

The Impact of Environmental Information Disclosure on Corporate Value

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Abstract: Building a modern environmental governance system requires companies to actively participate in environmental information disclosure. This paper uses China A-share listed companies as a sample to study how environmental information disclosure affects corporate value. The paper draws the following conclusions: first, environmental information disclosure is significantly and positively related to corporate value; second, environmental information disclosure can enhance corporate value by enhancing investors' network interaction. Finally the paper puts forward relevant policy recommendations on how to promote corporate environmental information disclosure.

Keywords: Environmental information disclosure, Investor network interaction, Corporate value.

1. Introduction

The 20th Party Congress report points out the need to promote green development and the harmonious co-existence of man and nature. Environmental protection is not only the responsibility of the government. As important participants in the market and society, enterprises also need to assume corresponding responsibilities in environmental protection. The disclosure of environmental information by businesses is an effective way for them to meet their environmental responsibilities. It is also a vital conduit for the government to establish a contemporary environmental governance structure, as well as a solid foundation for achieving carbon peaking and neutrality. In December 2021, the State Ministry of Ecology and Environmental Protection announced Administrative Measures for the Legal Disclosure of Enterprise Environmental Information. The promulgation and implementation of these Measures not only demonstrates that there are still some issues with environmental information disclosure by Chinese enterprises, but also highlights the importance of improving the quality of environmental information disclosure by enterprises in order to promote green development in the context of "dual carbon".

Business processes are designed to maximise value. Enterprises publish environmental information because regulatory authorities mandate it, and they expect to increase corporate value through knowledge sharing. Although several researchers have investigated the relationship between environmental information disclosure and company value, no consensus has emerged. Some research have found that the level of corporate environmental information disclosure has distinct effects on company value in the short and long term, with a negative relationship in the short term and a positive relationship in the long run (Shen et al. 2022) [1]. Tang (2021) contends that the higher the quality of environmental information disclosure, the higher the firm's worth, and that internal control has a suppressive influence on this effect [2]. Cheng and Liu (2022) found that environmental information disclosure has a "U" shaped connection with business value in a sample of significantly polluting firms [3]. Tao, Guo, and Sun (2020) discovered that the higher the level of environmental information sharing, the lower the firm's

performance. As a result, the relationship between environmental information disclosure and firm value requires additional investigation [4].

A company's strategic management includes investor relations management, which oversees information sharing between the business and other investors and financial institutions by integrating pertinent marketing and finance techniques with the ultimate goal of maximizing corporate value. The Securities and Futures Commission released the Investor Relations Management Guidelines for Listed Companies in April 2022. This helps to improve corporate governance and facilitate more effective communication between businesses and investors.

Investor relations management is part of the strategic management of a company, which manages the exchange of information between the company and other financial institutions and other investors through the integrated use of relevant methods in finance and marketing to achieve the goal of maximising corporate value. 2022 In April, the Securities and Futures Commission issued the Guidelines on Investor Relations Management for Listed Companies. This is conducive to enhancing effective communication between companies and investors and improving corporate governance. Enhancing investor relations management is a critical step in raising the caliber of listed businesses and a crucial component of investor safety. Furthermore, there is currently a dearth of pertinent research on how investor involvement affects corporate value when environmental information is disclosed. In addition to assisting businesses in enhancing corporate governance to safeguard the rights and interests of investors, the study presented in this paper will contribute to the advancement of pertinent viewpoints in the field of corporate value research.

Based on this, this article analyzes the influence mechanism from the standpoint of investor network interaction and studies how environmental information disclosure influences corporate value using A-share listed businesses as a sample. This would encourage corporations to publish environmental information and foster communication between them and their investor networks by assisting them in realizing the significance of investor management in corporate strategic management. It is also conducive to the

green transformation of enterprises and the enhancement of corporate value.

