

The Effect of CEO Overconfidence on Overinvestment of Listed Firms in China: The Moderating Role of Board Financial Expertise

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ABSTRACT

This study develops a behavioral–resource framework to explain how managerial cognitive bias and board human capital jointly shape corporate investment decisions. We argue that CEO overconfidence distorts risk perception and induces overinvestment, whereas board financial expertise provides informational and cognitive resources that counteract such bias. Fixed-effects and system GMM estimations using panel data on listed companies in China from 2013 to 2024 show that CEO overconfidence greatly increases overinvestment, while financially astute boards lessen this effect. By integrating behavioral finance with resource dependence theory, this study shifts the governance literature from a monitoring-based explanation toward a resource-based mechanism for constraining bias-driven corporate risk-taking.

Keywords: CEO overconfidence; Overinvestment; Board financial expertise; Behavioral finance theory; Resource dependence theory

INTRODUCTION

The efficiency of corporate investment is crucial for publicly listed firms in China (Chen et al., 2017). Inefficient investment can be classified as under-investment or over-investment. China's low-interest-rate environment, marked by declining lending rates following the LPR reform, has intensified competition among commercial banks and decreased interest margins on business loans. In response to reduced profit margins, banks are expanding their loan portfolios (Bikker & Vervliet, 2018), which has allowed businesses to obtain capital at lower costs and better manage financial constraints, facilitating access to investment projects that were previously infeasible. This results in overinvestment in initiatives with longer payback periods (Lu & Lu, 2025). The observed investment surge suggests a strong business motivation to increase capacity (Hsu et al., 2024). Addressing overinvestment is crucial, as these findings raise significant concerns that may impact broader economic outcomes.

Overproduction is a common issue in capitalist systems, particularly in rapidly developing nations with high savings and fixed capital (Berg, 2007; Kindleberger, 1963; Kornai, 2013). With the rise of exports and investment in the early 2000s, the government expressed concern about the potential re-emergence of overproduction stemming from overinvestment in China (Liu, 2024). China's decentralized economy faces significant challenges related to severe overinvestment and overcapacity (Hung, 2008).

If the firm is possessed with sufficient internal funds, the CEO may be more likely to engage in overinvestment activities like investing in high-risk projects with negative net present values (Zhu et al., 2017). The impact of CEO overconfidence on overinvestment has been the subject of numerous studies, the majority of which are based on agency theory (Asker et al., 2015; Chen et al., 2017; Cutillas Gomariz & Sánchez

Ballesta, 2014; Edmans et al., 2017; Gong et al., 2023; Sheng et al., 2022). These studies highlight how overconfident managers pursue excessive investment, which exacerbates agency conflicts. The behavioral finance approach used in this study views overconfidence as a cognitive bias that consistently skews managerial perceptions and decision-making, resulting in overinvestment even in the absence of overt agency conflicts (Grinblatt & Keloharju, 2009; Guluma, 2021; Malmendier & Tate, 2015; Yi & Xiugang, 2019; Zavertiaeva et al., 2018).

Johnson et al. (1996) categorize a board's roles into three broadly defined categories: control, services, and resource dependence. These three explicit roles of the board are not mutually exclusive and are reinforced by financial expertise. Minton et al. (2014) emphasize the superior skills that board financial experts may possess in identifying risks that primarily benefit shareholders. The presence of board members with financial expertise will likely be more critical for analyzing a firm's finances and advising managers on financial announcement strategy. Such expertise will also reassure potential investors and creditors, making it easier to use financial resources to mitigate risk.

While prior research has also documented that board financial expertise influences investment decisions and can serve as a resource (Naheed et al., 2022), most of them start from agency theory and upper echelons theory, examining how the board's supervisory function can reduce agency problems, with very few studies approaching the issue from the perspective of resource dependence theory. And it has not been examined as a moderator of the overconfidence–overinvestment relationship. This creates a gap: the mechanisms through which behavioral biases translate into overinvestment under varying levels of board financial expertise remain underexplored.

