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Green Mirage: Managerial Myopia and ESG Greenwashing in China

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Abstract: The widespread occurrence of corporate greenwashing can precipitate adverse selection within the green market, thereby undermining the efficacy of sustainable development initiatives. Existing research has predominantly concentrated on the effects of external regulation and internal organizational governance mechanisms on corporate greenwashing. However, limited attention has been paid to the influence of micro-level, individual factors. This study, therefore, shifts focus to the cognitive characteristics of management, specifically examining whether managerial myopia serves as a significant determinant of corporate greenwashing. Utilizing a sample of Chinese A-share listed firms from 2009 to 2022, this study empirically investigates the relationship between managerial myopia and greenwashing practices. The findings reveal a positive correlation: as the degree of managerial myopia increases, the severity of corporate greenwashing also intensifies. Furthermore, the analysis indicates that managerial myopia exerts a detrimental effect on corporate green transformation. Additionally, heterogeneity analysis indicates that the adverse impact of managerial myopia on corporate greenwashing is accentuated by factors such as weaker internal controls, a higher degree of ownership separation, intense analytical focus, and insufficient government regulation. These results underscore the importance of addressing individual managerial characteristics in the context of corporate sustainability and the potential implications of such characteristics for greenwashing behaviors.

Keywords: Short-sighted management; Corporate greenwashing; Sustainable development; Organizational governance; External regulation

1 Introduction

In the early 21st century, a series of high-profile corporate scandals, including the collapse of Enron's collapse and the BP oil spill, heightened public and investor awareness of sustainability and responsible investment. In response, the United Nations formally introduced the concept of Environmental, Social, and Governance (ESG) to the investment community in 2004, encouraging investment in companies committed to sustainable development. With the support from the Sustainability Accounting Standards Board (SASB), ESG soon emerged as a key framework in global investment strategies.

As internationalization accelerates, a growing number of Chinese enterprises have increasingly integrated social responsibility and sustainable practices into their operations to strengthen their global image and enhance market competitiveness through ESG-driven initiatives [1, 2]. Most of enterprises claim to engage in "green" development, positioning environmental sustainability as a core business strategy or marketing approach. However, data from China's Ministry of Ecology and Environment reveals that 91,000 environmental administrative penalty decisions were issued nationwide in 2022, resulting in total fines of 1.06 billion USD (Data source: https://www.chinanews.com.cn/cj/2023/02-22/9958491.shtml).

This discrepancy underscores potential gaps between corporate sustainability claims and actual regulatory compliance, raising concerns about widespread greenwashing in China's ESG landscape. The prevalence of greenwashing in corporate social responsibility (CSR) and ESG disclosures can be attributed, in part, to the absence of standardized ESG disclosure frameworks and the lack of robust regulatory oversight [3, 4]. The resulting information asymmetry between corporations and external stakeholders creates an environment conducive to strategic information manipulation aimed at enhancing corporate reputations without corresponding sustainability

improvements. Furthermore, ESG ratings for Chinese enterprises are mainly derived from corporate self-disclosed data, which third-party evaluators compile and augment with regulatory announcements and media reports [5]. This reliance on voluntarily disclosed information increases the likelihood of "symbolic compliance", where firms present a façade of environmental responsibility while neglecting substantive sustainability reforms.

Given these challenges, examining the underlying drivers of corporate greenwashing and identifying potential mitigation strategies is essential for reducing social governance costs and fostering genuine sustainable development. A more integrated regulatory framework, coupled with enhanced transparency and accountability mechanisms, could play a pivotal role in ensuring the reliability of ESG disclosures and promoting responsible corporate behavior.

Existing literature has made considerable efforts to explore the drivers of corporate greenwashing, drawing on stakeholder theory, institutional theory, impression management theory, and signaling theory to analyze both external and internal factors influencing such behavior [6–8]. External drivers primarily involve government policies and market dynamics. Policy-related factors include the low-carbon city pilot program [9] environmental tax reforms [10], green credit incentives [11], and penalties for environmental violations [12]. On the market side, drivers include product market competition [13, 14], the influence of social media on public opinion [15], and third-party assurance mechanisms [16].

At the same time, internal factors also play a crucial role in shaping corporate greenwashing behavior, including the proportion of female managers in the governance structure, the level of digitalization, and financing constraints. While these studies offer valuable insights, the specific role of managerial characteristics in greenwashing decisions remains underexplored. Yu et al. [8] pointed that firm-level governance factors are more effective than national-level regulatory mechanisms in mitigating selective ESG disclosure. As the central component of corporate governance structures, top management teams not only coordinate stakeholder relationships but also play a critical role in responding to external environmental pressures and internal governance challenges. For instance, Velte [17] suggests that senior executives may engage in CSR decoupling as a form of impression management and stakeholder manipulation.

According to behavioral decision theory, human decision-making processes are subject to cognitive biases such as overconfidence, time discounting preferences, and recency effects. Therefore, applying upper echelons theory, managers prone to cognitive biases and short-term orientations may overemphasize short-term performance at the expense of long-term strategic goals. Existing research indicates that short-sightedness is prevalent among corporate managers [18], which not only reduces firms' innovation investments but also impairs sustainable development [19, 20].

In essence, greenwashing is a form of impression management used by managers to respond to stakeholder pressures, with its implementation influenced by managerial cognitive traits, risk preferences, and social contexts [4, 21]. However, from a long-term perspective, greenwashing as an opportunistic behavior ultimately undermines corporate sustainability and long-term interests. This raises the core research question of this study: Does managerial short-sightedness driven by short-term profit motives promote greenwashing? If so, what factors might strengthen or weaken this relationship? What are the underlying internal mechanisms? This study integrates managerial short-term cognitive orientation and corporate greenwashing into a unified framework to uncover how managerial traits influence CSR decoupling.

