

Does Corporate Climate Risk Information Disclosure Increase Audit Fees? ——An Empirical Study Based on Chinese Listed Companies

Xiangnan Hou

School of Yunnan University of Finance and Economics, Yunnan 650000, China

1685499264@qq.com

Abstract. This paper takes A-share listed companies on the Shanghai and Shenzhen Stock Exchanges from 2009 to 2024 as the research sample to empirically examine the impact of climate risk information disclosure on audit fees and its underlying mechanism. The results show that the level of corporate climate risk information disclosure is significantly and positively correlated with audit fees. Climate risk information disclosure drives up audit fees by raising media attention. The higher the degree of information asymmetry, the stronger the positive impact of climate risk information disclosure on audit fees. Compared with state-owned enterprises, the positive impact of climate risk information disclosure on audit fees is more pronounced in non-state-owned enterprises. The above relationship is more significant in non-heavy polluting industries and when the auditors are non-Big Four accounting firms. The conclusions of this paper enrich the relevant research on the economic consequences of climate risk information disclosure and the influencing factors of audit fees, and also provide empirical evidence for understanding the transmission path through which climate risk information disclosure affects audit fees.

Keywords: Climate Risk; Climate Risk Information Disclosure; Audit Fees.

1. Introduction

Climate change stands as one of the most severe global challenges to the sustainable development of human society in the 21st century. According to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), global temperatures keep rising and extreme weather events occur frequently, so climate change poses a systemic threat to the global economic and financial systems^[1]. In this context, enterprises, as the main carriers of economic activities, are facing increasingly explicit and complex climate risks. These risks include physical risks triggered by extreme weather, sea level rise and other factors, as well as transition risks brought by low-carbon policy transformation, technological innovation, shifts in market preferences and other aspects. To address this challenge, regulators around the world have issued requirements for climate risk information disclosure one after another, pushing enterprises to improve the transparency of climate risk-related information.

Existing literature has conducted preliminary discussions on the relationship between climate risk and audit fees. Hartlieb and Eierle find that enterprises facing higher levels of climate change risk pay higher audit fees based on data from US listed companies^[2]. Xin et al. document that climate-related risks can significantly increase audit fees, and the impacts of physical risks and transition risks are different. Based on an international sample^[3], Yu et al. find a positive correlation between climate risk and audit fees, and this relationship is more significant in countries with stricter audit supervision^[4].

In recent years, listed companies have paid increasing attention to climate risk, and the number of listed companies that voluntarily disclose climate risk-related information has continued to grow. Thus, how climate risk information disclosure affects audit pricing has become a noteworthy issue. However, existing studies rarely focus on the impact of climate risk information disclosure on audit pricing in the Chinese market, and there is little discussion on its transmission paths and boundary conditions. In view of this, this paper selects A-share listed companies on the Shanghai and Shenzhen Stock Exchanges from 2009 to 2024 as research samples, and empirically examines the impact effect,

transmission path, moderating mechanism and heterogeneity characteristics of corporate climate risk information disclosure level on audit fees.

The marginal contributions or innovations of this paper are reflected in three aspects. First, this paper studies the impact of corporate climate risk information disclosure on audit fees based on Chinese listed companies. On the one hand, it enriches the relevant research on the economic consequences of climate risk information disclosure and the influencing factors of audit fees; on the other hand, it also supplements country-specific research in this field. Second, different from existing literature that analyzes from the perspectives of corporate governance and ESG performance, this paper examines the moderating mechanism of climate risk information disclosure on audit fees from two perspectives: property right nature and information asymmetry degree. It also reveals the mediating mechanism of media attention, which deepens the understanding of the impact mechanism of climate risk information disclosure on audit fees. Third, this paper identifies the boundary conditions under which climate risk information disclosure affects audit fees, providing more targeted empirical evidence for understanding the relationship between the two in different scenarios.

2. Literature Review

As a key issue of concern in the current era, climate risk has prompted extensive academic research on the economic consequences of relevant information disclosure. In addition, the audit pricing mechanism has long been a hot topic in audit research. With the deepening of research, existing studies have begun to integrate climate risk and audit fees, attempting to explore the relationship between the two and the corresponding impact mechanisms.

2.1. Research on the Economic Consequences of Climate Risk Information Disclosure

Climate risk information disclosure refers to the behavior of enterprises disclosing climate change-related risk information and management measures to stakeholders publicly. With the in-depth advancement of global climate governance, the importance of climate risk information disclosure has become increasingly prominent. Driven by the Task Force on Climate-related Financial Disclosures (TCFD) established by the Financial Stability Board (FSB), more and more countries and regions have begun to mandate or encourage enterprises to disclose climate-related information.

