

## ESG Disclosure, Cost of Debt, and the Moderating Role of Board Characteristics

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### Abstract

**Purpose** – This study aims to examine the effect of Environmental, Social, and Governance (ESG) disclosure on the cost of debt and to investigate the moderating role of board of commissioners characteristics in non-financial firms in Indonesia.

**Design/Methodology/Approach** – This study employs a quantitative approach using Ordinary Least Squares (OLS) regression and Moderated Regression Analysis (MRA). The data are collected from annual reports, financial statements, and the Refinitiv database of non-financial firms listed on the Indonesia Stock Exchange during the period 2020–2024, resulting in 205 observations.

**Findings** – The results indicate that ESG disclosure has a positive and significant effect on the cost of debt. Furthermore, the proportion of independent commissioners negatively and significantly moderates the relationship, while



board size shows a positive and marginally significant moderating effect. In contrast, female representation does not exhibit a significant moderating role.

**Research limitations/Implications** – The findings suggest that the relationship between ESG disclosure and the cost of debt is highly contextual and depends on the effectiveness of corporate governance mechanisms. Practically, the cost of debt is determined by creditors' risk perceptions, highlighting the importance of credible governance structures in supporting ESG disclosure.

**Keywords: Board Characteristics, Cost of Debt, Corporate Governance  
ESG Disclosure**

## Introduction

In recent years, global economic uncertainty, increased business risk, and sustainability demands have prompted creditors to be increasingly cautious in assessing corporate financing risk (You et al., 2025). This situation has caused the cost of debt to become more sensitive to non-financial risk perceptions, not limited to historical financial performance. Companies that are assessed as having high environmental, social, and governance risks tend to face higher risk premiums from lenders, thereby increasing the cost of debt (Maaloul et al., 2023). A high cost of debt can increase a company's financial burden and limit its funding flexibility, potentially hindering its long-term sustainability.

Therefore, understanding the factors that influence creditors' determination of the cost of debt is an important issue, especially amid increasing non-financial risks for companies.

(Fiorillo et al., 2025; Gholami et al., 2023).

The increased sensitivity of creditors to non-financial risks encourages the role of ESG disclosure

as a signaling mechanism used by companies to convey their commitment to sustainability and long-term risk management, making it relevant to examine in relation to the cost of debt (Fiorillo et al., 2025; Maaloul et al., 2023; You et al., 2025). The issue of corporate sustainability regarding Environmental, Social, and Governance (ESG) is gaining attention in global financial markets, including in Indonesia. Companies are no longer measured solely by their financial performance, but also by their social and environmental responsibilities (Tamasiga et al., 2024). ESG disclosure practices are considered capable of increasing transparency, accountability, and stakeholder trust, especially creditors, in assessing a company's risk profile (Helmi et al., 2025). Transparent ESG disclosure on environmental, social, and governance aspects can increase stakeholder trust and serve as a positive signal to investors and creditors regarding a company's ability to manage long-term risks (Marques Roque, 2024).

The extent to which ESG disclosure can affect the cost of debt is still a debated issue in the literature.

Several studies in developed countries show that good ESG disclosure can reduce the cost of debt by reducing information asymmetry and improving the company's reputation in the eyes of creditors (You et al., 2025). Conversely, research results in developing countries show inconsistent findings, with some studies finding that ESG disclosure can reduce the cost of debt, while others show that ESG disclosure has no effect or is even associated with higher cost of debt, which is thought to be influenced by differences in the level of governance implementation, regulation, and awareness of sustainability issues (Pramadhia & Nainggolan, 2025; Saputra & Anas, 2025; X. Zhang et al., 2025). This condition indicates the need for further research in the context of developing countries such as Indonesia, where ESG disclosure practices are still voluntary and the level of adoption varies between companies.

