How ESG Performance Affects Cost of Capital?

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Abstract. The integration of Environmental, Social, and Governance (ESG) factors into corporate decision-making has become a focal point for investors and companies alike, driven by a heightened emphasis on sustainable development. This study examines the nuanced relationship between ESG performance and the cost of capital, utilizing panel data from US listed companies over the period from 2002 to 2021. The findings indicate a significant negative relationship between high ESG scores and the cost of debt, attributed to reduced information asymmetry, enhanced investor confidence, and lower risk perceptions. In contrast, there is no substantial effect on the cost of equity, suggesting that equity investors may prioritize financial metrics over sustainability indicators. Further analysis shows that the debt-reducing effect of ESG was more pronounced before 2010 and among firms with lower leverage levels, underscoring the roles of regulatory evolution and financial risk. The study provides valuable implications for corporate managers, investors, and policymakers aiming to leverage ESG practices for improved financial outcomes and sustainable growth, highlighting the need for integrating ESG considerations into strategic decision-making processes.

Keywords: ESG Performance, Cost of Capital, Sustainable Finance, Heterogeneity.

1 Introduction

The growing emphasis on sustainable development has positioned Environmental, Social, and Governance (ESG) performance as a critical factor in corporate decision-making and investor evaluation. While existing hypothesis suggests that strong ESG performance can lower financing costs through mechanisms such as reduced information asymmetry, enhanced investor preference, and lower risk premiums, the empirical evidence remains nuanced and context-dependent. This study aims to provide a comprehensive analysis of the relationship between ESG performance and corporate financing costs, differentiating between debt and equity financing, and exploring temporal and firm-specific heterogeneities. By doing so, it seeks to contribute to the understanding of how ESG factors are priced in capital markets and under what conditions their benefits are most pronounced.

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To achieve this objective, a multi-dimensional empirical approach is employed, using panel data from a broad sample of US listed companies from 2002 to 2021. Three key dependent variables are constructed: the implied cost of capital, cost of debt, and cost of equity, each measured with rigorous methodologies to ensure accuracy and comparability. Control variables are incorporated to isolate the effect of ESG performance. The analysis utilizes fixed-effects regression models to account for unobserved firm and year heterogeneity, with standard errors clustered at the firm level to address potential serial correlation and heteroskedasticity.

Baseline results show a significant negative correlation between ESG performance and the cost of debt, indicating that creditors view high ESG scores as a marker of reduced default risk. This supports the theory of information asymmetry, as enhanced ESG performance likely provides clearer information to creditors, reducing their perception of hidden risks. In contrast, no significant link is found with the cost of equity, suggesting that equity investors may place greater emphasis on financial returns than on sustainability metrics. This finding aligns with the investor preference theory, where equity investors might prioritize short-term financial gains over ESG factors, which are seen as less directly related to immediate financial performance. Heterogeneity analysis further reveals that the debt cost reduction effect was stronger before 2010—when ESG disclosures were less standardized—but diminished thereafter, likely due to market adaptation. This temporal shift underscores the dynamics of risk premium theory, as the standardization of ESG disclosures may have normalized the perceived risk reduction benefits associated with high ESG scores. Moreover, the benefits of ESG are more pronounced in firms with lower leverage, where financial risk does not dominate risk assessment. This finding supports the risk premium theory, where lower leverage allows the risk-reducing benefits of ESG performance to be more fully recognized by creditors, as financial distress is less likely to overshadow the ESG-related risk mitigation.