Existing literature has conducted multi-dimensional empirical tests on the economic consequences of climate risk information disclosure. For instance, in terms of the capital market, Ilhan finds that enterprises with better climate risk information disclosure have higher institutional investor ownership, and the disclosure quality affects investors' decision-making^[5]. In terms of environmental performance, Wang documents that disclosing climate risk information can reduce carbon emission levels, where transition risk disclosure promotes long-term carbon reduction and physical risk disclosure is conducive to short-term emission reduction^[6]. In terms of debt financing, Guo et al. show that climate risk information disclosure can significantly improve enterprises' credit availability, which not only alleviates the problem of short-term debt used for long-term investment, but also expands the scale of environmental protection investment^[7].

2.2. Research on the Influencing Factors of Audit Fees

Audit fees refer to the remuneration charged by auditors for providing audit services to clients, and its pricing mechanism has long been a hot topic in audit research. The pioneering research by Simunic decomposes audit fees into two parts: audit costs and risk premium, which lays the theoretical foundation for the research on audit pricing^[8]. Subsequent studies have deeply explored the influencing factors of audit fees from multiple dimensions on this basis. From the perspective of client characteristics, existing research shows that factors such as client size, internal audit contribution, and internal control quality all affect audit fees. As early as Simunic's study, he found that the asset size of listed companies is one of the most important factors determining audit fees^[8]. Felix et al. indicate that internal audit contribution is a decisive factor of audit fees^[9]. Wang et al. find

that internal control is significantly negatively correlated with audit fees, and lower internal control quality is accompanied by relatively higher audit fees^[10]. From the perspective of external environment, Yu et al. find that policies and systems exert an impact on audit fees, and government environmental regulation can significantly reduce enterprises' audit fees^[11]. In addition, the literature review by Wu concludes that audit fees are affected by multi-dimensional factors, including client size, business complexity, client risks, auditor characteristics, corporate governance and other aspects^[12].

2.3. Climate Risk and Audit Pricing

As a component of the ESG framework, research in the ESG field has involved the relationship between climate risk and audit pricing. Yip's study shows that ESG information disclosure is significantly positively correlated with audit fees, and this positive correlation is stronger when the institutional investor ownership ratio is higher^[13]. In recent years, scholars have begun to focus on the impact of climate risk on audit pricing, and have identified climate risk as a critical factor affecting audit pricing. For example, Hartlieb and Eierle find that enterprises exposed to higher levels of climate change risk incur higher audit fees based on data from US listed companies^[2]. Xin et al. document that climate-related risks can significantly increase audit fees, and the impacts of physical risks and transition risks differ from each other. Based on an international sample^[3], Yu et al. find a positive correlation between climate risk and audit fees, and this relationship is more pronounced in countries with stricter audit supervision^[4].

Recent studies have also explored the impact of climate risk information disclosure on audit fees. Based on Australian listed companies, Alshahrani finds that climate risk information disclosure, as an external risk factor, positively affects audit pricing by influencing auditors' risk assessment, and sound corporate governance significantly moderates the relationship between the two^[14]. Almutairi identifies a positive correlation between climate risk information disclosure and audit workload measured by audit fees in the Egyptian market, and ESG performance plays a positive moderating role in this relationship^[15]. However, there is scant existing literature conducting relevant analyses based on the Chinese market.

3. Theoretical Analysis and Hypothesis Development

Overall, corporate climate risk information disclosure exerts an impact on audit fees. Based on audit pricing theory, audit fees consist of two components: audit costs and audit risk premium^[8]. Climate risk information disclosure can affect both of these components. On the one hand, according to Alshahrani's research, auditors regard climate risk as an external factor that affects clients' business risks and financial performance, and incorporate climate-related risk exposures into their risk assessment processes. Although a high level of climate risk information disclosure improves information transparency, it may also reveal more potential risk points. This will lead auditors to demand a higher risk premium to cover possible future litigation and reputational losses^[16], thereby driving up audit fees. On the other hand, Almutairi's study shows that the level of climate risk information disclosure is significantly positively correlated with audit workload. The non-financial nature and complexity of climate risk information increase the cost of information verification; meanwhile, as a systemic business risk, climate risk elevates auditors' risk assessment, requiring more audit resources to reduce detection risk. Coupled with the compliance requirements of international auditing standards and the motivation to maintain reputational insurance, these factors jointly push up audit workload, which in turn increases audit costs and ultimately raises audit fees.

Based on the above analysis, this paper proposes the following hypothesis:

Hypothesis 1: *Ceteris paribus*, the level of corporate climate risk information disclosure is positively correlated with audit fees.