Most previous studies in Indonesia have focused on the influence of ESG disclosure on the cost of equity, as shown by Jafar, Basuki, Windijarto, Setiawan, & Yaacob (2024), which found that the quality of ESG disclosure can reduce equity costs with the role of the board of commissioners structure as a factor that strengthens this relationship. These findings indicate that board characteristics not only function as a governance mechanism, but also play a role in enhancing the credibility and quality of ESG information conveyed to the market. However, the evidence is still limited to the perspective of

equity investors, who are generally oriented towards potential profits.

Other studies by Jafar et al. (2024) also focus on the direct influence of ESG disclosure on the cost of debt, without considering the role of board of commissioners characteristics as a moderating variable that could potentially influence how creditors interpret the credibility of ESG information. In the context of creditors, the structure of the board of commissioners is expected to play a different moderating role, as creditors place greater emphasis on value protection and default risk control (You et al., 2025). A high proportion of independent commissioners, adequate board size, and the presence of female representation have the potential to strengthen oversight functions and ensure that ESG disclosure reflects substantive and credible sustainability practices, thereby increasing creditors confidence in the company's risk assessment (Alkhawaja et al., 2023; Gurol & Lagasio, 2023; Wahyuningrum et al., 2025). Under these conditions, ESG disclosure serves as a more credible signal for creditors in assessing a company's sustainability risk and default risk, which ultimately affects the determination of the cost of debt (You et al., 2025). Conversely, when the structure of the board of commissioners is weak, ESG disclosure has the potential to lose its informational value and is not fully considered by creditors in the risk assessment process, thereby weakening its influence on the cost of

debt. Therefore, this study offers a different approach by examining the role of board of commissioners characteristics as a moderating mechanism in the relationship between ESG disclosure and cost of debt, which has not been widely explored in the Indonesian context. This study also considers the broader ESG dimensions and the Indonesian institutional context to provide a more comprehensive understanding of how sustainability disclosure influences the cost of debt.

This study aims to analyze the influence of ESG disclosure on cost of debt in non-financial companies listed on the Indonesia Stock Exchange, as well as to examine the role of board of commissioners characteristics, which include the proportion of independent commissioners, board size, and female representation as moderating variables in the relationship between ESG disclosure and cost of debt. This study makes several important contributions, namely theoretical contributions, to expand the literature on the influence of ESG disclosure on cost of debt by considering the moderating factor of board characteristics, thereby producing a more comprehensive understanding of the role of governance in supporting sustainability practices. Empirically, this study provides new evidence from the context of Indonesia as a developing country, which can enrich and broaden the generalization of previous research results that generally focus on developed countries. Meanwhile, in terms of practical contributions, the results of this study

can be a reference for creditors, investors, and regulators in assessing financing risks and encouraging the implementation of more effective ESG disclosure and governance practices to reduce the cost of debt.

## **Literature Review & Hypothesis**

### **Literature Review**

#### **Signaling Theory**

Signaling theory explains that information disclosure by companies serves to reduce information asymmetry between internal and external parties. According to Spence (1973), positive signals given by companies through non-financial performance reporting such as ESG can improve stakeholders' perceptions of management credibility and quality. In the context of the debt market, ESG disclosure is an indicator of a company's ability to manage social and environmental risks that can affect long-term financial stability. A recent study by Jafar et al. (2024) and You et al. (2025) shows that companies with more transparent ESG disclosure tend to have lower funding costs because they are considered to have lower risk and better governance.

#### **Legitimacy Theory**

Legitimacy Theory is based on the assumption that companies operate under a social contract with society (Suchman, 1995). In order to gain legitimacy, companies must demonstrate that their activities are in line with prevailing social values and norms (Reitmaier et al., 2025). ESG disclosure serves as a means of

communication between companies and stakeholders to demonstrate their commitment to social responsibility and compliance with environmental regulations. Research has found that companies with high levels of social legitimacy through good sustainability reporting tend to gain greater trust from capital markets and financial institutions, thereby reducing their financing costs (Amarna et al., 2024; Raimo et al., 2020).

