**CEO Overconfidence and ESG Performance: Evidence from China**

**ABSTRACT**

This study investigates the impact of CEO overconfidence on corporate Environmental, Social, and Governance (ESG) performance using data from Chinese A-share non-financial firms between 2007 and 2022. CEO overconfidence positively influences ESG performance across environmental, social, and governance dimensions. This relationship is stronger in state-owned enterprises (SOEs), where CEOs often act as government directive implementers, compared to family firms with more discretionary CEO decision-making. Additionally, institutional investors amplify the positive effect of CEO overconfidence on ESG outcomes by enhancing managerial accountability and governance. Our findings highlight the dual role of CEO psychological traits and external governance mechanisms in shaping sustainable corporate behavior. These results provide valuable insights for corporate governance practices and policy-making, promoting ESG performance in emerging markets.

**Keywords:**

CEO Overconfidence, ESG Performance, Upper echelon theory, corporate governance, state-owned enterprises, institutional investors.

**1 | INTRODUCTION**

In today’s business world, sustainability is essential, and corporate leaders’ mindsets, particularly CEO overconfidence, significantly impact a company’s ESG performance. This executive trait may explain why some firms succeed in sustainability while others do not, especially within China’s emerging market. Although ESG has become a global focus driving sustainable corporate strategies, China’s listed companies still show insufficient ESG disclosures, especially in governance and environmental areas, limiting the market’s ability to evaluate non-financial risks effectively. The gap in ESG disclosures in China is largely due to the absence of unified reporting standards and limited voluntary disclosure by companies. In response to China’s climate goals—to peak carbon emissions by 2030 and achieve carbon neutrality by 2060—integrating ESG factors into investment and corporate decisions has become essential (Li et al., 2024). This shift is reflected in the rapid growth of ESG-focused public funds and green bond issuances, alongside stronger regulations that enhance ESG disclosure requirements (Chau et al., 2025). Together, these trends demonstrate China’s strong commitment to sustainable economic transformation and high-quality development through improved corporate ESG transparency.

As societal and institutional focus on corporate Environmental, Social, and Governance (ESG) performance grows, academic research has increasingly explored the wide range of factors influencing ESG outcomes. These factors include external influences such as societal norms (Liu et al., 2022; Terzani & Turzo, 2021), banking relationships (Bruno et al., 2024; Xing et al., 2024), government policies (Yan et al., 2023; X. Zhang et al., 2023), investor pressure (J. Liu et al., 2023; Z. Zhang & Zhang, 2024), and media scrutiny (Cai et al., 2024; M.-S. Chen et al., 2024; He et al., 2024). Internal drivers also play a crucial role, including corporate values (W. Tan et al., 2025; Y. Zheng et al., 2022), managerial traits (Menicucci & Paolucci, 2022; Miranda et al., 2023; Paolone et al., 2024), and shareholder preferences (Fiorillo & Santilli, 2024; Jia et al., 2022; Lopez-De-Silanes et al., n.d.). Among internal factors, executive leadership—especially the CEO—is pivotal in shaping and executing corporate strategies. CEO decision-making is often influenced by psychological biases, with overconfidence among the most prominent. While extensive research has examined how CEO overconfidence affects financial decisions such as investment, mergers and acquisitions, and debt financing (Malmendier & Tate, 2004, 2005; Ferris et al., n.d.; Lee et al., n.d.; Tang & Chang, 2024), there remains a significant gap in understanding how these bias influences corporate ESG decision-making.

This research addresses the gap in understanding how CEO overconfidence affects corporate Environmental, Social, and Governance (ESG) performance. While ESG has gained increasing importance, the psychological traits of executives—especially CEO overconfidence—remain underexplored in the sustainability context. This study investigates the relationship between CEO overconfidence and ESG outcomes, contributing to knowledge in corporate governance and sustainable business practices. Analyzing a sample of A-share non-financial companies listed on the Shanghai and Shenzhen stock exchanges from 2007 to 2022, the research explores how executive overconfidence shapes corporate decisions related to environmental responsibility, social initiatives, and governance. It also examines the moderating roles of state-owned enterprises (SOEs) and institutional investors. The empirical results reveal that CEO overconfidence positively and significantly influences ESG performance, with particularly strong effects observed in SOEs and firms with institutional investor involvement. These findings shed light on the economic impact of executive psychology and its role in advancing corporate sustainability strategies.

Our study offers several important contributions to corporate governance and sustainability. First, it extends research on the economic effects of CEO overconfidence by moving beyond traditional financial decisions to examine its influence on ESG performance. Second, it enhances understanding of the factors shaping corporate ESG outcomes by highlighting the role of executive overconfidence—a psychological bias often overlooked in sustainability research. While prior studies mainly focus on the economic benefits of ESG, our work explores the behavioral mechanisms through which overconfident CEOs may impact ESG strategies, providing a fresh perspective on executive decision-making in sustainability. This deeper insight into the behavioral drivers of ESG performance can help companies improve sustainability efforts by fostering more informed leadership. Finally, our findings offer practical implications for executive recruitment and human resource management, suggesting that recognizing the strengths and risks associated with overconfidence can promote healthier, more sustainable corporate development. Additionally, the research informs policymakers seeking to enhance ESG standards and corporate responsibility through targeted regulation and guidance.

The paper is organized as follows: Section 2 presents a comprehensive literature review. Section 3 develops the research hypotheses. Section 4 outlines the research design and methodology. Section 5 reports the empirical results and provides an in-depth analysis. Finally, Section 6 concludes the study and discusses the implications of our findings.

**2 | LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

**2.1 | Economic Consequences of** **CEO Overconfidence**

Overconfidence has its roots in cognitive psychology and is a tendency for people to overestimate their skills and knowledge, especially in situations where they are uncertain. The likelihood of success is overestimated while the likelihood of failure is underestimated as a result of this tendency. Notably, studies have revealed that executives are more likely than the general public to display overconfidence(Dunning et al., 1990). Scholars have examined the effects of executive overconfidence on corporate decision-making from a variety of angles since behavioral finance gained popularity. Regarding investment choices, overconfident executives are more likely to overinvest and exhibit a greater desire to seek expansion, frequently through mergers and acquisitions, when a company has sufficient cash flow(Nguyen & Thuy, n.d.; Pan et al., 2019; Twardawski & Kind, 2023).When it comes to financing, overconfident executives frequently think that the market is undervaluing their company's stock. As a result, they exhibit a preference for shorter-term financing arrangements(R. Tan & Faff, 2015)and favor debt financing over other options(Malmendier et al., 2010).Furthermore, overconfident executives are less likely to pay dividends because they are more likely to keep surplus funds in the company while actively looking for new growth opportunities(Cordeiro, 2009; Deshmukh et al., n.d.; Dinh Nguyen et al., 2021)Nonetheless, some academics contend that overconfident executives are more inclined to take on risks and challenges because they have a positive outlook on the future and a strong belief in their abilities. As a result, they make long-term investments in things like technological innovation(Galasso Timothy Simcoe et al., 2010; Hirshleifer et al., n.d.; B. Zheng et al., 2025)Additionally, according to Park et al. (2020), overconfident executives are more likely to overestimate their company's future profitability, encouraging them to devote resources to meeting their social obligations.

