



How Do Auditors Value Inconsistency between Words and Deeds of Corporate Environmental Responsibility? Evidence from China

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SUMMARY: *Given the current need to protect the environment around the world, more and more enterprises at various levels are voluntarily promoting environmental protection initiatives now. However, in practice, some companies are only speaking about environmental protection and making commitments in their environmental disclosures without taking any corresponding actions; that is to say, their words do not match their deeds. Select Chinese A-share listed companies in the heavily polluting industries from 2016 to 2025. Based on the "words" and "deeds" of corporate environmental responsibility implementation, this paper develops an indicator for the inconsistency of corporate environmental responsibility words and deeds by measuring the gap between corporate environmental disclosures and actual environmental performance. Then we will empirically examine the connection between this inconsistency and audit opinions. Based on the above analysis, inconsistencies in a company's environmental responsibility claims and actual practices will increase the overall risk of the company and may lead to non-standard audit opinions from auditors. Heterogeneity analysis indicates that the impact of the inconsistency between corporate environmental responsibility words and deeds on audit opinions is stronger in environments with increased analyst attention, excellent auditor industry experience, and non-state ownership. This paper provides new empirical evidence for the economic benefits of corporate social responsibility and, in addition, expands the body of knowledge on the causes of audit fees and offers practical support for the decision-making process of setting audit fees.*

KEYWORDS: *Environmental Penalty; Environmental Information disclosure; Corporate Environmental Responsibility Words-Deeds Inconsistency; Audit Opinion; Audit Input.*

1 Introduction

Corporate Environmental Responsibility Words-Deeds Inconsistency shows that symbolic communication and actual behaviour are out of alignment. With the release of the ISSB standards and China's independent guidelines, listed companies have started to introduce high-quality environmental disclosure in recent years. Therefore, the decisions of China's 3rd Plenary Session of the 20th CPC Central Committee are clear: strengthen the institutional support system for ecological civilization and build a green, low-carbon development pattern. The first diagram of this top-level design presents the direction for environmental governance and corporate accountability in China. To implement this policy boldly, in 2024, China's Ministry

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of Finance, in cooperation with other key departments such as the Ministry of Foreign Affairs and the National Development and Reform Commission, announced the "Corporate Sustainability Disclosure Standards - Basic Criteria (for Trial Implementation)". The first policy provides the foundation for building an all-encompassing system of corporate sustainability disclosure in China. A single norm has now been released for reporting the company's environment to improve the quality of environmental data. The above will offer a platform for harmonizing the environmental responsibility pledges of the enterprises and promote an expansion of openness and accountability across all regions. The direction of the policy does not align with the actual conditions at the company's environmental protection department. Many of the companies that committed environmental offences have failed to report the imposed penalties voluntarily.

At the same time, some are forging data to satisfy the authorities and enjoying the economic benefits by deliberately underreporting or concealing environmental problems. In addition, a number of these companies have been committing environmentally destructive acts at a considerable scale for some time. The corporate ecological responsibility words and deeds do not match, thus impairing the market risk assessment and auditor's verification work. Therefore, in order to understand the effect on audit opinions, research needs to be carried out at present to help improve China's environmental governance system. The above studies will help to strengthen the impact of auditing, tackle the problem of greenwashing, and promote the construction of a green financial system.

Although there is a large body of studies on corporate environmental behaviour, on the one hand, most scholars have focused on a micro-level analysis of the effect of environmental information disclosure in various areas, such as corporate financial performance [31], pollution abatement [10], green innovation [32], and firm risk [3]. Scholars have also put forward the view that "greenwashing" is a type of information asymmetry, and thus there will be an increasing gap between a company's public image and its actual behavior; this results in weak internal control [25]. Auditors will expand the scope of testing and allocate more audit resources; as a result, they may be more likely to issue an unusual audit opinion in the face of such risks, and the company's reputation and long-term development will suffer serious harm. However, the existing research has mainly focused on the one-dimensional consequences of environmental responsibility in terms of "words" or "deeds", and the connection between a company's inconsistency between words and deeds and audit opinions has been studied relatively infrequently. This is mainly because it is difficult to develop a quantifiable index of corporate environmental responsibility word-for-word behaviour inconsistency, and there is also an endogeneity issue between audit opinions and this inconsistency. Therefore, this paper will combine data on corporate environmental performance with text-mined environmental disclosures to create an index of words-deeds inconsistency for corporate environmental responsibility. Then we will study empirically how the above indicators affect audit opinions and explore the reasons for this, thus adding to the body of evidence for other types of research. The first problem this paper investigates is whether a company's inconsistent statements and behaviour regarding environmental responsibility will lead to a qualified audit opinion. Second, do firms with different characteristics have different sizes of this effect? Therefore, to refine the research framework and indicator evaluation system, this paper investigates the reasons for the influence of inconsistencies between corporate environmental responsibility words and deeds on audit opinions in the context of China's institutional environment and theory. Explain the negative impact of a mismatch between corporate environmental responsibility words and deeds on the issuance of standard audit opinions and present the underlying mechanisms. The research sample of this study includes heavily polluting listed companies on the Shanghai and Shenzhen A-share markets from 2016 to 2025 at the empirical level. Build a corporate

environmental responsibility words-deeds inconsistency indicator based on IPE data, and then, using a logit model, study how it is related to standard audit opinions. Based on the above analysis, it can be seen that such connections are more prominent in areas that auditors focus on, where they have a deep understanding of the industry, and in private enterprises. The above results have remained stable after a number of tests, including PSM matching, the Heckman two-step procedure and variable reconstruction; thus, they offer systematic support for the audit risk transmission mechanism of "greenwashing" and provide a direct basis for regulators to build an environmental disclosure verification system and for auditors to enhance their ecological risk assessment frameworks.

The possible marginal contributions of this paper are as follows: First, by extending beyond the one-dimensional focus on environmental disclosure in previous studies, this paper develops a new index that considers the discrepancy between words and deeds in corporate environmental responsibility. In addition to the deficiencies of the present research, which only considers one factor in environmental information disclosure, a new index for corporate environmental responsibility words and deeds inconsistency has been constructed. A new index can be established to integrate information on a company's environmental performance with actual environmental fines and penalties it has been subjected to in real life to measure the extent to which the company's disclosures of environmental responsibility reflect its real-world environmental behaviour. Second, this paper studies the role of environmental penalties in forming audit opinions under the institutional conditions in China. It offers a new research direction to systematically study the reasons for the discrepancy between the economic impact of environmental liability and audit opinions, and also strongly shows that a key mechanism exists: "inconsistency between words and deeds" of corporate environmental responsibility leads auditors to conduct risk assessments and issue non-standard audit opinions. Thirdly, this study offers some theoretical and empirical support for promoting the development of environmental governance in China from formal disclosure to actual implementation, and presents some policy and practical suggestions.