### **Stakeholder Theory**

Stakeholder theory emphasizes that companies are not only responsible to shareholders, but also to various parties involved in or affected by their activities, including employees, the community, the government, and creditors (Freeman, 1984). Therefore, the long-term success of a company depends on its ability to maintain harmonious relationships with all of these stakeholders. ESG disclosure is an important tool in demonstrating a company's commitment to social responsibility, ethics, and sustainability. According to Xu et al. (2024), ESG transparency strengthens stakeholder trust and helps companies obtain external resources. In this context, the board structure plays an important role as a mechanism that ensures the interests of stakeholders are accommodated through good governance practices and credible sustainability reporting.

### **Hypothesis**

#### **The Effect of ESG Disclosure on Cost of Debt**

Sustainability issues are now one of the main considerations in corporate financing decisions. ESG disclosure serves as a communication tool that shows the extent to which companies carry out their environmental, social, and good governance responsibilities (Pardamean & Gunawan, 2025). Based on signaling theory, companies with good ESG disclosure send a positive signal to creditors regarding their commitment to managing non-financial risks and maintaining long-term stability (Spence, 1973; You et al., 2025).

Previous studies support the relationship between ESG disclosure and cost of debt. Maaloul et al. (2023) found that high-quality ESG disclosure lowers the cost of debt because creditors assess companies with high transparency as having lower risk. Research from You et al. (2025) also confirms that extensive ESG disclosure can improve creditors perceptions of companies and lower loan risk premiums. In Indonesia, research by Pramadhia & Nainggolan (2025) has found similar results, namely that ESG disclosure has a negative effect on the cost of debt, indicating that good sustainability reporting is beginning to be considered by creditors as an indicator of a company's credibility.

However, a study by Zhang et al. (2025) shows that divergences in ESG scores between rating agencies can actually increase information uncertainty and add to financing risk.

In line with these findings, research in Indonesia by Saputra & Anas (2025) found that ESG disclosure is positively associated with the cost of debt, indicating that creditors do not yet fully view ESG disclosure as a risk-reducing signal, but rather as an additional source of information that has the potential to increase risk perception.

H1: ESG disclosure has a negative effect on the cost of debt.

### **Proportion of Independent Commissioners as a Moderating Variable**

Independent commissioners have the primary function of supervising and ensuring that management decisions are carried out in the interests of shareholders and other stakeholders (Asad et al., 2024). Based on stakeholder theory, the existence of Independent Commissioners strengthens corporate governance and increases accountability, so that ESG reports published become more credible and trustworthy by creditors (Freeman, 1984).

Research by Gurol & Lagasio (2023) and Alkhawaja et al. (2023) shows that a high proportion of Independent Commissioners contributes to improved ESG disclosure quality. Jafar et al. (2024) confirms that the presence of independent commissioners strengthens the negative relationship between ESG and cost of equity because creditors and investors perceive the company as more transparent and accountable. In the context of cost of debt, this effect is

expected to be similar, as creditors view the presence of independent commissioners as a supervisory mechanism capable of reducing moral hazard risk. However, when the supervisory function is too strong, the influence of ESG disclosure on the cost of debt can become a substitute rather than a complement. This means that creditors may trust a strong board structure more than the quality of ESG disclosure itself (Yu & Hwang, 2024). H2: The proportion of independent commissioners moderates the effect of ESG disclosure on the cost of debt.

### **Board Size as a Moderating Variable**

Board size reflects the number of commissioners in a company. Based on governance theory, a larger board size generally has more diverse expertise and experience, which can strengthen the effectiveness of oversight of ESG reporting (Anderson et al., 2004; Setiawan et al., 2023). Based on stakeholder theory, the diversity of board members allows for the accommodation of various perspectives and stakeholder interests, thereby encouraging more responsible reporting practices (Freeman, 1984).

Research by Jafar et al. (2024) shows that board size affects the relationship between ESG and cost of equity, where a large board size strengthens this relationship. However, Agustina & Anwar (2021) and Kalbuana et al. (2022) found that an overly large board size actually reduces the effectiveness of supervision and slows down decision-making, thereby reducing the benefits

of ESG disclosure in reducing financing risk.