Using a sample of A-share listed companies from 2009 to 2022, this study empirically investigates the relationship between managerial short-sightedness and corporate greenwashing. The empirical results indicate that higher levels of managerial short-sightedness are associated with more severe greenwashing behavior. Further exploration reveals that managerial short-sightedness not only exacerbates greenwashing but also hinders firms' green transformation efforts. Heterogeneity analysis shows that the impact of managerial short-sightedness on greenwashing is intensified under conditions of weak internal governance, greater separation of ownership and control, high analyst coverage, and lax government regulation. Mechanism analysis suggests that managerial myopia obstructs firms' green transformation, adversely affecting sustainable development and ESG progress, ultimately leading to persistent greenwashing.

The marginal contributions of this paper are as following: First, this study advances research in corporate green governance and environmental performance management by adopting a managerial short-sightedness perspective. While existing literature has primarily focused on external incentives and constraints related to CSR and environmental information disclosure, this study highlights how managerial short-term behavior tendencies endogenously drive greenwashing, enriching the behavioral economics perspective on green governance. Second, this study reveals how managerial short-sightedness indirectly intensifies greenwashing by hindering firms' green transformation processes. Unlike studies that view greenwashing solely as a market-driven strategic behavior, the mechanism analysis emphasizes the intrinsic link between greenwashing and failures in corporate green transformation, deepening the understanding of corporate environmental strategy failures. Finally, from the interactive perspective of internal governance and external environmental pressures, this study systematically analyzes how internal governance structures and external market forces moderate the relationship between managerial short-sightedness and greenwashing. This approach uncovers the complex mechanisms of multidimensional governance failures, offering a comprehensive

understanding of the interplay between governance and greenwashing.

2 Literature Review and Hypothesis Development

2.1 Literature Review

The term "greenwashing" was first introduced by Jay Westerveld, an American environmentalist, to describe a cost-saving practice by hoteliers who encouraged towel reuse under the guise of environmental concern. Initially referring to specific actions in the hospitality industry, the concept has since evolved to encompass broader corporate behaviors. Today, greenwashing broadly describes companies' exaggeration of environmental commitments through public relations, marketing, and disclosures, often failing to deliver on these claims. While definitions vary, it is widely understood as a deceptive practice that misleads consumers or investors through green marketing, enabling enterprises to gain reputational or financial benefits without making meaningful ecological contributions. This dual focus on perception and reality underscores the growing need to scrutinize corporate claims about environmental responsibility.

The drivers of corporate greenwashing are multifaceted, arising from a combination of external and internal pressures. Corporate greenwashing is influenced by a range of external pressures, including policy incentives, regulatory measures, and media scrutiny. On the regulatory front, both incentives and penalties have dual effects. While regulatory mechanisms such as quality standards and penalties can reduce greenwashing by strengthening environmental regulation [22], excessive regulatory pressure may prompt opportunistic strategies. Zhou et al. [12] found that higher environmental penalties are positively correlated with greenwashing, as firms seek to protect their reputations through deceptive practices. Policies such as environmental tax reforms and financial measures, including comment letters, may also exacerbate greenwashing in the short term [10, 23]. Similarly, incentive policies, such as green finance and green credit, have been linked to increased greenwashing [24]. In addition to institutional pressures, media oversight, scrutiny from environmental organizations, and industry competition further drive greenwashing [13, 25, 26]. Internally, corporate greenwashing is also shaped by stakeholder attributes and senior executive leadership. For instance, firms led by female executives are less likely to engage in greenwashing compared to those dominated by male leadership [27]. Additionally, the social attention given to ESG responsibility can intensify compliance pressures on companies with low ESG ratings, further promoting deceptive behaviors [21]. These internal motivations, coupled with external pressures, create a complex environment in which corporate greenwashing is perpetuated.

Managerial myopia refers to the tendency of managers, influenced through short-term incentives such as quarterly bonuses or annual performance evaluations, to focus on short-term performance metrics or stock prices rather than long-term development [28]. Existing research on management myopia has primarily examined its consequences in areas such as CSR [29, 30], ESG practices [30], green technology innovation [31], and corporate strategy [32]. Some studies have also explored the antecedents of managerial myopia, highlighting its association with managerial personal characteristics as well as the internal and external pressures that firms encounter [33].

Existing literature on managerial myopia has extensively explored its implications; however, its potential impact on social responsibility decoupling, as reflected in corporate greenwashing, remains largely overlooked. Previous research on greenwashing motivations has predominantly concentrated on external regulatory pressures and corporate governance mechanisms. While these dimensions are important, they fail to account for the significant role of managerial bounded rationality and individual cognitive biases in shaping corporate decisions. Building on this gap, the present study integrates the cognitive framework of managerial behavior with the phenomenon of corporate greenwashing. By adopting a micro-cognitive perspective, it seeks to investigate how individual decision-making processes within organizations contribute to the underlying causes of greenwashing. This approach offers a novel lens to examine greenwashing, shifting the focus from external pressures to the cognitive dynamics driving managerial actions.

2.2 Hypothesis Development

Drawing on the upper echelons' theory, the strategic decisions and organizational outcomes of firms are profoundly shaped by the backgrounds, educational experiences, and cognitive values of their top management teams [34]. Managerial myopia, rooted in the bounded rationality of human decision-makers, leads managers to focus on short-term gains at the expense of long-term sustainability [35, 36]. Consequently, managers exhibiting short-term orientation are more inclined to allocate corporate resources toward greenwashing practices rather than investing in substantive ESG initiatives, which typically entail significant financial, technological, and temporal commitments before yielding tangible outcomes.

Several factors contribute to this strategic inclination. First, greenwashing practices often align with the immediate interests of myopic managers. By employing ambiguous language or manipulating the presentation of ESG disclosures, managers can enhance the firm's public image in a cost-efficient manner without undertaking substantial commitments to genuine sustainability practices.

On one hand, top executives typically possess substantial discretionary power in the disclosure of ESG information, which enables them to selectively communicate positive aspects while concealing or downplaying unfavorable data. As highlighted by Lee and Raschke [4], organizations frequently engage in "say more, do less" narratives, whereby they accentuate environmental or social achievements and simultaneously obscure material deficiencies [4, 7]. This approach allows performance-oriented managers to reap reputational benefits at minimal cost, thereby aligning greenwashing strategies with short-term performance targets [4].

