

# Impact of Environmental Information Disclosure on Corporate Debt Financing in China

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## Abstract

How to effectively curb corporate environmental pollution remains a challenge for all stakeholders. China is no exception. One way to force companies to reduce the impact of their operations on the environment is to link their loan funding capacity to the quality of environmental information disclosure; a device known as green credit mechanism. This paper empirically tests the correlation between the quality of enterprise environmental information disclosure and their debt financing ability. The sample consists of 351 listed companies in heavy polluting industries on the Shanghai Stock Market. Content analysis was used to quantitatively analyze the environmental information disclosed in these companies' social responsibility reports (or their environmental reports and sustainable development reports) for the period 2016-2018 and measure the environmental information disclosure level. Short-term loan, long-term, and total loan increments were used as explanatory variables to explore the correlation between the level of environmental information disclosure and debt financing. It was found that the level of environmental information disclosure among the companies sampled varies greatly and that there is a significant positive correlation between the level of environmental information disclosure of the sampled companies and their borrowing capability. Only 143 firms out of the 351 examined produced reports. The paper puts forward some suggestions to improve the level and quality of environmental information disclosure.

**Keywords:** Environmental Information Disclosure, Debt Financing, Polluting industries, Green Credit Policy

## 1. Introduction

Starting in the 18<sup>th</sup> century with the industrial revolution in England, large-scale machine-based production has since rapidly developed on the back of exponential scientific and technological achievements that have greatly improved labor productivity (Sorooshian & Panigrahi, 2020) and created wealth on a large scale (Nurdiana & Landing, 2021). These developments, however, have not taken place without costs to the environment. Indeed, by almost all accounts, the world is witnessing a continuous deterioration of the ecological environment due to the extensive mode of production and search for ever-faster economic growth that characterized today's economies (Aguas, 2019). While everybody is, to one degree or another, responsible for the deterioration of the environment and should be personally concerned, enterprises, it is believed, should bear the main responsibility for the current environmental problems (Aguas, 2019). More organizational accountability is needed.

One way to force companies to play a greater role in reducing the deterioration of the environment is to require them to disclose environmental information to their stakeholders (Cai & Xu, 2011). The goal is for them to publicly claim that they fulfill their responsibility in regard of environmental resources and can be trusted to engage in effective environmental management (Li et al., 2018). ). Of course, whether this is a valid claim or not depends in a large part on the efficacy of the environmental information disclosure system (Zhu & Li, 2017). There are several benefits associated with disclosing environmental information. One, as underlined by the signal transmission theory, is that enterprises which actively and comprehensively disclose environmental information are transmitting a positive image of actively fulfilling social responsibilities to the society and stakeholders (Low, 2016). Another, one directly related to this benefit, is that organizations with a positive image are more likely to increase their financing opportunities (Dong, 2018). In other words, Environmental information can affect a firm's borrowing capacity (Hu et al., 2018). Its ability to raise capital, either through equity financing or debt funding, will be facilitated, today more so than ever before, given the increasing pressure placed on banks by society not to finance projects seen as heavily contributing to climate change. Therefore, in order to attract the attention of external investors and garner more support in terms of external funds, companies will be eager to transmit positive signals to the outside world through environmental information disclosure.

This study focuses on environmental information disclosure in the context of China, where bank loans are the most important debt financing channel for companies. Of the two forms of debt funding, bond financing is mainly selected by the government and some large state-owned enterprises. The reasons loans remain the main financing method for most companies is that, compared with bond financing, loan funding is faster and more convenient. Whereas Chinese enterprises usually need to go through complex procedures, such as applying to the relevant regulatory agencies for approval, when issuing bonds, loan applications can be directly negotiated between the borrower and the lender, making the procedure much simpler and faster. Moreover, it has been shown that the cost advantage of bond financing of listed companies is not significant (Zhang, 2006) and in some cases can even be higher than the cost of loan funding (Li & Sun, 2013).