The remaining content of this paper is organised as follows: Section 2 reviews related studies and presents the primary hypotheses; Section 3 introduces the research design; Section 4 presents the empirical results; and Section 5 provides a summary and suggestions.

2 Theoretical Analysis and Research Hypothesis

2.1 Literature Review

Generally speaking, the two types of corporate environmental responsibility are the disclosure of environmental information and the execution of actual environmental responsibility. Directly result in the following different economic results. The information-disclosure level will increase the transparency and fairness of information distribution for companies and external investors, thus boosting market confidence and attracting more socially responsible investment at a lower cost of capital [12]. On the other hand, suppose that a company employs a false-disclosure strategy of "greenwashing" by deliberately omitting information on environmental fines, making extravagant environmental pledges, or fabricating environmental investments. In that case, they will be subject to regulatory fines and legal risks after being listed on the stock exchange or disclosed by regulators, as well as damage to their image, increased audit risk and a higher probability of future information disclosure violations [19, 23]. For the environment, to mitigate the risk of operational disturbances due to natural or artificial occurrences of the environment, all departments need to comply with environmental regulations and responsibilities. Thus, it will improve the company's reputation among the public and gain more

attention from various groups [1]. A company that has harmed the environment and been fined by the government will have to pay higher costs later on, and thus may lower financing in the future, increase lawsuits, etc.

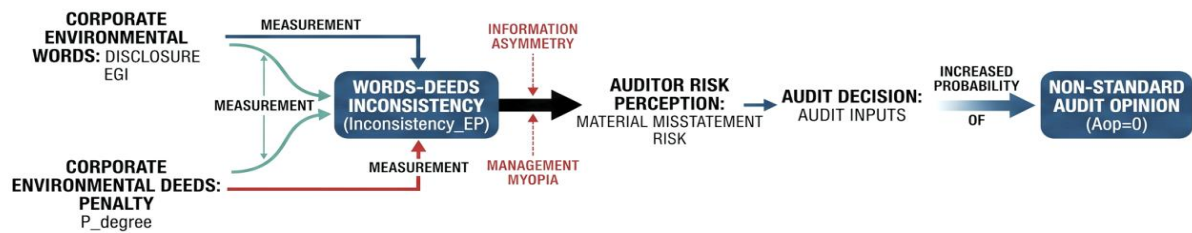


Figure 1: Theoretical Framework of the Impact of Environmental "Saying-Doing" Gap on Audit Opinions

Many factors cause an unqualified opinion, and they are not uniform [34]. As an independent third party in the fiduciary relationship [8], auditors provide the external audit institution with a reasonable basis for conducting the audit of financial statements [28]. Auditors' assessments of the client's integrity and the tone at the top directly affect their level of professional skepticism; thus, this will influence both the range and focus of further audit procedures [30, 16, 36]. Therefore, the auditors will be more likely to issue non-standard audit opinions for high-risk clients. Most research on the factors affecting audit opinions has been divided into two categories: Financial factors and Non-financial factors. The first is related to financial reasons; these include opportunistic earnings management [11], leverage manipulation [18], and a high goodwill bubble [5], all of which increase the likelihood of an abnormal audit opinion. The second category involves non-financial factors; these may affect whether an abnormal audit opinion is issued by a company, such as weak core competitiveness [17], regulatory announcements of violations of listed company regulations [13], non-financial litigation disputes [27], ESG performance [21], and the presence of auditors with industry-specific expertise [22].

According to the review of existing literature, scholars both in China and abroad have carried out various studies on corporate environmental disclosure, including reasons for doing so, economic effects, and "greenwashing" behavior; specifically, the impact of such behaviour on audit opinions has been studied less frequently. Although only a few studies, such as [19], have found that corporate greenwashing does not significantly increase the likelihood of a modified audit opinion, we believe on theoretical grounds that a "words-deeds inconsistency" in environmental responsibility is a serious opportunistic operating strategy and management myopia. This indicates serious deficiencies in the firm's basic operations for the auditors, and as a result, their assessment of the risk of material misstatement has changed. Unfortunately, no systematic empirical tests have been carried out on the mechanism of this possible channel. Secondly, existing studies have mainly focused on the factors affecting audit opinions from the perspective of external policy regulation and internal corporate governance, exploring aspects such as environmental risk, operating risk and agency problems, although acknowledging the function of auditing in restraining "greenwashing", the impact of environmental responsibility-action inconsistency on the formation and governance effect of audit opinions has not been well-researched.

Collect a large number of samples to study empirically how inconsistency in corporate environmental responsibility affects audit opinions. Based on the focus of analysts, auditor's industry knowledge and firm ownership are used to conduct a heterogeneity test for related theoretical and practical connotations.

(II) Theoretical Analysis and Hypothesis Development

In the 1980s, more scholars began to study how related environmental factors in a company are associated with the release of pollution information [20]. Inconsistency between words and deeds leads to information asymmetry and the risk of material misstatement from undisclosed environmental liabilities. A company will not disclose all relevant information voluntarily, so auditors need to do more work to verify it. However, due to data manipulation, the increased effort has reached a point of diminishing returns in terms of evidential power and has thus resulted in a loss of control over detection risk [24]. Second, a discrepancy between the environmental declaration and actual behaviour is often due to hidden financial fraud. Therefore, the auditor should focus on this type of strategic disclosure behaviour more and consider how it changes the scope of audit risk.

First, corporate environmental word-deeds inconsistency increases information asymmetry between the company and its auditors [29]. On the one hand, information asymmetry may conceal unknown environmental liabilities or operating constraints, thus increasing the risk of material misstatement in the financial statements [2]. At the same time, in order to identify the above-mentioned hidden risks, more resources will need to be deployed by auditors. However, given that the quality and amount of necessary audit evidence are significantly lacking, detection risk cannot be controlled to the required extent, and thus overall audit risk will be relatively high [24]. In accordance with the per-risk audit standards, given that it is a high-risk area, expand the audit scope. Due to information asymmetry arising from corporate environmental words-deeds inconsistency, such modifications may be made to the scope of substantive procedures, extended audit periods, or engagement of environmental specialists to assess the financial impact of compliance violations. The above responses will enhance the sense of risk and increase audit costs.

