Study on the Impact of Outgoing Audit of Natural Resource Assets of Leading Cadres on ESG Performance of Enterprises

Siqi Yang

International College Beijing, China Agricultural University, Beijing, China

siqi.3.yang@ucdenver.edu

Abstract. In recent years, due to the increasing national attention to environmental problems, the impact of environmental regulation on micro-enterprises has become the research focus of academic circles. The outgoing audit system of leading cadres' natural resource assets is one of the most popular management system to regular the behavior of regional micro-enterprises in China. To discuss the influence of the outgoing audit of leading cadres' natural resource assets on the ESG performance of heavily polluting enterprises, this paper adopts the method of multi-stage double difference to study the data of heavily polluting enterprises from 2011 to 2017. The results are as follows: the outgoing audit of leading cadres' natural resource assets will improve the ESG performance of heavily polluting enterprises and will vary with the degree of marketization. The results of this paper show that the implementation of the audit of natural resource assets will bring some practical influence to micro-enterprises.

Keywords: leading cadres of natural resources assets outgoing audit, heavy pollution enterprises, enterprise ESG performance

1   INTRODUCTION

1.1   Research Background

At the Third Plenary Session of the 18th CPC Central Committee in 2013, the outgoing audit of leading cadres' natural resource assets (NRAA) was proposed, aiming to further reinforce the construction of ecological civilization. After the reform of China's decentralization system, "political promotion championship" appears. Although this has promoted the economic development to some extent, it shows the serious consequences of "development first, then governance later". The property rights and use of natural resource assets should be included in the performance evaluation of leading cadres, to build a power operation system with scientific decision-making and clear responsibilities, and the administrative supervision and audit supervision of the exercise of power by major leading cadres should be strengthened [1].

As early as 2014, the audit pilot work of individual urban areas began before the introduction of the pilot program. From 2015 to 2017, the pilot work was successively carried out in all provinces across the country until 2018, when the audit work was launched. Audit institutions have been seeking an audit mode that fits the reality, and also summarized some typical practical experience. Therefore, it is timely to carry out the practical research of the NRAA.

Environmental, social responsibility, and governance (ESG) refers to whether the decisions and behaviors considered in the operation of the company will have an impact on the external natural environment, social responsibility, and the internal and external governance of the company. To conduct green innovation, heavy-polluting enterprises face the problems of high investment, high risk, and a long time. To achieve a high rate of return, enterprises generally do not actively choose to carry out green innovation and green investment and often need to intervene with external forces. The NRAA, as the "new tool" of the government to govern the environment, is given to leading cadres.

1.2   Research Object

Based on the theories of the "sustainable development concept", "entrusted economic responsibility view" and "legitimacy view", this paper aims to test the influence of the NRAA on the ESG performance of enterprises. Since the NRAA was formally proposed in 2013 and the pilot began in 2014, the standard research has been quite rich, with relatively little empirical research, and concentrated on the micro-enterprise level. Therefore, the key problem to be solved in this paper is whether is there a connection between the NRAA and the performance of enterprise ESG under the current "dual carbon" goal. If so, what is the mechanism of action? Will this effect be different according to the degree of marketization? These problems are of practical significance for the government audit to help achieve the "double carbon" goal, which needs to be further studied. Therefore, this paper takes the panel data of 283 prefecture-level cities in China from 2011 to 2017 as a sample to empirically test the impact of NRAA on enterprise ESG.

2   LITERATURE REVIEW

2.1   Review of the Audit Literature of Outgoing Leading Cadres.

Carrying out the NRAA has a great role in improving corporate governance and strengthening audit supervision [2]. The NRAA is an important audit method with typical Chinese characteristics, which is a special audit form for the deep integration of environmental audit and economic responsibility audit [1,3]. In China, due to the special political background of "cadres in charge of the Party", the object of environmental audit has gradually developed from the audit of "things" to the audit of "people" [4], and the performance of leading cadres' environmental responsibility has been officially included in the scope of audit supervision.

