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UNRAVELLING THE INTERPLAY BETWEEN ESG-LINKED EXECUTIVE COMPENSATION, BOARD CLIMATE OVERSIGHT, AND CARBON DISCLOSURE

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ABSTRACT

This study explores whether ESG-linked executive compensation influences carbon reporting by China's A-share listed firms and whether this influence is mediated by board-level climate governance. Based on stakeholder theory, agency theory, and upper echelons theory, the study suggests that ESG-linked executive compensation positively affects carbon disclosure quality and that board-level climate governance mediates this relationship, reinforcing the effect of ESG-linked incentives on disclosure practices. The study of firm-level panel data spanning 2021 to 2023 indicates that companies with ESG-linked executive compensation tend to have credible and transparent carbon disclosures. Furthermore, ESG-linked executive compensation pushes companies to establish board climate oversight, and board climate oversight helps the quality of disclosure outcomes. The findings show that board climate oversight functions as a mediator that connects ESG-linked executive compensation with carbon disclosure practices. The mediation results show that ESG-linked executive compensation affects carbon reporting through two separate channels. Board climate oversight is seen as the governing mechanism that connects the two channels. The results of this research suggest that investors, regulators and boards can consider readjusting their climate practices in response to new regulatory requirements.

Keywords: ESG-linked executive compensation, board climate oversight, carbon disclosure, China.

INTRODUCTION

Climate change increasingly shapes environmental systems, policymaking, market dynamics, and corporate accountability. Global warming has placed corporate accountability at the forefront, reflected in significant developments such as the emergence of board climate oversight (BCO) committee, the integration of sustainability metrics into executive compensation, and enhanced carbon disclosure (CD) practices. In terms of policymaking, governments and standard-setting organizations have intensified pressure on firms to disclose climate impacts and responses, especially after the Paris Agreement (UNFCCC, 2015; WHO, 2023). In China, environmental regulations issued by the Ministry of Ecology and Environment (MEE) via Measures for the Administration of Legal Disclosure of Enterprise Environmental Information became effective on 8 February 2022, Designated enterprises that engage in environment related industries, such as key pollutant discharging entities, enterprises subject to mandatory cleaner production audit, and listed companies or bond issuers that are subject to administrative penalties, or criminal charges due to violations of environmental regulations, must report environmental information for the 2021 fiscal year (MEE, 2022). In 2024, China launched an ambitious initiative to transition from voluntary to mandatory climate change disclosure (KPMG, 2024b). The Ministry of Finance released the Corporate Sustainability Disclosure Standards (CSDS) Basic Standards (Trial) in December 2024. The Shanghai, Shenzhen, and Beijing stock exchanges rolled out in April 2024 trial sustainability reporting guidelines for some listed firms and even urged others to adopt them voluntarily (PwC, 2024). Against this evolving regulatory backdrop, it is timely to examine these CD practices, particularly whether BCO mediates the association between sustainability-linked executive compensation and CD.

CD describes the process of disclosing greenhouse gas emissions together with their associated reduction strategies. In China, the MEE requires designated enterprises to disclose carbon emissions, environmental violations, pollutant generation and treatment, and environmental management details such as permits, taxes, liability insurance, and environmental credit evaluations. The sustainability-linked executive compensation system establishes a connection between executive pay and environmental, social, and governance (ESG) results, which serves to create executive incentives that match stakeholder needs for emissions reduction and climate risk supervision and organizational transparency (Dell'Erba & Ferrarini, 2024; KPMG, 2024c; Tingbani et al., 2020). The practice remains in its early stages according to a report which shows that only 13 out of 25 leading Chinese firms use sustainability factors to determine executive pay. In contrast, the practice enjoys wider use across Europe and Australia (Dell'Erba & Ferrarini, 2024; KPMG, 2025).

BCO has a formal role to play. It oversees climate risk, sets goals, and reviews disclosures (García-Sánchez et al., 2023). According to stakeholder theory, BCO turns pressure from outside stakeholders into internal monitoring and accountability (Radu & Smaili, 2022). Boards are also responsible for making sure that sustainability disclosures are accurate. This shows how important BCO is for keeping an eye on executive compensation tied to ESG and making sure that incentives are in line with climate performance (OECD, 2025). Prior evidence on whether ESG-linked executive compensation improves CD remains mixed. Luo et al. (2021) and Park et al. (2023) suggest that linking executive compensation to sustainability goals can support more transparent CD. By contrast, Bebchuk and Tallarita (2022), Comello et al. (2023), and Ratti et al. (2023) are of the view that this impact might be insignificant when ESG measures are subject to managerial discretion, whether hardly verifiable or not, as they are as important as financial indicators. These mixed results indicate that aligning incentives alone may not be enough to improve disclosure outcomes and that a different governance mechanism may be necessary. One possible mechanism is BCO, which could be the governance channel that turns managerial incentives into outcomes of transparency (Bui et al., 2020; Cohen et al., 2023b).

This lack of clarity is particularly evident when it comes to understanding how governance was interpreted and operationalized in previous studies. In research on the impact of ESG-linked executive compensation, BCO, and CD, governance is usually described very generally in terms of board features or aggregate governance scores, rather than being centered on specific BCO mechanisms (Michelon & Parbonetti, 2012; Cordova et al., 2021; Bui et al., 2020; Eklund & Pinheiro, 2024). Such a perspective can conceal the actual ways that incentive schemes impact disclosure behaviours and, as a result, make it impossible to ascertain if BCO really serves as a mediating governance channel that links ESG-linked executive compensation with CD (Bui et al., 2020; Cordova et al., 2021; Eklund & Pinheiro, 2024). Thus, the current investigation by supporting both theoretical advancement and ongoing regulatory debates on the importance of board-level climate governance, explores the governance pathway linking managerial incentives to disclosure outcomes, particularly on carbon transparency (Alodat & Hao, 2025; Cosma et al., 2022; Ratti et al., 2023). Evidence from emerging markets remain limited, and findings from developed markets may not generalize to China because of differences in enforcement, investor pressure, and board practices (Adam et al., 2024; Li et al., 2024; Zhu et al., 2024). Even though earlier research shows that BCO can be a positive factor for disclosure, the connection between BCO and ESG-linked executive compensation in China is largely unknown (Garcia-Sánchez et al., 2023; Meng et al., 2024; Orazalin, 2020; Radu & Smaili, 2022).

