

Can the Director Audit Experience Affect the Investment Behavior of Enterprises? Evidence from China

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Abstract. Based on data of Chinese listed companies covering the period from 2012 to 2022, this study investigates the influence of directors' audit experience on corporate investment behavior. The regression analyses show that director with audit experience tend to reduce investment scale, enhance investment diversification, and curb inefficient investment. The findings show that the COVID-19 pandemic amplified the risk-averse characteristics of directors with audit experience, intensifying their impact on investment behavior. Moreover, director audit experience can enhance corporate risk-taking capabilities, improve accounting information quality, and alleviate financing constraints.

Keywords: director, audit experience, investment scale, investment diversification, investment efficiency

1. Introduction

Investment serves as a crucial strategic mechanism for enterprises to enhance market competitiveness and optimize operational performance. As a fundamental driver of economic development, corporate investment not only stimulates economic growth but also facilitates industrial structure optimization and employment generation. However, over-, under-, and short-sighted investment is common among enterprises in various countries [1,2]. The board of directors functions as a vital element of corporate governance and acts as the centerpiece of corporate governance mechanisms. Directors provide their opinions about corporate operations and exert substantial influence in corporate investment [3]. However, they may not act entirely rationally regarding an enterprise's daily business activities, as evidenced by phenomena such as the profit announcement effect, the closed-end fund discount, and dividend mysteries, which deviate from the assumptions of principal-agent theory.

Prior research has comprehensively explored the associations between board characteristics and such dimensions as corporate performance, agency problems, internal control, and corporate risk [4-6]. Specifically, research on director investments in companies generally focuses on how director governance structures, member backgrounds, stability, and behavioral characteristics affect corporate investment efficiency [7-9]. Some scholars find that directors with financial backgrounds offer more strategic and appropriate suggestions for corporate investment and financing decisions, thereby enhancing the effectiveness of related projects [7]. Furthermore, research indicates if enterprises include more independent directors on their boards, they may be able to reduce over-investment and optimize investment efficiency [8].

Drawing upon the theoretical frameworks of upper echelons perspective and imprinting theory, executives past experiences "imprint" themselves, forming distinctive personal attributes and psychological traits, which subsequently influence their strategic decision-making processes and corporate governance approaches [10]. In recent years, it has become increasingly common for auditors to exit the audit profession and become company executives [11]. For example, as many as 51.2% of listed companies' senior management teams between 2008 and 2018 had worked in accounting firms [12].

Work experience in accounting firms significantly enhances practitioners' capabilities in multiple dimensions, including logical judgment, professional operations, prudent thinking, and risk management competencies [13,14]. Research indicates that executives with audit experience have more conservative risk appetites, which can mitigate enterprises' overly aggressive investment behavior and, while optimizing investment efficiency. However, such executives may lead to excessive caution and attempt to avoid any risk in investment project evaluation, resulting in enterprise under-investment [15,16].

A number of studies have initiated an exploration of the effect of directors' audit experience on corporate investment efficiency. The board of directors serves as the primary decision-making body for corporate investment. If directors have audit backgrounds, they can accurately identify and judge investment projects owing to their mastery of multi-industry risk information, professional business knowledge, and extensive professional networks, and then optimize enterprise investment behavior. Our study utilizes a comprehensive dataset comprising listed companies in China from 2012 to 2022 as the research sample. The research results demonstrate that director with audit work experience reduces the scale of corporate investment, enhances investment diversification, and inhibits inefficient investment.

This paper provides three important contributions to the extant literature. First, it extends the research on executive characteristics and corporate investment by systematically examining how directors' audit experience influences investment diversification, efficiency, and scale, thereby enhancing our grasp of the link between professional audit backgrounds and corporate investment behavior. Second, the COVID-19 pandemic exerted a notable influence on the global economy and has left a risk imprint on decision-makers, making them more cautious when making investment decisions. Therefore, this study further examines the role played by the pandemic in strengthening the impact of director audit experience on corporate investment. Third, the present study validates the impact mechanism of directors' audit experience on corporate investment from three perspectives: risk tolerance, accounting information quality, and financing constraints, and provides empirical evidence for optimizing corporate investment decisions. The findings provide valuable implications for corporate governance practices, particularly in establishing a more strategic framework for director selection, talent acquisition, and human capital optimization. This perspective deepens the understanding of the relationship between director audit experience and corporate investment and enriches corporate finance research on the upper echelons' perspective and imprinting theory. It can help board members improve their awareness and judgment of corporate risks through audit work, thereby improving corporate investment behavior and capital allocation efficiency and promoting economic development.

