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Quality of Environmental Information Disclosure, Corporate Reputation and Commercial Credit Financing

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Abstract

This paper uses A-share listed companies from 2015 to 2022 as a sample, and based on signal transmission theory, stakeholder theory, and reputation mechanisms, it empirically examines the impact of environmental information disclosure quality on corporate commercial credit financing. The empirical results show that improving the quality of environmental information disclosure significantly enhances corporate commercial credit financing. Environmental information disclosure quality can significantly boost corporate commercial credit financing through corporate reputation; the improvement in environmental information disclosure quality for state-owned enterprises is even more pronounced. This study provides empirical evidence for policymakers to refine environmental information disclosure systems and promote the implementation of green finance policies, while also offering theoretical support for companies to optimize their environmental governance and reputation management strategies and expand financing channels.

Keywords

Environmental Information Disclosure Quality; Corporate Reputation; Commercial Credit Financing.

1. Introduction

As the economy develops, business credit financing has become increasingly important for companies and is now one of the most significant sources of external financing for Chinese enterprises. To mitigate the borrowing difficulties caused by information asymmetry, suppliers require companies to present better information. Research has shown that, whether in daily procurement and sales or using commercial credit as an alternative to traditional loans, trading partners have specific requirements for the quality and reliability of environmental information disclosure [1]. High-quality environmental information disclosure can reduce the information gap between companies and stakeholders, build a good reputation, enhance mutual trust, and thus enable companies to secure more commercial credit support.

For listed companies, environmental information disclosure serves as an effective mechanism for conveying their commitment to social responsibility. It enhances transparency and, through positive reputation and enhanced social oversight, links environmental responsibility with corporate interests [2]. This is a crucial tool for encouraging companies to fulfill their environmental responsibilities and reduce pollution emissions. However, Chinese companies currently lack the initiative to disclose environmental information, and issues such as inconsistent content and low quality are widespread, necessitating ongoing regulation and improvement. Moreover, there is a lack of detailed theoretical analysis and empirical evidence on how environmental information disclosure affects commercial credit financing. To address these issues, this paper introduces the concept of corporate reputation as a mediating variable, focusing on exploring and testing the impact of environmental information disclosure on corporate commercial credit financing and its underlying mechanisms.

The contributions of this study may be reflected in the following: Most existing research on corporate commercial credit financing focuses on motivations and influencing factors. However, studies that integrate the quality of environmental information disclosure with corporate reputation and commercial credit financing are relatively rare. Studying a company's financing capability from the perspective of its environmental information disclosure quality will, theoretically, further enrich and develop the existing research on corporate reputation. In practice, the quality of environmental information disclosure significantly impacts both corporate reputation and commercial credit financing. The higher a company's transparency, the better its reputation, and the more trust it can earn from others, leading to more credit financing opportunities.

2. Literature Review

2.1. Factors Affecting the Quality of Environmental Information Disclosure

Regarding the factors influencing the quality of corporate environmental information disclosure, external factors can primarily be categorized into cultural, policy, and technical aspects. Culturally, Yang Zhonghai's research indicates that Confucian culture in China can enhance the quality of corporate environmental information disclosure, promoting a green transformation where actions align with words [3]. Specifically, Liu Qiongzi and Zhang Lisha highlight that institutional constraints and incentive policies play a crucial role in improving corporate environmental information disclosure [4]. Scholar Liu Yiwen finds that green credit policies, by intensifying corporate financing constraints and increasing environmental agency costs, compel companies to urgently improve their environmental management and disclosure [5]. Additionally, Zhong Haiyan and Wang Jianghan propose that the environmental credit evaluation system can enhance corporate environmental information disclosure quality by increasing compliance pressure and providing incentive guidance, which is more effective when supported by regional environmental regulation, financial development, and media supervision [6]. Technically, Cao Cuizhen argues that digital technology can amplify the impact of signals, improve corporate environmental performance, and thus motivate companies to enhance the quality of their environmental information disclosure [7]. Internally, Wang Rui's research shows that the collaborative governance of chain shareholders can radiate downward from the management level, thereby improving the quality of corporate environmental information disclosure [8]. However, Chang Yuan found that compensation incentive can directly alleviate the agency problem, reduce the self-interested motivation of managers, and stimulate them to choose to improve the quality of environmental information disclosure under external pressure. This effect will be strengthened under the influence of environmental regulation [9].

