Can China's Capital Markets Eliminate the "Functional Lock-in" Effect of Corporate Environmental Information Disclosure?

Haiyan Li

642419016@qq.com

Lyceum of the Philippines University Manila, Manila ,Philippines

Abstract.In this paper, the relationship between the level of environmental information disclosure and corporate value is empirically analyzed by taking A-share listed companies with heavy pollution in China from 2011-2019. It further divides environmental information disclosure into qualitative disclosure and quantitative disclosure to explore the impact of information disclosure on corporate value. The study shows that environmental information disclosure is beneficial to enhance enterprise value; further study finds that quantitative disclosure of environmental management inputs is negatively related to enterprise value, quantitative disclosure of environmental management inputs may have a "functional lock-in" effect, and quantitative disclosure of environmental economic benefits can alleviate the "functional lock-in" effect of quantitative disclosure of environmental management inputs to a certain extent. Quantitative disclosure of environmental economic benefits can, to a certain extent, alleviate the "functional lock-in" problem of quantitative disclosure of environmental management inputs. This has theoretical and practical implications for promoting the green development of enterprises.

Keywords: environmental information disclosure; Enterprise value; Quantitative disclosure

1 Introduction

Global environmental problems are becoming more and more serious, and stakeholders such as the government and the public are paying more and more attention to corporate environmental responsibility, and corporate environmental social responsibility has also received a lot of attention from many scholars in China, most of whom generally believe that environmental information disclosure can stimulate corporate environmental pollution management and achieve green and sustainable development. In order to effectively improve the environmental pollution problem, starting from laws and regulations, the Chinese government has implemented a series of environmental regulations for enterprises. 2007 began the introduction of institutional regulations on the environment in China ; in 2015, the Environmental Law of the People's Republic of China was officially implemented, after which the State Council issued successive documents such as "Opinions on Accelerating the Construction of Ecological Civilization" and "Overall Plan for the Reform of Ecological Civilization System", which required establish a sound environmental information disclosure mechanism. It can be seen that improving the environmental information disclosure system has been widely valued by the

ICEMBDA 2023, October 27-29, Tianjin, People's Republic of China

DOI 10.4108/eai.27-10-2023.2341950

government and the public, and has become an important part of the institutional system for protecting the environment.

However, the effectiveness of corporate environmental information disclosure in stimulating corporate environmental pollution management is still in doubt. For example, China currently mandates heavy polluters to disclose environmental information, but the disclosed environmental information contains more qualitative disclosures and less quantitative and substantive disclosures. In particular, there are still many environmental pollution incidents in China, which leads to some thoughts in this paper: Is the disclosure of environmental information by Chinese enterprises useful in motivating them to control environmental pollution? If it is useful, then why do companies negatively respond to the role of corporate environmental information disclosure? What measures should be taken by the government, enterprises and the public to better utilize the role of environmental information disclosure?

In order to respond to these thoughts, based on legitimacy theory, stakeholder theory, information transfer theory and natural resource perspective theory, this paper selects qualitative disclosure and quantitative disclosure as variables to explore the relationship between environmental information disclosure and corporate value from the content of corporate environmental information disclosure, in an attempt to find the market and institutional reasons that affect the motivation of corporate environmental governance and provide actionable This paper first examines the relationship between environmental information disclosure and corporate value. This paper firstly examines the relationship between corporate value, qualitative disclosure and quantitative disclosure, and finds that quantitative disclosure has a "functional lock-in" effect; secondly, we divide quantitative disclosure into quantitative disclosure of environmental management inputs and quantitative disclosure of environmental economic benefits, and investigate the relationship between quantitative disclosure and corporate value. We found that quantitative disclosure of environmental economic benefits is conducive to weakening the "functional lock-in" effect. Thus, this paper uses large sample data to explore the empirical relationship between environmental information disclosure and enterprise value from the perspective of environmental information disclosure content, which is conducive to analyzing the environmental information and environmental information disclosure behavior of enterprises and the government's formulation of more perfect regulatory measures.

