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Sustainability and Corporate Cost of Debt: The Role of ESG Scores and Capital Structure Moderation Evidence from the SRI-KEHATI Index

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Abstract

This study examines the effect of Environmental, Social, and Governance (ESG) performance on corporate cost of debt, with capital structure as a moderating variable and firm size as a control variable. Grounded in signalling theory, the study tests whether ESG performance serves as a credible signal that reduces perceived credit risk and lowers borrowing costs. The analysis focuses on firms listed in the SRI-KEHATI Index during 2020–2024. Using Partial Least Squares Structural Equation Modelling (PLS-SEM) on a purposive sample of 35 companies, the study assesses both direct and interaction effects within the proposed framework.

The results show that ESG performance has a negative and statistically significant effect on the cost of debt, indicating that firms with stronger ESG profiles benefit from lower borrowing costs. This finding suggests that sustainability performance reduces information asymmetry, strengthens creditor confidence, and mitigates perceived default risk. Leverage, proxied by the debt-to-equity ratio, is also significantly associated with borrowing costs, whereas the interaction between ESG performance and capital structure is not significant, indicating the absence of a moderating effect. Firm size is likewise not significant. With an explanatory power of 60.9% (R^2 = 0.609), the model demonstrates substantial robustness.

Practically, the findings suggest that managers should strengthen ESG performance to improve financing efficiency, while investors and creditors may use ESG indicators as relevant signals in debt risk assessment within emerging markets.

Kata kunci: ESG score, cost of debt, capital structure, SRI-KEHATI Index.

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INTRODUCTION

Environmental, Social, and Governance (ESG) performance has progressively assumed a strategic role in shaping corporate practice, serving as a key indicator of operational quality, reputational capital, and market credibility (Cheng et al., 2025). As global interest in sustainable investment intensifies, firms increasingly prioritise transparent and high-quality ESG disclosure as part of a broader strategy to create long-term value and mitigate financial risk (Tian, 2023). Higher ESG performance is positively associated with corporate solvency, as it reflects stronger risk management capacity across environmental, social, legal, reputational, operational, and regulatory dimensions. By integrating sustainability into strategic and governance frameworks, firms enhance their ability to anticipate and mitigate potential liabilities, whereas weak ESG performance may indicate governance deficiencies and inadequate risk control. Firms with lower ESG ratings are more likely to engage in practices that generate additional liabilities and heighten overall risk exposure, thereby increasing the probability of default and diminishing the value of their fixed-income securities (Apergis et al., 2022). Empirical evidence further suggests that robust ESG performance reduces firms' downside risk (Hoepner et al., 2022) (Ilhan, Sautner, & Vilkov, 2020) and enhances financial outcomes, including return on assets, Tobin's Q, and shareholder returns (Cornett et al., 2016), (Liang et al., 2026).

The cost of debt represents the marginal cost of increasing debt within a firm's capital structure, encompassing not only explicit interest expenses but also broader economic risks such as financial distress, bankruptcy risk, and agency conflicts. In line with trade-off theory, higher leverage intensifies these costs as the likelihood of financial distress increases. Accordingly, the cost of debt serves as a key indicator for assessing the financial implications of leverage decisions and identifying the firm's optimal capital structure (Binsbergen et al., 2010). In corporate finance, ESG performance is often examined through its effect on financing costs. Prior studies document a negative relationship between ESG performance and the cost of equity, indicating that firms with stronger ESG profiles benefit from a broader investor base, greater legitimacy, and stronger market recognition.(Chava & Chava, 2014), (El et al., 2011). However, the effect of ESG on the cost of equity is not uniform across its dimensions. Empirical evidence shows that environmental and governance factors tend to have a stronger and more significant influence, while the social dimension often displays a weaker and less consistent effect (Ng, 2014). More recent studies extend this analysis to debt financing, showing that robust ESG performance can reduce the cost of debt by lowering credit risk, mitigating information asymmetry, and strengthening corporate reputation in the eyes of creditors (G. Chen & Zou, 2025). Conversely, uncertainty surrounding ESG assessments may elevate borrowing costs, as ambiguity in ESG evaluation amplifies perceived information and reputational risks.

Although a substantial body of global evidence links ESG performance to lower financing costs, this relationship manifests in more nuanced ways within emerging markets such as Indonesia. In recent years, firms listed on the Indonesia Stock Exchange (IDX) have faced heightened credit risk and increased market volatility, prompting greater scrutiny of borrowing costs. These conditions have encouraged companies to enhance their credibility and improve the transparency of non-financial disclosures (Mindrawati & Romdhon, 2024). Empirical evidence from Indonesia indicates that firms obtaining ESG assurance experience a measurable reduction in their cost of debt. This finding suggests that creditors increasingly incorporate the quality and credibility of sustainability disclosures into their risk assessment and pricing decisions (Mindrawati & Romdhon, 2024).