It should be noted first that the Chinese environmental information disclosure system is relatively recent and therefore still contains imperfections (Zhao, Zhang, & Zheng, 2015). It did not start until 2010, when the Ministry of environmental protection issued guidelines for environmental information disclosure of listed companies. Known as the Exposure Draft, it clearly stipulates when listed companies should publicly disclose environmental information and outline the method to publish information (Zhao 2015). Among other consequences, this means that many enterprises in China may still be providing low environmental protection due to weak environmental information disclosure requirements and/or enforcement. Another reason may be a lack of awareness of the benefits associated with thorough disclosure and a failure to have yet realized the significance of green financing for organizational development. At present, in spite of a large body of literature on environmental information disclosure, there are relatively few studies on the correlation between the quality of environmental information disclosure and corporate debt financing ability in the context of China (Hu & Ma, 2020). Scholars have yet to form a systematic theoretical analysis framework or reach unified conclusions on this issue in relation to Chinese firms.

Specifically, this paper seeks to test the impact of the level of environmental information disclosed by Chinese firms on their debt financing or, to put it another way, to explore the relationship between environmental information disclosure and debt funding (bonds and loans). The research hinges upon the following question: Do firms with a sound environmental performance enjoy greater financing capacity as a result? The sample consists of companies operating in heavy polluting industries and listed on the Shanghai Stock Market. It is important to note at this juncture that the choice of companies operating in industries highly pollutive is obviously no coincidence; of all the firms involved, they should be the most concerned as they are the main contributors to climate change. Using the content analysis method to quantitatively analyze the environmental information disclosed, the study looks at their corporate social responsibility reports (or environmental and sustainable development reports) during the period 2016-2018 and assesses their environmental information disclosure level and its correlation with their debt financing. The paper also puts forward some suggestions to improve the environmental information disclosure system both from a government and enterprise perspectives to achieve green and sustainable development.

## 2. Literature Review and Conceptual Framework

Before discussing specific relevant prior literature, it is necessary first to briefly consider the variables used in this paper, starting with the independent variables. The independent and control variables are then discussed.

### - *Dependent Variables*

*Long-Term and Short-Term Borrowing Debt* – Bank loan financing is a common form of debt funding for all kinds of enterprises (Pang, Yu, & Xu, 2020). Since the focus of the present study is on green credit, funding in this study mainly comes from banks. A standard measurement method for corporate debt financing capacity is the ratio of the total loan balance to the total assets at the beginning of the period (Ni, 2016). However, while this ratio reflects the financing ability of enterprises as a whole, from a debt-maturity perspective, it cannot clearly explain whether the long-term or short-term debt financing ability of a firm will be affected by the quality of its environmental information disclosure. Therefore, based on the debt maturity structure, this paper also selects the long-term loan balance to beginning total assets ratio to measure a firm's long-term loan financing ability. The ratio of the balance of short-term borrowings to the total assets at the beginning of the period ratio will be used to measure the financing ability of short-term borrowings.

### - *Independent Variable*

*Environmental Disclosure Information Score* – At present, there is no unified index system at home and abroad to measure the level of environmental information disclosure (Gao et al., 2013). Due to the late start of environmental information disclosure in China, there is no database for listed companies to publicly disclose environmental information, so it is necessary to manually collect and sort out environmental information disclosure information. Therefore, referring to the method used by Shu and Zhang (2014) in their study, the paper utilizes "content analysis" to analyze the reports publicly disclosed by enterprises, with the contents of the reports divided into hard disclosure items and soft disclosure items to determine the score of each item and sum them up to get the overall score. This score is used to measure the

environmental information level of enterprises.

#### - Control Variables

*Company Size* – Due to a robust flow of capital, large-scale listed companies generally have strong debt financing ability. In addition, since they are owned by the public to whom they are accountable, they are under stricter scrutiny and supervised by more government agencies and the public than private firms. As a result, they are more inclined to disclose environmental information and eager to establish a positive social image (Wu & Wang, 2016). In this paper, company size is expressed by the logarithm on the average total assets of the enterprise.