Second, a firm's environmental words do not match its actions, indicating a deficiency in internal management and control, thus increasing the risk of financial reporting fraud. According to the risk-based audit framework, the type, timing and scope of audit work can all be changed in response to a higher-risk assessment. Enterprises with weak internal controls will have the auditors increase the quantity of audit evidence in the sample, conduct more in-depth tests of environment-related accounts, and may engage external experts to help assess the financial impact of non-compliance. Therefore, the audit will be more expensive to carry out. Therefore, the auditor will have to build a risk-reward model and cover the higher costs and risks. When an observable risk signal of environmental word-deeds inconsistency arises, auditors can express their cautious assessment of corporate risks in the form of non-standard opinions. This operation will provide assurance for the audit work and help maintain the professional image of the firm. Therefore, the auditors may issue a non-standard audit opinion to compensate for the higher cost and risk, alert the public, and protect their professional reputation.

In short, a company's words and actions on environmental protection do not align; thus, auditors believe there is an additional risk of material misstatement and will increase the assessed risk. As a result, a firm's disparity between its environmental words and deeds leads auditors to have a lower ethical perception of the client and thus an inadequate assessment of its actual environmental performance. Therefore, this paper puts forward the following research hypothesis:

H1a: Under the same circumstances, auditors will increase the risk of issuing a non-standard audit opinion for companies with corporate environmental responsibility word-deeds inconsistency.

The Informational value of the audit report in audit communication is required [4]. Under the threat of environmental penalties, the company's management may engage in impression

management by selecting specific information for disclosure and distorting how it is presented to improve the public image and thus have auditors underestimate the risks. Although clients with a higher risk are generally more likely to receive modified audit opinions [15], such impression management behaviour may cause auditors to reduce their overall risk assessment and believe that the audit risk is still reasonable. Therefore, they may not significantly increase the probability of issuing a modified opinion for firms with identified "words-deeds inconsistency" (Huang, 2020).

H1b: Auditors are less likely to issue non-standard audit opinions in the group with a higher level of enterprise application of big data technology.

3 Research Design

3.1 Sample Selection and Data Sources

We select Chinese A-share listed companies in the heavily polluting industries from 2016 to 2025, as shown in the 2010 draft of the Guidelines for Environmental Information Disclosure of Listed Firms. After excluding ST, PT firms, and firms with missing data, we obtain a total of 4761 firm-year observations finally. We will manually collect the environmental penalty data from the website of the Institute of Public and Environmental Affairs (IPE). We obtain the firm-level financial data from the CSMAR database and winsorize all the continuous variables at the 1% and 99% levels.

3.2 Variable Definition and Model Construction

Dependent variable: Audit opinion (Aop). Following the research framework of [35] and [7], it is treated as a dummy variable to distinguish different opinion types: a value of 1 indicates the auditor issued a standard unqualified opinion on the listed company's current financial statements; a value of 0 indicates any other type of audit opinion.

Explanatory Variable: Environmental Responsibility Words-Deeds Inconsistency (Inconsistency_{EP}). The independent variable for corporate environmental responsibility inconsistency in this study is constructed by subtracting the actual amount of environmental penalties paid by the company from the corporate environmental information disclosure index. Following the approach in [33] for measuring corporate "greenwashing", this study normalizes the level of disclosure of corporate environmental information and the actual severity of environmental penalties into a standard scale by subtracting the mean and dividing by the standard deviation. The index of environmental responsibility words-deeds inconsistency is then constructed as the difference between the two standardised measures, as shown in Equation (1):

$$Inconsistency_{EP_{i,t}} = \frac{EGI_{i,t} - \mu_{EGI_t}}{\sigma_{EGI_t}} - \frac{P_{degree_{i,t}} - \mu_{P_{degree_t}}}{\sigma_{P_{degree_t}}} \quad (1)$$

In the empirical analysis, the average level and standard deviation of enterprise environmental disclosure across all companies in year t are denoted as μ_{EGI_t} and σ_{EGI_t} respectively. The severity of environmental penalties imposed on firms is indicated by $P_{degree_{i,t}}$ (Chen et al., 2021). The level of environmental information disclosure ($EGI_{i,t}$) is assessed through a comprehensive scoring system covering seven aspects: corporate environmental objectives, investment amounts and proportions in environmental protection technologies, resource consumption, corporate environmental incidents and compensation,

corporate environmental targets, impacts of government environmental policies on firms, and other environmentally related income and expenditures. The specific assessment criteria are as follows: zero points for no environmental information disclosure; one point for qualitative disclosure lacking numerical and monetary data; two points for quantitative disclosure with numerical data but no monetary information; and three points for disclosure incorporating both numerical and monetary data. Summing scores across all items in these three dimensions yields the sample company's total quantified environmental disclosure score [9], which can be expressed as Equation (2):

$$EGI_{i,t} = \sum_{k=1}^7 ItemScore_{i,t,k} \quad (2)$$

Environmental penalties are measured using the number of companies penalized for environmental violations published by IPE. This is based on the annual environmental administrative penalty incidents for the company and its subsidiaries, which is the initial penalty frequency ($P_number_original_{i,t}$). The initial value is constructed by integrating acceptable amounts and rectification levels, guided by penalty point standards for corporate environmental violations published by multiple provinces/municipalities and institutions like IPE. Provincial/municipal violation penalty point standards are then applied for weighting [14]. The greater the severity of environmental penalties imposed on a company, the higher its corresponding score. This score is multiplied by the number of penalties incurred over the past year and the score assigned to each penalty, with the results summed to form the initial indicator of environmental penalty severity ($P_degree_original_{i,t}$), as mathematically structured in Equation (3):

$$P_degree_original_{i,t} = \sum_{j=1}^{P_number_{i,t}} (Penalty_Score_{i,t,j} \times Weight_j) \quad (3)$$

Finally, the two indicators were Z-score standardized to obtain the environmental penalty frequency metric (P_number) and the environmental penalty severity metric (P_degree).

Control variables: Building on previous studies, the following control variables are included in this paper: company size (Size), financial leverage (Lev), profitability (Roa), loss occurrence (Loss), growth potential (Growth), business complexity (Invrec), listing duration (Listage), capital accumulation rate (Car), environmental penalties (Penalty), auditor tenure (Tenure) and auditor reputation (Big4). Indcd and Year fixed effects for the industry and year are also included. The specific information of all these items is shown in Table 1.