Existing studies also focus more on environmental performance indicators or overall ESG ratings than on CD. Yet CD is important for investors and regulators assessing carbon emissions and climate risks (Luo & Tang, 2021). Accordingly, this study examines how ESG-linked executive compensation relates to CD, how ESG-linked executive compensation relates to BCO, how BCO relates to CD, and whether BCO mediates the association between ESG-linked executive compensation and CD (Donaldson & Preston, 1995; Freeman, 1984; Radu & Smaili, 2022). Its context involves China's A-share companies, where there is a growing trend in climate disclosures, but their quality and credibility are still diverse (KPMG, 2024a; PwC, 2024; Zhang & Li, 2025).

The present study applies a CD Index aligned with local regulations and international standards, including the TCFD and IFRS S2, to measure disclosure quality (Dan & Shen, 2022; Liu & Wu, 2024). The regulatory shift in 2021 requiring heavily polluting enterprises and financial institutions to disclose environmental information enables examination of how incentive mechanisms and board oversight respond to these requirements (Huld, 2022).

There are four research objectives in this paper. First, to investigate the relationship between ESG-linked executive compensation and CD. Second, to determine the extent to which there is a relationship between ESG-linked executive compensation and the existence of BCO. Third, to assess the effect of BCO upon CD. Fourth, to examine whether BCO mediates the association between ESG-linked executive compensation and CD.

The study advances the literature by positioning BCO as a novel mediating governance channel linking managerial incentives to disclosure outcomes and offers evidence for compensation committees, boards of directors, and regulators on how ESG-linked executive compensation and BCO may support more credible disclosure practices in China’s A-share listed companies (Luo et al., 2021). This study is highly relevant in China and globally, as many governments have announced “dual carbon” goals aimed at achieving carbon peaking and carbon neutrality.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Theoretical Framework

The main goal of this study is to develop a framework that illustrates the influence of CD on ESG-linked executive compensation, with the BCO mediating this effect. To build this framework, the study draws on stakeholder theory, which holds that firms adjust their internal decisions to the requirements of different stakeholders (Freeman, 1984). Linking ESG objectives to executive compensation can increase managerial accountability and direct greater attention to climate-related risks and disclosure (Berrone & Gomez-Mejia, 2009; Krueger et al., 2020). Prior research further shows that such compensation arrangements can improve disclosure credibility, reduce emissions, and promote green innovation (Flammer et al., 2019).

BCO institutions facilitate the process of translating the alignment of incentives into the disclosure of verified results. By establishing a special committee or supervisory function to monitor the activity of top management and maintain links between reported results and actual results, BCO organisations can decrease the ability of managers to comply in a symbolic manner with the requirements of the company's sustainability policy (Amara & Ahmadi, 2022; Berrone & Gomez-Mejia, 2009; Cordova et al., 2021). Evidence also suggests that stronger board oversight is associated with more comprehensive and accurate disclosures (Velte, 2024c, 2024d). The combination of different theories helps in understanding exactly how incentives within the governance system lead to changes in disclosure.

This framework is further supported by agency theory and upper echelons theory. Agency theory focuses on the necessity of having the objectives of managers and shareholders in line in order to decrease the level of asymmetric information (Jensen & Meckling, 1976), and upper echelon theory highlights the impact of board characteristics on the strategic orientation and decision of firms regarding carbon disclosure (Hambrick & Mason, 1984). These theories combined underpin the direct effects and the indirect effects with BCO as the mediator for the ESG-linked executive compensation, BCO, and CD.

ESG-Linked Executive Compensation and Carbon Disclosure

ESG-linked executive compensation is increasingly studied for its impact on CD (Veltri et al., 2025). Stakeholder theory argues that aligning managerial incentives with stakeholder interests improves CD (Flammer et al., 2019). Agency theory finds that such alignment curbs moral hazard and promotes credible disclosure (Schaltegger et al., 2019). Compensation tied to carbon metrics encourages accurate reporting (Cordova et al., 2021; Luo et al., 2021; Park et al., 2023; Velte, 2022; Wang et al., 2020). However, Legitimacy theory suggests that if ESG indicators lack rigour, such incentives may only encourage symbolic compliance, undermining CD (Mnif & Kchaou, 2023). Empirical studies generally support a positive link between ESG-linked executive compensation and more detailed, verifiable CD (Luo et al., 2021; Cordova et al., 2021; Al-Shaer & Zaman, 2019; Radu & Smaili, 2022; Toukabri, 2025). However, weak ESG indicators may lead to symbolic compliance, limiting CD effectiveness (Bebchuk & Tallarita, 2022; Mnif & Kchaou, 2023; Dell'Erba & Ferrarini, 2024; Lewa et al., 2025). Most evidence is from developed markets, leaving uncertainty about the impact of developing settings, such as China.

Thus, the existing research shows that ESG-linked executive compensation increases corporate disclosure practices. However, the findings, which primarily emerge from studies conducted in developed countries produce inconsistent results; sectors in these countries may attract investor interest, while overlooking how institutional frameworks and regulatory systems, such as China's changing disclosure rules, impact these practices.

The current research builds on theory and empirical evidence to develop the hypothesis that where there is significant institutional or stakeholder pressure for climate responsibility, the use of ESG-linked executive compensation is expected to strengthen CD. The following hypothesis H1 is, therefore proposed:

H1: ESG-linked executive compensation has a positive impact on carbon disclosure.