*Profitability* – Profitability is an important indicator to measure the financial situation of a firm. It is among other consequences the guarantee that an organization can repay its loans in full and on time. Unsurprisingly, Xiang and Chi (2020) determined that in China, banks are more inclined to provide preferential financing to enterprises with strong and sustained profitability as it substantially lowers the risk of default. In this paper, profitability is expressed by the rate of return on net assets.

*Financial Leverage* – As an investment strategy, leverage (borrowed capital) is used as a funding source when investing to expand a firm's asset and generate base returns on risk capital. Leverage thus refers to the amount of debt a firm uses to finance assets. If a firm is described as highly leveraged, the firm has more debt than equity. When the debt financing ratio of an organization is too high, its solvency is weak (Wang, Wang, & Su, 2019). Such conditions make it more likely that firms with a high level of debt will experience financial problems. In the event an enterprise goes bankrupt, the performance of the loans of the bank will be affected. Banks are therefore more cautious in lending to highly leveraged enterprises. Therefore, this paper uses the average asset liability ratio to represent financial leverage (Li, 2020).

*Operational Capacity* – The operational capacity of an enterprise reflects operational risk. The higher the operation and management level of the enterprise, the smaller the operation risk it faces and the better its operation performance (Cui & Ma, 2014). Therefore, when assessing credit risk, banks are more willing to provide financial support to firms with strong operational ability. This paper uses the total asset turnover rate to express the operational capacity of an enterprise (Sheng, Zhao, & Chen, 2020).

**Table 1:** Summary of Variables

	Name	Symbol	Definition
<b>Dependent Variables</b>	Total Borrowing Debt	$\Delta$ TBD	Increment of total lending debt in t+1 period divided by the total assets at the beginning of the period (Ni, 2016).
	Long-Term Borrowing Debt	$\Delta$ LBD	Increment of long-term borrowing debt in t+1 period divided by the total assets at the beginning of the period (total assets at the beginning of the period) (Ni, 2016).
	Short-Term Borrowing Debt	$\Delta$ SBD	Increment of short-term borrowing debt in t+1 period divided by the total assets at the beginning of the period (Ni, 2016)
<b>Independent Variable</b>	Environmental Disclosure Information Score	EDI	The sum of the total scores of environmental disclosure information (Shu & Zhang, 2014)

<b>Control Variables</b>	Company Size	SIZE	Natural logarithm of the average total assets of the year (Ni, 2016).
	Profitability	ROE	Corporate net profit for the year divided by average owner's equity in the current year (Wu & Wang, 2016).
	Financial Leverage	LEV	The average total liabilities of an enterprise divided by the average total assets in the current year (Li, 2020).
	Operational Capacity	Turnover	Operating income divided by the average total assets in the current year (Sheng, Zhao, & Chen, 2020).
	Term Structure of Assets	AT	Non-current assets divided by average total assets in current year (Liu, 2015).
	Net Profit Cash Flow	CFPS	Cash flow per share from operating activities divided by net profit (Liu, 2013; Li, 2019).