From 2014 to 2018, since the practical effect of this environmental policy tool is not very significant, scholars have mainly adopted normative research methods [5]. It

mainly analyzes the audit subject, audit target, audit object, audit content, accountability mechanism of natural resource assets, and relevant evaluation index system of natural resource balance sheet preparation [1,3]. After 2018, as the effect of the NRAA becomes more prominent, more and more scholars have empirically tested the transformation of the audit system of natural resource assets on enterprises from the perspective of combining macro and micro. among, Most scholars focus on the impact of the NRAA on the environmental protection of enterprises, Such as enterprise energy conservation and emission reduction [6], Enterprise environmental protection investment [3]. Corporate environmental responsibility performance [5]. Enterprise transformation and upgrading [7] and industrial structure quality of the manufacturing industry [8], et al., A small number of scholars have studied the earnings management in the audit of natural resource assets [9] and the impact of corporate debt financing [10]. However, increasing investment in environmental protection is a necessary condition to enhance the sustainable development ability of enterprises. At present, there is no relevant research on the NRAA and the ESG performance of enterprises, that is, whether enterprises can achieve sustainable development, so the research in this paper has certain practical significance.

2.2   Summary of Enterprise ESG Performance Studies.

According to the neoclassical theory, the ESG performance of an enterprise is generally negatively or unrelated to its financial position [11], that is, external expenditure such as environmental and social responsibility can not bring any monetary benefits to the enterprise, and will occupy limited resources such as technology research and development. However, most empirical studies in recent years have confirmed the positive role of ESG performance of enterprises in improving the capital market value of enterprises [12], improving enterprise performance [13], reducing operational risks and other aspects.

The research on the ESG concept in China started late and was relatively few. Huang Shizhong pointed out that the concept of ESG was developed based on the theory of sustainable development, economic externalities, and corporate social responsibility [14]. With the evolution of ESG reports, the phenomenon of "green drift" in the field of information disclosure makes ESG reports become a publicity stunt, which is not conducive to the orderly realization of the "two-carbon" goal [14]. From this point of view, the government and regulatory authorities need to improve the regulatory system of ESG information disclosure and improve the authenticity of enterprise ESG performance. However, in practice, ESG information disclosure is often confused with CSR information disclosure, and the boundary is blurred. In order to promote enterprises to better fulfill their ESG responsibilities and realize the sustainable development of enterprises, it is necessary to discuss the influencing factors of enterprise ESG information disclosure.

3   RESEARCH CONTENT

3.1   Audit of Outgoing Leading Cadres and Enterprise ESG Performance

The NRAA combines the environment of the jurisdiction with the job performance, aiming to continuously improve the ability of the Chinese government to fulfill the entrusted environmental responsibilities [5]. Also, the outgoing audit to the behavior of leading cadres have lifelong accountability and power investigated, can effectively supervise local government officials in the process of environmental governance of major policy implementation, capital usage, prompting local government officials to put more energy into environmental governance.

From the perspective of enterprises, the NRAA plays a role in supervision and management, prompting enterprises to implement environmentally friendly behaviors to seek sustainable development. Corporate ESG performance is mainly a key indicator to measure corporate environmental protection, social responsibility, and corporate governance level. On one hand, enterprises need to assume environmental and social responsibilities while pursuing their benefits; on the other hand, improving enterprise ESG report credibility is conducive to the market to grasp the relevant information, enhance stakeholders of its ESG fulfillment of cognition, and reduce enterprises due to pollution, energy consumption, and other environmental problems caused by the image cost and related costs, to accurately evaluate its value, and prompted the enterprise of low carbon development, green transformation for government support. Hence, the following assumption is made:

H1: The audit of leading cadres' natural resource assets will improve the ESG performance of enterprises.

3.2   Marketization Process, Outgoing Audit of Leading Cadres' Natural Resource Assets and Enterprise ESG Performance

The development level of different regions in China is unbalanced, and the marketization process of different regions varies greatly, resulting in government intervention and legal environment in different regions, which makes the governance effect of the NRAA on the environmental governance efficiency of local governments. In areas with a high marketization process, the legal environment is better, with less environmental pollution, and the degree of local government intervention in environmental governance measures is also lower [15]. Therefore, we believe that in the areas with a high marketization process, the NRAA may have less impact on the environmental performance of enterprises.