Table 1: Variable Definitions

Variable Categories	Variable Name	Variable Symbol	Variable Definition
Dependent variable	Audit Opinion	Aop	Virtual variable: value of 1 if the audit opinion is standard unqualified, and 0 in all other cases.
Explanatory variable	inconsistency between environmental words and deeds	Inconsistency_EP	Discrepancies Between Corporate Environmental Disclosure and Actual Environmental Penalties Imposed
Grouping variable	Auditor Industry Expertise	Spec	Calculating Industry Market Share Based on Audited Total Assets of Listed Companies
	Analyst Attention	Analyst	Number of analysts (teams) who have conducted follow-up analysis on the company
	Nature of Enterprise Ownership	Soe	State-owned firms: 0 Non-state-owned firms: 1
Control variables	Company Size	Size	Take the natural logarithm of total assets
	Financial leverage	Lev	Total Liabilities / Total Assets
	Profitability	Roa	Net Profit / Total Assets
	Loss situation	Loss	Virtual variable: Assigns a value of 1 when net profit is less than 0, otherwise 0
	Growth potential	Growth	$(\text{Revenue} - \text{Prior Year Revenue}) / \text{Prior Year Revenue}$
	Business Complexity	Invrec	The proportion of inventory and accounts receivable to total assets
	Listing Duration	Listage	The number of years listed is taken as the natural logarithm
	Capital Accumulation Rate	Car	$(\text{Total shareholders' equity at the end of the current period} - \text{Total shareholders' equity at the beginning of the current period}) / \text{Total shareholders' equity at the beginning of the current period}$
	Corporate Environmental Penalties	Penalty	Virtual variable: 1 if subject to environmental penalties in the past, 0 otherwise
	Audit Term	Tenure	Term of office for auditors
	Reputation of Auditors	Big4	Dummy variable: set to 1 if the auditing firm is one of the Big Four; otherwise, set to 0
	Industry Effect	Indcd	Industry dummy variables, based on the CSRC's 2012 classification standards, use the primary classification for all industries except manufacturing, which employs the secondary classification
	Annual Effect	Year	Annual Dummy Variable

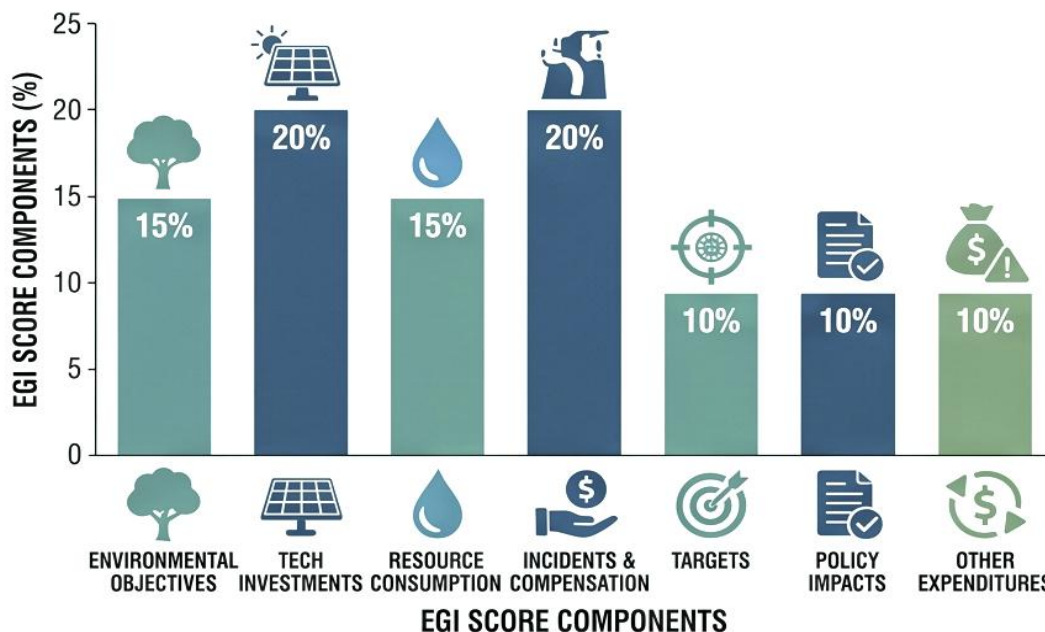


Figure 2: Composition of Corporate Environmental Green Information (EGI) Scores

To explore the impact of corporate environmental responsibility words-deeds inconsistency on audit opinions, a logit regression model is used, and *Inconsistency_EP* represents the level of inconsistency. The model is given by Equation (4) below:

$$\text{Logit} \left(P(Aop_{i,t} = 1) \right) = \alpha_0 + \alpha_1 \text{Inconsistency}_{EP_{i,t}} + \sum_k \gamma_k \text{Controls}_{i,t,k} + \sum \text{Year} + \sum \text{Indcd} + \varepsilon_{i,t} \quad (4)$$

4 Empirical Findings

4.1 Descriptive Statistics

Table 2 shows the descriptive statistics of all the variables. The mean of the dependent variable (*Aop*) is 0.975, and 97.5% of the sample enterprises received a standard unmodified audit opinion. The environmental responsibility inconsistency index (*Inconsistency_EP*) is positively skewed, and its mean is 0.002 and its median is 0.164. The distribution pattern shows two types of corporate behaviour: More than half of the firms have better environmental performance than reported and are strategically silent, but the large opposing extreme values, with a minimum of -5.605 and a maximum of 3.143, indicate another group of firms that significantly exaggerate their environmental goals in relation to their actual performance. The distributions of the other control variables are in line with previous studies, and thus the sample is representative.