Nevertheless, market responses to ESG performance in Indonesia remain far from uniform. Several studies report that improvements in ESG scores do not consistently translate into higher firm value, suggesting that traditional financial fundamentals continue to dominate investors' and creditors' assessments (Zahrazova et al., 2025) (Yori & Rahmawati, 2025). This evidence implies that the capacity of ESG performance to reduce financing costs may depend on firm-specific characteristics. In particular, capital structure appears to play a pivotal role in shaping how sustainability performance is interpreted and priced by the market.

Corporate capital structures in Indonesia continue to exhibit a pronounced reliance on debt financing, rendering leverage a critical factor in shaping firms' exposure to market risk and borrowing costs (Pujiastuti et al., 2024). Elevated leverage levels may amplify sensitivity to external shocks and influence how creditors price risk, particularly in volatile economic conditions. Firm size constitutes an additional determinant of financing capacity and default risk. Larger firms typically enjoy stronger reputational capital, greater bargaining power, and improved access to external funding, thereby securing more favourable financing terms than their smaller counterparts (Danila et al., 2020). Recent empirical evidence further highlights a moderating dynamic between ESG performance and the cost of debt. Specifically, the financial benefits associated with strong ESG performance may attenuate as borrowing costs increase, indicating that leverage conditions can constrain the positive impact of sustainability performance on firms' financial outcomes (Kusumo et al., 2025).

Notwithstanding the expanding literature on ESG and financing costs, a clear research gap persists concerning the moderating role of capital structure in the relationship between ESG scores and the cost of debt, particularly among firms listed on the SRI-KEHATI Index. Existing studies rarely examine how leverage conditions shape the effectiveness of ESG performance in influencing borrowing costs, nor do they systematically account for firm size as a control variable within this relationship. This study therefore seeks to investigate the effect of ESG scores on the cost of debt, incorporating capital structure as a moderating variable and firm size as a control variable. By focusing on companies included in the SRI-KEHATI Index, the research aims to offer robust empirical evidence that advances the ESG and corporate finance literature, especially within the context of emerging markets.

THEORITICAL REVIEW

Signaling Theory

Michael Spence first articulated Signalling Theory in his seminal 1973 article *Job Market Signaling*, in which he argued that job applicants use educational qualifications as credible signals of their underlying ability to prospective employers. By transmitting such signals, applicants reduce information asymmetry between themselves and employers (Spence, 1973). Subsequent developments in economic and financial theory extended this framework beyond the labour market, employing signalling mechanisms to explain how market participants mitigate uncertainty arising from asymmetric information. In corporate finance, Signalling Theory posits that managers deliberately disclose both financial and non-financial information to convey firm quality to investors and creditors. Through such disclosures, firms enhance credibility, reduce perceived risk, and shape financing decisions, including the pricing of risk premiums in both equity and debt markets (Spence, 1973).

In debt markets, creditors operate under conditions of incomplete information regarding a firm's probability of default. As a result, they rely heavily on credible external signals to assess the borrower's risk profile. ESG disclosure has emerged as an increasingly salient non-financial signal within credit risk evaluation frameworks (Menz, 2010). Empirical evidence indicates that firms with higher ESG scores generally secure lower borrowing costs,

as strong ESG performance signals superior risk management practices, enhanced transparency, and greater long-term stability (Shi et al., 2024). Consistent findings further demonstrate that robust ESG performance reduces credit risk premia by mitigating information asymmetry between firms and creditors and by strengthening managerial credibility in the eyes of the market (Houqe & Richardson, 2020).

Empirical evidence demonstrates that higher ESG scores correlate with narrower bond yield spreads, indicating that debt markets actively interpret ESG performance as a signal of reduced credit risk (Apergis et al., 2022). In this respect, investors and creditors incorporate sustainability performance into their assessment of default probability and risk pricing. However, the effectiveness of ESG as a signalling mechanism depends critically on the credibility and consistency of disclosure. Where ESG evaluations appear uncertain or inconsistent, markets may interpret such ambiguity as a source of informational risk, thereby increasing borrowing costs rather than reducing them (G. Chen & Zou, 2025). Leverage further conditions this relationship. Firms with high levels of debt face elevated default risk, prompting creditors to scrutinise corporate signals more closely. Evidence suggests that the negative association between ESG performance and the cost of debt becomes more pronounced among highly leveraged firms, as ESG signals assume greater relevance under heightened financial risk (Francisco & Lima, 2024).

