Exploring China's environmental sustainability reporting and corporate value based on the WIND database: theoretical analysis and empirical research

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Abstract. This empirical research paper explores the relationship between environmental sustainability reporting and corporate value in China, utilizing the WIND database. With the growing global focus on environmental issues, China has actively embraced green development principles, encouraging companies to engage in environmental sustainability reporting. This study aims to elucidate the impact of such reporting on corporate value, providing insights for companies to enhance their environmental disclosure practices and guiding investors in their decision-making processes. Employing a combination of theoretical analysis and empirical research, the study constructs a theoretical model to investigate the intrinsic link between environmental sustainability reporting and corporate value. The paper analyzes data from Chinese listed companies, assessing the current state of their environmental reporting and its implications for corporate value. The research findings are expected to contribute significantly to the theoretical understanding and practical application of environmental sustainability in the corporate sector.

Keywords: Environmental Sustainability Reporting, Corporate Value, Green Development, China, WIND Database, Listed Companies, Theoretical Analysis.

1. Introduction

In recent years, the exacerbation of global environmental challenges has placed environmental sustainability at the forefront of international focus. The mounting concerns about climate change, biodiversity loss, and pollution have highlighted the urgent need for sustainable practices across various sectors, including business and industry. In response to these pressing environmental issues, nations worldwide, including China, have been actively pursuing policies and initiatives to promote sustainable development [1], [2].

China, in particular, has shown a remarkable shift towards green development, reflecting its commitment to addressing environmental challenges. Recognizing the significant role that corporations play in contributing to environmental degradation, the Chinese government has introduced a series of policies and regulations aimed at encouraging corporate environmental responsibility. One such initiative is the promotion of environmental sustainability reporting among enterprises.

Environmental sustainability reporting serves as a critical tool for businesses to disclose information about their environmental impact. These reports are not merely a means of regulatory compliance but also a strategic instrument for companies to enhance their transparency and accountability. By providing detailed insights into their environmental practices and impacts, companies can foster trust and credibility among stakeholders, including investors, customers, and the public [3].

Furthermore, these reports are instrumental in painting a picture of a company's commitment to environmental stewardship. They offer a platform for businesses to showcase their efforts in reducing carbon footprints, managing waste, conserving resources, and engaging in sustainable practices. In a broader sense, environmental sustainability reports reflect a company's alignment with the global shift towards a more sustainable and responsible business paradigm[4], [5], [6].

In the context of China's rapidly evolving economic landscape, the emphasis on environmental sustainability reporting aligns with the nation's broader objectives of achieving ecological civilization

and sustainable development. As China continues to grow economically, the integration of environmental consciousness into corporate governance and reporting is seen as essential for the long-term health and sustainability of both the environment and the economy [7], [8].

This research aims to delve deeper into the realm of environmental sustainability reporting in China, exploring its implications, evolution, and impact on corporate value. Given the increasing attention to environmental issues and the role of corporations in driving change, this study is timely and relevant, offering insights into the intersection of environmental responsibility and corporate strategy in the context of one of the world's largest and fastest-growing economies.

2. Research Significance

This study, delving into the interplay between environmental sustainability reporting and corporate value in China, holds significant implications both in practical and theoretical realms. With the WIND database as a pivotal data source and focusing on Chinese listed companies, this research stands at the intersection of current environmental concerns and corporate economics, addressing a subject of critical relevance in today's increasingly eco-conscious market landscape [9].

2.1. Practical Implications

From a practical standpoint, this research offers valuable insights for businesses on elevating their environmental information disclosure levels. In an era where environmental consciousness is not just a moral imperative but also a market expectation, understanding the impact of sustainability reporting on corporate value is crucial. This study provides empirical evidence that can guide businesses in strategically shaping their environmental reporting practices. Such insights are indispensable for companies seeking to align their operational strategies with sustainable practices while enhancing their market value and investor appeal [10].

Additionally, the study serves as a vital resource for investors and stakeholders in making informed decisions. By shedding light on how environmental sustainability reporting correlates with corporate value, it enables investors to evaluate companies not just on financial metrics but also on their environmental stewardship. This holistic approach to investment decision-making can lead to more sustainable investment patterns, encouraging a shift towards environmentally responsible business practices [11].

