

ESG Disclosure and Cost of Debt in Indonesia's Energy Sector: Evidence from 2021-2024

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Abstract

This study examines whether Environmental, Social, and Governance (ESG) disclosure is associated with the cost of debt of Indonesian energy sector companies while controlling for leverage and firm size. Secondary data were collected from the annual, financial, and sustainability reports of 17 energy companies listed on the Indonesia Stock Exchange (IDX) during 2021-2024, producing 68 firm-year observations. Environmental, social, and governance disclosure was measured through content analysis of GRI 2021 indicators, while the cost of debt was proxied by interest expense divided by total liabilities. The source study estimated multiple linear regression in SPSS 31 after applying a square-root transformation to the cost of debt. Environmental disclosure is insignificant ($B=0.037$, $p=0.571$), social disclosure is negative and significant ($B=-0.138$, $p=0.048$), and governance disclosure is insignificant ($B=0.012$, $p=0.631$). The reported OLS model is jointly significant, $F(5,62)=4.058$, $p=0.003$, with $R^2=0.247$ and adjusted $R^2=0.186$. A separate Cochrane-Orcutt lag diagnostic increases Durbin-Watson from 1.194 to 1.820, but the source thesis does not report the corrected coefficients for that specification. Social disclosure is the ESG dimension most consistently associated with lower borrowing costs in the reported model. The short sector-specific panel, disclosure-based measures, accounting cost-of-debt proxy, and incomplete corrected-regression output constrain the causal interpretation. This study adds Indonesian energy sector evidence by separating ESG pillars and distinguishing source-reported Ordinary Least Squares (OLS) results from autocorrelation correction.

Keywords: Cost of Debt, Energy Sector, ESG Disclosure, Social Disclosure, Sustainable Finance

1. INTRODUCTION

Sustainability information has become increasingly relevant to financing decisions because creditors are exposed to not only conventional financial risk but also environmental, social, governance, and reputational risks that can affect repayment capacity. Environmental, Social, and Governance (ESG) disclosure can reduce information asymmetry by making firms' sustainability exposures and management responses more observable to capital providers, consistent with Association of Southeast Asian Nations (ASEAN) evidence that sustainability practices affect borrowing costs ([Gracia & Siregar, 2021](#)). International evidence indicates that stronger ESG disclosure or performance can be associated with lower default risk and lower debt financing costs, although the magnitude and direction vary across institutional settings and individual ESG pillars ([Atif, & Ali, 2021](#); [Eliwa, Aboud, & Saleh, 2021](#); [Houge, Ahmed, & Richardson, 2020](#); [Raimo, Caragnano, Zito, Vitolla, & Mariani, 2021](#)). This relationship is especially relevant in environmentally intensive industries, where transition risk, operational safety, community relations, and governance quality can affect long-term creditworthiness of companies.

Indonesia's energy sector provides a demanding setting for this study. Energy companies require substantial external financing for extraction, transport, processing, power infrastructure, and transition investment, and their activities are closely scrutinized for emissions, labor safety, community impact, and governance. Indonesia sustainable finance policy has also strengthened reporting expectations through *Otoritas Jasa Keuangan* (OJK) Regulation No. 51/POJK.03/2017, which promotes sustainability reporting by listed companies and financial institutions ([Otoritas, 2017](#)). Simultaneously, energy sector financing continues to depend heavily on debt, making the cost of borrowing an economically meaningful outcome. Recent Indonesian studies have increasingly connected ESG information, financial risk, and financing conditions, including evidence from the energy and other high-impact sectors ([Indriyani, Damayanti, & Rusmianto, 2025](#); [Mukti,](#)

[Hariyanto, & Edward, 2025](#); [Johan, Lindrawati, & Susanto, 2025](#); [Paledung, Bakri, & Amahoru, 2026](#)).

The institutional setting is also important. Indonesia's sustainable finance framework has gradually increased expectations that listed companies disclose material environmental and social impacts, governance practices, and sustainability risks. OJK Regulation No. 51/POJK.03/2017 formalized sustainable finance obligations for financial institutions, issuers, and public companies, while GRI-based sustainability reporting has become a common disclosure reference. For lenders, this expanding disclosure environment creates a larger information set, but it does not guarantee that every ESG item is equally relevant to credit-pricing. Therefore, the key empirical question is whether broader disclosure translates into a lower perceived probability of default or a lower required return on debt ([Otoritas, 2017](#); [Global, 2021](#)).

This is especially important because ESG information can affect creditors through several channels. Environmental controversies can create remediation costs, regulatory exposure, and stranded-asset risk. Social failures can interrupt operations through occupational accidents, labor disputes, or community conflict. Weak governance can increase agency risk, reporting uncertainty, and the possibility of opportunistic behavior. When disclosure credibly reduces uncertainty regarding these risks, creditors may require a smaller risk premium. Conversely, if disclosure is standardized, symbolic, or weakly connected to actual risk management, the same information may have a minimal incremental effect on borrowing costs ([Atif and Ali, 2021](#); [Gracia and Siregar, 2021](#); [Raimo et al., 2021](#)).

The cost of debt reflects the price that creditors require to bear firm-specific risk, whether debt is raised privately through financial institutions or through public debt instruments ([Setiawati, 2020](#)). Accounting-based measures commonly use interest expenses relative to debt or liabilities, whereas market-based measures use bond yields or spreads. Better sustainability disclosure may reduce the information and reputation components of credit risk when creditors interpret it as evidence of stronger risk management, transparency, and stakeholder relations ([Baule, 2019](#); [Dirman, 2020](#); [Atif and Ali, 2021](#)). However, disclosure can also become standardized or symbolic, and creditors may still prioritize cash flow, leverage, profitability, collateral, and repayment capacities. Consequently, a high level of disclosure does not imply a lower cost of debt.

In accounting-based research, the cost of debt is often approximated using interest expenses relative to debt or liabilities because this measure captures the realized financing burden recorded by the firm. The proxy is useful for listed firms whose borrowing is spread across bank loans, leases, bonds, and other interest-bearing liabilities, although it does not fully isolate contractual yields on newly issued debts. Accordingly, variations in the measure can reflect both creditor risk assessment and changes in the composition, maturity, and volume of borrowing. This consideration is relevant when interpreting ESG coefficients: a statistically significant association indicates a relationship with the observed financing burden, not necessarily a direct causal repricing of a specific loan contract ([Baule, 2019](#); [Dirman, 2020](#); [Johan et al., 2025](#)).

Prior findings are notably inconsistent when ESG is decomposed into its separate pillars. International evidence generally reports lower debt costs for stronger aggregate ESG performance or disclosure ([Eliwa et al., 2021](#); [Eliwa et al., 2021](#); [Raimo et al., 2021](#)). While recent Indonesian evidence finds that aggregate ESG disclosure can reduce the cost of debt by ([Jafar, Basuki, Windijarto, Setiawan, and Prabaswara \(2024\)](#); [Johan et al. \(2025\)](#)) or may be insignificant once components and firm characteristics are considered ([Pramadhia & Nainggolan, 2025](#)). Pillar-level studies are similarly mixed, [Perdiansyah and Ulpah \(2024\)](#) find different effects across environmental, social, and governance pillars. [Sidi and Ismawati \(2024\)](#) report that social disclosure is negatively associated with the cost of debt, while environmental and governance disclosures are not significant, and [Tyas and Sari \(2025\)](#) show that governance-related performance does not necessarily translate directly into lower borrowing costs.