Table 2: Descriptive Statistics

Variable	N	Mean	p50	SD	Min	Max
Aop	4761	0.975	1	0.157	0	1
Inconsistency_EP	4761	0.002	0.164	1.209	-5.605	3.143
size	4761	22.34	22.11	1.319	18.34	28.52
Lev	4761	0.412	0.402	0.198	0.016	0.989
Roa	4761	0.045	0.038	0.060	-0.172	0.232
Penalty	4761	0.412	0	0.492	0	1
Big4	4761	0.062	0	0.242	0	1
Tenure	4761	7.960	7	5.562	1	23
Listage	4761	2.234	2.398	0.747	0.693	3.296
Growth	4761	0.157	0.074	0.463	-0.676	2.964
Invrec	4761	0.211	0.197	0.124	0.016	0.594
Loss	4761	0.102	0	0.302	0	1
Car	4761	0.122	0.059	0.270	-0.514	1.497

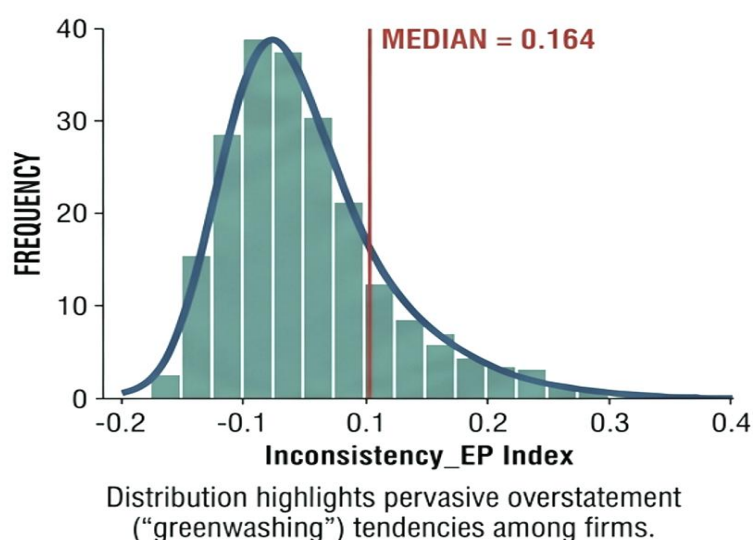


Figure 3: Distribution of the Environmental "Saying-Doing" Inconsistency Index

4.2 Multiple Regression Analysis

Aop is a binary dummy variable that serves as the dependent variable; thus, a simple linear regression model is not suitable. Therefore, we will use a Logit model for estimation. Therefore, Logit model (2) will be used for the test. The regression results of corporate environmental responsibility inconsistency (Inconsistency_EP) with audit opinions are shown in Table 4. Column (1) controls only for industry and year fixed effects, and the correlation coefficient between Aop and Inconsistency_EP is insignificant. Column 2 contains the control variables, and after controlling for industry and year fixed effects, the coefficient of Inconsistency_EP is 0.212 and statistically significant at the 1% level. Therefore, an inconsistency in the environment's sense of responsibility will likely lead to a modified audit opinion and thus be seen by auditors as a negative factor of the client company. This may show that the future is uncertain, so the senior management has been engaging in opportunistic operating activities, is short-sighted, and lacks integrity. A modified audit opinion indicates that there is a material non-compliance with laws and regulations or serious misstatement in the financial statements; thus, the published statements are unreliable and may cause significant harm to the firm's

reputation and future development. Only after applying an enhanced professional scepticism and performing comprehensive audit work will such an opinion be issued. Therefore, hypothesis H1a is supported. The effects of the other control variables on the audit opinions are also generally in line with the findings of previous studies.

Table 3: Relationship between corporate environmental responsibility words-deeds inconsistency and audit opinion.

	(1)	(2)
Variable	Aop	Aop
EP_consistency	0.087	0.212***
	(1.338)	(2.609)
firm_size		0.554***
		(5.914)
leverage		-3.443***
		(-6.801)
profitability		13.194***
		(5.784)
Penalty		0.584**
		(2.441)
big4_auditor		-0.033
		(-0.066)
audit_tenure		0.013
		(0.858)
listing_age		-0.397**
		(-2.508)
growth_rate		0.170
		(0.908)
inv_receivables		1.759**
		(2.191)
loss_dummy		0.303
		(0.949)
car		0.418
		(1.132)
Constant	3.769***	-6.755***
	(7.293)	(-3.185)
Observations	6,262	6,262
Incd FE	YES	YES
Year FE	YES	YES
Pseudo R-squared	0.0392	0.234

Note: The table shows the coefficient estimates and t-statistics for firm-level clustered standard errors in parentheses. ***, **, and * indicate that the results are significant at the 1%, 5%, and 10% levels, respectively.

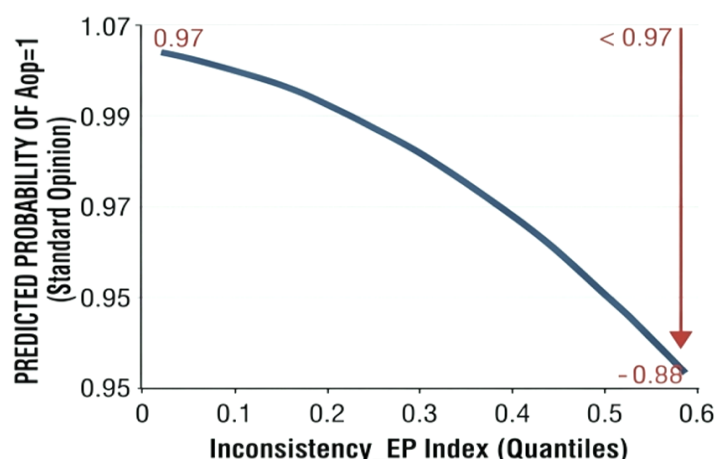


Figure 4: Marginal Effects of Environmental Inconsistency on the Probability of Standard Audit Opinions

4.3 Robustness Test

To verify the robustness of the results, we use a different model structure in a robustness check. We will use a Probit model to re-estimate the main equation. As shown in Table 5, the coefficient of `Inconsistency_EP` is positively correlated with `Aop` and statistically significant at the 1% level after controlling for other factors. The consistency in the sign, magnitude and significance of the relationship between environmental responsibility inconsistency and audit opinions shows that changing the model specification has not significantly altered our conclusions and thus supports the results of the first analysis.

Standard errors were clustered at the firm level in the model to address the problem of potential endogeneity. Column (2) of Table 5 shows that the regression coefficient for inconsistency in environmental responsibility (`Inconsistency_EP`) is 0.232 and is positive at the 5% level. As shown in Table 4, it also supports the main regression results.