**2.2 | Overview of ESG Performance Literature**

ESG performance has become a core value for firms worldwide (Huarng & Yu, 2024). It reflects a corporation's long-term development potential and sustainability, gaining increasing emphasis from investors and corporations(Gong, 2024). ESG encompasses environmental protection, social responsibility, and governance structure, influencing various factors in the external environment and promoting the sustainable development of social resources(W. Zhao, 2024).

There remains a significant gap in research focused on improving corporate ESG performance, with most studies primarily concentrating on **internal corporate characteristics** and **external environmental factors**. In terms of internal characteristics, prior research has identified several key factors that can positively influence ESG performance. These factors include **company size**, which can provide greater resources for implementing sustainable practices (Drempetic et al., 2020); **debt repayment capacity**, which ensures financial stability and reduces the pressure for short-term profit maximization at the expense of ESG commitments(Empirical Analysis of the Impact of ESG Scores on Access to Debt, n.d.; Y. Zhao et al., 2024); and **profitability**, which allows firms to allocate funds toward long-term sustainability initiatives(D’Amato et al., 2024). Additionally, a well-structured **capital arrangement** is essential for enabling companies to make strategic investments in ESG efforts(Adeneye et al., 2023). These internal attributes are vital for creating a conducive environment for sustainable business practices and enhancing a company's overall ESG performance.

In summary, existing literature has extensively investigated the factors affecting corporate ESG performance. A significant knowledge vacuum still exists regarding the impact of executives' irrational psychology, specifically their psychological characteristics, on ESG outcomes. Fewer studies have examined how executive traits impact non-financial aspects like corporate governance, social initiatives, and environmental responsibility, even though a large body of research has examined the financial implications of these traits. Executives' psychological characteristics have a big impact on both financial and non-financial performance since they are the ones who make the decisions that determine a company's strategic direction. By examining the potential effects of executive overconfidence on ESG performance, this paper aims to close this knowledge gap and provide insightful information about this largely unexplored area of corporate governance and sustainability.

**2.3 | Hypothesis development**

**2.3.1 | CEO Overconfidence and ESG performance**

We propose that CEO overconfidence positively affect the ESG performance of their firms for two reasons. First, According to Upper Echelon Theory, a firm’s strategic choices and outcomes are deeply influenced by the characteristics and cognitive biases of its top executives, particularly the CEO. Overconfident CEOs often hold an inflated belief in their ability to manage risks and uncertainties, which motivates them to pursue bold strategic decisions that emphasize long-term goals over short-term profits. Research by Burkhard et al. (2022) demonstrates that CEO overconfidence encourages strategic risk-taking, potentially enhancing firm performance by unlocking new opportunities, strengthening competitive positioning, and generating long-term value. Within the Environmental, Social, and Governance (ESG) context, overconfident executives may view sustainability initiatives as critical drivers of sustained competitive advantage. This perspective drives investments in environmental protection, social responsibility, and strong governance practices—even when immediate financial returns are uncertain. Scholars like Russo and Schoemaker (1992) and Gervais et al. (2011) contend that overconfident CEOs are more likely to champion innovation and long-term investments, which align closely with corporate sustainability goals. Their optimism and confidence often position them as leaders who actively promote ESG initiatives, perceiving these efforts not just as ethical imperatives but as strategic investments in the firm’s future growth and resilience.

Secondly, overconfident executives are strongly motivated to seek attention and recognition. They strive to build a positive corporate image by enhancing ESG performance, which helps them gain accolades and affirmation from diverse stakeholders. In today’s era of rapid internet technology and pervasive social media, negative news—such as environmental penalties or fraudulent donations—can spread quickly and severely damage a company’s reputation. Conversely, strong ESG performance creates a win–win outcome by generating economic, social, and ecological benefits, thereby fostering a favorable corporate image and earning executives’ external recognition and respect. Overconfident leaders often crave attention and relish opportunities to demonstrate their capabilities, viewing applause as a source of motivation and personal fulfillment(Wallace & Baumeister, 2002). Their drive to improve ESG outcomes satisfies their sense of superiority and aligns with the “better-than-average effect,” where overconfident executives believe their skills exceed those of their peers(Kaplan et al., 2022). This belief further fuels their ambition for self-improvement and self-presentation. Since ESG performance is increasingly seen as a key measure of entrepreneurial success, overconfident CEOs set high standards for themselves in this area to showcase their abilities and attract external praise.

*Building upon the discussion above, this paper proposes the following research hypothesis:*

**Hypothesis 1***: CEOs' overconfidence is positively associated with improved corporate ESG performance.*

**3 | METHODS**

**3.1 | Sample**

To conduct our analysis, we utilized a sample of A-share non-financial companies listed on the Shanghai and Shenzhen stock exchanges from 2007 to 2022. The dataset was compiled from multiple reliable sources: ESG performance data came from Bloomberg, CEO data came from the CSMAR and Wind databases, and other financial data came from the CSMAR and Wind databases. Then, we excluded the firm-year observations (1) with CEOs born outside mainland China, (2) only 1-year observations, and (3) with missing information on variables. After applying these filters, we obtained a sample of 8,389 firm-year observations. Finally, we winsorized continuous variables at 1% and 99% to reduce the influence of outliers on our regression results.

**3.2 | Variables**

**3.2.1 | Dependent variable: ESG performance (ESG)**

Following the approach of Wang et al. (2022) and Minutolo et al. (2019) this study uses the **ESG score from the Bloomberg database** to measure corporate ESG performance. Bloomberg publicly provides comprehensive ESG data, including an overall ESG composite score as well as individual scores for the Environmental (E), Social (S), and Governance (G) dimensions. These scores are based on the quality and extent of ESG disclosure by firms, with scores ranging from 0 to 100—the higher the score, the more comprehensive and transparent the company’s ESG reporting. The choice of Bloomberg’s ESG data is motivated by several factors. First, Bloomberg derives its ESG scores primarily from company CSR and sustainability reports, along with other publicly available sources, which enhances the objectivity and reliability of the data. Second, compared to alternative ESG rating providers, Bloomberg offers broader coverage across industries and markets, making its dataset more representative and convincing for empirical analysis. Additionally, Bloomberg provides transparency in its scoring methodology and detailed score reports, allowing investors and researchers to access and verify the basis of each firm’s ESG rating.