In terms of this study's contributions, prior research extensively examined how ESG factors impact various corporate outcomes, such as operational performance and investor behavior [1-2], while other studies have focused on the determinants of financing costs, highlighting factors like financial performance and market conditions [3]. This study uniquely intersects these two streams by empirically demonstrating the influence of ESG performance on the cost of capital. It expands the understanding of ESG's role, offering new insights into how ESG practices translate into tangible financial benefits, specifically in reducing the cost of debt. Furthermore, it deepens the understanding of the underlying mechanisms through which ESG affects financing costs, namely through information asymmetry reduction, investor preference alignment, and risk premium adjustments. By providing empirical evidence on how these mechanisms operate under different market conditions and firm-specific characteristics, this study offers a detailed theoretical framework that highlights the nuanced and context-dependent nature of ESG's financial benefits. It underscores the necessity for stakeholders to consider ESG in both strategic decision-making and investment evaluation to fully leverage its potential advantages. This positions the study as a critical bridge between understanding the broad impacts of ESG and recognizing its specific financial implications, thereby enriching both academic discourse and practical applications in sustainable finance.

2 Literature Review

ESG scoring often operates through three core mechanisms: information asymmetry, investor preferences, and risk premium. Therefore, this article will draw on existing research to further analyze the specific ways in which ESG affects financing costs.

Firstly, ESG scores play a significant role in reducing information asymmetry by enhancing transparency and corporate communication. Companies with robust ESG reports provide clearer insights into their governance practices, environmental impact, and social responsibility initiatives, which can reassure investors about their operational resilience. A reduction in information asymmetry often leads to a decrease in perceived risks, typically reflected in financing costs. Hence, firms with higher ESG ratings benefit from lower capital costs primarily because enhanced transparency diminishes concerns among investors and lenders regarding potential hidden risks. For instance, the research of Zhang et al. (2023) proves that improved ESG performance correlates with decreased information costs and better accessibility to lower-cost financing options [4]. It further emphasizes how higher ESG ratings can mitigate risks and therefore lower the cost of debt by reducing risks associated with misinformation or lack of visibility.

Secondly, investor preferences have increasingly gravitated towards ESG-compliant firms, directly impacting financing costs. As institutional and retail investors focus more on sustainability, firms exhibiting strong ESG practices are often rewarded with increased investment interest. This heightened preference translates into lower equity and debt financing costs as demand for their shares increases. Research has highlighted the role of institutional investors in shaping corporate behaviors through their appetite for ESG, suggesting that firms with better ESG profiles experience significant advantages in capital market access and financing affordability [5]. The evidence supports the idea that investor preferences can affect the cost of capital; for instance, firms targeted by socially responsible investors generally have improved financing conditions based on their adherence to ESG principles [6].

Thirdly, the relationship between ESG scores and risk premiums is crucial in understanding financing costs. High ESG scores often lead to lower risk premiums, as companies perceived as sustainable are generally regarded as having better long-term performance potential and lower operational risks. This perception allows these firms to secure financing at more favorable terms. Niblock's research (2024) has established a clear link between improved ESG outcomes and reduced risk premiums, indicating that investors are more willing to lend to or invest in companies that emphasize sustainability through lower compensation for perceived risks [7]. Further research suggests that ESG performance influences excess returns in equity markets, illustrating how firms with solid sustainability practices often enjoy lower financing costs as a result of diminished required rates of return from investors [8].

In summary, ESG scores significantly affect financing costs through various mechanisms grounded in information asymmetry, investor preference, and risk premium considerations. Enhanced transparency lowers information asymmetry, leading to decreased financing costs. Growing investor preference for high ESG ratings encourages

favorable financing conditions, while better ESG performance reduces the risk premium required by investors. These dynamics are supported by current literature that underscores the evolving importance of ESG factors in corporate finance.

3 Data and Methodology

3.1 Corporate ESG Score (ESG)

The ESG data used in this article is sourced from the ESG database of the *London Stock Exchange Group*, which is renowned for its comprehensiveness in the industry [9]. This data uses industry groups as environmental and social evaluation benchmarks, and countries or regions as governance evaluation benchmarks. The percentile ranking method is used to calculate and dynamically adjust the scores, ultimately forming a quantitative indicator of corporate ESG performance. In response to the possibility of multiple ESG records for the same company in the same year, this article takes the average ESG score to eliminate duplicate data. Finally, to control for the influence of extreme values, the overall ESG score, environmental score, social score, and corporate governance score were rounded up and down by 1% to obtain a cleaned ESG data set for subsequent analysis.

