An empirical study on the effect of corporate governance on the investment effectiveness of A-share listed firms -based on the mediating effect model

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Abstract. The investment efficiency of businesses is measured using the Richardson model in this paper. Two mediating variables—financial information quality and financing constraints—are also introduced, and the mediating effect model is used to examine the effect of corporate governance on the investment efficiency of A-share listed companies from 2007 to 2021. The findings demonstrate that the degree of corporate governance significantly enhances an organization's ability to invest effectively. The test results of the intermediary effect model show that the corporate governance structure can enhance the investment efficiency of the company by enhancing the quality of financial information, in addition to its primary goal of reducing financing constraints for enterprises. This article offers a fresh approach to corporate governance and a valuable resource for enhancing a company's capacity for value development.

Keywords: Richardson model; corporate governance; financing constraints

1 Introduction

Corporate governance influences the achievement of the objective of maximizing shareholder interests, and its significance is clear. In recent years, China's capital market supervision has been significantly enhanced. The 14th Five-Year Plan presents listed firms with a wealth of external investment options and resources. Recent academic study has focused heavily on how to guarantee that managers may achieve effective investing behavior of listed companies and increase shareholders' income.

Numerous academics have studied in-depth the topic of enterprise management and the advantages of investments in the current economic "new normal," but the majority of the research is based on a particular level of internal governance of the company or the particular external environment, and there are few studies that thoroughly measure the effect of internal governance on the company. In this context, this paper examines the improvement effect of corporate governance on corporate investment efficiency and its realization path using A-share listed companies from 2007 to 2020 as research samples. This paper thus enriches and expands the

micro-mechanistic research of corporate governance affecting corporate investment efficiency and offers fresh suggestions for enhancing corporate investment efficiency from the viewpoint of corporate governance.

2   Research hypothesis and theoretical analysis

2.1   How corporate governance affects an organization's ability to invest effectively

A favorable environment for the company to increase its value has been created by the system of corporate governance, which is well-structured. According to Chen's 2017 research [1], a company's ownership structure and investment level are closely associated. Rajkovic (2020) [2] demonstrated the beneficial effect independent directors have on a company's investment efficiency. To some extent, enhancing the corporate governance structure and putting in place an efficient management system can help the company's investment returns. This study suggests research hypothesis 1 based on the findings of the aforementioned analysis.

Hypothesis 1: The effectiveness of corporate investment can be impacted by internal corporate governance.

2.2   Analysis of the corporate governance mechanisms influencing enterprise investment effectiveness

Richardson (2006) [3] discovered that when a company has enough cash flow, its investment performance is noticeably better than that of other businesses. At the same time, Zhang Tianshu (2020) [4] noted that if a corporation is short on finances or has insufficient funds, it is probably underinvested. This essay suggests Hypothesis 2 based on the analysis of the material above.

Hypothesis 2: By easing financial restrictions, corporate governance structures can increase an organization's investment efficiency.

The corporate governance structure system can, to a certain extent, lessen the information asymmetry between the organization and the outside world while simultaneously enhancing the caliber of the company's financial information [5]. In addition, Vanke [6] noted that financial information disclosure can efficiently reduce over- and under-investment behavior, thereby enhancing company investment efficiency. Based on the study above, this essay suggests Hypothesis 3.

Hypothesis 3: Through raising the caliber of financial information, corporate governance structures can increase the investment effectiveness of businesses.

3   Research design

3.1   Sample choice and information sources

The research sample for this report, which excludes the ST and PT company samples, is data from A-share listed companies from 2007 to 2021. The businesses with missing financial data are examined concurrently, and 35843 observations are ultimately chosen for empirical investigation. The Wind database and the Cathay Pacific database provide the bulk of the data for this research. The annual report of the publicly traded corporation is where the missing information is found.