Firm size also plays a critical role in reinforcing the credibility of ESG signals. Larger firms typically operate with more sophisticated reporting systems, face greater public scrutiny, and possess more established reputations. Consequently, creditors are more likely to regard ESG disclosures issued by larger firms as reliable and informative (Gigante & Manglaviti, 2022). From the perspective of Signalling Theory, ESG scores function as mechanisms for reducing information asymmetry, thereby shaping creditors' perceptions of credit risk. Capital structure, in turn, conditions the market's sensitivity to these signals, as leverage influences the degree to which sustainability information affects risk assessment. Firm size further moderates this process by enhancing the perceived credibility and trustworthiness of the signals conveyed.

The foregoing review of the literature indicates that Signalling Theory offers a robust theoretical framework for explaining the relationship between ESG performance and the cost of debt. ESG disclosure operates as a signal of managerial quality in risk management and corporate sustainability, thereby reducing creditors' perceptions of default risk and, in turn, lowering financing risk premia. However, the strength and effectiveness of this signal are not uniform across firms. Leverage, as an indicator of financial risk, shapes the extent to which creditors rely on ESG information in pricing debt. At the same time, firm size serves as a proxy for credibility and market visibility, influencing how convincingly ESG disclosures are interpreted. Accordingly, this study conceptualises capital structure as a moderating variable that conditions the strength of the association between ESG performance and the cost of debt, while controlling for firm size to ensure that the estimated ESG effect is not confounded by differences in scale, reputation, or market prominence.

This argument is also supported by evidence from Indonesia, where non-financial companies listed on the Indonesia Stock Exchange found that broader ESG disclosure was associated with lower debt costs, suggesting that creditors interpret sustainability disclosure as a credible signal of lower risk and greater managerial transparency (Jafar et al., 2024). Furthermore, Indonesian companies with stronger ESG performance tend to rely more on equity financing and adjust more quickly to their leverage targets, suggesting that sustainability signals also shape corporate financing behavior in practice (Pujiastuti et al., 2024). Therefore, these findings suggest that ESG information is not merely symbolic

disclosure but serves as an economically meaningful signal that influences creditor perceptions and capital structure decisions.

The Influence of ESG Scores on Debt Costs

Comprehensive ESG performance reflects the extent to which a firm embeds sustainability principles within its operational processes and strategic decision-making. From the standpoint of Signalling Theory, robust ESG practices convey a positive signal to creditors regarding managerial competence, corporate social and environmental responsibility, and the effectiveness of governance structures. Such signals reduce information asymmetry between the firm and its lenders, thereby lowering perceived default risk. When creditors interpret risk as diminished, they are more inclined to offer financing at reduced interest rates, leading to a lower cost of debt (Goss & Roberts, 2011) (Magnanelli & Izzo , 2017) (Eliwa et al., 2021). A strong commitment to ESG practices therefore transmits a credible indication of favourable long-term prospects and effective risk management capabilities (Flammer, 2021). In this sense, ESG should not be viewed merely as an ethical or regulatory obligation; rather, it constitutes a strategic instrument through which firms can secure financing on more competitive terms.

A growing body of cross-country evidence indicates that firms exhibiting superior ESG performance tend to secure borrowing at lower cost (Erragragui, 2017) (Eliwa et al., 2021). These findings reinforce the view that ESG functions as a mechanism for risk mitigation and enhanced transparency, attributes that creditors reward through reduced lending rates. Nevertheless, the relationship between ESG and the cost of debt is neither uniformly linear nor straightforward. Divergence in ESG ratings across agencies may generate informational uncertainty, thereby increasing perceived risk and, paradoxically, elevating borrowing costs (K. Chen et al., 2026) (Christensen & Serafeim, 2021). Moreover, the financial implications of ESG performance vary according to firm-specific characteristics, including organisational scale, institutional context, and threshold levels of performance (G. Chen & Zou, 2025) (Boccaletti & Gucciardi, 2025). These nuances underscore the conditional and context-dependent nature of the ESG cost of debt nexus.

A number of recent studies identify non-linear patterns in the relationship between ESG performance and firm value or financial performance (Fuente et al., 2022) (Zhou et al., 2022) (Bagh et al., 2024) (Pu, Wang, & Lian, 2023). These findings suggest that the financial consequences of ESG engagement are inherently contextual and shaped by a range of internal and external determinants. In general, ESG performance exhibits a negative association with the cost of debt, primarily through the reduction of information asymmetry and the mitigation of risk. However, both the strength and the functional form of this relationship vary according to the quality and credibility of ESG information, firm-specific characteristics, and the surrounding institutional environment. Consequently, any empirical assessment of the ESG–cost of debt nexus must incorporate relevant contextual factors in order to generate a more nuanced and comprehensive understanding. Drawing upon the foregoing theoretical arguments and empirical evidence, this study advances the following hypothesis:

H1: ESG score is negatively associated with the cost of debt

The Influence of ESG score and the Cost of Debt: The Moderating Role of Capital Structure

Modern corporate finance theory, particularly the pecking order framework, posits that firms follow a hierarchical financing preference: they rely first on internal funds, then on debt, and issue equity only as a last resort. Within this structure, the quality of corporate information and reputation including ESG performance plays a pivotal role in shaping the cost of external finance. At the same time, divergence in ESG ratings may heighten informational uncertainty and amplify creditors' risk perceptions, especially for firms that depend heavily on external funding. Under such conditions, inconsistencies in ESG assessments can undermine credibility and lead to higher borrowing costs (Yang & Deng, 2025).

