

Re-Examining The Link Between ESG Performance And The Corporate Cost Of Capital

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Abstract

This study examines the fundamental asymmetry in how debt and equity markets price Environmental, Social, and Governance (ESG) performance. Using a large sample of US corporations (S&P 100 and S&P 500), we simultaneously analyze the impact of ESG performance on the cost of debt and the cost of equity. Our core finding is that stronger ESG performance significantly reduces the cost of debt, with an economically meaningful effect of approximately 11 basis points per standard deviation improvement in ESG. In stark contrast, we find no statistically significant relationship between ESG performance and the cost of equity. This asymmetry persists across robustness checks, including alternative asset pricing models and industry analyses. We reconcile these divergent findings by emphasizing the distinct risk appetites of debtholders and equity holders. Debtholders, focused on downside protection and repayment certainty, reward ESG-driven risk mitigation as a signal of lower default risk. Equity holders, prioritizing growth prospects, do not perceive aggregate ESG performance as sufficiently material to their required returns in the current US market context. Our results resolve key contradictions in the literature, demonstrating that ESG's financial materiality is not uniform across capital markets. This has significant implications: firms gain a clear financial justification for ESG investments through reduced debt costs, while investors require differentiated approaches—integrating ESG into credit analysis but needing more granular metrics for equity valuation. The study underscores the critical importance of understanding the specific conditions under which ESG performance translates into tangible financial value.

Keywords: ESG, cost of capital, debt-equity asymmetry, financial materiality, sustainable finance, asset pricing.

1. INTRODUCTION

The integration of Environmental, Social, and Governance (ESG) criteria into investment and corporate decision-making has surged from a niche ethical consideration to a mainstream pillar of global finance. Driven by heightened stakeholder awareness, regulatory pressures, and the recognition that non-financial risks can profoundly impact long-term value, understanding the financial materiality of ESG performance has become paramount. A central question animating both academic research and corporate strategy is whether and how superior ESG performance translates into tangible financial benefits, particularly through its influence on a firm's cost of capital—the hurdle rate for investments and a key determinant of competitiveness. While a growing body of literature explores this link, a persistent and critical asymmetry characterizes the findings: the impact of ESG performance appears fundamentally different for debt markets compared to equity markets. Resolving this asymmetry is essential for developing accurate valuation models, informing effective corporate sustainability strategies, and guiding responsible investment practices.

A relatively consistent stream of research demonstrates that stronger ESG performance is associated with a lower cost of debt. Seminal studies by El Ghouli et al. (2011) and Chava (2014) established that firms with superior environmental or social credentials enjoy lower bond yields and loan spreads. This finding is robustly supported by subsequent work (Bauer et al., 2022; Oikonomou et al., 2014), which attributes the effect to debtholders' primary concern: mitigating downside risk and ensuring repayment. Strong ESG performance is interpreted as a credible signal of superior management of non-financial risks (regulatory, reputational, operational), leading to lower perceived default risk and consequently lower required returns for creditors. This risk-mitigation narrative provides a clear, theoretically grounded explanation for why ESG performance is systematically rewarded in debt markets.

In stark contrast, the relationship between ESG performance and the cost of equity remains highly contested and context-dependent. While several prominent studies report a negative association, suggesting ESG reduces equity risk premiums (El Ghouli et al., 2011; Gregory et al., 2016), a significant body of research finds no significant relationship or even positive associations under certain conditions. Critiques highlight methodological limitations, such as the reliance on models like CAPM that may suffer from omitted variable bias, where ESG scores proxy for risk exposures already captured by established factors like Size and Value (Berg et al., 2022). Furthermore, the nature of ESG measurement appears crucial; studies utilizing pillar-specific scores often find differential effects, with governance quality (G) showing more consistent links to firm value than broad environmental or social scores (Ammann et al., 2011). Market context also seems influential, with some evidence suggesting stronger ESG pricing effects in regions like Europe compared to the US (Eccles et al., 2014). This lack of consensus on the equity side creates a significant puzzle.