The rest of this paper is structured as follows. Section 2 describes the research design. Section 3 details the empirical results and analysis. Section 4 offers further analysis. Finally, Section 5 concludes the paper.

2. Research design

2.1. Data sources

This research employs data of Chinese listed companies spanning 2012 through 2022 to explore the effect of director audit experience on corporate investment behavior. The sample excludes listed companies in the financial industry, those with special treatment (ST or PT), and those with missing data. The research data are obtained from the China Stock Market & Accounting Research (CSMAR) database. To limit the influence of extreme values, a 1% tail reduction process is applied to continuous variables, resulting in 14,408 observations.

2.2. Definition of variables

2.2.1. Explained variables

2.2.1.1. Investment scale *Inv_s*

An enterprise's total investment is used to reflect investment scale. The calculation is shown in Eq. (1):

$$Inv_s = \frac{(Cash\ paid\ to\ construct\ fixed,\ intangible,\ and\ other\ long - term\ assets - Net\ cash\ received\ from\ disposal\ of\ fixed,\ intangible,\ and\ other\ long - term\ assets)}{Total\ assets\ at\ the\ beginning\ of\ the\ period} \quad (1)$$

2.2.1.2. Investment diversification *Inv_d*

The methods in the literature used to measure enterprise investment diversification include diversification dummy variables, the count of industries operated by the firm, the Herfindel index, and the income entropy index. Following Haushalter et al. [17], this study uses the Herfindel index to measure enterprise investment diversification; the formula is shown in Eq. (2):

$$Inv_d = \sum P_j^2 \quad (2)$$

In Eq. (2), P_j is the proportion of the main business income of enterprise category j to its total business income. And the more diminutive Inv_d is, the greater the extent of diversification.

2.2.1.3. Inefficient investments *Inv_n*

The Richardson residual model measures enterprise investment efficiency [18]. Based on empirical evidence from domestic research and the relevant variables in Zhang et al. [19], Eq. (3) was constructed to estimate enterprise investment efficiency:

$$New_{inv_{i,t}} = \alpha_0 + \alpha_1 Growth_{i,t-1} + \alpha_2 Lev_{i,t-1} + \alpha_3 Cash_{i,t-1} + \alpha_4 Age_{i,t-1} + \alpha_5 Size_{i,t-1} + \alpha_6 Return_{i,t-1} + \alpha_7 Invest_{i,t-1} + \sum Year + \sum Industry + \varepsilon_{i,t} \quad (3)$$

$New_inv_{i,t}$ represents the new investments of company i in year t , $Growth_{i,t-1}$, $Lev_{i,t-1}$, $Cash_{i,t-1}$, $Age_{i,t-1}$, $Size_{i,t-1}$, $Return_{i,t-1}$, $Invest_{i,t-1}$ represent the operating income growth rate, asset-liability ratio, cash holding ratio, listing years, company size, excess rate of return, and investment level of company i in year $t - 1$, respectively. $Year$ and $Industry$ represent annual and industry dummy variables, respectively. $\varepsilon_{i,t}$ is enterprise investment efficiency. When $\varepsilon_{i,t}$ is greater than (less than) 0, it indicates over- (under-)investment. When it equals 0, it indicates ideal investment. The absolute value of $\varepsilon_{i,t}$ is defined as inefficient investment. The larger the value, the greater the degree of inefficient investment.

2.2.2. Explanatory variables

Based on Cai et al. [20], director audit experience is measured using director audit work experience, $Audit_e$, and the proportion of directors with audit experience, $Audit_r$. When only one director has accounting firm experience, audit experience $Audit_e$ equals 1, otherwise it is 0. The share of directors with audit experience is calculated by the ratio between the count of directors holding accounting firm experience and the total number of board directors.

2.2.3. Control variables

Drawing on prior studies, this study controls for factors that may affect corporate investment, including $Size$, Lev , EPS , $iTobinq$, $Top3$, $Cashflow$, $Firmage$, $Grossprofit$, and $Overseaback$. As other listed companies' performance affects corporate investment, year and company fixed effects are included. The definitions of variables are presented in Table 1.