Two other measures of corporate environmental responsibility inconsistency (`Inconsistency_EPn` and `Inconsistency_EGOIP`) have been used to replace the original explanatory variable (`Inconsistency_EP`). `Inconsistency_EPn` is constructed as the difference between the degree of corporate environmental information disclosure (`EGI`) and the frequency of corporate environmental penalties (`P_number`). `Inconsistency_EGOIP` is built by taking the difference between the corporate environmental governance outcome dimension (`EGOI`) and corporate environmental penalty intensity (`P_degree`) as the replacement explanatory variables. `P_number` here is a standardised measure of how often the listed company and its subsidiaries have been fined for environmental pollution in the past year; it is the total count of environmental violations by the listed company and its subsidiaries, organised by the company, after being standardised. `EGOI` refers to the dimension of corporate environmental governance outcomes, and it is obtained by standardising the total score of environmental governance outcome indicators (`EGOI_score`). As shown in Column (3) of Table 5, after adding control variables and controlling for industry and year fixed effects, the corporate environmental responsibility inconsistency measure `Inconsistency_EPn` is positively correlated with the issuance of standard audit opinions (`Aop`) at the 1% significance level. Similarly, the alternative measure `Inconsistency_EGOIP` is positively correlated with `Aop` and significantly so at the 1% level. The results are the same as those in Table 4, and thus support the conclusion of the first regression analysis.

Table 4: Robustness Tests Based on Alternative Models, Standard Errors and Explanatory Variables

Variable	Aop			
	(1)	(2)	(3)	
	Switch to a probit regression model	Robust Standard Error for Clustering	Replace explanatory variables	
Inconsistency_EP	0.093** (2.482)	0.212** (2.220)		
Inconsistency_EPn			0.083** (2.179)	
Inconsistency_EGOIP		0.212** (2.220)		0.105*** (2.820)
Size	0.248*** (5.599)	0.554*** (4.521)	0.249*** (5.631)	0.251*** (5.672)
Lev	-1.582*** (-6.603)	-3.443*** (-5.215)	-1.584*** (-6.614)	-1.576*** (-6.568)
Roa	6.408*** (5.823)	13.194*** (5.397)	6.420*** (5.838)	6.408*** (5.818)
Penalty	0.278*** (2.593)	0.584* (1.899)	0.265** (2.468)	0.298*** (2.757)
Big4	-0.083 (-0.403)	-0.033 (-0.050)	-0.080 (-0.391)	-0.081 (-0.393)
Tenure	0.005 (0.633)	0.013 (0.664)	0.004 (0.627)	0.004 (0.574)
Listage	-0.161** (-2.347)	-0.397* (-1.951)	-0.160** (-2.343)	-0.159** (-2.321)
Growth	0.098 (1.139)	0.170 (0.723)	0.097 (1.129)	0.096 (1.117)
Invrec	0.752** (2.078)	1.759 (1.467)	0.759** (2.098)	0.731** (2.018)
Loss	0.111 (0.772)	0.303 (0.927)	0.111 (0.770)	0.103 (0.719)
Car	0.214 (1.250)	0.418 (1.200)	0.210 (1.233)	0.214 (1.246)
Constant	-2.781*** (-2.792)	-6.755*** (-2.578)	-2.804*** (-2.820)	-2.816*** (-2.831)
IndcdFE	6,262	6,262	6,262	6,262
YearFE	YES	YES	YES	YES
N	YES	YES	YES	YES
R-squared	0.233	0.234	0.233	0.235

Propensity score matching (PSM) will be used in this paper to reduce the risk of sample selection bias, as shown in [6]. Firms subject to environmental penalties in a particular year are the treatment group, and those without such penalties are the control group. A dummy variable Penalty is set to 1 for penalized enterprises and 0 otherwise. First, using logit regression, we obtain the propensity scores based on firm attributes, such as size, debt-to-asset ratio, return on assets, loss status and business complexity, in the matching process. Then, apply 1:1 nearest-neighbour matching without replacement. The estimated mean treatment effect of the treated is statistically significant at the 1% level, and balance tests show no systematic differences between the matched treated and control groups. Re-estimating our model with the matched sample, as shown in column (1) of Table 6, the coefficient for Inconsistency_EP is still positive and statistically significant at the 5% level, which is consistent with the previous results and strengthens the conclusions we have drawn.

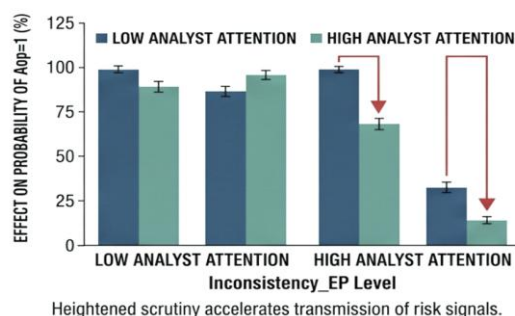


Figure 5: Moderating Effect of Analyst Coverage - A Comparison

Heckman's two-step estimator will be employed to correct for sample selection bias. The first is a Probit regression model of the reception of environmental penalties by enterprises. The inverse Mills ratio (IMR) at this time is added to the second-stage regression model. The results are shown in Table self-selection. After accounting for IMR, the results are the same as in Table 4, and thus support our previous conclusions.

Table 5: Robustness Tests of Propensity Score Matching and Heckman Two-Step Estimation Regressions

Variable	(1)	(1)	(2)
	Aop	Phase One Penalty	Phase Two Aop
Inconsistency_EP	0.100** (0.049)		0.108*** (2.820)
Size	0.171*** (0.064)	0.392*** (21.875)	0.918*** (2.628)
Lev	-1.036*** (0.329)	-0.092 (-0.852)	-1.783*** (-6.783)
Roa	7.602*** (1.556)	-1.550*** (-3.961)	3.710** (2.096)
Penalty	0.292** (0.123)		0.281*** (2.628)
Big4	-0.251 (0.234)	0.106 (1.416)	0.008 (0.036)
Tenure	0.004 (0.009)	0.013*** (4.186)	0.026** (1.977)
Listage	-0.066 (0.092)	0.094*** (3.610)	0.014 (0.123)
Growth	0.149 (0.119)	-0.048 (-1.270)	0.008 (0.087)
Invrec	0.489 (0.497)	-0.391*** (-2.745)	0.153 (0.320)
Loss	0.098 (0.189)	-0.150** (-2.191)	-0.135 (-0.702)
Car	0.143 (0.217)	0.141** (2.058)	0.454** (2.144)
Imr			2.485* (1.950)
Constant	-1.611 (1.437)	-9.193*** (-24.298)	-20.586** (-2.227)
IndcdFE	YES	YES	YES
YearFE	YES	YES	YES
N	3628	6,586	6262
PseudoR-squared/r2_a	0.213	0.133	0.236