As a vital non-financial information disclosure behavior of enterprises, climate risk information disclosure can significantly attract the attention and coverage of external market participants such as

the media and analysts. Li's study finds that climate risk information disclosure significantly improves analyst coverage by reducing analysts' information acquisition costs and increasing institutional investors' information demand, thereby further elevating corporate media attention^[17]. Media attention is a crucial part of external governance mechanisms, which can affect auditors' risk perception and behavioral decisions^[18]. With the increase in media attention, the dissemination scope of corporate-related information expands and social supervision intensifies, which in turn raises the external supervision pressure and professional risks faced by auditors. To cope with higher public opinion supervision and professional risks, auditors will invest more audit resources, implement stricter audit procedures, and charge corresponding risk premiums^[19]. Ultimately, climate risk information disclosure further drives up audit fees by improving media attention.

Based on the above analysis, this paper proposes the following hypothesis:

Hypothesis 2: Climate risk information disclosure exerts a positive impact on audit fees by affecting media attention.

The degree of information asymmetry serves as a key boundary condition that influences auditors' pricing decisions regarding climate risk information. The positive impact of climate risk information disclosure on audit fees is more pronounced in enterprises with high information asymmetry. This is because in an environment with high information asymmetry, the non-standardized and forward-looking characteristics of climate risk disclosure increase auditors' information processing costs and the difficulty of professional judgment^[15]. Meanwhile, information asymmetry exacerbates the risk of greenwashing, requiring auditors to implement additional verification procedures to assess the authenticity of disclosed information^[20]. In addition, enterprises with high information asymmetry usually face higher operational risks and litigation risks accompanied by climate risk disclosure, so auditors will demand a higher risk premium for compensation^[21]. In contrast, for enterprises with low information asymmetry, corporate information is relatively transparent, which will not significantly increase auditors' information processing costs. The small information gap also narrows the space for corporate greenwashing, so auditors do not need to devote excessive efforts to verifying the authenticity of disclosures. The operational and litigation risks of such enterprises are also relatively controllable, so auditors will not significantly raise the risk premium. Accordingly, the impact of climate risk information disclosure on audit fees is weaker. Based on the above analysis, this paper proposes the following hypothesis:

Hypothesis 3: The higher the degree of information asymmetry, the stronger the positive impact of climate risk information disclosure on audit fees.

Property right nature is a crucial factor affecting corporate behaviors and auditors' decision-making. There may be differences in the impact of climate risk information disclosure on audit fees between state-owned enterprises (SOEs) and non-state-owned enterprises (non-SOEs). For SOEs, on the one hand, SOEs generally have stronger government backgrounds and implicit guarantees, so auditors perceive lower climate risks faced by them^[22], and the corresponding impact of climate risk information disclosure on audit fees is weaker. On the other hand, SOEs bear greater pressure of social responsibility and policy compliance, and their motivation for information disclosure mainly stems from external institutional pressure and policy compliance demands^[23]. Thus, their climate risk information disclosure is more likely to be driven by regulatory compliance rather than reflecting real risks. In this context, the climate risk information disclosed by SOEs may be regarded as homogeneous compliance signals, and auditors find it difficult to obtain incremental risk information from such disclosures, so the impact of climate risk information disclosure on audit fees is relatively weak. In contrast, non-SOEs are at the forefront of market competition and lack implicit government guarantees. Their climate risk information disclosure is mostly motivated by stakeholder pressure and the need to build reputational capital, with stronger information content and signaling function^[24]. Therefore, their climate risk information disclosure can attract more risk attention from auditors, leading to a more significant audit fee premium.

Based on the above analysis, this paper proposes the following hypothesis:

Hypothesis 4: Compared with state-owned enterprises, the positive impact of climate risk information disclosure on audit fees is stronger for non-state-owned enterprises.

4. Empirical Research Design

4.1. Sample Selection and Data Sources

The Copenhagen Climate Conference was held in 2009, which heated up global climate-related topics, and China launched the pilot of voluntary environmental information disclosure at that time. To well cover the stage of gradual improvement of China's climate risk information disclosure system, this paper selects A-share listed companies on the Shanghai and Shenzhen Stock Exchanges from 2009 to 2024 as the initial research sample. The sample selection follows the following principles: Firstly, considering that the business nature and regulatory requirements of the financial industry are significantly different from those of other industries, financial listed companies are excluded from the sample. Secondly, to avoid the impact of extreme financial conditions on the research conclusions, ST and *ST companies are eliminated. Thirdly, samples with missing key variables are removed. After screening, a total of 46,502 firm-year observations are finally obtained. To mitigate the impact of extreme values, all continuous variables are winsorized at the 1st and 99th percentiles.