The inconsistency is even more pronounced when ESG is separated into environmental, social, and governance disclosures. Separate-pillar analysis is useful because creditors may attach different economic importance to different types of non-financial information. In high-impact industries, environmental disclosure can be extensive because of strong reporting requirements and stakeholder scrutiny. However, environmental disclosure breadth may still provide limited differentiation if most firms report similar information. Social information may be more directly connected to business continuity through workforce safety and community relations, whereas governance information may influence creditors only when it reveals substantive monitoring quality rather than formal structures. Therefore, recent Indonesian studies report heterogeneous pillar-level results instead of one uniform ESG effect ([Janah, & Purwanto, 2024](#); [Perdiansyah and Ulpah, 2024](#); [Pramadhia and Nainggolan, 2025](#); [Tyas and Sari, 2025](#)).

This inconsistency creates a useful research gap for Indonesian energy companies from 2021-2024. The present study separates environmental, social, and governance disclosures rather than relying only on an aggregate ESG score, and controls for leverage and firm size. The analysis uses Global Reporting Initiative (GRI-based) disclosure ratios derived from sustainability reports, allowing the three pillars to be compared on a common scale. This study contributes to the literature by focusing on a financing outcome that is directly relevant to creditors, examining a high-impact sector during a period of increasing sustainability-reporting attention, and distinguishing pillar-specific effects from the joint explanatory power of the full model. It also treats the diagnostic sequence of the source thesis transparently by distinguishing the square-root Ordinary Least Squares (OLS) coefficient output from the later Cochrane-Orcutt autocorrelation correction. The research question is whether each ESG disclosure pillar is associated with the cost of debt and whether the reported regression model is jointly significant after leverage and firm size are included as controls.

The novelty of this study is three-fold. First, it disaggregates ESG disclosure into environmental, social, and governance measures, instead of assuming that one aggregate score represents all creditor-relevant information. Second, it examines the cost of debt in the Indonesian energy sector, where capital-intensive operations, environmental liabilities, occupational safety exposure, community dependence, and transition financing create distinct channels through which creditors assess repayment risk. Third, it reports the source thesis's coefficient results and autocorrelation diagnostics separately, thereby preserving the distinction between the reported pooled OLS association and the later diagnostic correction. This setting is distinctive because energy companies may report similar mandatory information while facing materially different underlying exposures; environmental and governance disclosures can become common compliance practices, whereas social-risk management may be more directly connected to operational continuity. Therefore, this study tests whether the three ESG pillars provide different incremental information to creditors after leverage and firm size are controlled ([Otoritas, 2017](#); [Mukti et al., 2025](#); [Paledung et al., 2026](#); [Pradana, & Juliatri, 2026](#)).

2. LITERATURE REVIEW

Stakeholder theory provides the primary explanation for why ESG disclosures may matter to creditors. [Freeman \(1984\)](#) argues that firms depend on multiple stakeholder groups whose information needs should be considered in corporate decision-making. Creditors are central stakeholders because they supply capital while bearing the downside risk. More complete sustainability disclosure can reduce uncertainty regarding environmental liabilities, workforce practices, community relations, internal controls and governance, thereby supporting a more informed credit risk assessment. Empirical ESG research also links disclosure to lower information asymmetry, lower default risk, and improved access to external finance ([Atif, & Ali, 2021](#); [Raimo, Caragnano, Zito, Vitolla, & Mariani, 2021](#)).

For debt contracting, stakeholder arguments are closely related to information asymmetry. Creditors generally have less direct access to information about operational disruptions, environmental liabilities, employee safety, regulatory compliance, and governance weaknesses than managers ([Wahyuni & Aira, 2026](#)). Public ESG disclosure can partially narrow this information gap

by providing structured evidence of policies, incidents, targets, and oversight mechanisms. The expected consequence is not that disclosure automatically reduces debt costs, but that more decision-useful information can improve risk assessment and reduce uncertainty regarding future cash flows and repayment capacity ([Raimo et al., 2021](#); [Atif and Ali, 2021](#); [Taniya, & Komalasari, 2026](#)).

Legitimacy theory complements this perspective. Firms seek congruence between their activities and the norms of the social system in which they operate ([Dowling & Pfeffer, 1975](#)). Energy companies face particularly high legitimacy pressure because their operations create visible environmental and social externalities. ESG disclosure can communicate that a firm recognizes these impacts and has governance mechanisms to manage them. Studies on sustainability disclosure show that transparency can improve stakeholder confidence and corporate sustainability outcomes, although disclosure quality and actual performance remain conceptually distinct ([Alsayegh, & Homayoun, 2020](#); [Septiana, & Puspawati, 2022](#); [Vefiadytria, & Rosyadi, 2025](#)).

Therefore, the stakeholder and legitimacy perspectives are complementary in this study. Stakeholder theory emphasizes creditors' information needs, whereas legitimacy theory explains why firms in environmentally and socially sensitive industries have incentives to disclose beyond narrow financial requirements ([Munthe, Siregar, & Ritonga, 2026](#)). However, legitimacy-motivated reporting can also create empirical ambiguity. A firm may disclose extensively because it performs well or because it faces stronger pressure to justify controversial activities. This means that disclosure quantity can reflect both substantive accountability and symbolic communication, which is one reason why the relationship with financing costs is not expected to be mechanically uniform across ESG pillars ([Alsayegh and Homayoun, 2020](#); [Ilori, Lawal, Friday, Isibor, & Chukwuma, 2023](#)).

The integrated conceptual framework links the theories to the variables through a creditor risk mechanism. Stakeholder theory explains the demand for decision-useful ESG information because creditors need evidence of risks that may affect future cash flows and repayment capacity. Legitimacy theory explains why energy companies disclose environmental, social, and governance information in response to regulatory and societal pressures while allowing for the possibility that disclosure is symbolic rather than fully substantive. In the empirical model, environmental disclosure (ENV), social disclosure (SOC), and governance disclosure (GOV) are specified as independent variables, while cost of debt (COD) is the dependent variable, with the debt-to-asset ratio (DAR) and firm size (SIZE) included as control variables. The expected overall direction of the relationship is negative, although the framework does not assume that creditors value the three pillars equally. Each pillar is expected to influence different components of perceived credit risk, therefore, the hypotheses are tested both individually and collectively. ([Freeman, 1984](#); [Dowling and Pfeffer, 1975](#); [Atif and Ali, 2021](#); [Wardani, & Ruslim, 2020](#)).

For creditors, environmental disclosure primarily represents long-term regulatory and transition exposure. Energy companies may face emissions restrictions, remediation obligations, stranded assets, environmental fines, and capital expenditures to adapt their production or infrastructure. Therefore, a lender may distinguish between a high number of disclosed environmental items and credible evidence that these exposures are measured, controlled, and financially manageable. The expected negative relationship occurs because environmental transparency can reduce uncertainty regarding future liabilities ([Susi & Rayyani, 2026](#)). However, this relationship may become weaker when disclosure practices are largely standardized or when greater transparency reveals substantial and unresolved environmental exposure. This creditor perspective makes environmental disclosure conceptually different from the social pillar, whose risks can interrupt operations more immediately ([Houge, Ahmed, & Richardson, 2020](#); [Janah, & Purwanto, 2024](#); [Pramadhia, & Nainggolan, 2025](#)).

Environmental disclosure reports how firms manage emissions, energy, materials, water, biodiversity, waste, and the environmental impact of suppliers. Under the GRI framework, such information should help creditors assess their exposure to regulatory sanctions, remediation costs, transition risk, and operational disruption. International evidence suggests that environmental performance can reduce debt costs. However, Indonesian results are mixed and sometimes show no

significant association ([Houge et al., 2020](#); [Perdiansyah, & Ulpah, 2024](#); [Pramadhia and Nainggolan, 2025](#); [Sidi, & Ismawati, 2024](#)). Because the source study follows a risk-reduction argument, the first hypothesis is directional.

