

The Impact of Government Environmental Audit on the Quality of Corporate Environmental Information Disclosure

Yamei Guan¹, Xuan Xing²

¹Nanjing University of Finance and Economics, Nanjing, 210023, China

²Huai'an Tax Bureau, Huai'an, Jiangsu, 223001, China

Abstract: Government environmental audit as an important part of government audit, will it play the role of supervision in the end? Taking the data from 2019 to 2021 as a sample, this paper finds that: government environmental audit will significantly improve the quality of corporate environmental information disclosure and effectively promote the performance of corporate environmental responsibility; At the same time, at the macro level, government environmental audit can improve the quality of corporate environmental information disclosure through the intermediary of government environmental governance; At the micro level, government environmental audit improves the quality of environmental information disclosure by mediating the environmental performance of enterprises.

Keywords: Government environmental audit; Environmental information disclosure; Environmental performance

1. Introduction

Government environmental audit, as an important part of government audit, is a regulatory means implemented by the state to protect the environment. China's government environmental audit is far behind that of Western countries, but has made great progress in recent years as the country's green development has been increasingly put on the agenda. With the increasing call for environmental protection and the strengthening of green development, the role of government environmental audit in environmental governance has become increasingly prominent. At the macro regional level, Zeng Changli and Li Jiangtao found through the empirical evidence from 2005 to 2014 that government environmental audit can significantly improve the urban sewage treatment rate, the domestic harmless garbage treatment rate and the removal rate of industrial soot^[1]; At the micro enterprise level, Yu Lianchao and Zhang Weiguo deduced through theoretical analysis that government environmental audit can discover the abnormal operation of enterprise green facilities by revealing functions, urge enterprises to strengthen the construction of green facilities by resisting functions, and prevent the insufficient installation and overload operation of enterprise green facilities by preventing functions^[2]. Through the impact of exogenous events in 2008, CAI Chun et al. found that government environmental audit could significantly improve the level of environmental information disclosure of enterprises^[3]. However, few literatures have discussed the impact mechanism of government environmental audit on micro enterprise behavior. Will government environmental audit affect the quality of environmental information disclosure of enterprises? How does it affect them? This paper intends to provide relevant empirical evidence through large sample data, further expand the study of the impact mechanism of government environmental audit, and provide important implications for pollution prevention and ecological civilization construction.

Compared with the existing literature, the contributions of this paper are as follows: First, there are few empirical studies on government environmental audit, especially on the level of government environmental audit and corporate environmental information disclosure, although there are empirical evidences to support it (CAI Chun et al., 2019; Yu Lianchao et al., 2020), but most of them focus on the accelerated advance stage (2003-2014), and there is less direct empirical evidence for the current development stage in the new era; Second, existing literatures have extensively discussed the influencing factors of corporate environmental information disclosure, mainly involving environmental control, regulatory policy, environmental tax, corporate internal governance and other factors, while few literatures have discussed the impact of government environmental audit on corporate environmental information disclosure. This paper further improves the quality framework index of corporate

environmental information disclosure. To reflect the impact of government environmental audit on the quality of corporate environmental information disclosure in a more comprehensive way; Third, few literatures discuss the impact mechanism of government environmental audit on corporate environmental information disclosure from the macro and micro levels. This paper takes the data from 2019 to 2021 as samples to provide direct empirical evidence on how government environmental audit affects the quality of corporate environmental information.

2. Teoretical analysis and research hypothesis

2.1 Government environmental audit and enterprise environmental information disclosure quality

Sustainable development theory holds that social development should meet current needs without affecting future development, including the sustainable development of resources and the sustainable development of the environment; This requires the country to pay attention to protecting the ecological environment while developing the economy^[4]. As one of the main sources of national tax revenue, enterprises usually play an extremely important role in environmental pollution, which is often the main source of environmental pollution. The state must focus on regulating the pollution at the main source while regulating the ecological environment. However, according to the theory of external diseconomy, in the absence of supervision and control, enterprises may abuse the ecological environment and bring about adverse effects on the whole^[5]; According to external pressure theory and information asymmetry theory, it is necessary for the government to regulate information disclosure for the care of specific groups such as stakeholders; And government environmental audit, as a means of public supervision of environmental information^[6], must have a certain necessity. Therefore, the implementation of government environmental audit is necessary for environmental protection, which is not only limited to regional environmental conditions, but also involves the environmental behavior of enterprises. Based on this, the following hypothesis H1 is proposed in this paper:

H1: Government environmental audit has a significant positive impact on the quality of corporate environmental information disclosure.

