	
Instrumental variable identification inadequacy test		63.229
		(0.000)
Weak instrumental variable test		61.329
Stock-Yogo weak ID test critical values: 10% maximal IV size		16.38
N	10,854	10,854
R^2	0.155	

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

3. Propensity score matching estimation

To mitigate the sample selection bias caused by potential systematic differences among state-owned enterprises (SOEs) with varying degrees of non-state shareholder governance participation, this paper employs the propensity score matching (PSM) method for testing. The instrumental variable (NSGPI_w) is a dummy variable indicating whether it is higher than the average level of non-state shareholder governance participation in the industry (Gov_med). One-to-one matching with a caliper width of 0.01 is conducted based on control variables. Table 5 indicates that sample selection bias does not have a significant impact on the research conclusions, which are robust.

Table 5. Propensity Score Matching Estimation Test Results

	(1)	(2)
Variable	OLS	PSM
	Inv	Inv
NSGPI	-0.337***	-0.455*
	(-2.68)	(-1.77)
Controls	Controls	Controls
Year	Controls	Controls
Industry	Controls	Controls
Intercept term	5.852***	6.718***
	(4.84)	(3.58)
N	10854	5663
R^2	0.0904	0.0878
Adjust R^2	0.0825	0.0725

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Conclusion and Suggestions

5.1 Research Conclusions

This paper selects state-owned enterprises listed on China's Shanghai and Shenzhen A-shares from 2010 to 2024 as samples, and discusses how non-state shareholders' governance affects corporate investment based on both formal and informal institutional levels. The research results indicate that the participation of non-state shareholders in governance can significantly enhance corporate investment efficiency. In terms of the mechanism of action, the participation of non-state shareholders in governance exerts positive governance and resource effects, primarily by improving corporate investment efficiency through enhancing the level of salary incentives and capital allocation efficiency.

5.2 Research Suggestions

Firstly, state-owned enterprises (SOEs) should actively implement mixed ownership reform, taking into account the governance of non-state shareholders in both formal and informal systems. While paying attention to the governance of non-state shareholders' equity and senior management, they should fully leverage the governance advantages of non-state shareholders' diverse backgrounds, integrate their keen market perception and rich practical experience, and promote market-oriented governance. Secondly, it is necessary to enhance the voice of non-state shareholders, but it is also important to prevent excessive equity checks and balances within the company. SOEs need to relax the access thresholds and restrictions on non-state capital, and increase the voice of non-state shareholders in in-depth governance. At the same time, it is necessary to optimize the equity structure based on actual

conditions, establish effective supervision and incentive mechanisms, and prevent inefficient capital allocation and non-efficient investment caused by "self-interested behavior" and collusion risks of non-state shareholders. Thirdly, the government should play an external governance role to provide institutional guarantees for deepening mixed ownership reform. On the one hand, the government needs to exert external regulatory functions to maintain the order of enterprise market operations and ensure fair and effective allocation of market factor resources. On the other hand, the government also needs to moderately "delegate power", shifting from "excessive intervention" to "reasonable regulation". At the same time, based on the level of marketization in different regions, the characteristics of different industries, and the progress of mixed ownership reform in different levels of enterprises, the government should carry out "categorized", "layered", and "stepped" mixed ownership reforms, implementing corresponding reform policies to enhance the efficiency of mixed ownership reform and strengthen the effectiveness of enterprise reform.

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