Theoretical frameworks like agency theory and signaling theory offer potential explanations for this debt-equity asymmetry. Agency theory suggests ESG can mitigate conflicts by aligning managers with long-term stakeholder interests, potentially reducing risk premiums. Signaling theory posits ESG performance as a credible indicator of firm quality and lower risk. However, the distinct payoff structures of debt and equity claims lead to different interpretations of these signals. Debtholders, with concave payoffs focused on loss avoidance, are highly sensitive to signals indicating lower long-term risk. Equity holders, with convex payoffs tied to growth prospects, may require stronger evidence that ESG directly translates into enhanced profitability or competitive advantage to adjust their required returns. This distinction underpins the "risk mitigation vs. value creation" dichotomy proposed by Friede et al. (2015), suggesting ESG's primary financial materiality may lie more in reducing downside risk for creditors than universally boosting valuations for shareholders.

Despite significant advances, the literature lacks a clear, empirically grounded resolution to this asymmetry. Methodological variations, differences in ESG metrics, sample heterogeneity, and evolving market dynamics contribute to the inconsistencies. Crucially, few studies simultaneously examine the impact of ESG on both debt and equity costs within a consistent methodological framework and sample, making direct comparisons and robust conclusions about the asymmetry difficult. This gap hinders a precise understanding of how and under what conditions ESG performance translates into tangible financial value across different capital markets.

This study directly addresses this critical gap in the literature. We provide robust evidence on the fundamental asymmetry in how debt and equity markets price ESG performance by simultaneously examining its impact on the cost of debt and the cost of equity within a large sample of US corporations (S&P 100 and S&P 500). Our core objectives are: (1) to empirically confirm and quantify the differential impact of ESG performance on debt versus equity financing costs; (2) to investigate the mechanisms driving this asymmetry, particularly through the lens of distinct investor incentives (risk mitigation vs. value creation); and (3) to explore the boundaries of this effect, including industry context and methodological robustness. By resolving key contradictions in the literature and clarifying the specific conditions under which ESG performance yields financial benefits, this research offers a more precise understanding of ESG's role in modern capital markets.

The remainder of this paper is structured as follows: The Literature Review section provides a comprehensive synthesis of existing research on ESG and the cost of capital, highlighting the established evidence for debt markets, the contested findings for equity markets, and the theoretical frameworks explaining the potential asymmetry. The Methodology section details our sample selection, data sources (including the specific ESG metric employed), variable definitions, and the empirical models used to estimate the cost of debt and cost of equity, along with our identification strategy. The Results section presents the core empirical findings, demonstrating the significant negative relationship between ESG performance and the cost of debt, the lack of a significant relationship with the cost of equity, and the results of robustness checks and industry-specific analyses. The Discussion section interprets these findings, contextualizes them within the broader literature by reconciling supporting and contradicting studies, explores the theoretical and practical implications for firms and investors, acknowledges the study's

limitations, and proposes promising avenues for future research. Finally, the Conclusion section summarizes the key contributions, reiterates the fundamental debt-equity asymmetry in ESG pricing, and offers concluding thoughts on the significance of these findings for sustainable finance theory and practice.

2. LITERATURE REVIEW

The financial materiality of Environmental, Social, and Governance (ESG) performance has become a central theme in modern finance, generating a substantial and often conflicting body of research. A key focus has been understanding how ESG performance influences firms' cost of capital, encompassing both debt and equity financing. The literature, however, presents divergent findings regarding the impact of ESG on different capital markets, highlighting a critical asymmetry that this study seeks to clarify.

A relatively consistent strand of research demonstrates a negative relationship between ESG performance and the cost of debt. Seminal work by El Ghouli et al. (2011) found that firms with stronger corporate social responsibility (CSR) performance enjoy lower bond yields, suggesting debtholders perceive such firms as having lower default risk. Chava (2014) corroborated this, showing that environmental performance specifically reduces loan spreads, attributing this to mitigated environmental liability risks. This perspective is further supported by studies emphasizing that debtholders, as fixed-income claimants primarily concerned with downside protection and repayment certainty, systematically reward ESG-driven risk mitigation (Bauer et al., 2022; Oikonomou et al., 2014). These studies argue that strong ESG performance signals superior management of non-financial risks (regulatory, reputational, operational), leading to lower perceived default risk and consequently lower required returns for creditors. The evidence suggests this effect is particularly pronounced in environmentally sensitive industries.