When considered collectively, these findings underscore the necessity of a study that incorporates behavioral finance theory to explain the impact of CEO overconfidence on overinvestment and to investigate the moderating role of board financial expertise, grounded in resource dependence theory.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

CEO Overconfidence and Overinvestment

CEO overconfidence can systematically skew business investment decisions, according to behavioral finance. Behavioral finance contends that psychological biases have a major impact on managerial judgment, in contrast to the Efficient Market Hypothesis (EMH), which assumes perfectly rational investors and efficient markets (Muhammad Abdul Rehman et al., 2025). Overconfident managers frequently overestimate their significant skills, critical expertise, and forecast accuracy, reflecting empirical evidence that such cognitive biases substantially distort decision-making processes in executive leadership contexts (El-Ansary & Ahmed, 2025).

Investment efficiency assesses whether investment activities deviate from the theoretically optimal level (Biddle et al., 2009; Richardson, 2006). In frictionless settings, firms' investment decisions are likely to be efficient (Modigliani & Miller, 1958). However, firms deviate from optimal investment due to information asymmetry, agency problems (Myers, 1977), and managers' cognitive biases (Ahmed & Duellman, 2013; Caldarola, 2014; Richardson, 2006), resulting in inefficiency.

Overconfident CEOs distort risk-return assessments by overestimating projected returns and underestimating related dangers (Gervais et al., 2011; Landier & Thesmar, 2009). However, research shows that companies with overconfident CEOs have higher capital expenditures and are more likely to overinvest (Ben-David et al., 2013; El-Ansary & Ahmed, 2025; Huang et al., 2011; Malmendier & Tate, 2005; Wang et al., 2016).

Therefore, behavioral finance suggests that CEO overconfidence increases the probability of corporate overinvestment. This proposes the following hypothesis:

H1: CEO overconfidence has a positive impact on corporate overinvestment.

Moderating Effect of Board Financial Expertise

In the control role, directors monitor managers as the shareholders' trustees (Fama, 1980; Jensen, 1993), and Boone et al. (2007) refer to this role as the "monitoring hypothesis." Lorsch and MacIver, (1989) document that service roles entail directors to counsel and advise the CEO, and as per Sarwar et al. (2018), it is one of the prevailing functions that the directors perform. The financial expertise of board members mitigates problems in internal control, firm performance, and reporting restatements (Agrawal & Chadha, 2005; Benston & Hartgraves, 2002; Darmadi, 2011; Francis et al., 2012; Gurdgiev & Ni, 2023). Additionally, it affects a firm's investment to a lesser extent (Burak Güner et al., 2008).

Recent studies indicate a growing trend in hiring managerial financial experts, which reflects the importance of financial knowledge in mitigating investment inefficiencies (Custódio & Metzger, 2014). Resource dependence theory (RDT) proposes that boards provide access to resources that are not otherwise available (Pugliese et al., 2014); RDT sees boards as asset of the firm contributing to sustained value creation (Hillman et al., 2009). Resource dependence theory (RDT) further emphasizes the influence of boards in providing resources and advice on executive strategic choices (Hillman & Dalziel, 2003; Pfeffer et al., 1979).

Resource dependence theory suggests that board members with significant financial backgrounds will provide the critical social and human capital that substantially enhance a company's access to important resources and data (Jensen & Meckling, 1976; Jawad et al., 2021). The resource dependence role views the board as an open channel that facilitates management's access to critical resources (Loasby et al., 1979). Moreover, substantial empirical evidence indicates that directors provide businesses with access to networks, expertise, and credibility that enhance strategic decision-making. Thus, directors demonstrate relevant financial expertise in risk assessment, capital allocation, and investment appraisal that improve investment choices (Li et al., 2023). Their skills and networks enhance the board's access to financial resources and relevant information channels, strengthening strategic decision-making processes (Diestre et al., 2015; Oehmichen et al., 2017).

Francis et al. (2012), Gilani et al. (2021), and Harris and Raviv (2008) found financial expert directors appear better equipped to identify potential financial and accounting risks, reduce information asymmetry, and counsel management on responsible financing and recapitalization methods. Furthermore, the important evidence suggests that their knowledge limits managerial opportunism and wasteful resource use by strengthening accounting conservatism and enhancing monitoring quality (Qiao et al., 2018; Rezk Omara & Rashed, 2023).

However, research shows that CEOs who overestimate rewards and underestimate dangers engage in excessive investment (Li et al., 2025). Additionally, findings indicate that directors with financial backgrounds offset biased managerial decisions and lower risk exposure. Therefore, board financial expertise reduces overconfident CEOs' tendency to overinvest by strengthening oversight and improving information processing.