2.2. Factors Influencing Commercial Credit Financing

In theoretical studies, the factors influencing commercial credit financing primarily come from both external and internal aspects. External factors mainly include the financial environment, monetary policy, and market competitiveness. According to the substitution theory, when faced with borrowing restrictions from banks, companies tend to seek commercial credit from suppliers [10]. Wang Minghu and Wei Liangzhang found that in regions with lower financial development, it is more difficult for companies to obtain bank loans, leading them to seek help from suppliers [11], thereby increasing the scale of commercial credit financing. Research on monetary policy focuses on the policies themselves and their uncertainties. Tight monetary policy and increased economic policy uncertainty can increase a company's capital needs, necessitating more commercial credit financing [12]. Conversely, when monetary policy is loose, companies can secure larger loans at lower opportunity costs from banks, reducing their demand for commercial credit financing [13]. Regarding market competitiveness, Zhang Yong found that in highly competitive industries, companies lack bargaining power in commercial credit negotiations and struggle to secure more commercial credit financing [14].

Research on internal influencing factors primarily focuses on corporate characteristics, internal governance, and information quality. Larger companies with stronger market competitiveness and state-owned equity advantages have greater bargaining power in commercial credit, making it easier for them to secure commercial credit from upstream enterprises [15]. Internal governance practices, such as digital transformation, improving internal control quality, and building a good reputation [16], can earn the trust of suppliers and lead to higher commercial credit financing amounts. Regarding information quality, the focus is on how the quality of accounting information affects commercial financing, with the impact varying depending on the monetary policy environment. Zhang Yong notes that after companies receive non-standard audit opinions, their commercial credit financing levels significantly decline in the following year [17].

To sum up, based on the existing research, this paper constructs a regression model to verify the influence and mechanism of enterprise environmental information disclosure on commercial credit financing from the perspective of environmental information disclosure quality, and explores the influence mechanism between the two, in order to deepen relevant research and provide relevant suggestions for enterprises to broaden financing channels under environmental uncertainty.

3. Theoretical Analysis and Research Hypothesis

With the trend of dual-carbon economic development, corporate environmental information disclosure has gained widespread attention. Although this type of disclosure does not fall under financial reporting, it can provide stakeholders with information that financial reports cannot convey, thereby narrowing the gap between stakeholders and the company. This not only enhances the company's reputation and image but also helps to build a good business reputation with the public. According to signal transmission theory, when companies proactively meet the environmental information needs of stakeholders, it provides more channels for supervision, significantly increasing their willingness to participate. Moreover, information disclosure can provide intangible assets for the company and shape a positive image, making the company's information disclosure a social hotspot[18]. According to the theory of information asymmetry, there is a significant information gap between internal and external stakeholders of the company. Therefore, high-quality company information disclosure can effectively reduce this 'asymmetry' and enhance mutual trust. Research has shown that by disclosing production and operational information, listed companies can increase stakeholders' economic confidence and trust in the company, leading to more financial financing[18]. As a result, credit providers are more likely to transact with companies that disclose environmental information or increase their credit limits for such companies.

The following hypothesis is therefore proposed:

H1: The quality of environmental information disclosure is positively correlated with commercial credit financing, that is, the higher the quality of environmental information disclosure, the higher the amount of commercial credit financing.

Reputation refers to a positive social recognition, indicating the extent to which a company is accepted and trusted by various sectors of society and the public. A good corporate reputation can eliminate the drawbacks of information asymmetry among stakeholders. Moreover, it effectively guides market operations, facilitates communication and information disclosure,

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and reduces transaction costs. On the other hand, the quality of environmental information disclosure is influenced by factors such as financial markets, policy-making bodies, and the general public, ecological constraints, external supervision, and the company's development strategy, leading to variations in the quality of environmental information disclosure [19]. High-quality or low-quality environmental information disclosure is crucial for making precise economic decisions. Increased transparency in environmental information can help companies build a positive environmental image, enhance their reputation, and expand their visibility.

High-quality environmental information disclosure can enhance a company's ability to raise capital by leveraging its signaling and reputation-building effects. By enhancing the company's environmental reputation, it can directly boost market trust, thereby affecting the cost of financing. Moreover, the accumulation of reputation generates intangible asset advantages: a good reputation reduces negotiation costs and loan guarantee costs, making it easier for suppliers to offer longer credit terms or lower interest rates. This creates a path where companies fulfill their environmental responsibilities, accumulate reputation assets, and reduce financing costs. The risk-buffering role of reputation is crucial in this process; even with short-term operational fluctuations, companies with a good reputation can maintain social trust through long-term reputation building, ensuring a steady cash flow.