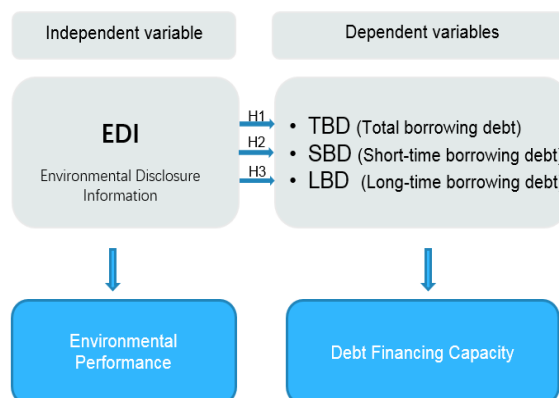
### - *Related Literature*

Zhu and Cai (2017) comprehensively analyzed the impact of environmental information disclosure on debt financing amount, debt financing term structure and debt financing cost in the context of Chinese green credit policy. Their findings indicate that the environmental information disclosure behavior of enterprises (i) improves the degree of information asymmetry between banks and enterprises, (ii) reduces the credit risk of banks, and (iii) therefore helps enterprises obtain more debt financing and long-term financing. The results are similar to those of Cheng (2019) and Zhang (2021). Sun and Wang (2020) studied the factors influencing the debt financing of enterprises. They found that difficulties obtaining corporate debt financing essentially are related to a lack of financing channels, insufficient bank credit support, imperfect guarantee mechanism, high debt financing costs, and unreasonably high proportion of debt financing. Their findings are consistent with those shown in the studies of He and Hou (2010), LIGO (2010), and Li and Bin (2012).

Hu and Ma (2020) investigated the relationship between corporate social responsibility, social trust, and debt financing efficiency. They concluded that when studying how to improve the efficiency of debt financing and solve the problem of corporate capital, the performance of corporate social responsibility can significantly improve the efficiency of debt financing. They also determined that, in this relationship, social trust (including reputation trust, institutional trust, and relationship trust) plays a partial intermediary role and that the action period is different. Seeking to show that corporate environmental information disclosure is an important way for enterprises to convey corporate environmental performance to stakeholders, Zhou and Liu (2021) selected listed companies in A-share heavy polluting industries in Shenzhen as research samples and studied whether the level of environmental information disclosure had an impact on the environmental performance in the following year. Their research shows that the more information disclosed, the better the environmental performance in the following years. There is a strong correlation between the level of enterprise environmental information disclosure and enterprise environmental performance. An improvement in a firm's level of environmental information disclosure can lead to an improvement of its environmental performance in the following years.

Shen and Li (2010) proposed that the method for disclosing enterprise environmental information should be adapted to the scale of the enterprise. They argued that whereas large-scale listed companies should embrace independent reports, medium-sized enterprises could add relevant items in their financial statements or disclose related information in a note to their financial statements. As to small enterprises, they could use the method of narrative disclosure. Zhao et al. (2015) studied a large sample data consisting of 4712 listed companies in heavy polluting industries over the period 2006-2013 and established a performance evaluation system based on the environmental information disclosure system of these companies. The performance of their environmental information disclosure systems was statistically analyzed. Through empirical tests, it was found that company size, profitability, the marketization process, the nature of state-owned equity, the proportion of independent directors, the size of the supervisory board, the educational background of senior executives, and the proportion of senior executives were all significantly positively correlated with the performance of the environmental information disclosure systems.

Yao and Wang (2016) argued that firms with high levels of environmental information disclosure should be distinguished from enterprises with poor environmental performance and be financed at a lower cost. They determined that the negative correlation between the two was significantly enhanced by such a green credit policy. Shen and Liu (2021) studied the relationship between corporate social responsibility reporting and public debt financing in relation to the A-share listed companies on the Shanghai and Shenzhen Stock Exchanges (except for the financial industry). They determined that the disclosure of corporate social responsibility report significantly improves the success rate and scale of public debt financing. Voluntary disclosure has a significant positive impact on public debt financing. Compared with listed companies that did not issue a social responsibility report, companies that actively disclosed their corporate social responsibility reports enjoyed higher success rates of public debt financing and obtained higher financial support. The higher the quality of corporate social responsibility reports, the greater the positive impact on the choice and scale of corporate public debt financing. This phenomenon is particularly significant in areas with a high level of marketization. While in these areas, disclosing corporate social responsibility reports can significantly promote public debt financing, in areas with a low marketization level, it has no significant impact. Based on all the above literature reviewed, the following conceptual framework can be developed:



**Figure 1:** Conceptual Framework

(Source: Created by author for this study)