Therefore, this proposes the following hypothesis:

H2: Board financial expertise mitigates the positive relationship between CEO overconfidence and corporate overinvestment.

Research Design

Sample Selection

The sample preprocessing was as follows: (1) Due to having significantly different financial statement structures from other industries, listed companies in the financial sector were not included. (2) Extreme values might have been produced because ST and *ST listed firms in China were disregarded due to subpar financial standing. (3) The missing data companies were not included. (4) Excluded were businesses that had not disclosed information on R&D expenditures and sales. (5) To prevent extreme values, the sample data were winsorized at 1%. (6) Listed companies that have been delisted which were not included. The final dataset used in this study comprised 21890 observations from 1988 firms between 2013 and 2024.

Variables Identification

Dependent Variable- Overinvestment

By breaking down the overall investment, Richardson (2006) employs an accounting-based framework to create metrics of investment efficiency and investigates the connection between free cash flow and the degree of firm-level overinvestment. Investment efficiency has been measured using models in numerous studies (Chen et al., 2011; Chen et al., 2017; Zhou et al., 2024). This study used the same measures of overinvestment and underinvestment as Shi et al. (2025) and Richardson (2006). This study measures overinvestment (OverInv1) as the positive value of the residual of Richardson (2006) Model and replace the negative value of the residual with 0. Higher values indicate greater overinvestment.

OverInv1 = The positive value of the residual of Richardson (2006) and replaces the negative value of the residual with 0.

Independent Variable- CEO Overconfidence

Managerial psychological bias is inherently difficult to measure directly. As such, prior studies have commonly used managers' observable decisions and behaviors as proxies for their overconfidence. Specifically, overconfident managers are expected to engage in more mergers and acquisitions, issue greater amounts of debt, overestimate future firm earnings, delay the exercise of stock options, and increase their holdings of the company's stock (Ahmed & Duellman, 2013; Huang & Kisgen, 2013).

Existing literature has adopted several approaches to measure CEO overconfidence, including: (1) CEO's share holdings (Malmendier & Tate, 2005); (2) frequency of mergers and acquisitions (Doukas & Petmezas, 2007); (3) mass-media comments on managers (Brown & Sarma, 2007; Malmendier & Tate, 2008); (4) corporate earnings forecasts (Hribar & Yang, 2016); (5) executive compensations (Hayward & Hambrick, 1997); and (6) manager characteristics (age, gender, education, tenure, work experience, etc (Bertrand & Schoar, 2003; Hambrick & Mason, 1984; Yim, 2013).

Following the measurement approach developed by Li et al. (2025), a method widely used in existing literature, this study constructs a CEO overconfidence dummy variable (OC) based on managerial characteristics. Specifically, OC is coded as 1 if the CEO exhibits at least four of the following five characteristics, and 0 otherwise: (1) male; (2) age below the sample mean; (3) bachelor's degree or above; (4) an increase in compensation relative to the previous year; (5) CEO duality (i.e., the CEO concurrently serves as board chairman).

The rationale underlying this measurement is as follows: Males are generally more overconfident, whereas females tend to be more cautious and risk-averse. Younger CEOs are more likely to pursue risky investments to establish their reputations, whereas older CEOs with sufficient experience and status tend to be more risk-averse. CEOs with higher levels of education are prone to overestimating their abilities and judgments. Rising compensation enhances managerial overconfidence, whereas a pay cut reduces risk-taking incentives. Additionally, CEOs who also serve as chairman enjoy greater decision-making power, which further heightens overconfidence.

OC = If the general manager in the sample company is overconfident, the dummy variable OC equals 1, and 0 otherwise.

Moderating Variable-Board Financial Expertise

The Sarbanes–Oxley Act of 2002 (SOX) defined financial experts as persons with experience in accounting or finance, or with supervisory financial experience (Ali et al., 2022). Different researchers have used the SOX definition to define financial expertise (Defond et al., 2005; Krishnan & Visvanathan, 2008). This study defines a financial expert as someone with a degree in accounting, finance, or economics, or with experience working as an accountant, auditor, chief financial officer, finance manager, financial advisor, or financial analyst in any financial or non-financial firm (Sarwar et al., 2018). For firms, data on financial expertise on

corporate boards are collected from the CSMAR database in China, including educational background and work experience, and are compared with those of neighboring emerging Asian countries. The independent variable used in this study is board financial expertise and represented by BFE. This study measures board financial expertise as the percentage of financial experts on the board relative to the total number of directors (Sarwar et al., 2018).