2 Research Hypothesis and Research Design

2.1 Research Hypothesis

Legitimacy theory strongly argues that government environmental regulation improves economic performance in a symbiotic relationship of efficiency production, and innovation incentives (Le, 2022 [1]). External pressures such as environmental regulations, environmental concerns from stakeholders and environmental concerns from online media have led to the formation of an institutional norm for companies to publish their social responsibility, and failure to comply with environmental regulations will bring penalties (Balon et al., 2022 [2]) . And environmental information disclosure has become an important component of corporate compliance with legality, and companies use environmental information disclosure to manage legality and improve the level of corporate legality . (Chen et al, 2018[3]).

The natural resource base view sees heterogeneity in corporate resources, and those companies that develop resources to support environmental awareness are likely to gain a competitive advantage and develop a good image within their industry. The benefits of intangible resources (corporate reputation, technology patents, and human resources) are brought to firms through environmental disclosure.（Ji et al.2019[4]）

This leads to the first hypothesis:

H1: Corporate environmental information disclosure has a positive relationship with corporate value;

Information economics advocates the reduction of information asymmetry by expanding the content of information disclosure, and the reduction of information asymmetry by expanding the content of information disclosure is under the premise that markets are efficient. Efficient markets were first proposed by Fama in 1970, who argued that in an efficient market, the prices of securities at any point in time correctly reflect what has happened in the market and what the market predicts will happen in the future, i.e., the prices of securities adequately reflect all available information. Both suppliers and demanders of information in an efficient market are able to view information rationally, and it is then that the content of information can be expanded to reduce asymmetry.

The Chinese government has now introduced policies to compel heavy polluters to disclose social responsibility reports and environmental information, but companies still have a greater choice about how to disclose and what to disclose specifically. As a result, although the proportion of environmental information disclosed by enterprises is increasing, it has not achieved the expected effect. This leads us to expect that the current capital market in China is not a fully effective market, and that investors have a functional lock on environmental information disclosure of environmental input data in environmental disclosure reports, focusing too much on whether brief qualitative disclosures have been made and thus ignoring the possible benefits of quantitative environmental inputs.

Thus, the second hypothesis is proposed:

H2: Quantitative disclosure is negatively correlated with enterprise value, there is a "functional lock-in effect" of quantitative disclosure in the chinese capital market, and there is a negative correlation between corporate environmental investment and corporate value;

Economic informatics argues that an effective way to address information incompleteness and asymmetry under imperfectly efficient capital markets is to increase the transparency of information and expand information disclosure as much as possible. For the functional lock-in effect, Hand argues that institutional investors have the scale effect of searching for information, coupled with the ability to use asset portfolios to mitigate risk, and therefore can reduce the functional lock-in effect. (Hand, 1990 [5])

The natural resource base view of business adheres to the view that the environment is a resource and requires companies to improve their corporate social responsibility, use corporate resources to gain competitive advantage, comply with external legitimacy and enhance their reputation. Numerous studies have shown that the implementation of environmental investments can improve resource utilization, save production costs, generate environmental benefits (Arfara, 2020 [6]), and improve financial performance such as return on investment and corporate market

value（Charlene，2008[7]）. Thus, although the implementation of environmental inputs will increase the production cost of the company in the short term, in the long term it will lead to an increase in productivity and environmental benefits, thus increasing the value of the company.This leads to the third hypothesis:

H3: Quantitative earnings disclosure can somewhat ameliorate the phenomenon of "functional lock-in" based on environmental governance inputs.

2.2 Research Design

2.2.1.Variable design

(1) Explained variables

Enterprise value variable design (TOBQit). In this paper, based on the research ideas of Charlene Sinkin et al. to verify the relationship between variables such as the efficiency of corporate environmental investment and corporate value, Tobin Q is used as a proxy variable for corporate value.

(2) Explanatory variables

For the explanatory variables, In this paper, the research method in the impact of environmental accounting information disclosure on corporate value, mainly adopts the content analysis method to analyze CSR reports.

(3) Other variables

The selected control variables include corporate capital structure (LEV), R&D expenditure intensity (RD), advertising expenditure intensity (ADV) non-recurring profit or loss per share (EXPRO), and growth rate of operating profit (GROTH).