Table 1. Variable definition

Symbol	Definition
$Audit_e$	If the number of board members with experience in accounting firms ≥ 1 , then audit work experience = 1, otherwise = 0
$Audit_r$	Number of directors with audit experience/total number of directors
Inv_s	Calculated from Eq. (1)
Inv_d	Herfindahl-Hirschman index
Inv_n	Absolute value of Richardson's investment efficiency residuals
$Size$	Natural logarithm of annual operating income
Lev	Total liabilities/total assets at the end of the year
EPS	Basic earnings per share
$Tobinq$	Tobin's q
$Top3$	Number of shares held by the top three shareholders / the total number of shares
$Cashflow$	(Monetary funds + securities)/current liabilities
$Firmage$	Logarithm of years of establishment plus 1
$Grossprofit$	(Net sales income - product cost) / net sales income $\times 100\%$
$Overseaback$	If the directors, supervisors, and senior executives have overseas background = 1, otherwise = 0

2.3. Empirical methods

Eq. (4) was used to verify the impact of director audit experience on corporate investment behavior:

$$Inv_{i,t} = \beta_0 + \beta_1 Audit_{i,t} + \beta_i Control_{i,t} + \sum Year + \sum Ind + \gamma_{i,t} \quad (4)$$

In Eq. (4), the explained variable, $Inv_{i,t}$, represents enterprise investment behavior i in year t , including investment scale (Inv_s), investment diversification (Inv_d), and inefficient investment (Inv_n). The explanatory variable, $Audit_{i,t}$, represents the audit experience of company i 's directors in year t , including audit work experience, $Audit_e$, and the proportion of directors with audit experience $Audit_r$. $Control_{i,t}$, $Year$, and Ind are the control variables, year fixed effects, and company fixed effects, respectively, while $\gamma_{i,t}$ is the random disturbance term.

Eq. (5) is constructed to examine the impact of COVID-19 on the relationship between director audit experience and corporate investment behavior:

$$Inv_{i,t} = \zeta_0 + \zeta_1 Audit_{e_{i,t}} + \zeta_2 Audit_{e_{i,t}} \times Time + \zeta_i Control_{i,t} + \sum Year + \sum Ind + \gamma_{i,t} \quad (5)$$

$Time$ is a dummy variable for the time the event occurred, which indicates whether the pandemic occurred in year t . This study focuses on the coefficient of the interaction term $Audit_{e_{i,t}} \times Time$. The definitions of the other variables are consistent with those above.

2.4. Summary statistics

As shown in Table 2, the average number of board members with audit work experience and the average proportion with audit experience are 0.482 and 0.068, respectively, indicating that most listed companies hire corporate directors with audit work experience. Considering the different dimensions of investment behavior, the mean values of investment scale, investment diversification, and inefficient investment when directors have audit work experience are 0.047, 0.711, and 0.035, respectively. The mean values of investment scale, investment diversification, and inefficient investment when directors lack audit work experience are 0.050, 0.760, and 0.034, respectively. Empirical results reveal that firms with directors possessing audit experience exhibit significantly smaller investment scales, greater investment diversification, and higher levels of inefficient investment, with all observed differences being statistically significant.

Table 2. Summary statistics

Variable	Mean	MIN	MAX	SD	Mean: audit work experience=0	Mean: audit work experienc=1	T-test
Audit_e	0.482	0.000	1.000	0.500	—	—	—
Audit_r	0.068	0.000	0.333	0.079	—	—	—
Inv_s	0.048	-0.018	0.268	0.050	0.050	0.047	0.002***
Inv_d	0.736	0.191	1.000	0.255	0.760	0.711	0.049***
Inv_n	0.035	0.000	0.236	0.038	0.034	0.035	-0.001**
Size	0.043	0.000	0.236	0.050	0.044	0.042	0.002*
Lev	0.030	0.000	0.236	0.027	0.028	0.032	-0.004***
EPS	21.930	18.930	26.170	1.476	22.070	21.770	0.299***
Tobinq	0.433	0.059	0.849	0.194	0.442	0.422	0.020***
Top3	0.356	-1.200	2.702	0.534	0.380	0.330	0.050***
Cashflow	1.917	0.821	7.236	1.150	1.891	1.945	-0.054***
Firmage	46.770	16.700	85.810	15.270	46.540	47.020	-0.480*
Grossprofit	0.051	-0.124	0.234	0.061	0.051	0.050	0.002
Overseaback	2.932	1.946	3.526	0.322	2.950	2.912	0.038***

