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Is executive compensation aligned with the company's ESG objectives? Evidence from Chinese listed companies based on the PSM-DID approach

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Fundamental principles of agency theory and incentive mechanisms suggest that executive compensation should align with a company's developmental goals. This paper aims to explore whether the executive compensation of listed companies in the Chinese capital market aligns with their ESG (Environmental, Social, and Governance) practices, and the underlying mechanisms of this influence. For the first time, this study integrates ESG practices with executive compensation, creating a novel analytical framework and filling a gap in the existing literature. Employing empirical research methods such as the PSM-DID (Propensity Score Matching - Difference-in-differences) model, fixed effects model, heterogeneity analysis, and tests for mediating effects, the study concludes that ESG practices of Chinese listed companies significantly increase executive compensation, demonstrating consistency between the two. Additionally, the beneficial impact of ESG practices on executive compensation incentives is more pronounced in state-owned enterprises compared to non-state-owned ones. Financial performance, company reputation, and investor relations partially mediate the relationship between a company's ESG practices and executive compensation. Specifically, financial performance acts as a negative mediator, while company reputation and investor relations serve as positive mediators. Initially, participation in ESG practices tends to exacerbate 'income inequality' between executives and other employees. However, as companies continue to enhance their ESG practice levels, this 'income inequality' gradually diminishes. Finally, the paper offers several suggestions: Firstly, Chinese listed companies can attract and retain top executive talents by strengthening ESG practices. Although initial ESG practices may lead to pay imbalances, long-term involvement will help reduce this disparity. Secondly, investors can conduct a more comprehensive assessment of a company's future performance, governance structure, and corporate social responsibility by analyzing how ESG practices are reflected in executive compensation. Lastly, the paper provides valuable insights for policymakers, suggesting that regulators should develop more targeted policies and guidelines based on the relationship between a company's ESG practices and executive compensation.

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Introduction

As a classic topic in the realm of corporate finance, research on executive compensation incentives for listed companies primarily emphasizes crafting suitable remuneration structures and designs for senior managers, such as board members, general managers, and board secretaries. Contemporary academic explorations in executive compensation are largely anchored in agency theory. This theory illuminates potential conflicts of interest arising from information asymmetry and the divergence in objectives between shareholders and company managers (Spence, 1973). This area of research encompasses analyses on the composition of executive compensation (Hall and Lieberman, 1998), its relationship with company performance (Jensen and Murphy, 1990), its correlation with company strategy and risk preference (Coles et al. 2006), and its ties with corporate governance structures (Bebchuk and Fried, 2003), among others. For publicly traded companies, studies on executive compensation bear significant implications: Firstly, understanding the relationship between executive compensation and company performance (Jensen and Murphy, 1990) can assist firms in devising more effective incentive mechanisms, propelling executives to generate greater value for shareholders. Secondly, there is a profound connection between compensation structures and corporate governance (Bebchuk and Fried, 2003). If executive compensation isn't closely tied to long-term performance or shareholder value, it might instigate executives to excessively focus on short-term results, compromising long-term value. Moreover, heightened transparency in compensation data can bolster corporate governance and reduce agency costs. Additionally, executive compensation can influence an executive's risk preference. For instance, if compensation heavily depends on short-term stock options, executives might be inclined to undertake high risks to rapidly elevate stock prices (Hall and Murphy, 2002). Furthermore, a transparent and rational executive compensation structure can enhance investor confidence, offering the company more investment opportunities (Conyon, 2006; Fernandes, 2008; Murphy, 1999). Lastly, serving as a pivotal condition for listed companies to attract and retain key managerial talents, a logical compensation structure and open compensation information, under the intensified public scrutiny, can aid companies in upholding their social responsibilities and public image (Fernandes et al., 2013; Frydman and Saks, 2010). The research sample of this paper is based on the Chinese capital market. Due to China's unique culture, regulations, and market environment, there are differences in the executive compensation structure between Chinese listed companies and those in European and American markets. For instance, executive incentives in Chinese listed companies are often based on performance bonuses, with fewer restricted stocks and options (Conyon and He, 2011).

As one of the most prominent evaluation frameworks and developmental goals in contemporary business, the enthusiasm for ESG (Environmental, Social, and Governance) in the investment community has far surpassed its mere conceptual introduction phase in the early 21st century. Numerous scholars have illuminated the multifaceted benefits that ensue from companies adopting ESG practices. For instance, a study by Ahmad et al. (2021) explicitly indicated a positive correlation between ESG factors and a firm's profitability. Moreover, companies that actively engage in ESG initiatives often attract greater capital investments. As affirmed by Kim and Li (2021), proactive participation in ESG efforts leads companies to improve their credit ratings, thereby reducing financing costs. A good ESG mechanism helps mitigate the impact of debt overhang on corporate investment (Zhang et al., 2022). In addition, practicing ESG not only stimulates corporate innovation and strengthens market

competitiveness, but exemplary ESG performance also has a significant positive correlation with both the quantity and quality of company innovations (Tang and Zhang, 2022). ESG practices assist businesses in holistically managing risks associated with environmental, social, and governance dimensions. Further research has corroborated that ESG practices can amplify employee satisfaction and engagement, particularly evident in companies emphasizing sustainability (Zumente and Bistrova, 2021). In China, although ESG had a relatively late start, the growth trajectory of ESG assets is notably robust. According to Bloomberg's forecast that by 2025, ESG assets in China will reach an astonishing \$53 trillion, constituting one-third of the global asset management volume. Furthermore, the core values championed by ESG, encompassing economic prosperity, environmental sustainability, and social equity, deeply resonate with China's strategy for "high-quality development"¹, its pursuit of "shared prosperity"², and its commitment to achieving "dual carbon" targets³. In China's capital market, which is profoundly influenced by the government, Chinese listed companies are under regulatory supervision, actively adopting ESG practices, and transparently disclosing pertinent ESG information to the public. Moreover, the compensation structure of senior executives in listed companies has become an integral component of the company's information disclosure.

Based on the fundamental principles of agency theory and incentive mechanisms, corporate shareholders and boards of directors employ compensation schemes to motivate executives to create value for shareholders (Edmans et al., 2009). Furthermore, executive compensation should align with the company's developmental objectives (Bebchuk and Fried, 2003). With ESG emerging as the current long-term developmental goal, does executive compensation align with a company's ESG developmental objectives? The questions this paper seeks to address include: Within the Chinese capital market, is the executive compensation of listed companies consistent with their ESG practices, and what is the transmission mechanism of this influence? Academic discussions on this topic are currently sparse. The significance of this study is manifold: Firstly, ESG practices are widely perceived to be intimately connected to the long-term sustainable development of a company. Aligning executive compensation structures with a company's long-term objectives is imperative to ensure sustained growth. If research findings indicate a positive correlation between ESG practices and executive compensation, it might further motivate more companies to embrace ESG strategies. Moreover, this study can provide clearer guidance for businesses on how to advance their ESG initiatives through appropriate compensation incentive mechanisms. If executive compensation is in sync with a company's ESG practices, it could bolster investor confidence in the enterprise. Lastly, the results of this research might impact the formulation of pertinent policies, particularly those concerning corporate governance and compensation incentives. Policymakers can leverage these research outcomes to craft more apt regulations and policies, encouraging businesses to make decisions that demonstrate a heightened sense of social responsibility.

The potential contributions of this research are significant and multifaceted. Firstly, the study provides a comprehensive analysis by integrating ESG practices with executive compensation within a unified analytical framework, thereby addressing a notable gap in the existing literature regarding the impact of ESG practices on executive compensation incentives and their underlying mechanisms. Secondly, the paper introduces methodological innovation through the application of the PSM-DID (Propensity Score Matching - Difference-in-Differences) approach, showcasing a novel perspective on the relationship between ESG practices

and executive compensation. Lastly, the study's conclusions offer valuable and actionable insights for corporate decision-making, governance, and policy formulation, as well as for strategies related to talent acquisition and retention. These insights enable companies to navigate ESG challenges more effectively and to make informed, forward-looking decisions that align with both sustainable practices and business objectives.

The remainder of this paper is organized as follows: Section "Literature review and research hypotheses" presents a literature review and theoretical analysis; Section "Research design" details the research design; Section "Empirical results and discussion" offers the empirical analysis and discussion; and the concluding section provides a synthesis of the findings.

