

Corporate Greenwashing, Information Asymmetry, and Debt Financing Costs

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Abstract. Against the continuous advancement of green financial policies and the dual-carbon goal, corporate greenwashing has gained growing market attention. According to the model of A-share public companies, this paper measures the green drift behavior by using the deviation between practical environmental performance and enterprise environmental information disclosure, and examines the impact on debt costs and the transmission effect of information asymmetry. Empirical results show that higher greenwashing intensity correlates with lower corporate debt financing costs. Further analysis shows that greenwashing behavior will significantly aggravate information disclosure and push up the cost of debt financing through this channel. The results show that bleaching green does not improve the financing conditions of claimant enterprises, but increases the risk compensation requirements of claimants by weakening the authenticity of information disclosure. This paper enriches research on the consequences of greenwashing the economy from the perspective of corporate debt financing and provides substantial evidence for improving the supervision of ESG disclosure and improving the efficiency of debt pricing.

Keywords: greenwashing, cost of debt financing, information asymmetry, ESG disclosure

1. Introduction

Against the backdrop of the continuous promotion of the goal of "double carbon", the gradual deepening of the concept of sustainable development, the performance of the enterprise environment, society, and governance has become a content of concern to the regulatory authorities and the capital market. With the continuous improvement of ESG information disclosure requirements, some enterprises may use disclosure behavior to create a green image [1]. Firms may adopt selective disclosure, overstate environmental performance, or conceal adverse information to conduct greenwashing under inconsistent disclosure standards and inadequate information verification [2]. Greenwashing will not only aggravate information asymmetry and mislead investors and creditors in decision-making but also affect the financing cost, resource allocation efficiency, and sustainable development ability of enterprises [3].

Existing papers analyze the economic impacts of corporate environmental activities based on ESG performance and disclosure, while few studies explore how greenwashing influences debt pricing and its internal transmission path. This paper takes China's A-share listed companies from 2019 to 2024 as a sample, uses a two-way fixed-effect and intermediary-effect model, and draws a

conclusion by analyzing the micro relationship between greenwashing and debt contracts: a higher level of green drift of enterprises is associated with a lower cost of debt financing. The underlying mechanism is that greenwashing aggravates information asymmetry and enables enterprises to obtain low-cost debt capital. In a theoretical sense, this paper extends the green drift research to the field of debt contracts and reveals the mechanism of ESG distortion in information-distorting financing pricing. In a practical sense, this paper provides empirical support for regulators to improve the ESG verification system and creditors to optimize the green credit risk identification mechanism.

2. Research assumptions and theoretical analysis

2.1. Impact of corporate greenwashing on debt financing costs

Corporate greenwashing is essentially an impression management strategy that packages operational activities with green narratives and manipulates environmental disclosure selectively. Bleaching green is not really to improve environmental performance, but for the sake of economic interests, enterprises whitewash environmental information to create a green image and reduce financing constraints. Discussing the contractual role of accounting information from the perspective of creditors, it is pointed out that the quality of information will affect creditors' credit decisions, and the more information can reflect the real operating conditions, the more willing creditors are to provide long-term financing [4]. Creditors pay more and more attention to the green attributes of projects in investment decisions, and will further evaluate the flow of funds used by enterprises, the performance of social responsibilities, and the effectiveness of environmental improvement [5]. In this process, the higher the level of green financial development, the stronger the creditors' awareness of green development and ability to supervise and evaluate.

Against the backdrop of the continuous development of green finance, creditors play an increasingly important role in environmental constraints in corporate financing decisions. Financial intermediaries have gradually taken into account the environmental performance of enterprises when granting credit and pricing, which makes non-green enterprises face higher financing constraints and risks. Enterprises need to choose between higher capital investment and a longer transformation cycle, or beautify their image by exaggerating green commitments and weakening environmental problems, so as to meet the preferences of creditors. If creditors fail to identify false elements in corporate disclosures, greenwashing may enhance the external financing capacity of enterprises and make it easier for them to obtain debt financing at a lower cost. Based on this, this paper puts forward the following assumptions:

H1: There is a negative correlation between the greening behavior of enterprises and their debt financing costs.

2.2. The influence of information asymmetry

Greenwashing distorts the authenticity and integrity of ESG disclosures and weakens the relevance, truthfulness, verifiability, and timeliness of information disclosure, thereby intensifying the information asymmetry between enterprises and external stakeholders. When enterprises shape a green image by selectively disclosing, exaggerating positive information, or concealing negative information, creditors and investors are more likely to overestimate the level of environmental governance and future operational stability of enterprises based on distorted information, thus affecting their risk judgment and resource allocation decisions. Higher-quality information

disclosure helps ease information asymmetry during corporate financing activities. On the contrary, the disclosure distortion caused by green bleaching will weaken this effect and further aggravate the problem of information asymmetry [6].