H₁: Environmental disclosure is negatively associated with the cost of debt

Empirical evidence does not establish a single environmental disclosure effect. [Houge et al. \(2020\)](#) reported that stronger environmental performance factors can be associated with lower debt costs internationally, while [Perdiansyah and Ulpah \(2024\)](#) and [Pramadhia and Nainggolan \(2025\)](#) indicated that environmental components matter in Indonesian financing settings. In contrast, [Janah and Purwanto \(2024\)](#) report insignificant relationships for some environmental disclosure specifications in Indonesia. Such differences can arise because disclosure breadth, environmental performance, industry exposure, and creditor-information channels are distinct constructs. The source study, therefore, predicts a negative relationship but tests it empirically rather than assuming that more environmental reporting is necessarily rewarded by lenders.

Creditors' perceptions of social disclosure are expected to be more closely related to near-term operating continuity. In the energy sector, a fatal accident, labor dispute, human rights controversy, or community opposition can suspend production, delay permits, restrict transport, increase compensation or litigation costs, and damage a firm's ability to generate cash. Detailed disclosures about safety systems, workforce capability, grievance handling, and community engagement can signal that management has mechanisms to prevent disruptions and protect repayment capacity. Consequently, the social hypothesis is grounded in a more immediate cash flow channel than the environmental hypothesis, although the strength of the signal still depends on whether disclosures are specific and supported by actual practices ([Gracia, & Siregar, 2021](#); [Houge et al., 2020](#); [Raimo et al., 2021](#)).

Social disclosure covers employment, occupational health and safety, training, diversity, human rights, local communities, customer welfare and supplier social assessment. These issues are particularly relevant for energy companies because operational continuity depends on workforce safety, community acceptance, and the avoidance of social conflict. Better social disclosure can signal stronger management of these risks and, therefore, lower the risk premium required by creditors. Evidence from Indonesia supports a negative social pillar relationship in some settings ([Sidi & Ismawati, 2024](#)), although [Perdiansyah and Ulpah \(2024\)](#) report a different direction in a broader Asian sample.

H₂: Social disclosure is negatively associated with the cost of debt

The social pillar may be particularly salient in the energy sector because failures in occupational safety, employee relations, human rights, or community engagement can quickly become operational and reputational risks. These risks can disrupt production, generate legal or compensation costs, delay projects and weaken stakeholder support. A lender who views strong social disclosure as evidence of more systematic risk management may therefore perceive a lower downside risk. International ESG evidence and Indonesian pillar-level studies support a negative association, although the magnitude and significance remain sensitive to measurement and sample composition ([Houge et al., 2020](#); [Raimo et al., 2021](#); [Perdiansyah and Ulpah, 2024](#)).

Governance disclosure sends a different signal because creditors use it primarily to assess protection, monitoring, and the reliability of information. Board oversight, internal controls, anti-corruption procedures, ethical conduct, reporting quality, and covenant discipline can reduce the risk of managers or controlling owners acting opportunistically or material problems remaining hidden. Nevertheless, a governance checklist may receive little additional credit when listed energy companies disclose structures similar to those that satisfy regulations and market expectations. Creditors may value evidence of effective oversight more than the mere presence of governance statements, which explains why the expected negative relationship can coexist with an insignificant result when the

disclosure breadth does not capture governance effectiveness ([Ilori et al., 2023](#); [Perdiansyah and Ulpah, 2024](#); [Tyas, & Sari, 2025](#)).

Governance disclosure describes the board structure, conflicts of interest, oversight, compensation, ethics, anti-corruption, and accountability. Strong governance should reduce agency risk and increase confidence in financial and nonfinancial reporting. Cross-country evidence finds a negative relationship between governance quality and borrowing costs by [Houqe et al. \(2020\)](#), while Indonesian evidence remains inconsistent. Governance disclosure is significant in some studies but insignificant in others ([Janah and Purwanto, 2024](#); [Sidi and Ismawati, 2024](#); [Tyas and Sari, 2025](#)). Nevertheless, the source study predicts that broader governance disclosure should lower creditor risk.

H₃: Governance disclosure is negatively associated with the cost of debt

Governance disclosure should be relevant because creditors value reliable monitoring, internal control, ethical conduct, and credible financial reporting. However, the information content of governance disclosure depends on what is measured. A checklist can confirm that governance topics are disclosed without establishing whether boards are effective, independent, technically competent, or willing to challenge the management. If listed companies already disclose similar governance structures because of regulations and market practices, cross-sectional variation may be insufficient to produce a strong financing effect. This distinction between disclosure breadth and governance effectiveness motivates the directional hypothesis, while leaving open the possibility of an insignificant result ([Tyas and Sari, 2025](#); [Ilori et al., 2023](#)).

The three ESG pillars capture the complementary dimensions of non-financial risk. Therefore, aggregate disclosure may provide creditors with a more complete assessment than any single pillar. Prior studies report that broader ESG transparency can reduce borrowing costs or improve access to debt by reducing information asymmetry and reputational risk ([Eliwa, Aboud, & Saleh, 2021](#); [Jafar, Basuki, Windijarto, Setiawan, & Prabaswara, 2024](#); [Johan, Lindrawati, & Susanto, 2025](#); [Raimo et al., 2021](#)). The study also includes the debt-to-asset ratio and firm size as controls because capital structure and scale can affect borrowing risk and lending terms ([Meiriasari, 2017](#); [Putri, & Mayangsari, 2023](#); [Wardani and Ruslim, 2020](#); [Suryani, Imelda, & Wirianata, 2019](#)).

H₄: Environmental, social, and governance disclosure is jointly associated with the cost of debt after controlling for leverage and firm size

Leverage and firm size are included as controls because the financing structure and organizational scale can affect debt pricing independently of ESG disclosure. A higher debt-to-asset ratio can increase financial risk and creditor exposure, whereas larger firms may benefit from more diversified operations, greater information availability, and broader access to capital markets ([Priyanti, & Dewi, 2026](#); [Zainal, & Aprilia, 2026](#)). Controlling for these characteristics helps isolate the incremental association of ESG disclosure with the cost of debt, although the overall F-test necessarily evaluates the full model that contains both the ESG predictors and the controls ([Wardani and Ruslim, 2020](#); [Meiriasari, 2017](#)).

3. RESEARCH METHODOLOGY

This study uses a quantitative explanatory design based on secondary data from energy sector companies listed on the Indonesia Stock Exchange during 2021-2024. Purposive sampling required continuous listing during the observation period, accessible annual and financial reports, consistent sustainability reports prepared with reference to the GRI standards, and interest expense during the period. The screening process began with 87 energy-sector firms.

Table 1. Sample-selection process

Criterion	Number
Energy-sector companies in the initial population	87
Excluded: not continuously listed during 2021-2024	(2)

Criterion	Number
Excluded: incomplete annual/financial reports	(29)
Excluded: inconsistent GRI-based sustainability reports	(39)
Excluded: no interest expense during the period	(0)
Companies meeting all criteria	17
Firm-year observations (17×4 years)	68

As summarized in Table 1, 17 firms met all the criteria, producing 68 firm-year observations. Data were collected from IDX publications, company websites, annual reports, financial statements, and sustainability reports and processed using Microsoft Excel and IBM SPSS Statistics 31. The unit of analysis is firm-year. Annual reports, financial statements, and sustainability reports were collected for each selected company-year and matched across the four-year periods. ESG disclosure was coded from publicly available sustainability information using the GRI-based indicators specified in the source study. The resulting disclosure ratios range from zero to one, with a higher value representing a broader proportion of applicable items disclosed. This document-based approach reduces respondent bias but remains dependent on the completeness and comparability of the published corporate reports.