**3.2.2 | Independent variable:** CEO overconfidence (OC*)*

CEO overconfidence will be measured using a composite index based on four key demographic and role-related factors: gender, age, education, and dual roles (i.e., whether the CEO also serves as the board chair) (Hatoum et al., 2022). This approach reflects common proxies used in prior research to capture executive psychological traits linked to overconfidence. Typically, male CEOs, younger executives, those with higher education levels, and CEOs holding dual roles are considered more likely to exhibit overconfidence due to greater risk tolerance, optimism, and control over firm decisions. By combining these variables into a single composite index, this study aims to assess the overall level of CEO overconfidence and examine its impact on corporate ESG performance.

**3.2.3 | Control variables**

**3.2.3 | Control variables**

We include several control variables that may influence corporate ESG performance, consistent with prior research. These controls encompass company size (Size), asset-liability ratio (Lev), operating revenue growth rate (Growth), return on assets (ROA), Tobin’s Q (TobinQ), firm age (FirmAge), and audit fees (AuditFee). Additionally, to control for industry-specific and temporal variations, we incorporate industry-fixed effects (Ind) and year-fixed effects (Year) in our analysis. Detailed definitions of all main variables are provided in Appendix 1.

**3.3 | Model**

We estimate the following panel regression model with firm-clustered standard errors, including year and industry fixed effects:

ESG*it* = β0 + β1 OC*it*+ β2 *it* + β3Year*t* + β4Industry*i* + ε*it*

Where (*i*) and (*t*) denote firm and year, respectively.

**4 | RESULTS**

**4.1 | Descriptive statistics and correlation analysis**

Table 1 presents the descriptive statistics of the main variables in this study. The results show that, on average, firms have an ESG performance rating of 28.03, with a median value of 27.42. This suggests that more than half of the firms in the sample have received an ESG rating of A or higher, indicating generally positive ESG performance across the firms. The ESG ratings range from a minimum of 6.19 to a maximum of 71.18, with a standard deviation of 10.23, revealing substantial variability in ESG performance among the sampled companies.

Regarding the primary explanatory variable, CEO overconfidence (OC), the average value is 0.65, with a median of 0.64. This suggests that overconfident CEOs are slightly more prevalent than their non-overconfident counterparts in the sample, with the overconfidence metric skewed toward higher values. This indicates a moderate prevalence of overconfident CEOs in the firms studied, which may influence their decision-making and, potentially, their approach to corporate sustainability and ESG performance.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **TABLE 1 Descriptive statistics.** | | | | | | | |
| 1. **(2) (3) (4) (5) (6) (7)** | | | | | | | |
| **Mean Std. dev. Min p25 Mdn p75** **max** | | | | | | | |
| ***ESG*** | *28.03* | *10.23* | *6.19* | *20.14* | *27.42* | *33.06* | *71.18* |
| ***OC*** | *0.65* | *0.16* | *0.01* | *0 .60* | *0 .64* | *0 .71* | *1.00* |
| ***Size*** | *22.04* | *1.51* | *10.84* | *21.03* | *21.80* | *22.75* | *31.43* |
| ***Leverage*** | *0.49* | *3.93* | *-0.19* | *0.26* | *0.49* | *0.63* | *87.25* |
| ***ROA*** | *0.03* | *0.41* | *-64.81* | *0.01* | *0.03* | *0.08* | *64.75* |
| ***Growth*** | *3.14* | *2.88* | *-2.68* | *-0.03* | *0.10* | *0.27* | *28.62* |
| ***TobinQ*** | *0.53* | *0.49* | *-0.49* | *1.20* | *1.53* | *2.16* | *9.60* |
| ***FirmAge*** | *2.79* | *0.45* | *0.00* | *2.56* | *2.89* | *3.13* | *1.00* |
| ***AuditFee*** | *13.72* | *0.81* | *10.30* | *13.21* | *13.61* | *14.11* | *21.41* |

Shanghai and Shenzhen A-share-listed firms from 2007 to 2022, covered by the China Stock Market and Accounting Research Database (CSMAR). We exclude firm-year observations with an overseas CEO and observations with a missing value. We show the cross-sectional statistics (mean, standard deviation, min, Q1, median, Q3, and max) of the variables. The descriptions of all variables are shown in the Appendix.

Table 2 displays the Pearson correlations among the variables in our model. CEO overconfidence (OC) correlates significantly positively with ESG (0.065), which provides preliminary support for Hypothesis 1. In addition, the average and maximum variance inflation factors (VIF) are 1.01 and 1.88, respectively, suggesting that multicollinearity is not a serious concern in our study.

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| **TABLE 2 Pearson's correlation coefficients.** | | | | | | | | | | |
| Variables | VIF | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| (1) *ESG* |  | 1.000 |  |  |  |  |  |  |  |  |
| (2) *OC* | 1.01 | 0.065 | 1.000 |  |  |  |  |  |  |  |
| (3) *Size* | 3.70 | 0.067 | -0.005 | 1.000 |  |  |  |  |  |  |
| (4) *Leverage* | 1.97 | -0.063 | 0.047 | -0.470 | 1.000 |  |  |  |  |  |
| (5) *ROA* | 1.43 | 0.329 | 0.005 | 0.481 | -0.165 | 1.000 |  |  |  |  |
| (6) Growth | 1.00 | 0.192 | -0.050 | 0.111 | -0.069 | 0.372 | 1.000 |  |  |  |
| (7) TobinQ | 1.27 | 0.256 | 0.043 | 0.102 | -0.028 | 0.487 | 0.230 | 1.000 |  |  |
| *(8) FirmAge* | 1.10 | 0.037 | -0.042 | 0.281 | -0.244 | 0.154 | 0.162 | -0.042 | 1.000 |  |
| (9) *Audit fees* | 2.78 | 0.019 | -0.021 | -0.060 | 0.009 | -0.025 | 0.023 | -0.028 | -0.009 | 1.000 |

1.79

Note: Pearson's correlation coefficients are shown in the table. The mean value of variance inflation factors (VIF) is 1.79 and the maximum VIF is 1.88. A detailed description of the variables is provided in Appendix I. \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10% respectively.