2.2 Government environmental audit, government environmental governance and enterprise environmental information disclosure quality

As for the intensity of government environmental audit and government environmental governance, from the perspective of public principal-agent theory and fiduciary economic responsibility, local governments carry out environmental audit work entrusted by the central government to protect the local ecological environment and improve the local environmental quality. As the entrusted party, local governments have the power and responsibility to take corresponding measures to regulate local environmental pollution discharge and to strengthen local environmental control. At the same time, the economic responsibility audit of government departments can play a role in governance by monitoring power, monitoring corruption and strengthening accountability, and environmental audit is included in the economic responsibility audit of government departments^[7]. Therefore, the implementation of government environmental audit will promote the governance function of local governments to play a better role, and then improve the intensity of local environmental governance and reduce the emission of local environmental pollution sources^[8]. The implementation of government environmental audit will strengthen local environmental control, and the strengthening of local environmental control will encourage enterprises to improve the quality of their environmental information disclosure. Therefore, the following hypothesis H2 is proposed in this paper:

H2: Government environmental audit has a significant positive impact on the quality of corporate environmental information disclosure through the intensity of government environmental governance.

2.3 Government environmental audit, enterprise environmental performance and quality of environmental information disclosure

The quality of an enterprise's environmental performance is related to the government's penalty cost and implementation cost. When the implementation cost is lower, the probability of the enterprise's environmental performance is higher, and the government is more likely to implement environmental audit. When the penalty cost of the government is more severe, the probability of good environmental performance of the enterprise is greater, and the government will punish the enterprise only when the

environmental audit is carried out and the problem is found. Therefore, both of these indicate that when the government carries out environmental audit, the environmental performance of enterprises will become better^[9]. The implementation of government environmental audit will promote the better environmental performance of enterprises, and the better environmental performance of enterprises will improve the quality of environmental information disclosure. Therefore, the following hypothesis H3 is proposed in this paper:

H3: Government environmental audit has a significant positive impact on the quality of corporate environmental information disclosure through corporate environmental performance.

3. Research design

3.1 Sample selection and data source

According to the Second National Pollution Source Census Communiqué released by the Ministry of Ecology and Environment in 2022, industrial pollution sources account for about 70% of the total pollution sources. It can be seen that industrial enterprises are still the main source of environmental pollution; At the same time, in view of the fact that the China Audit Yearbook compiled by the National Audit Office of China is only updated to 2021, this paper selects 486 heavily polluting listed companies in Shanghai and Shenzhen A-shares from 2019 to 2021 as research objects, and manually collects 1,458 sample sizes of government environmental audit and corporate environmental information disclosure quality. After matching them with the control variables in the CSMAR database, a total of 1455 observed values were obtained; Further collect the data of heavy industry proportion, the proportion of provincial environmental word frequency and enterprise environmental performance, and remove the prefecture-level cities that did not disclose the proportion of heavy industry in China City Yearbook, a total of 1219 observed values are obtained; The definition of industrial listed companies is in accordance with the Guidelines on Industry Classification of Listed Companies (2012). The data sources of this paper are as follows: (1) Government environmental audit data are from China Audit Yearbook for 2019-2021; (2) the quality of corporate environmental information disclosure and environmental performance data came from the 2019-2021 Social responsibility report, environmental report, corporate annual report and CSMAR database; (3) the government's environmental governance intensity comes from China Environmental Yearbook, China Urban Statistical Yearbook and government work Report; (4) Among the control variables, internal control index comes from DIB database, media attention data comes from CNRDS, marketization index comes from Fan Gang and Wang Xiaolu Marketization Process Index (2011), and other control variable data comes from CSMAR database.

3.2 Definition of variables

Explained variables

The explained variable of this paper is the quality of Environmental Information Disclosure (EDI). In this paper, 23 specific indicators from 7 aspects were used to construct an evaluation index system for the quality of environmental information disclosure of listed companies (see Table 1).

Explain the variables

The explanatory variable in this paper is the government environmental Audit. Because this paper wants to test the implementation effect of government environmental Audit, the explanatory variable is set as a dummy variable. If a certain prefecture-level city has implemented government environmental audit in the current year, the value of audit is 1; otherwise, the value is 0.

Intermediary variable

The mediating variables in this paper are corporate environmental performance (CEP) and government environmental governance effort (GEG). For corporate environmental performance, 8 indicators are constructed to measure the quality of corporate environmental performance, including: The disposal of solid waste, whether there is an environmental management system, whether the cleaner production audit passes, whether there are major or sudden environmental accidents, whether there are environmental violations, whether through ISO14001 certification, whether the pollutant discharge is up to standard, and whether there are letters and visits complaints, each indicator counts 1 point, a total of 8 points. For the government's environmental governance efforts, the government environmental audit is defined as the proportion of the frequency of environment-related words in the provincial government

work report to the total word frequency of the government work report (that is, the proportion of environmental word frequency) multiplied by the proportion of the city's heavy industry.