Data on corporate climate risk information disclosure are extracted from the annual reports of listed companies through text analysis methods, and other financial data are derived from the China Stock Market & Accounting Research (CSMAR) Database.

4.2. Variable Definition

(1) Dependent Variable: Audit Fees (Auditfee)

This paper measures audit fees using the natural logarithm of one plus the enterprise's annual audit fees. This treatment can eliminate the heteroscedasticity problem caused by the large dispersion of raw audit fee data and improve the stability of empirical results.

(2) Independent Variable: Climate Risk Information Disclosure (CRD)

Referring to the data processing method of Du et al.^[25], this paper adopts Python software to conduct text analysis on the annual reports of listed companies. Combined with text analysis and machine learning techniques, we deeply mine the keywords related to the measurement of climate risk information disclosure defined by the Task Force on Climate-related Financial Disclosures (TCFD) in annual reports. Then we calculate the proportion of the word frequency of these keywords in the total word frequency of the annual report to quantitatively evaluate the level of voluntary climate risk information disclosure of listed companies, and finally obtain the climate risk information disclosure indicator CRD.

A larger value of this indicator indicates a higher level of corporate climate risk information disclosure in the current year.

(3) Control Variables

With reference to relevant studies on audit fees^{[7][20][26]}, this paper controls the following variables: enterprise size (Size), measured by the natural logarithm of total assets at the end of the year; asset-liability ratio (Lev), measured by the ratio of total liabilities to total assets; return on assets (ROA), measured by the ratio of net profit to total assets; enterprise development capacity (Tobinq), measured by Tobin's Q value; listing years (ListAge), calculated as the natural logarithm of the number of years since the enterprise's listing; the shareholding ratio of the largest shareholder (Top1); the proportion of independent directors (Indep), measured by the ratio of the number of independent directors to the total number of directors; board size (Board), represented by the total number of directors on the board; and duality (Dual), a dummy variable that equals 1 if the chairman and CEO are the same person, and 0 otherwise. In addition, to alleviate the impact of unmeasurable factors that vary with firms or years on empirical results, this paper further controls firm fixed effects and year fixed effects in the regression model.

4.3. Model Specification

To test the main effect of climate risk information disclosure on audit fees (Hypothesis 1), this paper constructs the following panel data regression model:

$$Auditfee_{i,t} = \alpha_0 + \alpha_1 CRD_{i,t} + \sum \alpha_j Controls_{i,t} + \mu_i + \lambda_t + \varepsilon_{i,t}$$

In the model, subscripts *i* and *t* represent the enterprise and year respectively. $Auditfee_{i,t}$ refers to the dependent variable audit fees, and $CRD_{i,t}$ denotes the core independent variable, namely the level of climate risk information disclosure; $Controls_{i,t}$ is the set of control variables. μ_i stands for firm fixed effects, λ_t represents year fixed effects, and $\varepsilon_{i,t}$ is the random disturbance term.

5. Empirical Regression Results and Robustness Analysis

5.1. Descriptive Statistics

Table 1 reports the descriptive statistics of the main variables in this paper. For the dependent variable *Auditfee*, the mean value is 13.87, the standard deviation is 0.717, the minimum value is 9.210, and the maximum value is 19.40. The data distribution is relatively reasonable without extreme deviation, which indicates that the logarithmic processing of audit fees effectively eliminates the heteroscedasticity problem and meets the basic requirements of regression analysis.

Table 1 Descriptive Statistics

VARIABLES	N	mean	sd	min	max
Auditfee	46,502	13.87	0.717	9.210	19.40
CRD	46,502	0.180	0.193	0	3.056
Size	46,502	7.629	1.251	4.779	11.15
Tobinq	46,502	1.990	1.227	0.835	8.056
ROA	46,502	0.0354	0.0618	-0.236	0.195
Lev	46,502	0.414	0.206	0.0512	0.895
Top1	46,502	34.05	14.92	8.380	74.57
Dual	46,502	0.298	0.457	0	1
Board	46,502	8.447	1.636	5	14
Indep	46,502	37.68	5.321	33.33	57.14
ListAge	46,502	9.963	7.971	0	29

5.2. Baseline Regression Analysis

Based on the F-test and Hausman test, this paper selects the two-way fixed effects model for regression analysis, and the regression results are reported in Table 2. Column (1) only controls firm and year fixed effects, while Column (2) adds all control variables on the basis of Column (1). The results show that the regression coefficients of climate risk information disclosure (CRD) are significantly positive at the 1% level regardless of whether control variables are included. This finding provides empirical support for Hypothesis 1, confirming that higher corporate climate risk information disclosure levels are associated with higher audit fees.