Literature review and research hypotheses

ESG and executive compensation incentives. As ESG is a relatively new concept, early research predominantly approached the subject from the perspective of CSR (Corporate Social Responsibility). CSR is a more traditional concept that primarily focuses on how companies voluntarily engage in activities to improve society and the environment. ESG, encompassing Environmental, Social, and Governance dimensions, has a strong complementary relationship with CSR, and they share common objectives (Gillan et al., 2021). CSR can be considered a part of ESG, while ESG can be seen as an expanded extension of CSR (Broadstock et al., 2020). Surrounding the core elements of ESG and executive compensation, existing studies can be broadly categorized into two types based on the direction of causality. The first, and more prevalent direction of research, examines the impact of executive compensation on a company's ESG performance. This line of inquiry primarily focuses on how the structure or level of executive pay influences a company's ESG performance and behaviors. Understanding this relationship can assist companies in designing more effective compensation strategies to motivate executives to drive better ESG outcomes. Fabrizi et al. (2014) found divergent effects of the form of executive compensation incentives on a company's CSR (which includes ESG factors) behaviors: non-monetary incentives positively influence corporate CSR behaviors, while monetary incentives have the opposite effect. Hong et al. (2016) confirmed how corporate governance mechanisms and executive compensation either encourage or inhibit ESG performance. Miles and Miles (2013) more directly explored the relationship between CSR practices and executive compensation, finding that when executive pay is more closely aligned with CSR practices, a company's CSR performance might improve. Zhu et al. (2023) discovered that in listed companies in China, executive compensation incentives significantly enhanced ESG performance. Summarizing the conclusions of existing literature, it is evident that the structure and form of executive compensation have a significant impact on a company's ESG performance. Specifically, non-monetary incentives tend to enhance CSR and ESG outcomes, while monetary incentives may have the opposite effect. Additionally, strong corporate governance and compensation schemes closely tied to CSR can further promote a company's ESG performance.

The focus of this paper, however, is on the alternative direction, which is the impact of a company's ESG practices on executive compensation. Specifically, when a company adopts and practices ESG principles, does this behavior lead to adjustments in the structure or level of its executive compensation? Does the company's ESG practice result in an increase or decrease in executive pay? Do companies reward executives with additional incentives for actively promoting ESG practices? Understanding this relationship can help investors, boards of directors, and other stakeholders grasp the determinants of executive compensation

and the potential value of ESG practices. While there is no direct research on this relationship in the academic world currently, insights can be gleaned from existing study conclusions. Berrone and Gomez-Mejia (2009) confirmed how environmental performance, a crucial dimension of ESG, affects executive compensation. Deckop et al. (2006) suggested that there is a link between executive compensation structure and a company's social performance. Specific compensation incentives might either encourage or discourage executives from pursuing goals related to social performance. Hong et al. (2016) found from a corporate governance perspective (a crucial dimension of ESG) that good corporate governance can increase executive CSR compensation incentives. Cavaco et al. (2020) specifically explored the relationship between CSR practices and executive compensation, finding that when executive pay is more closely tied to CSR practices, a company's CSR performance might be better.

From a theoretical standpoint, the relationship between a company's adherence to ESG practices and executive compensation can be elucidated through several established theoretical frameworks. First, according to stakeholder theory, a company's proactive engagement in ESG practices can better address the needs of various stakeholders (Liu, 2022), thereby enhancing the company's reputation and long-term financial performance (Velte, 2020), which may provide a legitimate basis for higher executive compensation. Additionally, based on agency theory, there is an inherent conflict of interest between shareholders and executives. To align executives' decisions with shareholders' interests, shareholders may offer performance-linked compensation (Jensen and Meckling, 1976). When a company adheres to ESG practices, its long-term value may increase, potentially leading to higher executive compensation (Bebchuk and Fried, 2003). Furthermore, from the perspective of incentive and performance theory, companies typically offer financial rewards or incentives to motivate senior managers to achieve corporate goals and enhance company performance (Jensen and Murphy, 1990). If adherence to ESG practices is viewed as a means to enhance company value or reduce risks, executives might receive higher compensation as a result (Lee et al., 2024). Moreover, if ESG practices are seen as an innovative management strategy or a demonstration of leadership, the company might reward executives accordingly (Gupta and Govindarajan, 1984). This aligns with incentive and performance theory but leans more toward rewarding leadership and innovation capabilities. Finally, as global attention to ESG practices continues to grow, companies may face increased competitive pressure, particularly in attracting and retaining executives focused on ESG initiatives (Homroy et al., 2023). To retain these executives, companies may offer more competitive compensation packages (Edmans, 2011). Based on the above analysis, we can propose the following hypothesis:

H₁: There is a positive correlation between a company's adherence to ESG practices and executive compensation incentives.

The mediating role of financial performance, corporate reputation and investor relationship. In recent years, a substantial amount of research has been conducted on the relationship between ESG practices and corporate financial performance. The findings predominantly indicate a positive correlation between sound ESG practices and improved financial outcomes. Eccles et al. (2014) found that companies with high ESG scores performed better financially and that this performance was more enduring. Friede et al. (2015) also confirmed the positive relationship between ESG and financial performance. Moreover, traditional corporate governance research has shown that executive compensation is often positively correlated with a

company's financial performance (Jensen and Murphy, 1990). Therefore, if ESG practices can enhance a company's financial outcomes, then such improvements might influence executive pay. Edmans (2011) identified a positive relationship between high employee satisfaction and long-term stock returns. Employee satisfaction can be considered a component of ESG, while stock returns can serve as an indicator of corporate financial performance. Based on the aforementioned analysis, one might suggest that there exists a potential mechanism wherein corporate engagement in ESG practices could lead to enhanced company performance, which in turn might influence executive compensation incentives.

Corporate reputation is regarded as an intangible asset that positively impacts a company's financial performance and competitive advantage (Fombrun and Shanley, 1990). A high corporate reputation can aid businesses in attracting and retaining employees, reducing financing costs, and increasing customer loyalty (Turban and Greening, 1997). Moreover, Brammer and Pavelin (2006) explored the relationship between corporate social performance and executive compensation, highlighting corporate reputation as a potential key factor. Research has found a positive correlation between a company's ESG performance and its reputation (Meng et al., 2023). Good ESG practices often imply higher corporate value, better financial performance, and reduced risk. For executives, their compensation structures are typically closely aligned with the company's long-term performance. Companies with a commendable reputation tend to more easily attract and retain top managerial talent and offer them higher compensation (Terviö, 2008). ESG practices can bolster a company's reputation, and an enhanced reputation might, in turn, lead to increased executive compensation. Therefore, it can be posited that corporate reputation might play a mediating role between ESG practices and executive compensation.

As ESG investing becomes increasingly popular, a company's ESG practices have become particularly crucial in attracting and maintaining investor relations. Goss and Roberts (2011) proposed a relationship between socially responsible investing and a company's financial performance, suggesting that sound ESG practices can strengthen investor relations. Benlemlih et al. (2018) also discussed the relationship between corporate social responsibility and CEO compensation, touching upon some considerations related to investor relations. Effective ESG practices may enhance communication, transparency, and trust between companies and investors. The strength of investor relations can mitigate information asymmetry (Healy and Palepu, 2001), subsequently affecting stock prices (Yan and Zhang, 2009) and financial index (Bushee and Miller, 2012), which, in turn, indirectly impacts executive compensation based on company financial performance. Given the above analysis, we set the following research hypothesis:

H₂: Financial performance mediates the relationship between corporate ESG practices and executive compensation.

H₃: Corporate reputation mediates the relationship between corporate ESG practices and executive compensation.

H₄: Investor relationship mediates the relationship between corporate ESG practices and executive compensation.

Research design

Identification method. This paper empirically examines the influence of ESG practices on executive compensation incentives in Chinese listed companies using a PSM-DID model. The DID model, recognized as a crucial instrument for assessing the impact of policies, is progressively being employed in empirical research concerning ESG topics (Chen and Xie, 2022; Zhang et al., 2023).

For the DID model to be valid, it must satisfy two conditions: random events and random grouping. Using the DID model alone might not meet these conditions for this study. First, we consider a company's engagement in ESG practices and the attainment of ESG ratings as policy events, which might not align with the random event assumption. Second, companies with ESG ratings are mainly concentrated in the eastern coastal regions of mainland China. This concentration can be attributed to the region's advanced economic development, regulatory framework, infrastructure, and technology, suggesting it may not meet the random grouping assumption. Hence, we adopt the PSM-DID model introduced by (Heckman et al., 1997). This model first identifies control companies with characteristics similar to those of the experimental group through the PSM method. Once a balance is achieved, the DID method is applied to assess policy effects, effectively minimizing endogeneity issues and isolating the pure policy impact. The idea of this paper is to find company j in the control group that has not obtained an ESG rating, such that j and the experimental group company i , which has obtained an ESG rating, have as similar observable variables as possible, i.e., $X_i \approx X_j$.