3.2 Implied Cost of Capital (ICC)

The *Compustat* database is the source of the implied cost of capital (ICC) information used in this article. This concept is determined using Gebhardt, Lee, and Swaminathan's (2001) methodology, which employs a residual income model to calculate the discount rate by combining short-term analyst projections, long-term industry growth rates, and firm book value data [10].

3.3 Cost of Debt ($Cost\ of\ Debt$)

The data for this debt cost comes from the *FUNDA* dataset of *Compustat*, which is the main source of annual accounting data. Hence, the core variable $Cost\ of\ Debt$ is calculated using the ratio of interest expenses to the sum of short-term and long-term debt [11]. The exclusion of invalid samples with zero total debt ensures the validity of the calculation.

3.4 Cost of Equity ($Cost\ of\ Equity$)

The data on equity cost comes from *Compustat*'s SECD dataset and CRSP's S&P 500 index dataset. The calculation utilized the Capital Asset Pricing Model (CAPM) [12]. Specifically, the cost of equity measures the minimum expected rate of return that a company promises to its shareholders. The core logic is that the higher the risk borne by shareholders, the higher the required return. When calculating, first quantify the risk based on the sensitivity of the historical price changes of the company's stock to the

overall market volatility; then, subtract the risk-free rate from the overall expected market return to obtain the market risk premium; finally, the risk quantification result is multiplied by the premium and added back to the risk-free rate to obtain the cost of equity. The higher the value, the more shareholders perceive the company's risk and the higher the required return. The lower the value, the lower the company's risk and shareholders are willing to accept lower returns.

3.5 Control Variables

Control variables also come from *FUNDA*. This research adopts five control variables, including firm size (natural logarithm of total assets, denoted as $Size$), ROA (return on assets), ratio of long-term debt to total assets ($Leverage$), $Cash\ Ratio$ (ratio of cash and short-term investments to total assets), and $Sales\ Growth$ (defined as the year-over-year percentage change in sales).

3.6 Descriptive Statistics

Table 1 shows the descriptive statistical results of the main variables, including sample size, mean, standard deviation, 10% percentile, median, and 90% percentile. Firstly, considering the ESG scores, the mean and standard deviation are 0.483 and 0.295, respectively, indicating significant differences in ESG performance among sample companies. The data distribution is skewed to the right, which means that most companies score low and a few companies perform outstandingly.

In terms of financial indicators, the average cost of debt is 0.061, the average cost of equity is 0.153, and the standard deviations are 0.073 and 0.169, respectively, which also reflect significant differences in corporate financing costs. The distribution of other variables is within a reasonable range.

Table 1. Descriptive statistical results.

Variable	Sample Number	Average Value	Standard Deviation	P10	Median	P90
ESG	30032	0.483	0.295	0.130	0.426	0.922
ICC	26661	0.083	0.036	0.040	0.080	0.124
Cost of Debt	25680	0.061	0.073	0.020	0.049	0.090
Cost of Equity	30834	0.153	0.169	-0.030	0.155	0.375
Size	31147	8.134	1.801	5.752	8.133	10.422
Leverage	31033	0.243	0.212	0.002	0.209	0.526
Cash Ratio	31147	0.164	0.198	0.012	0.086	0.446
Sales Growth	30749	0.138	0.416	-0.130	0.067	0.403
ROA	29639	0.079	0.156	-0.030	0.097	0.218

3.7 Methodology

To ensure the robustness of the results, the initial dataset undergoes the following processing steps. Firstly, exclude financial reports and use industrial enterprise reports. At the same time, choose to merge the reports and ensure that the data source is published by the company itself and priced in US dollars. Secondly, apply 1% and 99% winsorization to the dataset to address the impact of extreme outliers and exclude company samples with total assets below $10 million.