**Proportion of Female Representation as a Moderating Variable**

Female representation on boards of commissioners reflects gender diversity, which is believed to enrich perspectives and increase sensitivity to social and environmental issues (Omenihu et al., 2025). Based on legitimacy theory, female representation strengthens the social legitimacy of companies in the eyes of the public and creditors, as it demonstrates a commitment to diversity and social responsibility (Suchman, 1995).

Research by Alkhawaja et al. (2023) and Gavana et al. (2024) found that the proportion of female representation has a positive effect on the quality of ESG disclosure. Similar results were also found by Sari & Nadhira (2024) in Indonesia, which showed that companies with a higher proportion of female representation tend to be more active in disclosing sustainability issues. Jafar et al. (2024) added that gender-diverse boards can enhance a company's credibility in the eyes of investors and creditors because they are considered to have higher social awareness.

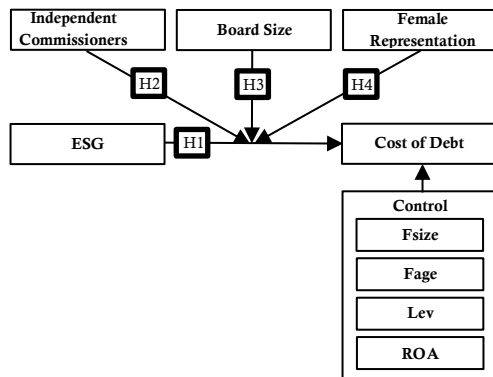
However, several recent studies show that the proportion of female representation on boards does not always have a significant effect on the cost of debt. Garcia-Blandon et al.

H3: Board size moderates the effect of ESG disclosure on the cost of debt.

(2024) found in their study that an increase in the number of female directors did not result in a significant change in the cost of debt, even when tested with various sensitivity tests. In addition, research from Aditia & Kuang (2024) as empirical evidence in Indonesia also shows that the proportion of female representation does not have a significant effect on the cost of debt, which is due to the low proportion of female representation on the board so that it has not substantially affected creditors perceptions.

H4: The proportion of female representation moderates the effect of ESG disclosure on the cost of debt.

**Research Model**



**Figure 1**  
**Research Model**

## Research Method

### Sample and Data

This study uses a quantitative causal approach with the aim of testing the causal relationship between Environmental, Social, and Governance (ESG) disclosure and cost of debt, with the structure of the board of commissioners as a moderating variable. A quantitative approach is used because it focuses on testing hypotheses through numerical data analysis and statistical models. The research design is associative, as it aims to explain the influence of one variable on another, as well as to test the role of moderating variables in strengthening or weakening this relationship.

The type of data used is quantitative secondary data. The data was obtained from annual financial reports, sustainability reports, and the Refinitiv Eikon database. ESG data,

company size, leverage, profitability, and debt costs were taken from the Refinitiv database. Meanwhile, data related to the structure of the board of commissioners was obtained from the annual reports of each company listed on the Indonesia Stock Exchange (IDX).

The population used was all non-financial companies listed on the Indonesia Stock Exchange (IDX). Non-financial sectors were selected to avoid differences in regulatory characteristics and capital structure that could affect the cost of debt. The sampling method used was purposive sampling. The research sample consists of non-financial sector companies that were consecutively listed on the IDX during the 2020-2024 period, have complete data on ESG disclosure scores, and present annual reports and adequate financial data to calculate the cost of debt and control variables.

**Table 1**  
**Sample Selection Results**

Criteria	Total
Non-financial sector companies listed on the IDX during the 2020-2024 period	943
Companies that do not consistently publish ESG scores	(902)
Number of research samples	41
Number of company financial reports studied (41 x 5 years)	205

Determining the sample size takes into account the complexity of the regression model involving moderating variables. According to Green (1991), the minimum number of observations for regression analysis is 50 plus eight times the number of independent variables. With a total of 11 variables in the model, the minimum number of observations

required is 138. In addition, Hair et al. (2019) and Hayes (2018) recommend using a minimum of 150 observations for regression analysis involving interaction variables in order to obtain stable and reliable estimates. Therefore, 205 observations are considered sufficient to produce reliable parameter estimates.