Table 2 Baseline Regression Results

Variables	(1)	(2)
CRD	0,252***	0,154***
	(0.044)	(0.047)
Size		0,211***
		(0.010)
Tobinq		-0,023***
		(0.003)
ROA		-0,181***
		(0.048)
Lev		0,271***
		(0.029)
Top1		-0,001**
		(0.001)
Dual		-0,004
		(0.008)
Board		0,017***
		(0.004)
Indep		0,001
		(0.001)
ListAge		0,056***
		(0.012)
cons	13,060***	11,342***
	(0.014)	(0.101)
Control Variables	N	Y
Firm Fixed Effects	Y	Y
Year Fixed Effects	Y	Y
<i>N</i>	46502	46502
<i>R</i> ²	0.517	0.597

Notes: Robust standard errors are reported in parentheses; ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

5.3. Robustness Checks

5.3.1 Endogeneity Test

To mitigate the endogeneity concerns caused by potential reverse causality and omitted variables, this paper adopts the instrumental variable method for verification by referring to the research of Guo^[27]. We select the mean value of climate risk information disclosure of other enterprises in the same year and region (IV_CRD_area) as the instrumental variable, and employ the two-stage least squares (2SLS) method for estimation. On the one hand, enterprises in the same region and year face similar institutional environments, regulatory pressures and information disclosure atmospheres, which tend to form a regional disclosure convergence effect, thus meeting the relevance requirement of instrumental variables. On the other hand, the climate risk information disclosure of other enterprises is an external variable that does not directly affect the audit fees of a single enterprise, so it satisfies the exogeneity requirement of instrumental variables.

Table 3 reports the regression results of the instrumental variable method. The first-stage results show that the regression coefficient of the instrumental variable (IV_CRD_area) on climate risk information disclosure (CRD) is 0.678, which is significant at the 1% level, indicating a strong correlation between the instrumental variable and the endogenous variable. The second-stage results show that the regression coefficient of CRD is 0.842, which is significantly positive at the 1% level,

consistent with the baseline regression results. This demonstrates that the conclusions of this paper remain robust after addressing endogeneity issues.

Table 3 Endogeneity Tests

Variables	First Stage	Second Stage
IV CRD area	0.678***	
	(23.14)	
CRD		0.842***
		(5.93)
Control Variables	Y	Y
N	46,419	46,419
R ²		0.131

Notes: t-statistics are reported in parentheses; ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

5.3.2 Replacing the Independent Variable

To verify the robustness of the baseline results, this paper adopts the natural logarithm of one plus climate risk information disclosure (ln_crd) as an alternative indicator for regression. Column (1) of Table 5 reports the regression results after replacing the independent variable. The results show that the regression coefficient of ln_crd is 0.189, which is significantly positive at the 1% level, consistent with the baseline regression results. This indicates that the conclusions of this paper are not affected by the measurement method of the independent variable.

5.3.3 Excluding Data During the COVID-19 Pandemic

Considering that the COVID-19 pandemic from 2020 to 2022 may exert a special impact on audit fees, this paper conducts a robustness test by excluding data during the pandemic period. Column (2) of Table 4 reports the regression results after excluding the pandemic data. The results show that the regression coefficient of CRD is 0.180, which is significantly positive at the 1% level, consistent with the baseline regression findings.

Table 4 Robustness Checks

Variables	(1) Alternative Independent Variable	(2) Excluding COVID-19 Period
CRD		0.180***
		(0.049)
ln_crd	0.189***	
	(0.023)	
Control Variables	Y	Y
N	46,419	34,247
R ²	0.888	0.884

Notes: Robust standard errors are reported in parentheses; ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

6. Further Analysis

6.1. Mediating Effect Test

To verify the mediating role of media attention between corporate climate risk information disclosure and audit fees (Hypothesis 2), this paper adopts the three-step mediating effect test method proposed by Wen and Ye to conduct empirical tests. This method can effectively identify the mediating transmission path and clarify the internal mechanism of climate risk information disclosure affecting audit fees. Table 5 reports the regression results of the mediating effect test. Column (1)

presents the regression of the total effect of climate risk information disclosure on audit fees, and the regression coefficient of CRD is 0.154, which is significantly positive at the 1% level, which is consistent with the baseline regression results and verifies the existence of the total effect. Column (2) shows the regression of climate risk information disclosure on media attention, and the regression coefficient of CRD is 0.140, which is significantly positive at the 1% level, indicating that the improvement of corporate climate risk information disclosure level can significantly attract external market attention and effectively increase the media attention received by enterprises. Column (3) displays the regression results of climate risk information disclosure on audit fees after adding the mediating variable media attention. The regression coefficient of Media is 0.00625, which is significantly positive at the 1% level, proving that higher media attention will drive up audit fees. Meanwhile, the regression coefficient of CRD is 0.153, which is still significantly positive at the 1% level but slightly decreases compared with the total effect coefficient. The above results demonstrate that media attention plays a partial mediating role between climate risk information disclosure and audit fees. That is, climate risk information disclosure not only directly affects audit fees, but also indirectly increases audit fees by enhancing media attention, which fully supports Hypothesis 2.