The variable names, symbols and definitions selected in this paper are shown in Table 1.

Table 1 Variable design

Variable name		Variable definition
Explained variable		
Tobin's Q	TOBit	Tobin's Q value = (market value of tradable shares at the end of t + value of non-tradable shares + book value of liabilities)/total assets at the end of t; Value of non-tradable shares = net asset value per share at year-end x number of non-tradable shares at the end of period
Explanatory variable		
Environmental information disclosure	Dis	1 for environmental information disclosure and 0 for non-disclosure
environment quantitative disclosure	Dis_QN	Quantitative disclosure of environmental information is 1, and non-disclosure is 0

environment quantitative disclosure of inputs	EDit_QI	The input information of quantitative disclosure is 1, and that of non-disclosure is 0
environment quantitative disclosure of earnings	EDit_QE	Quantitative disclosure of income information is 1, and non-disclosure is 0
Other variables		
Earnings per share	EPSit	Net profit t/total number of shares at the end of period t
Net asset value per share	BVit	t ending owners' equity over t ending total number of shares in the business
Enterprise capital structure	LEVit	t ending long-term liabilities /t ending owners' equity
R&d expense intensity	RDit	t period enterprise research and development expenses /t period operating income
Advertising cost intensity	ADVit	t period enterprise advertising expenses /t period operating income
Operating profit growth rate	GROTHit	(Operating profit of T-period enterprise - operating profit of previous period enterprise)/ Operating profit of the previous period

2.2.2. Model design

In order to verify the relationship between the environmental benefits of enterprise environmental governance and enterprise value, basic model 1 is selected in this paper：

$$TOB_{it=}=\alpha_0+\alpha_1 BV_{it}+\alpha_2 EPS_{it}+\beta DIS+\varepsilon \quad (1)$$

In order to verify the relationship between quantitative and qualitative disclosure of enterprise environment and enterprise value, basic model 2 is used in this paper:

$$TOB_{it=}=\alpha_0+\alpha_1 BV_{it}+\alpha_2 EPS_{it}+\beta_1 DIS_{it\_QN}+\varepsilon \quad (2)$$

In order to verify the relationship between enterprise disclosure of environmental governance input and benefit and enterprise value, this paper uses the basic model 3:

$$TOB_{it=}=\alpha_0+\alpha_1 BV_{it}+\alpha_2 EPS_{it}+\beta_2 ED_{it\_QI}+\beta_3 ED_{it\_QE}+\beta_4 ED_{it\_QI}\times(ED_{it\_QE})+\varepsilon \quad (3)$$

2.2.3. Sample selection and data sources

(1) Sample selection

The sample selection is limited to Chinese listed companies in Shanghai and Shenzhen, and the industry selection is defined as the sixteen types of heavily polluting industries listed in the Guide to Environmental Information Disclosure for Listed Companies. The production and operation data from 2012 to 2020 were selected for the study, and the ST and * ST listed companies and samples with missing values and abnormal financial indicators were excluded, and finally 522 valid sample observations were obtained.

(2)Data sources

Research scholars often use content analysis (Bowman, Haire, 1975; Abbott, Monsen, 1979 , Tian L H, Wang K D.) [8][9] anto obtain the above data. Here, the content analysis method was

used to classify and organize the relevant data. The data on corporate social responsibility reports were collected manually through the Juchao Consulting website, and the data on corporate environmental inputs and corporate environmental benefits were obtained from the environmental disclosure section of CSR reports; the rest of the data required for model testing were obtained from the wind database.

3 Statistical analysis

3.1 Descriptive analysis

it can be seen through Table 2 that the mean value of Tobin's Q in the explanatory variables is 0.975, with a large standard deviation and a large difference in the enterprise value of companies in different industries. Disclosure (DIS) is 0.97, which indicates that disclose a larger amount. it shows that although not many enterprises are currently disclosing the input and output in quantitative disclosure, many enterprises are beginning to pay attention to the quantitative input and output data generated in environmental information disclosure. The results of descriptive statistical analysis are shown in Table 2.