As can be seen from the above analysis, enterprise reputation, as a mediating variable between environmental information disclosure quality and commercial credit financing, can reduce the degree of information asymmetry inside and outside the enterprise, which is conducive to the expansion of enterprise commercial credit financing.

Therefore, this paper puts forward hypothesis 2

H2: Corporate reputation is the mediating variable between environmental information disclosure quality and commercial credit, that is, corporate reputation can enhance the impact of environmental information disclosure quality on commercial credit financing.

4. Research Design

4.1. Sample Selection and Data Source

This paper selects A-share listed companies from 2015 to 2022 as the research sample. To ensure data accuracy, the following steps are taken: 1. Eliminate samples with missing environmental information disclosure quality data; 2. Exclude ST, *ST, and PT companies; 3. Exclude samples from the financial and insurance sectors; 4. Exclude samples with missing variable data. After these screening processes, 14,207 annual enterprise observations remain. To control for the impact of extreme values, all continuous variables are truncated at 1% and 99%. The data sources are all from the CSMAR database.

4.2. Variable Definition

4.2.1. Commercial Credit Financing (Cre)

In this article, commercial credit financing refers to net commercial credit. Following the methods of Chen Shenglan and Liu Xiaoling [20], the commercial credit supply (Tcs) is calculated by dividing the total of accounts receivable, notes receivable, and prepaid accounts by the total assets at the end of the period. Following the methods of Lu Zhengfei [21] and Xiu Zongfeng [22], the commercial credit financing (Tcd) is calculated by dividing the total of accounts payable, notes payable, and advance receipts by the total assets at the end of the period. The net commercial credit financing (Cre) [23] is then calculated by subtracting the commercial credit supply (Tcs) from the commercial credit financing (Tcd).

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4.2.2. The Corporate Reputation (Rep)

Using the method of Guan Kao Lei [24], which involves constructing a reputation evaluation system to measure a company's reputation. This approach is based on the research findings of Chang Lijuan and Qu Wen [25], which evaluates the company's credibility from the perspectives of various stakeholders. The evaluation follows the principles of operability, hierarchy, effectiveness, and relative completeness, selecting 12 corporate credibility assessment indicators. The 12 evaluation indicators are statistically analyzed using factor analysis to derive the corporate reputation index. The company's reputation is rated from 1 to 10, with each level corresponding to a score from 1 to 10.

4.2.3. Quality of Environmental Information Disclosure (Edio)

Table 1. Environmental Information Disclosure Index scoring criteria

Type of disclosure	Disclosure project	Explanation of scoring
Environmental management disclosure	environmental protection concept	Disclosure:2 points None: 0 points
	Environmental goals	
	Environmental management system	
	Environmental education and training	
	Special environmental protection campaign	
	Environmental time emergency mechanism	
	Environmental honor or award	
	"Three simultaneous" system	
Environmental certification disclosure	Whether ISO14001 certification is passed	Yes: 2 points No:0 points
	Whether ISO9001 certification is passed	
Environmental information disclosure carrier	Annual reports of listed companies	Disclosure: 2 points None: 0 points
	Social responsibility report	
	environmental statement	
Environmental liability disclosure	Waste water discharge	Quantitative and qualitative description: 2 points Only qualitative: 1 point None: 0 points
	COD, discharge	
	SO2, emissions	
	CO2 Emissions	
	Emissions of soot and dust	
	Industrial solid waste discharge	
Environmental performance and governance disclosure	Waste gas emission reduction treatment	
	Waste water reduction and treatment	
	Dust and smoke control	
	Utilization and disposal of solid waste	
	Noise, light pollution, radiation and other treatment	
	Implementation of cleaner production	

Following Kong Dongmin [26]'s method, the environmental research database from the CSMAR database is used to classify the disclosure of environmental information by companies based on whether it is monetized [27]. In a combination of quantification and quality, quantified indicators are assigned a value of 1, while unpublicized indicators are assigned a value of 0. For unpublicized data, published data is assigned a value of 2, and unpublicized data is assigned a value of 0. Environmental responsibility disclosure, environmental performance, and corporate

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governance disclosures are all monetary information, whereas environmental management information, environmental certification information, and environmental information disclosure are non-monetary information. There are 25 items in total for these two categories. The scores for each item are summed and then logarithmically calculated to obtain Eidq, which comprehensively reflects the quality of environmental information disclosure by listed companies. The scoring items for environmental information disclosure are shown in Table 1.