The improvement of information transparency essentially strengthens the ability of enterprises to send credible signals to creditors. Compared with the situation of insufficient information disclosure, sufficient and high-quality information can supplement the judgment basis for creditors on the operating conditions, risk exposure, and solvency of enterprises, so as to narrow the information gap between the two sides and reduce the uncertainty of credit risk identification [7]. Positive information disclosure can alleviate the financing constraints of heavily polluting enterprises and help creditors judge regulatory pressures, future constraints, and cash flow capability [8]. Information transparency, analyst attention, and enterprise innovation information disclosure are all important bases for creditors to assess enterprise risks. It can be seen that information transparency not only affects the risk judgment of creditors but also further affects the financing cost of enterprises by optimizing their pricing decisions [9]. Based on this, this paper puts forward the following assumptions:

H2: As an intermediary, information asymmetry has a transmission effect on the green floating behavior of enterprises and the cost of debt financing.

3. Study design

3.1. Data sources and sample selection

In order to explore the substantial impact of corporate greenwashing on external debt pricing, this study selects Chinese A-share listed firms spanning 2019 to 2024 as the initial observation value. After removing ST, PT, and financial enterprises together with samples lacking core data, this study constructs an unbalanced panel dataset with 12030 valid observations. The green drift measure is extracted according to the indicators relying on the CSMAR database, while the financial characteristics and information transparency at the company level are cross-supplemented by the wind database. This paper uses the difference between the score of enterprise environmental information disclosure and the actual environmental performance score to measure the degree of enterprise greening [10]. In this paper, the explanatory variable is presumed to be the cost of debt financing, which is quantified by the proportion of interest expenditure to total liabilities. The names and definitions of control variables are shown in Table 1.

Table 1. Variable names and definitions

Variable type	Variable name	Symbol	Measurement
Explained variable	Debt financing costs	DebtCost	Interest expense / (total liabilities accounts payable)
Explanatory variable	Greenish index	Greenwashing	Text similarity of Bloomberg ESG data disclosure
	Return on equity	Roe	Net profit / Average shareholders' equity
	Asset-liability ratio	Lev	Year-end total liabilities / Year-end total assets
Control variable	Profitability	ROA	Net income / Total assets
	Growth	Growth	Operating income (t) / Operating income (t-1) -1
	Nature of property rights	SOE	State ownership: 1 = yes, 0 = no

3.2. Model setting

To examine the direct effect of corporate greenwashing on debt financing costs, this paper constructs the following benchmark regression model (1). Among them, Debtcost refers to the cost of debt financing, which is used to determine the cost level borne by enterprises to obtain debt funds. Greenwashing refers to the degree of greenwashing of enterprises, which is used to characterize the degree of deviation between ESG information disclosure and real performance. Controls constitute a set of control variables employed to regulate other corporate characteristics that may influence the cost of debt financing. " μ " represents the individual fixed effect, " λ " denotes the time fixed effect, both of which are utilized to account for the common impact at the year level. Epsilon is the random disturbance term. The model is mainly used to test the direction and extent of the impact of greening behavior on the debt financing cost.

$$\text{DebtCost}_{it} = a_0 + \beta_1 \text{Greenwashing}_{it} + \sum \gamma_j \text{Controls}_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

In order to further assess the mediating role of information asymmetry in the relationship between greenwashing and the cost of debt financing, this study specifies the following mediation models (2) and (3), in which IA represents the degree of information asymmetry, which is employed to reflect the information difference and the extent of disclosure transparency between enterprises and external investors. The first stage model is used to test whether green bleaching will significantly affect the degree of information asymmetry of enterprises. The second stage model further examines its impact on debt financing costs after incorporating information asymmetry variables and tests whether it plays an intermediary role between greenwashing behavior and debt financing costs.

$$\text{IA}_{it} = a_2 + \beta_2 \text{Greenwashing}_{it} + \sum \gamma_j \text{Controls}_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

$$\text{DebtCost}_{it} = a_3 + \beta_3 \text{Greenwashing}_{it} + \gamma \text{IA}_{it} + \sum \gamma_j \text{Controls}_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (3)$$

4. Empirical results

4.1. Descriptive statistics

Table 2 presents the descriptive statistics for the main variables. The mean value of the greenwashing degree is 0.438, and the standard deviation is 0.104. Descriptive results indicate prevalent moderate greenwashing among sampled firms with concentrated indicator distribution. The average debt value financing cost degree is 0.151. With a standard deviation of 0.139, this indicates notable differences in the cost burden associated with obtaining external debt funds among different enterprises. The control variables are close to the existing literature, which objectively reflects the heterogeneity of sample enterprises in financial situation and corporate governance. According to the test of variance expansion factor, the VIF value does not exceed 3, indicating the absence of a significant multicollinearity problem.