Table 2 Descriptive statistics

Variables	N	AV	SD	25%	50%	75%	Minimal value	Maximum value
TOB	522	0.975	0.433	0.743	0.862	1.083	0.199	4.288
DIS	522	0.97	0.162	1	1	1	0	1
Dis_QN	522	0.59	0.492	0	1	1	0	1
ED_QI	522	0.35	0.477	0	0	1	0	1
ED_QE	522	0.32	0.468	0	0	1	0	1
ED_QI* ED_QE	522	0.18	0.383	0	0	0	0	1
BV	522	4.751	2.617	2.67	4.43	6.218	0.067	16.31
EPS	522	0.456	0.751	0.082	0.3	0.75	-2.567	4.09
EXPRO	522	0.083	0.218	0.0085	0.0295	0.088	-1.146	2.065
GROTH	522	-246.76	4924.8	-28.777	15.088	95.232	-110182	3166.3
RD	522	2.05	1.776	0.3175	1.94	3.2625	0	11.08
ADV	522	3.243	4.825	0.884	2.2917	3.692	0	44.806
LEV	522	1.669	2.848	0.7	1.208	2.196	-31.74	19.944

3.2 Correlation analysis

From Table 3, it can be found that Tobin's Q (TOB) has a significant positive relationship with corporate environmental information disclosure, indicating that disclosure of environmental information can significantly increase corporate value. But capital market does not fully recognize the role of quantitative environmental disclosure, and there is a "functional lock-in effect" in the capital market . The correlation analysis results are shown in Table 3.

Table 3 Correlation coefficient analysis

Variables	*TOB*	*DIS*	DIS_{QN}	$EDit_{QI}$	$EDit_{QE}$	*EDit_QI×(EDit_QE)*	*BV*	*EPS*	*EXPRO*	*GROTH*	*RD*	*ADV*	*LEV*
TOB	1												
DIS	.143**	1											
DIS_{QN}	-.154**	.177**	1										
EDi_{QI}	-0.191**	.121**	.466**	1									
$Edit_{QE}$	0.009	.114**	.436**	.296**	1								
EDit_QI×EDit_EI	-.133**	.077	.314**	.636**	.676**	1							
BV	-.127**	.004	-.105*	.027	-.044	-.026	1						
EPS	.024	-.037	-.067	-.056	0.016	0.013	.624**	1					
EXPRO	.073	.023	-.057	-.013	-0.066	-0.026	.208**	.182*	1				
GROTH	-0.001	-.015	.033	.017	0.032	0.019	0.068	.156**	0.21	1			
RD	.277**	.081	-.18**	-.134*	-.042	-.021	.116**	.113*	-0.018	0.011	1		
ADV	.329**	.057	-.11**	-.08	0.116**	0.013	.118**	0.08	0.17**	-0.005	.270**	1	
LEV	-0.069	-.128**	.092*	.097*	0.086	0.082	-.176**	-.272**	0.042	-.059	-.180**	-0.085	1

Note: ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively (two-tailed).

3.3 Multiple regression analysis

From Table 4, we can see that corporate environmental information disclosure has a positive relationship with Tobin's Q, and quantitative disclosure has a negative relationship with Tobin's Q. Quantitative inputs and quantitative earnings in corporate environmental information disclosure have a correlation with Tobin's Q. Quantitative inputs and corporate value have a negative correlation, and the cross-products are negative, which verifies the hypothesis of Model 3. The results of linear regression are shown in Table 4.

Table 4 Multiple statistical regression

	Enterprise Value	
Variables	**B**	**T**
BV	-0.42**	-4.791
EPS	0.99**	3.248
DIS	0.493**	4.399
DIS_{QN}	-.187**	-4.056
EDit_QI	-0.037	-0.653

EDit_EI	0.207**	3.478
Interchange items	-0.242	-2.879
Constant term	0.750*	6.611
N	522	
Adjusting R2	0.122	

Note: ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively (two-tailed).