On the other hand, external environmental pressures further incentivize myopic managers to pursue greenwashing. As societal attention to environmental sustainability continues to grow, stakeholders increasingly expect firms to fulfill their environmental responsibilities. To maintain organizational legitimacy under such conditions, firms must respond to these expectations [37]. However, in the absence of the capabilities or resources required for substantive sustainability, greenwashing emerges as a strategic response to legitimacy pressures.

It is also noteworthy that certain cognitive biases may further exacerbate the likelihood of greenwashing, particularly within institutional contexts characterized by stringent regulatory oversight and elevated legitimacy demands. Managers with myopic tendencies often exhibit a strong preference for immediate rewards, while overconfident executives may overestimate their strategic acumen and underestimate the long-term risks associated with symbolic compliance [38]. Such biases may lead them to believe they can manage external impressions through symbolic actions and selective disclosures, thereby underestimating the potential regulatory or reputational consequences.

Moreover, the recency effect offers a psychological explanation for the link between short-term managerial orientation and greenwashing behavior. This effect describes the tendency of individuals to assign disproportionate importance to recent information or events when forming judgments [39, 40]. In the context of managerial decision-making, this implies that executives are more likely to respond to recent financial results, stakeholder feedback, or regulatory signals. Given that greenwashing can generate immediate reputational gains and temporarily appease legitimacy demands while postponing the realization of associated risks [41], the recency effect reinforces the preference for short-term symbolic compliance and selective disclosure practices.

Hypothesis 1: The more short-sighted the management, the more serious the greenwashing behavior of the enterprise.

3 Research Design

3.1 Sample and Data Collection

This research investigates the influence of managerial myopia on greenwashing in ESG discourse, focusing on Chinese A-share firms listed on the Shanghai and Shenzhen stock exchanges during the period from 2009 to 2022. The study period was selected for two primary reasons. First, ESG data disclosure by Chinese listed firms began in 2009, making it the earliest feasible starting point for consistent data collection. Second, while more recent ESG data (e.g., 2023 and beyond) have become available, we retained 2022 as the endpoint to ensure the consistency and comparability of financial and ESG data across sources.

The dataset utilized is derived from the *China Stock Market and Accounting Research Database (CSMAR)*, a source renowned for its credibility and accuracy. ESG-related data is collected from Bloomberg and Huazheng ESG ratings, which have been consistently available since 2009 (Since 2009, Sino-Securities Index Information Service Co. Ltd (Huazheng) starts to evaluated the ESG performance of A-shared listed firms. See more details from https://www.chindices.com/esg-ratings.html#esg_indexes. Although Bloomberg ESG ratings are available from 2011, they provide historical ESG ratings data going back to 2006. See more details from https://www.bloombergchina.com/global-environmental-social-governance-data/). The sample selection adheres to specific guidelines: (1) financial firms are excluded; (2) firms designated as ST or *ST are omitted; and (3) records with incomplete key variables are excluded. Following these criteria, the final dataset comprises 10,820 valid observations across 1,366 firms.

3.2 Model and Variables

3.2.1 Regression model

To empirically investigate the impact of managerial myopia on corporate greenwashing, this study employs a high-dimensional fixed effects model (REGHDFE). This model has been extensively applied in panel data analysis, particularly when addressing datasets characterized by a large number of observations and multiple layers of fixed effects.

The selection of the REGHDFE model is motivated by the following considerations. First, the dataset used in this study comprises more than 10,000 observations and exhibits an unbalanced panel structure, making it well-suited for REGHDFE estimation, which is optimized for large-scale panel data. Second, the analytical framework involves multiple fixed effects at four distinct levels—firm, year, industry, and city—which can be efficiently controlled for using the REGHDFE model, thereby minimizing estimation bias due to unobserved heterogeneity. Third, it

is noteworthy that incorporating high-dimensional fixed effects serves as a semi-structural approach to mitigating potential endogeneity, particularly that arising from omitted variable bias.

$$gws_{i,t} = \beta_0 + \beta_1 myopia_{i,t} + \sum control_{i,t} + commpany_i + industry\_year_i + city\_year_i + \varepsilon_{i,t} \tag{1}$$

The variables $gws_{i,t}$ represents the degree for firm i in year t, while $myopia_{i,t}$ captures the management's short-term perspective. $\sum control_{i,t}$ is a set of control variables, to account for time-invariant factors specific to each firm, $commpany_i$ is included as a firm fixed effect. Additionally, the model incorporates fixed effects for city-year and industry-year variations to enhance reliability. The errors term $\varepsilon_{i,t}$ represents random disturbances. Robust standard errors, clustered at the company level, are reported to ensure statistical validity.

3.2.2 Dependent variable: Corporate greenwashing

Following studies [12, 42], corporate greenwashing is defined as the disparity between a company's promised and actual ESG performance, as indicated by its ESG ratings. Specifically, Bloomberg ESG reflects a firm's ESG disclosure, while Huazheng ESG captures its ESG actions. To ensure comparability across the two rating systems, we standardized both Bloomberg and Huazheng ESG scores at the industry-year level. For each firm i in year t, we computed the standardized ESG disclosure score as the z-score relative to the distribution of Bloomberg ESG ratings within the same industry and year. Similarly, we standardized the ESG performance score using Huazheng data by calculating its z-score within the corresponding industry-year group. This normalization process accounts for potential discrepancies in scale and distribution between the two rating systems and mitigates concerns regarding cross-provider heterogeneity. The extent of greenwashing is measured using Eq. (2), calculated as the difference between the standardized scores of ESG disclosure and actual ESG performance for each company.

$$greenwashing_{i,t} = \left(\frac{ESG_{disclosure\,i,t} - \overline{ESG}_{disclosure\,i.t}}{\sigma ESG_{disclosure\,i,t}} - \frac{ESG_{action\,i,t} - \overline{ESG}_{action\,i.t}}{\sigma ESG_{action\,i,t}} \right) \tag{2}$$

Here, $ESG_{disclosure\,i,t}$ and $\overline{ESG}_{action\,i.t}$ denote the original ESG scores of firm i in year t, based on Bloomberg and Huazheng, respectively. $\overline{ESG}_{disclosure\,i.t}$ and $\overline{ESG}_{action\,i.t}$ represent the mean values the mean ESG scores for all firms in the same industry j and year t, while $\sigma ESG_{disclosure\,i,t}$ and $\sigma ESG_{action\,i,t}$ are the corresponding standard deviations. A higher greenwashing score indicates a greater divergence between disclosure and action, suggesting less credible or effective corporate sustainability practices.

