

Environmental regulation tools and corporate environmental information disclosure: Evidence from a-share-listed companies in Shenzhen and Shanghai, China



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ABSTRACT

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Environmental accounting is not only a more comprehensive and effective accounting model but also a more beneficial monitoring model for ecological protection and social development. Environmental accounting enables companies to develop economic benefits while protecting and managing the environment and to assume corresponding social responsibilities and obligations. Based on the importance of environmental regulation, this study attempts to evaluate the role of environmental regulatory tools in corporate environmental information disclosure using the Environmental Information Disclosure Index (EIDI) as a proxy variable. The regression analysis conducted on a panel dataset encompassing all A-share listed companies in the Shanghai and Shenzhen stock markets from 2007 to 2018 reveals a significant relationship between environmental regulatory tools and EIDI. Specifically, the Control command type, Public Participation Type, and Voluntary action-oriented Type have a positive and significant influence on corporate environmental information disclosure, whereas the Market Incentive Type has a negative and significant influence. This evidence suggests that the reasonable use of environmental regulatory tools is an important means of improving the quality of corporate environmental information disclosure.

Contribution/ Originality: Using a panel dataset of A-share listed companies in Shanghai and Shenzhen, this study investigates the relationship between environmental regulation tools and the quality of environmental information disclosure based on two dimensions: the quantity and quality dimensions of firms' innovation.

1. INTRODUCTION

With the development of environmental information disclosure (EID), Chinese companies have gained economic advantages in the game of the green economy by actively implementing various energy-saving and emission reduction measures and beginning to pay attention to EID. Environmental information has become a key disclosure content that companies are focusing on (Peng & Li, 2019). Therefore, the quality of a company's EID has become an important factor affecting its development (Yao & Liang, 2019). As the main body of EID, companies should be guided to voluntarily and effectively disclose environmental information, improve their social image and credibility, promote sustainable development, and drive China's overall achievement of green economic transformation (Jie, 2018). Based on this concept, this article adopts the Kong, Wei, and Ji (2021) method for measuring the quality of environmental information disclosure, namely the Environmental Information Disclosure Index (EIDI), to measure the level of EID

quality of different companies. EIDI has the advantages of strong comparability, relative objectivity, and high transparency. It provides a comprehensive index that includes the five core dimensions of EID: Environmental Management Disclosure; Environmental Certification Disclosure; Environmental Information Disclosure Vehicles; Environmental Liability Disclosure; Environmental Performance and Governance Disclosure (SCMAR Database¹).

Environmental regulation is an important means and guarantee to maintain the environment and achieve sustainable development, which can promote the improvement of environmental quality and sustainable development. The role of environmental regulation is to promote compliance with environmental laws and standards by all parties to ensure the quality and sustainability of the environment. At the same time, environmental regulation can also promote the environmental responsibility and transparency of enterprises and governments and improve public environmental awareness and participation. At the international level, environmental regulation also plays an important role in promoting global cooperation and coordination for environmental protection through international agreements and treaties. Therefore, environmental regulation has become an indispensable part of today's society and one of the key factors for protecting the earth and achieving sustainable development.

So, how exactly does environmental regulation affect corporate EID? Are there differences in the effects of different types of environmental regulations? Environmental regulation, as one of the main instruments of governmental problem solving, inevitably affects the environmental governance, environmental investment, and EID behaviors of enterprises (Li & Feng, 2015). Can the current environmental regulatory system in China play the expected role in the quality of corporate EID? Some scholars (Shen & Feng, 2012) argue that EID is more of a response by listed companies to government administrative order-based environmental regulatory pressure. Some studies (Bi, Gu, & Zhang, 2015) analyze the impact on corporate EID from the perspective of the intensity of environmental regulations.

Some studies (Shen & Feng, 2012) have argued that the impact of institutional pressure on environmental information disclosure is also relatively limited due to the low overall level of environmental responsibility in the field where companies are located. In this case, companies lack the initiative and consciousness to disclose environmental accounting information, and there is a clear homomorphism and imitation behavior, and it is a frequency imitation of other companies' average level rather than imitating the leader (Shen & Su, 2012). In the above studies, the effects of environmental regulation on corporate EID are mostly considered only in terms of command-and-control environmental regulation instruments. A very small number of studies have actually looked into the link between the type of voluntary disclosure and EID. Another problem is that the idea of environmental regulation doesn't look at how different types of environmental regulation can affect the quality of corporate EID.