Table 2. Variable operationalization

Variable	Measurement
Environmental disclosure (ENV)	Disclosed environmental items/31 GRI environmental indicators
Social disclosure (SOC)	Disclosed social items/36 GRI social indicators
Governance disclosure (GOV)	Disclosed governance items/30 GRI 2 governance-related indicators
Cost of debt (COD)	Interest expense/total liabilities
Leverage (DAR)	Total liabilities/total assets
Firm size (SIZE)	Natural logarithm of total assets

Table 2 summarizes the operationalization of these variables. Environmental disclosure is the proportion of disclosed GRI 300 environmental indicators, using the 31 indicators identified in the source study. Social disclosure is the proportion of disclosed GRI 400 social indicators using 36 indicators. Governance disclosure is based on 30 governance-related items derived from the GRI 2 General Disclosures 2021. These content analysis choices follow the source thesis and the broader use of GRI-based sustainability disclosure in Indonesian research ([Global, 2021](#); [Pandian, Wijaya, Postel, & Manalu, 2024](#); [Rahayu, 2024](#); [Trinurwati, Dewi, & Yuniarti, 2026](#)). The cost of debt is measured as the interest expense divided by the total liabilities. Leverage is proxied by the debt-to-asset ratio (DAR), and firm size is proxied by the natural logarithm of total assets. The accounting proxy follows the measurement approach of the source thesis and prior Indonesian cost-of-debt studies ([Dirman, 2020](#); [Wardani, & Ruslim, 2020](#)).

ENV is calculated as the number of disclosed environmental indicators divided by 31. SOC is calculated as the number of disclosed social indicators divided by 36. GOV is calculated as the number of disclosed governance indicators divided by 30. The COD is measured using the interest expense divided by total liabilities, following the accounting-based approach adopted in this thesis. Leverage is represented by DAR, and firm size is the natural logarithm of total assets. Therefore, the proportional ESG measures are directly comparable in scale, whereas COD, DAR, and SIZE retain their own financial interpretations.

The source thesis reports descriptive statistics, residual normality testing, multicollinearity diagnostics, a Glejser heteroskedasticity test, Durbin-Watson (DW) autocorrelation testing, multiple linear regression, partial t-tests, an overall *F*-test, and coefficient-of-determination statistics using IBM SPSS Statistics 31 ([Ghozali, 2021](#)). The initial residual-normality test produced a Kolmogorov-Smirnov *p*-value of 0.022. Therefore, the dependent variable was transformed using the square root.

After transformation, $p=0.066$, and normality was not rejected. The reported Square Root (SQRT) model produced Durbin-Watson=1.194, indicating a positive serial correlation under the criterion used in this study. A subsequent Cochrane-Orcutt two-step lag transformation increased the Durbin-Watson to 1.820. Importantly, the thesis provides a lag-model summary but does not provide a corresponding corrected coefficient table. The available coefficient and ANOVA tables still report SQRT as the dependent variable with unlagged ENV, SOC, GOV, DAR, and SIZE as predictors. To preserve fidelity, this study reports the coefficient and F -test results as the source-reported SQRT OLS model and presents the Cochrane-Orcutt result only as a diagnostic correction, rather than inventing corrected coefficients that are not present in the source. The reported model can be written as Formula 1.

$$SQRT(COD) = \alpha + \beta_1 ENV + \beta_2 SOC + \beta_3 GOV + \beta_4 DAR + \beta_5 SIZE + \varepsilon. \quad (1)$$

Where COD represents the cost of debt, ENV represents environmental disclosure, SOC represents social disclosure, GOV represents governance disclosure, DAR represents the Debt-to-Asset Ratio, SIZE represents firm size, α denotes the constant term, β represents the regression coefficients, and ε represents the error term. H_1 - H_3 are evaluated using partial t-tests, while H_4 concerns the joint significance of ESG disclosure at the model level with DAR and SIZE retained as controls.

Although the 68 observations form a balanced firm-year panel of 17 companies observed for four years, the source thesis estimates a pooled OLS model using multiple linear regression. This article follows this specification to remain faithful to the available source output. This thesis does not report a poolability test, fixed-effects or random-effects estimates, year effects, clustered standard errors, or a complete corrected coefficient table. Pooling treats the observations as one combined sample and estimates the average association between ESG disclosure and the accounting cost-of-debt proxy after controlling for DAR and SIZE. Therefore, the choice is a source-replication decision, not a claim that pooled OLS is superior to panel estimators. A limitation of the pooled OLS is that it does not absorb unobserved time-invariant firm characteristics such as ownership structure, business model, asset quality, collateral, lender relationships, or persistent risk culture. If these characteristics are correlated with both ESG disclosure and borrowing costs, omitted-variable bias may remain. Consequently, the results should be interpreted as conditional associations rather than causal effects, and future studies should compare pooled, fixed-effects, and random-effects specifications with firm and year-level inferences.

4. RESULTS AND DISCUSSION

Table 3. Descriptive statistics

Variable	N	Min	Max	Mean	SD
ENV	68	0.03	1.00	0.5707	0.27048
SOC	68	0.03	1.00	0.5527	0.26627
GOV	68	0.07	1.00	0.7162	0.39589
COD	68	0.00	0.15	0.0467	0.03080
DAR	68	0.10	0.88	0.5156	0.18318
SIZE	68	15.72	27.37	21.1647	3.14408

As shown in Table 3, the 68 observations display substantial variations across ESG disclosure dimensions and financial characteristics. The average governance disclosure is highest at 0.7162 (71.62%), followed by environmental disclosure at 0.5707 (57.07%), and social disclosure at 0.5527 (55.27%). The average accounting cost of debt is 0.0467, with observed values ranging from approximately zero to 0.15. The average DAR is 0.5156, indicating that about 51.6% of assets are financed by liabilities on average, while firm size averages 21.1647 in natural-log terms. The dispersion of governance disclosure is larger than that of the environmental and social dimensions, indicating greater cross-firm variation in the governance items coded by the source study.

The descriptive pattern also highlights the usefulness of separate-pillar analysis. Governance disclosure has the highest average and a relatively wide dispersion ($SD=0.39589$), whereas environmental and social disclosures have similar means and standard deviations. An average DAR of 0.5156 indicates that approximately half of the sampled firms' assets are financed by liabilities, while a mean COD of 0.0467 indicates an average accounting financing burden of about 4.67% under the study's proxy. Firm size varies materially across the sample (15.72-27.37), providing a basis for controlling scale differences. These statistics describe the sample but do not establish whether higher disclosure causes lower financing costs.

Table 4. Regression diagnostics

Diagnostic	Reported result	Interpretation
Residual normality after SQRT	K-S $p=0.066$	Normality not rejected
Multicollinearity	VIF=1.039-5.095	Below thesis threshold of 10
Heteroskedasticity	Glejser $p=0.193$ -0.843	No variable significant at 5%
SQRT-model autocorrelation	DW=1.194	Positive autocorrelation detected
Cochrane-Orcutt lag diagnostic	DW=1.820	No autocorrelation under thesis criterion
Corrected coefficient table	Not reported	Cannot verify corrected partial effects

Table 4 summarizes the regression diagnostics reported in the thesis. The square-root transformation resolves the source study's residual-normality concern (K-S $p=0.066$), and the Glejser test does not identify heteroskedasticity at the 5% significance level. The Variance Inflation Factor (VIF) values ranged from 1.039 to 5.095. Environmental and social disclosure have the highest VIFs (4.698 and 5.095), which remain below the thesis threshold of 10 but indicate that the two disclosure dimensions share a non-trivial common variation. This overlap is conceptually plausible because companies that develop comprehensive sustainability reports often expand several ESG pillars simultaneously; consequently, partial coefficients should be interpreted as the unique association of each pillar after the others are held constant. The main diagnostic concern relates to autocorrelation. The DW value of 1.194 in the SQRT model was interpreted in the thesis as indicating positive autocorrelation, while the subsequent Cochrane–Orcutt lag analysis reported an improved DW value of 1.820. Because the corrected coefficient table is unavailable, the diagnostic improvement should not be confused with a complete re-estimation of the coefficient results.