ESG-Linked Executive Compensation and Board Climate Oversight

ESG-linked executive compensation and BCO are important governance mechanisms for addressing climate-related challenges. According to stakeholder theory, it is anticipated that firms that use ESG-linked executive compensation will be more likely to engage in formalising BCO due to a heightened likelihood that boards will align management's activities with external stakeholder pressure related to climate change challenges (Donaldson & Preston, 1995; Freeman, 1984). The use of ESG-linked compensation arrangements related to climate change is also expected to be more likely to lead to a decrease in symbolic compliance and an increase in the completeness of disclosure by boards, as argued by Berrone & Gomez-Mejia (2009) and Radu & Smaili (2022). From an agency theory standpoint, incorporating ESG objectives as a component of executive pay increases the rationale for formalising monitoring processes by board members and reduces the discretionary ability of managers in their absence (Haque & Ntim, 2020).

Empirical evidence shows that companies with linked compensation arrangements of executives to ESG objectives have a greater likelihood of having undertaken sustainability activities, CSR, or special climate-related committees at the board level that effectively govern climate issues and diminish asymmetries in information (Cordova et al., 2021; Derchi et al., 2021; Eklund & Pinheiro, 2024). Such panels not only consider the risk of the climate in strategy, but also make associated executive compensation performance metrics observable, monitorable, and credible (Velte, 2024b). Bui et al. (2020) found that when executive compensation was tied to ESG criteria, including environmental committee membership, this would lead to better disclosure practices while reducing the potential for greenwashing. The original research employed moderation as its main analytical technique. The present study extends the logic to hypothesise a mediating role of BCO in transmitting ESG-linked executive compensation effects to CD. Torres (2024) and Eliwa et al. (2025) support the mechanism by which ESG-linked executive compensation motivates boards to establish committees to enforce ESG or carbon targets.[1]

Also, executive compensation linked to ESG can encourage boards to set up CSR, ESG, or climate-related committees to keep an eye on sustainability. For example, Eklund and Pinheiro (2024) report that firms offering CSR-based compensation incentives are more likely to establish CSR committees. Such committees institutionalise board-level monitoring and make ESG-linked performance targets more observable and enforceable. Related evidence also suggests that formal oversight structures can support the implementation of ESG-linked executive compensation and reduce symbolic compliance (Bui et al., 2020; Cordova et al., 2021; Eklund & Pinheiro, 2024).

[1] While this study hypothesises a causal effect from ESG-linked executive compensation to the presence of BCO, it acknowledges the potential for reverse causality, whereby firms with established BCO structures may be more likely to adopt ESG-linked executive compensation. Future research could further investigate this dynamic, particularly using longitudinal or quasi-experimental designs to disentangle these effects.

The relationship between these two parties becomes stronger when investors put pressure from outside, which forces the boards to create real climate oversight mechanisms instead of just making a show of fake compliance (Baraibar-Diez et al., 2019 & Velte 2024d). Even though metrics related to ESG are very complicated and sometimes very confusing, a direct oversight body is the one that really gives the right incentives to the management, so that their discretion is limited and the risk of their opportunistic behaviour in the design of ESG-linked executive compensation is reduced (Al-Shaer & Zaman, 2019; Keddie & Magnan, 2023).

Drawing on these theoretical and empirical insights, it is reasonable to expect that ESG-linked executive compensation encourages firms to strengthen their governance structures by establishing BCO. Accordingly, the following hypothesis is proposed:

H2: ESG-linked executive compensation has a positive impact on BCO.

Board Climate Oversight and Carbon Disclosure

BCO represents an institutionalised governance response to stakeholder demands for greater accountability on environmental issues (Bui et al., 2020; García-Sánchez et al., 2023). From the lens of stakeholder theory, integrating climate oversight into the board mandate enables companies to integrate emission reduction measures into long-term planning, keep a close eye on the quality of climate data, and make sure climate considerations are central to strategic choices, implying that the presence of BCO positively affects the completeness and reliability of CD (Cordova et al., 2021; Freeman, 1984; Liao et al., 2015). Prior evidence also shows that BCO can help boards balance financial objectives with environmental responsibilities and is associated with more complete disclosure (Baraibar-Diez & Odriozola, 2019).

In addition to showing that BCO influences and informs a board's ability to effectively convert supervisory responsibilities into credible disclosures due to the board's structure and knowledge, the upper echelons theory indicates that the characteristics of boards are also likely to have a substantial effect upon how well they are able to fulfil those responsibilities, reinforcing the positive impact of board characteristics on disclosure practices (Hambrick & Mason, 1984; Mnif & Kchaou, 2023). Agency theory similarly indicates that BCO can reduce agency conflicts by strengthening board monitoring of managerial environmental performance, constraining managerial discretion, and improving the credibility of CD (Adam et al., 2024; Cosma et al., 2022). Together, these perspectives support the expectation that BCO enhances disclosure quality.

Research shows that companies that establish more specialised environmental, sustainability, or climate committees make higher-quality disclosures that are more consistent, comprehensive, and forward-thinking than companies without these specialised committees. The structure of these committees is more likely to align with global efforts (such as the TCFD and GRI) and reduce the likelihood that companies will engage in token or selective reporting (Cosma et al., 2022; García-Sánchez et al., 2023; Monteiro et al., 2025; Peters & Romi, 2015). Moreover, sufficient climate-related board oversight may be one way for an organisation to demonstrate a true commitment to transparency, which in turn helps build trust among stakeholders and a positive corporate image. At the same time, it is possible that this will be accompanied by a reduction in the company's cost of capital (Yuriev & Boiral, 2024). Although some studies caution that formal oversight structures do not always guarantee substantive improvements and may sometimes be symbolic or limited in effectiveness (Adam et al., 2024; Tingbani et al., 2020), the overall evidence suggests that BCO is associated with higher-quality disclosure and accountability. Therefore, firms with BCO are expected to exhibit stronger CD.

By extension of these findings, it is anticipated that firms' exposure to BCO reinforces their obligations towards clear reporting and induces superior quality and higher volume CD. Therefore, the following hypothesis is proposed:

H3: The presence of board climate oversight has a positive impact on carbon disclosure.