Table 1: Environmental information disclosure quality evaluation index system of listed companies

Disclosure	Serial number	Disclosure indicators	Top score	In disclosure	Serial number	Disclosure indicators	Top score
Environmental management Aspects	1	Environmental concepts	1	Environmental Performance and Outcomes	13	Benefits of pollution control	2
	2	Environmental information disclosure system	2		14	Environmental relief incentive income	2
	3	Environmental management objectives	2		15	Whether to perform the certification passed	2
	4	Environmental honors or awards	1				
	5	The "three simultaneous" system	1		16	Management of waste gas emission reduction	2
	6	Environmental education and training	1		17	Wastewater emission reduction and treatment	2
Environmental input Aspects	7	Sewage charges or green taxes	2	Pollutant discharge and treatment	18	Dust control situation	2
	8	Environmental spending	2		19	Utilization and disposal of solid waste	2
	9	Environmental measures and improvements	2		20	Noise, light pollution, radiation and other treatment	2
Energy consumption Aspects	10	Energy consumption	2		21	Pollutant emissions	2
	11	Measures and results of energy conservation	2	Environmental emergency Aspects	22	Environmental Emergencies	1
Cleaner production Aspects	12	Implementation of cleaner production	2		23	Emergency spending for major environmental problems	2

3.3 Model construction

In order to investigate the impact of government environmental audit on the quality of corporate environmental information disclosure and its mechanism, this paper constructs the following models for analysis, as shown in model (1), (2), (3) and (4). Among them, the intermediary effect test refers to Hayes (2018) to test the existence of multiple parallel intermediary methods. The first model is to test whether government environmental audit can significantly improve the quality of corporate environmental information disclosure. The second model is to test whether government environmental audit can significantly strengthen government environmental governance at the macro level. Then, it examines whether government environmental audit can significantly improve the environmental performance of enterprises at the micro level. Finally, it examines the effects of government environmental audit, government environmental governance and corporate environmental performance on the quality of corporate environmental information disclosure.

$$EDI_{i,t} = \beta_0 + \beta_1 Audit_{i,t} + \sum \beta_j Controls_{i,t} + \sum year + \sum industry + \varepsilon \quad (1)$$

$$GEG_{i,t} = \beta_0 + \beta_1 Audit_{i,t} + \sum \beta_j Controls_{i,t} + \sum year + \sum industry + \varepsilon \quad (2)$$

$$CEP_{i,t} = \beta_0 + \beta_1 Audit_{i,t} + \sum \beta_j Controls_{i,t} + \sum year + \sum industry + \varepsilon \quad (3)$$

$$EDI_{i,t} = \beta_0 + \beta_1 Audit_{i,t} + \beta_2 GEG_{i,t} + \beta_3 CEP_{i,t} + \sum \beta_j Controls_{i,t} + \sum year + \sum industry + \varepsilon \quad (4)$$

4. Empirical analysis

4.1 Descriptive statistics

Table 2 reports the descriptive statistics of the relevant variables. The minimum value of EDI is 0, the maximum is 36, the mean is 12.80, the median is 12, and the standard deviation is 7.623, indicating that enterprises do not disclose environmental information, and there are significant differences in the quality of environmental information disclosure between enterprises. The mean value of Audit is 0.487 and the median is 0, indicating that less than half of the regions have implemented environmental audit after the pilot audit of natural resource assets leaving office was carried out. When the variables of government environmental audit are reconstructed, the scope of environmental audit is relaxed and extended to other audits related to ecological environment. It can be seen that the mean value of Audit_1 is 0.510 and the median value is 1, indicating that more than half of the regions have implemented the audit work related to ecological environment.