3.2.3 Independent variable: Managerial myopia

Building on insights from [20, 28, 31], this study employs the "managerial myopia index," as publicly disclosed within the WinGo database, to assess the prevalence of managerial myopia. The construction process of this index is articulated as follows: Firstly, the "Management Discussion and Analysis" (MD&A) sections of annual reports from Chinese A-share listed companies are designated as the primary analytical corpus. Drawing upon the English "short-term horizon" lexicon established by Brochet et al. [43] and the conceptual framework for constructing textual indicators proposed by Li [44], an initial vocabulary list pertinent to "short-term horizon" within the Chinese MD&A context is formulated. This preliminary lexicon encompasses both direct and indirect expressions that signify a focus on short-term managerial perspectives.

Secondly, the study leverages the Word2Vec algorithm, a sophisticated machine learning technique grounded in neural network-based word embedding methodologies. This approach represents words as multidimensional vectors based on contextual semantic information, thereby facilitating the determination of syntactic similarities through the computation of vector proximity metrics. More specifically, the index adopts the Continuous Bag-of-Words (CBOW) model—a variant of Word2Vec—to train on a corpus derived from Chinese annual financial reports. The CBOW model is mathematically expressed as:

$$max \sum_{w=c} log\ p(w/Context(w)) \tag{3}$$

where, C denotes the corpus, w represents the target word, and $Context(w)$ signifies the contextual words surrounding the target word. It is noteworthy that the model is trained on an extensive repository of financial texts, ensuring that the resulting word similarities are particularly germane to the financial domain. This method effectively circumvents the subjectivity inherent in manually curated word lists and mitigates the limited relevance of generic synonym tools.

Furthermore, the vocabulary set generated through this machine learning process undergoes rigorous validation by a panel comprising three experts from both industry and academia. This verification entails a detailed comparison with representative MD&A text samples, culminating in the identification of 43 "short-term horizon" words deemed suitable for measuring managerial myopia (see appendix for the complete list).

Subsequently, the managerial myopia index is calculated as the proportion of the total frequency of this "short-term horizon" vocabulary set relative to the overall word count in the MD&A section, multiplied by 100. This is formally expressed as:

$$Managerial\,myopia = 100 \times \frac{Total\,frequency\,of\,short-term\,horizon\,words}{Total\,word\,count\,in\,MD\&A}$$

A higher value of this index is indicative of an elevated degree of managerial myopia, thus providing a robust quantitative measure of the extent to which managerial discourse is oriented toward short-term considerations.

3.2.4 Control variables

Following established studies like Zhang [9], Liao et al. [23] and Treepongkaruna et al. [42], this study includes a range of control variables that are potentially relevant to greenwashing and ESG performance. These variables encompass *firm age, firm size* (natural logarithm of the number of employees), and *financial leverag*e (ratio of total liabilities to total assets). Profitability is measured by return on assets, while *operational growth* is captured through the revenue growth rate (org). Corporate governance factors include *CEO duality* (a binary variable indicating whether the CEO also serves as the chairperson), the *ownership concentration ratio* (shareholding of the largest shareholder relative to the second-largest shareholder), *board size* (total number of directors), *number of independent directors*, and *the number of female directors*. Additionally, we control for corporate *environmental investment*, reflecting a firm's commitment to sustainability practices. These variables help ensure a comprehensive assessment of potential influences on greenwashing behavior.

4 Empirical Results

4.1 Descriptive Statistics

Table 1 provides the descriptive statistics for the variables used in the analysis. The dependent variable, greenwashing, which captures greenwashing intensity, exhibits considerable variation, with a mean value of -0.366 and a standard deviation of 1.265. The minimum and maximum values, -5.546 and 5.691, respectively, highlight the diverse greenwashing behaviors across firms. The key independent variable, myopia, reflecting managerial short-termism, has a mean of 0.09 and a standard deviation of 0.079. It ranges from 0 to 0.855, indicating varying levels of short-term orientation among managers.

Table 1. Descriptive statistics

Variable	N	Mean	SD	Min	Max
Greenwashing	10820	-0.366	1.265	-5.546	5.691
Managerial myopia	10820	0.09	0.079	0	0.855
Firm age	10820	18.315	6.12	4	33
Firm size	10820	23.236	1.391	18.266	28.636
Leverage	10820	0.481	0.197	0.008	1.698
ROA	10820	0.057	0.137	-11.167	0.644
Operational growth	10820	0.311	0.825	-0.622	5.618
Ownership concentration	10820	11.545	19.008	1.016	119.103
CEO duality	10820	1.788	0.409	1	2
Director scale	10820	10.736	2.844	4	26
Independent directors scale	10820	4.03	1.289	2	13
Famele directors scale	10820	1.336	1.229	0	9
Environmental investment	10820	0.0002	0.011	0	0.888

4.2 Baseline Results

This paper employed the baseline regression model of Eq. (1) to examine the impact of managerial myopia on corporate greenwashing. The regression outcomes, displayed in Table 2, reveal a positive and statistically significant coefficient for myopia in both model specifications, with values of 0.532 and 0.508, respectively, at the 5% significance level. These results suggest that an increased focus on short-term objectives by management is linked to a higher probability of corporate greenwashing, thereby supporting the hypothesis that myopia fosters

greenwashing behaviors. Furthermore, the inclusion of control variables and fixed effects for company, industry-year, and city-year enhances the robustness of these findings. Thus, Hypothesis 1, which asserts a positive relationship between managerial myopia and greenwashing, is confirmed.