After the above sample screening and variable data processing, the following panel fixed-effects regression model is constructed to empirically test the impact of ESG performance on financing costs.

$$Cost_{i,t} = \alpha_0 + \alpha_1 ESG_{i,t} + \alpha_2 ControlVar_{i,t} + \delta_i + \delta_t + \varepsilon_{i,t} \quad (1)$$

In this model, the subscripts i and t denote firm and year, respectively. The dependent variable $Cost$ represents the financing cost of firm i in year t, measured by the ICC, $Cost\ of\ Debt$, and the $Cost\ of\ Equity$ in previous sections. The key explanatory variable measures the ESG performance of firm i in year t. $ControlVar_{i,t}$ represents a vector of time-varying firm-level control variables, including $Size$, $Leverage$, $Cash\ Ratio$, $Sales\ Growth$, and ROA, to account for the potential influences of financial characteristics and risk on financing costs.

Furthermore, the model incorporates firm fixed effects δ_i and year fixed effects δ_t. The firm fixed effects control for time-invariant firm heterogeneity, while the year fixed effects absorb macroeconomic cycles and common temporal shocks. The term $\varepsilon_{i,t}$ denotes the idiosyncratic error term. All regressions employ standard errors clustered at the firm level to mitigate concerns regarding serial correlation and heteroskedasticity.

4 Research Results and Analysis

4.1 Correlation Analysis

This article uses the Pearson correlation coefficient method to preliminarily test the relationship between variables, and presents the data results in Table 2. It can be seen that, there is a weak negative correlation between ESG and ICC (coefficient=-0.001), indicating that companies with better ESG conditions may benefit from slightly lower financing costs, although this relationship is not strong. In addition, except for the correlation coefficients between the three variables of financing cost, the coefficients between the other variables are all less than 0.7, indicating that there is no serious collinearity problem between the variables and they can all be retained.

Table 2. Correlation analysis results.

	ESG	ICC	Cost of Debt	Cost of Equity	Size	Leverage	Cash Ratio	Sales Growth	ROA
ESG	1.000								
ICC	-0.001	1.000							
Cost of Debt	-0.116	0.088	1.000						
Cost of Equity	0.008	-0.034	0.010	1.000					
Size	0.513	0.158	-0.177	-0.087	1.000				
Leverage	0.023	0.018	-0.149	0.025	0.091	1.000			
Cash Ratio	-0.218	-0.183	0.096	0.098	-0.437	-0.237	1.000		
Sales Growth	-0.152	-0.095	0.018	0.047	-0.148	-0.045	0.230	1.000	
ROA	0.298	0.097	-0.103	-0.107	0.292	0.064	-0.426	-0.141	1.000

4.2 Panel Regression Analysis

4.2.1 Baseline. The implied cost of capital, cost of debt, and cost of equity are evaluated independently against the current year's overall ESG score in accordance with the aforementioned research question. Table 3 displays the primary multiple regression analysis.

There is a significant negative correlation between the ESG score and the cost of capital (ICC), meaning that the higher the score, the lower the implied cost of capital for the company. This is evident from the baseline of ICC columns, which shows that the coefficient of the ESG score is negative and significant at the 1% level under industry-year fixed effects and the same under the firm-year fixed effects.

The differential impact of ESG scores on debt capital costs versus equity capital costs can be attributed to distinct mechanisms underlying the preferences of creditors and shareholders. Debt capital is typically more sensitive to risk evaluation, reflecting concerns over the firm's sustainability and governance practices more acutely than equity capital [11]. Creditors prioritize the reliability of cash flows to safeguard their loan repayments, thus viewing ESG scores as indicative of lower operational risks and potential future liabilities, and perceiving high ESG performance as reducing default risks [13].