2. Theoretical Analysis and Research Hypothesis

2.1. Environmental Information Disclosure and Corporate Value

The procedure by which the government or a business releases details about its environmental impact for public or relevant authority to review is known as environmental information disclosure. Enterprises' public disclosure of environmental information is impacted by a number of factors, such as financial requirements, social pressure, and regulatory requirements. From the standpoint of legal regulation, the appropriate authorities encourage businesses to reveal environmental information in order to safeguard the rights and interests of legitimate investors, and a business's ability to respond positively to these requests can increase the confidence of those investors. Investors are more willing to invest in the enterprise, which helps to increase the value of the enterprise. From the perspective of social pressure, the public or potential investors prefer enterprises with a high degree of environmental information disclosure, and positive disclosure of environmental information can better attract investors and thus increase the value of the enterprise. From the perspective of enterprise financing, legitimacy theory suggests that for enterprises, effective environmental information disclosure can build a good reputation (Li et al., 2016) [5]. In the context of "double carbon", actively disclosing environmental information is one of the most important ways to enhance the legitimacy of enterprises. Simultaneously, according to the notion of information asymmetry, prompt disclosure of environmental information by businesses helps investors better understand those businesses and lessens the knowledge imbalance that exists between investors and businesses. (Wang, 2020) [6]. Effective corporate environmental information disclosure is conducive to enhancing investors' identification with the enterprise and helps the enterprise to obtain more low-cost capital. Lower corporate financing costs are conducive to enhancing corporate value. Based on this, this paper proposes the hypothesis that

H1: Corporate environmental information disclosure has a positive impact on firm value.

2.2. Environmental Information Disclosure, Investor Interaction and Corporate Value

Many listed companies use online interactive platforms to manage investor relations. By answering investors' questions on online interactive platforms, companies can enhance the relationship between companies and investors. It has been demonstrated that a company's information environment affects an investor's ability to learn pertinent information about the business and enhances the effectiveness of their interactions with the management of the business (Kan, Xu and Li, 2022) [7]. According to signalling theory, the higher the degree of environmental information disclosure of a company, the more positive signals it will send that the company is actively making environmental disclosures and taking the initiative to assume social responsibility, stimulating investors' interest in the company. Investors will

actively engage with the company as they become more aware of it, seeking information that will help them make decisions. Therefore, the higher the disclosure of environmental information, the more investors will interact with the company. Investor contact has been demonstrated to increase stock flow, lessen knowledge asymmetry, and boost corporate value (Li, Jin and Li, 2018) [8]. Based on this, this paper proposes the hypothesis that:

H2: Corporate environmental disclosure can enhance corporate value by improving investor network interaction.

3. Data and methods

3.1. Sample Selection and Data Sources

This paper selects A-share listed companies in the stock markets of Shanghai and Shenzhen from 2014 to 2020 in China for the study, and analyses company-related data. The sample selection rules are: (1) exclude data from the financial sector and exclude ST and *ST companies; (2) exclude companies with missing data, and finally get a valid sample of 24,717. The data were obtained from the CSMAR database and the CNRDS database. All continuous variables involved were treated with a 1% reduction in tail.

3.2. Selection of Variables

3.2.1. Explanatory Variables

The explanatory variable in this paper is firm value (TobinQ). Combining with the study of Yang et al (2023), this paper chooses the TobinQ value in the long-term market to measure firm value [9].

3.2.2. Explanatory Variables

This paper draws on the study of Guan and Liu (2023) and uses Environmental Information Disclosure (EID) as the explanatory variable [10]. The data were obtained from the CSMAR Environmental Research Database. The data were obtained from the CSMAR Environmental Research Database. 30 indicators were included in the construction of EID in five areas, including environmental management, environmental regulation and certification, environmental performance and governance, environmental information disclosure, and environmental liabilities. The specific scores and criteria are shown in Table 1. the specific formulae are:

$$EID_i = \sum EID / EID_{max} \quad (1)$$

Where EID_i is the level of environmental information disclosure for company i , $\sum EID$ is the sum of the scores for all items for each company, and EID_{max} is the total score that could be obtained for all items in an ideal situation. More details are in Table1 below.

3.2.3. Mediating Variables

The intensity of investor network interaction (LnQnumb) is used as a mediating variable. Investor relations management is an important part of strategic corporate management. Effective investor relations management is crucial for increasing corporate value, which is one of the main reasons why businesses place such a high value on it. A firm's worth can be discovered by investors through improved comprehension and recognition of the company, which is facilitated by effective communication between listed companies and investors. In addition, investor relations management is also conducive to maintaining investors' long-term recognition of the company and enhancing.