Note: The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively

3. Empirical results and analysis

3.1. Baseline regression

Table 3 lists the results of director audit experience on corporate investment behavior. Columns (1), (3), and (5) report the impact of audit work experience on corporate investment scale, investment diversification, and inefficient investment, respectively. Columns (2), (4), and (6) report the regression results of the proportion of directors with audit work experience on corporate investment scale, investment diversification, and inefficient investment, respectively. The regression coefficients of audit work experience are -0.003, -0.013, and -0.003, and the regression coefficients of the proportion of directors with audit experience are -0.017, -0.076, and -0.015. All results are statistically significant and negative at the 1% significance level, which suggests that director audit experience and the ratio of directors possessing audit experience exert a significantly reduce the scale of corporate investment, increase investment diversification, and inhibit inefficient investment.

These results indicated that director work experience in accounting firms makes a prudent imprint on their economic decision-making behavior, making them more inclined to control risk and choose small-scale investment projects to increase the certainty of investment returns. When making investment decisions, funds are dispersed among different projects, and an enterprise minimizes risk through diversified investment decisions. As directors have accumulated rich financial theoretical

knowledge and practical experience in audit work, they can prejudge the risk of investment projects and improve investment efficiency.

Table 3. Baseline results

	Inv s		Inv d		Inv n	
	(1)	(2)	(3)	(4)	(5)	(6)
Audit_e	-0.003*** (-3.561)		-0.013*** (-4.596)		-0.003*** (-3.053)	
Audit_r		-0.017*** (-2.918)		-0.076*** (-4.099)		-0.015*** (-2.758)
Control variables	Y	Y	Y	Y	Y	Y
Business/Year	Y	Y	Y	Y	Y	Y
N	14408	14408	14408	14408	14408	14408
R ²	0.454	0.453	0.793	0.793	0.196	0.196

Note: The values in parentheses are robust standard errors.

3.2. The impact of COVID-19

Table 4 depicts the regression findings analyzing how the COVID-19 pandemic affected the link between directors' audit experience and corporate investment behavior. The results indicate that the interaction term's coefficient is significantly negative regardless of investment scale, investment diversification, and inefficient investment. This reveals that the impact of directors' audit experience on corporate investment behavior was enhanced after the pandemic outbreak. The outbreak of COVID-19 intensified the uncertainty of enterprise production and business activities, affected free cash flow, caused shortages in operating capital for some enterprises, and strengthened individuals' risk perception. Teams of directors with auditing backgrounds are more sensitive to perceptions of this event and more cautious in economic decision-making. With a professional attitude toward capital markets and comprehensive consideration of corporate risk, such directors reduce their company's investment scale, improve investment diversification, and increase investment efficiency.

Table 4. The impact of the COVID-19

	Inv s	Inv d	Inv n
	(1)	(2)	(3)
Audit_e	-0.002** (-2.428)	-0.010*** (-3.255)	-0.002* (-1.889)
Audit_e×Virtual variable of epidemic occurrence time	-0.003* (-1.791)	-0.010** (-2.034)	-0.003** (-1.978)
Control variables	Y	Y	Y
Business/Year	Y	Y	Y
N	14408	14408	14408
R ²	0.454	0.793	0.196

3.3. Mechanism analysis

To verify the effect mechanism, Eq. (6) was constructed, using the mechanism variables as the explained variable and director audit experience as the explanatory variables:

$$M_{i,t} = \delta_0 + \delta_1 Audit_{i,t} + \delta_i Control_{i,t} + \sum Year + \sum Ind + \xi_{i,t} \quad (6)$$

The mechanism variables in Eq. (6), combined with the study's theoretical analysis and research hypotheses, include three channels: risk tolerance, accounting information quality, and financing constraints.

3.3.1. Director audit experience, risk tolerance, and corporate investment behavior

As per John et al. [21], earnings volatility is used to measure risk-taking ability. First, the industry average is used to adjust the annual profitability rate to obtain an adjusted corporate profitability rate in Eq. (7). Second, taking as the observation period, the risk-taking capacity, is calculated using Eq. (8).

$$Adj_Pfrate_{i,t} = Pfrate_{i,t} - \frac{1}{N} \sum_{q=1}^Q Pfrate_{i,t} \quad (7)$$

$$Risktake_{i,t} = \sqrt{\frac{1}{Q-1} \sum_{q=1}^Q \left(Adj_Pfrate_{i,t} - \frac{1}{Q} \sum_{q=1}^Q Adj_Pfrate_{i,t} \right)^2} \quad (8)$$

Pfrate is enterprise profitability, defined as the ratio of profit before interest and taxes to total assets. *N*, *Q*, and *q*, respectively, denote the count of enterprises within the industry that enterprise *i* is a member of in period *t*, the maximum annual ordinal value and annual ordinal value for each observation period. The value of *Q* in this study is 3.