Table 2. Managerial myopia and corporate greenwashing

Variable	Greenwashing	
	(1)	(2)
Managerial myopia	0.532**	0.508**
	(2.17)	(2.08)
Firm age		-0.137**
		(-2.00)
Firm size		-0.066
		(-1.12)
Leverage		0.220
		(1.12)
ROA		0.246**
		(1.97)
Operational growth		0.032
		(1.43)
Ownership concentration		-0.001
		(-0.58)
CEO duality		-0.052
		(-0.92)
Director scale		0.017
		(1.53)
Independent directors scale		-0.012
		(-0.62)
Famele directors scale		-0.068***
		(-3.17)
Environmental investment		-2.226**
		(-2.51)
Constants	-0.417***	3.555**
	(-19.15)	(2.01)
Company fixed effect	Yes	Yes
Industry-Year fixed effect	Yes	Yes
City-Year fixed effect	9251	9251
N	0.408	0.410

Note: t statistics in parentheses, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Regression analysis reveals significant negative correlations between greenwashing and key factors (column 2): enterprise age, proportion of female directors, and environmental investment. Older firms are less likely to greenwash, likely due to organizational inertia and a focus on maintaining reputational capital. Similarly, a higher presence of female directors reduces greenwashing, possibly because they emphasize corporate social responsibility (CSR) and prioritize substantive environmental efforts over superficial actions [27, 45]. Increased environmental investment also correlates with less greenwashing, reflecting a genuine commitment to sustainability [46]. In contrast, a positive correlation exists between return on assets (ROA) and greenwashing. High-performing firms may use their financial and managerial resources to shape a favorable environmental image through selective disclosure or symbolic gestures, rather than meaningful commitment. This behavior could be driven by the need to sustain market valuations and reputation, especially where external oversight is weak.

4.3 Robust Checks

4.3.1 Replacement of corporate greenwashing

To ensure the robustness of our findings, this study further replaces the dependent variable with alternative measures: lagging the dependent variable by one period [47, 48], ESG disclosure score *(esg_disclosure)* and ESG action score *(esg_action)* [48]. The results, presented in Table 3, indicate that managerial myopia significantly promotes greenwashing and surface-level ESG disclosures, rather than actual ESG practices. Specifically, in column (1), the coefficient of myopia remains positively significant at the 5% level with a value of 0.626. In column (2),

the coefficient also remains positively significant when ESG disclosure score is used as the dependent variable. In contrast, the coefficient of myopia in column (3), where the dependent variable is ESG action score, is negative and statistically insignificant. These findings provide additional evidence that managerial short-termism influences corporate behavior towards more superficial ESG disclosures without translating into genuine ESG actions.

Table 3. Robustness tests (replacement of corporate greenwashing)

Dependent Variable	**Lag by One Year**	**Replacement of Greenwashin**	
	(1)	**(2)**	**(3)**
	L.greenwashing	esg_disclosure	esg_action
Managerial myopia	0.626**	0.476***	-0.078
	(2.22)	(2.59)	(-0.44)
Constants	1.400	-1.498	-5.180***
	(0.65)	(-0.95)	(-4.12)
Controls	Yes	Yes	Yes
Company fixed effect	Yes	Yes	Yes
Industry-Year fixed effect	Yes	Yes	Yes
City-Year fixed effect	Yes	Yes	Yes
N	7674	9251	9251
Adjusted R^2	0.465	0.489	0.422

Note: t statistics in parentheses, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

4.3.2 Re-estimating different samples

The manufacturing sector forms the backbone of the real economy, with listed manufacturing firms representing the largest share of and serving as key examples of China's listed enterprises [46, 49]. Thus, this study conducted a new regression analysis using a sample of manufacturing firms identified through industry classification codes. Table 4, columns (1) and (2), presents the findings. In column (1), where control variables are excluded, the coefficient of myopia is significantly positive at the 5% level. After incorporating control variables and fixed effects in column (2), the coefficient of myopia remains significantly positive at the 5% level, with a value of 0.688. These results consistently highlight the significant influence of managerial myopia on corporate greenwashing, reinforcing the validity of our conclusions.

Table 4. Robustness tests (different samples)

Dependent Variable	**Different Samples**	
	(1)	**(2)**
	Greenwashing	Greenwashing
Managerial myopia	0.723**	0.688**
	(2.19)	(2.11)
Constants	-0.450***	2.188
	(-16.31)	(0.87)
Controls	No	Yes
Company fixed effect	Yes	Yes
Industry-Year fixed effect	Yes	Yes
City-Year fixed effect	Yes	Yes
N	5245	5245
Adjusted R^2	0.447	0.452

Note: t statistics in parentheses, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

4.3.3 Alternative the fixed effect

In this study, we modified the fixed effects estimators by replacing city-year fixed effects with province-year fixed effects and incorporating province-industry fixed effects. The estimation results are presented in Table 5. In Column (1), which excludes control variables, the coefficient for managerial myopia is statistically significant at the 5% level with a value of 0.479. In Column (2), which includes control variables, the coefficient for managerial myopia remains statistically significant at the 5% level with a value of 0.450. However, upon introducing more granular province-industry fixed effects in Column (3), the coefficient for managerial myopia remains positive but decreases slightly in magnitude and becomes only marginally significant. It is plausible that the inclusion of more

sophisticated controls, such as province-industry fixed effects, accounts for some differences in management myopia or greenwashing behavior related to regional and industry-specific factors. This, in turn, reduces the residual variation used to estimate the management myopia effect, resulting in smaller coefficients and lower significance. Furthermore, the province-industry fixed effects are intended to control for time-varying differences across provinces and industries, which may include variations in regulatory enforcement. For example, the papermaking industry in Shandong Province, China, faces stricter environmental supervision compared to other provinces and industries due to its status as a heavily polluting sector [50]. Additionally, Shandong Province is one of the top five provinces in China in terms of industrial solid waste emissions, underscoring its significance as a major polluting region. By controlling for these potential province-industry differences, some variations in greenwashing behavior caused by regional disparities in regulatory enforcement may be absorbed, thereby reducing the estimated effect of managerial myopia.