When a company's individual characteristics determining the probability of participating in ESG practices depend entirely on observable control variables, the DID method can effectively identify the impact of ESG practices on executive compensation incentives. The principle of using the DID method is based on the "ignorability" assumption proposed by Rosenbaum and Rubin (1983). Given certain characteristic variables, the distribution of the outcome variable is identical between the experimental and control groups, i.e., $E(y_{0i} | x_i, D_i) = E(y_{0i} | x_i)$ and $E(y_{1i} | x_i, D_i) = E(y_{1i} | x_i)$. Here, D_i represents the treatment variable, with 1 indicating receiving treatment and 0 indicating no treatment; y_i is the outcome variable, with y_{1i} when $D_i = 1$ and y_{0i} when $D_i = 0$; and x_i is the covariate, encompassing certain characteristic values. The mean "ignorability" implies that, given x_i , the means of y_{1i} and y_{0i} are independent of D_i . In principle, x_i can be directly introduced as a control variable in the regression equation to address the omitted variable problem. This paper uses logit regression to calculate the propensity scores of variables for both the experimental and control groups. Based on these propensity scores, we employ the k-nearest neighbor matching method (with k set to 2) for sample matching.

Data. The sample for this research includes companies listed on the Main Boards of the Shanghai and Shenzhen Stock Exchanges in the Chinese A-share market from 2011 to 2021. The data was processed as follows: (1) companies designated as "ST" or "*ST" were excluded⁴; (2) firms from the financial sector were removed⁵; (3) samples with missing values for key variables were discarded; and (4) the data was winsorized at the 1% and 99% levels. After applying these filters, we compiled a panel dataset consisting of 12,832 observations from 1,373 listed companies. The data was sourced from the China Stock Market and Accounting Research (CSMAR) database, the WIND database, and the Chinese Research Data Services (CNRDS) platform.

Variables

Independent variable. In this study, we utilize the ESG rating data from "Syn Tao Green Finance" to construct the core independent variable (*DID*). "Syn Tao Green Finance" stands out as China's pioneer in releasing such rating data and is notably the first Chinese service agency to endorse the UNPRI. The metrics they disseminate are highly regarded. By the year 2021, their ESG evaluations encompassed over 1500 publicly traded companies in China, laying the groundwork for the formation of experimental

Table 1 Control variables definition.

Symbols	Name	Definition
Age	Age of company	Natural logarithm of the number of years the company has been listed +1
Size	Size of company	Logarithm of total assets
Gearing	Debt-to-asset ratio	Company's total liabilities/total assets
Employees	Number of employees	Number of employees in the company
Revenue	Profitability of company	Company's net profit/main business income
Shareholding	Equity concentration	Proportion of shares held by the top ten shareholders
Dual	Dual positions	Dummy variable, valued at 1 when the chairman also serves as the general manager, otherwise valued at 0
Dispersion	Separation rate of control and ownership rights	The difference in ownership between the actual controller of the listed company and the controller

and control groups in the multi-temporal Difference-in-Differences (DID) methodology. Drawing inspiration from the methods of Tan and Zhu (2022), if “Syn Tao Green Finance” has published rating data for company i in year t , it is categorized as the treatment group, assigning DID as 1. In the absence of such data, it is designated as the control group, with DID mark as 0.

Furthermore, for the sake of robustness checks, this research adopts the ESG rating data from Hua Zheng as a substitute for the primary explanatory variable. The Hua Zheng ESG scoring system divides companies into nine levels according to their ESG performance, namely: AAA, AA, A, BBB, BB, B, CCC, CC, C. Following the practice of a majority of Chinese researchers (Xi et al., 2023), this study assigns these grades from highest to lowest as “9 ~ 1”. In order to mitigate the impact of heteroscedasticity and extreme values, a natural logarithmic transformation has been applied to this variable.

Dependent variable. The dependent variable in this study is executive compensation (Pay). Following the approach of Perry and Zenner (2001), we calculate the level of executive compensation using the natural logarithm of the total cash compensation of the top three executives. The data is sourced from the company's annual reports.

Control variables. Based on existing research, this study incorporates a series of firm-level control variables. Specifically, these include company age (Age), company size ($Size$), debt-to-asset ratio ($Gearing$), number of employees ($Employees$), company profitability ($Revenue$), equity concentration ($Shareholding$), dual positions ($Dual$) and Separation rate of control and ownership rights ($Dispersion$). Additionally, individual company fixed effects and year-fixed effects are also considered as control variables. Detailed control variable names, symbols, and definitions can be found in Table 1.

Mediating variables. To examine the mechanism by which corporate ESG practices influence executive compensation incentives, this paper introduces the following mediating variables:

Firstly, this study selects “financial performance” as the potential mediating variable and adopts ROE (Return on Equity) as its representative indicator (ROE). ROE is a common metric for measuring company performance, reflecting the relationship between a company's net profit and shareholders' equity (Damodaran, 2011). Through ROE, investors, company management, and other stakeholders can gain a clearer understanding of the economic value the company creates for its shareholders.

Next, we identified “corporate reputation” as the second mediating variable ($Reputation$). Based on previous research, we developed an evaluation system for corporate reputation, which is built around four core factors: image, competitiveness, value orientation, and cross-boundary capabilities (Meng et al., 2023).

To validate the principal component analysis, we included indicators such as company size, market share, advertising spending, sustainability, years since listing, beta coefficient, enterprise type, net debt-to-asset ratio, long-term debt ratio, return on total assets, price-to-book ratio, book-to-market ratio, and Tobin's Q (a ratio comparing the market value of a company to the replacement cost of its assets). The cumulative variance contribution of the six factors extracted through the principal component analysis, post-rotation, was used to calculate a composite score for corporate reputation.

In addition, “investor relations” was identified as a third mediating variable, represented by “investor attention” ($Attention$). Early studies measured investor attention using stock trading data, such as volume and liquidity (e.g., Barber and Odean 2008, Gervais et al. 2001), as well as the number of shareholders and stocks held (e.g., D'Aveni and Finkelstein 1994). More recent research has shifted towards indicators like social media attention and search engine queries to measure investor interest. For example, Hahn (2007) used mentions in The Wall Street Journal, while Sprenger et al. (2014) counted relevant tweets on Twitter. Drawing on the approach by Da et al. (2011), which used Google search volume as a proxy for investor attention, we employed Baidu, China's leading search engine, as a similar metric. Specifically, we calculated the sum of search volumes for the company's stock code, abbreviation, and full name on Baidu, and to address heteroscedasticity and mitigate the influence of outliers, we added one to the total and applied a natural logarithmic transformation.

Model setup. Inspired by An and Jiang (2020), the baseline regression setup of this paper is as shown in Model (1):

$$Pay_{it} = \beta_0 + \beta_1 DID_{it} + \beta_2 Treat_i + \beta_3 Time_t + \beta_4 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Where:

i represents a company,

t denotes the year.

Pay_{it} stands for the executive compensation incentive for company i in year t .

$Treat_i$ is a dummy variable for grouping. If company i receives an ESG rating during the research period covered in this paper, it is classified as an experimental group company and $Treat_i = 1$. Conversely, if company i has never received an ESG rating during the research period, it is classified as a control group company and $Treat_i = 0$.

$Time_t$ is a time dummy variable. For an experimental group company i , if the year t first receives an ESG rating during the research period is denoted as the “Policy Year”, then if $t < \text{Policy Year}$, $Time_t = 0$; if $t \geq \text{Policy Year}$, $Time_t = 1$.

$Controls_{it}$ are control variables at the company level. μ_i represents industrial fixed effects, and λ_t represents time fixed effects.

DID_{it} is the interaction term of $Treat_i$ and $Time_t$. The coefficient β_1 is the main focus of this paper, indicating the impact of a company's ESG practices on executive compensation.

The test for the mechanism effect is built upon the mediation effect testing method proposed by Baron and Kenny (1986),

specifically as illustrated in Model (2) and Model (3).

$$Mediator_{it} = \alpha_0 + \alpha_1 DID_{it} + \alpha_2 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it} \tag{2}$$

$$Pay_{it} = \gamma_0 + \gamma_1 Mediator_{it} + \gamma_2 DID_{it} + \gamma_3 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it} \tag{3}$$

In Models (2) and (3), the $Mediator_{it}$ stands for the mediating effect variable, specifically encompassing company performance, corporate reputation, and investor relations. The interpretations of the other variables are consistent with Model (1). If both α_1 and γ_1 are significant, it indicates the presence of the mediating effect by the $Mediator_{it}$.

Empirical results and discussion

Propensity score matching results. To address the selection bias in sample selection, inspired by An and Jiang (2020) this study initially conducted Propensity Score Matching (PSM) for the experimental and control groups within the sample, using the control variables from model (1) as a set of covariates. Figure 1 displays the kernel density function graph of PSM. The kernel density function graph serves as an assessment tool for the quality of PSM. The greater the overlap between the kernel density graphs of the experimental and control groups, the better the matching quality.