The results obtained from evaluating the influence of directors' audit experience on risk-taking ability are reported in Columns (1) and (2) of Table 5. The coefficients of audit work experience and the proportion of directors with audit experience are significantly negative at the 10% and 5% levels, respectively. These results show that if company directors have audit work experience, the company's risk-taking ability is improved. Engaging in audit work requires the professional ability to identify and judge risks, and these audit staff abilities are taught and strengthened during the lengthy audit process. Therefore, enterprise directors with audit work experience maintain stable work styles when investing in projects. They are committed to improving financial management and stabilizing business conditions as much as possible to enhance enterprise risk tolerance. The stronger an enterprise's risk-taking ability, the more choices it has in investment decisions, which can change its investment structure. To avoid investment risks, firms must reduce their investment scale and inefficient investment as well as improve investment diversification.

Table 5. Mechanism test

	Risk tolerance		Quality of accounting information		Financing constraints	
	(1)	(2)	(3)	(4)	(5)	(6)
Audit_e	0.001* (1.884)		-0.002* (-1.763)		0.004* (1.775)	
Audit_r		0.010** (2.443)		-0.016* (-1.892)		0.025* (1.689)
Control variables	Y	Y	Y	Y	Y	Y
Business/Year	Y	Y	Y	Y	Y	Y
N	14408	14408	14408	14408	14408	14408
R ²	0.364	0.364	0.145	0.145	0.885	0.885

3.3.2. Director audit experience, accounting information quality, and corporate investment behavior

Regarding accounting information quality, *Da*, the Jones model modified by Dechow et al. [22], is used to calculate the manipulation of accrual-based profits. The greater the absolute value, the lower the quality of corporate accounting information will be. The calculation is performed using Eqs. (9) - (11):

$$Da_{it} = \frac{Ta_{i,t}}{A_{i,t-1}} - Nda_{i,t} \quad (9)$$

$$\frac{Ta_{i,t}}{A_{i,t-1}} = \iota_0 \frac{1}{A_{i,t-1}} + \iota_1 \frac{\Delta Rev_{i,t}}{A_{i,t-1}} + \iota_2 \left(\frac{Ppe_{i,t}}{A_{i,t-1}} \right) + \epsilon_{i,t} \quad (10)$$

$$Nda_{i,t} = \hat{\iota}_0 \frac{1}{A_{i,t-1}} + \hat{\iota}_1 \frac{\Delta Rev_{i,t} - \Delta Rec_{i,t}}{A_{i,t-1}} + \hat{\iota}_2 \left(\frac{Ppe_{i,t}}{A_{i,t-1}} \right) \quad (11)$$

In Eq. (9), T , A_{t-1} , and Nda , respectively, represent total accrued profits, total assets at the end of period $t - 1$, and non-controllable accrued profits. In Eq. (10), ΔRev and Ppe represent change in operating income and change in net fixed assets, respectively, and $\epsilon_{i,t}$ is the residual term. Eq. (10) is used to perform the regression by industry and year, and the regression coefficients are used in Eq. (11) to obtain Nda . In Eq. (11), ΔRec is the change in accounts receivable.

Columns 3 and 4 in Table 5 demonstrate that the regression coefficients of audit work experience. The proportion of directors with audit experience are -0.002 and -0.016, respectively, with both values being statistically significant at the 10% significance level. These results show that hiring directors with accounting firm experience reduces earnings management opportunities and is conducive to improving enterprise accounting information quality.

Directors with auditing practice experience usually have strong industry expertise and practical experience. They can effectively inhibit manipulative accruals by promoting the disclosure of internal control deficiencies and improving the company's quality of information disclosure. Directors with auditing backgrounds can strengthen supervision of corporate financial data, reduce adverse selection and moral hazard, promote more efficient internal resource allocation, and improve inefficient company behavior.