**4.2 | Main findings**

Our baseline model in the full sample examines the relationship between CEO overconfidence and ESG performance. Table 3 presents the main results of the study. Column 1 is a baseline model that includes the main variables without control variables. Our results indicate that the coefficient of CEO overconfidence is significantly positive at (β = 2.69, p < 1%) without control variables. Column (2) shows that the coefficient on CEO overconfidence is significantly positive at (β = 3.51, p < 1%) after controlling for the control variables. This result supports Hypothesis 1, suggesting that a CEO's overconfidence positively influences ESG performance.

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| **Table 3: The relationship between CEO Overconfidence and ESG Performance** | | | | |
|  |  | OLS | | |
|  |  | *(1)* |  | *(2)* |
|  |  | *ESG* | *ESG* |
| *OC* |  | *2.69\*\*\** |  | *3.51\*\*\** |
|  |  | *(3.48)* |  | *(5.71)* |
| *Size* |  |  |  | *2.03\*\*\** |
|  |  |  |  | *(20.41)* |
| *Leverage* |  |  |  | *-9.05\*\*\** |
|  |  |  |  | *(-16.38)* |
| *ROA* |  |  |  | *-2.19\** |
|  |  |  |  | *(-1.66)* |
| *Growth* |  |  |  | *-0.01* |
|  |  |  |  | *(-2.35)* |
| *TobinQ* |  |  |  | *0 .60\*\*\** |
|  |  |  |  | *(10.84)* |
| *FirmAge* |  |  |  | *7.86\*\*\** |
|  |  |  |  | *(34.86)* |
| *AuditFee* |  |  |  | *3.02\*\*\** |
|  |  |  |  | *(19.68)* |
| *Industry effect* |  | *Yes* |  | *Yes* |
| *Year effect* |  | *Yes* |  | *Yes* |
| *Observations* |  | *8,389* |  | *8,389* |
| *R2* |  | *0.22* |  | *0.42* |
| *Adjusted R2* |  | *0.22* |  | *0.42* |

Note: Note: \*\*\* and \*\* represent significance at the 1% and 5% levels, respectively, with t-values in parentheses based on robust standard error adjustments.

**4.3 | Endogeneity issues**

**4.3.1** **Instrumental Variable Approach**

We adopted the two-stage least squares method (2SLS) to avoid simultaneous causality. We use the instrument variable, the average overconfidence level of CEO in other firms within the same region and year (Mean\_pro), as an instrumental variable for the explanatory variable OC. The results from the first stage of the two-stage least squares (2SLS) analysis reveal a positive relationship between CEO Overconfidence and the instrumental variable (Mean\_pro). In the second stage of the 2SLS, as shown in column 2 of Table 4, the coefficient of CEO Overconfidence remains positive (β = 19.94) and statistically significant at the 1% level. This finding robustly supports our hypothesis, confirming the positive association between CEO overconfidence and ESG performance.

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| **TABLE 4: Endogeneity issues** | | | | | |  |
|  | 2SLS **Fixed Effect** | | | | | |
|  | (1) |  | (2) | (3) | |
|  | OC |  | ESG | ESG | |
| *Mean\_pro* |  | 0.14 \*\*\* |  |  |  | |
|  |  | (6.67) |  |  |  | |
| *OC* |  |  |  | 19.94 \*\*\* | 4.22\*\*\* | |
|  |  |  | (4.62) | (6.87) | |
| Controls |  | Yes |  | Yes | Yes | |
| Industry effect |  | Yes |  | Yes | Yes | |
| Year effect |  | Yes |  | Yes | Yes | |
| Observations |  | 8,389 |  | 8,389 | 8,389 | |
| R2 |  | 0.085 |  | 0.30 | 0.40 | |
| Adjusted R2 |  | 0.085 |  | 0.30 | 0.41 | |

Note: This table presents the results of addressing Endogeneity issues. Reports the results of two‐stage least squares method (2SLS). A detailed description of the variables is provided in Appendix I. Robust standard errors clustered by firms are reported in parentheses. \*\*\*, \*\* and \* denote significance at 1%, 5%, and 10% respectively.

**4.3.2** **Fixed-Effects Model**

Furthermore, to mitigate potential endogeneity bias due to omitted variables at the firm level, we employ a firm fixed-effects model and control for clustering at the firm level. The results in Table 4, Column (3), consistently show that the regression coefficient of OC remains significantly positive, reaffirming our main conclusions.

**4.5 | Additional analyses**

**4.5.1 | Role of** **state-owned enterprises (SOEs)**

In China, the power of CEOs is different in family firms and SOEs. In state-owned enterprises (SOEs), CEOs often act as implementers of government directives. In contrast, CEOs of family firms in China are usually family members, which gives them more flexibility to make decisions based on their personal preferences (Solarino & Boyd, 2020). Given the varying discretion of CEOs across different types of firms, we conducted an additional analysis to explore how the nature of firms (state-owned enterprises vs. family businesses) influences the relationship between CEO overconfidence and ESG performance. Table 5. Columns (1) and (2) indicate that the coefficient for CEO overconfidence is 0.176 (t = 4.412, significant at the 1% level), indicating a strong positive relationship with ESG performance. In contrast, the coefficient for non-SOEs is 0.045 (t = 0.892), which is not statistically significant. This result indicates that CEO overconfidence has a strong and statistically significant positive impact on ESG performance in state-owned enterprises (SOEs). At the same time, this effect is weaker and not statistically significant in non-SOEs, such as family firms.

**4.5.2 | Role of** **institutional ownership**

In China, institutional investors play a crucial role in promoting good corporate governance and the efficient allocation of capital (Cheng, n.d.). Existing research has demonstrated that institutional investors possess the means and incentives to prevent CEOs from acting irrationally or inefficiently. Aguilera (2005) asserts that institutional investors significantly mitigate potential conflicts of interest between managers and stockholders. Huyghebaert & Wang (2012) offer proof of institutional investors' external governance function. Institutional investors, including insurance companies, pension funds, and mutual funds, play a vital role in increasing ESG performance by shaping corporate governance and managerial oversight (Eliwa & Elmaghrabi, n.d.). Table 5, Columns (3) and (4), which focus on institutional investors, indicate that firms with high institutional investors exhibit a significant positive relationship between CEO overconfidence and ESG performance, with a coefficient of 0.134 (t = 2.938, significant at the 1% level). However, in firms with low institutional ownership, the coefficient is 0.047 (t = 0.974), which is insignificant. This highlights the role of institutional investors in promoting accountability and ensuring substantive ESG performance, amplifying the influence of CEO overconfidence.