4.2.4. Controlled Variable

On the basis of reviewing the existing research results, and according to the latest relevant domestic and foreign research results, the variables including enterprise size, asset-liability ratio, return on assets, operating cash flow, sustainable growth rate and control variables were selected. The symbols, names and definitions of the variables are listed in Table 2.

Table 2. Variable definitions

Type of variable	Variable name	Variable symbol	Measurement method
explained variable	Commercial credit financing	Cre	The sum of accounts receivable, notes receivable and prepayments divided by the sum of accounts payable, notes payable and advances at the end of the period
explanatory variable	Quality of environmental information disclosure	Edio	For monetized information, the combined quantitative and qualitative disclosure value is 2, the qualitative indicator value is 1, and the un-disclosed indicator value is 0. For non-monetized information, the disclosed indicator value is 2, and the un-disclosed indicator value is 0. Both types of information cover five aspects and 25 scoring items, with the scores summed and then logarithmically processed
	Corporate reputation	Rep	Select 12 corporate reputation evaluation indicators; then, the factor analysis method is used to calculate the corporate reputation score of the 12 indicators; according to the corporate reputation score from low to high, it is divided into ten groups, and each group is assigned a value rep from 1 to 10 in turn.
	scale	Insize	The logarithm of the company's total assets for that year
	asset-liability ratio	Lev	Total liabilities at year-end / total assets at year-end
	Return on assets	Roa	Net profit/total assets
	Cash flow from operations	Cfa	Net cash flow from operating activities/total assets
	Sustainable growth rate	Sgr	Return on shareholders 'equity x (1-dividend payout ratio)/(1-return on shareholders' equity x (1-dividend payout ratio))

4.3. Model Construction

Based on the existing research and drawing lessons from the research of Han Xiaochen [28], this paper constructs model (1) to verify hypothesis 1: the correlation between environmental information disclosure quality and commercial credit financing

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$$Cre_{it} = \alpha_0 + \alpha_1 Edio_{it} + \alpha_2 Crontrol_{it} + \lambda_i + \mu_t + \varepsilon_{it}$$

Among them, the subscripts i and t represent enterprises and years respectively. Cre represents commercial credit financing, Edio is the λ_i quality μ_t of environmental information ε_{it} disclosure. The variable Crontrol is the control variable. and are the fixed effects of enterprises and years respectively. is the random disturbance term.

Model construction (2) To test hypothesis 2: the mediating effect of corporate reputation on environmental information disclosure quality and commercial credit financing

$$Cre_{it} = \rho_0 + \rho_1 Edio_{it} + \rho_2 Rep_{it} + \rho_3 \mathrm{Crontrol}_{it} + \lambda_i + \mu_t + \varepsilon_{it}$$

5. Empirical Analysis Results

5.1. Descriptive Statistical Analysis

Table 3 presents the descriptive statistics of the main research variables in this paper. The table shows that the minimum value of commercial credit financing (Cre) is 0.2772, the maximum value is 0.9999, and the standard deviation is 0.112. This indicates that few companies can effectively use commercial credit financing to alleviate their financial pressure or maximize the efficiency of their capital utilization. Regarding the explanatory variables, the mean value of environmental information disclosure quality (Edio) is 11.51, indicating that listed companies disclose high-quality information, effectively disclosing relevant details about their operations. The statistical results for other control variables are all within normal ranges.

Table 3. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Cre	14,207	.8457143	.1126056	.2772	.9999
Edio	14,207	11.51545	7.142268	2	37
Rep	14,207	5.935736	2.808902	1	10
Insize	14,207	22.63779	1.389945	17.6413	28.63649
Roa	14,207	.437487	.1905819	.0155788	1.484092
Lev	14,207	.0391054	.061076	-.8469862	.6042443
Cfa	14,207	5.379348	6.805699	-71.44	72.55
Sgr	14,207	.0500772	.2204385	-15.48434	2.496711

5.2. Correlation Statistical Analysis

As shown in Table 4, the correlation coefficients between environmental information disclosure (Edio), corporate reputation (Rep), and commercial credit financing (Cre) are 0.152,0.124, respectively. All of these correlations are significant at the 1% level. Additionally, control variables Size, Lev, Roa, and Cfa also show significant positive correlations with Cre at the 1% level, indicating that these factors significantly influence a company's ability to secure commercial credit financing. The correlation coefficient between Edio and Rep is 0.276, which is also significant at the 1% level. Only a few of the correlation coefficients have an absolute value above 0.3, suggesting that multicollinearity among the variables is not severe.