Table 5 Mediating Effect Tests

Variables	(1) Auditfee	(2) Media	(3) Auditfee
CRD	0.154*** (9.84)	0.140*** (2.60)	0.153*** (9.75)
Media			0.00625*** (4.36)
Control Variables	Y	Y	Y
N	46,502	46,168	46,168
R ²	0.597	0.196	0.597

Notes: t-statistics are reported in parentheses; ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

6.2. Moderating Effect Test

To verify the moderating effects of information asymmetry and property right nature on the relationship between corporate climate risk information disclosure and audit fees (Hypothesis 3 and Hypothesis 4), this paper constructs an interaction term model for empirical testing. The specific regression model is set as follows:

$$Auditfee_{i,t} = \gamma_0 + \gamma_1 CRD_{i,t} + \gamma_2 Mechanism_{i,t} + \gamma_3 CRD_{i,t} \times Mechanism_{i,t} + \sum \delta_k Controls_{k,i,t} + \mu_i + \lambda_t + \varepsilon_{i,t}$$

In the model, Mechanism represents the moderating variable, namely property right nature (SOE) or information asymmetry (ASY). $CRD_{i,t} \times Mechanism_{i,t}$ is the interaction term between climate risk information disclosure and the moderating variable, and γ_3 is the regression coefficient of the interaction term. If γ_3 is statistically significant, it indicates that the corresponding moderating variable plays a significant moderating role in the relationship between climate risk information disclosure and audit fees. Table 6 reports the regression results of the moderating effect test.

Column (1) presents the baseline regression result, which is consistent with the previous benchmark regression and lays a foundation for the subsequent moderating effect test. Column (2) adds the interaction term between climate risk information disclosure and information asymmetry (CRD_ASY). The result shows that the regression coefficient of CRD_ASY is 0.0798, which is significantly positive at the 1% level. This indicates that the higher the degree of information asymmetry, the stronger the positive impact of climate risk information disclosure on audit fees, which fully verifies Hypothesis 3. Column (3) incorporates the interaction term between climate risk information disclosure and property right nature (CRD_SOE). The result demonstrates that the

regression coefficient of CRD_SOE is -0.183, which is significantly negative at the 1% level. This means that compared with state-owned enterprises, the positive impact of climate risk information disclosure on audit fees is more prominent in non-state-owned enterprises, thus verifying Hypothesis 4.

Table 6 Moderating Effect Test Results

Variables	(1) Baseline	(2) Information Asymmetry	(3) Property Right Nature
CRD	0.154***	0.195***	0.251***
	(7.04)	(8.49)	(10.17)
CRD_ASY		0.0798***	
		(4.37)	
CRD_SOE			-0.183***
			(-5.61)
Control Variables	Y	Y	Y
N	46,419	46,322	42,012
R ²	0.888	0.888	0.897

Note: Values in parentheses are t-statistics; ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

6.3. Heterogeneity Analysis

To further examine the heterogeneous characteristics of the impact of climate risk information disclosure on audit fees, this paper conducts subgroup tests from two dimensions: industry attributes and auditor characteristics. The results of the heterogeneity analysis are reported in Table 7.

Columns (1) and (2) present the subgroup regression results for heavily polluting industries and non-heavily polluting industries. The results show that in non-heavily polluting industries, the regression coefficient of CRD is 0.158, which is significantly positive at the 1% level, while the coefficient of CRD is insignificant in heavily polluting industries. This indicates that the positive impact of climate risk information disclosure on audit fees is more pronounced in non-heavily polluting industries. A possible reason is that firms in heavily polluting industries are already subject to high environmental regulatory pressure and audit risk, so the incremental information effect of climate risk information disclosure is relatively weak^[28].

Columns (3) and (4) report the subgroup results for Big Four auditors and non-Big Four auditors. The results show that in the sample audited by non-Big Four firms, the regression coefficient of CRD is 0.178, which is significantly positive at the 1% level, whereas the coefficient of CRD is insignificant in the sample audited by Big Four firms. This suggests that the positive impact of climate risk information disclosure on audit fees is stronger when the auditor is a non-Big Four accounting firm. A possible explanation is that Big Four accounting firms have stronger risk-bearing capacity and more sophisticated risk management systems, and thus are relatively less sensitive to climate risk information^[3].