(Feldhütter, 2025) advances the ESG Modigliani–Miller (ESG–MM) proposition, arguing that under conditions of perfect capital markets where prices adjust linearly and ESG attributes are additively distributed capital structure decisions, including the issuance of green bonds, should not affect firm value or the overall cost of capital. Within such an idealised framework, ESG characteristics are fully priced, and financing choices remain value-neutral. However, empirical evidence presented in the same study challenges this theoretical neutrality. Labelling securities as 'green' appears to reduce debt yields, suggesting that in imperfect markets capital structure decisions can influence how ESG attributes transmit into borrowing costs. This finding implies that market frictions, informational asymmetries, or investor preferences may enable financing structure to shape the financial consequences of ESG performance.

These considerations suggest that capital structure may operate as a moderating variable in the relationship between ESG performance and the cost of debt. In firms characterised by higher leverage, the impact of ESG performance on borrowing costs is likely to intensify, as creditors become more sensitive to default risk and place greater weight on the quality and credibility of disclosed information. Under heightened financial risk, ESG signals assume greater informational value in creditors' pricing decisions. By contrast, in firms with relatively low leverage or limited reliance on external financing, the influence of ESG performance on the cost of debt may be attenuated, given the reduced salience of credit risk considerations. Capital structure therefore represents not merely a financing choice, but a conditioning factor that shapes the extent to which ESG performance translates into differential borrowing costs. Drawing on this theoretical reasoning and the supporting empirical evidence, the study proposes the following hypothesis:

H2: Capital structure (DER) moderates the relationship between ESG performance and the cost of debt

RESEARCH METHODS

Data Type and Sources

This study adopts a quantitative research design and employs Partial Least Squares Structural Equation Modelling (PLS-SEM) to examine the effect of ESG scores on the cost of debt, with capital structure incorporated as a moderating variable. The analytical framework utilises path analysis and moderation testing to evaluate both direct and interaction effects within the proposed structural model. The study relies on secondary data. ESG performance data are obtained from the S&P Global ESG Scores database, which provides standardised and internationally comparable sustainability metrics. The sample is restricted to firms with S&P Global ESG Scores in order to ensure consistency and comparability in ESG measurement. This is important because prior research shows that ESG ratings frequently

diverge across providers due to methodological differences, creating potential measurement error in empirical analysis (Chen, Mao, & Yoon, 2025).

Financial data, including variables related to capital structure and borrowing costs, are drawn from firms' audited financial statements and sustainability reports available through the official website of the Indonesia Stock Exchange (www.idx.co.id). The analysis is conducted using SmartPLS 4.0. PLS-SEM is selected because it is particularly suitable for studies with relatively small sample sizes and does not require the strict multivariate normality assumptions associated with covariance-based SEM techniques (Hair, Risher, Sarstedt, & Ringle, 2019).

The evaluation of the model comprised two sequential stages. The first stage focused on the assessment of the measurement (outer) model to determine the validity and reliability of the constructs. We examined convergent validity and discriminant validity, together with internal consistency reliability as reflected in composite reliability and the average variance extracted (AVE). These criteria ensured that the indicators accurately captured their underlying constructs and that each construct demonstrated sufficient empirical distinctiveness.

The second stage addressed the structural (inner) model in order to test the hypothesised relationships among the variables. This analysis involved estimating path coefficients, assessing the coefficient of determination (R^2), calculating effect sizes (f^2), and evaluating predictive relevance (Q^2). We determined the statistical significance of the estimated parameters through a bootstrapping procedure, which generated robust standard errors and confidence intervals (Hair, Risher, Sarstedt, & Ringle, 2019) (Sarstedt et al., 2019).

Population and Sample

Table. 1 Sample Selection Criteria

No	Criteria	Number
1.	Firms listed in the SRI-KEHATI Index during the 2020–2024 period	145
2.	Firms that did not participate in the ESG rating assessment conducted by S&P Global ESG Scores	(110)
3.	Firms without complete financial statements for the 2020–2024 period	(0)
	Total Sample	**35**

Source : Processed data, 2026

The study population comprised all firms included in the SRI-KEHATI Index over the period 2020–2024. From this population, the analysis retained 35 companies for which complete ESG score data were available. To identify the final sample, the study employed purposive sampling. The selection followed a set of predefined criteria established by the author to ensure data availability, relevance, and consistency with the research objectives.

