

# Study on Relevance of Environmental Information Disclosure and Corporate Performance: an empirical study in heavy pollution industry

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**Abstract.** This paper selects 211 listed companies in the heavily polluting industry of A shares of the Shanghai Stock Exchange from 2014 to 2016 as examples, and empirically explores the relationship between environmental disclosure and corporate performance. As the disclosure of environmental information is closely related to the degree of marketization of its external environment, the level of marketization in various regions of China is significantly different. Therefore, this paper introduces the level of marketization as a moderator variable, and further discusses the impact of market-level differences on corporate environmental disclosure and corporate performance. The study found that: The level of environmental information disclosure in heavily polluting industries is positively related to corporate performance. In areas with a high level of marketization, the level of environmental information disclosure has a more positive effect on corporate performance.

## 1. Introduction

The 19th National Party Congress put forward the goal of building a prosperous, strong, democratic, civilized, harmonious and beautiful socialist modernized nation for the first time, and pointed out the principle of building a beautiful China. According to this, we can know that protecting the ecological environment has become quite urgent. To fight well in the fight against environmental protection, the responsibility of the company is significant, because the enterprise is the largest body of social production, the core of economic development, but also the main source of environmental pollution. The attention of all sectors of the society to corporate environmental information is increasing day by day, but the level of disclosure of corporate environmental information is low and it is no longer able to satisfy the needs of stakeholders.

The goal of the company is to pursue the maximization of interest. Whether or not an enterprise is willing to disclose environmental information is closely related to whether the disclosure of environmental information can improve corporate performance. In addition, the level of marketization in different regions of China is different. Companies will choose the corresponding information disclosure behavior according to the characteristics of the market they are in, which will in turn influence the decisions of stakeholders and ultimately affect corporate performance. This article takes a sample of listed companies in the heavily polluting industry in the A stock market of the Shanghai Stock Exchange as a sample to study the relationship between environmental information disclosure and corporate performance. On this basis, consider China's special economic background, join the marketization level as a moderator variable, and test the impact of marketization on the relationship between environmental information disclosure and corporate performance.

## **2. Research hypotheses**

### **2.1 Research hypothesis on the relationship between environmental information and corporate performance**

According to the theory of sustainable development, only by taking into account economic development and environmental protection can companies achieve the sustainable development of enterprises and the entire society. According to signal transmission theory and stakeholder theory, the improvement of information disclosure can effectively reduce the information asymmetry between enterprises and stakeholders and increase investors' trust. Enterprises actively adopt environmental protection measures and disclose environmental information, intending to convey a good corporate image with social responsibility to the society. This will lead to increased consumer buying behavior, increase the market competitiveness and market share of enterprises, and gain more competitive power than competitors in the same industry. The specific performance will be the increase in sales revenue and diversification of financing channels. The ultimate result is that enterprises increased performance.

Based on the above analysis, this paper proposes the first research hypothesis:

H1: Environmental information disclosure is positively related to corporate performance.

### **2.2 Research hypothesis of marketization level as a moderator variable**

China is a country with unbalanced level of marketization. The different levels of marketization also have different effects on corporate environmental information disclosure. In regions with higher levels of marketization, there is less government intervention and market competition is relatively fair. Enterprises will rely more on disclosure of more environmental information to improve their image, increase consumer purchasing behavior, and improve corporate performance. In addition, in regions with higher levels of marketization, the degree of legalization is usually relatively high. To avoid punitive punishment, companies usually actively protect the environment and publicly disclose environmental protection information, occupying a larger market share in order to improve corporate performance. In areas with low level of marketization, due to factors such as government protection, the enthusiasm for corporate environmental information disclosure will decline, making the information asymmetry between stakeholders and enterprises more serious, thus reducing consumer purchasing behavior and reducing corporate performance.

Based on the above analysis, this paper proposes the second research hypothesis:

H2: In regions with high levels of marketization, the positive correlation between environmental disclosure and corporate performance is even more significant.

## **3. Study design**

### **3.1 Sample selection and data sources**

This article selects listed companies in the A stocks heavy pollution industry of the Shanghai Stock Exchange as samples. The sample observation period is from 2014 to 2016. After eliminating ST, \*ST, and incomplete data companies, 211 companies have been identified, 633 in total sample. The financial data required for the research mainly comes from the CSMAR database. The environmental information disclosure data comes from the annual reports of listed companies, social responsibility reports and independent environmental reports. All of them are manually collected and scored for each project according to certain standards. The level of marketization is measured by the data in the 'China Marketization Index' compiled by Fan Gang et al. The data processing of this paper uses software such as spss17.0 and Excel2003.

### **3.2 Selection and measurement of the major variables**

This paper uses ROE as the substitution variable for corporate performance, takes the corporate performance as the explained variable, the environmental information disclosure as the explanatory

variable and the production level as the moderator variable. Through the multiple linear regression analysis, the two hypotheses proposed in this paper are tested. Specific variables indicators and measurement methods are shown in Table 1:

Table 1. Selection and measurement of the major variables.