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Table 4. Variable correlation analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Cre	1.000							
(2) Edio	0.152	1.000						
	(0.000)							
(3) Rep	0.124	0.276	1.000					
	(0.000)	(0.000)						
(4) Insize	0.108	0.158	0.219	1.000				
	(0.000)	(0.000)	(0.000)					
(5) Lev	0.027	0.102	0.613	-0.017	1.000			
	(0.001)	(0.000)	(0.000)	(0.043)				
(6)Roa	-0.071	0.102	-0.068	0.194	-0.383	1.000		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
(7) Cfa	0.240	0.139	0.359	0.027	0.475	-0.157	1.000	
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)		
(8) Sgr	-0.014	0.061	0.315	0.017	0.519	-0.157	0.203	1.000
	(0.100)	(0.000)	(0.000)	(0.039)	(0.000)	(0.000)	(0.000)	
Note: ***, ** and * indicate that the regression coefficients are significant at the level of 1%,5% and 10%, respectively. Table 4-8 is the same.								

5.3. Regression Analysis

Using the quality of environmental information disclosure as the independent variable and commercial credit financing as the dependent variable, regression analysis was conducted using Model 1 to examine the relationship between environmental information disclosure quality and commercial credit financing. The specific results are shown in Table 5(1). The regression coefficient between environmental information disclosure quality (Edio) and commercial credit financing (Cre) is 0.001, indicating a significant positive correlation at the 1% level. This suggests that improving environmental information disclosure quality can significantly enhance a company's commercial credit financing, further confirming Hypothesis 1. Companies with high environmental disclosure quality provide accurate information, which enhances trust among stakeholders and reduces conflicts. Consequently, this helps to gain higher public recognition. Establishing a positive corporate image is beneficial for companies to secure more commercial credit financing.

Table 5. Regression results

variable	(1)	(2)	(3)
Edio	0.003*** (3.36)	0.013*** (4.36)	0.001*** (4.07)
Rep			0.003*** (3.19)
Controls	yes	yes	yes
Firm	yes	yes	yes
Year	yes	yes	yes
N	14207	14207	14207
$R2$	0.304	0.665	0.306

Given the validity of Hypothesis 1, we now test Hypothesis 2. The results of the regression analysis on environmental information disclosure quality, corporate reputation, and

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commercial credit financing are presented in Table 5(3). The table shows that the regression coefficient for Rep is 0.003 and is significant at the 1% level, indicating that corporate reputation significantly influences commercial credit financing. Additionally, the regression coefficient for Edio is significantly positive, suggesting that corporate reputation partially mediates the relationship between environmental information disclosure quality and commercial credit financing. Therefore, Hypothesis 2 is supported.

5.4. Endogeneity Test

5.4.1. Instrumental Variable Method.

Table 6 presents the results of the endogeneity test. The Kleibergen-PaaprkLM statistic is significant at the 1% level, rejecting the null hypothesis of insufficient identification of instrumental variables. The Cragg-Donald WaldF statistic exceeds the critical value at the 10% significance level for the Stock-Yogo weak instrument variable identification F-test, also rejecting the null hypothesis of weak instrument variable identification. This indicates that the instrumental variables selected in this paper are appropriate.

Table 6. Endogeneity test

	stage Ⅰ (1) Edio	stage Ⅱ (2) Cre
Edio		0.004*** (0.000)
Lv1	0.901*** (0.015)	
Controls	yes	yes
Year	yes	yes
Firm	yes	yes
N	15107	15107
Kleibergen-PaaprkLM	2859.68***	
CraggDonald WaldF Stock-Yogo	3576.83> 16.38	

5.4.2. Propensity Score Matching Method

Table 7. Tendency scores

	(1)
	cre
Edio	0.0005**
	(5.54)
lnsize	0.029***
	(24.72)
Roa	-0.1068***
	(-19.41)
Lev	-0.2233***
	(-19.63)
Cfa	0.0021***
	(26.26)
Sgr	-0.0033*
	(-1.87)
_cons	0.2100***
	(8.41)
N	10176
adj.R2	0.2938

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This paper employs the propensity score matching method to address the self-selection issue of the sample. The business loan amount of enterprises is used as the dependent variable, and relevant factors from previous studies are used as independent variables for propensity score matching. A 1:1 approximate matching method is used to ensure that the standard error of all variables is less than 0.1. As shown in Table 7, after using propensity score matching for sample exclusion, the main research findings of this paper remain valid.