Figure 1 demonstrates that, before PSM, the skewness and kurtosis of the control group's kernel density showed significant deviations. However, after PSM, the kernel density distributions of both the experimental and control groups converged more closely, indicating an improved quality of matching. This suggests that PSM effectively mitigated the selection bias.

For the PSM results to be deemed reliable, they must adhere to the "Conditional Independence Assumption". This stipulates that there should be no significant differences between the experimental and control groups concerning the matched variables. A general rule of thumb to gauge the efficacy of PSM is to ensure that the absolute value of the standard deviation of the matched covariates is less than 20 (Rosenbaum and Rubin, 1983). The smaller this absolute value, the better the matching outcome (Smith and Todd, 2005). Table 2 provides a comparison of the balance tests before and after the matching process.

From Table 2, the variables "Size", "Age", "Gearing", "Revenue", "Shareholding", "Dual", and "Dispersion" show balance after propensity score matching, suggesting a reduction in selection bias for these factors. However, the "Employees" variable poses a

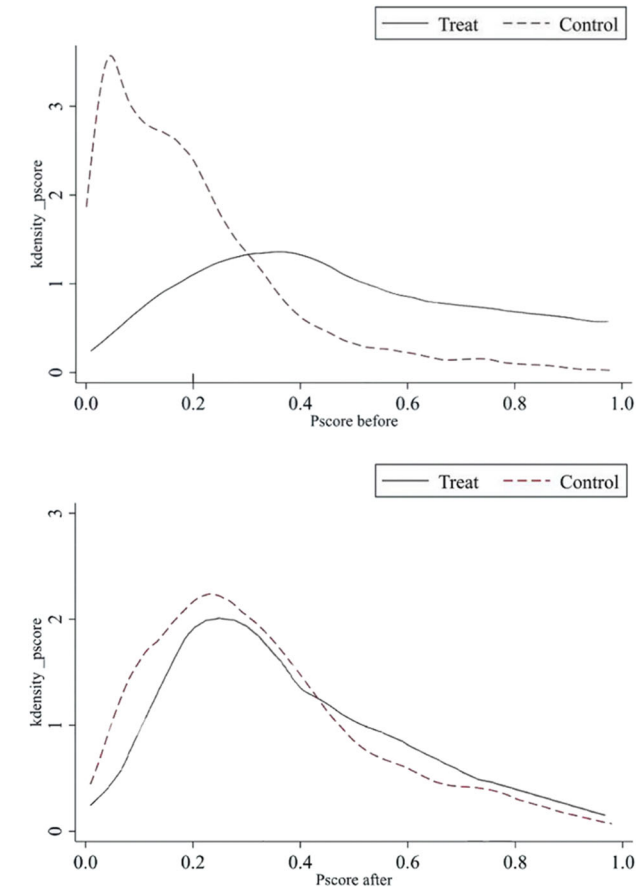


Fig. 1 Kernel density function before and after PSM.

Table 2 Balance test results.							
Variable	(U)Unmatched (M)Matched	Mean		% reduct		t-test	
		Treated	Control	% bias	bias	t	p> t
Size	U	23.072	21.836	116.3	98.8	59.34	0.000
	M	22.934	22.920	1.4		0.51	0.608
Age	U	13.150	11.409	24.5	58.0	11.79	0.000
	M	12.922	13.654	-10.3		-3.99	0.493
Gearing	U	0.44896	0.41702	16.1	10.3	7.66	0.000
	M	0.44025	0.46890	-14.4		-5.41	0.677
Revenue	U	1.3787	1.3393	4.0	-65.1	1.93	0.054
	M	1.3786	1.5622	-18.6		-5.62	0.778
Shareholding	U	35.982	32.903	21.1	54.3	10.33	0.000
	M	35.830	34.423	9.6		3.70	0.909
Employees	U	9021.3	2678.9	76.8	66.1	44.84	0.000
	M	6824.2	8974.5	-26.0		-9.38	0.000
Dual	U	0.25617	0.28536	-6.6	78.7	-3.14	0.002
	M	0.25385	0.26006	-1.4		-0.56	0.575
Dispersion	U	6.3138	5.2093	13.9	80.9	6.79	0.000
	M	6.3557	6.1453	2.6		1.00	0.315

Table 3 Descriptive analysis.					
Variable	Mean	p50	Max	Min	SD
DID	0.134	0.000	1.000	0.000	0.340
Pay	14.43	14.41	17.90	0.000	0.827
Size	22.17	22.05	25.71	19.71	1.184
Age	11.97	11	28	1	7.321
Gearing	0.430	0.422	0.884	0.0570	0.201
Revenue	1.358	1.121	7.964	0.313	1.015
Shareholding	3.414	3.431	4.289	2.207	0.460
Employees	2.031	2.038	2.382	1.521	0.154
Dual	0.283	0.000	1.000	0.000	0.450
Dispersion	5.537	0.201	28.80	0.000	7.770
ROE	0.061	0.069	0.328	−0.682	0.127
Reputation	0.109	0.111	6.032	−4.761	0.961
Attention	6.730	6.668	8.690	4.078	0.658

challenge. Before matching, a significant bias of 76.8% was observed. After matching, while the bias shifted to −26.0%, the *t*-test *p*-value was still 0, indicating a persistent significant difference for this variable. A closer look at the data revealed that the experimental group primarily consists of companies with a large number of employees, in contrast to the control group. The “Employees” data also has outliers; after adjustments, the values ranged from 97 to 50,319 with a median of 2150. These outliers could impact the matching. The *k*-nearest neighbor matching method may not be the best fit for the skewed distribution of the “Employees” variable, suggesting that other methods, such as kernel matching or radius matching, might be more effective.

Descriptive analysis. Table 3 provides a detailed presentation of the descriptive statistics for the main variables in the total sample after PSM processing. From the Table 3, it’s evident that the core independent variable, *DID*, has a mean value of 0.134. This indicates that 13.4% of the observations in the entire sample have a value of 1. Given that the sign of *DID* (*Treat***Time*) is consistent with *Treat*, we can infer that 13.4% of the sample data belongs to the experimental group. Setting aside the details of data processing, this suggests that among the A-share listed companies in China, the number of companies participating in ESG practices and receiving ESG ratings is still relatively small compared to the total number of listed companies.

Further examining the core dependent variable, *Pay*, we notice that its median is 14.41, which is very close to its mean, implying that the distribution of this variable is approximately normal and that outliers have minimal impact on its mean. Among the control variables, for instance, the “Age” variable shows that the age range of companies spans from 1 to 28 years, with a standard deviation of 7.321. This indicates a relatively high dispersion in company ages within the sample, suggesting significant age differences, covering both emerging and mature companies. For the “Dispersion” variable, the maximum and minimum values are 28.80 and 0, respectively, with a standard deviation of 7.770. Additionally, the other control variables demonstrate robust statistical characteristics. Additionally, we applied a logarithmic transformation to the “Employees” variable.

Moreover, we conducted a Pearson correlation analysis among the dependent variable, independent variable, control variables, and mediating variables, with all correlation coefficients between the variables being less than 0.5. From the results of the correlation analysis, there is a significant positive correlation between the dependent variable “Pay” and the independent variable “DID”, with a correlation coefficient of 0.384. This preliminary evidence suggests that participation in ESG practices

Table 4 Baseline regression results.			
	(a) Pay	(b) Pay	(c) Pay
DID	0.855*** (0.051)	0.300*** (0.035)	0.120*** (0.032)
Size		0.297*** (0.037)	0.275*** (0.024)
Age		0.00376 (0.002)	−0.00228 (0.002)
Gearing		−0.499*** (0.106)	−0.538*** (0.090)
Revenue		0.00965 (0.027)	−0.0152 (0.020)
Shareholding		−0.140*** (0.036)	−0.0686** (0.028)
Employees		0.200 (0.188)	0.537*** (0.200)
Dual		0.107*** (0.039)	0.0567 (0.043)
Dispersion		0.00221 (0.002)	0.00360*** (0.001)
Constant	14.31*** (0.033)	7.989*** (0.718)	7.094*** (0.473)
Fixed effect	NO	NO	YES
N	12,817	10,874	10,874
Adjusted R ²	0.123	0.246	0.354

The standard errors for clustering at the industrial level are in parentheses. The Year, Industry indicators are included in the corresponding models, but their coefficients are not in this table. ***, ** represent significance at 1%, 5% levels, respectively.

contributes to enhanced executive incentives in companies. Furthermore, this study also carried out a Variance Inflation Factor (VIF) test. Due to space constraints, only the results are reported, with an average VIF value of 1.03, indicating no significant multicollinearity issues among the variables.