Variables and Measurements

Table 2. Variables description

Variable	Definition	Description	Source
Dependent variable	Cost of Debt (CoD)	Ratio between the firm's financial expense and interest-bearing debt Cost of Debt (After Tax) = Interest Expense × (1 − Tax Rate)	(Boubaker et al., 2026) (Fitri, 2024)
Independent variables	ESG	company ESG score	S&P Global CSA
Mediating variables	Capital Structure	Debt to Equity Ratio = $\frac{\text{Total Debt}}{\text{Total Equity}}$	(Modigliani & Miller, 1958)
Control Variable	Firm Size	$Size$ = ln ($Total\ Asset$)	(Diamond, 1991)

Source : Processed data, 2026

RESULTS AND DISCUSSION

Measurement Model (Outer Model)

Convergent Validity

The assessment of the measurement model focused on establishing convergent validity through the examination of outer loadings. In confirmatory research designs, a loading factor exceeding 0.70 is generally recommended, as it indicates that the indicator explains a substantial proportion of the variance in the latent construct. In exploratory contexts, however, loadings above 0.50 may still be regarded as acceptable, provided that the indicators demonstrate theoretical coherence and empirical adequacy. These thresholds ensure that each indicator contributes meaningfully to the construct it is intended to measure and that the measurement model demonstrates sufficient explanatory power. The following section presents the results of the convergent validity assessment.

Table 3. Convergent Validity Test Results (Outer Loadings)

Variable	Outer Loading	Description
ESG (X)	1.000	Valid
CoD (Y)	0.994	Valid
DER (Z)	1.000	Valid
Size	1.000	Valid

Source : Output smartpls 4, 2026

The results of the convergent validity assessment, as indicated by the outer loadings, demonstrate that all indicators exceed the recommended minimum threshold of 0.70. The Cost of Debt (CoD) construct records outer loadings of 0.994 for both the CoD and CoD-after-tax indicators. Meanwhile, the DER, ESG Score, and Size variables each display outer loadings of 1.000. These values indicate exceptionally strong correlations between the indicators and their respective latent constructs. Accordingly, the measurement model satisfies the criteria for convergent validity and is therefore deemed appropriate for subsequent structural analysis.

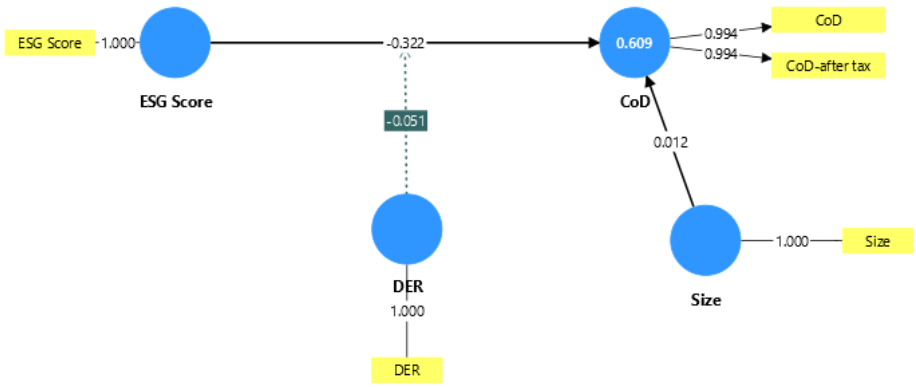

Figure 1. Outer Model Results of SmartPls 4

Discriminant Validity

The study assessed discriminant validity by comparing the Average Variance Extracted (AVE) across constructs. This procedure determines whether each latent construct demonstrates sufficient empirical distinctiveness from the others. A construct satisfies the criterion for discriminant validity when its AVE exceeds 0.50 and surpasses the squared correlations with other latent constructs, thereby confirming that it shares more variance with its own indicators than with competing constructs (Ringle & Sarstedt, 2021). The following section presents the results of the discriminant validity assessment :

Table 4. AVE Test Results

Research Variables	Average variance extracted (AVE)
Cost of Debt (CoD)	0.989

Source : Output smartpls 4, 2026

The convergent validity assessment indicates that the Cost of Debt (CoD) construct achieves an Average Variance Extracted (AVE) of 0.989. As this value substantially exceeds the recommended threshold of 0.50, the construct accounts for 98.9 per cent of the variance in its indicators. This result demonstrates that the CoD construct exhibits strong convergent validity. The indicators employed capture the underlying construct with a high degree of precision and explanatory power, confirming their adequacy within the proposed measurement model.