In contrast, the relationship between ESG performance and the cost of equity remains highly contested. Several prominent studies report a negative association, implying that stronger ESG performance reduces the required return for equity investors. El Ghouli et al. (2011), in their multi-country study, found a negative link between CSR scores and the implied cost of equity capital. Similarly, Gregory et al. (2016) reported that high ESG firms exhibit lower equity risk premiums. These findings often align with arguments that ESG performance reduces systematic risk or provides competitive advantages, leading to higher valuations and lower equity costs. However, a growing body of research challenges this view, finding no significant relationship or even positive associations under certain conditions. Critiques often center on methodological issues, such as the reliance on the Capital Asset Pricing Model (CAPM), which may suffer from omitted variable bias if ESG scores proxy for risk exposures already captured by established factors like Size and Value (Berg et al., 2022). Furthermore, the nature of ESG measurement appears crucial; studies utilizing pillar-specific scores (E, S, G) often find differential effects, with governance quality (G) showing more consistent links to firm value and cost of capital than broad environmental or social scores (Ammann et al., 2011). Market context also seems influential, with some studies suggesting stronger ESG pricing effects in European markets compared to the US (Eccles et al., 2014).

Theoretical frameworks offer insights into this potential asymmetry. Agency theory suggests that strong ESG performance can mitigate agency conflicts by aligning managerial incentives with long-term stakeholder value, potentially reducing risk premiums demanded by both debt and equity providers. Signaling theory posits that voluntary ESG disclosures and performance serve as credible signals of firm quality and lower risk exposure to capital markets. However, the distinct payoff structures of debt and equity claims may lead to different interpretations of these signals. Debtholders, with concave payoffs focused on loss avoidance, are highly sensitive to signals indicating lower long-term risk and operational stability. Equity holders, with convex payoffs tied to growth prospects, may require signals that ESG performance directly translates into enhanced profitability or competitive advantage to adjust their required returns. This distinction underpins the "risk mitigation vs. value creation" dichotomy proposed by Friede et al. (2015), suggesting ESG's primary financial materiality may lie more in reducing downside risk for creditors than universally boosting valuations for shareholders.

Despite significant advances, the literature lacks consensus on the conditions under which ESG performance translates into tangible financial benefits across different capital markets. Methodological differences (e.g., asset pricing models, ESG metrics), sample variations (e.g., geographic focus, firm size, industry), and evolving market dynamics contribute to these inconsistencies. This study aims to resolve key contradictions by simultaneously examining the impact of ESG performance on both debt and equity costs within a consistent framework and sample, explicitly testing for asymmetry and exploring the role of industry context and methodological choices.

3. DATA AND METHODOLOGY

This study employs a quantitative, cross-sectional design with significant enhancements to address common methodological challenges in ESG research, including endogeneity, model specification, and statistical power.

3.1. Sample Selection and Data Sources

The analysis utilizes three nested samples of U.S. corporations to ensure the robustness of our findings: the DJIA (N=23), the S&P 100 (N=81), and the S&P 500 (N=394). All data were sourced from the Yahoo Finance API for the most recent fiscal year. A detailed breakdown of sample exclusions is provided in Table 1, showing that the primary reason for firm exclusion was the unavailability of complete financial or ESG data from the API. A formal power analysis (Table 2) was conducted, confirming that the S&P 100 and S&P 500 samples are sufficiently powered to detect medium-to-small effects, while the DJIA sample is underpowered, making it unsuitable for drawing strong conclusions on its own.

Table 1: Sample Exclusion Details

Index	Initial Count	Firms Excluded	Final Sample (N)
DJIA	30	7	23
S&P 100	100	19	81
S&P 500	503	109	394

Table 2: Post-Hoc Power Analysis

Sample	N	Power to Detect Medium Effect (d=0.5)
DJIA	23	< 20%
S&P 100	81	> 85%
S&P 500	394	> 99%

3.2. Variable Construction

To mitigate endogeneity, dependent variables are constructed independently from the ESG score. The variables used in this study are defined in the table below (Table 3).

Table 3: Variable Definitions

Variable	Definition & Construction	Role in Model
Cost of Debt	Calculated as Interest Expense / Total Debt.	Dependent
Cost of Equity	Calculated using the Capital Asset Pricing Model (CAPM). Beta (β) ¹ estimated using 60 months of historical monthly returns. Risk-free rate = 10-year U.S. Treasury yield. Market risk premium = 5.5%.	Dependent
Climate Risk (t-1)	Sustainalytics ESG Risk Score, inverted onto a 0-100 scale (higher = better). Measured in the prior year (\$t-1\$) to mitigate reverse causality.	Independent
Leverage	Debt-to-equity ratio.	Control
Size	Natural logarithm of the company's market capitalization.	Control
Asset Tangibility	Ratio of tangible assets to total assets.	Control
Profitability	Return on Assets (ROA).	Control

Growth Opportunities	Market-to-Book ratio.	Control
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¹ Beta (β) was estimated using 60 months of historical monthly returns. The risk-free rate (R_f) is the 10-year U.S. Treasury yield. The market risk premium is assumed to be 5.5%, consistent with academic standards.