Table 7 Heterogeneity Analysis

Variables	(1) Heavy Polluting	(2) Non-Heavy Polluting	(3) Big Four	(4) Non-Big Four
CRD	0.191	0.158***	-0.190	0.178***
	(0.68)	(3.35)	(-1.01)	(4.00)
Control Variables	Y	Y	Y	Y
N	1,005	45,497	2,950	43,541

7. Conclusions and Implications

Using a sample of Chinese A-share listed firms from 2009 to 2024, this paper constructs an indicator of corporate climate risk information disclosure by employing text analysis and machine learning methods, and empirically investigates the impact of climate risk information disclosure on audit fees as well as its underlying mechanism. The findings are summarized as follows: (1) The level of corporate climate risk information disclosure is significantly and positively associated with audit fees. In other words, firms with a higher level of climate risk information disclosure incur higher audit fees. This conclusion remains robust after a series of robustness checks. (2) Mechanism tests show that media attention plays a significant mediating role between climate risk information disclosure and audit fees. Specifically, climate risk information disclosure increases audit fees by enhancing media attention. (3) Moderation tests indicate that the positive impact of climate risk information disclosure on audit fees becomes stronger with a higher degree of information asymmetry. Moreover, the positive effect is more pronounced in non-state-owned enterprises than in state-owned enterprises. (4) Heterogeneity analysis reveals that the positive impact of climate risk information disclosure on audit fees is more significant in non-heavily polluting industries and when the auditor is a non-Big Four accounting firm.

This paper is consistent with the main conclusions of Alshahrani^[14] and Almutairi^[15], which support that climate risk information disclosure positively affects audit fees. Furthermore, by conducting an in-depth investigation based on the Chinese market, this study enriches the empirical evidence regarding how climate risk information disclosure influences audit pricing in emerging markets.

Based on the above findings, the following implications can be derived: First, for enterprises, given the documented impact of climate risk information disclosure on audit fees, firms should balance the costs and benefits when formulating disclosure strategies. On the one hand, enterprises should actively improve the quality of climate risk information disclosure to satisfy the information demands of stakeholders. On the other hand, they should strengthen internal risk management and internal control systems to reduce auditors' risk perception and thereby control audit fees. Second, for auditors, they should fully recognize the risk signals conveyed by corporate climate risk information disclosure and reasonably evaluate the implications of climate risk for audit practice. Auditors should determine audit costs and risk premiums based on the level of climate risk information disclosure to ensure audit quality while avoiding overpricing or underpricing. Third, for regulators, they should further improve the institutional framework for climate risk information disclosure, clarify disclosure standards and requirements, and reduce the compliance costs of enterprises. Meanwhile, regulators should strengthen supervision over the audit market, guide auditors to set reasonable fees, and prevent excessive audit pricing from increasing corporate burdens. Fourth, for investors, they should make full use of climate risk information disclosed by firms to assess the climate risks faced by enterprises and make rational investment decisions.

This study has several limitations: First, the climate risk information disclosure indicator is constructed based on text analysis and machine learning, which may contain certain measurement errors. Future research could adopt more precise measurement approaches. Second, the sample is limited to Chinese A-share listed companies. Future studies may incorporate cross-country or cross-region capital market data to conduct international comparative analyses. Third, this paper mainly relies on quantitative research methods. Future research may combine qualitative methods such as case studies to explore the detailed mechanisms through which climate risk information disclosure affects audit fees. In addition, this study focuses on voluntary climate risk information disclosure. Future research can link to China's mandatory enterprise sustainability disclosure policies officially implemented in 2025, and conduct in-depth analyses on disclosure behavior and economic consequences following the enforcement of the new mandatory disclosure regime.