## **Operational Definitions and Measurement of Variables**

### **Dependent Variables**

Cost of debt describes the cost burden that a company must bear for the use of interest-bearing debt during a period, with a primary focus on funding efficiency and the company's ability to meet interest obligations. To assess the cost of debt, interest expense is divided by total interest-bearing debt (You et al., 2025).

### **Independent Variables**

ESG Disclosure describes the level of disclosure by companies regarding sustainability practices covering environmental, social, and governance aspects. This disclosure shows the extent to which companies provide transparent information about their sustainability performance and initiatives (Gjergji et al., 2021; Jizi, 2017; Salvi et al., 2024). To assess ESG Disclosure, the ESG score issued by Refinitiv, which ranges from 0 to 100, is used.

### **Moderating Variables**

The structure of the board of commissioners is measured using three moderating proxies. First, the proportion of independent commissioners, which is the ratio between the number of independent commissioners and the total number of board members. This proportion reflects the extent to which the company has an objective oversight mechanism that is free from management interests, as independent commissioners play an important role in minimizing conflicts of interest and maintaining the quality of corporate

governance (Umar et al., 2024). Second, board size, which is represented by the total number of board of commissioners members. A larger board size is considered to provide a variety of perspectives, expertise, and experience that enrich the oversight process and strategic decision-making. However, an overly large board size can also face issues of coordination and communication effectiveness, making board size an important aspect in assessing the quality of a company's governance structure (Ma & Chen, 2024). Third, the proportion of female representation on the board of commissioners, which is the number of female commissioners compared to the total number of board members (Jafar et al., 2024). The presence of women in the board structure is often associated with increased diversity of perspectives, greater sensitivity to social issues, and strengthened monitoring functions. Gender diversity on the board can support more inclusive and effective governance practices (Tyrowicz et al., 2020).

### **Control Variables**

Firm Size (FSIZE) is controlled because larger companies typically have lower bankruptcy risk and more stable access to funding, which can reduce debt costs. Firm size is measured using the natural logarithm of total assets (Dua & Sharma, 2024; Gholami et al., 2023). Furthermore, Firm Age (FAGE) is calculated based on the number of years since the company was established, because more mature operational experience

and reputation can increase credibility in the eyes of lenders, thereby reducing risk and debt costs (Bamel et al., 2025). Next, Leverage (LEV) is calculated as total debt divided by total assets, controlled because companies with high leverage have a greater risk of default, so creditors demand higher rates of return (Jafar et al., 2024; Nicolò et al., 2022; Zhang et al., 2025). Finally, Return on Assets (ROA), calculated as net profit divided by total assets, is also controlled because companies with high profits are considered more capable of meeting their financial obligations, thus potentially obtaining a lower cost of debt (Jafar et al., 2024; Wijaya et al., 2022; You et al., 2025).

**Regression Model and Testing Methods**

$$COD = \alpha + \beta_1 ESG + \beta_2 IND + \beta_3 BS + \beta_4 FEM + \beta_5 (ESG*IND) + \beta_6 (ESG*BS) + \beta_7 (ESG*FEM) + \beta_8 Fsize + \beta_9 Fage + \beta_{10} Lev + \beta_{11} ROA + e$$

Description:

- COD : Cost of Debt
- ESG : ESG Disclosure
- IND : Independent Commissioners
- BS : Board Size
- FEM : Female Representation
- ESG\*IND; ESG\*BS; ESG\*FEM : Interaction Variables
- Fsize : Firm Size
- Fage : Firm Age
- Lev : Leverage
- ROA : Return on Assets
- α : Constant
- β : Regression Coefficient
- e : Error

Data analysis was performed using Ordinary Least Squares (OLS) to test the main effect between independent and dependent variables, as well as Moderated Regression Analysis (MRA) to assess the role of moderating variables in strengthening or weakening these relationships. The entire data processing process, including classical assumption testing and correlation analysis, was carried out using STATA version 17 statistical software.