Mediating Role of Board Climate Oversight

BCO institutionalises the translation of ESG-linked executive compensation into formal board processes. Companies that link executive compensation to ESG performance create CSR, and ESG and climate committees, which work to assess results and develop climate-based strategies. Moreover, these committees help board members acquire new skills which support their climate-related business goals (Eklund & Pinheiro, 2024; García-Sánchez et al., 2023; Velte, 2024b; Cosma et al., 2022; Gennari, 2019). These previous research demonstrate that committees lead to better ESG results, and they create more environmental initiatives and produce more trustworthy disclosures. In addition, there is the opportunity to nurture board members who possess independence, expertise and diversity characteristics which will enable accurate CD assessment (Elmaghrabi, 2021; Velte & Stawinoga, 2020; Kubo & Sasaki, 2024; Mardawi et al., 2024).

Although previous studies have rarely examined the exact pathway from ESG-linked executive compensation to CD via BCO, related evidence supports the plausibility of this mediating role. Samarawickrama et al. (2024) show that CSR committees mediate the relationship between CSR mandates and social disclosure. Orazalin (2020) provides indirect support by showing the relevance of sustainability committees for environmental and social performance, while other studies suggest that committee effectiveness can operate through indirect mechanisms, such as cultural and gender diversity (Ashraf et al., 2025; Martínez-Ferrero et al., 2021). Extending this logic to the present study, corporate governance structures, such as ESG-linked executive compensation structures, encourage the executive to give higher ranking to climate-related matters, but it is the BCO that embeds this consideration, turning it into strict policies and practices of tangible disclosures, and monitoring routines that support carbon disclosure (Bui et al., 2020; Cordova et al., 2021; Eklund & Pinheiro, 2024). The effectiveness of climate-related disclosures has been also shown by Mahmoudian et al. (2022) and García-Sánchez et al. (2023) for companies whose monitoring role is effectively underpinned by the use of ESG incentives. In this way, the agency risk is also significantly mitigated because the use of the compensation agreement is not tokenistic.

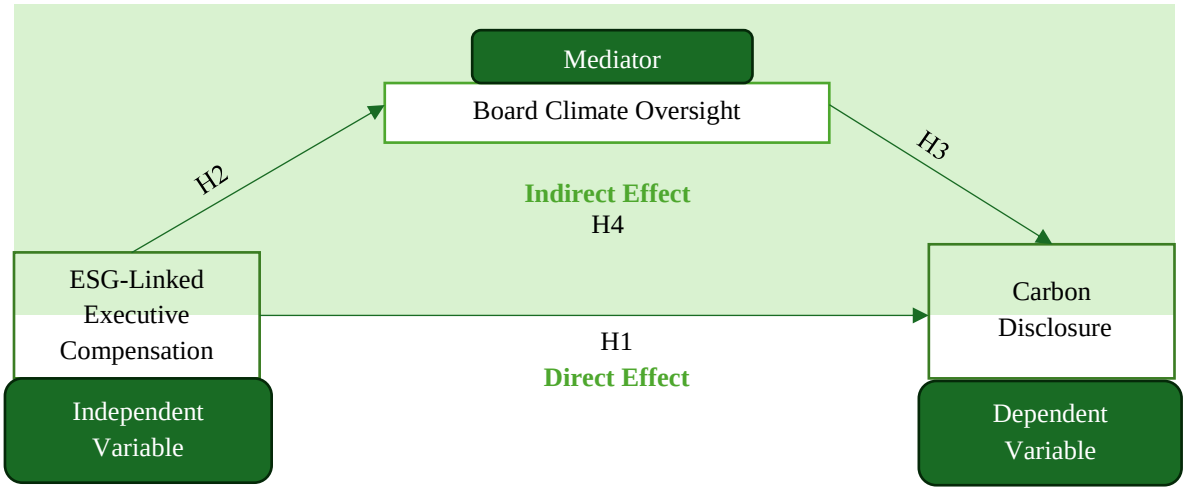
BCO is expected to mediate the relationship between ESG-linked executive compensation and CD by embedding incentives into governance structures that translate into tangible disclosure outcomes. Therefore, the following hypothesis is proposed:

H4: Board climate oversight mediates the relationship between ESG-linked executive compensation and carbon disclosure.

Figure 1 presents the conceptual framework of the present study. It shows three direct paths, from ESG-linked executive compensation to CD, from ESG-linked executive compensation to BCO, and from BCO to CD, together with the indirect path through which BCO mediates the relationship between ESG-linked executive compensation and CD.

Figure 1

Study's Conceptual Framework



METHODOLOGY

Sample and Data

The initial population comprised all companies listed in China's A-share market from 2021 to 2023. The sample spanned all sectors without exclusions, ensuring a comprehensive coverage of China's A-share market. The sample was then restricted to firms with available data on ESG-linked executive compensation, BCO, CD, and all control variables. Firms with missing observations on any of these variables were excluded (Baltagi, 2008; Wooldridge, 2010). The relatively small final sample reflects the limited adoption and disclosure of ESG-linked executive compensation and BCO among China's A-share listed companies during the sample period, resulting in limited data availability. After this screening process, the final sample comprised 345 firms and 1,035 firm-year observations in a balanced panel (see Table 1).

A-share listed companies were selected because they operated within a relatively stable regulatory setting and were subject to evolving ESG and CD expectations in China. The sample period coincided with the implementation of the Dual Carbon goals and covered important policy developments, including stricter coal controls under the 14th Five-Year Plan and the launch of the national Emissions Trading Scheme in 2021 (UNESCO, 2023; Xinhua, 2021).

CD data were sourced from the China Listed Firms CD Index on the CSMAR platform. CD index scored 0–50 based on clarity, completeness, and comparability in annual and sustainability reports. Besides, CSMAR provided firm-level financial and governing variables like state ownership, institutional ownership, board size, board independence, return on assets, leverage, and market-to-book ratio (Abbas et al., 2023; CSMAR, 2025). ESG-linked executive compensation and BCO variables were drawn from LSEG Workspace. The Workspace helps to standardise corporate ESG governance information (Heubeck & Ahrens, 2024; Issa et al., 2025; LSEG Workspace., n.d.; Shahrour et al., 2024).