3.2   Variable setting

(1) Describe the variables. To gauge the company's investment level, the Richardson model is used in accordance with China's unique national circumstances. The precise measurement technique is displayed in Model 1:

$$\text{Inv}_{i,t}=\alpha_0+\alpha_1\text{Tobinq}_{i,t-1}+\alpha_2\text{Lev}_{i,t-1}+\alpha_3\text{Cash}_{i,t-1}+\alpha_4\text{Age}_{i,t-1}+\alpha_5\text{Size}_{i,t-1}+\alpha_6\text{Ret}_{i,t-1}+\alpha_7\text{Inv}_{i,t-1}+ \quad \text{Ind}$$
$$\text{Year} + \varepsilon_{i,t} \tag{1}$$

The term "Inv" stands for both the enterprise's level of capital expenditures and its investment efficiency. The residual's absolute value is what determines inv_ eff. An inverted index is inv _ eff. The severity of overinvestment and underinvestment will increase with the size of the Inv _ eff value. The enterprise's investment efficiency increases with a decrease in the Inv _ eff value.

(2) Explanatory variables. The largest shareholder percentage (LSH) and the pay for the top three executives (TESC) are chosen as the indicators of corporate governance in this study. The equity balance degree (EBD) and board size (BOR) are used as the limiting factors. And in the subsequent stationarity test, the remaining three core explanatory variables are employed as auxiliary evidence for Hypothesis 1 while the shareholding ratio of the largest shareholder serves as the core explanatory variable for regression analysis.

(3) Control variables. Growth possibilities (Tobinq), net cash flow (Cash), enterprise asset liability level (Lev), enterprise listing term (Year), and enterprise stock return rate (Ret) are some of the control variables in this study. At the same time, the measurement model will also incorporate annual dummy and industry dummy variables.

Table 1 displays the description and measurement of particular variables.

Table 1. Basic terms and variables

Variable type	Variable name	Variable symbol	Variable declaration
Explained variable	Investment efficiency	Inv_eff	Calculate the non-normalized residual's absolute value from the model's regression results.
Explanatory	The percentage	LSH	The percentage of shares that the

variable	owned by the biggest shareholder			biggest shareholder owns
	The top three executives' pay packages	TSEC		The compensation of the top three executives as a natural logarithm
	Equity balance degree	EBD		Shares held by the top 10 shareholders as a percentage
	Board size	BOR		The number of board members' natural logarithm
Control variable	Investment Opportunity	Tobinq		The pair value of Tobin's Q
	Cash flow for TNet	Cash		the proportion of the current period's total assets to the prior period's net operating cash flow
	Level of enterprise assets and liabilities	Lev		Subtracting past debts from total assets
	Market life	Age		the amount of years between the date a firm goes public and the calculation of investment expenditure
	Corporate stock return	Ret		The value of the company's return on individual stocks in the previous year

Note: The variables and related definitions in the table are compiled from the collection of relevant data

3.3   Model construction.

The corporate governance variables are introduced here to the model to assess the validity of the hypothesis put out in this study, which is based on the principle of measuring the investment efficiency model of firms (2).

$$\text{Inv\_eff}_{i,t}=\beta_0+\beta_1\text{GOV}_{i,t}+\beta_2\text{Control}_{i,t}+ \quad \text{Year} + \quad \text{Ind} + \varepsilon_{i,t} \qquad (2)$$

4   Empirical research

4.1   Regression analysis of the baseline

The value of R2 is 0.05, and LSH is significant at the level of 1%, as shown in Column (1) of Table 2, indicating that the better the corporate governance, the higher the investment efficiency of the company is, indicating that there is a positive correlation between the internal governance of the company and the investment efficiency of the company, and Hypothesis 1 is confirmed.

4.2   Test for robustness

(1) Substitute alternative explanatory variables. The dependent variables are changed, and the top three executive compensation (TESC), equity balance degree (EBD), and board size (BOR) of the remaining three core explanatory variables of corporate

governance GOV are regressed using Model 2 in accordance with Cai Xiaohui's (2016) [7] method. The fitting outcomes are displayed in Table 2's columns (2) through (4). The findings support hypothesis 1 and the validity of the earlier research findings.