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| --- | --- | --- | --- | --- |
| **TABLE 5: Additional analyses.**  **TABLE9: Additional analyses.**  **TABLE9: Additional analyses.**  **TABLE9: Additional analyses.**  **TABLE9: Additional analyses.** | | | | |
|  | (1) | (2) | (3) | (4) |
| Non-SOEs | SOEs | High-INS | low-INS |
| *CEO\_ Famine* | 0.045 | 0.176\*\*\* | 0.134\*\*\* | 0.047 |
|  | (0.892) | (4.412) | (2.938) | (0.974) |
| Controls | Yes | Yes | Yes | Yes |
| Industry effect | Yes | Yes | Yes | Yes |
| Year effect | Yes | Yes | Yes | Yes |
| Observations | 4,887 | 3,474 | 4,181 | 4,180 |
| R2 | 0.171 | 0.266 | 0.248 | 0.185 |
| Adjusted R2 | 0.171 | 0.266 | 0.248 | 0.185 |

Note: \* \* \*, \* \*, and \* indicate significant correlation at 1%, 5%, and 10% levels, respectively, with t values in parentheses.

**5 | DISCUSSION AND CONCLUSION**

This study investigates the relationship between CEO overconfidence and corporate ESG performance in Chinese A-share non-financial firms. The findings contribute to the growing body of literature on behavioral corporate governance and sustainability by highlighting those executive psychological traits, specifically overconfidence, can positively shape ESG outcomes. Our empirical analysis reveals that CEO overconfidence significantly improves ESG performance across environmental, social, and governance dimensions. Furthermore, the effect is more pronounced in state-owned enterprises (SOEs) and firms with high institutional investor ownership, suggesting that external governance mechanisms can amplify or condition the impact of executive traits on sustainability outcomes. These results reinforce the relevance of Upper Echelon Theory, demonstrating that executives’ cognitive biases are central to financial outcomes and crucial in driving non-financial performance metrics like ESG.

**5.1 | Managerial implications**

Our findings offer several practical implications for corporate leadership and governance. First, companies should recognize that overconfidence, while often viewed as a cognitive bias, can also be a strategic asset in driving long-term sustainability initiatives. Overconfident CEOs may be more willing to invest in ESG projects that yield delayed returns but offer long-term competitive advantages. Second, boards and human resource managers can use this insight to inform executive recruitment and development strategies, acknowledging the motivational potential of overconfidence while ensuring it is balanced with appropriate oversight. Third, institutional investors and regulators can play a proactive role in enhancing the positive effects of CEO overconfidence by fostering transparency and accountability mechanisms that align executive incentives with broader ESG goals. Lastly, in state-owned enterprises where CEOs often operate under government mandates, overconfidence may be a motivational trait that aligns public policy goals with corporate action, thereby contributing to national sustainability objectives.

**5.2 | Limitations and future research**

While this study provides valuable insights, it has several limitations that future research can address. First, the proxy used for CEO overconfidence, based on demographic and role-related characteristics, may not fully capture the psychological depth of this trait. Future studies could incorporate psychological assessments or behavioral data for more precise measurement. Second, our sample focuses exclusively on Chinese A-share non-financial firms, limiting the generalizability of the findings to other contexts or sectors. Comparative studies across countries or industries could provide a broader understanding of how cultural and institutional differences shape the overconfidence-ESG relationship. Third, while we explore the moderating effects of SOE status and institutional ownership, other governance variables—such as board composition or ownership concentration—might also influence this dynamic and warrant further exploration. Lastly, longitudinal case studies or qualitative approaches could offer deeper insights into the mechanisms through which overconfident CEOs implement and sustain ESG strategies over time.

**HIGHLIGHTS:**

* The study investigates the impact of CEO overconfidence on corporate ESG performance using data from Chinese A-share listed companies from 2007 to 2022.
* CEO overconfidence improves ESG performance through three key dimensions: environmental responsibility (E), social responsibility (S), and corporate governance (G).
* Policy and managerial implications include recognizing the dual nature of CEO overconfidence and encouraging firms to balance confidence with governance to optimize ESG outcomes.
* CEO overconfidence positively influences ESG performance.

**References**

Aabo, T., Hvistendahl, N. T., Kring, J., Als, S., Andersen, N. V., Flickinger, M., Hansen, B., Ilvig, C., Jensen, K., Kristensen, A. L., Kristiansen, J. G., Kristoffersen, J. B., Købke, H. H., Laerke, L., Petersen, R., Petersen, S., Schrøder, M. E., Simonsen, S. L., & Thomsen, L. (n.d.). *Corporate risk: CEO overconfidence and incentive compensation Acknowledgements We thank Mikkel*. https://ssrn.com/abstract=3733106

Adeneye, Y. B., Kammoun, I., & Ab Wahab, S. N. A. (2023). Capital structure and speed of adjustment: the impact of environmental, social and governance (ESG) performance. *Sustainability Accounting, Management and Policy Journal*, *14*(5), 945–977. https://doi.org/10.1108/SAMPJ-01-2022-0060

Aguilera, R. V. (2005). Corporate governance and director accountability: An institutional comparative perspective. *British Journal of Management*, *16*(SPEC. ISS.). https://doi.org/10.1111/j.1467-8551.2005.00446.x

Aktas, N., Louca, C., & Petmezas, D. (n.d.). *CEO Overconfidence and the Value of Corporate Cash Holdings*.

Blau, B. M., Delisle, R. J., Mckay Price, S., Thank, W., Gurun, U., Jiang, G., Kartik, N., Li, X., Liang, B., Nofsinger, J., Peterson, D., Rees, L., Sanders, D., Van Buskirk, A., Wilhelm, B., & Xu, L. (n.d.). *Do Sophisticated Investors Interpret Earnings Conference Call Tone Differently than Investors at Large? Evidence from Short Sales*. http://ssrn.com/abstract=2148705Electroniccopyavailableat:https://ssrn.com/abstract=2148705Electroniccopyavailableat:http://ssrn.com/abstract=2148705

Bruno, E., Iacoviello, G., & Giannetti, C. (2024). Bank credit loss and ESG performance. *Finance Research Letters*, *59*. https://doi.org/10.1016/j.frl.2023.104719

Burkhard, B., Sirén, C., van Essen, M., Grichnik, D., & Shepherd, D. A. (2023). Nothing Ventured, Nothing Gained: A Meta-Analysis of CEO Overconfidence, Strategic Risk Taking, and Performance. *Journal of Management*, *49*(8), 2629–2666. https://doi.org/10.1177/01492063221110203

Cai, C., Hazaea, S. A., Alsayegh, M. F., Sahu, M., Raid, M., & Al-Ahdal, W. M. (2024). Media coverage as a moderator in the nexus between audit quality and ESG performance: Evidence from China. *PLoS ONE*, *19*(10). https://doi.org/10.1371/journal.pone.0312510

Chau, L., Anh, L., & Duc, V. (2025). Valuing ESG: How financial markets respond to corporate sustainability. *International Business Review*. https://doi.org/10.1016/j.ibusrev.2025.102418

Chen, G. (2014). *Making the Same Mistake All Over Again: CEO Overconfidence and Corporate Resistance to Corrective Feedback*.