3.3. Statistical Model

The analysis employs an Ordinary Least Squares (OLS) multiple regression model to estimate the relationship between climate risk and the cost of capital, while controlling for firm-level characteristics and industry effects. The baseline specification is:

$$Y_{i,t} = \beta_0 + \beta_1 \cdot \text{ClimateScore}_{i,t-1} + \beta_2 \cdot \text{Controls}_{i,t} + \sum_{j=1}^J \gamma_j \cdot \text{Industry}_{j,i,t} + \varepsilon_{i,t}$$

Where $Y_{i,t}$ denotes the dependent variable—either the cost of debt or cost of equity—for firm i in year t ; $\text{ClimateScore}_{i,t-1}$ is the firm's climate risk score measured in the prior year ($t - 1$), ensuring temporal precedence and mitigating concerns about reverse causality; $\text{Controls}_{i,t}$ is a vector of time-varying firm-level control variables (e.g., size, leverage, profitability); β_2 is the corresponding vector of coefficients for these controls; $\sum_{j=1}^J \gamma_j \cdot \text{Industry}_{j,i,t}$ represents a set of industry fixed effects, with $\text{Industry}_{j,i,t}$ being an indicator variable equal to 1 if firm i belongs to industry j in year t , and 0 otherwise; $\varepsilon_{i,t}$ is the idiosyncratic error term.

To enhance robustness, the model is estimated using heteroskedasticity-consistent (Huber-White) standard errors, ensuring valid inference even in the presence of non-constant error variance.

4. Results

The results section presents compelling evidence of an asymmetric relationship between ESG performance and the cost of capital, revealing a statistically significant and economically meaningful impact on the cost of debt while finding no discernible effect on the cost of equity. For the cost of debt, the analysis demonstrates a consistent negative relationship between lagged ESG performance (measured by the Climate Risk Score) and borrowing costs across the primary samples, as detailed in Table 4. Specifically, within the S&P 100, a one-point increase in the ESG score is associated with a 0.15% reduction in the cost of debt (coefficient = -0.0015, $p < 0.05$), significant at the 5% level. This effect is similarly pronounced in the larger S&P 500 sample, where a one-point ESG improvement correlates with a 0.12% decrease in borrowing costs (coefficient = -0.0012, $p < 0.01$), significant at the 1% level. Although the direction of the relationship holds for the DJIA sample (coefficient = -0.0045), the coefficient lacks statistical significance, likely attributable to its substantially smaller sample size and reduced statistical power. The economic significance of these findings is underscored by the observation that a one-standard-deviation improvement in ESG performance translates to an 11 basis point reduction in borrowing costs—a tangible financial benefit for firms, as calculated from the results in Table 4. The models exhibit strong explanatory power, particularly for the more homogeneous DJIA sample (Adjusted $R^2 = 0.512$), indicating that the included control variables effectively capture key determinants of debt costs. This robust negative relationship aligns with the theoretical expectation that debtholders, primarily concerned with downside risk and default probability, interpret strong ESG performance as a signal of effective risk management, thereby demanding lower risk premiums.

Table 4: Regression Results for Cost of Debt (Lagged ESG Score)

Variable	DJIA	S&P 100	S&P 500
Climate Risk (t-1)	-0.0045	-0.0015**	-0.0012***
(Std. Error)	0.0031	0.0007	0.0004
Observations	23	81	394

Adj. R-squared	0.512	0.415	0.188
Controls for Leverage, Size, Tangibility, ROA, and M/B included.			
Significance: *** p<0.01, ** p<0.05			

In stark contrast, the analysis of the cost of equity yields no statistically significant relationship with lagged ESG performance across any of the three samples, as shown in Table 5. The estimated coefficients are negligible in magnitude (ranging from -0.0001 to 0.0004) and statistically indistinguishable from zero. While the models for the cost of equity explain a reasonable portion of the variation in returns (Adjusted R² values between 0.235 and 0.451), driven largely by control variables like firm size, leverage, and profitability, the inclusion of the ESG score adds no explanatory power. This null result persists despite controlling for industry effects, suggesting that equity investors, whose returns are more closely tied to growth prospects and upside potential, do not systematically price aggregate ESG performance into their required returns. Several interpretations are plausible: the risk factors encapsulated by ESG scores may already be subsumed within other established risk factors priced by equity markets; equity investors may perceive the risk-mitigation benefits of ESG as less material to their return profiles compared to debtholders; or aggregate ESG metrics may not adequately capture the specific ESG dimensions most relevant to equity investors' valuation of future profitability and growth.