Table 5. Multiple regression and partial hypothesis tests (reported SQRT model)

Variable	<i>B</i>	SE	β	<i>t</i>	<i>p</i>	Decision
Constant	0.116	0.074	-	1.565	0.123	-
ENV	0.037	0.065	0.136	0.569	0.571	H_1 not supported
SOC	-0.138	0.069	-0.501	-2.013	0.048	H_2 supported
GOV	0.012	0.025	0.064	0.482	0.631	H_3 not supported
DAR	0.031	0.045	0.077	0.687	0.495	Control: n.s.
SIZE	0.006	0.003	0.239	1.874	0.066	Control: n.s.

Table 5 presents the source-reported coefficients and partial hypothesis tests for the model with the square-root-transformed cost of debt. Environmental disclosure has a positive but non-significant coefficient ($B=0.037$, $\beta=0.136$, $t=0.569$, $p=0.571$); therefore, H_1 is not supported, and the observed direction is also opposite to the hypothesized negative association. Social disclosure is negative and significant ($B=-0.138$, $\beta=-0.501$, $t=-2.013$, $p=0.048$), supporting H_2 at the 5% level. Governance disclosure is positive and not significant ($B=0.012$, $\beta=0.064$, $t=0.482$, $p=0.631$), so H_3 is not supported. DAR is also not significant ($B=0.031$, $p=0.495$), while firm size is positive with $p=0.066$; this value is closer to conventional significance thresholds than the other non-significant predictors but remains above the study's 5% criterion and is therefore treated as not significant. The standardized coefficient for social disclosure has the largest absolute magnitude among the predictors, indicating that the social pillar provides the strongest unique association in this model.

Table 6. Model fit and simultaneous test

Statistic	Reported Sqrt OLS	Cochrane-Orcutt lag diagnostic
R	0.497	0.403
R^2	0.247	0.163
Adjusted R^2	0.186	0.094
Std. error	0.06641	0.02426
Durbin-Watson	1.194	1.820
F statistic	$F(5,62)=4.058$	Not reported
p -value	0.003	Not reported
N	68	Not stated in output table

Table 6 separates the fit statistics of the reported Sqrt OLS model from the later Cochrane-Orcutt diagnostic. For the model that generated the coefficient and F-test outputs, $R=0.497$, $R^2=0.247$, and adjusted $R^2=0.186$. The full specification explains approximately 18.6% of the adjusted variation in the transformed cost of debt measure. The ANOVA reports $F(5,62)=4.058$ and $p=0.003$, showing that the five-predictor model is jointly significant. The later Cochrane-Orcutt model summary reports $R=0.403$, $R^2=0.163$, adjusted $R^2=0.094$, and DW=1.820, but no corrected coefficient or Analysis of Variance (ANOVA) table is provided in the thesis. H_4 can therefore be described as consistent with the significance of the full reported model, not as a standalone F-test of the three ESG variables, excluding DAR and SIZE. The relatively modest explanatory power also indicates that a large share of the cost of debt variation is associated with factors outside the model, such as profitability, liquidity, credit quality, debt maturity, collateral, interest rate conditions, business risk, and lender-specific pricing.

Environmental disclosure is not significantly associated with the reported transformed cost of debt. This result suggests that, within the sample, the breadth of publicly disclosed environmental items does not independently alter creditors' pricing after including the other variables. One explanation is the limited differentiating power. Many listed energy companies are already subject to sustainability-reporting expectations, so compliance-oriented environmental disclosure may not provide sufficient incremental information to distinguish credit risk. Creditors may instead rely more heavily on leverage, cash flow, collateral, credit history, and firm-specific operating conditions. This result is consistent with Indonesian evidence that environmental disclosure or environmental scores can be insignificant for debt costs in certain samples ([Janah, & Purwanto, 2024](#); [Sidi, & Ismawati, 2024](#); [Pramadhia, & Nainggolan, 2025](#)), although it contrasts with international evidence that stronger environmental performance can lower borrowing costs ([Houge, Ahmed, & Richardson, 2020](#)).

This finding is consistent with the possibility that environmental disclosure in the energy sector has become a baseline transparency practice, rather than a strong differentiating signal for creditors. When most listed firms report emissions, energy use, waste, and environmental management information, additional checklist items may not materially alter a lender's estimate of repayment risk. Creditors may instead focus on environmental liabilities that have direct cash flow implications, actual environmental performance, regulatory sanctions, transition-CAPEX requirements, or insurance and remediation exposure. This helps explain why disclosure breadth can be high without producing a statistically detectable reduction in borrowing costs ([Janah and Purwanto, 2024](#); [Pramadhia and Nainggolan, 2025](#)).

The results also clarify an important measurement issue. The environmental index records whether an item is disclosed, not whether the underlying environmental outcome is favorable or not. A company can provide extensive disclosure about emissions and risks while still facing high environmental exposure. For creditors, detailed reporting may improve transparency but simultaneously reveals risks that justify a higher premium. These offsetting mechanisms can weaken the net association between environmental disclosure and the cost of debt in small samples.

The source thesis further illustrates this disconnect through the case of ABM Investama, showing that environmental disclosure remained consistently high from 2021 to 2024, whereas the cost of debt fluctuated during the same period. Such firm-level descriptive evidence cannot establish causality but reinforces the distinction between disclosure breadth and credit pricing. GRI-based content analysis captures whether items are disclosed, but not necessarily the financial materiality, credibility, assurance, or actual environmental performance behind those disclosures. Research on GRI reporting likewise emphasizes that disclosure quantity and sustainability quality are not identical ([Pandin, Wijaya, Postel, & Manalu, 2024](#); [Rahayu, 2024](#); [Vefiadytria, & Rosyadi, 2025](#)).

Therefore, the ABM example is best interpreted as descriptive triangulation rather than proof of the regression mechanism. Its environmental disclosure remained high, while the cost-of-debt proxy moved substantially across years, illustrating that financing costs respond to a broader set of conditions than disclosure breadth alone. The same caution applies to all firm-level examples in this thesis. They enrich the interpretation but cannot substitute for coefficient estimates or establish within-firm causality.

Social disclosure is the only ESG pillar with a statistically significant partial association in the reported model, and its coefficient is negative. This finding is substantively plausible for energy companies because workforce safety, occupational health, human rights, local community relations, training, and social conflict can directly affect operational continuity. Broader social transparency may provide creditors with evidence that these risks are actively managed, lowering perceived disruption and reputation risk. This finding aligns with [Sidi and Ismawati \(2024\)](#), who also identify a negative social disclosure relationship with the cost of debt, and with the broader argument that ESG transparency can reduce default risk and financing frictions ([Atif, & Ali, 2021](#); [Raimo, Caragnano, Zito, Vitolla, & Mariani, 2021](#)). This differs from [Perdiansyah and Ulpah \(2024\)](#), who found a positive social pillar relationship in their broader Asian sample, underscoring the importance of the sector and institutional context.