2.2. Theoretical Contributions

On the theoretical front, this research contributes to the expanding body of knowledge on the nexus between environmental responsibility and corporate economics. By constructing and testing a theoretical model that elucidates the relationship between environmental sustainability reporting and corporate value, the study enriches the academic discourse in this field. It bridges existing gaps in literature, especially considering the mixed findings of previous studies, and offers a nuanced understanding of this complex relationship in the context of the Chinese market.

Furthermore, the study's focus on China, a leading global economic power with unique environmental challenges and policies, adds a distinct dimension to the existing research. The findings from this context can offer comparative insights for other economies and contribute to a more global understanding of the role of environmental sustainability in corporate valuation.

3. Literature Review

The relationship between environmental sustainability reporting and corporate value has been a subject of extensive study among scholars both domestically and internationally. However, the findings have been somewhat incongruous, leading to a rich and diverse discourse on the topic.

Many studies argue that environmental sustainability reporting can enhance corporate value. This enhancement is often reflected in various aspects such as reduced financing costs, increased market

value, and improved brand image. Researchers have found that companies engaging in transparent sustainability reporting often enjoy better investor confidence and customer loyalty, which translates into tangible economic benefits. These reports are seen as indicators of a company's commitment to long-term sustainability and risk management, factors that are increasingly valued in today's market.

Conversely, some studies suggest that the impact of environmental sustainability reporting on corporate value is not significant or could even be negative. This perspective stems from the view that the costs associated with implementing and maintaining sustainable practices, as well as the reporting thereof, can be substantial. Additionally, the skepticism about the authenticity of such reports and the potential for greenwashing can negate the intended positive impact on a company's value.

The varied findings in existing literature underline the complexity of the relationship between environmental sustainability reporting and corporate value. They also highlight the need for more nuanced and context-specific research, particularly in the rapidly evolving economic and regulatory landscape of China.

4. Research Methodology

This study employs a mixed-method approach, combining theoretical analysis with empirical research to explore the relationship between environmental sustainability reporting and corporate value.

In the theoretical analysis phase, the study will develop a conceptual framework to understand the intrinsic link between environmental sustainability reporting and corporate value. This framework will be grounded in existing literature and theories, incorporating various aspects such as corporate governance, stakeholder theory, and environmental economics. It aims to elucidate the mechanisms through which environmental reporting can impact corporate financial performance and market perception.

The empirical research phase will utilize data from the WIND database, focusing on Chinese listed companies. This database provides a comprehensive set of data including environmental reports, financial statements, and other relevant corporate information. The study will analyze this data to examine the current state and effectiveness of environmental sustainability reporting among these companies and its correlation with corporate value.

A combination of quantitative and qualitative methods will be employed. Quantitative analysis will involve statistical techniques such as regression analysis to test the hypotheses derived from the theoretical framework. This will be complemented by qualitative methods, including content analysis of sustainability reports, to gain deeper insights into the quality and substance of the environmental disclosures.

5. Methods

This section explores the definition, characteristics, and trends in environmental sustainability reporting. It involves a detailed examination of the elements that constitute effective environmental reporting and how these have evolved over time, especially in the Chinese context. We assess the current landscape of environmental sustainability reporting among Chinese listed companies. This includes an analysis of reporting quality, frequency, and comprehensiveness, as well as identifying existing gaps and challenges faced by these companies in their reporting processes.

For the empirical analysis, the study employs statistical methods and mathematical models. The primary approach includes multiple regression analysis to determine the strength and nature of the relationship between environmental sustainability reporting and corporate value.

The regression model is structured as follows:

$$CV_i = \alpha + \beta_1 ESR_i + \beta_2 ControlVariables_i + +\varepsilon_i \quad (1)$$

Where CV_i represents the corporate value of the ith company, ESR_i is a measure of the ith company's environmental sustainability reporting (quantified based on factors like reporting depth, frequency, and transparency), and $ControlVariables_i$ includes other factors that may influence corporate value (such as company size, industry type, profitability).

Next, we perform Logistic Regression on the data:

$$\log(1 - pp) = \beta 0 + \beta 1X \tag{2}$$

Where X is the independent variable, $\beta 0$ and $\beta 1$ are coefficients.

Statistical techniques like ANOVA and t-tests are used to assess the significance of the results, while regression diagnostics test for model assumptions like multicollinearity, homoscedasticity, and normality of residuals.

The empirical study relies on data from the WIND database, annual reports of listed companies in China, corporate websites, and the China Social Responsibility Report network.

6. Results

The logistic regression analysis, conducted to understand the influence of environmental sustainability reporting on corporate value, provides insightful results. The analysis leverages data on Chinese listed companies, focusing on variables such as environmental reporting, revenue, and green rating scores.