Baseline regressions. The subsequent part of this section explores the influence of companies ESG practices on executive compensation incentives. This is estimated based on the design of Model (1). Table 4 reports the results of three baseline regressions. All regression analyses have controlled for fixed effects of the year and industry and have utilized clustered standard errors at the corporate level.

The regression result (a) in Table 4 is based on a model that does not include control variables. The findings reveal that a company’s ESG practices can significantly enhance executive compensation incentives. Regression result (b) further suggests that upon introducing a series of control variables, the *DID* regression coefficient stands at 0.300, significant at the 1% level. This indicates that engaging in ESG practices can increase executive compensation incentives by 30%. Regression result (c) shows that even after adding control variables, fixed effects of the year, and industry, the *DID* regression coefficient remains significantly positive at the 1% level. ESG practices continue to have a positive effect on executive compensation. From regression result (a) to result (c), the Adjusted R² progressively improves, indicating that the model’s fit is becoming increasingly refined. This confirms Hypothesis 1: Companies’ engagement in ESG practices has a significantly positive role in promoting executive compensation incentives.

This conclusion demonstrates that in recent years, as the Chinese government places increasing emphasis on sustainable development and the green economy, the compensation of top

executives in Chinese-listed companies aligns with ESG development objectives. Companies engaged in ESG practices might be more likely to receive support and incentives from the Chinese government (Berg et al., 2022), such as tax benefits and subsidies. This governmental backing could indirectly boost the performance of firms involved in ESG initiatives, consequently raising executive compensation. Additionally, as Chinese consumers and investors grow increasingly attentive to ESG issues (Tan and Zhu, 2022), a company's proactive approach to ESG can enhance its brand value and market standing. Executives striving to achieve this goal might be rewarded with corresponding compensation incentives. Furthermore, with the gradual opening and maturation of China's capital markets, there is a surge of foreign investment (Zhou et al., 2022). Many international investors prioritize ESG considerations; thus, companies with commendable ESG performance may be more attractive to foreign investors, increasing the firm's market value. This market perception could lead to higher remuneration for company executives. It's noteworthy that state-owned enterprises (SOEs) occupy a significant position in China's capital market (Zhou et al., 2022). Decision-making in these enterprises often reflects governmental policies and macroeconomic regulation. As the Chinese government underscores ESG matters, the ESG practices of SOEs may intensify. Compared to non-listed firms, do SOEs exhibit a stronger positive correlation between ESG practices and executive compensation? We will conduct a heterogeneity analysis on the findings of our baseline regression in subsequent sections.

Regarding control variables, the size of a company's assets (*Size*) is directly proportional to executive compensation incentives. This is because larger companies require a higher level of management skills and experience for operations. Hence, higher compensation incentives might be used to attract and retain competent executives, as larger companies demand executives with more experience and capability (Rosen, 1981). Similarly, the number of employees a company has (*Employees*) is positively related to executive compensation incentives. Managing more employees requires enhanced leadership capabilities, thereby necessitating higher compensation to motivate and reward executives (Terviö, 2008). Additionally, the debt-to-asset ratio (*Gearing*) is inversely related to executive compensation incentives. A higher ratio might signify that the company faces elevated financial risks, thereby potentially hindering it from offering higher compensation, as Jensen and Meckling (1976) had discussed the influence of agency costs and debt on managerial compensation. Moreover, shareholding concentration (*Shareholding*) is inversely proportional to executive compensation incentives. When share ownership is highly concentrated, a few shareholders might find it easier to monitor and control managers, thereby reducing the need for high compensation incentives (Shleifer and Vishny, 1986). Lastly, the dispersion between voting and cash-flow rights (*Dispersion*) is negatively related to executive compensation incentives. Such a dispersion might imply a misalignment between the controlling shareholders and other shareholders. To mitigate potential agency costs, companies might curtail executive compensation incentives (La Porta et al., 1999).

Robustness tests

Parallel trends assumption test. Ensuring unbiased results in PSM-DID necessitates the satisfaction of the Parallel Trends Assumption. If there's a time trend difference between the treatment and control groups before the event, changes in executive compensation incentives might not be attributable to the company's ESG practices. Instead, these changes might arise

from prior time trend differences. Therefore, to validate the appropriateness of the DID model in this study, it's essential to verify whether there exists a parallel trend in executive compensation incentives between the treatment and control groups before the company's participation in ESG practices. For the parallel trends test, this study follows the approach of Hu et al. (2023) and constructs the following model (4):

$$\begin{aligned} Pay = & \alpha + \beta_s^{precut} [D_i * I(t - T_D < -3)] \\ & + \sum_{s=-3}^{-2} \beta_s^{pre} [D_i * I(t - T_D = s)] \\ & + \sum_{s=0}^2 \beta_s^{post} [D_i * I(t - T_D = s)] \\ & + \beta_s^{postcut} [D_i * I(t - T_D > 2)] \\ & + \mu_i + \lambda_t + \varepsilon_{it} \end{aligned} \quad (4)$$

In this, $D_i = 1$ indicates that company i is in the treatment group, while $D_i = 0$ indicates company i is in the control group; $I(\cdot)$ is the indicator function, and T_D represents the period of the ESG rating, taking the relative time from the release date of the ESG rating as a reference ($t - T_D = s$), where $s = -1$ is the baseline period. The other variables have the same meanings as in model (1) and will not be elaborated further. The coefficient of interest in this model is β_s , and its variation reflects the dynamic changes in the impact of ESG practices on executive compensation. If the regression coefficients β_s^{pre} and β_s^{precut} are not significantly different from 0, and the regression coefficients β_s^{post} and $\beta_s^{postcut}$ are significantly different from 0, it suggests that the multi-timepoint difference-in-differences model constructed in this paper satisfies the parallel trend test.

The results of the parallel trends test are illustrated in Fig. 2. As can be discerned from the figure, prior to companies engaging in ESG practices (i.e., obtaining an ESG rating), there wasn't a significant difference in executive compensation incentives between the treatment and control groups, evidenced by the regression coefficient β_s^{pre} being statistically insignificant from zero, thereby satisfying the parallel trends assumption. However, post-adoption of ESG practices, both groups experienced a notable rise in executive compensation incentives, with the regression coefficient β_s^{post} being significant at the 1% level. Notably, a marked difference in executive compensation incentives between the two groups emerged in the third period after receiving the ESG rating (post3). This suggests that ESG practices have had an impact on the executive compensation incentives of the treatment group, with the effects manifesting with a certain lag.

Placebo test. To ensure that the impact of ESG practices on executive compensation isn't driven by other random factors, this study further employed a placebo test to discern the randomness of the effects of ESG practices. Following the approach of La Ferrara et al. (2012), we randomly sampled 500 times based on the distribution of the ESG rating variable in the baseline regression, constructing "pseudo-policy dummy variables." These were then re-estimated using Model (1) to examine their coefficient and p -value distributions, as shown in Fig. 3.

Based on the results from Fig. 3, the mean regression coefficients of executive compensation incentives on the "pseudo-policy dummy variables" are less than those of the baseline regression. The distribution of the estimated coefficients is also close to a normal distribution, with the majority of p -values exceeding 0.10, indicating insignificance at the 10% level. This suggests that the impact of companies engaging in ESG practices on executive compensation incentives is not influenced

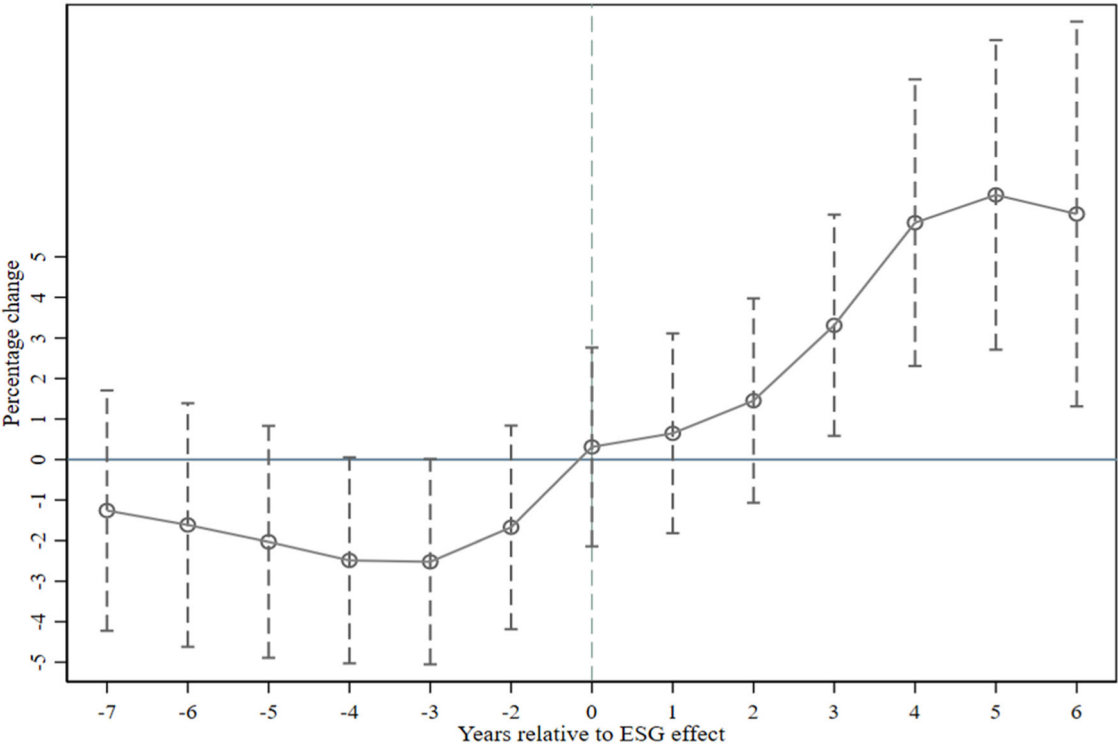


Fig. 2 Parallel trends test result.