### - Research Hypothesis

As noted in the introduction to this study, in China, bank loans are the most important debt financing channel for listed companies. Since a sound environmental performance and a high level of environmental information disclosure are evidence of a strong motivation for sustainability, these enterprises are preferred by financial institutions and their financing capacity will be improved accordingly. Based on the above analysis, the following assumption can thus be formed:

**H1:** *The level of environmental information disclosure is positively correlated with an enterprise's total debt financing capacity.*

When commercial banks make loan decisions, they not only consider the debt scale, but also the length of debt maturity. If long-term borrowing debt and short-term borrowing debt are not reasonably coordinated in advance, enterprises may face excessive debt repayment pressure at some time, and even fall into financial difficulties. Therefore, it is of significant importance to plan debt maturity rationally. Hypotheses 2 and 3 can thus be proposed as follows:

**H2:** *There is a positive correlation between the level of enterprise environmental information disclosure and long-term debt financing ability*

**H3:** *There is a positive correlation between the level of enterprise environmental information disclosure and short-term debt financing ability*

## 4. Research Methodology

A green credit policy aims to strengthen financial institutions' awareness of environmental risks. With regard to a company's external financing, in China, loans, bank loans in particular, remain the main source of funding. Since the credit decision of commercial banks is increasingly based on the environmental performance of borrowing enterprises, environmental information disclosure is therefore likely to impact their borrowing capacity. Recall from above that the research question was articulated as follows: Do firms with a sound environmental performance enjoy greater financing capacity as a result? In order to address this query, this paper selected A-share listed companies in eight heavy polluting industries on the Shanghai Stock Market. The sample is based on the Guidelines for Industry Classification of Listed Companies, which was initially issued by the China Securities Regulatory Commission (CSRC) in 2001.

This was also how Shen and Li (2010) selected the sample they used in their study. As reported by Liu (2013), highly polluting industries have been merged into eight categories as listed in the Classified Management Directory of Environmental Protection Verification Industries of Listed Companies, published by the Ministry of Environmental Protection in 2008. Accordingly, in the present study, the author selected all the companies listed on the Shanghai Stock Market under these eight categories for the period 2017-2019 as the research sample. Using China Stock Market Accounting Research (CSMAR) solution database, the financial data for the period 2017-2019 cover only 143 companies out of an initial group of 351 companies as the other failed to produce reports. This study used the content analysis method as expounded by Shu & Zhang (2014). This method is employed to refine the content related to environmental information contained in the Global Reporting Initiative (GRI) guidelines into 46 indicators mainly about enterprise management system and environmental protection

measures. The reports publicly disclosed for each enterprise was then analyzed and each corresponding indicator determined and assigned a value (0 or 1). Specifically, in order to measure the level of environmental information disclosure, the nonquantitative data in the report was digitized, the score of each item determined, and the overall score synthesized. The score range of environmental information disclosure of each sample company ran from 0 to 96 points. The process of information transmission takes time and space and the time and space for individuals to obtain information are different (Shen et al., 2020). Information is asymmetric as not everyone receives it at the same time. After the disclosure of environmental information, enterprises need time to transmit information to stakeholders to present a favorable social image and create more financing opportunities.

Thus, the timing of the release of the financial results of an enterprise may be affected by the environmental information disclosure. Accordingly, the author manually collected the environmental information disclosure data of the sample companies from 2016 to 2018 through the Corporate Social Responsibility report and independent reports. The content disclosed were scored based on the scoring rules of content analysis. The scores of the various indicators were then summed up to obtain the score of environmental information disclosure of the enterprise. Empirically, this paper used multiple linear regressions to identify the relationship between the environmental information disclosure score and debt financing ability, and further verify the implementation effect of green credit policy.