Table 2: Descriptive statistics of related variables

Variable names	variable	N	mean	min	p50	max	sd
Quality of environmental disclosure	EDI	1219	12.80	0	12	36	7.623
Government Environmental Audit	Audit	1219	0.487	0	0	1	0.500
Government Environmental Audit (Refactoring)	Audit_1	1219	0.510	0	1	1	0.500
Government environmental governance efforts (%)	GEG	1219	0.301	0.052	0.288	0.754	0.121
Corporate environmental performance	CEP	1219	0.877	0.517	0.854	1	0.073
Business size	size	1219	22.47	18.90	22.23	27.07	1.367
Nature of title	soe	1219	0.414	0	0	1	0.493
Financial leverage	lev	1219	0.399	0.032	0.381	1.352	0.203
Ownership concentration	top1	1219	0.357	0.034	0.342	0.891	0.150
Return on assets	roa	1219	0.048	0.286	0.038	0.410	0.063
Separation of roles	dual	1219	0.774	0	1	1	0.418
Media attention	Tnews	1219	5.706	0	5.652	9.254	1.004
Internal control Index	ICI	1219	6.174	0	6.582	8.592	1.653
Percentage of independent directors	Idr	1219	0.373	0.250	0.333	0.667	0.055

4.2 Regression result analysis

Quality of government environmental audit and environmental information disclosure

The regression results of enterprise Environmental Information Disclosure Quality (EDI) in government environmental Audit are shown in column (1) of Table 3. Audit and EDI are significantly positively correlated at the 1% level, so assuming H1 is verified, that is, the implementation of government environmental audit will significantly improve the quality of corporate environmental information disclosure and promote enterprises to fulfill their responsibility of environmental information disclosure.

Government environmental audit, government environmental governance and quality of environmental information disclosure

Further, in order to explore the impact mechanism of government environmental Audit on enterprise environmental information disclosure quality (EDI), we conducted an analysis from the macro level, and selected government environmental governance intensity (GEG) as the intermediary variable at the macro level. The empirical results are shown in columns (2) and (4) in Table 3. There is a significant positive correlation between Audit and GEG at the level of 1%, indicating that the implementation of government environmental audit will reduce local industrial pollution emissions and strengthen local environmental control. GEG and EDI are significantly positively correlated at 1% level, indicating that the implementation of government environmental audit will improve the quality of corporate environmental information disclosure by strengthening local environmental governance, thus verifying

hypothesis H2.

Government environmental audit, corporate environmental performance and quality of environmental information disclosure

Finally, the impact path of government environmental Audit on corporate environmental information disclosure quality (EDI) is analyzed from the micro level, and corporate environmental performance (CEP) is selected as the intermediary variable at the micro level. The empirical results are shown in columns (3) and (4) in Table 3. There is a significant positive correlation between Audit and CEP at the level of 5%, indicating that the implementation of government environmental audit will make the environmental performance of enterprises better, which is embodied in no violations of laws and regulations, no sudden accidents, emission standards or compliance with relevant certification standards. CEP and EDI are significantly positively correlated at the 1% level, indicating that the implementation of government environmental audit will improve the environmental performance of enterprises. The better the environmental performance of enterprises, the higher the awareness of environmental responsibility, the stronger the willingness to disclose environmental information, and the higher the quality of environmental information disclosure, thus verifying hypothesis H3.

Table 3: Regression results of government environmental audit and corporate environmental information disclosure quality and their impact mechanism

	(1)	(2)	(3)	(4)
	EDI _t	GEG _t	CEP _t	EDI _t
Audit _t	0.840*** (2.617)	0.035*** (5.093)	0.009** (2.565)	0.100 (0.400)
GEG _t				6.322*** (6.178)
CEP _t				55.648*** (28.238)
size _t	1.414*** (7.311)	0.011 (2.686)	0.011*** (4.871)	0.895*** (5.960)
soe _t	0.360 (0.891)	0.019 (2.165)	0.005 (1.187)	0.780** (2.516)
lev _t	3.161*** (3.088)	0.019 (0.865)	0.005 (0.470)	2.738*** (3.489)
top1 _t	2.125* (1.878)	0.006 (0.237)	0.006 (0.451)	1.768** (2.039)
roa _t	3.748 (1.138)	0.061 (0.856)	0.004 (0.111)	3.904 (1.547)
dual _t	0.469 (1.224)	0.000 (0.039)	0.002 (0.534)	0.343 (1.167)
ICI _t	0.047 (0.481)	0.002 (0.935)	0.000 (0.363)	0.038 (0.497)
N	1219	1219	1219	1219

5. Robustness test

Considering that ecology and the environment are closely related, and in recent years, government departments have not only conducted audits of water, atmosphere, river channels, etc., but also conducted audits of some fixed projects related to the ecological environment and conducted special or follow-up audits, which may also have an important impact on the environment, such as the audit of greening projects, which is conducive to regulating climate and purifying air; The audit of farmland and water conservancy projects is conducive to improving the surrounding water environment; Auditing the construction of ecological protection areas is conducive to conserving water sources and maintaining biodiversity. Therefore, this paper redefines government environmental audit as: on the basis of the original concept, if the audit of "green engineering project", "ecological nature reserve construction", "farmland water conservancy project", "ecological environment project" and other aspects has been carried out, it is also considered that the prefecture level city has implemented environmental protection related audit in the year, the value of Audit_1 is 1, otherwise the value is 0. After reconstructing the government environmental audit, the empirical results are shown in Table 4. The results are consistent

with the conclusions of the empirical analysis and support the hypothesis H1, H2 and H3.