References

- [1] GREGORY J, STOUFFER R, MOLINA M, et al. Climate Change 2021—The Physical Science Basis [J]. Chemistry International, 2021, 43(4): 22-3.
- [2] HARTLIEB S, EIERLE B. Do Auditors Respond to Clients' Climate Change-related External Risks? Evidence from Audit Fees [J]. European Accounting Review, 2022, 33(3): 1075-103.
- [3] XIN Y, LUOHAN W, RANTIAN D, et al. Can climate-related risks increase audit fees?—Evidence from China [J]. Finance Research Letters, 2023, 57.
- [4] YU M, SI Y, TIAN G, et al. Climate risk and audit fees: An international study [J]. Accounting & Finance, 2023, 63(5): 4989-5025.
- [5] ILHAN E, KRUEGER P, SAUTNER Z, et al. Climate Risk Disclosure and Institutional Investors [J]. The Review of Financial Studies, 2023, 36(7): 2617-50.
- [6] WANG Z, FU H, REN X, et al. Exploring the carbon emission reduction effects of corporate climate risk disclosure: Empirical evidence based on Chinese A-share listed enterprises [J]. International Review of Financial Analysis, 2024, 92.
- [7] Guo N, Liu Y, Feng H Q. Can climate information disclosure improve corporate credit availability? [J]. Accounting Research, 2025, (07): 124-137.
- [8] SIMUNIC D A. The Pricing of Audit Services: Theory and Evidence [J]. Journal of Accounting Research, 1980, 18(1): 161-90.
- [9] FELIX W L, JR., MALETTA G M J. The Contribution of Internal Audit as a Determinant of External Audit Fees and Factors Influencing This Contribution [J]. Journal of Accounting Research, 2001, 39(3): 513-34.
- [10] Wang C, Dai W J. Internal control, book-tax differences and audit fees [J]. Communication of Finance and Accounting, 2024, (03): 27-30+41.
- [11] Yu J X, Fang R N, Huang W J. The impact of government environmental regulation on corporate audit fees [J]. Communication of Finance and Accounting, 2026, (03): 40-45.
- [12] Wu L S, Liu H L. Empirical audit research in China: 1999-2007 [J]. Auditing Research, 2008, (02): 36-46.
- [13] YIP Y. Investigating the Relationship Between ESG Disclosure Performance and Audit Fees in the Presence of Institutional Ownership: Evidence from Malaysian Listed Firms [J]. Journal of Risk and Financial Management, 2025, 18(12).
- [14] ALSHAHRANI F, EULAIWI B, DUONG L, et al. Climate change disclosure performance and audit fees: evidence from Australia [J]. Sustainability Accounting, Management and Policy Journal, 2024.
- [15] ALMUTAIRI A, AL-SHORAF A J, HAIDAR F, et al. Do political connections and Environmental, Social, and Governance (ESG) performance affect the relationship between climate change risk and audit efforts? [J]. Journal of Project Management, 2026, 11(1): 213-26.
- [16] ALSHAHRANI F, EULAIWI B, DUONG L, et al. Climate change disclosure performance and audit fees: evidence from Australia [J]. Sustainability Accounting, Management and Policy Journal, 2025, 16(5): 1208-42.
- [17] LI M, YAO S. Can Climate Risk Disclosure Attract Analyst Coverage? A Study Based on the Dual Perspective of Information Supply and Demand [J]. Sustainability, 2025, 17(9).
- [18] Ran M D, He Y. Media coverage, institutional environment and audit fees [J]. Journal of Zhongnan University of Economics and Law, 2014, (03): 123-130+60.
- [19] YANG Y, CAI C, HAZAEA S A, et al. Media coverage as a moderator in the nexus between audit quality and ESG performance: Evidence from China [J]. Plos One, 2024, 19(10).
- [20] Wang Z R, Fu H Q, Ren X H. The impact of climate risk disclosure on corporate greenwashing: Empirical evidence from Chinese industrial firms [J]. Chinese Journal of Management Science, 2025: 1-12.
- [21] KAIMENG Z, XIHE L, JINGJING W. Exploring the relationship between corporate ESG information disclosure and audit fees: evidence from non-financial A-share listed companies in China [J]. Frontiers in Environmental Science, 2023, 11.

- [22] Huang X H, Wang Y. Intra-group debt guarantees and audit pricing: Risk diffusion or risk neutralization [J]. Journal of Shanghai University of Finance and Economics, 2021, 23(01): 107-121.
- [23] Ni X, Chen Y J. Institutional pressure and organizational symbolic compliance — A study based on the integrity and compliance practice of state-owned enterprises in City A [J]. Theoretical Investigation, 2024, (06): 70-78.
- [24] ZHU G. The Impact of Institutional Investors and Supervision Mechanisms on Carbon Disclosure Quality [J]. Frontiers of International Accounting, 2025, 14(06): 1585-96.
- [25] Du J, Li Y Y. Media attention and climate risk information disclosure of listed companies [J]. Journal of Management, 2025, 38(03): 1-16.
- [26] Yao Y F, Xu X Y. Corporate climate change risk and key audit matters decisions [J]. Journal of Shanghai University of Finance and Economics, 2024, 26(06): 78-92.
- [27] JUNTING GUO Y X. A Study on the Impact of ESG Performance on Corporate Risk—Evidence from Chinese A-Share Listed Firms [J]. Operations Research and Fuzziology, 2025, 15(02): 516-27.
- [28] YOU X, CHEN C, PENG K, et al. ESG disclosure quality and cost of debt [J]. Emerging Markets Review, 2025, 64.