Currently, research on environmental regulation has relatively matured. However, there are still many controversies and uncertainties regarding the relationship between environmental regulation and corporate EID. On the one hand, the promoting role of environmental regulation on corporate EID has been widely recognized., but whether different types of environmental regulations will produce different effects still needs further research (Cao & Sun, 2021). On the other hand, some academics contend that investor and stakeholder demands have a greater impact on corporate EID than does environmental regulation by the government, which also needs more empirical research to support. Therefore, it is necessary to continue to strengthen research on the relationship between environmental regulation and corporate EID in the future in order to better guide the environmental management and EID work of corporate and governments (Wang, Shang, Li, & Li, 2023).

This study aims to fill in that gap by looking at how environmental regulatory tools affect the quality of environmental information disclosure by corporations. It will add to the body of research, especially in the areas of how environmental regulatory tools are used and the quality of environmental information disclosure by corporations.

¹ SCMAR database: China Stock Market & Accounting Research Database.

2. LITERATURE REVIEW

After combing and summarizing the relevant literature, we found that most of the research perspectives of foreign scholars focus on the formal system and corporate environmental information disclosure, but the relationship between environmental regulation and corporate environmental information disclosure has not been uniformly concluded.

Government agencies must enact the necessary laws and regulations to oversee corporate disclosure of environmental information and regulate corporate disclosure behaviour of environmental accounting information because corporate EID is closely linked with external stakeholders, has strong external characteristics, and is limited by information asymmetry characteristics. As a result, there will be incidents where corporate withholds or declines to disclose environmental accounting information. Shleifer and Vishny (1997) found a positive correlation between the degree of legal system integrity and accounting information disclosure. By investigating the importance of corporate governance, with special attention to legal protection for investors and concentration of ownership in corporate governance systems around the world, the study found that corporate are afraid of the risks and costs of violating relevant environmental regulations and tend to voluntarily and voluntarily disclose true and effective accounting information, and that a well-developed legal system also implies a good market environment in which true and effective disclosure of accounting information can better attract investors.

2.1. ER and EID are Positively Correlated

Some scholars believe that the relevant government departments can give full play to their institutional supervision and management functions by introducing regulations to effectively urge enterprises to disclose environmental information.

Clarkson, Li, Richardson, and Vasvari (2008), looked at 191 companies from five of the most polluting industries in the US and found a link between environmental information disclosure and sustainability reporting. They did this by focusing on companies that disclosed only optional environmental information and using the Global Reporting Initiative's content analysis index to see how much discretionary information was in environmental and social responsibility reports.

Porter and Linde (1995) support the "Porter hypothesis" and find that traditional studies of theoretically high environmental compliance costs have focused on static cost impacts and ignored any offsetting productivity gains from innovation. They typically overestimate compliance costs, ignore the offsetting effects of innovation, and disregard the initial competitiveness of the affected industry. Rather than simply increasing costs, properly developed environmental standards can trigger innovation offsets that enable companies to increase the productivity of their resources. He believes that adopting environmental legislation can encourage innovation among public corporate and can lead to a win-win situation for economic growth through environmental protection and productivity gains.

A regression analysis by Patten (1991) of the disclosure levels of 128 companies showed that social disclosure was used as a means of addressing the risks faced by companies in relation to the social environment and that the greater the risk faced in relation to the social environment, the higher the level of disclosure.

Some scholars, such as Choi, Lee, and Psaros (2013), De Villiers and Van Staden (2006), and Cho and Patten (2007), take a legitimacy perspective, i.e., organizational legitimacy theory, to predict that corporate will do whatever they consider necessary to maintain their image as legitimate businesses with legitimate goals and methods of achievement. In the social and environmental accounting research (SEAR) literature, legitimacy has mostly been used to support the idea that companies with poorer environmental performance should provide more extensive offsetting or positive environmental disclosures in their financial reports. Social disclosures would remain at current levels or increase over time to avoid a legitimacy crisis.