The output provides a summary of the logistic regression model along with the coefficients and significance of each predictor. The coefficient of -0.1327182 for the Environmental Report variable in the model indicates a somewhat negative correlation with the probability of a firm having high-value. But with p = 0.749, this association is not statistically significant. Revenue also shows a negative but non-significant correlation (p = 0.739) with the high-value status of enterprises, with a coefficient of -0.0004763. In contrast, the Green Rating exhibits a coefficient of 0.2558484, indicating a favorable influence on the high-value probability; nevertheless, it should be noted that this effect does not reach statistical significance (p = 0.152).

The impacts of the predictors are easily interpreted by looking at Fig. 1, which graphically displays the model's coefficients. According to the numerical output from the model summary, the negative coefficients for Environmental Report and Revenue and the positive coefficient for Green Rating are shown. The precision of the coefficient estimations is indicated by the error bars, which stand for standard errors.

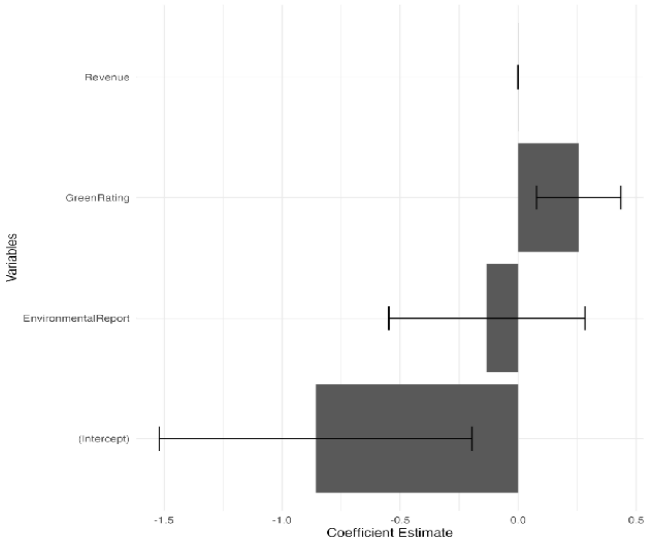

Fig 1. Coefficient Plot of logistic regression analysis.

Another essential part of our research is the Receiver Operating Characteristic (ROC) curve in Fig. 2, which evaluates the model's capacity for categorization. The curve's corresponding Area under the Curve (AUC) value gives an indication of how well the model can differentiate between high-value and low-value businesses. A more successful model would be shown by a curve that is closer to the upper-left corner of the plot.

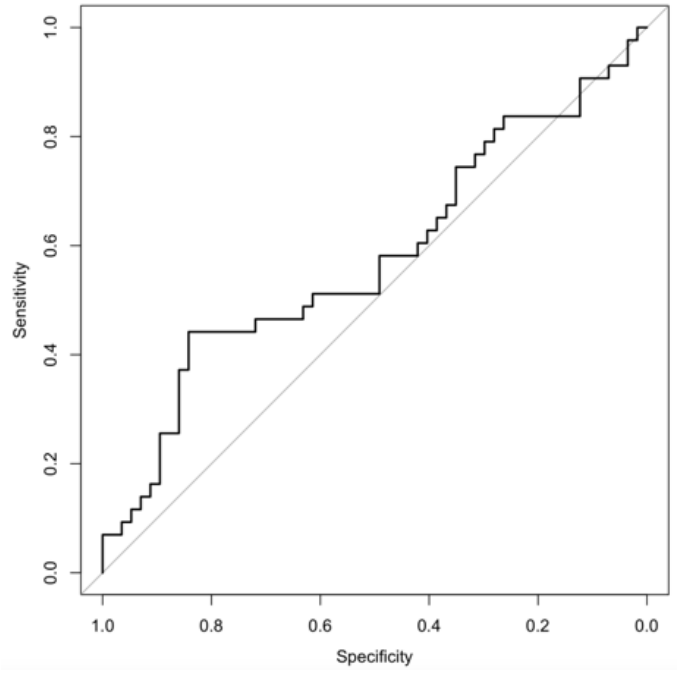

Fig 2. ROC curve of logistic regression analysis.

Fig3 showcases the distribution of predicted probabilities for the binary outcome. The overlap between the two categories (High Value = 1 and High Value = 0) is a crucial indicator of the model's discriminative power. A clear separation between the two groups would suggest a more effective model in differentiating high-value companies based on the predictors used.