The study assessed discriminant validity using two complementary procedures: the Fornell–Larcker criterion and cross-loadings. Under the Fornell–Larcker approach, a construct demonstrates adequate discriminant validity when the square root of its Average Variance Extracted (AVE) exceeds its correlations with all other latent constructs. This condition indicates that the construct shares greater variance with its own indicators than with other constructs in the model, thereby confirming its empirical distinctiveness (Ringle & Sarstedt, 2021). The following section presents the results of the discriminant validity assessment based on the Fornell–Larcker criterion.

Table 5. Discriminant validity test results - Fornell-Larcker Criterion

Variable	CoD	DER	ESG Score	Size
CoD	0.994			
DER	-0.711	1.000		
ESG Score	-0.486	0.249	1.000	
Size	-0.059	0.053	0.078	1.000

Source : Output smart pls 4, 2026

The results of the discriminant validity assessment based on the Fornell–Larcker criterion indicate that the square root of the AVE for each construct exceeds its correlations with other latent variables. Specifically, the square root of the AVE is 0.994 for Cost of Debt (CoD), and 1.000 for DER, ESG Score, and Size. In each case, these values are greater than the corresponding inter-construct correlations. For example, CoD correlates with DER at –0.711, with ESG Score at –0.486, and with Size at –0.059; all of these coefficients fall well below 0.994. Similarly, the correlations among the independent variables remain relatively modest, including 0.249 between DER and ESG Score, 0.053 between DER and Size, and 0.078 between ESG Score and Size. Taken together, these findings confirm that each construct demonstrates satisfactory discriminant validity. The model therefore fulfils the Fornell–Larcker criterion, indicating that the latent variables are empirically distinct and appropriately specified within the measurement framework.

Reliability Test

Reliability testing assesses the degree to which a research instrument demonstrates consistency and stability in measuring a given construct. An instrument is considered reliable when it produces consistent results under repeated measurement in comparable conditions. Within the PLS-SEM framework, researchers typically evaluate reliability using Cronbach's alpha and composite reliability (CR). Values of 0.70 or above indicate satisfactory internal consistency and suggest that the indicators reliably capture the underlying construct (Ringle & Sarstedt, 2021). The results of the reliability assessment are presented in Table 6.

Table 6. Reliability test results

Variable	**Cronbach's Alpha**	**Composite reliability**	**Description**
Cost of Debt (CoD)	0.988	0.989	Reliabel

Source : Output SmartPls 4, 2026

The reliability assessment indicates that the Cost of Debt (CoD) construct achieves a Cronbach's alpha of 0.988 and a composite reliability value of 0.989. Both coefficients substantially exceed the recommended minimum threshold of 0.70, thereby demonstrating a high level of internal consistency. These findings confirm that the measurement instrument for the Cost of Debt construct operates reliably. The indicators consistently capture the underlying construct and provide dependable measurements within the proposed research model.

Structural Model (Inner Model)

Coefficient of Determination (R^2)

The study evaluated the structural model by examining the coefficient of determination (R^2), which indicates the extent to which the exogenous variables explain variance in the endogenous construct (Bancin et al., 2023). In essence, R^2 reflects the model's explanatory power and its capacity to account for the variability of the dependent variable. Scholars commonly classify R^2 values into three categories: substantial (0.67–1.00), moderate (0.20–0.33), and weak (≤ 0.19). The following section reports the R^2 values obtained in this study and interprets their implications for the model's explanatory strength.

Table 7. R-Square test results

	R-square	R-square adjusted
CoD	0.609	0.557

Source : Output SmartPls 4, 2026

The structural model yields an R^2 value of 0.609 and an adjusted R^2 of 0.557 for the Cost of Debt (CoD) construct. An R^2 of 0.609 indicates that the independent variables included in the model account for 60.9 per cent of the variance in Cost of Debt, while the remaining 39.1 per cent reflects influences beyond the scope of the present model. The adjusted R^2 of 0.557, which controls for the number of predictors and sample size, suggests that the model retains substantial explanatory power even after accounting for model complexity. Taken together, these results indicate that the proposed structural model demonstrates a robust capacity to explain variations in Cost of Debt.

Hypothesis Testing

Table 6. Results of Hypothesis Testing

	Original sample	Standard deviation (STDEV)	T statistics (|o/STDEV|)	P values
ESG Score -> CoD	-0.645	0.143	4.507	0.003
DER -> CoD	-0.051	0.142	0.362	0.000
Size -> CoD	-0.322	0.118	2.735	0.464
DER x ESG Score -> CoD	-0.012	0.131	0.091	0.359

Source : Output SmartPls 4, 2026

The hypothesis testing results indicate that DER exerts a negative and statistically significant effect on Cost of Debt (CoD), with a path coefficient of –0.645, a t-statistic of 4.507, and a p-value of 0.000. This finding suggests that higher leverage, as measured by DER, is associated with a reduction in the cost of debt within the estimated model. Similarly, ESG Score demonstrates a negative and significant relationship with CoD (β = –0.322; t = 2.735; p = 0.003), indicating that firms with stronger ESG performance tend to incur lower borrowing costs. However, the interaction term between DER and ESG Score does not reach statistical significance (β = –0.051; t = 0.362; p = 0.359). This result implies that DER does not moderate the relationship between ESG performance and the cost of debt. Finally, firm size does not exhibit a statistically significant effect on CoD (β = 0.012; t = 0.091; p = 0.464), suggesting that, within this model, company size does not meaningfully influence borrowing costs.