Choi et al. (2013) found that the legislation of the National Greenhouse and Energy Reporting Act 2007 (NGER Act) may have enhanced voluntary carbon disclosure in 2008 through a study of voluntary disclosure of carbon

emissions by Australian corporate from 2006-2008, although the NGER Act was a fiscal year before it became effective. And it examined whether the impending implementation of salient and mandatory environmental disclosures led to greater voluntary carbon disclosure. The findings could help regulators draft appropriate legislation that targets those industries and specific practices where disclosure is most important to relevant stakeholders. The results are consistent with legitimacy theory.

De Villiers and Van Staden (2006) conducted a content analysis of over 140 corporate annual reports over a 9-year period to identify long-term trends in EID by South African companies. It was found that legitimacy could also be achieved by changing the type of EID (general/specific) or reducing its number. These trends are consistent with legitimacy theory.

Cho and Patten (2007) looked at how monetary and non-monetary environmental disclosures were used in size-matched groups based on industry membership (environmentally sensitive vs. non-environmentally sensitive) and environmental performance (poorer vs. better performance). The groups were based on these factors to see how they were used. The results indicate that the use of monetary and non-monetary components of non-litigation environmental disclosures differs across groups. Overall, these findings provide additional support for the argument that companies use disclosure as a legitimation tool. Our scholars Zheng and Xu (2018) used a sample of Chinese listed corporate with heavy pollution from 2013 to 2016 and divided the sample into experimental and control groups by reference to the administrative level of the actual controller to test the effect of the "New Environmental Protection Law", which came into effect on January 1, 2015, on the quality of corporate EID. The study shows that the "New Environmental Protection Law" has a positive impact on the quality of EID.

2.2. ER and EID are Negative Correlated

Palmer, Oates, and Portney (1995) Questioning the traditional benefit-cost analysis as an approach to environmental issues. Traditional benefit-cost analysis suggests that stringent environmental measures induce innovative efforts, leading to emissions reductions and improvements in production technology, offsetting the costs of regulations. Based on basic economic theory and the available data on control costs, Palmer, K et al. consider this offset to be exceptional. The data shows that offsets are insignificant relative to the cost of control.

Gray and Shadbegian (1998) examined whether environmental regulations influence investment decisions from a capital investment and transfer perspective using census data for individual paper mills. In states with strict environmental regulations, new mills choose cleaner production technologies, and differences in air and water pollution regulations also influence technology choice. When examining the allocation of investments in existing plants, we find that emissions reductions and productive investments are often scheduled together. However, plants with high abatement investments spend significantly less on productive capital throughout the period. This appears to reflect the "crowding out" of productive investments within plants by environmental investments and the shifting of investments by corporate to plants facing less stringent abatement requirements.

Shadbegian and Gray (2005) used plant-level data from the Census Bureau for 68 pulp and paper mills, 55 oil refineries, and 27 steel mills for the period 1979-1990 to investigate the contribution of pollution abatement expenditures to output using an estimated Cobb-Douglas production function to measure the contribution of capital, labor, and material inputs to productivity. The study finds that abatement expenditures make little or no contribution to production. Even though the effects on different types of plants were estimated separately based on how they were made and the type of pollution-reduction investment, there was no evidence to suggest that these types of plants were significantly different from each other.

However, existing research findings also suggest that there may be another relationship between environmental regulation and environmental information disclosure.

Van Soest (2005) studied how environmental taxes and quotas affect the speed at which new and improved energy-efficient technologies appear and how investment decisions affect when they are adopted. He found that

neither policy tool was clearly better at encouraging early adoption of new technologies. Moreover, the relationship between the intensity of external environmental regulations and corporate environmental disclosure behavior shows an inverted "U" shape, and when the intensity of environmental regulations reaches a certain value, continuing to increase the intensity of environmental regulations does not promote corporate environmental disclosure behavior, and corporate environmental investment does not continue to increase and may even have the opposite effect. Li and Feng (2015) used listed corporate in the heavy pollution environmental protection industry in Shanghai from 2010 to 2012 as a research sample. The empirical analysis tested that environmental regulation has an "interval effect" on the quality of EID, and the nature of property rights has different effects on this effect, specifically: environmental regulation and state-owned enterprises The relationship between environmental regulation and EID quality is "U" shaped, and the relationship between EID quality of private corporate is inverted "U" shaped; political affiliation moderates the relationship between environmental regulation and EID quality, and the EID quality of private corporate with high political affiliation is more sensitive to environmental regulation (inverted "U" curve is steeper) and less tolerant (inverted "U" curve has an earlier inflection point) than that of private enterprises in general. The inflection point appears earlier).