Table 2. Robustness test results of baseline regression and replacement of core explanatory variables

variable	(1)	(2)	(3)	(4)
	Inv_eff	Inv_eff	Inv_eff	Inv_eff
LSH	-0.003*** (-3.267)			
TESC		-0.002*** (-3.992)		
EBD			0.003** (2.133)	
BOR				-0.014*** (-7.542)
Age	-0.001*** (-14.302)	-0.001*** (-13.330)	-0.001*** (-12.713)	-0.001*** (-13.320)
Tobinq	0.023*** (10.809)	0.023*** (10.746)	0.024*** (11.069)	0.023*** (10.395)
Lev	-0.000 (-0.486)	-0.000 (-0.898)	-0.000 (-0.599)	-0.000 (-0.442)
Cash	0.016*** (4.083)	0.016*** (4.019)	0.015*** (3.770)	0.016*** (3.913)
Ret	0.021 (0.643)	0.047 (1.387)	0.001 (0.025)	0.025 (0.771)
Constant	0.048*** (13.647)	0.051*** (14.523)	0.027*** (4.680)	0.071*** (13.516)
Year	Yes	Yes	Yes	Yes
Ind	Yes	Yes	Yes	Yes
N	35843	35843	35843	35843
R-squared	0.05	0.05	0.05	0.051

Note: The T value in parentheses, *, **, *** indicates that the level of 10%, 5%, and 1% is significant. The results in the table are the measurement results of Stata14

(2) Other robustness tests. This paper also refers to the stationarity test methods of other scholars, including 1. Cite Zhang Yuemei's (2017) [8] article. the top 10% of the samples (m1) are excluded after progressively sorting the absolute value of the residuals from the Richardson model regression; 2. Excluding the sample data of small and medium-sized boards and GEM (m2); 3. Considering the potential impact of the economic crisis on the sample enterprises, the sample data from 2008 are deleted (m3). Considering the update of data and the credibility of empirical conclusions, the data with a time interval of 2016-2022 are replaced as the main body (m4). Table 3's findings further demonstrate the validity of Hypothesis 1 and its high degree of fit.

Table 3. Additional robustness tests

VARIABLES	（1）	（2）	（3）	(4)
	m1	m2	m3	m4
	Inv_eff	Inv_eff	Inv_eff	Inv_eff
LSH	-0.002***	-0.005***	-0.002***	-0018***
	（-2.822）	（-5.022）	（-2.738）	(-1.92)
Constant	0.051***	0.052***	0.046***	0.054***
	（13.776）	（10.545）	（12.690）	(14.14)
Controls	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Ind	Yes	Yes	Yes	Yes
N	32,257	20,835	32,690	19936
R-squared	0.049	0.069	0.053	0.043

Note: The T value in parentheses, *, **, *** indicates that the level of 10%, 5%, and 1% is significant. The results in the table are the measurement results of Stata14

4.3   Heterogeneity analysis

(1) Heterogeneity in property. This article categorizes China's listed firms into state-owned and non-state-owned companies and discusses He Kaigang (2021) [9] from the standpoint of enterprise property rights. The outcomes are displayed in Table 4's columns (1) and (2). It is clear that state-owned companies' corporate governance has a greater ability to deter unproductive investment.

(2) Heterogeneity in investment kind. The sample is split into under- and over-investment types based on the type of enterprise investment. The outcomes are displayed in Table 4's columns (3) and (4). It is clear that corporate governance has a greater effect on investment efficiency in over-invested businesses.