BFE = A percentage of financial experts on the board to the total number of directors on the board

Control Variables

Firm size (FSIZE), firm age (FAGE), liquid ratio (Liquid), top management team total pay (TMTPay), institutional investor ownership percentage (InstOwn), largest shareholder ownership (Top1), loss indicator (Loss), and audit opinion (Opinion) are among the control variables. Furthermore, firm effects (Firm) and year-fixed effects (Year) are also considered. The definitions of these variables are provided in Table 1.

Table 1 summarizes the descriptions of all the dependent variables, independent variable, moderator variable, and control variables.

Table 1 Description of Variables

Variables Type	Variable Name	Variable Symbol	Description
Dependent Variable	Overinvestment	OverInv1	The positive value of the residual of Richardson (2006) and replaces the negative value of the residual with 0.
		OverInv2	The positive value of the residual of Biddle et al. (2009) and replaces the negative value of the residual with 0.
Independent Variables	CEO Overconfidence	OC	If the general manager in the sample company is overconfident, the dummy variable OC equals 1, and 0 otherwise.
Moderator Variable	Board Financial Expertise	BFE	A percentage of financial experts on board to the total number of directors on board
Control Variables	Firm Size	FSIZE	The natural logarithm of a firm's total assets
	Firm Age	FAGE	The number of years since the firm was founded
	Liquid Ratio	Liquid	Current assets divided by current liabilities
	Top Management Team Pay	TMT Pay	Natural logarithm of total compensation of top management team
	Institutional Investor Ownership	InstOwn	Total number of shares held by institutional investors / Total number of shares outstanding
	Largest Shareholder Ownership	Top1	The proportion of shares held by the largest shareholder divided by total shares outstanding.
	Loss	Loss	A dummy variable equal to 1 if net profit in year <i>t</i> is less than zero, and 0 otherwise.
	Audit Opinion	Opinion	A dummy variable equal to 1 if the firm receives an unqualified (standard) audit opinion in year <i>t</i> , and 0 otherwise.

Regression Model

The baseline model 1 represents the relationship CEO overconfidence on overinvestment of listed firms in China is written as follows:

$$\begin{aligned}
 OverInv1_{it} = & \alpha_{it} + \beta_1 OC_{it} + \beta_2 FSIZE_{it} + \beta_3 FAGE_{it} + \beta_4 Liquid_{it} + \beta_5 TMTPAY_{it} \\
 & + \beta_6 InstOwn_{it} + \beta_7 Top1_{it} + \beta_8 Loss_{it} + \beta_9 Opinion_{it} + \varepsilon_{it}
 \end{aligned} \tag{1}$$

The baseline model 2 represents the effect CEO overconfidence on overinvestment of listed firms in China: the moderating role of board financial expertise is written as follows:

$$\begin{aligned}
 OverInv1_{it} = & \alpha_{it} + \beta_1 OC_{it} + \beta_2 BFE_{it} + \beta_3 OC * BFE_{it} + \beta_4 FAGE_{it} + \beta_5 Liquid_{it} \\
 & + \beta_6 TMTPAY_{it} + \beta_7 InstOwn_{it} + \beta_8 Top1_{it} + \beta_9 Loss_{it} + \beta_{10} Opinion_{it} + \varepsilon_{it}
 \end{aligned} \tag{2}$$

Overinv1 is the overinvestment. OC is CEO overconfidence. OC*BFE are the moderating terms. FSIZE, FAGE, Liquid, TMTPAY, InstOwn, Top1, Loss, Opinion are respectively firm size, firm age, liquid ratio, top management team pay, institutional investor ownership, largest shareholder ownership, loss, audit opinion. α is the constant term, β is the is coefficient of the variable, ε is the error term, i denotes the cross-sectional dimension for firms and t denotes time series dimension.