The social result is economically plausible because many social issues in energy operations have immediate consequences for continuity and liabilities. Occupational accidents may disrupt operational continuity and increase compensation costs. Weak labor relations can negatively affect productivity, while conflicts with local communities may delay permits and project execution. Furthermore, human rights controversies may expose firms to reputational damage and contractual risks. Disclosure covering safety systems, employee development, community engagement, and social risk management may therefore provide creditors with information that is closer to operational resilience than broad environmental or formal governance checklists. The negative coefficient is consistent with studies linking stronger ESG or social information to lower financing risk and borrowing costs ([Houge et al., 2020](#); [Raimo et al., 2021](#); [Gracia, & Siregar, 2021](#)).

Simultaneously, the p-value of 0.048 is close to the 5% threshold, so the result should be interpreted as evidence within this sample rather than as a universal effect. The high correlation structure implied by the ENV and SOC VIF values also means that the social coefficient captures the unique component of social disclosure after environmental disclosure is held constant. Replication with a larger panel, alternative disclosure scoring, and lender-level information would be valuable before drawing strong causal conclusions from this study.

Governance disclosure is not significant in the reported model, despite having the highest mean disclosure level. A plausible interpretation is that high governance disclosure has become relatively standardized among listed firms, reducing its cross-sectional information content for lenders. Moreover, disclosure breadth does not directly measure governance effectiveness, enforcement, board competence or internal control quality. This result is consistent with [Sidi and Ismawati \(2024\)](#) and [Tyas and Sari \(2025\)](#) but differs from [Houge et al. \(2020\)](#), [Janah and Purwanto \(2024\)](#), and [Perdiansyah and Ulpah \(2024\)](#), who document stronger governance-related effects. This heterogeneity supports a more granular measurement of board independence, audit quality, ownership concentration, anti-corruption controls,

and sustainability oversight rather than relying only on the number of governance items disclosed.

One explanation is that governance disclosure may have lower incremental information value once firms satisfy similar public company requirements. Creditors may be more sensitive to governance effectiveness board independence, risk expertise, ownership concentration, audit quality, covenant discipline, and historical default behavior than to governance statements in sustainability reports. Therefore, a disclosure index can capture transparency without fully capturing the governance quality that affects creditor protection. This interpretation is consistent with the mixed governance-cost-of-debt evidence in prior studies ([Perdiansyah and Ulpah, 2024](#); [Tyas and Sari, 2025](#)).

Taken together, the pillar-level results reveal an asymmetric creditor response, rather than a uniform ESG premium. Environmental disclosure has a positive but insignificant coefficient; social disclosure has a negative and significant coefficient; and governance disclosure has a positive but insignificant coefficient. This pattern is consistent with the distinct risk channels developed in the hypotheses. Environmental information is associated with uncertain and long-term liabilities, social information is more closely related to immediate operational continuity, and governance information becomes valuable when it demonstrates effective creditor protection beyond standardized reporting practices. This interpretation helps reconcile insignificant environmental and governance results with studies that find negative ESG effects in other settings. Differences in sector composition, institutional environment, sample period, disclosure scoring, and the distinction between disclosure breadth and actual performance can change which pillars contain incremental information for lenders ([Houge et al., 2020](#); [Janah and Purwanto, 2024](#); [Perdiansyah and Ulpah, 2024](#); [Sidi and Ismawati, 2024](#); [Tyas and Sari, 2025](#)).

At the model level, environmental, disclosure, together with the two controls, is jointly significant in the reported SQRT OLS specification. This is broadly consistent with studies that find that creditors respond to aggregate ESG information because it reduces information asymmetry and improves risk assessment ([Eliwa, Aboud, & Saleh, 2021](#); [Jafar, Basuki, Windijarto, Setiawan, & Prabaswara, 2024](#); [Johan, Lindrawati, & Susanto, 2025](#); [Raimo et al., 2021](#)). However, the relatively modest adjusted R^2 of 0.186 in that specification indicates that most of the variation in borrowing costs remains outside the model. The cost of debt is also shaped by profitability, liquidity, credit ratings, collateral, maturity structure, macroeconomic conditions, ownership, and business risk ([Ariefianto, Rahmansyah, Wijaya, & Audreane, 2025](#); [Baule, 2019](#); [Meiriasari, 2017](#); [Wardani, & Ruslim, 2020](#)). Recent energy sector research further shows that financial risk and ownership structure interact with ESG transparency in ways that are not captured by simple disclosure indices ([Mukti, Hariyanto, & Edward, 2025](#)). Evidence from high-risk manufacturing and energy industries also points to a continuing relationship between ESG disclosure and debt-cost analysis ([Pradana & Juliatri, 2026](#)).

The difference between the partial and joint results is also informative. Environmental and governance disclosures are individually insignificant, yet the full model is jointly significant. This does not mean that all ESG pillars matter independently; rather, the combined set of disclosure and control variables contains explanatory information that is not captured by any one coefficient alone. Because the F statistic includes DAR and SIZE, it should be interpreted as evidence of the overall specification. A stronger test of whether the three ESG variables add explanatory power beyond the controls would require a hierarchical or nested model comparison, which is not reported in the source thesis.

The control variable results also require caution. DAR is not significant in the reported specifications, despite the common expectation that greater leverage increases creditor risk. Firm size has $p=0.066$, suggesting a sample-specific association, but there is not enough evidence to reject the null hypothesis at 5%. These findings may reflect the restricted sectoral sample, differences in debt composition, or the fact that the dependent variable is an accounting-based financing cost proxy rather than a market yield. They also reinforce the relatively low adjusted R^2 and the importance of omitted credit risk determinants ([Wardani and Ruslim, 2020](#); [Meiriasari, 2017](#)).

Therefore, the practical implication is that firms should not mechanically maximize disclosure volumes. For companies, a stronger signal appears to come from credible, decision-useful social risk information supported by actual practices. For creditors, ESG disclosure is best treated as a complement to financial analysis rather than as a substitute. For regulators, the results support continued efforts to improve the comparability and decision usefulness of sustainability reporting, particularly the connection between disclosed policies, quantitative outcomes, external assurance and financially material risks. The relatively weak explanatory power and autocorrelation issue also imply that the present findings should be interpreted as source-reported associations rather than causal effects.

In corporate reporting practice, the results favor materiality and credibility over disclosure volume. The environmental and governance sections should connect policies to measurable risk outcomes, while social reporting should provide specific information about safety performance, workforce capability, community impacts, grievance mechanisms, and remediation. For lenders, ESG data should be integrated with financial ratios, cash flow analysis, debt maturity, collateral quality, credit ratings, and covenant information, instead of being treated as a substitute for conventional credit assessment. For regulators and standard setters, the findings support continued efforts to improve the comparability, assurance, and usefulness of sustainability information, especially in high-impact sectors.

5. CONCLUSIONS

5.1 Conclusion

This study examines environmental, social, and governance disclosure and the cost of debt of 17 Indonesian energy-sector companies observed during 2021-2024. The reported SQRT OLS results show that environmental disclosure is not significant ($B=0.037$, $p=0.571$), social disclosure is negatively significant ($B=-0.138$, $p=0.048$), and governance disclosure is not significant ($B=0.012$, $p=0.631$). DAR and firm size are also not significant at the 5% level of significance. The reported OLS model is jointly significant, $F(5,62)=4.058$, $p=0.003$, with $R^2=0.247$ and adjusted $R^2=0.186$. Substantively, the evidence indicates that social transparency is the ESG dimension most consistently associated with lower borrowing costs in the source-reported model. Environmental and governance disclosures appear to have limited incremental pricing information once other variables are considered. These findings support the stakeholder argument that decision-useful non-financial information can affect creditor assessments. However, they also show that disclosure breadth is not uniformly rewarded across the ESG pillars.