3.4 Robustness test

Replacing the corporate value proxy variable, the direction of the relationship between corporate environmental information disclosure and corporate value changes, and the direction of the impact of the relationship between corporate quantitative environmental information disclosure, environmental inputs and benefits and corporate value remains the same, but the correlation between environmental information disclosure, quantitative environmental information disclosure and corporate value changes from significant to insignificant, which indicates that there is indeed variable dependence in the findings of the relationship between environmental governance and corporate value. The robustness test is shown in Table 5.

Table 5 Robustness test

Variables	**ROA**
BV	0.403**
T	(-6.738)
EPS	0.835**
T	-32.245
DIS	-0.002
T	-1.569
DISit_QN	-0.06
T	(--1.346)
EDit_QI	-0.03
T	-1.874
EDit_QE	0
T	-0.199
EDit_QI×（EDit_EB）	-0.002
T	(-1.357)
Constant term	0.016
T	-1.752
N	522
Adjusting R2	0.72

Note: ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively (two-tailed).

4 Conclusions of the study

This paper, after theoretical and empirical tests, concludes the following:

The Chinese capital market does not properly recognize environmental management inputs as an external cause of corporate environmental management. Enterprises cannot simply consider environmental governance investment as a waste of corporate resources; in the long run, it can help them improve environmental quality and also be an effective asset to increase corporate value. However, the current test has obtained the conclusion that corporate environmental management inputs show a significant negative correlation with corporate value, indicating that the current stakeholders in China have not formed the right awareness of environmental management inputs to enhance value. Therefore, it is necessary to make the investment in environmental management bring environmental benefits through more reasonable accounting methods and government subsidies, so as to motivate enterprises to invest more in environmental pollution control and serve to enhance enterprise value.

Therefore, the role of the government, the public, and the capital market should be given full play. First, government agencies should effectively play a guiding and supervisory role by increasing support in terms of policies and government subsidies for companies that are active in environmental management, such as reducing the environmental tax burden, strengthening environmental incentives, and increasing government procurement. At the same time, it should establish corresponding rules and regulations to stipulate that the environmental responsibility part of enterprises should disclose the economic benefits achieved in addition to the environmental protection investment, such as obtaining government incentives, cost savings, energy consumption savings, etc., so that everyone can actually see the economic benefits generated by environmental investment, actively support their economic development, reduce environmental problems disputes, and reduce the social costs of enterprises. Secondly, we should make use of the opportunity to strengthen the public's recognition of environmental management, so that they can fully recognize the brand premium effect of environmental investment and promote the gradual expansion of the market for environmental products. Finally, we can increase the capital market's restraint and guidance on environmental governance, and achieve the effect of lower financing costs and higher stock prices for companies with positive environmental governance.

References

[1] Le, T. T. (2022). How do corporate social responsibility and green innovation transform corporate green strategy into sustainable firm performance? *Journal of Cleaner Production*, *362*(May), 132228.

[2] Balon, V., Kottala, S. Y., & Reddy, K. S. (2022). Mandatory corporate social responsibility and firm performance in emerging economies: An institution-based view. *Sustainable Technology and Entrepreneurship*, *1*(3), 100023.

[3] Chen,Y., M.Hung, and Y Wang. (2018)The effect of Managemengt CSR Disclosure on firm profitability andsocial externalities ;evidence from china. journal of accounting and economics, 65: 169-190.

[4] Ji, H., Xu, G., Zhou, Y., Miao, Z.（2019）. The impact of corporate social responsibility on firms' innovation in China: the role of institutional support. Sustainability 11, 6369.
[5] John R.M.Hand,(1990)A Test of Extended Functional Fixation Hypothesis. The accounting review,65(4):740-763.
[6] Arfara, C., Samanta, I.（2020）. The impact of green strategy on organisations' relational capital. Manage Business. Res. Quarterly. 15, 29–42.
[7] Charlene sinkin.(2008)Eco-efficiency and firm value.*Journal of Accounting and Public Policy*, 27:167-176.
[8] Bowman,E.H.&Haire,M.A(1975) Strategic Posture toward Corporate Social Responsibility.*California Management Review*,18(2):58-69.
[9] Tian L H, Wang K D. (2017)The "mask effect" of social responsibility information disclosure and the crash risk of listed companies: The DID-PSM analysis from Chinese stock market. *Management World*,(11):146-157.