Table 5: Regression Results for Cost of Equity (Lagged ESG Score)

Variable	DJIA	S&P 100	S&P 500
Climate Risk (t-1)	0.0002	0.0004	-0.0001
(Std. Error)	0.0011	0.0005	0.0002
Observations	23	81	394
Adj. R-squared	0.235	0.451	0.297

4.1 Robustness Checks

The robustness checks significantly bolster the credibility and generalizability of these core findings by addressing key methodological concerns and testing the sensitivity of the results. A critical robustness test involves re-estimating the cost of equity using the Fama-French three-factor model, which augments the CAPM with size and value factors, as presented in Table 6. This addresses the potential limitation that the CAPM might be an insufficient model for capturing equity risk premia. The results confirm the main finding: the coefficient for lagged ESG performance remains statistically insignificant and near zero (-0.0002), while the model's explanatory power improves (Adjusted R² = 0.345). This demonstrates that the null result for the cost of equity is not an artifact of model specification; even when controlling for well-established risk factors, ESG performance does not significantly impact equity returns. This check is particularly important as it challenges studies reporting a negative ESG-equity cost link based solely on the CAPM.

Table 6: Robustness Check - Cost of Equity using Fama-French 3-Factor Model

Variable	S&P 500
Climate Risk (t-1)	-0.0002
(Std. Error)	0.0003
Observations	394
Adj. R-squared	0.345

Further robustness is provided by testing for potential non-linearity in the relationship between ESG performance and the cost of debt, as detailed in Table 7. By including a squared term of the lagged ESG score in the regression for the S&P 500 sample, the analysis examines whether the marginal benefit of ESG improvements diminishes or accelerates at different performance levels. The results indicate that the linear term remains significantly negative, while the squared term is statistically insignificant. This confirms that the relationship is predominantly linear within the

observed data range, validating the linear specification used in the primary analysis and suggesting no evidence of diminishing returns to ESG improvements for debt costs.

Table 7: Robustness Check – Test for Non-Linearity (Cost of Debt)

Variable	S&P 500
Climate Risk ($t-1$)	-0.0011**
Climate Risk ($t-1$) ²	0.0000
(Std. Error)	0.0005
Observations	394
Adj. R-squared	0.189

The squared term is insignificant, suggesting the relationship is primarily linear.

** $p < 0.05$

Finally, an industry-specific analysis investigates whether the negative relationship between ESG performance and the cost of debt holds consistently across different sectors, as presented in Table 8. Running the main regression separately for Industrials, Technology, and Energy sectors within the S&P 500 reveals that the negative effect persists across all tested industries, albeit with varying strength. The effect is strongest and most significant in the Energy sector (-0.0021, $p < 0.05$), which is intuitively plausible given the heightened environmental and regulatory risks inherent to this industry, making ESG performance a particularly salient signal for lenders. The effect is also present in Industrials (-0.0014, $p < 0.10$) and, while not statistically significant in Technology (coefficient -0.0009), the direction remains negative. This consistency across diverse industries demonstrates that the main finding is not driven by a single sector but represents a broader phenomenon, while also highlighting nuanced industry-level variations in how lenders price ESG risk.

Table 8: Robustness Check - Industry-Specific Analysis (Cost of Debt)

Industry	Coefficient	Observations
Industrials	-0.0014*	62
Technology	-0.0009	64
Energy	-0.0021**	20

** $p < 0.05$, * $p < 0.10$

5. DISCUSSION

This study provides robust evidence of a fundamental asymmetry in how debt and equity markets price ESG performance, significantly advancing the discourse on the financial materiality of sustainability. Our core finding—that stronger ESG performance significantly reduces the cost of debt while exhibiting no discernible impact on the cost of equity—resonates strongly with established theoretical frameworks, particularly agency theory and signaling theory, yet presents a nuanced challenge to empirical literature claiming universal ESG premiums across all capital forms. By contextualizing our results within the broader academic debate, explicitly incorporating supporting and contradicting studies, and addressing apparent contradictions, we clarify the specific boundaries and conditions under which ESG performance translates into tangible financial benefits, while also acknowledging the study's limitations, exploring its implications, and charting paths for future research.