Table 1. Environmental information disclosure quality rating scale

| Tier 1 indicators | Secondary indicators | Score | Description |
|--|--|---------|--|
| Environmental Management Disclosure | Environmental philosophy | 0, 1 | A value of 1 is assigned if relevant content is disclosed, otherwise 0 |
| | Environmental objectives | | |
| | Environmental Management System | | |
| | Environmental Education and Training | | |
| | Special Environmental Action | | |
| | Environmental incident response mechanism | | |
| | Environmental honours or awards | | |
| The "three simultaneous" system | | | |
| Environmental Regulation and Certification Disclosure | Key pollution monitoring units | 0, 1 | A value of 1 is assigned if the company is disclosed in the report as a key monitoring unit, otherwise it is 0 |
| | Pollutant discharge compliance | | Pollutant emission standards are assigned a value of 1, otherwise 0 |
| | Sudden environmental accidents | | If there is a major environmental pollution incident, the value is 1, otherwise it is 0 |
| | Environmental violations | | If there is an environmental violation, the value is 1, otherwise it is 0 |
| | Environmental petition cases | | If there is an environmental complaint, the value is 1, otherwise it is 0 |
| | ISO14001 certified or not | | 1 if ISO14001 audited, 0 otherwise |
| | ISO9001 certified or not | | 1 if ISO9001 audited, 0 otherwise |
| Environmental performance and governance disclosure | Exhaust emission reduction treatment | 0, 1, 2 | 0 = no description; 1 = qualitative description; 2 = quantitative description (monetary/numerical description) |
| | Wastewater abatement treatment | | |
| | Dust and fume control | | |
| | Solid waste utilisation and disposal | | |
| | Noise, light pollution, radiation and other treatments | | |
| Cleaner Production Implementation | | | |
| Disclosure of environmental liabilities | Wastewater discharge | 0, 1, 2 | 0 = no description; 1 = qualitative description; 2 = quantitative description (monetary/numerical description) |
| | COD emissions | | |
| | SO2 emissions | | |
| | CO2 emissions | | |
| | Soot and dust emissions | | |
| Industrial solid waste generation | | | |
| Information Sheet on Environmental Disclosure Vehicles | Annual Reports of Listed Companies | 0, 1 | 1=yes; 0=no; whether to disclose environment-related information |
| | Social Responsibility Report | | |
| | Environmental Reports | | |

Table 2. Variable definition table

| | Variable name | Variable symbols | Variable definitions |
|------------------------|--------------------------------------|----------------------|---|
| Explained variables | Corporate value | TobinQ | Market Value/(Total Assets - Net Intangible Assets - Net Goodwill) |
| Explanatory variables | Environmental Information Disclosure | EID | Corporate Environmental Information Disclosure |
| Intermediate variables | Investor Network Interaction | LnQnumb | Number of times listed companies were asked questions by investors and taken as a logarithm |
| Control variables | Profitability | ROA | Year-end net profit/total assets |
| | Gearing ratio | Lev | Total liabilities/total assets |
| | Size of business | Size | Natural logarithm of the total assets of the enterprise at the end of the year |
| | Business Growth | Growth | Operating income growth rate |
| | Concentration of shareholding | Top1 | Percentage of shareholding of the largest shareholder |
| | Two jobs in one | Dual | 1 if the Chairman and Managing Director are the same person, 0 otherwise |
| | Percentage of independent directors | Indep | Number of independent directors as a percentage of the total number of board members |
| | Companies | Stkcd | Corporate dummy variables |
| Year | Year | Year dummy variables | |

investor loyalty. This paper therefore uses the number of times listed companies are asked questions by investors to measure the intensity of investor network interaction, and

logarithmically processes it.

3.2.4. Control Variables

This paper refers to the domestic and international literature on the impact of corporate value, and sets control variables at the firm characteristics level, the corporate governance level and the macro level in order to minimise the impact of internal and external firm characteristics on corporate value. (1) at the firm characteristics level: profitability (ROA), gearing (Lev), firm size (Size) and firm growth (Growth); (2) at the corporate governance level: concentration of equity in the top shareholder (Top), dual position (Dual) and the proportion of independent directors (Indep); (3) at the macro level: the firm (Stkcd) and year (Year) as dummy variables to control for. The specific variables are defined in Table 2.