4.4 Heterogeneity Analysis

Explanatory Variables under different progress environments are subjected to group regression analysis in this study to explore their varying impacts. The attention metric (Analyst) was defined as the natural logarithm of the analyst tracking count plus one. Using the median of this indicator as the dividing point, a high-attention group and a low-attention group were established for logit regression analysis as shown in Model (1). The results in Column (1) of Table 8 show that in the high analyst attention group, the coefficient for corporate environmental responsibility inconsistency (Inconsistency_EP) is positively and significantly correlated with the 5% level. The degree of the negative correlation between corporate environmental responsibility words and deeds inconsistency and the probability of issuing a standard audit opinion is relatively high. As shown in the above figures, the demand for market supervision is gradually growing. Analysts find environmental information bias and convey risk signals; auditors are restricted by reputational and legal risks and thus need to be very particular about inconsistency risk to link inconsistency with a non-standard audit opinion. However, the association was much weaker in the low-attention group. This may be because the more attention an auditor pays to a company's environmental responsibility statements, the higher their risk of overlooking deviations between words and deeds will be; thus, the perceived risk is amplified and more likely to lead to a non-standard audit opinion.

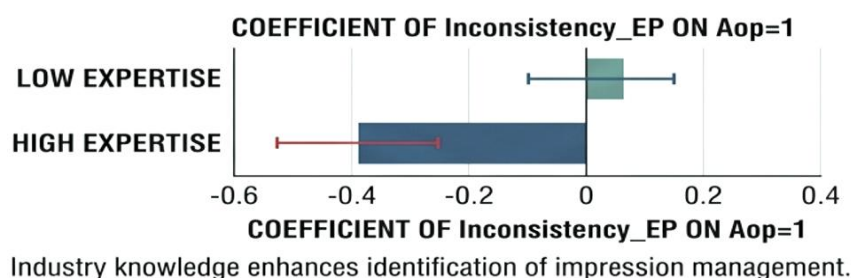


Figure 6: Moderating effect of auditor industry expertise: A comparison

A company's proportion of a particular industry in the market is mainly due to its industry-focused business model and specialised investment; this is in line with the company's strong points and innate advantages. Neal and Riley (2004) have conducted research on this, and in this paper, we will use an industry market share method based on total assets to measure auditor industry expertise. As shown in column (2) of Table 8, the results of the heterogeneity test based on industry experience indicate that auditors with industry experience are more familiar with the regulatory environment of the clients and the demands placed on the environment of the enterprises. However, it is unknown whether the above industry knowledge can help reveal the discrepancy between a company's environmental responsibility declarations and actual behaviour or the management's perception-management strategy. Neal and Riley (2004) are used here to determine the auditors' level of experience in a particular industry through an industry-level market share analysis based on total assets of that industry. According to the heterogeneity test results in column (2) of Table 8, auditors with industry experience are more likely to conduct risk-oriented audits according to the requirements of risk-oriented auditing. They have better professional skills and more experience, can therefore identify the company's impression management related to environmental responsibility more accurately, and improve the quality of the audit.

According to the kind of ownership, the sample was divided into state-owned enterprises (SOEs, represented by SOE=0) and non-state-owned enterprises (non-SOEs, represented by SOE=1). As shown in Table 8, the Inconsistency_EP coefficient for non-state-owned

enterprises is positive and statistically significant at the 5% level, but the Inconsistency_EP coefficient for state-owned enterprises is not statistically significant. Therefore, the amount of environmental information disclosed by non-state-owned enterprises has been positively associated with their total factor productivity, but this has not occurred for state-owned enterprises. Non-SOEs' differences in corporate behavioural logic and constraint mechanisms: They are driven by a survival logic focused on market competition, and thus their operational decisions are more susceptible to changes in market signal feedback. When the "words-deeds inconsistency" in these companies occurs, it will directly damage the chain of market trust among consumers and investors. Therefore, the market has a smaller margin for error for non-SOEs, and any words-deeds inconsistency is more likely to cause a chain reaction. The state-owned enterprise will also be under some constraints from institutions and society. Although corporate environmental responsibility is not in line with behaviour, administrative intervention and the allocation of resources will still affect how it is carried out. Policy support can reduce some market risks, and institutions such as audits will not reveal these risks immediately.

Table 6: Heterogeneity Analysis of Big Data Application.

Variable	Aop					
	(1)		(2)		(3)	
	Analyst Attention(low)	Analyst Attention(high)	Auditor Industry Expertise(low)	Auditor Industry Expertise(high)	private firms	State-owned enterprise
Inconsistency_EP	0.203	0.234**	0.102	0.330***	0.320**	0.192
	(1.589)	(2.323)	(0.805)	(2.819)	(2.426)	(1.470)
Size	-0.452	-2.018***	0.333*	0.188	0.500**	0.414**
	(-0.430)	(-2.741)	(1.833)	(1.071)	(2.348)	(2.549)
Lev	-2.034**	-3.046***	-2.516***	-4.476***	-2.853**	-4.041***
	(-2.422)	(-4.865)	(-2.891)	(-6.486)	(-1.999)	(-5.814)
Roa	8.805**	14.939***	11.402***	14.556***	14.166***	13.970***
	(2.237)	(5.008)	(3.143)	(4.638)	(2.889)	(4.630)
Penalty	0.711*	1.087***	0.703*	0.656*	0.895*	0.475
	(1.959)	(3.673)	(1.950)	(1.951)	(1.736)	(1.267)
Big4	0.910	0.289	0.016	-0.941	0.231	-0.563
	(0.875)	(0.574)	(0.688)	(-1.487)	(0.190)	(-0.862)
Tenure	-0.030	0.025	-0.307	0.002	0.012	0.014
	(-1.233)	(1.264)	(-1.095)	(0.073)	(0.371)	(0.461)
Listage	0.205	-0.490**	0.323	-0.467**	-0.517	-0.607**
	(0.893)	(-2.121)	(0.930)	(-2.302)	(-1.112)	(-2.486)
Growth	-0.176	0.112	2.432*	0.037	0.351	0.006
	(-0.770)	(0.418)	(1.721)	(0.161)	(0.696)	(0.025)
Invrec	1.850	0.482	0.089	2.159**	-0.022	2.164**
	(1.376)	(0.489)	(0.191)	(1.995)	(-0.008)	(1.965)
Loss	0.016	0.192	0.515	0.533	0.492	0.273
	(0.033)	(0.484)	(0.910)	(1.163)	(0.889)	(0.625)
Car	1.055	-0.606	-2.691	0.049	1.041**	0.055
	(1.304)	(-1.339)	(-0.666)	(0.096)	(2.096)	(0.143)
Constant	3.453**	8.252***	0.102	15.488	-6.180	-2.864
	(2.417)	(6.475)	(0.805)	(0.012)	(-1.458)	(-0.748)
IndcdFE	YES	YES	YES	YES	YES	YES
YearFE	YES	YES	YES	YES	YES	YES
N	2,474	3,986	3217	2,549	2,523	3,443
PseudoR-squared/r2_a	0.153	0.274	0.187	0.299	0.253	0.278