Table 5. Robustness tests (changing the fixed effect)

Dependent Variable	**Greenwashing**		
	(1)	**(2)**	**(3)**
Managerial myopia	0.479**	0.450**	0.394*
	(2.32)	(2.19)	(1.87)
Constants	-0.413***	3.193**	2.937*
	(-22.30)	(2.15)	(1.90)
Controls	No	Yes	Yes
Company fixed effect	Yes	Yes	Yes
Industry-Year fixed effect	Yes	Yes	Yes
Province-Year fixed effect	Yes	Yes	Yes
Province-Industry effect	No	No	Yes
N	10716	10716	10692
Adjusted R^2	0.379	0.381	0.371

Note: t statistics in parentheses, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

4.4 Heterogeneity Analysis

Corporate internal governance and the external regulatory environment are pivotal determinants of corporate strategic activities. Within internal governance, the quality of corporate governance is closely linked to the standardization of managerial behavior and the efficiency of strategic decision-making [51]. Robust internal governance not only curtails managerial opportunism but also optimizes resource allocation, enhancing the rationality and effectiveness of strategic initiatives [52, 53]. Additionally, the degree of separation between ownership and control (i.e., the separation of the two rights) represents a critical dimension of internal governance [54]. Excessive separation may result in “insider control”, thereby undermining strategic decision-making and implementation.

Externally, analyst attention and government regulation influence corporate strategic activities through distinct mechanisms: market-based oversight and administrative constraints [6, 55]. Elevated analyst attention enhances market scrutiny, fosters information transparency, and encourages enterprises to adopt scientifically grounded and sustainable strategies. Conversely, government regulation directly shapes the strategic direction and behavioral boundaries of enterprises through policy interventions and legal frameworks.

This paper investigates the heterogeneous impacts of two internal governance factors (corporate governance quality and the separation of the two rights) and two external regulatory factors (analyst attention and government supervision) on corporate greenwashing activities. The analysis aims to uncover the interplay between internal and external factors in shaping strategic decision-making processes. These findings not only contribute to understanding the micro-level mechanisms underlying corporate strategy but also provide theoretical insights to inform policymaking and improve corporate governance frameworks.

4.4.1 Internal corporate governance

Internal control quality is the primary factor influencing management’s decision and effect. When deficiencies in internal governance, the degree of information asymmetry among different stakeholders is increasing, these caused to manager more like for opportunity behavior [56]. Based on the above analysis, this paper hypothesizes that lower internal control quality weakens the supervision and constraints on management, thereby amplifying the positive correlation between management myopia and corporate greenwashing. To test this hypothesis, following Sun et al. [57], this paper use earnings management to capture the quality of internal corporate governance. Because it is a vital method of measurement of corporate governance level in existing studies [58]. According to the annual and industry median, this paper divides the samples into two groups: “high internal corporate governance” and

“low internal corporate governance”. The empirical results presented in columns (1) and (2) of Table 6 indicate that, while management myopia generally increases corporate greenwashing behavior, this effect is significantly more pronounced in samples characterized by low internal control quality. These findings suggest that insufficient supervision and constraints from stakeholders exacerbate corporate greenwashing practices.

Table 6. Heterogeneity analysis of internal corporate governance

Dependent Variable	**Greenwashing**			
	Internal Corporate Governance		**Separation Degree of Two Rights**	
	(1)	(2)	(3)	(4)
	High_ic	Low_ic	High_seper	Low_seper
Managerial myopia	0.561	1.103**	0.720*	0.340
	(1.54)	(2.28)	(1.92)	(0.76)
Constants	4.530	3.464	5.810*	-2.450
	(1.55)	(1.34)	(1.94)	(-0.75)
Controls	Yes	Yes	Yes	Yes
Company fixed effect	Yes	Yes	Yes	Yes
Industry-Year fixed effect	Yes	Yes	Yes	Yes
City-Year fixed effect	Yes	Yes	Yes	Yes
N	4094	3568	4481	3520
Adjusted R^2	0.463	0.451	0.415	0.482

Note: t statistics in parentheses, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

4.4.2 Separation degree of two rights

Most publicly listed enterprises in China employ cross-shareholding arrangements or pyramid structures to maintain control, resulting in a divergence between control rights and ownership [59, 60]. Prior research has highlighted that this separation can facilitate conditions for the actual controllers to engage in "tunneling" activities, thereby heightening the risk of expropriation [54]. Consequently, a greater degree of separation between ownership and control rights may amplify the likelihood of opportunistic behavior by management, particularly in response to short-term performance pressures. This study quantifies the separation of ownership and control by calculating the disparity between the actual controller's control rights and ownership stakes in listed companies. Using the annual and industry-specific median values of the separation degree as the grouping criteria, the sample is divided into two groups: "high separation" and "low separation." Columns 3 and 4 of Table 6 demonstrate that when this separation is more pronounced, the effect of management myopia in driving greenwashing becomes significantly stronger. These findings suggest that the misalignment of ownership and control exacerbates the greenwashing behaviors induced by managerial short-sightedness.

4.4.3 Analyst attention

The Hawthorne experiments demonstrate that individuals tend to alter their behavior when they become aware of being observed or studied [61]. A similar phenomenon applies to analyst attention, as analysts act as information intermediaries and market supervisors in the capital market. High levels of analyst attention typically indicate that a firm's operations and managerial decisions are subject to closer external scrutiny [62, 63]. Under such circumstances, corporate management may face heightened pressure to deliver short-term performance, as analysts' evaluations often focus on quarterly or annual financial metrics. This short-term orientation can further incentivize management to engage in myopic behavior, such as greenwashing, to project an environmentally responsible image, rapidly enhance the firm's reputation, and meet market expectations or gain investor support. In this study, analyst attention is measured by the number of analysts tracking a firm. Firms with tracking numbers above the annual and industry-specific medians are classified as the "high attention" group, while others are categorized into the "low attention" group. As shown in Table 7, Columns 1 and 2, the higher the analyst attention, the more pronounced the effect of managerial myopia on greenwashing behavior.