The Influence of ESG Score and Cost of Debt

The findings indicate that ESG Score exerts a negative and statistically significant effect on the Cost of Debt (CoD), with a path coefficient of –0.322, a t-statistic of 2.735, and a p-value of 0.003 ($p < 0.05$). This result suggests that firms with higher ESG performance tend to face lower borrowing costs. From a theoretical perspective, this outcome aligns with stakeholder theory and signalling theory. Strong ESG performance and transparent disclosure practices convey credible signals to creditors regarding the firm's risk management quality, governance standards, and long-term sustainability. Such signals reduce perceived default risk and information asymmetry, thereby encouraging lenders to offer financing at more favourable interest rates.

These findings support the view that ESG performance is, to a considerable extent, already embedded within corporate credit ratings. Credit rating agencies increasingly incorporate ESG considerations into their risk assessment frameworks; consequently, the effect of ESG on borrowing costs may not appear as a wholly independent factor, as it is reflected in the overall creditworthiness evaluation. Moreover, firms with high ESG scores typically integrate sustainability principles into their core policies and strategic decision-making processes rather than treating them as symbolic or compliance-driven initiatives. This integration suggests that ESG practices form part of a broader system of risk management and corporate governance, reinforcing the firm's financial resilience and long-term stability (Apergis et al., 2022).

The findings of this study are consistent with prior empirical evidence (Goss & Roberts, 2011) demonstrate that firms exhibiting stronger CSR/ESG performance tend to secure lower loan spreads, largely because lenders perceive them as facing more effectively managed non-financial risks. This suggests that responsible environmental and social practices reduce uncertainty and enhance creditors' confidence in the firm's overall risk profile. Similarly, (Bauer & Hann, 2010) report that companies associated with poor environmental performance incur higher borrowing costs, whereas robust environmental performance corresponds with a reduction in the cost of debt. Their results reinforce the argument that environmental risk constitutes a material factor in credit risk assessment and directly influences firms' financing conditions.

Empirical evidence further substantiates this relationship. (Oikonomou & Pavelin, 2014) find that stronger corporate social performance associates with lower credit risk and narrower bond spreads, suggesting that markets reward firms perceived as socially responsible with more favourable financing terms. Likewise, (Eliwa et al., 2021) demonstrate that firms providing more extensive ESG disclosure incur lower borrowing costs. Enhanced transparency mitigates information asymmetry between the firm and its creditors, thereby strengthening lenders' confidence and reducing the risk premium embedded in debt contracts.

Overall, the findings align with the international body of literature demonstrating that robust ESG practices reduce perceived risk and strengthen creditor confidence, thereby lowering the cost of debt. Firms that embed environmental, social, and governance considerations within their strategic and operational frameworks signal financial prudence and long-term viability, which in turn diminishes the risk premium demanded by lenders. Accordingly, ESG implementation extends beyond ethical commitment and sustainability objectives; it also generates tangible financial benefits in the form of more efficient financing costs.

The Influence of ESG score and the Cost of Debt: The Moderating Role of Capital Structure

The empirical results indicate that the interaction between DER and ESG Score does not exert a statistically significant effect on the Cost of Debt (CoD), as reflected in a path coefficient of –0.051, a t-statistic of 0.362, and a p-value of 0.359 ($p > 0.05$). This evidence suggests that capital structure, proxied by DER, does not moderate the relationship between ESG performance and borrowing costs. In other words, the effect of ESG on the Cost of Debt operates directly rather than conditionally upon the firm's level of leverage. Regardless of variations in debt ratios, creditors appear to prioritise the reputational advantages and risk mitigation associated with strong ESG practices when determining lending terms. Thus, ESG performance influences borrowing costs independently of the firm's capital structure configuration.

Previous research indicates that Indonesia's debt market is strongly shaped by macroeconomic conditions, particularly interest rates, inflation, exchange rate movements, and foreign exchange reserves, all of which influence bond yields and corporate financing costs (Fatmawatie, Endri , & Husein, 2024). In addition, economic policy uncertainty has been shown to increase the cost of debt in Indonesia, especially during periods of crisis. This pattern suggests that lenders respond more strongly to systemic economic uncertainty than to firm-level differences in leverage positions (Komari & Juliana, 2022). Consequently, debt pricing in the Indonesian market appears to be driven primarily by broader macroeconomic risk conditions rather than by the interaction between corporate sustainability performance and capital structure.