Datasets were merged at the firm-year level using stock tickers and fiscal years. Continuous variables such as return on assets, leverage, and market-to-book ratio were winsorised at the 1st and 99th percentiles to reduce the influence of extreme values. Only firms with complete information for all years were retained, ensuring balanced panels for empirical analysis. Key dummy variables were mean-centred by subtracting the overall sample mean from the original 0/1 coding to improve interpretability and reduce multicollinearity (Louviere et al., 2000).

Table 1

Sample Reconciliation

Details	n
Initial population of firms observed in China's A-share market during 2021–2023	5,460
Missing CD data	(11)
Missing BCO data	(4362)
Missing ESG-linked executive compensation data	(210)
Missing control variables or incomplete three-year observations	(532)
Final sample of firms	345
Final firm-year observations	1,035

Variables Measurement

Table 2 reports the definitions and measurements of all variables. The dependent variable in this study was CD, measured using the Corporate Carbon Disclosure Index, which comprised 22 disclosure items (Cai et al., 2021; Dan & Shen, 2022; Guo et al., 2025). The ESG-linked executive compensation was used as the independent variable. It measures whether a firm has adopted an ESG-linked executive compensation policy for the CEO (Cohen et al., 2023b; Haque & Ntim, 2020). Similarly, BCO was used as the mediating variable and was coded as a binary indicator (Al-Shaer & Zaman, 2019; Issa et al., 2025). In the China context during the period 2021–2023, both an ESG-linked executive compensation and BCO were largely voluntary, as no regulatory mandates required all A-share listed companies to adopt such policies or committees. Nevertheless, adoption was influenced by investor pressure, market norms, and regulatory guidance, making these voluntary mechanisms meaningful for examining their governance impact on CD.

The analysis included several firm-level control variables related to governance and finance that can potentially interact with CD and executive incentives. The reason for state ownership (SOE) inclusion was that government-related firms may have other pressures related to disclosure and governance that differ from pressures faced by for-profit firms (Chen et al., 2023, 2025). Institutional ownership was included since institutional investors are known to exert pressure on firms to improve ESG performance and disclosure credibility (Luo et al., 2022). Board size (BSize) (Akbaş & Canikli, 2019; Ali et al., 2024) and board independence (Bind) (Chen et al., 2023; Shen et al., 2020; Wenhao et al., 2022) were included as control variables because previous research has demonstrated that board structure influences the firm's monitoring capacity and reporting transparency.

In addition, firm-level financial indicators are important determinants of disclosure incentives. Profitability, that is, return on assets (ROA), is a measure of a company's capacity to invest in ESG activities and is able to predict disclosure decisions (Chen et al., 2024; Cohen et al., 2023a). Leverage (Lev) is included in the analysis since highly leveraged firms may be willing to disclose information

for strategic purposes, like fulfilling creditor demands or mitigating reputational risks (Cahyono et al., 2024; Cohen et al., 2023a; Tan et al., 2020). The market-to-book ratio (MTB) was taken into consideration since the corresponding growth opportunities and valuation pressures are relevant to governance choices and the extent of voluntary disclosure (Luo et al., 2022; Shen et al., 2020). Thus, the controls were considered appropriate to isolate the impact of ESG-linked executive compensation and BCO on CD.

Table 2

Summary of Variables and Definitions

Name of variable	Symbols	Measurement	Source	References
Dependent Variable				
Carbon Disclosure	CD	Content analysis evaluated the 22-item Corporate Carbon Disclosure Index (0–50), with higher scores indicating greater disclosure.	CSMAR	(Cai et al., 2021; Dan & Shen, 2022; Guo et al., 2025)
Independent Variable				
ESG-Linked Executive Compensation	COMP_ESG	Dummy variable indicating whether ESG-linked executive compensation is implemented (1 = yes, 0 = no).	LSEG	(Cohen et al., 2023b; Haque & Ntim, 2020)
Mediating Variable				
Board Climate Oversight	BCO	Indicator of board climate oversight (1 = exists, 0 = otherwise).	LSEG	(Al-Shaer & Zaman, 2019; Issa et al., 2025)
Control Variables				
State Ownership	SOE	Coded as one if the ultimate controller is a government agency, state-owned enterprise, or public institution, and zero otherwise.	CSMAR	(Chen et al., 2023, 2025)
Institutional Ownership	InstOwn	Percentage of shares held by institutional investors.	CSMAR	(Tan et al., 2020; Luo et al., 2022)
Board Size	BSize	Natural logarithm of the number of directors.	CSMAR	(Akbaş & Canikli, 2019; Ali et al., 2024)
Board Independence	Bind	Proportion of independent directors on the board.	CSMAR	(Chen et al., 2023; Shen et al., 2020)
Profitability	ROA	Net profit divided by total assets.	CSMAR	(Chen et al., 2024; Cohen et al., 2023a)
Leverage	Lev	Total liabilities divided by total assets.	CSMAR	(Cahyono et al., 2024; Cohen et al., 2023a; Tan et al., 2020)
Market-to-Book Ratio	MTB	Market value divided by book value of shareholders' equity.	CSMAR	(Luo et al., 2022; Shen et al., 2020)

The empirical models of the present study are as follows:

Model 1: $$CD_{i,t}=\beta_0+\beta_1 COMP\_ESG_{i,t}+\beta_2 SOE_{i,t}+\beta_3 InstOwn_{i,t}+\beta_4 BSize_{i,t}+\beta_5 Bind_{i,t}+\beta_6 ROA_{i,t}+\beta_7 Lev_{i,t}+\beta_8 MTB_{i,t}+\Sigma Firm+\varepsilon_{i,t} \quad (1)$$

Model 2: $$BCO_{i,t}=\beta_0+\beta_1 COMP\_ESG_{i,t}+\beta_2 SOE_{i,t}+\beta_3 InstOwn_{i,t}+\beta_4 BSize_{i,t}+\beta_5 Bind_{i,t}+\beta_6 ROA_{i,t}+\beta_7 Lev_{i,t}+\beta_8 MTB_{i,t}+\varepsilon_{i,t} \quad (2)$$