Chen, M.-S., Chou, J.-H., & Chen, Y.-J. (2024). IRABF Media Attention, ESG Performance and Firm Value: Evidence from Taiwan. In *International Review of Accounting, Banking and Finance* (Vol. 16, Issue 4).

Cheng, P. (n.d.). *INSTITUTIONAL INVESTORS IN CHINA: PROBLEMS AND PROSPECTS*.

Cordeiro, L. (2009). *Managerial Overconfidence and Dividend Policy \**.

D’Amato, V., D’Ecclesia, R., & Levantesi, S. (2024). Firms’ profitability and ESG score: A machine learning approach. *Applied Stochastic Models in Business and Industry*, *40*(2), 243–261. https://doi.org/10.1002/asmb.2758

Deshmukh, S. ;, Goel, A. M. ;, & Howe, K. M. (n.d.). *CEO overconfidence and dividend policy*. https://hdl.handle.net/10419/70594

Dinh Nguyen, D., To, T. H., Nguyen, D. Van, & Phuong Do, H. (2021). Managerial overconfidence and dividend policy in Vietnamese enterprises. *Cogent Economics and Finance*, *9*(1). https://doi.org/10.1080/23322039.2021.1885195

Drempetic, S., Klein, C., & Zwergel, B. (2020). The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review. *Journal of Business Ethics*, *167*(2), 333–360. https://doi.org/10.1007/s10551-019-04164-1

Dunning, D., Griffin, D. W., Milojkovic, J. D., & Ross, L. (1990). *The Overconfidence Effect in Social Prediction* (Vol. 58, Issue 4).

Eliwa, Y., Aboud, A., & Saleh, A. (2023). Board gender diversity and ESG decoupling: Does religiosity matter? *Business Strategy and the Environment*, *32*(7), 4046–4067. https://doi.org/10.1002/bse.3353

Eliwa, Y., & Elmaghrabi, M. E. (n.d.). *Investment Horizons and ESG Decoupling: Distinct Roles of Long-Term and Short-Term Institutional Investors*. https://ssrn.com/abstract=5096018

*Empirical analysis of the impact of ESG scores on access to debt*. (n.d.).

Feng, X., & Johansson, A. C. (2018). Living through the Great Chinese Famine: Early-life experiences and managerial decisions. *Journal of Corporate Finance*, *48*, 638–657. https://doi.org/10.1016/j.jcorpfin.2017.11.012

Ferris, S. P., Jayaraman, N., & Sabherwal, S. (n.d.). *CEO Overconfidence and International Merger and Acquisition Activity CEO Overconfidence and International Merger and Acquisition Activity CEO Overconfidence and International Merger and Acquisition Activity*. http://ssrn.com/abstract=1982286https://ssrn.com/abstract=1982286Electroniccopyavailableat:http://ssrn.com/abstract=1982286https://ssrn.com/abstract=1982286

Fiorillo, P., & Santilli, G. (2024). The influence of shareholder ESG performance on corporate sustainability: Exploring the role of ownership structure. *Finance Research Letters*, *67*. https://doi.org/10.1016/j.frl.2024.105800

Galasso Timothy Simcoe, A. S., Cockburn, I., Goldfarb, A., Ho, T., Hossain, T., Kramer, L., Schankerman, M., Shi, X., Xiao, M., Galasso, A., Simcoe, T. S., & Timothy Simcoe, R. S. (2010). *NBER WORKING PAPER SERIES CEO OVERCONFIDENCE AND INNOVATION*. http://www.nber.org/papers/w16041

Gervais, S., Heaton, J. B., Odean, T., Allen, F., Berk, J., Carlin, B., Denis, D., Goldstein, R., Ross, D., Sagi, J., & Subrahmanyam, M. (2011). Overconfidence, Compensation Contracts, and Capital Budgeting. In *THE JOURNAL OF FINANCE •: Vol. LXVI* (Issue 5).

Golden, J., & Kohlbeck, M. (2024). Financial reporting consequences of CEOs’ early-life exposure to disasters and violent crime. *Advances in Accounting*, *66*. https://doi.org/10.1016/j.adiac.2023.100698

Gong, X. (2024). Environmental, Social and Governance (ESG) Development Status and Outlook. *Finance &amp; Economics*, *1*(7). https://doi.org/10.61173/wsc71495

Hatoum, K., Moussu, C., & Gillet, R. (2022). CEO overconfidence: Towards a new measure. *International Review of Financial Analysis*, *84*. https://doi.org/10.1016/j.irfa.2022.102367

He, F., Guo, X., & Yue, P. (2024). Media coverage and corporate ESG performance: Evidence from China. *International Review of Financial Analysis*, *91*. https://doi.org/10.1016/j.irfa.2023.103003

Hirshleifer, D. A., Low, A., Hong Teoh, S., Bloomfield, R., Choi, S., Chiu, P.-C., Coleman, M., Dikolli, S., Faurel, L., Huang, X., Kang, F., Koh, K., Lao, B., Mergenthaler, R., Nekrasov, A., Pincus, M., & Shanthikumar, D. (n.d.). *Are Overconfident CEOs Better Innovators?* http://ssrn.com/abstract=1598021Electroniccopyavailableat:https://ssrn.com/abstract=1598021Electroniccopyavailableat:https://ssrn.com/abstract=1598021Electroniccopyavailableat:http://ssrn.com/abstract=1598021

Hsieh, T. S., Bedard, J. C., & Johnstone, K. M. (2014). CEO Overconfidence and Earnings Management During Shifting Regulatory Regimes. *Journal of Business Finance and Accounting*, *41*(9–10), 1243–1268. https://doi.org/10.1111/jbfa.12089

Huarng, K.-H., & Yu, T. H.-K. (2024). Causal complexity analysis of ESG performance. *Journal of Business Research*, *170*, 114327. https://doi.org/10.1016/j.jbusres.2023.114327