Shu (2014) conducted a comprehensive analysis of the content, level, and authentication of EID in 620 social responsibility reports of listed companies in the heavy pollution industry in Shanghai, China, from 2008 to 2012 and found that the number of companies disclosing environmental information by means of social responsibility reports has continued to increase in the past five years, although more than 70% of companies disclosed social responsibility reports in response to the requirements of SSE's Notice. Although more than 70% of corporate disclose social responsibility reports in response to the requirements of the SSE Circular, the number of companies voluntarily releasing environmental information in the form of social responsibility reports has been increasing year by year. The distribution of EID content among listed companies is hierarchical, with more soft disclosure information and less hard disclosure information, especially the disclosure of environmental performance indicators. There are significant industry differences in the level of EID, and it shows an inflection point in 2010, rising first and then falling.

3. DATA AND METHODOLOGY

3.1. Data

This study assesses the relationship between environmental legislation and the quality of EID using a panel dataset of annual data from Chinese A-share listed businesses on the Shenzhen and Shanghai stock exchanges between 2007 and 2018.

The EIDI was used as the dependent variable, and the data for it was taken from the CSMAR database and computed using STATA. The China Environmental Statistical Yearbook provided information for the independent variable, environmental regulation. Based on the definitions given by Wang (2016), environmental regulation was measured using four different types of environmental regulatory tools: Control Command Type, Public Participation Type, Voluntary Action-oriented Type, and Market Incentive Type. The panel data set utilized in this study consisted of the data for the remaining five control variables, which were taken from the listed businesses' annual reports on the Shenzhen and Shanghai stock exchanges in China between 2007 and 2018. During the data processing step, samples of financial industry stocks, ST³, SST⁴, *ST⁵, and PT⁶ stocks, as well as samples with missing or anomalous values for pertinent variables, were all excluded. To lessen the possible influence of outliers on the regression results,

² SSE: Shanghai Stock Exchange.

³ ST: Special treatment – Companies facing consecutive annual losses receive special handling.

⁴ SST: Companies facing consecutive annual losses receive special handling, plus they have not completed a stock reform.

⁵ *ST: Companies facing three consecutive years of losses receive a delisting warning.

⁶ PT: Particular Transfer – Trading is suspended and prices reset to zero for stocks awaiting delisting.

all continuous variables at the firm level were also clipped annually at or above the 99th percentile and at or below the 1st percentile (Winsorization). At the same time, the standard errors of the regression coefficients were adjusted for company-level clustering in order to remove any possible clustering patterns in the sample data. Stata 17.0 was the main programme used for data processing and analysis.

After several screenings based on the above criteria, this study finally got an unbalanced panel data set with 20,421 "company-year" observations. The large sample size ensures the validity of the research results.

Table 1. Variable definition table.

Definition table of environmental regulation tools and corporate environmental disclosure variables			
Variable type	Variable name	Variable symbol	Variable definition
Dependent variable	Corporate environmental information disclosure	EID	It consists of 25 indicators in five areas: environmental management disclosure, environmental certification disclosure, environmental disclosure vehicles, environmental load disclosure, and environmental performance and governance disclosure. For non-monetized information, 2 if one of the disclosures is made, 0 otherwise; for monetized information, 2 for quantitative and qualitative descriptions, 1 for qualitative only, and 0 for no description. The 25 indicators are summed and logarithmically processed to obtain this variable.
Independent variable	Control command type	Law	Number of local environmental regulations enacted by province
	Market incentive type	Invshare	Environmental governance investments/GDP ⁷
	Public participation type	Renda	Combined number of NPC ⁸ and CPPCC ⁹ proposals as a proportion of local population
	Voluntary action-oriented type	ISO ¹⁰	Whether a company's products have applied for ISO 1004 certification is 1 if the product is ISO 1004 certified and 0 otherwise.
Control variables	Company size	Size	Natural logarithm of total assets at the end of the period
	Asset and liability levels	Lev	Total liabilities at the end of the period / Total assets at the end of period
	Growth	Growth	Operating income growth rate at the end of the period
	Social responsibility report	CFO	Net cash flow from operations/Total assets
	Nature of ownership	SOE	Whether the company under study is a state-owned enterprise, 1 if it is a state enterprise, 0 otherwise.