The use of pooled Ordinary Least Squares (OLS) in this study is based on the assumption that the relationship between ESG disclosure, board characteristics, and the cost of debt is relatively homogeneous across firms and stable over the observation period. This approach is considered appropriate given the study’s primary objective of examining the moderating effects of board characteristics, as pooled OLS provides a more straightforward interpretation of interaction terms compared to more complex panel data models. However, it is important to acknowledge that the dataset has panel data characteristics, which may introduce unobserved heterogeneity across firms and over time. In this context, alternative approaches such as fixed effects or random effects models could potentially control for firm-specific or time-specific effects. Nevertheless, the use of pooled OLS is maintained to preserve model simplicity and avoid potential overfitting, particularly given the inclusion of multiple interaction terms (Hair et al., 2019; Hayes, 2018).

In addition, potential endogeneity issues may arise due to reverse causality or omitted variable bias, as ESG disclosure and cost of debt could be jointly determined. Although this study does not explicitly address endogeneity through advanced econometric techniques, the inclusion of control variables such as

firm size, firm age, leverage, and profitability is intended to mitigate this concern. Future research is encouraged to apply more robust methods, such as instrumental variable approaches or dynamic panel models, to further validate the causal relationship (Nicolò et al., 2022).

## Results and Discussion

### Descriptive Statistics

**Table 2**  
**Descriptive Statistics**

	N	Min	Max	Mean	Std. Dev.	VIF
COD	205	0.000	1.545	0.100	0.169	
ESG	205	16.420	87.940	53.494	17.387	1.37
IND	205	0.158	0.833	0.441	0.125	1.24
BS	205	3.000	21.000	6.010	2.503	1.47
FEM	205	0.000	0.429	0.108	0.120	1.13
FSIZE	205	29.268	33.790	31.538	0.947	1.39
FAGE	205	8.000	111.000	45.244	19.718	1.33
LEV	205	0.000	0.727	0.251	0.197	1.48
ROA	205	-0.183	0.557	0.069	0.082	1.34

Data Source: STATA 17

Table 2 presents descriptive statistics of all research variables consisting of 205 observations. The Cost of Debt (COD) variable has an average value of 0.100 with a minimum value of 0.000 and a maximum value of 1.545. This indicates that there is variation in debt costs between companies in the research sample. The minimum value of zero reflects companies that did not have interest-bearing debt during the observation period. The standard

deviation of COD of 0.169 indicates a relatively moderate level of data dispersion.

The average ESG disclosure score was 53.494, with a minimum score of 16.420 and a maximum score of 87.940. This range indicates that there are significant differences in the level of ESG disclosure among the sample companies. This suggests that companies' commitment to disclosing environmental, social, and

governance aspects is still heterogeneous.

Independent Commissioners (IND) have an average value of 0.441 with a minimum value of 0.158 and a maximum value of 0.833, indicating that most companies have independent commissioners that are quite significant. Board Size (BS) has an average value of 6.010 members, ranging from 3 to 21 members, reflecting differences in governance structures between companies. Meanwhile, Female Representation (FEM) has an average value of 0.108, with a minimum value of 0.000 and a maximum value of 0.429, indicating that female representation on the board of commissioners is still relatively low in most companies.

Firm Size (FSIZE), measured by the natural logarithm of total assets, has an average value of 31.538 with a standard deviation of 0.947, indicating that the scale of companies in the sample is relatively homogeneous. Firm Age (FAGE) has an average

value of 45.244 years with a maximum value of 111 years, indicating that there is variation in the age of companies from relatively young to very mature. Leverage (LEV) has an average value of 0.251 with a minimum value of 0.000 and a maximum of 0.727, reflecting differences in funding structures and the existence of debt-free companies. Return on Assets (ROA) has an average value of 0.069, with a minimum value of -0.183 and a maximum value of 0.557, indicating variations in financial performance between companies.

The results of multicollinearity testing show that all Variance Inflation Factor (VIF) values are below the recommended limit, with an average VIF value of 1.34. This indicates that there are no significant multicollinearity issues in the basic regression model of the study.