3.3.3. Director audit experience, financing constraints, and corporate investment behavior

Based on Bottazz et al. [23], Eqs. (12) and (13) are established to measure corporate financing constraints:

$$P(Qufc = 1 \text{ or } 0 | Z_{it}) = \frac{e^{Z_{it}}}{1 + e^{Z_{it}}} \quad (12)$$

$$Z_{it} = \lambda_0 + \lambda_1 Asset_{it} + \lambda_2 Lev_{it} + \lambda_3 \left(\frac{Cashdiv}{ta} \right)_{it} + \lambda_4 Mb_{it} + \lambda_5 \left(\frac{Nwc}{ta} \right)_{it} + \lambda_6 \left(\frac{Ebit}{ta} \right)_{it} \quad (13)$$

In Eq. (12), $Qufc$ is a financing constraint dummy variable. First, company size, company age, and cash dividend payout ratio are standardized by year. Thereafter, listed companies are ordered in ascending sequence based on the mean of the standardized variables, with the upper and lower tertiles employed as the cut-off criteria for financing constraints. Listed companies above the 66th percentile are identified as having low financing constraints (coded 0), whereas those at or below this quantile are coded 1.

In Eq. (13), $Asset$, Lev , $Cashdiv$, ta , Mb , Nwc , and $Ebit$ are the natural logarithm of total assets, financial leverage ratio, current year cash dividends, total assets, price-to-book ratio, net working capital, and EBIT, respectively. We employ a *Logit* model to calculate the annual probability of financing constraints, which is defined as the financing constraint index, FC . Higher values indicate smaller financing constraints.

Columns 5 and 6 in Table 5 present the impact of director audit work experience on financing constraints. The regression coefficients of audit work experience and the proportion of directors with audit experience are significantly negative at the 10% level, indicating that director audit experience alleviates enterprise financing constraints. Directors with auditing backgrounds have a greater sense of integrity and social responsibility. They supervise companies to ensure that accounting information is disclosed in a more standardized manner in accordance with corporate accounting standards and that it conveys accurate and truthful financial information to external stakeholders, which ultimately

reduces financing costs and alleviates constraints for enterprises. The mitigation of financing constraints significantly enhances a firm's investment capacity, thereby facilitating strategic investment diversification and optimizing investment efficiency.

3.4. Robustness check

3.4.1. Changing methods used to measure explained variable

For robustness verification, we refer to Yang et al. [24] and calculate the investment scale by taking the ratio of the value stated in the cash flow statement as "Cash paid for the construction of fixed assets, intangible assets and other assets" to the balance sheet's "total assets at the end of the period". Investment diversification is measured via the income entropy index, with the Biddle model applied to gauge inefficient investment. The results are shown in Table 6 and are consistent with the previous conclusions.

Table 6. Changing the method of measuring the explained variable

	Inv s		Inv d		Inv n	
	(1)	(2)	(3)	(4)	(5)	(6)
Audit_e	-0.003*** (-3.297)		0.024*** (4.970)		-0.003*** (-3.937)	
Audit_r		-0.015*** (-2.608)		0.131*** (4.160)		-0.014*** (-3.124)
Control variables	Y	Y	Y	Y	Y	Y
Business/Year	Y	Y	Y	Y	Y	Y
N	14408	14408	14408	14408	14246	14246
R ²	0.461	0.461	0.816	0.815	0.242	0.241

3.4.2. Changing the sample interval

A large-scale crash occurred in China's stock market in 2015, significantly impacting the financial market. As this may interfere with the robustness of the empirical results, the impact of the stock market crash on this study's results is removed by eliminating the 2015 observations. Table 7 displays the robustness test outcomes, which corroborate the previous findings.

Table 7. Robustness check: change the sample interval

	Inv s		Inv d		Inv n	
	(1)	(2)	(3)	(4)	(5)	(6)
Audit_e	-0.003*** (-3.370)		-0.013*** (-4.352)		-0.002** (-2.201)	
Audit_r		-0.018*** (-2.916)		-0.082*** (-4.222)		-0.011** (-1.990)
Control variables	Y	Y	Y	Y	Y	Y
Business/Year	Y	Y	Y	Y	Y	Y
N	13037	13037	13037	13037	13037	13037
R ²	0.451	0.451	0.792	0.792	0.193	0.193

3.4.3. Endogeneity

There may be endogeneity in the impact of director audit experience on corporate investment behavior. The first problem is potentially omitted variables. Some factors that are not observable or are difficult to measure, such as directors' business philosophies, company culture, and growth stage, affect the relationship between director audit experience and investment behavior. The second problem is possible reverse causality. Corporate investment behavior may potentially affect board member selection. For example, companies with relatively stable corporate investment behaviors may

prefer directors with auditing backgrounds. These endogeneity problems may lead to inconsistencies in the estimated regression coefficients.