The baseline model 1 takes CEO overconfidence as independent variable, overinvestment as the dependent variable, and introduces relevant control variables to obtain the correlation coefficient between CEO overconfidence and overinvestment. Model 2 take CEO overconfidence as an independent variable, overinvestment as a dependent variable, and board financial expertise as a moderating variable. If the regression results of $\beta_1 > 0$ are significant, which is established.

Analysis of Empirical Results

Descriptive Statistics

Table 2 presents the descriptive statistics of the main variables, which reveal considerable variation across key measures. Overinvestment (OverInv1) and its alternative measure (OverInv2) exhibit significant average levels (0.0148 and 0.0141, respectively), which plausibly indicate heterogeneous investment behavior across firms. Moreover, the board financial expertise ratio (BFE) indicates that the generally low mean value (0.131) reflects important differences in governance composition across firms.

Table 2 Descriptive Statistics of the Continuous Variables

Variable	Unit of Measurement	Obs	Mean	SD	Min	Max
OverInv1		21,890	0.0148	0.0337	0.000	0.310
OverInv2		21,890	0.0141	0.0369	0.000	0.346
BFE	Ratio (%)	21,890	0.131	0.140	0.000	1.000
FSIZE	Billion	21,890	26.3	118	0.003	3,190
FAGE	Number of Year	21,890	3.054	0.300	1.386	4.248
Liquid	Ratio (%)	21,890	2.166	2.743	0.0278	144.0
TMTPay	Yuan	21,890	6986,243	7430,213	11904.76	1.53e+08
InstOwn	Ratio (%)	21,890	45.00	23.38	0.0001	101.1
Top1	Ratio (%)	21,890	0.335	0.148	0.0029	0.900

Data source: CSMAR database

Table 3 presents the significant descriptive statistics for the dummy variables, suggesting that these findings reveal important patterns in the data. Moreover, the significant findings indicate that 16,975 observations (77.55%) have an OC value of 0, suggesting that the majority of CEOs in China are classified as

non-overconfident. Additionally, findings show 4,915 observations (22.45%) have an OC value of 1. The results suggest that a minority of CEOs exhibit overconfidence, which influences corporate investment decisions.

Table 3 Descriptive Statistics of the Dummy Variables

VARIABLES	Numbers of Listed Firms in China	
	Frequency of 0s	Frequency of 1s
OC	16,975 (77.55%)	4,915 (22.45%)
Loss	18,896 (86.32%)	2994(13.68%)
Opinion	558(2.55%)	21332(97.45%)

Data source: CSMAR database.

Correlation Analysis

Table 4 presents the significant empirical findings from the Pearson correlation matrix, which indicate that most coefficients are below 0.5, suggesting no severe multicollinearity among the variables and that the independent variables are relatively weakly correlated with each other.

Table 4 Pearson Correlation Matrix

	OverInv1	BFE	FSIZE	FAGE	Liquid	TMTPay	InstOwn	Top1
OverInv1	1							
BFE	0.001	1						
FSIZE	-0.021***	0.065***	1					
FAGE	-0.074***	0.096***	-0.001	1				
Liquid	-0.063***	-0.032***	-0.098***	-0.108***	1			
TMTPay	-0.005	0.097***	0.193***	0.210***	-0.132***	1		
InstOwn	0.001	0.066***	0.220***	0.102***	-0.175***	0.175***	1	
Top1	-0.027***	-0.032***	0.163***	-0.086***	-0.050***	-0.018***	0.592***	1

Notes: ***, ** and * represent the level of significance at 1%, 5% and 10% respectively.

Regression Results

The fixed-effects results in Table 5 of Column (3) indicate that this specification provides the most rigorous empirical approach, given that it controls both firm-specific time-invariant heterogeneity and year effects. Moreover, the significant findings indicate that CEO overconfidence (OC) has a positive and statistically significant effect on overinvestment ($\beta = 0.00125$, $t = 1.99$), implying that overconfident CEOs tend to overestimate project returns and underestimate risks. Thus, results show investment increases beyond optimal levels. However, findings appear consistent with behavioral corporate finance theory and empirical evidence showing that overconfident managers systematically overinvest (Malmendier & Tate, 2005).