3.2. Variable Definition

The research variables in this study consist of three main components: environmental information disclosure, Number of innovations, Quality of innovation and control variables. The definitions of the variables are shown in Table 1.

3.2.1. Dependent Variable: EIDI

This study uses the classification system developed by Kong et al. (2021) for corporate disclosures of environmental information based on whether or not they are monetary (Wiseman, 1982). Quantitative and qualitative

7 GDP: Gross Domestic Product.

8 NPC: National People's Congress.

9 CPPCC: Chinese People's Political Consultative Conference.

10 ISO: International Organization for Standardization.

disclosures are assigned a value of 2, while qualitative indicators are given a value of 1, and non-monetized information is given a value of 0. In particular, the indicators in the disclosures about environmental liabilities, environmental performance, and governance are monetized information, whereas the indicators in the disclosures about environmental management, environmental certification, and environmental information disclosure vehicles are not. For the two categories of information, there are five aspects and twenty-five rating items. The ratings of these items are added together and logarithmically processed to provide the EID, a comprehensive measure of the caliber of environmental information disclosure by an organization.

Independent Variable: This paper uses Wang (2016) classification and definition of environmental regulatory tools as follows:

The control command type describes how the state administration directly manages and enforces mandatory supervision of production behaviour in accordance with applicable laws, regulations, rules, and standards.

Market incentive type refers to specific financial incentives given to businesses through fees or subsidies in order to encourage them to weigh the advantages and disadvantages of emissions and decide on the degree of production technology and emission levels.

The type of public participation refers to methods that indirectly support the more stringent application and enforcement of pertinent environmental laws, regulations, and technical standards. These methods primarily include public opinion, social and moral pressure, persuasion, and other tactics.

Voluntary action-oriented type refers to a range of voluntarily undertaken environmental protection measures by citizens, businesses, and civil organizations in accordance with their own definitions of sustainable development in order to minimise the use and waste of natural resources in both production and daily living.

3.3. Model Specification

In this study, year-fixed effects and industry-fixed effects are included in order to exclude the effect of unobservable factors during the sample period. The regression analysis is carried out according to the following model, using (1) to test hypothesis H1 and (2) to test hypothesis H2.

$$EID_{it} = a_0 + a_1 \lnlaw + a_2 Lev + a_3 Growth + a_4 CFO + a_5 SOE + a_6 \sum ind + a_7 \sum year + e1 \quad (1)$$

$$EID_{it} = a_0 + a_1 invshare + a_2 Lev + a_3 Growth + a_4 CFO + a_5 SOE + a_6 \sum ind + a_7 \sum year + e2 \quad (2)$$

$$EID_{it} = a_0 + a_1 renda + a_2 Lev + a_3 Growth + a_4 CFO + a_5 SOE + a_6 \sum ind + a_7 \sum year + e3 \quad (3)$$

$$EID_{it} = a_0 + a_1 ISO14001 + a_2 Lev + a_3 Growth + a_4 CFO + a_5 SOE + a_6 \sum ind + a_7 \sum year + e4 \quad (4)$$

Where EID is the Environmental Information Disclosure Index, *lnlaw*, *invshare*, *renda* and *ISO14001* are the independent variables, the control variables *Lev*, *Growth*, *CFO*, and *SOE* respectively represent Asset and Liability Levels, Operating income growth rate at the end of the period, Cash flow capacity, and Nature of Ownership. a_0 is the constant term, $a_1 \sim a_7$ is the regression coefficient and e^1, e^2 is the disturbance term.

Table 2. Regression analysis results.