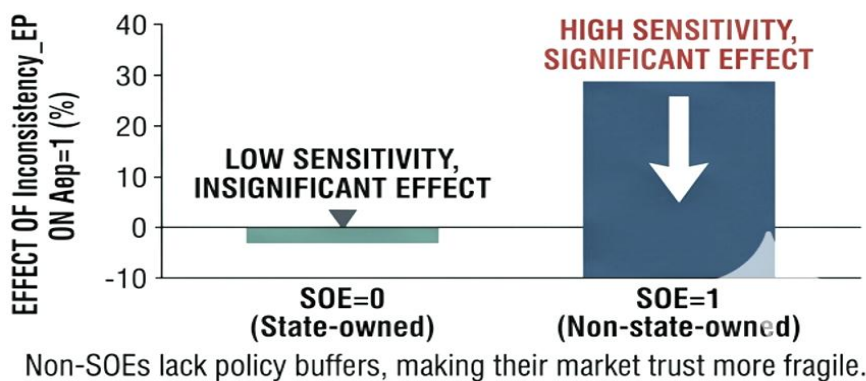


Figure 7: Sensitivity Differences between State-Owned Enterprises (SOEs) and Non-SOEs

5 Conclusions and Recommendations

Based on empirical analysis of Chinese Shanghai and Shenzhen A-share listed companies in heavy-polluting industries from 2016 to 2025, this study systematically investigates the impact mechanism of the inconsistency between corporate environmental responsibility words and deeds on audit opinions and derives the following core conclusions: (1) By sending negative signals of future uncertainty and management integrity, this inconsistency between words and deeds directly prompts auditors to increase the assessment of the risk of material misstatement. Therefore, it reduces the chance of obtaining a normal unmodified opinion by increasing the risk of an abnormal unmodified opinion. In addition, all the above conclusions are consistent with the results of various robustness checks, including modifications to the explanatory variables, PSM tests and the Heckman two-step estimation method. (2) Heterogeneity tests show that the negative effect of corporate environmental responsibility inconsistency on audit opinions is relatively stronger in three specific circumstances. Given that there are many analysts covering it, when market attention increases, auditors will be under higher pressure to detect errors in the environmental data and may be forced to issue a non-standard audit report. Auditors who have prior experience in the industry will be able to identify significant shortcomings in a company's environmental management system and impression-management practices more easily, and therefore, such problems will be more likely to be disclosed in the audit report. Due to the lack of institutional support and a safety net provided by policies, the environmental information disclosed by non-state-owned enterprises is generally subjected to more rigorous verification for authenticity and thus further affected. Therefore, a high intensity of external monitoring, the professional competence of auditors, and the nature of firm ownership jointly provide contextual supports for auditors' judgments. All of the robustness tests are still statistically significant.

Given the economic changes in recent years, high-quality development has been pointed out by the government. With the foundation laid for economic growth and the maintenance of public health and social stability, this paper puts forward the following suggestions based on its research.

Given that environmental offences have caused relatively more serious damage to the audit results of non-state enterprises, the focus of regulation will be on building a system of verifiable material non-compliance rather than merely requiring mandatory disclosure by private enterprises. Improvement of the System for Disclosing Environmental Information. Set up compulsory requirements to force enterprises to disclose information on both favorable investments and adverse penalty liabilities in a quantitative and all-encompassing manner, thereby seriously restricting the scope of "selective disclosure". At the same time, establish an

integrated mechanism that connects environmental and financial supervision needs to include records of corporate environmental non-compliance in credit reports and financing assessments, thus imposing actual penalties. Strengthen targeted supervision and capacity-building support for non-listed companies. Green credit and technology subsidies will be introduced to lower the compliance costs for these enterprises, free up resources from "image packaging", and focus on "substantive pollution control".

Strengthen the building of a collaborative governance model by issuing guidelines on the assurance of environmental information audits and promoting the development of a third-party analysis market. It will increase the supervisory function of auditors and social organisations over the environmental performance of the corporation to build a multi-stakeholder governance model based on administrative, market and social forces. Thus, the enterprise will move from talk about environmental responsibility to actual behaviour.

As the "gatekeepers" of the capital market, auditors now need to ensure the implementation of a company's environmental responsibility and the consistency of information disclosure in the assessment of all-round corporate risk. In light of the risk-oriented audit system, auditors should pay more attention to deviations from the stated environment information and the actual situation in their scope of audit. Adjust Audit plans and resources to improve the accuracy of the identified environmental risk. Second, there are no uniform standards for the audit attestation of the complexity and diversity of current ESG disclosures; thus, audit results lack comparability and credibility. Therefore, in cooperation with industry associations and regulatory authorities, we will work together to explore the construction of an ESG audit system specifically for Chinese companies. Set up audit procedures, establish standards for evidence and risk assessment models for environmental information, etc., to help audits check whether companies have misrepresented environmental data.

Firms should not see the environmental requirements of the meeting as an additional expense but as necessary for all-weather development. According to the above data, the company has been fined for pollution; as a result, it faces a loss of public trust and a drop in market share. It is necessary to point out that such a form of disclosure cannot be allowed to take place in the name of helping the public. If a company is spending too much money to present its disclosure information in a favourable light, then it will not make corresponding adjustments to reduce pollution. The above practices do not create real competition and have caused a crisis of trust due to information asymmetry. Therefore, the company needs to establish all-encompassing mechanisms that link environmental responsibility with its business strategy and switch the mode of environmental disclosure from image construction to the promotion of ecological improvement.

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