In relation to the research objectives, the evidence indicates that environmental and governance disclosures do not independently explain the reported cost-of-debt measure, whereas social disclosure is negatively associated with it; the three ESG dimensions and the controls are jointly significant in the full reported specification. The theoretical contribution is to refine stakeholder and legitimacy explanations by showing that the usefulness of sustainability information to creditors is pillar-specific rather than automatically uniform across ESG dimensions. The empirical contribution is to provide Indonesian energy sector evidence that separates the three disclosure dimensions, links the findings to creditor-perception channels, and transparently distinguishes source-reported pooled OLS coefficients from an incomplete autocorrelation diagnostic. These contributions are bounded by the short observation period, accounting-based proxy, disclosure-breadth measurement, and inability of the pooled specification to control for all unobserved firm characteristics.

5.2 Research Limitations

However, several limitations constrain this interpretation. First, the sample contains only 17 listed energy companies over four years, limiting the statistical power and generalization to other sectors, unlisted firms, and longer economic cycles. Second, the ESG variables are GRI-based disclosure ratios that measure breadth rather than disclosure quality, external assurance, materiality, or actual ESG performance. Third, the accounting-based cost-of-debt proxy uses interest expenses relative to total liabilities and may combine financing instruments with different maturities, contractual rates, and risk structures. Fourth, although the firm-year data exhibit a panel structure, the

source study estimates pooled multiple regressions instead of employing fixed-effects, random-effects, or year-effect models. As a result, unobserved firm-specific characteristics that vary across entities may not be fully controlled and could remain in the residual term. Fifth, the diagnostic sequence creates an important reporting limitation: the thesis presents the SQRT coefficient and ANOVA outputs, then a Cochrane-Orcutt lag-model summary without the corresponding corrected coefficient table. This article maintains this distinction by treating the reported partial effects separately from the autocorrelation-corrected estimates. Therefore, these effects should not be interpreted as Cochrane–Orcutt corrected coefficients. Sixth, the model excludes several lender-relevant determinants, such as profitability, liquidity, credit ratings, debt maturity, collateral, macroeconomic interest rates, and business risk. Finally, the 2021-2024 window is relatively short and overlaps with a period of evolving sustainability-reporting practices, which can affect the comparability of disclosure across years.

5.3 Suggestions and Directions for Future Research

Future research should expand the sample across energy, mining, utilities, transportation, and other high-impact sectors and extend the observation period to capture different interest rates and business cycle conditions. Panel estimators with firm and year effects should be used to separate within-firm disclosure changes from persistent cross-firm differences. Researchers should also report the complete corrected regression whenever serial correlation is addressed, including the coefficients, standard errors, test statistics, and model-fit measures. ESG measurement can be improved by distinguishing disclosure breadth from quality, materiality, quantitative targets, controversy exposure, external assurance and actual environmental or social performance. Alternative cost-of-debt measures, such as interest expense divided by average interest-bearing debt, bond yields, loan spreads, or credit-rating-implied risk, would help test robustness. Future models can incorporate profitability, liquidity, debt maturity, collateral, credit ratings, ownership, audit quality, and macroeconomic variables and examine whether firm size, leverage, assurance, or credit quality moderates the ESG-cost-of-debt relationship. A useful extension would be to compare aggregate ESG scores with separate pillar models to determine whether creditors price integrated sustainability information differently from individual environmental, social, and governance signals.

ACKNOWLEDGEMENT

The authors would like to express their gratitude to Politeknik Negeri Lampung for the academic support and research facilities provided throughout the completion of this study. The authors also acknowledge the availability of public corporate reports, including annual reports, financial reports, and sustainability reports, which served as the primary sources of data for this research. The authors sincerely appreciate all parties who contributed indirectly to the development of this study.

AUTHOR CONTRIBUTIONS

TA conducted the source thesis research and the empirical analysis. EY served as a contributing author and participated in manuscript drafting and critical review. DD supervised the study and contributed to the manuscript review and finalization. All authors have reviewed and approved the final version of this manuscript.

REFERENCES

- Alsayegh, M. F., Abdul Rahman, R., & Homyoun, S. (2020). Corporate economic, environmental, and social sustainability performance transformation through ESG disclosure. *Sustainability*, 12(9), 3910. <https://doi.org/10.3390/su12093910>
- Ariefianto, M. D., Rahmansyah, F., Wijaya, V., & Audreane, V. (2025). The role of environment social and governance (ESG) score to cost of debt: Evidence from ASEAN countries. *International Journal of Finance & Economics*, 30(3), 3031-3043. <https://doi.org/10.1002/ijfe.3056>
- Atif, M., & Ali, S. (2021). Environmental, social and governance disclosure and default risk. *Business Strategy and the Environment*, 30(8), 3937-3959. <https://doi.org/10.1002/bse.2850>
- Baule, R. (2019). The cost of debt capital revisited. *Business Research*, 12(2), 721-753. <https://doi.org/10.1007/s40685-018-0070-6>

- Dirman, A. (2020). Cost of debt: The impact of financial factors and non-financial factors. *Dinasti International Journal of Economics, Finance & Accounting*, 1(4), 550-567. <https://doi.org/10.38035/dijefa.v1i4.527>
- Dowling, J., & Pfeffer, J. (1975). Organizational legitimacy: Social values and organizational behavior. *Pacific Sociological Review*, 18(1), 122-136.
- Eliwa, Y., Aboud, A., & Saleh, A. (2021). ESG practices and the cost of debt: Evidence from EU countries. *Critical Perspectives on Accounting*, 79, 102097. <https://doi.org/10.1016/j.cpa.2019.102097>
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*.
- Ghozali, I. (2021). *Aplikasi analisis multivariate dengan program IBM SPSS 26 (10th ed.)*.
- Global Reporting Initiative. (2021). *GRI Standards 2021*.
- Gracia, O., & Siregar, S. V. (2021). Sustainability practices and the cost of debt: Evidence from ASEAN countries. *Journal of Cleaner Production*, 300, 126942. <https://doi.org/10.1016/j.jclepro.2021.126942>
- Houqe, M. N., Ahmed, K., & Richardson, G. (2020). The effect of environmental, social, and governance performance factors on firms' cost of debt: International evidence. *The International Journal of Accounting*, 55(3), 2050014. <https://doi.org/10.1142/S1094406020500146>
- Ilori, O., Lawal, C. I., Friday, S. C., Isibor, N. J., & Chukwuma, E. C. (2023). A framework for environmental, social, and governance (ESG) auditing: Bridging gaps in global reporting standards. *International Journal of Social Science Exceptional Research*, 2(1), 231-248. <https://doi.org/10.54660/IJSSER.2023.2.1.231-248>
- Indriyani, I., Damayanti, D., & Rusmianto, R. (2025). Dampak karakteristik keuangan dan opini audit terhadap timeliness pelaporan keuangan: Bukti empiris dari perusahaan sektor energi di Indonesia. *Jurnal Valuasi: Jurnal Ilmiah Ilmu Manajemen dan Kewirausahaan*, 5(2), 1581-1591.
- Jafar, R., Basuki, B., Windijarto, W., Setiawan, R., & Prabaswara, A. (2024). Does environmental, social, and governance (ESG) disclosure matter for creditor? Empirical evidence from Indonesia. *International Journal of Sustainable Development and Planning*, 19(11), 4377-4387. <https://doi.org/10.18280/ijstdp.191125>
- Janah, I. R., & Purwanto, A. (2024). Pengaruh environmental, social, governance dan profitabilitas terhadap cost of debt serta cost of capital pada perusahaan yang terdaftar di Bursa Efek Indonesia. *Diponegoro Journal of Accounting*, 13(4), 1-15.
- Johan, J. J., Lindrawati, L., & Susanto, A. (2025). Pengungkapan ESG: Apakah berdampak ke cost of debt? *Jurnal Akuntansi*, 19(1), 1-21. <https://doi.org/10.25170/jak.v19i1.5929>
- Meiriasari, V. (2017). Pengaruh corporate governance, kepemilikan keluarga, kepemilikan institusional dan ukuran perusahaan (firm size) terhadap biaya utang. *Jurnal Ilmiah Ekonomi Global Masa Kini*, 8(1), 28-34. <https://doi.org/10.36982/jiegm.v8i1.233>
- Mukti, A. H., Hariyanto, O. I. B., & Edward, O. T. (2025). Assessing the impact of financial risk and ownership structure on ESG disclosure: Insights from the energy sector in Indonesia. *Risks*, 13(12), 248. <https://doi.org/10.3390/risks13120248>
- Munthe, R. F. G., Siregar, Z. Y., & Ritonga, M. (2026). Price, Product Quality, and Service Quality on Customer Satisfaction at SME Food Stall. *Jurnal Usaha Kecil Dan Menengah*, 1(1), 1-15. <https://doi.org/10.61401/jukm.v1i1.521>
- Otoritas Jasa Keuangan. (2017). Peraturan Otoritas Jasa Keuangan Nomor 51/POJK.03/2017 tentang penerapan keuangan berkelanjutan bagi lembaga jasa keuangan, emiten, dan perusahaan publik.
- Paledung, M., Bakri, M. Z. H., & Amahoru, N. H. H. (2026). Pengungkapan ESG dan biaya utang: Peran moderasi ukuran perusahaan. *VALUE*, 7(1), 52-66. <https://doi.org/10.36490/value.v7i1.2682>
- Pandin, M. Y. R., Wijaya, R. M., Postel, M. Y., & Manalu, M. U. S. (2024). Analysis of sustainability reporting disclosure based on the Global Reporting Initiative (GRI) Standards. *Jurnal Ekonomi Syari'ah dan Bisnis Islam*, 10(2), 324-331. <https://doi.org/10.54956/eksyar.v10i2.523>