In contrast, equity investors may weigh a broader set of qualitative and future growth potentials that are less sensitive to current ESG scores. The relationship between ESG performance and cost of equity is less pronounced ($p > 0.1$), suggesting that shareholders may prioritize immediate financial performance and growth prospects over sustainability metrics. This discrepancy underscores the inherent preferences; while creditors seek short to medium-term stability afforded by robust ESG practices, equity investors may exhibit a willingness to tolerate greater risk in pursuit of higher returns [14]. Recent research supports these observations, noting that improved ESG disclosures have

a pronounced effect on lowering the cost of debt, as they can enhance perceived management quality [13]. Conversely, the link between ESG performance and equity costs is less deterministic, as investors often focus on additional variables influencing future profitability [14]. This nuanced understanding reflects the evolving landscape of investor behavior and risk assessment regarding ESG factors in capital costs.

Table 3. Regression results for the baseline model.

	ICC		Cost of Debt	Cost of Equity
	(1)	(2)		
ESG	-0.013***	-0.005***	-0.011***	-0.001
	(-3.746)	(-2.816)	(-3.349)	(-0.365)
Size	0.002***	0.001	-0.018**	0.006***
	(3.585)	(0.925)	(-8.336)	(3.762)
Leverage	0.016***	0.011***	-0.121***	0.022***
	(3.224)	(3.209)	(-12.026)	(4.319)
Cash Ratio	-0.033***	-0.017***	0.007	-0.000
	(-7.947)	(-4.669)	(0.607)	(-0.047)
Sales Growth	-0.006***	-0.006***	-0.003	0.003**
	(-4.166)	(-6.133)	(-1.336)	(2.166)
ROA	0.023**	0.025***	-0.000	-0.009
	(2.210)	(4.884)	(-0.006)	(-1.313)
SIC FE	Yes			
Firm FE		Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.271	0.701	0.457	0.857
N	24554	24554	23213	28042

Note: The data in the table are regression coefficients of each variable, and ***, **, and * are significant at the significance level of 1%, 5% and 10% respectively.

4.2.2 Heterogeneity. To further investigate whether there is heterogeneity in the impact of ESG score on implied cost of capital due to differences in external environment or corporate characteristics, and to reveal the boundary conditions of the relationship between the two in more depth, this article conducted grouped regression tests based on the time dimension (around 2010) and the level of corporate leverage (high/low), and the specific results are presented in Table 4.

The initial heterogeneity test employs 2010 as a pivotal time marker for grouped regression analysis. The period surrounding 2010 represents a significant juncture in the trajectory of global sustainable financial development. Prior to 2010, ESG considerations were predominantly regarded as niche or ethically-driven investment strategies, primarily targeting investors with specific value orientations [15]. In the aftermath of the 2008 global financial crisis, the investment community increasingly scrutinized

short-termism and excessive corporate risk-taking. This introspection spurred an enhanced focus on long-term, sustainable investment value. The influence of initiatives such as the United Nations Principles for Responsible Investment expanded markedly post-2010, signifying a transition of ESG considerations from peripheral to mainstream investment practices [15]. Consequently, 2010 represents a critical inflection point, transitioning ESG from a stage of conceptual advocacy to one of large-scale implementation.

Regression analyses indicate that in the column of "prior to 2010", a significant negative correlation exists between ESG performance and the implied cost of capital, significant at the 1% level. Post-2010, this relationship ceases to be statistically significant. This shift may be attributed to cognitive convergence stemming from changes in the information environment and investor preferences post-2010. From an information asymmetry perspective, the pre-2010 market environment was characterized by insufficient and non-standardized ESG information disclosure, leading to pronounced information asymmetry. Enterprises engaging in proactive ESG disclosure and management signaled to the market their excellence in governance, comprehensive risk management, and commitment to long-term sustainable development. This effectively reduced perceived uncertainty and risk among external investors, operating as an effective "reputation mechanism" or "signal transmission mechanism", thereby significantly lowering the cost of equity financing for such enterprises. Consequently, the risk reduction and information transparency effects of ESG were particularly salient during this nascent phase. Post-2010, as the ESG paradigm gained prominence and regulatory mechanisms strengthened, the distinctiveness of superior ESG performance diminished, transforming from a scarce attribute to a prevailing expectation among leading companies. This convergence reduced the efficacy of ESG ratings as differentiation signals. Concurrently, with investors' understanding of ESG becoming more homogenous, substantial capital influx into the ESG domain may have generally elevated ESG asset valuations, thus diluting their excess returns in terms of reducing capital costs. At this juncture, ESG resembles more of a necessity than a premium product, serving primarily to shield companies from penalties associated with ESG deficiencies (i.e., avoiding increased capital costs), while offering limited additional competitive advantages in financing. In conclusion, delineating 2010 as the boundary, the relationship between ESG and capital cost transitions from a significant negative to an insignificant correlation, reflecting the maturation of the ESG investment ecosystem in a profound manner.