Variable	(1)	(2)	(3)	(4)
	lnEID	lnEID	lnEID	lnEID
Lnlaw	0.0199* (1.83)			
Invshare		-0.0402*** (-2.63)		
Renda			0.5201*** (3.87)	
ISO14001				0.9534*** (47.73)
Size	0.3126*** (28.64)	0.3145*** (28.72)	0.3140*** (28.80)	0.2855*** (29.45)
Lev	-0.1677*** (-2.60)	-0.1705*** (-2.65)	-0.1819*** (-2.82)	-0.1464*** (-2.61)
Growth	-0.1081*** (-8.72)	-0.1081*** (-8.73)	-0.1068*** (-8.62)	-0.0812*** (-7.07)
CFO	0.7139*** (6.26)	0.7056*** (6.17)	0.6950*** (6.10)	0.5216*** (5.21)
SOE	0.1549*** (5.14)	0.1569*** (5.19)	0.1631*** (5.40)	0.1530*** (5.88)
_Cons	-5.9937*** (-26.43)	-5.9616*** (-26.24)	-6.0575*** (-26.60)	-5.4975*** (-26.94)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	20421	20421	20421	20421
R ²	0.294	0.295	0.296	0.432
Adj. R ²	0.293	0.294	0.295	0.431
F	111.4030	110.9941	111.7607	236.1557

Note: *t* statistics in parentheses.

* $p < 0.1$, *** $p < 0.01$.

4. RESULTS AND DISCUSSION

The regression results for models (1) and (2) are displayed in Table 2. The model's overall fit of 0.264 and 0.262, respectively, shows that the independent variables chosen for this investigation have a high explanatory capacity. The F-values of 128.7484 and 126.8638, respectively, which are significant at the 1% level, show that the model overall fits the data well.

As can be seen from the regression results in column (1) for two-way fixed industry and year, Control command type positively affects ln EID, and this effect is significant at the 10% level. This result is consistent with the findings of Freedman and Patten (2004) and Frost (2007), which suggest that command-and-control environmental regulatory tools can promote the quality of EID by corporate. It is evident that the strength of local law enforcement and regulatory frameworks has a significant effect on improving the quality of EID by companies, with local regulations playing a positive role in guiding corporate to engage in such behavior. The effect of local law enforcement and regulatory frameworks on the improvement of EID quality by companies has two main aspects of influence. On the one hand, as local governments strengthen their environmental regulatory efforts, corporate' enthusiasm for EID will also increase to meet regulatory requirements, avoid punishment, and reduce public pressure. On the other hand, the development and implementation of local laws and regulations help to clarify the obligations and responsibilities of companies in terms of EID, prompting them to improve the standardization and transparency of EID. Therefore, the government's mandatory force and standardization play an important role in promoting the improvement of the quality of EID by corporate.

The regression results in column (2) with a two-way fixed industry and year show that Market Incentive Type has a negative and significant effect on ln EID, indicating that it has a suppressing effect on the level of corporate environmental information disclosure quality. This result is contrary to our hypothesis. However, this finding is

consistent with the research of Huang (2021), who suggests that market-based environmental regulatory tools are negatively correlated with the quality of corporate environmental information disclosure at a significant level of 1%. This may be because an increase in government environmental investment could lead to a decrease in corporate environmental costs, thereby reducing the motivation for voluntary environmental information disclosure by companies. In addition, an increase in government environmental investment could also lead to an increased reliance by companies on government environmental policies, thereby reducing their autonomy and sense of responsibility. Therefore, when making environmental investments, the government needs to strengthen its guidance and supervision of corporate environmental awareness while also encouraging companies to take independent environmental actions and improve their sense of responsibility and willingness to disclose environmental information.

The regression results in column (3) with a two-way fixed industry and year indicate that Public Participation Type has a significant positive effect on lnEID at the 1% level. This suggests that Public Participation has a significant positive effect on the quality of corporate environmental information disclosure. This result is consistent with the findings of Liu (2011) and Chen and Feng (2007), which suggest that emphasizing public participation can gradually improve the level of environmental information disclosure by Chinese enterprises. This may be due to the increased attention and participation of citizens in environmental issues, which leads to higher social pressure and responsibility for companies in environmental protection, thus increasing their emphasis on environmental information disclosure. In addition, citizen proposals can reflect the public's level of concern and demand for corporate environmental issues. Through government supervision and guidance, companies are encouraged to strengthen their environmental information disclosure, improve the quality and transparency of information disclosure, and enhance public trust and recognition. Therefore, the promoting effect of citizen proposals on corporate environmental information disclosure cannot be ignored.