### Correlation Analysis

Table 3  
Correlation Matrix

	COD	ESG	IND	BS	FEM	FSIZE	FAGE	LEV	ROA
COD	1.0000								
ESG	0.2170 <sup>3</sup>	1.0000							
IND	-0.1009	-0.0394	1.0000						
BS	0.1329 <sup>1</sup>	0.2708 <sup>3</sup>	-0.2981 <sup>3</sup>	1.0000					
FEM	0.0427	0.1579 <sup>2</sup>	0.1997 <sup>3</sup>	-1.1273 <sup>1</sup>	1.0000				
FSIZE	-0.1045	0.1574 <sup>2</sup>	-0.1114	0.4299 <sup>3</sup>	-0.1777 <sup>2</sup>	1.0000			
FAGE	0.0354	0.3703 <sup>3</sup>	0.1074	0.1573 <sup>2</sup>	0.0733	0.0898	1.0000		
LEV	-0.2546 <sup>3</sup>	-0.2266 <sup>3</sup>	0.1136	0.1477 <sup>2</sup>	-0.1565 <sup>2</sup>	0.2769 <sup>3</sup>	-0.2812 <sup>3</sup>	1.0000	
ROA	-0.0343	0.2775 <sup>3</sup>	0.0467	-0.0390	0.1594 <sup>2</sup>	-0.2105 <sup>3</sup>	0.2774 <sup>3</sup>	-0.4152 <sup>3</sup>	1.0000

Data Source: STATA 17

(Notes: <sup>3</sup>, <sup>2</sup>, and <sup>1</sup> indicates 1%, 5%, and 10% significance)

Table 3 presents the results of Pearson's correlation analysis between the research variables. In general, the correlation results show that all

correlation coefficients are below an absolute value of 0.8, so there is no indication of a very strong relationship between the variables.

The analysis results show that ESG disclosure has a positive and significant correlation with the cost of debt of 0.217 at a significance level of 1%. This finding indicates that, bivariately, companies with higher levels of ESG disclosure tend to have higher costs of debt. However, this relationship is correlational and does not yet consider the influence of moderating variables and other control variables.

The proportion of independent commissioners does not show a significant relationship with the cost of debt, with a correlation coefficient of -0.1009. Conversely, board size has a positive and significant correlation with the cost of debt of 0.1329 at a significance level of 10%, indicating that companies with larger boards of commissioners tend to have higher debt costs. Meanwhile, the proportion of female representation does not show a significant relationship with the cost of debt, indicating that female representation on the board of commissioners is not directly correlated with a company's cost of debt.

The relationship between corporate governance and company characteristics shows a consistent economic pattern. ESG disclosure correlates positively and significantly

With board size, firm size, and firm age, indicating that larger and more mature companies tend to have higher levels of ESG disclosure. In addition, board size has a fairly strong positive correlation with firm size, reflecting that large companies generally have larger board structures. The leverage variable shows a negative and significant correlation with the cost of debt, indicating that companies with higher leverage tend to have lower debt costs. In addition, leverage also correlates negatively and significantly with ESG disclosure and firm age, indicating differences in funding structures between companies with different age characteristics and disclosure levels. Return on assets does not show a significant relationship with cost of debt, but has a positive and significant correlation with ESG disclosure and firm age, and a significant negative correlation with leverage. These findings indicate that more profitable companies tend to have higher levels of ESG disclosure and lower levels of leverage.