Based on Quan et al. [25], we select the number of outstanding provincial accounting firms as the instrumental variable 1 (IV1) for director audit work experience. Sourced from the top 100 accounting firms in the annual comprehensive evaluation released by the Chinese Institute of Certified Public Accountants, the data are manually collected and organized from the National Enterprise Credit Information Publicity System. The high number of outstanding provincial accounting firms has a demonstration effect on companies that hire directors with auditing backgrounds but does not directly impact corporate investment decisions; thus, it meets the instrumental variable requirements of both correlation and exogeneity. For the proportion of directors with audit experience, based on Fisman and Svensson [26], we select the mean of the proportion of directors with audit experience of other companies in the same industry as the IV2. A company's decision to select board members is affected by social trends and industry models but does not directly affect the company's own investment behavior. Therefore, the average ratio of directors with audit experience from other firms in the same industry—excluding the firm itself—serves as a reasonable instrumental variable (IV).

The two-stage least squares model is adopted to re-test the relationship between directors' audit experience and corporate investment behavior. Columns (1) and (5) of Table 8 demonstrate a positive association between the quantity of outstanding provincial accounting firms and directors with audit work experience, and between the average ratio of audit-experienced directors among other companies in the same industry and the ratio of audit-experienced directors in the focal firms. These associations are significant at the 1% level. Moreover, the IVs are correlated. The K-P LM statistics of under-identification are 38.966 and 231.994, respectively, and the p-value is 0.000, indicating no under-identification problem in the IVs. The C-D Wald F statistic of weak identification surpasses the critical value (16.38) at the 10% significance level, suggesting no weak IV issue exists [27]. Therefore, the selection of the IVs is reasonable.

The results in columns (2) - (4) for the second stage show that audit work experience is significantly negative at the 5% level. And the results in columns (6) - (8) for the second stage show that the proportion of directors with audit experience is significantly negative. Therefore, after eliminating endogeneity problems from the model, the results show that director audit experience reduces the scale of corporate investment, increases investment diversification, and inhibits corporate inefficient investment.

Table 8. Endogeneity test

	First stage		Second stage		First stage		Second stage	
	Audit_e (1)	Inv_s (2)	Inv_d (3)	Inv_n (4)	Audit_r (5)	Inv_s (6)	Inv_d (7)	Inv_n (8)
IV1	0.025*** (6.25)							
Audit_e		-0.061** (-3.54)	-0.537** (-5.08)	-0.542** (-2.312)				
IV2					0.749*** (16.63)			
Audit_r						-0.086** (-2.09)	-0.687*** (-3.97)	-0.484* (-1.820)
Control variables	Y	Y	Y	Y	Y	Y	Y	Y
Business/Year	Y	Y	Y	Y	Y	Y	Y	Y
K-P LM Statistics		38.966***				231.994***		
C-D Wald F Statistics		38.667				286.334		
N	14408	14408	14408	14408	14408	14408	14408	14408
R ²	0.486	0.453	0.793	0.195	0.508	0.454	0.793	0.195

4. Further analysis

4.1. The impact of audit experience in special positions on investment behavior

Board members hold different positions according to the board's structure; among these, the position of chairman is relatively special. The chairman serves as the convener and presider of the company's board meetings, and acts as a key decision-maker in the firm's strategic positioning. In order to further explore the impact of audit experience on corporate investment behavior, how the chairman's audit work experience impacts corporate investment is examined. The estimation results in columns (1)–(3) of Table 9 reveal that director audit experience negatively impacts corporate investment scale and investment diversification, which reach statistical significance at the 5% and 10% levels. The imprint of the chairman's audit work experience has the most obvious impact on investment scale and diversification.