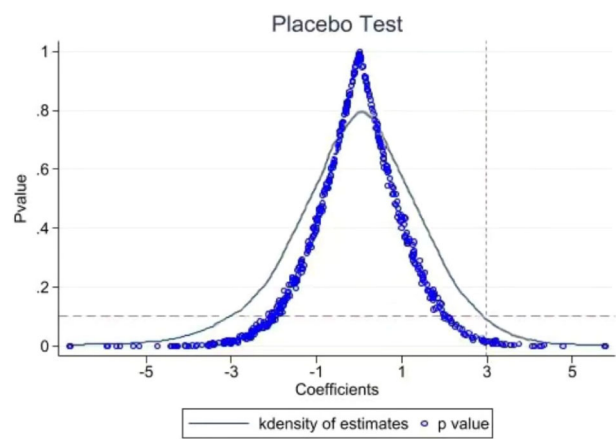


Fig. 3 Placebo test result.

by other random factors, affirming that the conclusions drawn from the baseline regression are relatively robust.

Replacing key variables. To further validate the robustness of the conclusion that companies’ involvement in ESG practices enhances executive compensation incentives, we followed the approach proposed by Hu et al. (2023). We replaced the primary explanatory variable using the Hua Zheng ESG rating data (*HZ_ESG*) to replace the main explanatory variable. Since the Hua Zheng ESG rating data already covers over 4000 listed companies on the main boards of both the Shanghai and Shenzhen stock exchanges, it is more appropriate to use this rating data directly as the primary explanatory variable. Following the procedure from Lin et al. (2021), we assigned values from 1 to 9 to the 9-tier ESG ratings, with higher values indicating superior ratings. The regression results are presented in column (1) of Table 5. The coefficient for the Hua Zheng ESG

Table 5 Regression for replacing key variables.					
	(1) <i>Pay</i>	(2) <i>L. Pay</i>	(3) <i>L2. Pay</i>	(4) <i>L3. Pay</i>	(5) <i>Pay</i>
<i>HZ_ESG</i>	0.0383*** (0.011)				
<i>DID</i>		0.124*** (0.037)	0.152*** (0.041)	0.186*** (0.046)	0.095*** (0.036)
Constant	7.604*** (0.532)	8.290*** (0.528)	8.778*** (0.540)	9.447*** (0.518)	7.869*** (0.536)
Control variable	YES	YES	YES	YES	YES
Fixed effect	YES	YES	YES	YES	YES
<i>N</i>	10874	9972	8760	7600	10874
Adjusted <i>R</i> ²	0.358	0.335	0.303	0.277	0.362

The standard errors for clustering at the industrial level are in parentheses. The Year, Industry indicators, control variables are included in the corresponding models, but their coefficients are not in this table. *** represents significance at 1% level.

(*HZ_ESG*) is 0.0383, and it is statistically significant at the 1% level.

Additionally, considering the potential lag in the effect of ESG practices on executive compensation incentives, we further test by replacing the dependent variable, *Pay*, with its lagged values (*L. Pay*, *L2. Pay*, *L3. Pay*). The results are displayed in columns (2), (3), and (4) of Table 5. The *DID* coefficients are 0.124, 0.152, and 0.186 respectively, all significant at the 1% level. Compared to the baseline regression coefficient of 0.120 (see Table 4), the *DID* coefficient becomes increasingly larger as the lag period lengthens, which is in line with our expectations. Additionally, in column (5) of Table 5, we employed the kernel matching from PSM to rederive the independent variable *DID* and conducted the regression. The results indicate that the coefficient for *DID* is 0.095 and is statistically significant at the 1% level, reinforcing the robustness of our baseline regression findings.

Heterogeneity analysis. This study subsequently segments the sample based on the nature of company ownership (*SOE*),

distinguishing between state-owned companies ($SOE = 1$) and non-state-owned companies ($SOE = 0$) for the baseline regression. This is to explore the impact of ESG practices on executive compensation in companies with different ownership characteristics. The results are presented in Table 6.

As per the data in Table 6, 34.14% of the companies in the sample are state-owned. The *DID* regression coefficients for state-owned companies ($SOE = 1$) and non-state-owned companies ($SOE = 0$) are 0.104 and 0.089, respectively, significant at the 1% and 5% levels. To demonstrate the significance of the difference in regression coefficients between the state-owned companies ($SOE = 1$) and non-state-owned companies ($SOE = 0$) subsamples, a CHOW test and a seemingly unrelated regression (SUR) test were conducted. The CHOW test constructs an interaction term between *SOE* and *DID*, which is significantly positive. In the SUR test, the probability of the difference in sample means between the state-owned companies ($SOE = 1$) subsample and state-owned ($SOE = 0$) subsample is 0.0000, indicating a significant difference in the regression coefficients of the two subsamples. Both subsamples show a significant positive correlation between ESG practices and executive compensation incentives, confirming the baseline regression conclusion. However, in the state-owned companies ($SOE = 1$) subsample, the

absolute value of this coefficient is larger, it's evident that the beneficial impact of ESG practices on executive pay incentives is more pronounced in state-owned companies than in non-state-owned ones.

Overall, the findings suggest that participation in ESG practices notably enhances executive compensation incentives. When examining the sub-samples, it's evident that the beneficial impact of ESG practices on executive pay incentives is more pronounced in state-owned companies than in non-state-owned ones. The potential explanation for the observed phenomenon might be rooted in the unique corporate structure and governance in China. State-owned companies in China are more susceptible to government interventions and policy directives (Jiang and Kim, 2015). If governmental policies lean towards endorsing ESG practices, these firms are more likely to be influenced, leading them to adjust their executive compensation strategies to prioritize ESG objectives. Additionally, state-owned enterprises may place a greater emphasis on their societal responsibility and brand image, given their intimate ties with the government and the public's perception (Deng et al., 2013). In pursuit of enhancing or maintaining such an image, these enterprises could actively promote ESG practices and utilize compensation mechanisms to motivate their top executives accordingly. Lastly, these enterprises might display a propensity for long-term goals and sustainable growth, aligning seamlessly with ESG practices. Consequently, restructuring the compensation strategy to incentivize long-term objectives could be more prevalent.

Mechanism impact analysis. Table 7 presents the regression outcomes for Model (2) and Model (3). In this table, columns (1) and (2) illustrate the test results for the mediating effect of the pathway “ESG Practices - Company Performance - Executive Compensation Incentives.” Columns (3) and (4) show the test outcomes for the mediating effect of the pathway “ESG Practices - Company Reputation - Executive Compensation Incentives.” Finally, columns (5) and (6) highlight the test results for the mediating effect of the pathway “ESG Practices - Investor Relations - Executive Compensation Incentives.”

To confirm the robustness of the mediating effect test results, the Bootstrap method was used for validation. As shown in the last row of Table 7, the estimated coefficients for both the direct

Table 6 Heterogeneity analysis on company ownership.

	(1) Pay <i>SOE = 1</i>	(2) Pay <i>SOE = 0</i>
DID	0.104*** (0.035)	0.089** (0.039)
Constant	8.617*** (0.317)	7.541*** (0.344)
Fixed effect	YES	YES
Control variable	YES	YES
N	3712	7160
Adjusted R^2	0.389	0.377

The standard errors for clustering at the industrial level are in parentheses. The Year, Industry indicators, control variables are included in the corresponding models, but their coefficients are not in this table. ***, ** represent significance at 1%, 5% levels, respectively.

Table 7 Intermediary mechanism test results.