#### - Model Specification

Taking the level of enterprise environmental information disclosure as an independent variable and the increment of enterprise debt financing as the dependent variable, an empirical study was conducted using the statistical method of regression analysis. On the basis of the corresponding hypotheses and research variables, the regression models designed in this paper are as follows:

- (1)  $\Delta\text{TBD} = c + \beta_1 * \text{EDI} + \beta_2 * \text{SIZE} + \beta_3 * \text{ROE} + \beta_4 * \text{LEV} + \beta_5 * \text{Turnover} + \beta_6 * \text{AT} + \beta_7 * \text{CFPS} + \varepsilon$
- (2)  $\Delta\text{LBD} = c + \beta_1 * \text{EDI} + \beta_2 * \text{SIZE} + \beta_3 * \text{ROE} + \beta_4 * \text{LEV} + \beta_5 * \text{Turnover} + \beta_6 * \text{AT} + \beta_7 * \text{CFPS} + \varepsilon$
- (3)  $\Delta\text{SBD} = c + \beta_1 * \text{EDI} + \beta_2 * \text{SIZE} + \beta_3 * \text{ROE} + \beta_4 * \text{LEV} + \beta_5 * \text{Turnover} + \beta_6 * \text{AT} + \beta_7 * \text{CFPS} + \varepsilon$

Where:

$\beta$  is the regression coefficient of each variable; C the constant term;  $\varepsilon$  a random error term.

## 4. Data Analysis and Results

### - Descriptive Statistics

As Table 2 shows, based on information the score of environmental disclosure of heavy polluting companies listed on Shanghai A-share market, the highest score is 96 and the lowest 0. The average score of the sample is 21.467 and the median 17, indicating that the environmental information disclosure level of those listed companies operating in heavy polluting industries is generally low. The standard deviation is 16.944, indicating that the level of environmental information disclosure can vary significantly and has high volatility. In terms of debt maturity, the proportion of long-term debt in the total amount of debt funding obtained is 60 percent and the proportion of short-term debt 40 percent. This means that in terms of long-term and short-term debt portfolio, the companies in the sample prefer long-term financing and opt for long-term loans.,



**Table 2:** Descriptive Statistical Analysis

Variable	N	Mean	Median	Std. Deviation	Variance	Minimum	Maximum
ΔTBD	405	0.010	0.000	0.107	0.012	-0.514	0.742
ΔLBD	405	0.006	0.000	0.075	0.006	-0.296	0.694
ΔSBD	405	0.004	0.000	0.073	0.005	-0.512	0.272
EDI	405	21.467	17.000	16.944	287.116	2.000	76.000
SIZE	405	23.450	23.321	1.479	2.189	20.729	28.507
ROE	405	0.082	0.067	0.098	0.010	-1.232	0.542
LEV	405	0.495	0.492	0.184	0.034	0.100	1.324
TURNOVER	405	0.662	0.577	0.425	0.181	0.000	3.562
CFPS	405	5.700	1.988	23.469	550.792	-43.876	317.159
AT	405	0.590	0.597	0.202	0.041	0.000	0.968

### - Correlation Analysis

The results shown in Table 3 indicate that the correlation coefficient of total borrowings, long-term borrowings and short-term borrowings with environmental information disclosure are all significant at the 1% level. At the same time, the three coefficients are positive, which preliminarily verifies the three hypotheses. In addition, since the correlation coefficient in the table is lower than 0.7, this means that there is no serious multicollinearity between the explanatory variables.

**Table 3:** Coefficient Matrix of Pearson Correlation Test

Variable	ΔTBD	ΔLBD	ΔSBD
ΔTBD	1		
ΔLBD	0.734**	1	
ΔSBD	0.717**	0.053	1
SIZE	0.079	0.011	0.105
ROE	0.165**	0.047	0.194**
LEV	0.012	0.038	-0.022
TURNOVER	0.029	0.041	0.000
CFPS	-0.062	-0.026	-0.064
AT	0.004	0.035	-0.031
EDI	0.544**	0.358**	0.432**

\*\* . Correlation is significant at the level of 1% (2-tailed)