Table 9. The impact of audit experience in special positions on investment behavior

	Inv s	Inv d	Inv n
	(1)	(2)	(3)
Chairman's audit work experience	-0.014** (-2.010)	-0.042* (-1.864)	-0.002 (-0.269)
Control variables	Y	Y	Y
Business/Year	Y	Y	Y
N	14408	14408	14408
R ²	0.453	0.793	0.195

4.2. The impact of director audit experience on inefficient investment

Further tests examine whether the impact of director audit experience on corporate over- and under-investment differs. Table 10 presents the test results, where the regression coefficients of the explanatory variables in columns (1) and (2) are statistically significantly negative at the 1% significance level. Columns (3) and (4) show that the regression coefficients of director audit experience on corporate under-investment are significantly positive. This indicates that directors with auditing backgrounds reduce a company's investment scale out of caution. They effectively identify corporate investment risks, thereby inhibiting corporate over-investment. However, their caution may lead to under-investment.

Table 10. The impact of director audit experience on inefficient investment

	Inv s		Inv d	
	(1)	(2)	(3)	(4)
Audit_e	-0.012*** (-5.378)		0.001* (1.934)	
Audit_r		-0.075*** (-5.060)		0.010** (2.222)
Control variables	Y	Y	Y	Y
Business/Year	Y	Y	Y	Y
N	5083	5083	9002	9002
R ²	0.221	0.220	0.216	0.216

5. Conclusion

This study conducts an empirical analysis of the relationship between directors' auditing experience and corporate investment decisions, utilizing a comprehensive dataset comprising Chinese listed companies during the 2012-2022 period. The main findings are as follows. First, directors with accounting firm work experience often have more thoughtful, professional, and cautious traits; strong,

logical, and analytical ability; solid business knowledge; and rigorous professional judgment. These traits affect directors' investment decisions and are reflected in their tendency to reduce the scale of corporate investment, expand investment diversification, and inhibit inefficient investment. Second, the study analyzes in detail the three mechanisms through which director audit work experience influences investment decisions, revealing that audit work experience improves directors' ability to identify and judge risks. This is conducive to improving corporate operating conditions and enhancing corporate risk-taking capabilities, thereby affecting corporate investment behavior. Directors with audit experience also have solid professional capabilities, which can effectively strengthen the supervision of corporate financial data, improve corporate accounting information quality, and optimize corporate investment behavior. Additionally, directors with auditing backgrounds can effectively perform their company's internal supervision function, reduce information asymmetry, and ease corporate financing constraints, thereby affecting corporate investment decisions. Third, based on imprinting theory, this study explores the risk imprint made by the COVID-19 pandemic on decision-makers. The results show that the pandemic impact strengthened the risk-averse characteristics of directors with auditing backgrounds and strengthened how their audit experience impacts corporate investment behavior. Fourth, as the board's most important decision-maker, the chairman controls the enterprise's overall development direction. Director audit work experience reduces the scale of corporate investment and improves investment diversification. It also distinguishes two inefficient investment phenomena: over- and under-investment. The results show that directors with auditing backgrounds can effectively identify corporate investment risk, thus inhibit over-investment but potentially increase under-investment.

The study's research conclusions enrich related research on the background characteristics of senior executives, showing how director audit work experience impacts corporate investment, thus enriching finance research on imprinting theory and high-level echelon theory. As the uncertainties facing economic development continue to rise, enterprise operating risks have intensified. Accurately identifying investment risks and improving investment quality and governance levels is necessary. Capital is a basic production factor, and improving capital efficiency is an important part of promoting high-quality economic development. As an important part of real economy, listed companies' prosperity and stability are crucial to financial prevention and control. Healthy development of the real economy and orderly operation of listed companies' investment activities ensure the capital market's stable development. However, current "anti-globalization" trends, a sluggish global economic recovery, and the impact of the COVID-19 pandemic have added to economic development uncertainty. Macro investment efficiency continues to decrease, and some industries and regions face issues such as duplication of construction and over-investment. Corporate investment and financing decisions have gone awry, and some companies have experienced financial difficulties. The directors' team makes corporate investment decisions. In addition to their accumulated financial market experience, personal background characteristics affect their ability to recognize the market, identify risks, and analyze corporate profits, thus affecting corporate investment decisions. This research suggests that when building a senior management team or director talent flow, more attention should be paid to senior executives' professional background characteristics. Personnel allocation should be optimized, giving full play to the role of director background diversity. Capital factor efficiency must be improved, and investment risk prevention and control strengthened. In related corporate investment research, 1) paying attention to decision-makers' professional background factors and 2) a comprehensive and in-depth assessment of the relationship between director audit work experience and corporate investment behavior can improve capital factor efficiency and promote high-quality development of economy.

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