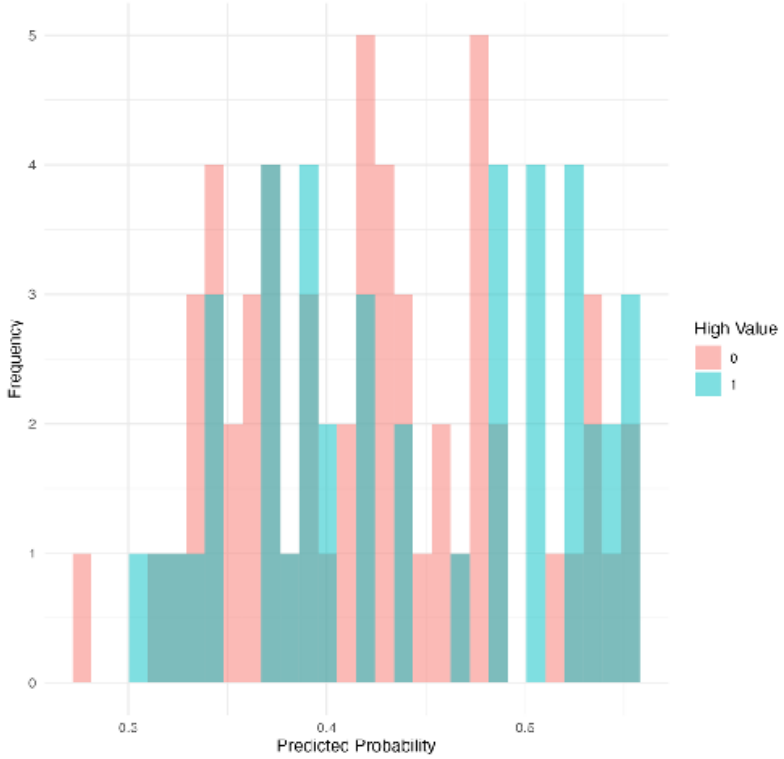

Fig 3. Predicted Probabilities Histogram of Predicted Probably and Frequency.

Although revenue, green rating scores, and environmental reporting are major components, the logistic regression analysis shows that their individual effects on a company's high-value status are not statistically significant in this model. Nonetheless, the patterns that the coefficients indicate offer insightful information about the characteristics of these connections. Though there is still need for improvement, the model's overall fit and predictive power, as shown by the ROC curve and deviance residuals, indicate that it reasonably represents the underlying dynamics.

6.1. Discussion

The results of this study provide a number of points of debate on how environmental sustainability reporting affects business value. Although it has certain limitations in terms of statistical significance, the logistic regression analysis offers an empirical viewpoint on this connection and is mostly focused on Chinese listed businesses.

6.2. Interpretation of Findings

The investigation shows that, although revenue, green rating scores, and environmental sustainability reporting are related to a company's probability of being regarded as high-value, our model does not find any statistical significance for these relationships. This result may point to a number of underlying causes. First of all, it can imply that even if businesses adopt environmental sustainability policies, these measures may not yet be the main factor used by the market to assess a company's worth. On the other hand, this may represent how environmental sustainability is still being included into basic business plans and valuation schemes in the Chinese market.

6.3. Implications for Corporate Strategy

Despite the lack of statistical significance, the negative association of environmental reporting and revenue with high-value status, and the positive association with green rating scores, offer valuable insights. They hint at the possibility that the market might value intrinsic environmental quality over mere reporting. This can encourage companies to focus on actual environmental performance improvements rather than just on reporting practices. The findings also suggest that investors and stakeholders might be beginning to recognize and value genuine environmental sustainability efforts, which could become more pronounced in the future.

6.4. Limitations and Considerations

The study has some shortcomings. While useful for a broad examination, secondary data from the WIND database could not fully reflect the subtleties of environmental sustainability reporting techniques and their effects. Furthermore, the absence of statistical significance for important variables in the model suggests the need for more detailed information or different analytical techniques.

6.5. Future Research Directions

Future research should consider longitudinal data to capture the evolving nature of environmental sustainability reporting and its long-term impact on corporate value. Additionally, qualitative research could provide deeper insights into how and why environmental sustainability practices influence corporate valuation from the perspective of investors, customers, and other stakeholders. Exploring different industry sectors and incorporating international comparisons could also enrich the understanding of these dynamics in a global context.

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