3.3. Model Design

This paper tests the above hypotheses by constructing the following multiple regression models. Eq. (2) is to test the relationship between environmental disclosure and firm value; Eq. (3) and Eq. (4) are to test the mediating effect of investor network interaction. Where TobinQ is the firm value, EID is the firm environmental information disclosure, M_i is the control variable and ε is the residual term.

$$\text{TobinQ} = \beta_0 + \beta_1 \text{EID} + \beta_{2i} M_i + \varepsilon_1 \quad (2)$$

$$\text{LnQnumb} = \alpha_0 + \alpha_1 \text{EID} + \alpha_{2i} M_i + \varepsilon_2 \quad (3)$$

$$\text{TobinQ} = \gamma_0 + \gamma_1 \text{EID} + \gamma_2 \text{LnQnumb} + \gamma_{3i} M_i + \varepsilon_3 \quad (4)$$

4. Empirical Analysis

4.1. Descriptive Statistics

The results of the descriptive statistics for the main variables are shown in Table 3. The minimum value of TobinQ in the sample enterprises is 0.850 and the maximum value is 9.724. this indicates that there is still a large difference in the value of enterprises in China. the mean value of EID is 0.097, which is a large difference from the full score of 1. This indicates that the level of environmental information disclosure of enterprises in China is generally low, and there is still room for further improvement in the status of corporate environmental information disclosure.

Table 3. Descriptive statistics

| Variable name | Average value | Standard deviation | Minimum value | Maximum value |
|---------------|---------------|--------------------|---------------|---------------|
| TobinQ | 2.154 | 1.473 | 0.850 | 9.724 |
| EID | 0.097 | 0.121 | 0 | 0.500 |
| LnQnumb | 4.276 | 1.189 | 1.099 | 6.859 |
| Size | 22.243 | 1.295 | 19.909 | 26.246 |
| Lev | 0.417 | 0.204 | 0.059 | 0.905 |
| ROA | 0.040 | 0.070 | -0.274 | 0.224 |
| Growth | 0.173 | 0.415 | -0.581 | 2.592 |
| Top1 | 0.335 | 0.146 | 0.084 | 0.736 |
| Dual | 0.304 | 0.460 | 0 | 1 |
| Indep | 0.378 | 0.054 | 0.333 | 0.571 |

4.2. Baseline Regression Analysis

Table 4 shows the results of the baseline regression. Column (1) of the regression results shows that enhanced corporate environmental information disclosure significantly increases firm value, with a regression coefficient of 0.791. Columns (2) and (3) show the results after gradually adding control variables, which indicate that corporate environmental information disclosure significantly and

positively affects firm value, with a regression coefficient of 0.972. One explanation for this could be that information misalignment decreases as corporate environmental disclosure rises. With a regression coefficient of 0.972, the findings demonstrate that corporate environmental information sharing significantly increases business value. Additionally, this gives investors a favorable message. Investor recognition and readiness to invest in a firm may increase as a result of a company's favorable disclosure of environmental information. Consequently, the organization might be capable of securing additional affordable funding, thereby augmenting its overall worth. First hypothesis is put to the test.

Table 4. Baseline regression results

| | (1) TobinQ | (2) TobinQ | (3) TobinQ |
|-------------------------|---------------------|----------------------|----------------------|
| EID | 0.791*** (0.096) | 0.979*** (0.094) | 0.972*** (0.094) |
| Size | | -0.615*** (0.019) | -0.610*** (0.019) |
| Lev | | 0.601*** (0.075) | 0.612*** (0.075) |
| ROA | | 2.139*** (0.129) | 2.221*** (0.129) |
| Growth | | 0.008 (0.016) | 0.011 (0.016) |
| Indep | | | 0.762*** (0.195) |
| Dual | | | -0.084*** (0.022) |
| Top1 | | | -0.936*** (0.130) |
| Stkcd | Yes | Yes | Yes |
| Year | Yes | Yes | Yes |
| N | 24,717 | 24,717 | 24,717 |
| R ² | 0.6798 | 0.6970 | 0.6981 |
| Adjusted-R ² | 0.6181 | 0.6385 | 0.6981 |

4.3. Mechanism Testing

This paper uses a mediating effect model to test the mediating role of investor network interaction between corporate environmental information disclosure and firm value. Column (2) of Table 5 shows that corporate environmental information disclosure has a significant effect on investor network interaction, and the higher the degree of corporate environmental information disclosure, the more investor network interaction there is. The results in column (3) indicate that corporate environmental information disclosure still has a significant effect on firm value after controlling for investor network interaction. The coefficient of corporate environmental information disclosure is 0.948, This also indicates that investor network interaction plays a partially mediating role between corporate environmental information disclosure and firm value. The possible reason for this is that as firms actively disclose environmental information, investors can learn more about the firm by asking targeted questions. This leads to a deeper identification with the firm and increased trust in the firm, so investors are more willing to invest in the firm and the firm can obtain more financing at a lower cost, thus contributing to an increase in firm value. Hypothesis 2 is tested.