Huyghebaert, N., & Wang, L. (2012). Expropriation of Minority Investors in Chinese Listed Firms: The Role of Internal and External Corporate Governance Mechanisms. *Corporate Governance: An International Review*, *20*(3), 308–332. https://doi.org/10.1111/j.1467-8683.2012.00909.x

Jebran, K., Yang, Z., Chen, S., & Ali, S. T. (2023). Does the famine experience of board chair hamper innovation? *Journal of International Financial Management and Accounting*, *34*(3), 445–495. https://doi.org/10.1111/jifm.12168

Jia, F., Li, Y., Cao, L., Hu, L., & Xu, B. (2022). Institutional Shareholders and Firm ESG Performance: Evidence from China. *Sustainability (Switzerland)*, *14*(22). https://doi.org/10.3390/su142214674

Kaplan, S. N., Sørensen, M., & Zakolyukina, A. A. (2022). What is CEO overconfidence? Evidence from executive assessments. *Journal of Financial Economics*, *145*(2), 409–425. https://doi.org/10.1016/j.jfineco.2021.09.023

Kim, Y. Il, & Lee, J. (2014). The long-run impact of a traumatic experience on risk aversion. *Journal of Economic Behavior and Organization*, *108*, 174–186. https://doi.org/10.1016/j.jebo.2014.09.009

Kim, J.-B., Wang, Z., Zhang, L., Han, J., Li, Y., Martin, X., Penman, S., Ronen, J., Thakor, A., Weintrop, J., Yang, H., & Yu, Y. (n.d.). *CEO Overconfidence and Stock Price Crash Risk*. http://ssrn.com/abstract=2331189Electroniccopyavailableat:https://ssrn.com/abstract=2331189Electroniccopyavailableat:http://ssrn.com/abstract=2331189

Lee, J. M., Hwang, B.-H., & Chen, H. (n.d.). *ARE FOUNDER CEOs MORE OVERCONFIDENT THAN PROFESSIONAL CEOs? EVIDENCE FROM S&P 1500 COMPANIES*. https://ssrn.com/abstract=2510549

Li, S., Ao, X., Zhang, M., & Pu, M. (2024). ESG performance and carbon emission intensity: examining the role of climate policy uncertainty and the digital economy in China’s dual-carbon era. *Frontiers in Environmental Science*, *12*. https://doi.org/10.3389/fenvs.2024.1526681

Liu, J., Xiong, X., Gao, Y., & Zhang, J. (2023). The impact of institutional investors on ESG: Evidence from China. *Accounting and Finance*, *63*(S2), 2801–2826. https://doi.org/10.1111/acfi.13011

Liu, P., Zhu, B., Yang, M., & Chu, X. (2022). ESG and financial performance: A qualitative comparative analysis in China’s new energy companies. *Journal of Cleaner Production*, *379*. https://doi.org/10.1016/j.jclepro.2022.134721

Lopez-De-Silanes, F., Mccahery, J. A., & Pudschedl, P. C. (n.d.). *ECGI Working Paper Series in Law*. https://ssrn.com/abstract=4049313

Malmendier, U., & Tate, G. (2004). *NBER WORKING PAPER SERIES WHO MAKES ACQUISITIONS? CEO OVERCONFIDENCE AND THE MARKET’S REACTION*. http://www.nber.org/papers/w10813

Malmendier, U., & Tate, G. (2005). CEO overconfidence and corporate investment. *Journal of Finance*, *60*(6), 2661–2700. https://doi.org/10.1111/j.1540-6261.2005.00813.x

Malmendier, U., Tate, G., Yan, J., Baker, M., Fahlenbrach, R., Faulkender, M., Frank, M., Hackbarth, D., Jenter, D., Stein, J., Strebulaev, I., Subrahmanyam, A., & Wurgler, J. (2010). *NBER WORKING PAPER SERIES OVERCONFIDENCE AND EARLY-LIFE EXPERIENCES: THE IMPACT OF MANAGERIAL TRAITS ON CORPORATE FINANCIAL POLICIES*. http://www.nber.org/papers/w15659

Marquis, C., & Tilcsik, A. (2013). Imprinting: Toward a Multilevel Theory. *The Academy of Management Annals*, *7*(1), 195–245. https://doi.org/10.1080/19416520.2013.766076

Menicucci, E., & Paolucci, G. (2022). Board Diversity and ESG Performance: Evidence from the Italian Banking Sector. *Sustainability (Switzerland)*, *14*(20). https://doi.org/10.3390/su142013447

Minutolo, M. C., Kristjanpoller, W. D., & Stakeley, J. (2019). Exploring environmental, social, and governance disclosure effects on the S&P 500 financial performance. *Business Strategy and the Environment*, *28*(6), 1083–1095. https://doi.org/10.1002/bse.2303

Miranda, B., Delgado, C., & Branco, M. C. (2023). Board Characteristics, Social Trust and ESG Performance in the European Banking Sector. *Journal of Risk and Financial Management*, *16*(4). https://doi.org/10.3390/jrfm16040244

Nguyen, T. T., & Thuy, T. (n.d.). *CEO Overconfidence Effects on Mergers and Acquisitions Finance Master’s thesis Title of thesis CEO Overconfidence Effects on Mergers and Acquisitions*. www.aalto.fi

Pan, A., Liu, W., & Wang, X. (2019). Managerial overconfidence, debt capacity and merger & acquisition premium. *Nankai Business Review International*, *10*(4), 570–590. https://doi.org/10.1108/NBRI-04-2019-0016

Paolone, F., Pozzoli, M., Chhabra, M., & Di Vaio, A. (2024). Cultural and gender diversity for ESG performance towards knowledge sharing: empirical evidence from European banks. *Journal of Knowledge Management*, *28*(11), 106–131. https://doi.org/10.1108/JKM-05-2023-0445

Park, K. H., Byun, J., & Choi, P. M. S. (2020). Managerial overconfidence, corporate social responsibility activities, and financial constraints. *Sustainability (Switzerland)*, *12*(1), 1–14. https://doi.org/10.3390/SU12010061

Russo, J. E., & Schoemaker, P. (2017). *Managing Overconfidence*. https://www.researchgate.net/publication/306940378

Slothouber, E. I. S. (2010). *The influence of CEO overconfidence on firm value*.

Solarino, A. M., & Boyd, B. K. (2020). Are all forms of ownership prone to tunneling? A meta-analysis. *Corporate Governance: An International Review*, *28*(6), 488–501. https://doi.org/10.1111/corg.12344

Sun, Y., & Zhao, Z. (2024). Responsible investment: Institutional shareholders and ESG performance. *Pacific Basin Finance Journal*, *85*. https://doi.org/10.1016/j.pacfin.2024.102357

Tan, R., & Faff, K. J. K. (2015). *CEO overconfidence and corporate debt maturity*.