Table 4: Robustness test of reconstructing government environmental audit indicators

	(1)	(1)	(2)	(1)
	EDI _t	GEG _t	CEP _t	EDI _t
Audit _{1t}	0.752** (2.344)	0.036*** (5.234)	0.007** (2.016)	0.117 (0.470)
GEG _t				6.309*** (6.162)
CEP _t				55.654*** (28.270)
size _t	1.426*** (7.373)	0.011 (2.590)	0.011*** (4.937)	0.896*** (5.969)
soe _t	0.356 (0.880)	0.019 (2.112)	0.006 (1.225)	0.783** (2.524)
lev _t	3.138*** (3.063)	0.019 (0.840)	0.005 (0.439)	2.738*** (3.490)
top1 _t	2.119* (1.872)	0.005 (0.224)	0.006 (0.448)	1.767** (2.038)
roa _t	3.730 (1.132)	0.063 (0.887)	0.004 (0.115)	3.893 (1.543)
dual _t	0.457 (1.191)	0.001 (0.134)	0.002 (0.517)	0.340 (1.156)
ICI _t	0.048 (0.491) (2.532)	0.002 (0.906) (0.546)	0.000 (0.369) (1.241)	0.038 (0.500) (2.191)
N	1219	1219	1219	1219

6. Conclusion

Using China Audit Yearbook, China Environment Yearbook, corporate annual reports, social responsibility reports and environmental reports from 2019 to 2021, this paper examines the impact of government environmental audit on the quality of corporate environmental information disclosure and its mechanism. The findings are as follows: Government environmental audit can significantly improve the quality of corporate environmental information disclosure and effectively promote the fulfillment of corporate environmental responsibility; At the same time, at the macro level, government environmental audit can improve the quality of corporate environmental information disclosure through the intermediary of government environmental governance. At the micro level, government environmental audit improves the quality of environmental information disclosure by mediating the environmental performance of enterprises. The further study found that the positive effect of government environmental audit on the quality of environmental information disclosure was mainly manifested in the enterprises with more female directors, higher average age of senior executives, less number of senior executives leaving that year and higher average education of senior executives. The conclusions of this paper not only expand the relevant research of government environmental audit, but also enrich the mechanism of government environmental audit on the quality of corporate environmental information disclosure, and provide important implications for pollution prevention and ecological civilization construction.

Acknowledgements

Project: “The research of government environmental audit, internal governance mechanism and quality of corporate environmental information disclosure” (21GLB013) of the Jiangsu philosophy and social sciences fund.

References

[1] Zeng Changli, Li Jiangtao. Government environmental audit and improvement of environmental performance [J]. *Audit Research*, 2018(4): 44-52.

- [2] Yu Lianchao, Zhang Weiguo, Bi Qian, Dong Jinting. Will government environmental audit improve corporate environmental performance [J]. *Audit and Economic Research*, 2020(1): 41-50.
- [3] Cai Chun, Zheng Kaifang. Research on the impact of government environmental audit on corporate environmental responsibility information disclosure [J]. *Audit Research*, 2019(6): 3-12.
- [4] Bi Qian, Peng Jue, Zuo Yongyan. Environmental information disclosure system, corporate governance and environmental information disclosure [J]. *Accounting Research*, 2012(7): 39-47.
- [5] Li Qingyuan, Xiao Zehua. Heterogeneous environmental regulation tools and corporate green innovation incentives [J]. *Economic Research Journal*, 2020(9): 192-208.
- [6] Ballou. B, D. Heitger, C. Landes. The Rise of Corporate Sustainability Reporting: a Rapidly Growing Assurance Opportunity [J]. *Journal of Accountancy*, 2006 (6): 65-74.
- [7] Cai Chun, Xie Liufang, Wang Biaohua. Economic responsibility audit and local government governance: from the perspective of environmental pollution [J]. *Journal of Xiamen University (Philosophy and Social Sciences Edition)*, 2020(02): 91-104.
- [8] Patten, D. The Relation between Environmental Performance and Environmental Disclosure: A Research Note [J]. *Accounting, Organizations and Society*, 2002, 27 (8): 763-773.
- [9] Bao Qun, Shao Min, Yang Dali. Have environmental controls curbed emissions? [J]. *Economic Research Journal*, 2013, 48 (12): 42-54.