### - Multiple Linear Regression Analysis

The regression results of the three hypotheses for all the samples are shown in Table 4. In the first two models, the R-square values exceed 20%, indicating that the regression model has passed the goodness of fit test. The p value corresponding to the F-test statistic is 0. This means that the above regression equation has passed the significance test. The DW statistic is close to 2, which can eliminate the influence of autocorrelation between variables. Therefore, Hypothesis 1 and Hypothesis 2 are verified and valid. In the third model, the R-square shows that the goodness of fit is not particularly good. The reason may be that since the scores of environmental information disclosure are collected manually, there may be some gaps between

the scoring standards and the actual environmental performance of enterprises, thus affecting the data goodness of fit. At the same time, the corresponding p value is approximately 0, indicating that there is a significant positive correlation between them at the significance level of 1%. Hypothesis 3 is valid. In addition, the significance of regression coefficients in the financial leverage model is not strong, with some positively correlated and some negatively correlated. One possible reason for the positive correlation is that companies with low financing constraints prefer debt financing. The main reason for the negative correlation may be that banks will conduct risk assessment for enterprises with high asset liability ratio, which means that when a firm has a high debt ratio, the bank will limit the amount loaned to that firm.

**Table 4:** Regression Analysis Results

Variable	(Model 1) TBD		(Model 2) SBD		(Model 3) LBD	
	Beta	Sig.	Beta	Sig.	Beta	Sig.
Constant	0.161	0.040	0.015	0.799	0.147	0.019
SIZE	-0.009	0.012	-0.001	0.719	-0.008	0.005
ROE	0.158	0.001	0.126	0.000	0.032	0.390
LEV	0.013	0.640	-0.001	0.959	0.014	0.526
TURNOVER	-0.010	0.384	-0.013	0.101	0.004	0.682
CFPS	0.000	0.820	0.000	0.754	0.000	0.566
AT	-0.055	0.037	-0.057	0.003	0.002	0.929
EDI	0.004	0.000	0.002	0.000	0.002	0.000
	R Square=0.344 F=29.079 P(F)=0.000 D-W=2.175		R Square=0.244 F=17.888 P(F)=0.000 D-W=1.878		R Square=0.148 F=9.630 P(F)=0.000 D-W=2.151	

## 5. Discussion, Conclusion, and Recommendations

In light of the green credit system in place in China, this paper analyzed the impact of company environmental information disclosure on their funding ability, using the data of companies operating in heavily polluting industries listed on the Shanghai Stock Market during the period 2017-2019 to do so. One of the main findings is that the level of environmental information disclosure among the companies sampled varies greatly. For one thing, while some companies have been disclosing environmental information, more than half of them have failed to do so during the period considered as only 143 of the 351 sampled firms surveyed in this paper issued independent reports. For another, among those that have reported action taken to mitigate their environmental impact, the level of disclosure is quite uneven.

Although the Shanghai Stock Exchange and the Environmental Protection Administration provide environmental disclosure guidelines, there is no compulsory disclosure requirement. Companies have a great deal of autonomy in their disclosure of environmental information. They choose their own environmental information content according to their own preferences, so they are more inclined to disclose favorable content, which, among other consequences, means that the content disclosed is relatively random, selective, and arbitrary. The result is that information effectiveness was poor, only a few issued environmental reports or disclosed environmental information in detail in social responsibility reports, and the level of environmental information disclosure was seriously polarized. This causes great inconvenience to information users. This begs the question of why the firms sampled were not active in preparing independent reports to disclose environmental information.

This is largely due to the absence of enforcement mechanism or to put it another way to a lack of binding requirements on environmental information disclosure. Indeed, to date, there is no regulation specifically forcing firms to disclose information on the measures they may take to lessen their impact on the environment, this in spite of the fact that, as noted in the introduction to this paper, all the companies surveyed in this research operate in heavy polluting industries. Given their classification as main contributors to climate change, it seems common sense that they should be the first companies to be obligated to report their efforts to lower their impact on the environment. Yet, while some may feel that they have a moral obligation to do so, clearly, it is not the case with many of them that fail to disclose information. It is important to note at this juncture that, given the growing pressure of consumers and growing public concerns over climate change it can be surmised that the firms that are still not reporting any information may have yet to take any action as environmental information disclosure would contribute to a negative image.