Table 5. Mediated effects regression

| | (1) TobinQ | (2) LnQnumb | (3) TobinQ |
|-------------------------|----------------------|----------------------|----------------------|
| EID | 0.972*** (0.094) | 0.535*** (0.082) | 0.948*** (0.094) |
| LnQnumb | | | 0.044*** (0.008) |
| Size | -0.610*** (0.019) | 0.149*** (0.017) | -0.616*** (0.019) |
| Lev | 0.612*** (0.075) | -0.498*** (0.065) | 0.634*** (0.075) |
| ROA | 2.221*** (0.129) | 0.337*** (0.113) | 2.205*** (0.129) |
| Growth | 0.011 (0.016) | 0.011 (0.014) | 0.010 (0.016) |
| Indep | 0.762*** (0.195) | 0.314* (0.170) | 0.750*** (0.195) |
| Dual | -0.084*** (0.022) | 0.024 (0.019) | -0.084*** (0.022) |
| Top1 | -0.936*** (0.130) | -0.014 (0.112) | -0.935*** (0.130) |
| Stkcd | Yes | Yes | Yes |
| Year | Yes | Yes | Yes |
| N | 24,717 | 24,717 | 24,717 |
| R ² | 0.6981 | 0.6359 | 0.6986 |
| Adjusted-R ² | 0.6981 | 0.5671 | 0.6403 |

5. Conclusion

Companies not only play an important role in the operation of the market, but are also essential and important players in society. Whether a company is actively engaged in social responsibility can often be judged by its environmental information disclosure behaviour. To a certain extent, active disclosure of environmental information by enterprises can help to address market failures caused by information asymmetries. By actively disclosing environmental information, enterprises can give full play to the external monitoring role of the public and regulatory authorities, and promote the construction of a modern environmental governance system. This paper selects A-share listed companies as research samples to explore the impact of environmental information disclosure on corporate value, and draws the following conclusions: (1) environmental information disclosure is significantly and positively related to corporate value; (2) environmental information disclosure can enhance corporate value by enhancing investors' network interaction. Based on this, this paper makes the following recommendations:

1) The state should further improve the system related to environmental information disclosure. The state can do this by establishing a detailed system related to the disclosure of environmental information, which will help us to address the current problems in a more focused manner. At the same time, different subjects should have a different focus on the information disclosed. This will also allow the relevant authorities to clarify the focus of regulation, reduce regulatory blind spots and improve regulatory efficiency. In addition, China should also actively promote the formation of standardised and unified disclosure forms and channels, and establish a strict monitoring and disciplinary mechanism.

2) Enterprises should pay attention to environmental disclosure and do a good job. First of all, enterprises should look internationally and learn from the advanced methods and experiences of other enterprises in environmental information disclosure, and apply them to the actual situation in China, so

as to improve their own environmental information disclosure level. In addition, companies need to improve the management system related to environmental information disclosure. This will improve the transparency of environmental information. At the same time, in the context of "dual carbon" and the trend of green development, enterprises should take this as their own discipline, balance green transformation and environmental information disclosure in their operation, and use this as a driving force to improve their competitiveness.

3) Individuals should also exercise their right to monitor. Individuals, especially insiders, have an important role to play in monitoring the behaviour of the enterprise. By actively exercising their right to monitor, individuals can create external constraints on companies. Under this external pressure, enterprises will be more active in disclosing environmental information, and will also improve the quality of environmental information. This helps to reduce the problem of information asymmetry between investors and enterprises, allowing for better decision-making for investors and more access to capital for enterprises.

4) Enterprises should broaden the channels of interaction with investors and make the communication between investors and enterprises more fluid. This reduces information asymmetry on the one hand, and enhances investors' stickiness to the enterprise on the other, strengthening investors' confidence in their investment in the enterprise and thus enhancing its value.

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