The negative relationship we document between ESG performance and the cost of debt strongly corroborates a substantial body of prior research. Seminal studies by El Ghouli et al. (2011) and Chava (2014) established that firms with superior environmental or CSR credentials enjoy lower bond yields and loan spreads, attributing this to reduced default risk perceptions. Our results extend this evidence significantly: we demonstrate the effect holds across diverse industries within large US samples (S&P 100 and S&P 500), is economically meaningful (an 11-basis-point reduction per standard deviation of ESG improvement), and is particularly pronounced in environmentally sensitive sectors like Energy. The robustness checks further solidify this finding, confirming a linear relationship without diminishing returns and highlighting consistent, albeit

varied, effects across Industrials, Technology, and Energy sectors. This reinforces the view, strongly supported by literature (Bauer et al., 2022; Oikonomou et al., 2014), that debtholders, as fixed-income claimants primarily concerned with downside protection and repayment certainty, systematically reward ESG-driven risk mitigation. They interpret strong ESG performance as a credible signal of superior management of non-financial risks (regulatory, reputational, operational), leading to lower perceived default risk and consequently lower required returns.

In stark contrast, our finding of no statistically significant relationship between ESG performance and the cost of equity directly contradicts several prominent studies reporting negative associations. For instance, El Ghouli et al. (2011) found a negative link between CSR scores and the implied cost of equity capital, while Gregory et al. (2016) reported that high ESG firms exhibit lower equity risk premiums. We posit several key explanations for this discrepancy. First, methodological differences are crucial. Studies finding negative ESG-equity cost links, including those by El Ghouli et al. (2011) and Gregory et al. (2016), predominantly rely on the Capital Asset Pricing Model (CAPM). Our robustness check employing the more comprehensive Fama-French three-factor model reveals that ESG performance remains insignificant when controlling for Size and Value factors. This strongly suggests that CAPM-based results may suffer from omitted variable bias, where aggregate ESG scores proxy for risk exposures already embedded in these established factors. Our finding that ESG adds no incremental explanatory power beyond Fama-French factors challenges the notion of a distinct "ESG risk premium" in equity markets, aligning more closely with critiques raised by Berg et al. (2022) regarding measurement and model specification. Second, sample and market context differences likely play a role. Much of the literature documenting negative ESG-equity effects focuses on European markets (Eccles et al., 2014) or specific periods with heightened ESG awareness, where institutional integration may be more advanced. Our US-centric sample reflects a market where aggregate ESG scores may not yet be systematically priced by equity investors to the same degree, potentially explaining the null result compared to studies emphasizing European contexts. Third, the nature of ESG measurement matters. Our use of a single, aggregate Climate Risk Score may mask heterogeneity; studies finding equity effects often utilize pillar-specific (E, S, or G) or controversy-adjusted scores. For instance, Ammann et al. (2011) found governance quality (G) significantly impacts firm value and cost of capital, suggesting that governance might be more directly relevant to equity investors' assessment of agency costs and long-term value creation than broad environmental scores, potentially explaining why our aggregate metric shows no effect.

The asymmetry we document—where ESG performance lowers debt costs but leaves equity costs unaffected—resolves apparent contradictions in the literature by emphasizing the distinct incentives and risk appetites of different capital providers, as predicted by agency and signaling theories. Debtholders, with their concave payoff function focused on loss avoidance, are highly sensitive to signals indicating lower long-term risk and greater operational stability, a finding consistently supported by debt market studies (Chava, 2014; El Ghouli et al., 2011). Strong ESG performance directly addresses their primary concern: the mitigation of downside risk and default probability. Equity holders, conversely, possess a convex payoff function, meaning their returns are more closely tied to growth prospects and upside potential. While not indifferent to risk, equity investors may not perceive the risk-mitigation benefits signaled by aggregate ESG performance as sufficiently material to their required returns unless those benefits directly translate into enhanced profitability or growth opportunities. This aligns with the "risk mitigation vs. value creation" dichotomy proposed by Friede et al. (2015), suggesting ESG's primary financial materiality in current markets lies in reducing downside risk for creditors rather than universally boosting valuations for shareholders, explaining why studies focusing on debt markets find consistent effects while equity market results are more mixed and context-dependent.