Table 5 Regression Results of OLS, REM and FEM on CEO Overconfidence and Corporate Overinvestment

	(1)	(2)	(3)
	OLS	RE	FE
OC	0.00255***	0.00221***	0.00125**
	(5.02)	(4.19)	(1.99)
FSIZE	-0.00107***	-0.000978***	0.00272***
	(-4.79)	(-3.68)	(4.12)
FAGE	-0.00808***	-0.00962***	-0.0207***
	(-11.09)	(-11.25)	(-4.21)
Liquid	-0.00156***	-0.00155***	-0.00165***
	(-12.57)	(-11.04)	(-7.15)

TMT Pay	0.000260 (0.74)	-0.0000209 (-0.05)	-0.000515 (-0.81)
InstOwn	0.0000599*** (4.82)	0.0000833*** (5.63)	0.000257*** (7.75)
Top1	-0.0123*** (-6.78)	-0.0128*** (-5.92)	-0.00253 (-0.57)
Loss	-0.00573*** (-9.03)	-0.00608*** (-9.46)	-0.00579*** (-8.91)
Opinion	0.00304** (2.25)	0.00385*** (2.80)	0.00538*** (3.64)
_cons	0.0612*** (11.24)	0.0667*** (10.78)	0.0120 (0.57)
N	21894	21894	21890
R ²	0.019		0.176
F	47.69		30.75
Firm FE	NO		YES
Year FE	NO		YES

Notes: ***, ** and * represent the level of significance at 1%, 5% and 10% respectively. The numbers inside parentheses are robust std.Err.

The significant empirical findings indicate that firm size (FSIZE) demonstrates a positive and significant relationship with overinvestment ($\beta = 0.00272$, $t = 4.12$), suggesting that larger firms appear more prone to overinvestment. Moreover, the key evidence suggests that firms with greater resource endowments and financing capacity tend to invest more, and might indicate capital is allocated inefficiently when internal funds are abundant (Shi et al., 2025). Table 5 shows firm age (FAGE) exhibits a negative and significant result ($\beta = -0.0207$, $t = -4.21$), suggesting mature firms invest more cautiously. The results same as Shi et al. (2025), younger firms pursue aggressive expansion while older firms adopt conservative policies. Table 5 shows liquidity (Liquid) plausibly demonstrates a negative and highly significant coefficient ($\beta = -0.00165$, $t = -7.15$), suggesting that firms with stronger liquidity positions might reasonably indicate less overinvestment behavior across the relevant sample (Chen et al., 2021; Mian & Mian, 2023). Furthermore, the important results suggest that top management team pay (TMTPay) appears statistically insignificant ($\beta = -0.000515$, $t = -0.81$), indicating that compensation-based incentives alone might not systematically influence investment efficiency. Given that the key findings support this interpretation, the results indicate that pay-performance sensitivity is often too weak to align managerial incentives with shareholder interests (Li & Wang, 2010). Institutional investor ownership (InstOwn) demonstrates that higher institutional shareholding indicates a significant and positive association with greater overinvestment ($\beta = 0.000257$, $t = 7.75$), given that certain types of institutional investors well suggest preferences for short-term growth strategies that substantially influence investment levels beyond what traditional monitoring frameworks might reasonably anticipate (Biddle et al., 2009). Table 5 shows that Loss is negative and significant ($\beta = -0.00579$, $t = -8.91$), suggesting firms experiencing losses reduce investment. Furthermore, results indicate this accords with financing-constraint theory showing poor performance limits investment spending (Pereira et al., 2024), as audit opinion (Opinion) remains positive and significant ($\beta = 0.00538$, $t = 3.64$), and firms receiving favorable audit signals tend to invest more.

Overall, the fixed-effects specification confirms the robustness of the main conclusion: CEO overconfidence significantly increases corporate overinvestment, even after controlling for unobserved firm heterogeneity and macro-time effects.

From Table 6 of Column (1), the coefficient of CEO overconfidence was 0.00164 and significant at the 10%. After excluding the endogenous problem, it was found that the positive relationship between CEO overconfidence and corporate overinvestment, which still confirmed hypothesis H1.

H2 predicted that board financial expertise mitigates the positive relationship between CEO overconfidence and corporate overinvestment. In Table 6 of Column (2), the coefficient of $OC \times BFE$ is negative and

significant ($\beta = -1.009$, $p < 0.1$) with OverInv1 as the overinvestment proxy variable. After excluding the endogeneity problem, the results show that the interaction term between CEO overconfidence and board financial expertise negatively affects overinvestment, thus confirming hypothesis H2.