These findings accord with the evidence reported by (Ge & Liu, 2015), who demonstrate that ESG-related factors shape creditors' risk perceptions primarily through direct channels rather than through a firm's financing structure. Their study further indicates that strong CSR performance reduces the cost of debt directly, without compelling evidence of an interaction effect with leverage. Similarly, (Suto & Takehara, 2017) show that higher standards of corporate governance and social responsibility contribute to lower credit risk. However, they do not find consistent support for the view that capital structure systematically amplifies this relationship. Collectively, these studies reinforce the argument that ESG performance influences borrowing costs independently of leverage considerations.

(Gracia & Siregar, 2021) report that sustainability initiatives are associated with a reduction in debt financing, yet their effect on the cost of debt in ASEAN countries remains relatively modest. This finding suggests that, although ESG disclosure and sustainability performance generally contribute to lower borrowing costs, the magnitude of this effect is not uniform across contexts. Rather, the extent to which ESG influences debt pricing depends on firm-specific characteristics, including borrower quality, as well as on lenders' risk perceptions and broader macroeconomic conditions. These contextual factors shape how sustainability-related information is interpreted and incorporated into credit assessments, thereby determining the strength of its impact on financing costs.

(Jung et al., 2016) report that more extensive environmental disclosure associates with lower borrowing costs; however, they find no robust evidence that leverage materially strengthens or weakens this relationship. Their results suggest that the pricing benefits of environmental transparency operate largely independently of the firm's capital structure. Similarly, (Oikonomou & Pavelin, 2014) conclude that the influence of ESG performance on corporate risk and financing costs stems primarily from reductions in reputational risk and information asymmetry. Rather than functioning through an interaction mechanism with capital

structure, ESG appears to affect debt pricing directly by reshaping creditors' assessments of firm-level risk.

The findings of this study reinforce the argument that ESG practices exert a direct influence on reducing the Cost of Debt, whereas capital structure does not function as a significant moderating variable in this relationship. These results suggest that creditors place greater emphasis on the quality of a firm's sustainability performance and governance standards than on its leverage configuration when assessing financing risk. In evaluating creditworthiness, lenders appear to prioritise long-term resilience and risk management capacity over the specific composition of debt within the firm's capital structure.

CONCLUSION

This study investigates the effect of ESG Score on the Cost of Debt (CoD), incorporating capital structure (proxied by DER) as a moderating variable and firm size as a control variable, focusing on companies listed in the SRI-KEHATI Index during 2020–2024. Using PLS-SEM analysis, the findings reveal that ESG Score has a negative and statistically significant effect on the Cost of Debt ($\beta = -0.322$; $p = 0.003$), indicating that firms with higher ESG performance tend to obtain lower borrowing costs. This result supports signalling theory, suggesting that strong ESG practices function as credible signals of effective risk management, sound governance, and long-term sustainability. Consequently, creditors perceive lower default risk and offer more favourable lending terms.

The results also show that DER has a negative and significant effect on CoD ($\beta = -0.645$; $p = 0.000$), implying that leverage is associated with changes in borrowing costs. However, the interaction between ESG Score and DER is not statistically significant, indicating that capital structure does not moderate the relationship between ESG performance and the Cost of Debt. Firm size likewise does not significantly influence borrowing costs. With an R^2 value of 0.609, the model demonstrates strong explanatory power, accounting for 60.9 per cent of the variance in CoD.

Based on the empirical findings reported in the study several recommendations can be proposed. First, firms particularly those listed on the SRI-KEHATI Index should strengthen the integration of ESG practices into their core strategic and governance frameworks, as robust ESG performance has been shown to reduce borrowing costs directly. Second, companies should enhance the transparency, consistency, and credibility of ESG disclosures in order to reinforce positive signals to creditors and minimise information asymmetry. Third, regulators and stock exchange authorities in Indonesia may consider promoting standardised ESG reporting frameworks to improve comparability and reliability of sustainability information. Finally, future research is encouraged to expand the sample beyond SRI-KEHATI constituents and explore additional moderating variables, such as institutional ownership or credit ratings, to further enrich the understanding of ESG and debt financing dynamics in emerging markets.

In addition, the findings offer important practical implications for both managers and policymakers. At the managerial level, firms should integrate ESG more deeply into corporate strategy, governance, and risk management because strong ESG performance can directly improve financing conditions. At the policy level, the results support the need for more standardised and credible ESG reporting practices in Indonesia, enabling creditors and investors to evaluate firm sustainability performance more effectively and consistently. Strengthening disclosure frameworks and assurance mechanisms may therefore enhance market confidence and contribute to the growth of sustainable finance in emerging markets.

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