In regions with different marketization processes, residents' income varies greatly, and their demands for environmental quality improvement also show regional characteristics. Therefore, the effect of the pilot NRAA is also different. In areas with a high marketization process, the public has a strong awareness of environmental protection. No matter whether the local pollution increases, the number of environmental petitions will also increase, and environmental petitions are transmitted through the pressure of

higher departments to promote local governments to strengthen environmental pollution control [16].

In addition, compared with the eastern regions with higher marketization processes, the central and western regions have a higher level of unit GDP, and strict implementation of environmental policies will be able to reduce pollution emissions more effectively [16]. To achieve the sustainable governance of the enterprise, the following assumptions are proposed:

H₂: Given that other conditions remain unchanged, compared with the regions with higher marketization processes, the implementation of the pilot audit of outgoing leading cadres has a greater impact on the ESG performance of enterprises in the regions with lower marketization degree.

4   RESEARCH DESIGN

4.1   Data Sources

This paper selects the listed companies of China's A-share heavy pollution enterprises from 2011 to 2017 as the research sample. Among them, to collect the NRAA pilot data, this paper to "city name + NRAA" as the theme, mainly from the China audit yearbook, the audit website, provincial bureaus website, Baidu search engines, newspapers and magazines and research reports and media reports, and other multiple ways, search provinces and cities each pilot implementation of NRAA. Through manual collection to obtain the pilot NRAA in prefecture-level cities every year. Enterprise ESG performance was obtained from the data of China Securities scoring institution. The data of other control variables were all from the CASMAR database. After excluding financial enterprises and ST, STP, PT, and other enterprises, 3,846 data were finally obtained. Meanwhile, to overcome the influence of extreme values, the continuous variable extreme values are reduced by 1% and 99% quantile.

4.2   Variable-Definition

Outgoing audit of the natural resources and assets of leading cadres. As an external policy, the NRAA leaves office and adopts the construction method of the multi-stage DID model. Therefore, this paper selects from 2011 to 2017 as the research sample. The specific approach of DID construction in this paper is to take the enterprises that implemented the pilot NRAA of the registered city in the city from 2014 to 2017 as the experimental group, and the enterprises that have not implemented the NRAA of the registered city from 2014 to 2017 as the control group. To investigate the impact of the new environmental protection assessment mechanism of the outgoing audit of leading cadres on enterprise ESG, this paper generates a policy virtual variable POST, and the experimental group will pilot the value of 1 in the same year and the following year, otherwise the value will be 0.

Enterprise ESG performance. In this paper, the ESG rating data disclosed by China Securities is selected as the measurement index of the quality of enterprise ESG information disclosure, which mainly considers that the data of China Securities database

has a longer window period and the data volume is more sufficient compared with other databases. The sample period studied in this paper was from 2011 to 2017, and the ESG data in the CSI database were complete and sufficient during the period, making the study conclusions more reliable. Borrowing the research methods of Fang Xianming and Hu Ding [17], and assigns the nine grades (from AAA to C) from high to low to 9 to 1, so as to construct the ESG variables in the empirical method of this paper.

Table 1. Definition of variables

explained variable	Enterprise ESG performance	ESG	ESG scores disclosed by China rating agencies
explanatory variable	Experimental group pilot	Audit	Take 0 before pilot group (pilot city); 1 for pilot and later, and 0 for control group
Enterprise characteristics	company size	Size	Ln (Total Staff Number + 1)
	asset-liability ratio	Lev	Total liabilities / total assets at the end of the year
	cash flow	Cashflow	Net cash flows from operating activities / total assets
	all capital earnings rate	ROA	Average balance of net profit / total assets
	asset turnover	Turnover	Operating income / average total assets
	Company growth	Growth	Operating income of this year / (previous year-1)
	Board size	Director	Ln (Board Number + 1)
	The proportion of independent directors	In_director	Number of independent directors / directors
	Two jobs in one	Duality	The chairman and the general manager are the same person 1, otherwise 0
	enterprise value	TQ	1 for state-owned enterprises and 0 for non-state-owned enterprises
	The largest shareholder shareholding ratio	Top1	Number of shares of the largest shareholder / total number of shares
Market characteristics	Market competition	HHI	The Heffendar index
	per capita GDP	GDP_per	Ln (Provincial per capita GDP + 1)
Official characteristics	Provincial Party Secretary's term of office	Tennu	The tenure of the post
	Whether to change the provincial party secretary in that year	Change	Change to 1 otherwise 0
	The Provincial Party secretary is educated	Edu	15 junior college, 16 undergraduate, 19 master, 22 doctoral