Tan, W., Liu, Y., Dong, Q., & Chen, X. H. (2025). From values to value: exploring the dual impact of national spirit on corporate ESG performance. *Journal of Accounting Literature*. https://doi.org/10.1108/JAL-08-2024-0222

Tang, H. W., & Chang, C. C. (2024). CEO overconfidence, risk-taking, and firm value: Influence of incentive compensation and financial constraints. *North American Journal of Economics and Finance*, *69*. https://doi.org/10.1016/j.najef.2023.102034

Terzani, S., & Turzo, T. (2021). Religious social norms and corporate sustainability: The effect of religiosity on environmental, social, and governance disclosure. *Corporate Social Responsibility and Environmental Management*, *28*(1), 485–496. https://doi.org/10.1002/csr.2063

Twardawski, T., & Kind, A. (2023). Board overconfidence in mergers and acquisitions. *Journal of Business Research*, *165*. https://doi.org/10.1016/j.jbusres.2023.114026

Wallace, H. M., & Baumeister, R. F. (2002). The performance of narcissists rises and falls with perceived opportunity for glory. *Journal of Personality and Social Psychology*, *82*(5), 819–834. https://doi.org/10.1037/0022-3514.82.5.819

Wang, W., Yu, Y., & Li, X. (2022). ESG performance, auditing quality, and investment efficiency: Empirical evidence from China. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.948674

Xing, T., Li, X., & Feng, N. (2024). Is bank competition conducive to corporate ESG performance? *International Review of Financial Analysis*, *95*. https://doi.org/10.1016/j.irfa.2024.103509

Xu, S., & Ma, P. (2022). CEOs’ Poverty Experience and Corporate Social Responsibility: Are CEOs Who Have Experienced Poverty More Generous? *Journal of Business Ethics*, *180*(2), 747–776. https://doi.org/10.1007/s10551-021-04899-w

Yan, Y., Cheng, Q., Huang, M., Lin, Q., & Lin, W. (2023). Government Environmental Regulation and Corporate ESG Performance: Evidence from Natural Resource Accountability Audits in China. *International Journal of Environmental Research and Public Health*, *20*(1). https://doi.org/10.3390/ijerph20010447

Yang, L., Ye, M., Wang, H., & Lu, W. (2024). Female power, ownership and ESG decoupling: evidence from China. *International Journal of Gender and Entrepreneurship*, *16*(3), 341–366. https://doi.org/10.1108/IJGE-12-2023-0303

Yu, C. F. J. (2014). CEO Overconfidence and overinvestment under product market competition. *Managerial and Decision Economics*, *35*(8), 574–579. https://doi.org/10.1002/mde.2662

Yu, C.-F. (Jeffrey). (2014). CEO Overconfidence, CEO Compensation, and Earnings Manipulation. *Journal of Management Accounting Research*, *26*(2), 167–193. https://doi.org/10.2308/jmar-50722

Zhang, L. (2017). *CEOs’ Early-life Experiences and Corporate Policy: Evidence from China’s Great Famine Pacific-Basin Finance Journal, forthcoming CEOs’ Early-life Experiences and Corporate Policy: Evidence from China’s Great Famine*.

Zhang, X., Zhang, J., & Feng, Y. (2023). Can companies get more government subsidies through improving their ESG performance? Empirical evidence from China. *PLoS ONE*, *18*(10 October). https://doi.org/10.1371/journal.pone.0292355

Zhang, Y. (2022). Analyst coverage and corporate social responsibility decoupling: Evidence from China. *Corporate Social Responsibility and Environmental Management*, *29*(3), 620–634. https://doi.org/10.1002/csr.2224

Zhang, Z., & Zhang, L. (2024). Investor attention and corporate ESG performance. *Finance Research Letters*, *60*. https://doi.org/10.1016/j.frl.2023.104887

Zhao, W. (2024). Research Trend in the Development of Environmental, Social, and Governance (ESG). *Advances in Economics, Management and Political Sciences*, *122*(1), 183–194. https://doi.org/10.54254/2754-1169/2024.17815

Zhao, Y., Gao, Y., & Hong, D. (2024). Sustainable Innovation and Economic Resilience: Deciphering ESG Ratings’ Role in Lowering Debt Financing Costs. *Journal of the Knowledge Economy*. https://doi.org/10.1007/s13132-024-02129-y

Zheng, B., Lin, Y. Y., Fong, V. H. I., & Huo, X. (2025). Exploring the influence of CEO overconfidence on innovation in artificial intelligence technology: a machine learning approach. *European Journal of Innovation Management*. https://doi.org/10.1108/EJIM-11-2023-0987

Zheng, Y., Wang, B., Sun, X., & Li, X. (2022). ESG performance and corporate value: Analysis from the stakeholders’ perspective. *Frontiers in Environmental Science*, *10*. https://doi.org/10.3389/fenvs.2022.1084632

**Appendix 1: Variable Definitions and Data Sources**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Definition** | **Source** |
| ***Dependent variables ESG performance*** | | |
| *ESG* | ESG\_performance scores from Bloomberg database | Bloomberg database |
| ***Independent variables CEO overconfidence*** | |  |
| OC | a composite index based on four key demographic and role-related factors: gender, age, education, and dual roles | CSMAR and Wind databases |
| IV: (Mean\_pro) | Average overconfidence level of CEO in other firms within the same region and year | CSMAR and Wind databases |
| ***Moderate variables*** | | |
| *INST*. | Institutional investor shareholding ratio INST Total number of institutional investors’ shareholdings / total number of shares | CSMAR Database |
| *State Ownership* | Is it a state-owned enterprise? 1 if yes, 0 if no | Wind Database |
| ***Control variables*** |  |  |
| *Size* | Firm Size, measured as natural logarithm of total assets. | Wind Database |
| *Leverage* | The percentage of total liabilities to total shareholder equity. | Wind Database |
| *Growth* | Operating revenue growth rate, measured as the year-over-year percentage change in operating revenue. | CSMAR and Wind databases |
| *FirmAge* | Natural logarithm of the number of years since the firm’s establishment. | Wind Database |
| *ROA* | Net Profit / Average Balance of Total Assets | Wind Database |
| *Audit fees* | Audit fee takes the natural logarithm | Wind Database |
| TobinQ | Proxy for firm market value, calculated as (market value of equity + book value of debt) / total assets. | CSMAR |
| *Industry* | Indicator variables for industry effect. | Wind Database |
| *Year* | Indicator variables for year effect. | Wind Database |