Table 2. Descriptive analysis of variables

Variable	Observations	Mean	Standard deviation	Min	Max
DebtCost	12,030	0.1513	0.1395	0.0000	1.0000
Greenwashing	12,030	0.4382	0.1042	0.0000	1.0000
ROE	12,030	0.0007	0.0083	-0.8565	0.0154
Size	12,030	23.3973	1.3645	18.1225	28.7908
Lev	12,030	0.4809	0.1963	0.0091	1.1654
Growth	12,030	0.1218	0.2871	-0.9532	1.9986
Top1	12,030	0.3724	0.1647	0.0308	0.8999
Dual	12,030	0.1963	0.3972	0.0000	1.0000
Indep	12,030	0.3784	0.0765	0.1429	0.8462
Asy	12,030	-0.7613	0.5939	-2.4377	1.7687

4.2. Benchmark regression analysis

Table 3 reports the benchmark regression results of the effect of corporate greenwashing on debt financing costs. After incorporating firm and year two-way fixed effects into the regression model, the core explanatory variable presents a coefficient of -0.024, which is significantly negative at the 1% confidence level. This shows that in the current market environment, the green bleaching behavior of enterprises, to a certain extent, can play a role in greenwashing in the short term, thus significantly reducing the cost of obtaining external debt funds. R2 is 0.0854, which reflects satisfactory explanatory power of the model, and the benchmark regression results are robust and are in line with theoretical expectations.

Table 3. Benchmark regression analysis of variables

Variable	(1) DebtCost	(2) IA	(3) DebtCost
Greenwashing	-0.024*** (-4.23)	0.324*** (3.07)	-0.013* (-1.69)
IA	-	-	-0.010*** (-4.95)
ROE	0.122 (1.48)	-0.581 (-0.94)	0.101 (1.19)
Size	-0.014*** (-4.73)	-0.287*** (-10.63)	-0.016*** (-5.17)
Lev	0.073*** (10.46)	0.560*** (15.14)	0.067*** (8.39)
Growth	0.005* (2.25)	-0.104*** (-8.69)	0.004* (1.75)
Top1	0.059*** (4.90)	0.799*** (14.02)	0.006*** (4.27)
Dual	0.004	0.007	0.004

Table 3. (continued)

	(1.50)	(0.61)	(1.50)
Indep	-0.029***	-0.133***	-0.026***
	(-3.61)	(-2.77)	(-2.88)
Constant	0.422***	6.727***	0.463***
	(7.27)	(29.37)	(7.12)
Individual FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	12030	12030	12030
R ²	0.0854	0.02372	0.0854
Sobel value			2.61**
Proportion			11.57%

Note: () is the value of T. *, **, and *** represent 10%, 5%, and 1% significance levels, respectively.

Information asymmetry is used to measure the market information environment and carry out the intermediary effect test. Columns (2) and (3) of Table 3 report the regression results. Column (2) shows that the degree of greening is significantly positively related to information asymmetry at the 1% level, with a coefficient of 0.324, $t=3.07$. It shows that enterprise greening can significantly aggravate information asymmetry. Column (3) indicates that the degree of greening is negatively related to the cost of debt financing at the significance level of 10%, with a coefficient of -0.013, $t=-1.69$, the information asymmetry of intermediary variables is negatively correlated with the debt financing cost at the 1% significance, with a coefficient of -0.010, $t=-4.95$. It shows that there is a partial mediating effect; the greater the degree of information asymmetry, the lower the debt financing cost for enterprises. Corporate greenwashing reduces the cost of debt financing by exacerbating information asymmetry.

5. Conclusion

This paper systematically investigates the impact of corporate greenwashing on the cost of debt financing and its mechanism. The study found that a higher level of greenwashing is associated with a lower cost of debt financing. Analyzing its internal reasons, the greening behavior conceals the true environmental risks and exacerbates the information asymmetry between businesses and finance sources. This shows that there are loopholes in the pricing mechanism of ESG information in the current debt market, and creditors fail to effectively penetrate the green camouflage of enterprises, triggering a short-term mismatch of green credit resources. Corresponding suggestions are proposed accordingly: regulators need to upgrade mandatory ESG disclosure and verification rules to restrict misleading green disclosure. Creditors should introduce multi-dimensional information, such as third-party authentication and environmental penalties, to carry out cross-verification and reshape the penetrating risk identification system. Enterprises should promote green governance from formal disclosure to substantial improvement and avoid replacing real green transformation with strategic compliance.

This study contributes to the literature on the relationship between ESG distortion information and debt pricing by extending the economic effects of greenwashing to the sphere of debt finance. g. This study not only identifies the internal mechanism of distorted credit pricing from the standpoint

of information asymmetry but also provides new empirical evidence to better understand the pricing failure of green financial markets and helps to guide financial institutions to optimize pricing models and provides a theoretical reference for follow-up scholars to explore ESG information quality and capital allocation efficiency. Restricted by available data, the greenwashing indicator calculated from disclosure-performance gaps fails to fully identify covert greenwashing activities and does not subdivide the types of debt. Future research can try to use natural language processing and other technologies to build more accurate and multi-dimensional green drift measurement indicators and further explore the heterogeneous impact of green drift on the pricing of specific financial instruments such as green bonds, so as to deepen research in this field.

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