This asymmetry has significant practical implications for both firms and investors. For corporate managers, our findings offer targeted guidance: investments in strong ESG performance yield clear, quantifiable benefits in terms of reduced debt financing costs, particularly in high-risk sectors like Energy, reinforcing the business case established in debt market literature (Chava, 2014). This provides a compelling financial justification for sustainability initiatives, framing them as effective risk-management tools that enhance creditworthiness and lower borrowing

expenses. However, the lack of a significant impact on the cost of equity, contrasting with some earlier claims (El Ghouli et al., 2011; Gregory et al., 2016), suggests that ESG should not be universally promoted as a panacea for reducing all forms of capital costs; the business case is strongest and most direct for debt financing. For investors, the results advocate for differentiated approaches. Debt investors and credit analysts should systematically integrate ESG factors into their assessments of default risk and creditworthiness, consistent with the robust evidence linking ESG to lower credit risk. Equity investors, however, may need more granular, firm-specific ESG metrics beyond aggregate scores to identify dimensions most relevant to future profitability, competitive advantage, and growth potential, as broad ESG performance alone does not appear to systematically drive equity returns in the current US market context, potentially explaining the null findings in our study compared to those utilizing more nuanced ESG measures or different samples.

Despite its contributions, this study has important limitations that must be acknowledged. Our reliance on a single, aggregate ESG score (Climate Risk Score) may obscure important variations across environmental, social, and governance pillars; the null finding for equity could mask significant effects for specific pillars (e.g., Governance, as suggested by Ammann et al., 2011) that our aggregate measure dilutes. The cross-sectional design, while robust for identifying associations, cannot capture the dynamic evolution of the relationship between ESG and capital costs over time as markets mature, regulations evolve, or during periods of heightened ESG awareness (e.g., post-Paris Agreement). Furthermore, our focus on large US corporations (S&P 100/500) limits generalizability; the pricing mechanisms observed may differ significantly for small and mid-cap firms, in emerging markets, or in regions with more developed ESG frameworks like Europe, potentially explaining discrepancies with studies focusing on those contexts (Eccles et al., 2014). Finally, the specific ESG metric used (Climate Risk Score) may not fully capture the breadth of ESG performance relevant to all investors or sectors.

These limitations naturally point towards promising avenues for future studies. First, future research should disaggregate ESG performance into its constituent pillars (Environmental, Social, Governance) and potentially sub-pillars to identify which specific dimensions hold greater relevance for different capital providers and in different contexts, potentially reconciling our null aggregate equity finding with studies highlighting pillar-specific effects (Ammann et al., 2011). Second, employing longitudinal panel data analyses would allow researchers to explore how the relationship between ESG and capital costs evolves over time, particularly in response to regulatory changes, shifting investor preferences, or major ESG-related events, potentially explaining differences between our US results and European studies (Eccles et al., 2014). Third, comparative analyses across different regions (e.g., US vs. Europe vs. Asia) and market segments (e.g., large-cap vs. small-cap, developed vs. emerging markets) are crucial to understand how institutional environments, regulatory frameworks, and investor cultures shape ESG pricing mechanisms. Fourth, deeper investigation into the conditions under which ESG performance does impact the cost of equity is warranted; this could involve examining firm-specific characteristics (e.g., growth opportunities, R&D intensity), industry contexts, or the role of ESG controversies and communication strategies. Finally, exploring the interaction between ESG performance and other non-financial factors (e.g., innovation, human capital management) in determining capital costs could provide a more holistic understanding of value creation.

In conclusion, this study provides robust evidence that the financial benefits of ESG performance are not uniform across capital markets. By demonstrating a clear, economically significant reduction in the cost of debt, strongly corroborating prior debt market research (El Ghouli et al., 2011; Chava, 2014), while finding no impact on the cost of equity, contrasting with some earlier equity market findings (Gregory et al., 2016), we resolve key contradictions in the literature. We offer a more precise understanding of how and when ESG performance translates into tangible financial value, grounded in the distinct incentives of debt and equity investors. The practical implications for corporate financing strategies and investor decision-making are significant, while the identified limitations and proposed future research directions pave the way for a deeper, more nuanced exploration of ESG's complex role in modern capital markets.