5.5. Robustness Test

The measurement method for the dependent variable, commercial credit financing, is replaced. Following Xu Jiangbo [29]'s approach, the result of Cre= (accounts payable + notes payable + advance receipts) - (accounts receivable + notes receivable + prepaid accounts) / total assets is replaced with Cre1= (accounts payable + notes payable) / total assets. The substituted variable is then used in the regression model, which still confirms the hypotheses proposed in this paper, indicating that the empirical conclusions of the empirical model are relatively reliable.

5.6. Heterogeneity Analysis

The impact of the quality of environmental information disclosure on corporate commercial credit financing can also vary depending on the nature of different enterprises. To explore this issue, this paper adopts the approach of Zhang Rao et al. [30], categorizing the sample into state-owned and non-state-owned enterprises, and re-estimating the parameters. As shown in columns (1) and (2) of Table 8, compared to non-state-owned enterprises, state-owned enterprises exhibit a more significant positive effect from their higher level of environmental information disclosure on commercial credit financing. This is mainly due to the stricter social and public oversight that state-owned enterprises face, leading to better environmental information disclosure quality. Additionally, their unique property rights provide certain financing advantages. In contrast, non-state-owned enterprises, often lacking resources, tend to have lower levels of information transparency, resulting in information asymmetry between the parties involved, which ultimately leads to their weaker financing capabilities compared to state-owned enterprises.

Table 8. Heterogeneity analysis

	(1)	(2)
	belong to the state	Non-state-owned
Edio	0.0005***	0.0002*
	(3.30)	(1.87)
lnsize	0.0363***	0.0377***
	(6.62)	(13.63)
Roa	-0.0852***	-0.0915***
	(-6.22)	(-10.13)
Lev	-0.1791***	-0.2497***
	(-7.73)	(-16.39)
Cfa	0.0018***	0.0020***
	(13.67)	(17.66)
Sgr	-0.0027	-0.0017*
	(-1.42)	(-0.60)
_cons	0.0385*	0.0131*
	(0.31)	(0.22)
N	5140	9067
adj. R2	0.267	0.321

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6. Conclusion and Suggestions

This paper selects A-share listed companies in China from 2015 to 2022 as the research subjects, conducting an empirical study on the relationship between environmental information disclosure quality, corporate reputation, and commercial credit financing. It also analyzes the mediating role of environmental information disclosure quality in corporate reputation and commercial credit financing. The study concludes that there is a positive correlation between environmental information disclosure quality and commercial credit financing; the higher the environmental information disclosure quality, the more commercial credit financing a company can obtain. Environmental information disclosure quality significantly enhances corporate commercial credit financing through corporate reputation; the improvement in commercial credit financing by state-owned enterprises is more pronounced due to their higher environmental information disclosure quality.

Based on the above research conclusions, the following suggestions are proposed:

①The government should enforce mandatory disclosure and tiered supervision of enterprises, particularly for heavily polluting industries such as chemicals and energy, by establishing mandatory disclosure guidelines that require quantified disclosures of key indicators like carbon emission intensity and emergency response plans for environmental incidents. For small and medium-sized enterprises (SMEs), a differentiated policy combining voluntary disclosure with tax incentives should be implemented. Additionally, incentive policies should be introduced to encourage core enterprises to require their upstream suppliers to disclose environmental data simultaneously, using blockchain technology to trace the carbon footprint of the supply chain, thereby reducing information asymmetry throughout the supply chain.

②Companies should systematically enhance the quality of environmental information disclosure, establishing a quantitative indicator system that includes environmental management, pollution control, and carbon emissions. They should also integrate corporate reputation into their strategic planning and strengthen stakeholder trust through social responsibility investments. Additionally, they should set up an environmental public opinion monitoring system, develop rapid response plans for negative events, and restore trust through transparent communication to safeguard their reputation.

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