Model 3: $$CD_{i,t}=\beta_0+\beta_1 BCO_{i,t}+\beta_2 SOE_{i,t}+\beta_3 InstOwn_{i,t}+\beta_4 BSize_{i,t}+\beta_5 Bind_{i,t}+\beta_6 ROA_{i,t}+\beta_7 Lev_{i,t}+\beta_8 MTB_{i,t}+\Sigma Firm+\varepsilon_{i,t} \quad (3)$$

Model 4: $$CD_{i,t}=\beta_0+\beta_1 COMP\_ESG_{i,t}+\beta_2 BCO_{i,t}+\beta_3 SOE_{i,t}+\beta_4 InstOwn_{i,t}+\beta_5 Bsize_{i,t}+\beta_6 Bind_{i,t}+\beta_7 ROA_{i,t}+\beta_8 Lev_{i,t}+\beta_9 MTB_{i,t}+\Sigma Firm+\varepsilon_{i,t} \quad (4)$$

where, all variables are defined in Table 2. The mediating role of BCO was tested using four regression models; where Model 1, Model 2 and Model 3 estimated the direct associations and Model 4 assessed whether BCO transmitted part of the association between ESG-linked executive compensation and CD.

RESULTS AND DISCUSSION

Descriptive Statistics and Correlations

Table 3 reports descriptive statistics for all the variables. The average CD score was 27.76 (SD = 11.52), indicating that CD scores exhibited moderate average levels with considerable cross-firm heterogeneity, capturing meaningful differences in climate disclosure practices. ESG-linked executive compensation was adopted by 21.4% of firms, while BCO was present in 24% of firms. Among firms with BCO, 35% also adopted ESG-linked executive compensation, indicating that the two governance mechanisms sometimes co-occurred, but were often implemented independently.[2] This variation highlights differences in climate governance practices and provides context for examining BCO as a mediating mechanism between ESG-linked executive compensation and CD (Velte & Stawinoga, 2020; García-Sánchez et al., 2023).

SOEs represented 46% of the observations in the study, highlighting the significance of SOEs as institutions in China's economy. The average InstOwn level was 58.96% and ranged from 7.55% to 95.62% across the lowest- and highest-ranked firms in the study. The average natural log Bsize for the sample was 2.16 (roughly 8-9 board members), consistent with previous studies on governance. The Bind percentage was 38.38%, exceeding the one-third minimum requirement. In terms of firm characteristics, the average ROA was 6%, the Lev was 47%, and the MTB was 2.63.

[2] Among the 83 firms with BCO, representing 24% of the sample, 29 also adopted ESG-linked executive compensation, equivalent to about 35% of BCO firms.

Table 4 shows the Pearson correlations. CD indicated a positive correlation with ESG-linked executive compensation ($r = 0.24$, $p < 0.01$) and BCO ($r = 0.48$, $p < 0.01$). In addition, CD was positively correlated with InstOwn ($r = 0.25$, $p < 0.01$), which is in line with the argument that institutional investors are the ones to ask for greater transparency. A positive correlation between SOE and CD ($r = 0.13$, $p < 0.01$) may be a reflection of stronger compliance incentives under state-driven disclosure requirements in the emerging market. Bsize and Bind had weak positive correlations with CD, while profitability and leverage showed positive correlations. MTB did not show a significant relationship with CD in the bivariate analysis. Variance inflation factors were less than 2.0, which means that multicollinearity is unlikely to distort the regression estimates (Daniels & Minot, 2025; Everitt, & Rabe-Hesketh, 2006; Gujarati, 2003; Kennedy, 2008).

Overall, descriptive and correlation evidence indicate that ESG-linked executive compensation and BCO were the two salient governance mechanisms that determined the variation in CD in China's evolving regulatory environment.

Table 3

Descriptive Statistics

Variables	Mean	SD	Min	Max
CD	27.76	11.52	1	46
SOE	0.46	0.50	0	1
InstOwn	58.96	22.81	7.55	95.62
Bsize_Log	2.16	0.21	1.61	2.89
Bsize_Raw	8.89	1.91	5	18
Bind	38.38	5.72	33.33	57.14
ROA	0.06	0.06	-0.14	0.27
Lev	0.47	0.19	0.08	0.83
MTB	2.63	2.46	0.09	13.13
COMP_ESG	0.21	0.41	0	1
BCO	0.24	0.43	0	1
BCOcent	-0	0.43	-0.24	0.76
COMP_ESGcent	-0	0.41	-0.21	0.79
N				

Notes. COMP_ESG and BCO were grand-mean centred to improve coefficient interpretation and ensure consistent parameterisation across the mediation models. This does not affect model fit but expresses coefficients around the sample mean rather than the zero category. Centred variables carry the suffix 'cent'.

Table 4

Pearson Correlations

Variables	VIF	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) CD		1.00									
(2) COMP_ESG	1.13	0.24***	1.00								
(3) BCO	1.16	0.48***	0.32***	1.00							
(4) SOE	1.46	0.13***	0.04	-0.02	1.00						
(5) InstOwn	1.36	0.25***	0.14***	0.18***	0.44***	1.00					
(6) BSize	1.49	0.07**	-0.02	0.02	0.29***	0.20***	1.00				
(7) Bind	1.37	0.08**	0.04	0.04	0.03	0.01	-0.48***	1.00			
(8) ROA	1.44	0.08***	0.05	0.03	-0.12***	0.08**	-0.02	0.03	1.00		
(9) Lev	1.38	0.16***	0.05	0.09***	0.18***	0.12***	0.03	0.05	-0.49***	1.00	
(10) MTB	1.24	-0.02	-0.02	-0.00	-0.25***	-0.06*	-0.16***	0.10***	0.35***	-0.28***	1.00

*Notes. *** p<.01, ** p<.05, * p<.1*

Regression Analyses and Mediation Effect

Table 5 presents the regression of the four hypotheses. Model (1) tested the direct influence of ESG-linked executive compensation on CD. The coefficient of COMP_ESG was positive and significant ($\beta = 4.59$, $p < 0.01$), indicating that firms with ESG-linked executive compensation had higher CD, consistent with Luo et al. (2021). This result is consistent with the stand of stakeholder theory, which posits that firms respond to external stakeholder pressures for transparency, and agency theory, which suggests that tying executive incentives to ESG outcomes reduces agency conflicts and aligns managerial behaviour with firm objectives. This result supports Hypothesis 1.