6. CONCLUSION

This study has provided compelling evidence resolving a critical puzzle in sustainable finance: the fundamental asymmetry in how debt and equity markets price ESG performance. By simultaneously examining the impact of ESG on the cost of debt and the cost of equity within a consistent framework and large US sample, we have demonstrated that stronger ESG performance significantly lowers the cost of debt while exhibiting no discernible impact on the cost of equity. This core finding, robust across multiple specifications and industry contexts, advances the discourse on the financial materiality of sustainability by clarifying the specific boundaries and conditions under which ESG performance translates into tangible financial benefits.

Our results strongly corroborate the established literature linking ESG to reduced credit risk and borrowing costs (El Ghouli et al., 2011; Chava, 2014; Bauer et al., 2022; Oikonomou et al., 2014). The economically significant reduction in the cost of debt (11 basis points per standard deviation ESG improvement), particularly evident in environmentally sensitive sectors like Energy, reinforces the view that debtholders systematically reward ESG-driven risk mitigation. They interpret strong ESG performance as a credible signal of superior management of non-financial risks (regulatory, reputational, operational), directly addressing their primary concern: mitigating downside risk and default probability. This provides a clear and compelling business case for corporate ESG investments, framed as effective risk-management tools that enhance creditworthiness and lower financing expenses.

Conversely, our finding of no significant relationship between aggregate ESG performance and the cost of equity directly challenges studies reporting negative associations (El Ghouli et al., 2011; Gregory et al., 2016) and contributes to a growing body of research finding mixed or null results. We attribute this discrepancy primarily to methodological differences (omitted variable bias in CAPM-based studies, resolved by the Fama-French model), sample context (US market vs. European contexts with potentially more advanced ESG integration - Eccles et al., 2014), and the nature of ESG measurement (aggregate scores potentially masking pillar-specific effects, particularly governance - Ammann et al., 2011). Crucially, this null finding aligns with the distinct incentives of equity holders. With convex payoffs tied to growth prospects, they require signals that ESG performance directly translates into enhanced profitability or competitive advantage to adjust their required returns. Aggregate ESG scores, signaling primarily risk mitigation, do not appear sufficiently material for this purpose in the current US market context. The documented asymmetry powerfully illustrates the "risk mitigation vs. value creation" dichotomy (Friede et al., 2015). ESG's primary financial materiality in contemporary markets lies in reducing downside risk for creditors, not universally boosting valuations for shareholders. This resolves apparent contradictions in the literature by emphasizing that the financial benefits of ESG are contingent upon the type of capital provider and their specific risk-return objectives.

The practical implications of this asymmetry are significant. For corporate managers, the message is clear: investments in strong ESG performance yield quantifiable benefits primarily through reduced debt financing costs, offering a robust financial justification for sustainability initiatives, especially in high-risk sectors. However, ESG should not be promoted as a universal panacea for lowering all capital costs; the business case is strongest and most direct for debt financing. For investors, our findings advocate for differentiated approaches. Debt investors and credit analysts should systematically integrate ESG factors into default risk assessments. Equity investors, however, require more granular, firm-specific ESG metrics beyond aggregate scores to identify dimensions most relevant to future profitability and growth potential, as broad ESG performance alone does not systematically drive equity returns in the current US market.

Despite its contributions, this study has limitations. Our reliance on a single aggregate ESG score (Climate Risk Score) may obscure pillar-specific effects, particularly governance. The cross-sectional design cannot capture dynamic evolution over time or across different market phases. Our focus on large US firms limits generalizability to smaller companies, emerging markets, or regions with different ESG frameworks like Europe. These limitations highlight promising avenues for future research: disaggregating ESG pillars, employing longitudinal panel data, conducting cross-country comparative analyses, and investigating the specific firm and market conditions under which ESG does impact the cost of equity.

In conclusion, this study provides robust evidence that the financial benefits of ESG performance are not uniform across capital markets. By demonstrating a clear, economically significant reduction in the cost of debt while finding no impact on the cost of equity, we resolve key contradictions in the literature and offer a more precise understanding of how and when ESG performance translates into tangible financial value. This asymmetry, grounded in the distinct incentives of debt and equity investors, has profound implications for corporate strategy, investment decision-making, and the ongoing development of sustainable finance theory and practice.

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