Provincial Party Sec-retary age	Age	In those days age

Control variables. This paper refers to the relevant literature, in the enterprise characteristics level select enterprise scale (Size), asset-liability ratio (Lev), cash flow ratio (Cashflow), return on assets (ROA), asset turnover (Turnover), company growth (Growth), the board of directors size (Director), independent directors (In_director), two unity (Duality), enterprise value (TQ) and the largest shareholder stake (Top1) to control. In terms of market characteristics, market competition degree (HHI) and provincial GDP per capita (GDP_per) are used as control variables. At the level of official characteristics, the term years of the provincial Party Secretary (Tennu), whether to change the provincial Party Secretary (Change) or not in the same year, the years of education of the provincial Party Secretary (Edu), and the age of the provincial Party Secretary (Age) were selected as the control variables, as shown in table 1.

4.3   Model Building

After the implementation of the NRAA, the change of enterprise environmental performance mainly comes from three aspects: first, the time effect, the change of the ESG performance of the enterprise, that is, the heterogeneity in different cities will affect the performance of the ESG; the third is the policy treatment effect, that is, the change of ESG realization is caused by the NRAA of the enterprise. The double difference method (DID) can effectively identify the net effect of the policy, namely the treatment effect of the policy, and can control the endogenous correlation between the NRAA and the ESG performance of enterprises. In this paper, the multi-stage DID model was used to test the effect of the policy by comparing the difference between the influence of the average change in the experimental group compared to the control group. The experimental group of this paper is the heavily polluted listed enterprise implementing the pilot NRAA in the registered city in 2014-2017. The control group is the heavily polluting listed enterprise registered in the city that has not implemented the NRAA.

Because different city pilot implementations of NRAA time is different, this paper adopts more broader DID, namely according to the pilot implementation of NRAA time set virtual variable POST, a city implementation of NRAA pilot POST = 0, a city implementation of NRAA pilot in and after POST = 1. The model to test the net effect of the NRAA is set as follows:

$$\text{ESG}_{i,t} = \alpha_0 + \alpha_1 \text{Audit}_{i,t} + \alpha_2 \text{Controls}_{i,t} + \text{Year FE} + \text{Industry FE} + \varepsilon_{i,t} \qquad (1)$$

5   RESULTS

5.1   Audit of Leading Cadres' Outgoing Natural Resource Assets and Enterprise ESG Performance

Table 2 below reports the main assumptions, which is the impact of the NRAA on the ESG performance of enterprises. The results presented in column (1) are based on the quarterly scoring of ESG by China Securities rating agencies. The influence coefficient

of the NRAA on the enterprise ESG is 0.2779, and it is significant at the confidence level of 5%. The results presented in column (2) are based on the annual scoring of ESG by China Securities rating agencies. The influence coefficient of the NRAA on the ESG of enterprises is 0.3052, and it is significant at the confidence level of 5%. Column (3) reports data from the quarterly scoring ESG lag period.The influence coefficient of the NRAA on the ESG of enterprises is 0.3865, and it is significant at the confidence level of 1%. Column (4) reports data from the annual scoring ESG lag period. The influence coefficient of the NRAA on the ESG of enterprises is 0.3205, and it is significant at the confidence level of 5%.