The regression results from column (4) for two-way fixed industry and year show that Voluntary action-oriented Type positively affects in EID, and this effect is significant at the 1% level. This result is consistent with Liu (2011) research, which suggests that encouraging voluntary disclosure can gradually improve the level of environmental information disclosure by Chinese companies. Voluntary action-oriented behavior by a company can promote the quality of environmental information disclosure. This may be because when a company voluntarily certifies its products for environmental protection, it indicates that the company's decision-makers have gradually formed an awareness and concept of environmental reform, and the company's development model is gradually shifting towards a more environmentally friendly and sustainable direction. This shift may prompt the company to pay more attention to environmental information disclosure, enabling the public to better understand the company's environmental measures and achievements and increasing the public's trust and approval of the company. At the same time, companies may also expect to obtain government and market recognition and support through environmental certification and other means, further promoting environmental reform and sustainable development. Therefore, environmental certification can be regarded as an important part of a company's fulfilment of environmental responsibility and is also a necessary path for its development.

5. CONCLUSION AND RECOMMENDATIONS

Among A-share-listed businesses on the Shenzhen and Shanghai stock markets in China, this study examined the relationship between environmental regulatory tools and the standard of corporate environmental information disclosure between 2007 and 2018.

Based on preliminary test results, in order to eliminate the potential unobserved factors during the sample period, we used a model with fixed effects for both year and industry and employed the ordinary least square (OLS) regression analysis method for statistical analysis. This study found that the Control command type, the Public Participation Type, and the Voluntary action-oriented Type have a positive and significant effect on the quality of

corporate environmental information disclosure. The Market Incentive Type has a negative and significant effect on the quality of corporate environmental information disclosure.

The results of this study provide some policy implications and recommendations.

Optimizing the application of command-and-control environmental regulation tools. This tool can encourage companies to strengthen environmental governance through the government's mandatory requirements. However, overly strict measures should be avoided to avoid excessive economic burden and unnecessary pressure on companies. At the same time, regulatory efforts should be strengthened to ensure that companies fulfill their environmental responsibilities as required.

Promote the use of market-incentive-based environmental regulation tools. This type of tool can encourage companies to adopt environmentally friendly behavior and achieve environmental governance goals by providing economic rewards or benefits. For example, the government can provide tax breaks or subsidies for environmental investments or support the procurement of environmentally friendly products to encourage companies to strengthen environmental investments and technological innovation, thereby improving the quality of environmental information disclosure. This approach can not only reduce the environmental governance costs of companies but also increase their sense of environmental responsibility. At the same time, it can also encourage companies to disclose environmental information and achieve a virtuous circle of environmental governance.

Strengthen the application of public participation-oriented environmental regulatory tools to promote corporate environmental information disclosure. Public participation can encourage companies to fulfill their environmental responsibilities through monitoring mechanisms and information transparency. To inform the public about businesses' environmental conditions and to promote public involvement in environmental debates and decision-making, the government may provide environmental data about them. The objective of environmental governance is attained by using these techniques to raise corporate environmental awareness and the standard of EID.

Create thorough policies for the disclosure of environmental information, then put them into action. To guarantee the thoroughness, accuracy, and timeliness of environmental information disclosure, this entails defining the scope, target audience, content, method, and frequency of disclosure. Simultaneously, businesses should prioritize and constantly enhance the quality of environmental information disclosure. The content and accuracy of disclosures enhance public trust in the company. As part of their social responsibility, companies should also take effective measures to ensure the security and confidentiality of environmental information.

However, some limitations of this study should be noted.

First, this study specifically focuses on the impact of using environmental regulation tools on the quality of corporate environmental information disclosure without considering the intensity of environmental regulation. Second, this article does not consider the interactive effects of using different environmental regulation tools.

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