Model (2) was estimated using a pooled logit regression to examine the association between ESG-linked executive compensation and BCO. Significance was found in the positive coefficient ($\beta = 1.51$, $p < 0.01$).[3] Again, the result is consistent with stakeholder theory—directors respond to strategic and societal pressures—and agency theory, as board oversight complements incentive structures to reduce managerial opportunism. This result demonstrates that executive incentives encouraged directors to formalise climate oversight, providing empirical evidence that ESG-linked executive compensation drove structural governance improvements beyond symbolic compliance in China's A-share market, supporting Hypothesis 2 (Eklund & Pinheiro, 2024).

Model (3) studied the influence of BCO on CD. The impact of BCO was positive and significant ($\beta = 7.45$, $p < 0.01$), which was a confirmation of Hypothesis 3. This result suggested that when directors engaged more in climate-related oversight, firms disclosed carbon information more extensively. This result is supported by stakeholder theory, agency theory, and upper echelons theory, which posit that board characteristics, knowledge, independence, and diversity influence how oversight translates into disclosure outcomes (Hambrick & Mason, 1984; Mnif & Kchaou, 2023). Previous studies also highlighted the critical role of board oversight in disclosure quality and transparency (Bui et al., 2020; García-Sánchez et al., 2023; Mahmoudian et al., 2022).

Model (4) employed both ESG-linked executive compensation and BCO to examine the mediation effect. As a result, the coefficient of COMP_ESG in Model (1) was reduced from 4.59 to 2.65 in Model (4). Meanwhile, BCO was still a significant and powerful factor in influencing CD, with a coefficient of 6.77 ($p < 0.01$). This pattern is consistent with the mediating role of BCO and suggests that part of the association between ESG-linked executive compensation and CD was transmitted through formal BCO. Following the Baron and Kenny (1986) mediation approach, Table 5 provides initial evidence of mediation, but does not formally decompose the direct and indirect effects (Radu & Smaili, 2022). Thus, the indirect effect inferred from Table 5 should be interpreted cautiously and not as a strict causal mediation estimate (Sobel, 1982; Radu & Smaili, 2022). Therefore, Sobel and bootstrap mediation tests are reported in the robustness section to provide a more rigorous estimation of the indirect effect.

[3] A conditional firm fixed-effects logit model was also used as a robustness check for Model (2), and the results were qualitatively similar. However, it excluded 258 firms, or 774 firm-year observations, because BCO did not vary within firms from 2021 to 2023. The pooled logit model was therefore retained for the main analysis.
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Table 5

Multivariate and Mediation Analysis

Variables	(1) CD	(2) BCO	(3) CD	(4) CD
COMP_ESG	4.59***	1.51***		2.65***
	(1.11)	(0.22)		(1.02)
BCO			7.45***	6.77***
			(1.08)	(1.07)
SOE	3.04	-0.74***	1.67	1.60
	(2.37)	(0.09)	(2.46)	(2.50)
InstOwn	-0.09	0.02***	-0.05	-0.05
	(0.06)	(0.01)	(0.06)	(0.06)
BSize	-10.11*	0.66	-10.49**	-9.96**
	(5.25)	(0.64)	(4.28)	(4.43)
Bind	-0.10	0.03	-0.16	-0.14
	(0.15)	(0.02)	(0.13)	(0.13)
ROA	-22.17***	1.87	-19.26***	-17.73**
	(7.43)	(1.85)	(7.05)	(7.12)
Lev	-8.22	1.54**	-5.579	-4.87
	(7.40)	(0.68)	(6.36)	(6.41)
MTB	0.30*	-0.00	0.211	0.17
	(0.17)	(0.04)	(0.16)	(0.16)
Constant	61.74***	-5.78***	61.86***	59.90***
	(16.80)	(1.93)	(13.64)	(14.09)
Observations	1,035	1,035	1,035	1,035
Number of Firm	345	345	345	345
R-squared	0.06		0.11	0.12
Pseudo R2		0.12		
Firm	Yes	No	Yes	Yes

Notes. Model 1, Model 3, and Model 4 were estimated using firm fixed-effects panel regressions with robust standard errors. Model 2 was estimated using a pooled logit specification with standard errors clustered at the firm level[4]; *** *p<.01*, ** *p<.05*, * *p<.1*

Robustness Test

Mediation was further assessed as a robustness check using the four-step procedure of Baron and Kenny (1986) in Table 6. Unlike Table 5, which reports the baseline multivariate regression results for H1 to H4, Table 6 reports the focal coefficients from the mediation decomposition. Step 1 estimated the total effect of COMP_ESG on CD, Step 2 estimated the effect of COMP_ESG on the BCO, and Steps 3 and 4 were obtained from the same specification in which CD was regressed on both COMP_ESG and BCO, allowing the direct and mediator effects to be assessed simultaneously. The results indicate a total effect of 5.546, an effect of 0.305 from COMP_ESG to BCO, an effect of 11.166 from BCO to CD conditional on COMP_ESG, and a direct effect of 2.140 from COMP_ESG to CD conditional on BCO. The implied indirect effect was 3.407, accounting for 61.4% of the total effect, with the remaining 38.6% representing

[4] BCO was binary, and a fixed-effects logit model would retain only firms with within-firm variation in BCO over the short 2021 to 2023 panel, substantially reducing the usable sample. Year effects were not included in the baseline specification because the panel was short, and the analysis focused on within-firm governance relationships.

the direct effect of COMP_ESG. To avoid redundancy, only the focal mediation coefficients are reported in Table 6, while the control variables remain the same as in Table 5. Table 7 further reports the Sobel and bootstrap tests as supplementary evidence on the indirect effect.