Table 2. ESG performance of the NRAA

VARIABLES	ESG_j (1)	ESG_n (2)	ESG_j_{t+1} (3)	ESG_n_{t+1} (4)
Audit*Post	0.2779**	0.3052**	0.3865***	0.3205**
	(1.9893)	(1.9969)	(3.3109)	(2.2815)
Size	0.2349***	0.2422***	0.2171***	0.2655***
	(13.2847)	(12.3903)	(13.1026)	(13.7456)
Lev	-1.0110***	-1.0053***	-0.9266***	-0.9368***
	(-9.6534)	(-8.7369)	(-9.1444)	(-8.1947)
Cashflow	-0.2371	-0.5040*	0.2716	-0.1210
	(-0.8814)	(-1.7211)	(1.0768)	(-0.4067)
ROA	2.1594***	2.6802***	0.8097**	3.7167***
	(5.9332)	(6.6787)	(2.3627)	(9.1734)
Turnover	-0.0412	-0.0462	-0.0382	-0.0547
	(-1.0244)	(-1.0224)	(-1.0100)	(-1.2364)
Growth	-0.1484***	-0.1976***	-0.0592*	-0.0456
	(-4.1555)	(-4.9022)	(-1.8251)	(-1.0624)
Director	0.5455***	0.5409***	0.5239***	0.5389***
	(6.1431)	(5.5812)	(6.0544)	(5.6465)
In_director	2.3528***	2.5106***	1.9160***	1.9579***
	(7.0698)	(6.7874)	(6.0616)	(5.1494)
Duality	0.0045	0.0098	0.0107	-0.0961**
	(0.1238)	(0.2387)	(0.3131)	(-2.2271)
TQ	-0.1770***	-0.1622***	-0.2533***	-0.1295***
	(-6.8612)	(-5.7011)	(-10.6837)	(-4.6222)
Top1	0.0759***	0.0593**	0.0772***	0.0263
	(3.0980)	(2.1869)	(3.3877)	(0.9431)
HHI	0.2850	0.1222	0.4723	0.1749
	(0.8407)	(0.3120)	(1.4273)	(0.4643)
GDP_per	0.0671*	0.0695*	0.0702**	0.0379
	(1.8959)	(1.7651)	(2.1189)	(0.9531)
Tennu	-0.0077	-0.0077	-0.0108	-0.0094
	(-0.8337)	(-0.7530)	(-1.2400)	(-0.9063)
Change	0.0475	0.0850	0.0077	-0.0224
	(0.9319)	(1.5226)	(0.1629)	(-0.3981)

Edu	0.0085	0.0124	0.0029	0.0077
	(0.9436)	(1.2486)	(0.3336)	(0.7826)
Age	0.0183***	0.0192***	0.0163***	0.0209***
	(4.7712)	(4.5267)	(4.3704)	(4.8919)
Constant	-1.5136***	-1.7856***	-0.7918	-1.5603**
	(-2.6143)	(-2.7795)	(-1.4358)	(-2.4117)
Observations	3,846	3,846	3,846	3,846
YearFE	Yes	Yes	Yes	Yes
IndustryFE	Yes	Yes	Yes	Yes
Adj.R²	0.176	0.157	0.166	0.178
F	20.03	17.57	19.80	21.09

Note: regression t value in brackets; * * * * and * * * are significant at 10%, 5% and 1%, respectively.

5.2 Low Marketization and High Marketization

The public company-Hufendal Index (HHI) measures the relative share or concentration of a company in the market. It is obtained by the sum of market share. The higher the index value, the higher the concentration of the market or industry, the relatively small competition, and the lower the index value, the more intense competition in the market or industry. This article references Liu Guanchun [18], in the practice of others, the Heffindar index of listed companies was calculated by means of main business income and total assets. According to the average value of the marketization process index, the samples were divided into two subsamples: the higher marketization process group (High_market) and the lower marketization process group (Low_market), and the regression analysis was conducted respectively. Table 3 below shows the specific regression results.

Among them, column (2) shows that the NRAA will have a positive impact on the ESG performance of enterprises under the low market competition degree, and it is significant at the confidence level of 5%. Column (4) indicates that the regression results remain significant after the variable lag period. However, the high degree of marketization in column (1) and column (3) is not significant, which proves hypothesis 2 of this paper.