	(1) <i>ROE</i>	(2) Pay	(3) Reputation	(4) Pay	(5) Attention	(6) Pay
DID	-0.011** (0.006)	0.104*** (0.037)	0.00399** (0.054)	0.125*** (0.034)	0.234*** (0.031)	0.100*** (0.035)
ROE		0.712*** (0.116)				
Reputation				0.287*** (0.033)		
Attention						0.0750** (0.029)
Constant	-0.534*** (0.072)	7.769*** (0.500)	-17.52*** (0.581)	13.54*** (0.793)	2.382*** (0.424)	7.384*** (0.475)
Fixed effect	YES	YES	YES	YES	YES	YES
Control variable	YES	YES	YES	YES	YES	YES
N	9513	9499	5792	5782	10744	10730
Adjusted R^2	0.139	0.366	0.806	0.332	0.485	0.357
Bootstrap Results	$P > z $ (0.00); (-0.0238914_ -0.0044821)		$P > z $ (0.01); (-0.0334886_ -0.0002453)		$P > z $ (0.00); (-0.0061746_ -0.0007229)	

The standard errors for clustering at the industrial level are in parentheses. The Year, Industry indicators, control variables are included in the corresponding models, but their coefficients are not in this table. ***, ** represent significance at 1%, 5% levels, respectively. The last row reports the significance levels of the direct effects in the bootstrap results, as well as the upper and lower bounds of the 95% confidence intervals.

and indirect effects of the mediating variables, including Company Performance (ROE), Company Reputation (Reputation), and Investor Relations (Attention), are statistically significant at the 1% level. Moreover, the 95% confidence intervals for these effects do not contain zero.

The results indicate that Company Performance, Company Reputation, and Investor Relations partially mediate the relationship between ESG practices and executive compensation. Specifically, Company Performance functions as a negative mediator, implying that ESG practices could harm financial performance, which in turn may reduce executive compensation. In this case, financial performance serves as a link between ESG efforts and compensation. Conversely, both Company Reputation and Investor Relations act as positive mediators, suggesting that ESG initiatives can improve a company's reputation and foster better investor relationships, ultimately leading to higher executive compensation incentives.

The negative link between ESG practices and financial performance differs from some previous studies (e.g., Friede et al. 2015). In China's capital market, businesses adopting ESG practices often incur significant upfront costs, such as investments in technological upgrades, employee training, and regulatory compliance. These expenditures may temporarily raise operating costs and reduce profits. For instance, efficiency might drop when implementing new ESG procedures as employees adjust (Gao, 2023). Furthermore, investors and markets may be slow to react to these changes, potentially depressing stock prices in the short term, especially if immediate returns aren't expected (Wang et al., 2022). As a result, early investments in ESG initiatives might hurt performance initially (Zhang et al., 2022), although they could enhance long-term sustainability and competitiveness. In China, government-driven ESG requirements could further increase compliance costs, which could negatively impact short-term performance (Zhou et al., 2022). However, ESG practices positively influence corporate reputation, with growing consumer demand for sustainability and social responsibility strengthening brand loyalty. Companies with strong ESG records may earn greater public trust, as social expectations in China for corporate responsibility continue to rise (Tan and Zhu, 2022). Additionally, ESG practices positively impact investor relations, as China's capital market opens to more foreign investors who prioritize ESG investments, making companies with strong ESG practices more appealing to foreign capital (Zhou et al., 2022).

Further research - ESG practices and 'income inequality'. The income disparity between executives and regular employees in the company, often referred to as "income inequality", is a hotly debated topic in both academic and public policy arenas and is subject to some controversy. From the perspective of the incentive contract theory (Murphy, 1999), those who favor a larger income gap argue that it serves as a motivation, driving top managers to work harder, thereby yielding greater economic benefits. To attract and retain the best managerial talent, they believe substantial compensation is necessary. Conversely, opponents believe that an excessive Income Inequality could lead to resource wastage, such as an overinvestment in executive compensation at the expense of other critical company investments. Looking at the issue from the perspective of organizational harmony and morale, the majority of scholars lean towards favoring a smaller income disparity. They contend that when employees perceive the compensation system as fair, it results in higher job satisfaction, loyalty, and productivity. On the flip side, a larger income gap could dampen employee morale and increase turnover (Card et al., 2012). From a shareholder's viewpoint,

proponents of a larger income gap primarily argue that higher compensation attracts and retains the best executives, maximizing the company's long-term profits. In contrast, scholars against a larger pay gap believe that excessive compensation could foster short-term behaviors at the cost of long-term corporate value (Bebchuk and Fried, 2004). Lastly, some companies emphasize team collaboration and fairness extensively. Within such corporate cultures, an excessive income disparity might conflict with the core company values (Akerlof and Yellen, 1990).

The empirical analysis of the preceding sections has established that company ESG practices significantly enhance executive incentives. This raises an inevitable question: as executive compensations increase, will it widen the income inequality within the company? Therefore, building upon Model (1), we replaced both the independent and dependent variables to construct a regression model to validate our hypothesis. Firstly, as shown in Model (5), we use the "Ratio of executive to average employee income" (*Ratio*) to represent 'Income Inequality' (Faleye et al., 2013), replacing the dependent variable in Model (1). The interpretations of other variables remain consistent with Model (1). The regression outcome mainly tests whether corporate ESG practices affect the internal income disparity of the company, focusing on the significance and sign of θ_1 . Subsequently, we continue to employ the 'Syn Tao Green Finance ESG' rating level, *ST_ESG*, as our independent variable (Broadstock et al., 2021) and build Model (6) for regression. The aim is to examine the effect of ESG practice levels on the internal income disparity after the company's involvement in ESG practices. The primary focus is on the significance and sign of φ_1 . The regression results are shown in Table 8.

$$Ratio_{it} = \theta_0 + \theta_1 DID_{it} + \theta_2 Treat_i + \theta_3 Time_t + \theta_4 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it} \tag{5}$$

$$Ratio_{it} = \varphi_0 + \varphi_1 ST_ESG_{it} + \varphi_2 Treat_i + \varphi_3 Time_t + \varphi_4 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it} \tag{6}$$

Table 8 presents regression results where the first column showcases the outcomes of Model (5), and the second column reveals the results from Model (6). Based on these findings, a company's ESG engagement demonstrates a significant positive correlation with the internal income disparity within the company. In contrast, the level of a company's ESG practices is inversely related to this internal income disparity.

The ESG engagement (*DID*), illustrated by the difference-in-differences measure, primarily reflects whether a company is currently engaged in ESG practices, without necessarily

Table 8 Further research result.

	(1) Ratio	(2) Ratio
DID	3.130*** (0.632)	
ST_ESG		-0.0778*** (0.210)
Constant	83.18*** (14.563)	77.57*** (14.549)
Fixed effect	YES	YES
Control variable	YES	YES
N	10,888	10,888
Adjusted R ²	0.0129	0.0104

The standard errors for clustering at the industrial level are in parentheses. The Year, Industry indicators, control variables are included in the corresponding models, but their coefficients are not in this table. *** represents significance at 1% level.

accounting for the quality or sustainability of such initiatives. For instance, a firm might choose to adopt certain ESG practices in response to immediate external pressures or to align with prevailing trends. However, this doesn't necessarily indicate a long-term commitment or genuine dedication to these practices, which can be interpreted as a short-term effect. On the other hand, the ESG rating (*ST_ESG*) delves deeper, considering the quality, depth, and breadth of a company's ESG engagements. A high ESG rating could imply that a company is not only involved in ESG activities but excels in these areas, consistently seeking improvements. This can be perceived as a reflection of a firm's long-term commitment and continuous efforts in the ESG realm.

This suggests that when companies initially engage in ESG activities, they might undergo preliminary investments and resource allocations, such as R&D, staff training, and infrastructure enhancements. To realize the early benefits of these undertakings, top executives might require, and thus be rewarded for, extra effort and specialized expertise. This, in the short term, can escalate executive compensation, thereby widening the income gap within the company (Eccles et al., 2014). As time progresses, continued ESG engagements might profoundly influence company culture, emphasizing fairness, diversity, and inclusivity. This could lead to a more equitable pay structure as companies pivot their focus toward internal fairness and employee welfare (Pfeffer and Langton, 1993). Unlike ESG practices adopted merely as strategic moves or brand-boosting initiatives, a genuine and profound ESG commitment might steer companies towards valuing the welfare of all stakeholders, including their internal workforce. As a result, companies deeply dedicated to ESG may be more inclined to ensure a fair pay structure. Consequently, in the long run, as the depth of a company's ESG engagements increases, the income disparity between top executives and other employees might gradually narrow (Card et al., 2012).