In other words, they simply do not disclose information because they have nothing positive to disclose. Assuming this is the case, this makes enforcement even more pressing. Short of binding regulations obligating them to report what they do (assuming they do something) and short of a penalty system if they report no action, this is unlikely to change. In short, the pressure has to come from the government as enterprises have failed to summon and demonstrate a capacity for self-regulation. Not only do firms are not obligated to disclose information but there is also no provision to impose penalty. Pressure could also come from consumers and the public at large. This, however, presupposes concerted and coordinated efforts by environmentally minded groups. There is no evidence of such groups on a large scale, which therefore seriously limits the possibility of public pressure. All that said, pressure may come from banks through the green credit system as this study has shown. This is precisely the second main finding of this study. The environmental information disclosure level of the sampled companies is correlated with their borrowing capability, both long-term and short-term debt funding. It was found that the higher the disclosure level, the stronger the financing capability. Compared to enterprises with lower environmental disclosure information scores, enterprises with higher environmental disclosure information scores were able to secure more bank loans; this, as a result of the green credit system established by banks and other financial institutions, which favors firms that disclose environmental information and are therefore presumably active on the climate change front as we just saw. Banks may perceive them as more sustainable in the long term.

For one, they are less subject to major changes in environmental regulations as they are proactive. These include not only domestic laws but perhaps more importantly international provisions, which may impose carbon taxes or prohibit them from exporting. For another, they are less likely to be affected by a consumer boycott or sudden costly legal requirements. In addition, banks are also well aware that damages caused by extreme weather events are increasingly more costly and may in some cases destroy the assets collateralized; hence their eagerness to see companies taking steps to limit such risks. Another key finding, one directly related to the second finding is that the sampled companies prefer long-term financing, which from a bank's perspective presents more risk as the remote future is by definition less predictable than the near future. As uncertainties pile up and visibility decreases, risks rise,

including all the operational risks discussed above. In summary, the green credit policy effectively links the corporate debt financing ability with environmental disclosure information and encourages enterprises that intend to raise funds to disclose environmental information more actively and better improve their environmental performance. The green credit policy also has sent a positive signal to the market, influencing on the allocation of credit resources between the environmentally polluting companies and environmentally friendly companies. A lot more could happen, though, if environmental information disclosure was mandatory and strictly enforced.

*- Recommendations for Governments:*

Environmental issues have strong externalities. It must rely on systems and regulations to link the interests of the company with environmental protection to effectively urge enterprises to fulfill their environmental responsibility. The environmental information disclosure system would then be an effective way to improve the level of corporate environmental disclosure information and enhance the impact of environmental disclosure information on capital markets. So, the government should adopt binding environmental information disclosure regulations and set clear requirements for the content, form and time of disclosure. All requirements for environmental disclosure information should be mandatory with no exception permitted. Finally, the government should strengthen supervision. The government regulatory authorities should check whether the disclosure content is complete and true. At the same time, penalties should be strengthened and imposed on companies that intentionally conceal major environmental pollution accidents.

*- Recommendations for Listed Companies:*

Due to the voluntary nature of environmental information disclosure, a large number of enterprises fail to engage in self-disclosure. Yet, with the increasing concern of society with environmental problems, companies must improve their awareness of environmental disclosure information. Managers should have a long-term strategic vision and fully understand the economic benefits brought about by environmental information disclosure so as to achieve a win-win situation for both environmental and economic benefits. Employees' role should also be enhanced and environmental education and training provided to enhance their awareness in terms of environmental protection. If an environmental protection performance were included as part of an enterprise performance assessment, this would prompt firms to improve the quality of environmental information disclosure.

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