4.4.4 Government regulation

Government regulation serves as a critical external constraint on corporate behavior. When regulatory intensity is low, firms face weaker mandatory requirements and penalties for environmental governance and information disclosure [64]. Thus, corporate environmental actions rely more on internal motivations or market pressures rather than external oversight. For management, the absence of strong regulatory deterrence can reduce the costs of noncompliance or false disclosure, encouraging more short-sighted strategies. One such strategy is greenwashing, wherein firms fabricate or exaggerate environmental achievements to construct a favorable green image. Additionally, information asymmetry between firms and the public becomes more pronounced in a low-regulation environment.

Management may exploit this asymmetry by manipulating or selectively disclosing environmental data to mislead the public and investors.

Table 7. Heterogeneity analysis of external regulation

Dependent Variable	**Greenwashing**			
	Analyst Attention		**Government Regulation**	
	(1)	(2)	(3)	(4)
	High_ana	Low_ana	High_gover	Low_gover
Managerial myopia	0.971**	0.047	0.407	1.087***
	(2.45)	(0.12)	(1.04)	(2.59)
Constants	1.303	5.456	4.296*	1.142
	(0.48)	(1.35)	(1.72)	(0.42)
Controls	Yes	Yes	Yes	Yes
Company fixed effect	Yes	Yes	Yes	Yes
Industry-Year fixed effect	Yes	Yes	Yes	Yes
City-Year fixed effect	Yes	Yes	Yes	Yes
N	4233	3476	3751	3863
Adjusted R^2	0.498	0.400	0.431	0.406

Note: t statistics in parentheses, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

In this study, government regulation is measured by the level of attention local governments dedicate to environmental development, that is, the proportion of words related to environmental protection in the total number of words reported by the government. Firms with regulation levels above the annual and industry-specific medians are classified into the "high regulation" group, while others are categorized as the "low regulation" group. As shown in Table 7, Columns 3 and 4, weaker government regulation amplifies the impact of managerial myopia on corporate greenwashing behavior.

4.5 Further Analysis

In the context of corporate sustainable development decision-making, greenwashing serves to fulfill the expectations of short-sighted managers. However, the advancement of sustainable social development necessitates that companies engage in substantial and authentic green development practices. For short-sighted managers, genuine green development requires significant investments in green technology innovation, equipment upgrades, energy efficiency improvements, and emissions reduction initiatives, all of which are essential for meeting long-term sustainability goals, rather than opting for short-term, superficial green initiatives. This approach is fundamentally at odds with the preferences of short-sighted managers, who tend to prioritize immediate financial gains over long-term environmental strategies.

Table 8. Managerial myopia and green transformation

Dependent Variable	**Green_Transformation**	
	(1)	(2)
Myopia	-2.480***	-0.127*
	(-20.56)	(-1.82)
Constants	3.475***	0.639
	(199.26)	(1.40)
Controls	No	Yes
Company fixed effect	No	Yes
Industry fixed effect	No	Yes
Year fixed effect	No	Yes
City fixed effect	No	Yes
N	10544	10544
Adjusted R^2	0.104	0.709

Note: t statistics in parentheses, $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Consequently, this paper posits that managerial myopia not only contributes to corporate greenwashing but also serves as a significant impediment to the green transformation of firms. Drawing on [49], this study measures the extent of corporate green transformation through the following methodological steps: First, in addition to the annual

reports of listed companies, supplementary texts with stronger environmental attributes—such as CSR reports, ESG reports, sustainability reports, and environmental reports—are incorporated as data mining sources. Second, a keyword library focused on green transformation is developed, encompassing five key domains: promotional initiatives, strategic concepts, technological innovation, pollution control, and monitoring management. Third, leveraging the Jieba word segmentation tool in Python, the frequency of these keywords is extracted from the aforementioned textual reports of listed companies, summed, and subsequently transformed logarithmically. This process generates an alternative variable that quantifies the degree of a company's green transformation.

Table 8 presents the specific regression results, which demonstrate that, after accounting for control variables and a series of fixed effects, the regression coefficient for managerial myopia in relation to corporate green transformation is negatively correlated at the 10% significance level. This finding suggests that short-sighted managers, driven by a focus on short-term performance outcomes, allocate capital and resources toward projects that yield quick profits, thereby undermining substantial green transformation efforts. Instead, these managers may engage in greenwashing as a means of superficially meeting stakeholder demands for green development, rather than implementing genuine and long-term environmental initiatives. This analysis highlights the critical role of managerial vision in shaping corporate sustainability strategies and underscores the need for a long-term perspective to facilitate authentic green transformation and mitigate the tendency toward greenwashing.

5 Conclusion, Managerial Implications and Limitations

Amid escalating global environmental challenges, public demand for sustainable development has intensified, elevating corporate environmental responsibility and sustainable business practices to critical societal concerns [42]. As pivotal actors within market-driven economies, corporations are uniquely positioned to mitigate these challenges through green development initiatives. Nevertheless, the path toward sustainable transformation is encumbered by constraints such as limited resource endowments, elevated transition costs, and substantial operational risks, rendering many firms ensnared in a "cannot transform, will not transform" predicament. Within this context, the incongruence between symbolic environmental commitments and substantive actions has proliferated, giving rise to pervasive corporate greenwashing practices.

Drawing on annual data from Chinese A-share listed companies spanning the period from 2009 to 2022, this study investigates the influence of managerial myopia on corporate greenwashing. The empirical findings substantiate that heightened levels of managerial myopia correlate with more severe manifestations of greenwashing behavior. Moreover, further analysis reveals that managerial myopia not only exacerbates corporate greenwashing but also impedes genuine green transformation efforts. Specifically, in the context of sustainability-oriented decision-making, managers exhibiting short-term cognitive biases are predisposed toward cost-efficient, symbolic environmental strategies, culminating in intensified greenwashing tendencies coupled with diminished incentives for substantive environmental transformation.