In the second heterogeneity test conducted within the group, the sample companies are categorized into high and low leverage ratio groups based on the calculation of the industry's annual median $Leverage$. As presented in Table 4, the ESG coefficient is not statistically significant in the high leverage group but achieves significance at the 5% level in the low leverage group. This suggests that the financial risks associated with higher debt levels can overshadow the perceived benefits of ESG performance. Firms with increased leverage may experience heightened financial risk, which could diminish the effectiveness of positive ESG attributes as forms of risk mitigation [16]. Lower leverage likely translates to less financial distress and thus a more pronounced effect of ESG factors on the cost of capital, reinforcing the notion that risk characteristics associated with capital structure significantly mediate the ESG-cost relationship.

There exists evidence suggesting that lower leverage allows firms to reap the benefits of ESG investments more efficiently, while higher leverage could negate these advantages due to elevated financial risks associated with debt financing [17].

Table 4. Results of heterogeneity analysis.

	Full Sample (Dependent Variable of ICC)			
	Before 2010	After 2010	Low Leverage	High Leverage
ESG	-0.008***	-0.003	-0.006**	-0.003
	(-3.139)	(-1.410)	(-2.088)	(-1.612)
Size	0.002	-0.001	0.000	0.002*
	(1.051)	(-0.643)	(0.118)	(1.719)
Leverage	0.005	0.015***	0.023***	-0.003
	(0.727)	(3.992)	(3.862)	(-0.460)
Cash Ratio	-0.023***	-0.012***	-0.017**	-0.016***
	(-3.654)	(-3.214)	(-2.535)	(-4.445)
Sales Growth	-0.004*	-0.004***	-0.006***	-0.004**
	(-1.843)	(-4.510)	(-3.691)	(-3.619)
ROA	0.036***	0.023***	0.031***	0.021***
	(3.375)	(4.023)	(3.341)	(3.623)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adjusted R-squared	0.748	0.735	0.684	0.802
N	4934	19620	12630	11924

Note: The data in the table are regression coefficients of each variable, and ***, **, and * are significant at the significance level of 1%, 5% and 10% respectively.

5 Conclusion

This study demonstrates that robust ESG performance significantly lowers the cost of debt, as creditors perceive high-rated firms as less risky and more sustainable. In contrast, no significant association is found with the cost of equity, indicating that shareholders prioritize financial performance over non-financial metrics. The relationship is shaped by temporal and firm-specific factors. The debt-reducing effect of ESG was stronger before 2010, when ESG disclosure was less standardized, suggesting that market normalization has reduced its informational advantage. Moreover, the benefits are more evident in low-leverage firms, where financial risk does not dominate lenders' assessments. These findings offer practical insights for various stakeholders. Corporate managers should leverage ESG improvements to reduce financing costs, especially when utilizing debt instruments. Debt investors may use ESG scores as a reliable indicator of creditworthiness, while equity investors are encouraged to integrate ESG with traditional financial analysis to better assess long-term value. Policymakers and regulators should continue enhancing ESG disclosure frameworks to improve transparency

and comparability. Advocacy groups and industry associations can use these results to promote broader ESG adoption as part of sound corporate strategy. Future research may extend this work to emerging markets, private firms, or specific sectors to further clarify the contextual value of ESG performance.

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