Variable types	Variable name	Symbol	Measurement
explained variable	corporate performance	ROE	net profit/ average balance of shareholders' equity
explanatory variable	environmental information disclosure score	EDI	the sum of the scores
moderator variable	marketization	INDEX	the company in Shanghai, Jiangsu, Zhejiang, and Guangdong assign the value 1, otherwise assign 0
control variable	company size	SIZE	natural log of total assets
	asset-liability ratio	LEV	total liabilities/total assets
	ownership concentration	GR	the sum of the proportion of shares held by the top five largest shareholders
	proportion of independent directors	INDRATIO	the number of independent directors/the umber total of directors
	chairman and experience served by the same person	TDU	chairman and experience served by the same person assign the value 1, otherwise assign 0
	listed years	AGE	the number of years since the firm's listed

### 3.3 Regression models

In older to examine the impact of environmental information disclosure on corporate performance, this paper verifies hypothesis 1 by establishing the following model:

$$ROE_{i,t} = \beta_0 + \beta_1 EDI_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_5 CR_{i,t} + \beta_6 INDRATIO_{i,t} + \beta_7 TDU_{i,t} + \beta_8 AGE_{i,t} + \omega \quad (1)$$

In order to test the impact of marketization on the relationship between environmental information disclosure and corporate performance, this paper validates Hypothesis 2 by establishing the following model:

$$ROE_{i,t} = \alpha_0 + \alpha_1 EDI_{i,t} + \alpha_2 EDI_{i,t} * INDEX_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 CR_{i,t} + \alpha_6 INDRATIO_{i,t} + \alpha_7 TDU_{i,t} + \alpha_8 AGE_{i,t} + \varepsilon \quad (2)$$

In the model,  $\beta_0$  and  $\alpha_0$  are constant terms,  $\omega$  and  $\varepsilon$  are residual terms.

## 4. Empirical test and result analysis

### 4.1 Descriptive statistical analysis

The specific situation of EDI level in 2014-2016 is shown in Table 2:

Table 2. The level of EID from 2014 to 2016.

YEAR	Maximum	Minimum	Median	Mean	Std. Deviation
2014	0.875	0.000	0.313	0.297	0.206
2015	0.875	0.000	0.313	0.300	0.210
2016	0.875	0.000	0.313	0.344	0.212

From Table 2, it can be seen that the mean value of EDI between 2014 and 2016 was 0.297, 0.300, and 0.344, respectively, indicating that the environmental protection awareness of enterprises in heavy polluting industries has gradually increased, and environmental issues have become more and more important, but the overall level is not high and needs further strengthening. Compared with

2015, the average value of EDI for sample companies increased by 0.044 in 2016, which may be related to the introduction of multi-directional environmental protection policies in 2016. There are great disparities between the maximum and minimum values in the sample interval each year, indicating that the EDI levels of the sample companies vary greatly and have not been reduced. The minimum value within three years is 0.000, indicating that some enterprises with heavy pollution have not disclosed environmental information and have not assumed environmental responsibility.

## 4.2 Regression analysis

Regression analysis of EID and corporate performance are shown in Table 3:

Table 3. Regression analysis of EID and corporate performance.

Variable name	Model I	Model II
Constan	-0.346*** (-2.628)	-0.356*** (-2.712)
EDI	0.101*** (3.351)	0.067** (2.029)
EDI*INDEX	- -	0.078** (2.407)
SIZE	0.024*** (4.156)	0.024*** (4.209)
LEV	-0.291*** (-9.461)	-0.274*** (-8.691)
CR	0.047 (1.071)	0.028 (0.626)
INDRATIO	-0.265** (-2.135)	-0.237* (-1.905)
TDU	0.007* (0.473)	0.002 (0.116)
AGE	0.002* (1.241)	0.001 (1.113)
N	633	633
Adjust-R <sup>2</sup>	0.163	0.169
F	18.555***	17.084***

Note: the data in the table are the regression coefficients of the respective variables, and the values in parentheses are T values, \*\*\*, \*\*, and \* are respectively significant in 1%, 5%, and 10% statistical significance.

The F values of the models in Table 5 are all significantly above 1%, and the Adjusted-R<sup>2</sup> of the models are all above 0.16, indicating that the test models have a good fitting effect and a high degree of interpretation of the regression results.

The result of Model I shows that there is a significant positive correlation between EDI and ROE at the 1% level, indicating that the higher the level of environmental information disclosure, the better the corporate performance. At the same time, there is a significant positive correlation between SIZE and ROE at the 1% level of significance, indicating that the larger the company's asset size, the better its corporate performance, and the scale effect of the firm is well applied. There is a significant negative correlation between LEV and ROE at the 1% level of significance, indicating that the higher the company's debt, the more unfavorable the improvement of corporate performance. Companies should control their debt ratios and rationally use financial leverage. In addition, the control variables INDRATIO, TDU, AGE are all significantly related to ROE. Thus, hypothesis 1 is verified.

The results of Model II show that EDI and ROE are significantly positively correlated at the 5% level, and the coefficient of the interaction item EDI\*INDEX is 0.078, which is significant at the level of 5%, indicating that the relationship between environmental disclosure and corporate performance is related to marketization level. There is a regulating effect. SIZE is significantly positively correlated with ROE, and LEV, INDRATIO are significantly negatively correlated with ROE. From this, hypothesis 2 is verified.

## 5. Conclusion

This paper selects the listed company of the A stock heavy pollution industry of the Shanghai Stock Exchange from 2014 to 2016 as a sample. From the perspective of different levels of marketization of the company external environment, this paper deeply discusses the special relationship between environmental information disclosure and corporate performance at different levels of marketization. The empirical results show that: 1 The level of disclosure of environmental information in companies with heavy pollution is positively correlated with corporate performance; 2 In areas with higher levels of marketization, the positive impact of environmental information disclosure on firm performance is more significant.

Based on the above conclusions, this paper puts forward the following recommendations: (1) The government should strengthen the legal construction and supervision, enhance the effectiveness of marketization and the level of marketization in economically backward regions, and provide a sound and developed market environment for corporate environmental information disclosure, making environmental information disclosure plays a positive role in improving corporate performance. (2) Enterprises should actively disclose environmental information, earnestly strengthen environmental protection management, adhere to the path of sustainable development, and achieve a win-win result of environmental protection and corporate performance.

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