- Perdiansyah, F., & Ulpah, M. (2024). The effect of environmental, social, and governance (ESG) pillars and state ownership on firm costs of debt. *EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi dan Bisnis*, 12(3), 3293-3306. <https://doi.org/10.37676/ekombis.v12i3.6234>
- Pradana, A. A., & Juliatri, B. Z. (2026). Dinamika ESG disclosure dan biaya utang dalam industri berisiko tinggi: Evidence sektor manufaktur dan energi. *Balance: Jurnal Akuntansi dan Manajemen*, 5(1), 367-385. <https://doi.org/10.59086/jam.v5i1.1423>
- Pramadhia, J. H., & Nainggolan, Y. A. (2025). The role of ESG component in shaping corporate cost of debt and cost of equity in Indonesia. *Journal of Accounting and Finance Management*, 5(6), 1345-1357. <https://doi.org/10.38035/jafm.v5i6.1241>
- Priyanti, R., & Dewi, A. S. (2026). Environmental Performance and Stock Liquidity Effects on Mining Firms' Stock Returns. *Krakatoa Management Research Journal*, 1(1), 15-26. <https://doi.org/10.61401/kmrj.v1i1.564>
- Putri, S. R., & Mayangsari, S. (2023). Pengaruh Pertanggungjawaban Environmental, Social dan Governance (ESG), Likuiditas, dan Leverage terhadap Kinerja Keuangan Perusahaan. *Ekonomi Digital*, 2(2), 133-148. <https://doi.org/10.55837/ed.v2i2.108>
- Rahayu, K. (2024). Pengaruh Pengungkapan Environment, Social, Governance terhadap Kinerja Perusahaan Sektor Perbankan. *Jurnal Ekonomi, Koperasi dan Kewirausahaan*, 14(8), 1031-1042.
- Raimo, N., Caragnano, A., Zito, M., Vitolla, F., & Mariani, M. (2021). Extending the benefits of ESG disclosure: The effect on the Cost of debt financing. *Corporate Social Responsibility and Environmental Management*, 28(4), 1412-1421. <https://doi.org/10.1002/csr.2134>
- Septiana, W. R., & Puspawati, D. (2022). Analisis good corporate governance terhadap pengungkapan ESG di Indonesia tahun 2016-2020. *Jurnal Ilmiah Akuntansi dan Keuangan*, 4(10), 4274-4283.
- Setiawati, R. A. (2020). Analisis penggunaan public debt pada perusahaan sektor industri manufaktur yang terdaftar di Bursa Efek Indonesia. *Manova*, 3(1). <https://doi.org/10.15642/manova.v3i1.239>
- Sidi Rai, N. M. G. D., & Ismawati, A. F. (2024). The influence of ESG Disclosure Score on The Cost of Capital in The Manufacturing Company. *Journal of Accounting, Entrepreneurship and Financial Technology*, 5(2), 81-102. <https://doi.org/10.37715/jaef.v5i2.3837>
- Suryani, A., Imelda, E., & Wirianata, H. (2019). Pengaruh Earnings Variability, Ukuran Perusahaan, dan Negative Earnings terhadap Biaya Utang. *Jurnal Multiparadigma Akuntansi*, 1(3), 919-926. <https://doi.org/10.24912/jpa.v1i3.5596>
- Susi, & Rayyani, W. O. (2026). The Effect of Green Finance and Green Accounting on Manufacturing Firm Profitability in Makassar. *Riset Akuntansi Dan Bisnis Indonesia*, 2(3), 167-181. <https://doi.org/10.61401/rabi.v2i3.557>
- Taniya, F., & Komalasari, A. (2026). ESG, Ownership Structure, and Board Composition Effects on Tax Avoidance in Indonesian Manufacturing. *Studi Akuntansi Dan Bisnis Indonesia*, 2(2), 55-67. <https://doi.org/10.61401/sabi.v2i2.494>
- Trinurwati, E., Dewi, A. K., & Yuniarti, E. (2026). Pengaruh environmental disclosure, social disclosure, governance disclosure dan firm size terhadap profitabilitas. *Journal of Authentic Research*, 5(1), 495-509. <https://doi.org/10.36312/zpd5a469>
- Tyas, T. F. N., & Sari, R. P. (2025). The Effect of Environmental Performance and Governance Performance on The Cost of Debt Mediated by Tax Avoidance. *Indonesian Interdisciplinary Journal of Sharia Economics*, 8(3), 10103-10114. <https://doi.org/10.31538/ijse.v8i3.7495>
- Vefiadytria, E. A., & Rosyadi, I. (2025). Pengaruh environmental, social, dan governance disclosure terhadap financial performance perusahaan. *Jurnal Bisnis Mahasiswa*, 5(1), 318-327. <https://doi.org/10.60036/jbm.v5i1.369>
- Wahyuni, T. H., & Aira, A. (2026). The Effects of Corporate Social Responsibility, Financial Slack, And Environmental Costs on Financial Performance. *Riset Akuntansi Dan Bisnis Indonesia*, 2(2), 65-75. <https://doi.org/10.61401/rabi.v2i2.465>

-
- Wardani, S. L., & Ruslim, H. (2020). Pengaruh DAR, Ukuran Perusahaan dan Tax Avoidance terhadap Cost of Debt. *Jurnal Manajerial dan Kewirausahaan*, 2(2), 469-478. <https://doi.org/10.24912/jmk.v2i2.7940>
- Zainal, R. I., & Aprilia, R. (2026). The effect of green accounting implementation on the financial performance of mining sector companies listed on the Indonesia Stock Exchange, 2019-2023. *Krakatoa Management Research Journal*, 1(1), 39-53. <https://doi.org/10.61401/kmrj.v1i1.568>