Conclusion and insight

This paper primarily investigates the impact and underlying mechanisms of ESG practices in Chinese listed companies on executive compensation incentives. Innovatively, the baseline regression constructs a PSM-DID model, concluding that the participation in ESG practices by Chinese listed companies significantly elevates executive compensation. Furthermore, the robustness of the baseline regression model is solidified through passing parallel trend tests, placebo tests, and alternative variable tests. Heterogeneity analysis of the baseline regression reveals that the beneficial influence of ESG practices on executive compensation incentives is more pronounced in state-owned enterprises than in non-state-owned enterprises. Subsequently, by employing stepwise regression and the Bootstrap method for mechanism verification, the study finds that financial performance, corporate reputation, and investor relations all partially mediate the relationship between a company's ESG practices and executive compensation. Specifically, financial performance acts as a negative mediator, suggesting it weakens the positive association between ESG practices and executive compensation incentives. Conversely, both corporate reputation and investor relations serve as positive mediators, implying that as companies adopt ESG practices, their reputation and attention from investors typically rise, subsequently driving an increase in executive compensation incentives. Lastly, an extended study reveals that initial participation in ESG practices tends to widen the wealth gap between executives and other employees. However, as companies continue to elevate their levels of ESG practices, this "wealth disparity" gradually diminishes.

The first conclusion of this study suggests that participation in ESG practices by Chinese listed companies has significantly increased executive compensation, with the beneficial impact of ESG practices on executive compensation being more pronounced in state-owned enterprises than in non-state-owned ones. This finding underscores the close link between ESG practices and internal company management, especially executive compensation. For Chinese listed companies, this implies they can enhance their appeal to top executives by strengthening ESG practices, thereby attracting and retaining top management talent (Cai et al., 2011). As the significance of ESG in investment decisions grows, this conclusion offers shareholders and investors a window to understand how a company's ESG practices reflect in executive compensation, enabling a more comprehensive assessment of a company's future performance, governance structure, and corporate social responsibility (Flammer and Bansal, 2017). Investors might lean towards companies where a positive relationship between ESG practices and executive compensation exists, signifying a company's emphasis on sustainability and governance. This conclusion further guides companies, especially state-owned ones, on the significance of considering ESG practices when determining executive compensation strategies. It validates that social responsibility and economic benefits can coexist (Edmans, 2011). Companies can not only fulfill their social responsibilities through ESG practices but also realize economic growth benefits, such as increased executive compensation. This conclusion provides a reference for balancing economic rewards with ESG practices, contributing to fostering a more proactive corporate culture and boosting employee morale (Fabrizi et al., 2014). Lastly, policymakers such as governments and regulatory bodies can influence the formulation of specific policies or guidelines for these companies by understanding the unique relationship between ESG practices and executive compensation in state-owned enterprises (Fernando et al., 2017). For instance, if policymakers explicitly require that state-owned enterprises must consider ESG practices when formulating executive compensation strategies, this could include setting ratios or standards linking ESG goals to executive remuneration, thereby encouraging enterprises to incorporate social and environmental responsibility factors into compensation decisions. Furthermore, enhancing supervision of state-owned enterprises in their ESG practices ensures the genuine implementation of ESG-related policies and measures. In addition, the introduction of third-party audits and assessments can objectively verify a company's ESG performance. Additionally, state-owned enterprises could be required to increase the transparency of their ESG practices and executive compensation decisions, using regular reporting and public disclosure to inform the public and investors about their performance and progress in these areas. Encouraging state-owned enterprises to integrate the long-term benefits of ESG practices into their performance evaluation systems ensures that executive compensation aligns with long-term sustainable development goals, rather than solely short-term financial performance. Even providing ESG-related education and training for the management and staff of state-owned enterprises can enhance their understanding of the value and importance of ESG, thereby better integrating ESG elements into corporate culture and business strategies.

The second conclusion reveals that financial performance, reputation, and investor relations partially mediate the relationship between a company's ESG practices and executive compensation. Financial performance negatively mediates, while both reputation and investor relations positively mediate. This offers researchers and practitioners a holistic perspective, understanding that the relationship between ESG practices and executive compensation is not merely direct but mediated by various factors.

Intuitively, many might assume ESG practices directly elevate company performance, subsequently boosting executive compensation (Dhaliwal et al., 2011). However, the negative mediation suggests a more intricate relationship, possibly hinting at short-term conflicts or trade-offs with other financial metrics despite the long-term benefits of ESG practices (Margolis et al., 2009). This emphasizes the pivotal role of corporate reputation and investor relations in the modern enterprise (Servaes and Tamayo, 2013). Enhanced reputation and investor relations, stemming from ESG practices, could lead to increased executive compensation (Orlitzky et al., 2003), highlighting the importance of these non-financial factors in determining it. For corporate decision-makers, these insights offer a deeper understanding that can aid in balancing ESG practices with their impact on financial performance, reputation, and investor relations when formulating more comprehensive and long-term strategic decisions. For instance, by gradually implementing ESG initiatives, companies can spread out the initial costs and provide employees with more time to adapt to new processes, thereby mitigating the negative impact on production efficiency (Park and Oh, 2022). Additionally, engaging in transparent communication with investors and stakeholders to explain the long-term strategic benefits and potential returns of ESG investments can help alleviate short-term negative market reactions (Rounok et al., 2023). Companies could also take advantage of government subsidies and incentives related to ESG practices (Zhang et al., 2023). For investors, this perspective offers a new lens through which they can evaluate the relationship between ESG practices, financial performance, and other non-financial indicators, enabling them to make more comprehensive and informed investment decisions.

Lastly, this paper indirectly substantiates that early ESG practices can widen the pay gap between executives and other employees. Still, as companies continually engage, raising their ESG practice levels, this “Income Inequality” gradually decreases. This conclusion offers a deeper understanding of the short-term and long-term effects that companies might face when implementing ESG practices (Albuquerque et al., 2019). In the short term, ESG practices might lead to internal pay imbalances. Still, in the long run, with more profound ESG involvement, this imbalance might be alleviated, providing enterprises with vital references on how to consider fair compensation when implementing ESG practices (Jiraporn and Chintrakarn, 2013). For instance, companies could develop fairer compensation policies (Greene, 2018); increase employees’ ownership in the company through equity incentives or profit-sharing plans, allowing them to directly benefit from the company’s success (Bryson and Freeman, 2019); or provide ongoing training and career development opportunities to help employees enhance their skills and capabilities (Xiao et al., 2019), thereby enabling them to achieve career advancement and salary growth. Employees, investors, and other stakeholders can better understand the relationship between a company’s ESG practices and its internal compensation structure, leading to more informed decisions (Flammer and Luo, 2017). More broadly, this also unveils the relationship between ESG practices and societal fairness and stability, potentially exerting a positive impact in the long term.

However, this study’s potential limitations include its focus on Chinese-listed companies during a specific time frame, possibly restricting the generalizability of the conclusions, especially for companies in other countries or time periods. The study might not have considered qualitative factors affecting executive compensation, like culture, organizational structure, or the personalities and leadership styles of the executives. The chosen mediators (financial performance, reputation, and investor relations) might not be exhaustive or the only relevant factors. Future research could expand to other countries or regions, examine

Chinese companies over more extended periods, and consider other potential mediating factors like employee satisfaction, customer satisfaction, or a company’s innovation capability.

Data availability

The dataset used in this study can be obtained from the corresponding author upon reasonable request.

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Notes

- 1 The concept was introduced by Chinese President Xi Jinping in his report at the 19th National Congress of the Communist Party of China in 2017. It emphasized that the focus of China’s development is no longer on high-speed growth, but on innovation, coordination, green development, openness, and shared benefits.
- 2 In 2021, Chinese President Xi Jinping highlighted the significant direction for China’s socio-economic development. He emphasized economic fairness and justice, aiming to reduce income inequality and ensuring that everyone can share the fruits of economic development.
- 3 At the United Nations General Assembly in September 2020, Chinese President Xi Jinping formally made a commitment to the “dual carbon” goals: China aims to reach peak carbon emissions before 2030 and strives to achieve carbon neutrality by 2060.
- 4 In the Chinese stock market, companies labeled as ST (Special Treatment) or *ST typically face financial difficulties or have reported consecutive losses for two years, potentially signaling abnormal financial performance and delisting risks.
- 5 The operational models, financial structures, and risk profiles of firms in the financial sector, such as banks and insurance providers, differ considerably from those of non-financial enterprises. Consequently, analyzing financial and non-financial companies together could result in biased outcomes.

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Author contributions

Tiantian Meng: Conceptualized the study, designed the research framework, and drafted the original manuscript. Dan Lu: Collected and curated the data, and conducted the statistical analysis. Dr. Danni Yu: Contributed to the writing, review, and editing of the manuscript. Dr. M.H. Yahya and Dr. Zariyawati Mohd Ashhari: Supervised the research process.

Competing interests

The authors declare no competing interests.

Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

Informed consent

This article does not contain any studies with human participants performed by any of the authors.

Additional information

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