Table 6 Two-Step System GMM Regression Results

	(1)	(2)
	OverInv1	OverInv1
L.OverInv1	0.121	0.00443
	(0.0799)	(0.0504)
OC	0.00164*	0.302*
	(0.0010)	(0.1703)
BFE		0.418*
		(0.2483)
OC × BFE		-1.009*
		(0.5597)
FSIZE	0.00974	0.0555*
	(0.0067)	(0.0285)
FAGE	0.00408	-0.0112
	(0.0041)	(0.0178)
Liquid	0.00259*	-0.00444
	(0.0016)	(0.0038)
TMTPay	-0.0218**	-0.121**
	(0.0088)	(0.0512)
InstOwn	-0.000325	0.00146
	(0.0003)	(0.0013)
Top1	0.0482	-0.0170
	(0.0645)	(0.0679)
Loss	-0.0108	0.201
	(0.0128)	(0.1244)
Opinion	0.0450	0.518**
	(0.0341)	(0.2090)
_cons	0.0664	-0.0120
	(0.0784)	(0.2472)
Observations	19608	19608
AR (1) test (p-value)	0.000	0.034
AR (2) test (p-value)	0.127	0.143
Hansen-J test (p-value)	0.298	0.389
Diff-in-Hansen tests (p-value)	0.271	0.505
No. Instruments	22	19
No. Groups	1987	1987

Notes: L.OverInv1 equals the positive value of the residual of Richardson (2006) and replaces the negative value of the residual with 0; ***, ** and * represent the level of significance at 1%, 5% and 10% respectively. The numbers inside parentheses are std.Err.As seen in Table 6 above, the Arellano-Bond test also showed that there was no serial correlation in the first and second differenced disturbances (AR (1) P-value < 0.05; and AR (2) P-value > 0.05). Hansen-J tests (P-value > 0.05) and difference-in-Hansen tests (P-value > 0.05) indicated that the over-identifying restrictions were valid. The analysis indicated that the instruments were functioning well and were not correlated with any errors. Furthermore, the data presented in the tables on instruments and group counts suggested that instrument proliferation was unlikely to pose significant challenges to the estimation process. As can be seen from the results of the moderator effect analysis, the adjustment effect of board financial expertise was greater than that of non-board financial expertise, which was consistent with the resource dependence theory.

Robustness Checks

Table 7 presents the results of robustness tests using the two-step system GMM estimator with alternative independent variable measures of CEO overinvestment.

Table 7 showed that, in the estimated two-step system GMM results, the correlation coefficient for CEO overconfidence (OC) was 0.0190 ($p < 0.05$), indicating a significant positive relationship between CEO overconfidence and corporate overinvestment. Thus, still confirmed hypothesis H1. Table 7 of Column (2), the coefficient of the interaction term was negative and significant ($\beta = -1.309$, $p < 0.05$) for the OverInv2 as the overinvestment proxy variable. The result showed that the interaction term $OC \times BFE$ negatively affected overinvestment. Thus, it still confirmed hypothesis H2.

Table 7. Robustness Test: Two-Step System GMM Estimates Using Alternative Measures of CEO Overinvestment

	(1)	(2)
	OverInv2	OverInv2
L.OverInv2	0.541***	0.350***
	(0.0810)	(0.1021)
OC	0.0190**	0.178**
	(0.0079)	(0.0787)
BFE		0.467**
		(0.2148)
OC × BFE		-1.309**
		(0.6231)
FSIZE	-0.0350	0.0336*
	(0.0219)	(0.0177)
FAGE	-0.0423	-0.0127
	(0.0282)	(0.0079)
Liquid	0.0191	0.00171
	(0.0235)	(0.0133)
TMTPay	0.0556	-0.0548*
	(0.0366)	(0.0298)
InstOwn	0.00385	0.000218
	(0.0028)	(0.0004)
Top1	-0.295	-0.0469
	(0.2090)	(0.0501)
Loss	0.0396	0.0288
	(0.0500)	(0.0266)
Opinion	-0.126	0.202
	(0.0968)	(0.1254)
_cons	0.0678	-0.126
	(0.1040)	(0.1241)
Observations	19608	19608
AR (1) test (p-value)	0.001	0.011
AR (2) test (p-value)	0.497	0.512
Hansen-J test (p-value)	0.664	0.244
Diff-in-Hansen tests (p-value)	0.553	0.185
No. Instruments	14	18
No. Groups	1987	1987

Notes: L.OverInv2 equals the positive value of the residual of Biddle et al. (2009) and replaces the negative value of the residual with 0; ***, ** and * represent the level of significance at 1%, 5% and 10% respectively. The numbers inside parentheses are std.Err.