The heterogeneity analysis indicates that the positive association between managerial myopia and corporate greenwashing is accentuated under specific governance and regulatory conditions. These include lower internal control quality, higher separation between ownership and control rights, heightened analyst attention, and weaker governmental regulatory enforcement. Deficiencies in internal governance erode managerial oversight, fostering an environment conducive to opportunistic conduct. Pronounced ownership-control separation facilitates self-serving managerial behavior, while excessive analyst attention amplifies impression management tendencies. Furthermore, inadequate regulatory enforcement attenuates compliance costs, incentivizing deceptive environmental claims.

It should be noted that this paper also makes an additional three-dimensional interaction effect between internal governance factors and external regulatory factors and management myopia, but the regression results are not significant. One possible explanation is that the empirical context of this study, which involves institutional complexity and heterogeneous levels of regulatory enforcement, may weaken the moderating effect of internal governance on the relationship between managerial myopia and greenwashing. In addition, internal and external governance mechanisms may operate more independently than interactively under such conditions. Nonetheless, this finding highlights an important avenue for future research. It may be worthwhile to further explore under what institutional or organizational conditions internal and external governance reinforce or substitute each other in shaping short-term managerial behavior. Future studies could also incorporate additional or more nuanced internal governance variables, such as board independence, managerial incentives, or ownership structure, to gain deeper insights into their interaction with external regulatory forces.

Based on the study's empirical insights, several key managerial implications are drawn: First, corporations should institutionalize long-term performance-oriented management selection and incentive mechanisms. This may involve integrating executive compensation and career advancement with verifiable environmental performance metrics and demonstrable progress in green transformation initiatives. Such alignment would mitigate symbolic environmental strategies driven by short-term profit considerations. Additionally, boards of directors should intensify strategic oversight to instill a culture of long-term environmental accountability among senior management.

Second, firms must fortify internal control systems to mitigate information asymmetries and curb managerial opportunism within corporate governance structures. Shareholders and boards should enhance supervisory mechanisms concerning strategic decision-making processes to preclude governance imbalances stemming from ownership-control divergence.

Third, optimizing the evaluation criteria employed by financial analysts is imperative. Analytical frameworks should equitably emphasize both short-term financial performance and long-term environmental sustainability outcomes, thereby reducing managerial myopia induced by an overemphasis on quarterly earnings forecasts.

Finally, policymakers should implement more stringent environmental regulations and ensure the rigorous enforcement of sustainability-related policies. This entails establishing transparent, standardized accountability frameworks for corporate environmental disclosures while intensifying punitive measures for environmental non-compliance. Such regulatory enhancements would recalibrate the cost-benefit calculus of opportunistic environmental behavior, disincentivizing greenwashing practices.

This study acknowledges several limitations. First, the study does not account for cultural factors that may influence managerial decision-making in the Chinese context. Cultural dimensions, such as collectivism, long-term orientation, or attitudes toward environmental responsibility, could shape how managers prioritize ESG initiatives versus short-term financial gains. These cultural influences may moderate the extent of greenwashing behaviors and warrant further exploration to better understand their impact on corporate sustainability practices.

Second, the analysis does not explore differences in ESG challenges across industries, such as manufacturing versus technology sectors. Industries face distinct regulatory pressures, technological constraints, and stakeholder expectations, which likely affect the prevalence and nature of greenwashing. For instance, manufacturing firms may face greater scrutiny for environmental impacts compared to technology firms, potentially leading to different greenwashing strategies. Future research could incorporate industry-specific analyses to uncover these variations and their implications for ESG performance.

Third, the data on greenwashing behaviors were primarily sourced from ESG rating databases, such as Bloomberg and Huazheng. These databases may not fully capture the extent or nuances of greenwashing, as they rely on standardized metrics and publicly available information. To address this limitation, future studies could leverage diverse data sources, such as social media, corporate reports, or stakeholder feedback, and employ advanced text analysis techniques to assess the tone, readability, and similarity of ESG disclosures. Such approaches could provide a more accurate and comprehensive evaluation of greenwashing behaviors, enhancing the robustness of findings.

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Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Appendix

Table A1. The words chosen to measure management myopia Chinese English

Type	Chinese	English
initial vocabulary	天内	within the day / within a day
initial vocabulary	年内	within the year
initial vocabulary	立刻 / 马上	immediately
initial vocabulary	之际	at the time of / on the occasion of
initial vocabulary	考验	challenge / test
initial vocabulary	数月	several months
initial vocabulary	尽快	as soon as possible
initial vocabulary	契机	opportunity / turning point
initial vocabulary	压力	pressure
Similar vocabulary	数天	several days
Similar vocabulary	即刻	instantly / immediately
Similar vocabulary	最晚	at the latest
Similar vocabulary	关头	critical moment / juncture
Similar vocabulary	来临之际	upon the arrival of
Similar vocabulary	适逢	happens to be / coincides with
Similar vocabulary	正逢	exactly at the time of
Similar vocabulary	难度	difficulty / challenge
Similar vocabulary	严峻考验	severe test / severe challenge
Similar vocabulary	通胀压力	inflationary pressure
Similar vocabulary	应尽快	should be done as soon as possible
Similar vocabulary	早日	at an early date
Similar vocabulary	时值	at the time of / during
Similar vocabulary	到来之际	upon arrival
Similar vocabulary	环境压力	environmental pressure
Similar vocabulary	融资压力	financing pressure
Similar vocabulary	日内	within the day
Similar vocabulary	随即	subsequently / soon after
Similar vocabulary	在即	imminent / approaching
Similar vocabulary	最迟	no later than

Type	Chinese	English
Similar vocabulary	恰逢	coincides with / happens to be
Similar vocabulary	前夕	on the eve of
Similar vocabulary	遇上	encounters / meets
Similar vocabulary	之时	at the time of
Similar vocabulary	困境	pedicament / difficult situation
Similar vocabulary	双重压力	dual pressure
Similar vocabulary	上涨压力	upward pressure（often on prices）
Similar vocabulary	尽早	as early as possible
Similar vocabulary	及早	promptly / as soon as possible
Similar vocabulary	时机	timing / opportunity
Similar vocabulary	财务压力	financial pressure
Similar vocabulary	诸多困难	numerous difficulties
Similar vocabulary	还款压力	repayment pressure