Table 4. Heterogeneity analysis

VARIABLES	Property right heterogeneity		Heterogeneity of investment type	
	（1）	（2）	（3）	（4）
	State-owned company	Non-state-owned company	overinvestment	underinvestment
LSH	-0.005***	0.002	-0.004***	-0.001
	(-3.893)	(1.608)	(-3.813)	(-0.633)
Controls	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Ind	Yes	Yes	Yes	Yes
Observations	13,944	21,584	19,615	15,910
R-squared	0.059	0.044	0.058	0.065

Note: The T value in parentheses, *, **, *** indicates that the level of 10%, 5%, and 1% is significant. The results in the table are the measurement results of Stata14

4.4   Influence mechanism test

This research uses the mediating effect model of Wen Zhonglin and Ye Baojuan (2014) [10] to examine the potential indirect mechanism and determine if the aforementioned hypothesis is true.

The "corporate governance -- financing constraint -- investment efficiency" intermediary impact model is as follows:

$$KA_{i,t}=\beta_0+\beta_1 LSH_{i,t}+\beta_2 Control_{i,t}+\quad Year+\quad Ind +\varepsilon_{i,t} \tag{3}$$

$$Inv\_eff_{i,t}=\beta_0+\beta_1 LSH_{i,t}+\beta_2 KA_{i,t}+\beta_3 Control_{i,t}+\quad Year+\quad Ind +\varepsilon_{i,t} \tag{4}$$

The KA index serves as an example of one of these financial constraints on publicly traded firms.

The corporate governance structure can be determined to be effective in achieving the goal of increasing the investment efficiency of firms by easing financing limitations, according to the findings of columns (1) and (2) of Table 5. The second theory is accurate.

The intermediary effect model of "corporate governance -- financial information quality -- investment efficiency" is as follows:

$$Big4_{i,t}=\beta_0+\beta_1 LSH_{i,t}+\beta_2 Control_{i,t}+\quad Year +\quad Ind +\varepsilon_{i,t} \tag{5}$$

$$Inv\_eff_{i,t}=\beta_0+\beta_1 LSH_{i,t}+\beta_2 Big4_{i,t}+\beta_3 Control_{i,t}+\quad Year+\quad Ind +\varepsilon_{i,t} \tag{6}$$

The results of the mechanism test based on model 5–6 are displayed in columns (3) and (4) of table 5. It is clear from column (3) of the data that the regression coefficient of corporate governance LSH is highly positive at the level of 1%, demonstrating that as corporate governance capability has increased, so has the caliber of financial information. The quality of financial information Big4 is significantly negative at the level of 1%, as shown in Column (4) of Table 5, indicating that corporate governance structure can increase the investment efficiency of enterprises by improving the quality of financial information. The third hypothesis is confirmed.

Table 5. Influence mechanism analysis

VARIABLES	(1)	(2)	(3)	(4)
	KA	Inv_eff	big4	Inv_eff
LSH	-0.050***	-0.002**	0.037***	-0.002***
	(-3.542)	(-2.450)	(13.137)	(-3.063)
KA		0.004***		
		(6.141)		
Big4				-0.004***
				(-3.298)
Constant	1.542***	0.048***	1.044***	0.044***
	(20.151)	(10.69)	(92.975)	(12.049)
Controls	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Ind	Yes	Yes	Yes	Yes

N	27,794	27,794	35843	35843
R-squared	0.497	0.054	0.11	0.05

Note: The T value in parentheses, *, **, *** indicates that the level of 10%, 5%, and 1% is significant. The results in the table are the measurement results of Stata14

5   Conclusions and Suggestions

This study employs the mediating effect model and data from China's A-share listed enterprises from 2007 to 2021. The following conclusions are reached after analyzing how corporate governance affects the investing effectiveness of A-share listed businesses. First, an enterprise's ability to invest effectively can be impacted by internal corporate governance. Second, state-owned businesses' corporate governance is better able to control inefficient investment than those of non-state-owned businesses. In addition, organizations with excessive levels of investment show a greater impact of corporate governance on investment efficiency. Third, it is discovered through the impact mechanism that the corporate governance structure can improve the investment efficiency of the company by enhancing the caliber of financial information, in addition to achieving the goal of increasing the investment efficiency of enterprises by relieving financing constraints.

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