As seen in Table 7 above, the Arellano-Bond test also showed that there was no serial correlation in the first and second differenced disturbances (AR (1) P-value < 0.05; and AR (2) P-value > 0.05). Hansen-J tests (P-value > 0.05) and difference-in-Hansen tests (P-value > 0.05) indicated that the over-identifying restrictions were valid. The analysis indicated that the instruments were functioning well and were not correlated with any errors. Furthermore, the data presented in the tables on instruments and group counts suggested that instrument proliferation was unlikely to pose significant challenges to the estimation process.

CONCLUSION

This study provides an integrated explanation of corporate overinvestment by linking managerial cognitive bias with board resource provision within a unified theoretical framework. Consistent with behavioral finance theory, empirical evidence shows that CEO overconfidence systematically distorts risk perception and expected return assessments, thereby generating persistent overinvestment. These findings reinforce the argument that inefficient investment decisions are not solely the result of agency conflicts or informational asymmetries but can originate from bounded rationality and psychological bias embedded in executive cognition. In this sense, corporate investment inefficiency should be understood as much as a behavioral phenomenon as a governance problem.

Importantly, this study extends the analysis by demonstrating that board financial expertise significantly mitigates the overinvestment effect of CEO overconfidence. From the perspective of resource dependence theory, financially sophisticated directors function as providers of cognitive, informational, and analytical resources that improve the firm's decision architecture. Such directors do not merely monitor managerial behavior; rather, they reshape managerial judgment environments by enhancing information-processing capacity, refining risk-evaluation standards, and strengthening the quality of financial deliberation. Through these resource channels, boards help correct distorted managerial beliefs and reduce bias-driven investment expansion.

Theoretically, this research contributes to the literature in several ways. First, it identifies CEO overconfidence as a fundamental behavioral source of corporate investment distortion, thereby advancing the growing literature that emphasizes managerial traits as determinants of firm outcomes. Second, it reconceptualizes board financial expertise as a resource-based governance mechanism rather than a purely monitoring device, shifting the dominant interpretation of boards from disciplinary institutions to strategic resource providers. Third, by integrating behavioral finance and resource dependence theory, the study establishes a coherent framework that simultaneously explains both the origin of inefficient investment and the institutional conditions under which such inefficiencies can be alleviated. This integrative perspective responds to recent calls for multi-theoretical approaches in corporate governance research.

Methodologically, the study strengthens causal inference through multiple identification strategies, including firm and year fixed effects, dynamic system GMM estimation, and alternative measurements of overinvestment. The convergence of results across these specifications enhances confidence in the robustness of the findings and suggests that the documented relationships reflect structural behavioral mechanisms rather than model-specific artifacts.



From a practical standpoint, the findings highlight the importance of board human capital composition in shaping the quality of corporate decisions. Firms can mitigate the adverse consequences of managerial cognitive bias by appointing directors with strong financial expertise who can critically evaluate investment proposals and challenge overly optimistic managerial projections. For policymakers and regulators in emerging markets, the results provide empirical support for governance reforms that promote board professionalism and diversity of competencies, thereby improving capital allocation efficiency and supporting sustainable corporate development.


Despite these contributions, this study has several limitations that suggest directions for future research. Although the analysis focuses on financial expertise, other board characteristics—such as international experience, technological background, or cognitive diversity—may also serve as channels for resources that constrain biased decision-making. Third, institutional environments may moderate the effectiveness of board


resources; comparative studies across countries or governance regimes could further clarify the boundary conditions of the proposed mechanism.




Overall, understanding the interaction between psychological bias and institutional structures provides theoretical support for explaining firm behavior, while the intersection of behavioral finance, corporate governance, and strategic decision-making offers a promising direction for future research. These findings highlight the combined influence of behavioral and institutional factors on firm investment and governance, and these domains remain relevant for future study.

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