In Table 7, using 1,000 bootstrap replications, the indirect effect was 3.407 with a bootstrap standard error of 0.465, a normal-based confidence interval from 2.496 to 4.318, and a bias-corrected confidence interval from 2.554 to 4.418. The remaining direct effect was 2.140 with a bootstrap standard error of 0.778, a normal-based confidence interval from 0.614 to 3.665, and a bias-corrected confidence interval from 0.545 to 3.652. These results indicate that 61.4% of the total effect of ESG-linked executive compensation on CD operated through BCO, while 38.6% remained direct. Because both the indirect effect and the remaining direct effect were significant, and all confidence intervals excluded zero, the results support partial rather than full mediation in China's A-share listed companies. In this study, partial mediation means that BCO transmits part, but not all, of the association between ESG-linked executive compensation and CD, whereas full mediation would require the direct effect to become insignificant after BCO was included (Baron & Kenny, 1986; Sobel, 1982).

The results demonstrate that ESG-linked executive compensation is associated with higher carbon disclosure, while BCO has a direct positive effect on carbon disclosure, and ESG-linked executive compensation is positively associated with the presence of BCO. The COMP_ESG coefficient shows a strong positive value after including BCO, but the COMP_ESG coefficient shows a decrease, which remains significant because executive incentives affect corporate development through board oversight systems. The pattern shows that incentive alignment together with board governance systems leads to better disclosure results, which match previous research about board functions in environmental transparency and governance mediation research (Bui et al., 2020; Eklund & Pinheiro, 2024; García-Sánchez et al., 2023; Luo et al., 2021; Mahmoudian et al., 2022; Samarawickrama et al., 2024).

The findings show how stakeholders require climate disclosure from China's businesses during the country's regulatory changes, which occurred between 2021 and 2023. The alignment of incentives leads to managers focusing on climate metrics because board members who establish formal climate oversight systems will provide better climate disclosure outcomes. This governance system serves as a bridge connecting the external pressure to the company's internal accountability, and it also facilitates the journey from incentives to genuine reporting. This interpretation is consistent with the view that board attention helps align strategy, disclosure practices, and policy responses (Honey et al., 2025; Martínez-Ferrero et al., 2021).

Table 6

Baron and Kenny Four-Step Mediation Regression Results

Variables	Step 1 CD	Step 2 BCO	Step 3 and Step 4 CD
COMP_ESG	5.546***	0.305***	2.140***
BCO			11.166***

*Notes. *** p<0.01, ** p<0.05, * p<0.1*

Table 7

Sobel and Bootstrap Mediation Test Results

Variables	Sobel	Bootstrap				
	BCO	BCO	Normal-Based Confidence Interval (CI)		Bias-Corrected Confidence Interval (CI)	
Direct effect	2.140***	2.140***	0.614	3.665	0.545	3.652
Indirect effect	3.407***	3.407***	2.496	4.318	2.554	4.418
Total effect	5.546***	5.546***				
Proportion mediated	0.614	0.614				
Sobel test	3.407***					
Aroian test	3.407***					

Notes. Bootstrap sample size = 1,000; normal-based 95% confidence and bias-corrected 95% confidence intervals were reported; *** $p<.01$, ** $p<.05$, * $p<.1$

CONCLUSION AND IMPLICATIONS

This paper examines the relationship between ESG-linked executive compensation and CD in China's A-share listed companies, and further tests whether BCO mediates this relationship. The results show that firms adopting ESG-linked executive compensation disclose more carbon information and are more likely to establish BCO. Table 7 highlighted in the Discussion and Results section further supports partial mediation, as the indirect effect through BCO was significant, the remaining direct effect was also significant, and the bootstrap confidence intervals excluded zero. ESG-linked executive compensation systems must include fixed climate targets. Similarly, the boards ought to set up climate-related committees whose task would be to assess how effective the measures are, thus increasing the quality of CD (Bui et al., 2020; García-Sánchez et al., 2023; Mahmoudian et al., 2022).

The results show that both incentives and supervision contributed to disclosure outcomes, with supervision accounting for a considerable share of the influence. This finding corroborates previous empirical evidence from other countries on ESG governance mechanisms (Morrison et al., 2024; Velte, 2024a).

Building on prior studies showing that board committees can mediate the link between governance mandates and disclosure or performance outcomes, this paper extends that logic from general CSR committee settings to the more specialised climate context by examining whether BCO mediates the association between ESG-linked executive compensation and carbon disclosure (Samarawickrama et al., 2024; Eklund & Pinheiro, 2024; Liao et al., 2015). The present study has addressed measurement challenges by treating BCO as a distinct governance variable, which in turn allowed the independent contribution of board mechanisms to carbon disclosure to be clearly identified (Bui et al., 2020; Velte, 2024b; García-Sánchez et al., 2023; Cordova et al., 2021).

Future research may investigate extended time horizons in China as mandatory disclosure requirements intensify, while considering endogeneity and variations across industries and ownership structures. It might also look into how ESG-linked executive compensation contracts are set up, such as how clear the ESG goals are and how the incentive parts are weighted. Since ESG-linked executive compensation and BCO are evaluated within the same year, the chronological order can only be partially determined, although previous research indicates that ESG-linked executive compensation typically precedes BCO

(Eklund & Pinheiro, 2024). Future research could test this sequencing more directly by using more detailed longitudinal firm-level data. The low occurrence of ESG-linked executive compensation packages (21.4%) and BCO (24%) shows that organisations need more regulatory direction, while assessment standards for CD need better enforcement.

According to the research results, the disclosure quality improved the most when ESG-linked executive compensation was combined with BCO, which therefore showed authentication through China's A-share market test cases.

In conclusion, the findings show that ESG-linked executive compensation enhances the climate disclosure in China's A-share companies, partly through the governance role of BCO.

CONFLICT OF INTEREST STATEMENT

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