Table 3. ESG performance of leading cadres' natural resource assets under different degrees of marketization

	ESG$_t$	ESG$_t$	ESG$_{t+1}$	ESG$_{t+1}$
	High_market	Low_market	High_market	Low_market
VARIABLES	(1)	(2)	(3)	(4)
*Audit*Post*	0.1518	0.3193**	0.4359	0.4015***
	(0.4654)	(2.0817)	(1.5837)	(3.1470)
Size	0.3019***	0.2130***	0.2683***	0.1965***
	(8.4540)	(10.2391)	(7.8386)	(10.1628)
Lev	-0.9534***	-1.0219***	-0.9152***	-0.9148***

	(-3.8863)	(-8.6641)	(-3.8166)	(-8.0812)
Cashflow	-0.2948	-0.2724	0.2418	0.2705
	(-0.5157)	(-0.8868)	(0.4117)	(0.9624)
ROA	2.8941***	1.9398***	1.3737*	0.6523*
	(3.6295)	(4.6902)	(1.7286)	(1.6911)
Turnover	-0.1769*	-0.0156	-0.2019**	-0.0104
	(-1.8263)	(-0.3542)	(-2.1817)	(-0.2508)
Growth	-0.0682	-0.1660***	0.0350	-0.0798**
	(-0.9712)	(-4.0451)	(0.4779)	(-2.2099)
Director	0.5645***	0.5648***	0.5956***	0.5145***
	(3.2389)	(5.4578)	(3.7059)	(5.0590)
In_director	2.1982***	2.3487***	1.9712***	1.8789***
	(3.1684)	(6.2080)	(3.3849)	(5.0016)
Duality	-0.0273	0.0095	-0.0165	0.0128
	(-0.3518)	(0.2284)	(-0.2310)	(0.3276)
TQ	-0.1767***	-0.1754***	-0.2224***	-0.2591***
	(-3.3107)	(-5.9864)	(-4.3916)	(-9.6861)
Top1	0.0063	0.1005***	0.0396	0.0987***
	(0.1278)	(3.4456)	(0.8667)	(3.6515)
HHI	-0.5579	0.4030	-0.6594	1.7312*
	(-1.0338)	(0.3781)	(-1.2166)	(1.8546)
GDP_per	0.0188	0.0861**	0.0446	0.0840**
	(0.2366)	(2.1573)	(0.6100)	(2.2234)
Tennu	-0.0003	-0.0104	-0.0175	-0.0096
	(-0.0130)	(-0.9775)	(-0.9919)	(-0.9460)
Change	0.0296	0.0491	0.0242	-0.0015
	(0.2848)	(0.8293)	(0.2513)	(-0.0279)
Edu	0.0501***	-0.0040	0.0360**	-0.0075
	(2.6793)	(-0.3863)	(1.9985)	(-0.7571)
Age	0.0215**	0.0172***	0.0241***	0.0147***
	(2.5615)	(3.9667)	(3.1105)	(3.4439)
Constant	-2.3186*	-1.2347*	-1.9293	-0.7519
	(-1.7453)	(-1.8024)	(-1.5863)	(-1.1396)
Observations	852	2,994	852	2,994
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adj.R²	0.234	0.159	0.229	0.149
F	8.210	14.82	8.149	14.33

Note: regression t value in brackets; * * * * and * * * are significant at 10%, 5% and 1%, respectively.

6   CONCLUSION

This paper tests the NRAA (outgoing audit of leading cadres' natural resource assets) and the ESG performance of heavy pollution enterprises. The results indicate that the NRAA will improve the ESG performance of enterprises, and the improvement effect is more obvious in non-state-owned enterprises and regions with low marketization processes.

To enhance the ESG (environmental, social, governance) responsibility of leading cadres in natural resource management, it is crucial to formulate clear regulations and policies. First, companies should be required to conduct highly transparent ESG reports, including detailed information on environmental impact, social responsibility, and corporate governance. Leading officials need to ensure that companies follow relevant regulations and international standards and communicate their ESG performance to the public and stakeholders. Moreover, providing ESG training to leading cadres can enhance their awareness of these factors to more fully consider the impact of ESG in decision-making. Encouraging companies to actively interact with stakeholders, including local communities, environmental organizations, and employees, can help build a good reputation. The reward and punishment mechanism is also necessary to encourage enterprises with good performance and take corresponding punishment measures for enterprises with poor performance. In addition, information security and data privacy, technological innovation, and ESG performance evaluation are also key points to focus on in policy making. Together, these proposals aim to encourage leading officials to pay more attention to ESG in natural resource management, to promote enterprises in a more sustainable and socially responsible direction. Support and oversight by governments and regulators will be key to ensuring that these policies are being implemented effectively.

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