### Hypothesis Analysis

**Table 4**  
**Pooled OLS Hypothesis Test**

<b>COD</b>	<b>Coefficient</b>	<b>P&gt; t </b>	<b>Direction</b>
_CONS	1.106	0.008	
ESG	0.002 <sup>2</sup>	0.019	Positive(+)
IND	0.075	0.356	Positive (+)
BS	0.018 <sup>2</sup>	0.024	Positive (+)
FEM	-0.036	0.701	Negative (-)

COD	Coefficient	P> t	Direction
ESG_IND	-0.011 <sup>2</sup>	0.036	Negative (-)
ESG_BS	0.001 <sup>1</sup>	0.053	Positive (+)
ESG_FEM	0.006	0.314	Positive (+)
FSIZE	-0.030 <sup>2</sup>	0.017	Negative (-)
FAGE	0.000	0.790	Positive (+)
LEV	-0.202 <sup>3</sup>	0.008	Negative (-)
ROA	-0.449 <sup>3</sup>	0.006	Negative (-)
R-SQUARED	0.265		
F	2.07		
PROB > F	0.024		
N	205		

Data Source: STATA 17  
 (Notes: <sup>3</sup>, <sup>2</sup>, and <sup>1</sup> indicates 1%, 5%, and 10% significance)

The R-squared value of 0.265 in Table 4 shows that 26.5% of the variation in cost of debt can be explained by ESG disclosure variables, board of commissioners characteristics, and control variables used in the model. This value indicates that although the model is able to explain the variation in cost of debt moderately, there are other factors outside the model that also influence the determination of a company's debt costs. The simultaneous test results show an F value of 2.07 with Prob > F of 0.024, which means that the regression model is significant overall at a significance level of 5%. Therefore, the research model is considered feasible to use to analyze the effect of ESG disclosure and the role of moderating variables on the cost of debt. The regression results show that ESG disclosure has a positive and significant coefficient on the cost of debt with a coefficient of 0.002 and a significance value of 0.019. Thus, ESG disclosure is proven to have a significant effect on the cost of

debt at a significance level of 5%. The independent commissioners variable has a positive but insignificant coefficient with a coefficient of 0.075 and a significance value of 0.356. Meanwhile, board size shows a positive coefficient of 0.018 and a significance value of 0.024. The female representation variable has a negative but insignificant result with a coefficient of -0.034 and a significance value of 0.701.

The ESG and Independent Commissioners interaction variable (ESG\_IND) has a coefficient of -0.011 with a significance value of 0.036, indicating a moderating effect of the proportion of independent commissioners in the relationship between ESG disclosure and cost of debt. The ESG and Board Size interaction variable (ESG\_BS) has a coefficient of 0.001 and a significance value of 0.053, indicating that board size also acts as a moderating variable. Meanwhile, the interaction variable between ESG and Female

Representation (ESG\_FEM) has a positive coefficient of 0.006 but is not significant with a significance value of 0.314, so there is no statistical evidence of a moderating effect of female representation in the relationship between ESG disclosure and cost of debt.

The regression results on the control variables show that company financial characteristics, particularly company size, funding structure, and profitability, play a greater role in influencing the cost of debt than company age. Firm size has a coefficient of -0.030 and a significance value of 0.017. The leverage variable shows a negative and significant effect with a coefficient of -0.202 and a significance value of 0.008. In addition, return on assets also has a negative and significant coefficient on the cost of debt with a coefficient of -0.449 and a significance value of 0.006. Conversely, firm age does not show a significant effect on the cost of debt with a coefficient of 0.000 and a significance value of 0.790.

The test results show that ESG disclosure has a positive and significant effect on the cost of debt, so that the first hypothesis (H1) is not supported. This finding indicates that in the context of non-financial companies in Indonesia, an increase in the level of ESG disclosure is actually responded to by creditors with higher debt costs. From a theoretical perspective, this finding is not in line with the predictions of signaling theory, which suggests that ESG disclosure should serve as a positive signal to reduce information asymmetry and credit risk (Spence,

1973). However, the effectiveness of ESG disclosure as a risk reducing signal is highly dependent on the institutional context and the credibility of reporting practices. In emerging markets such as Indonesia, where ESG disclosure standards, regulatory enforcement, and reporting consistency are still evolving, such signals may not be fully trusted by creditors, limiting their ability to reduce perceived risk (You et al., 2025). Instead of functioning as a clear positive signal, ESG disclosure may be perceived as less reliable and introduce additional uncertainty, which helps explain the observed positive relationship between ESG disclosure and the cost of debt in this study (You et al., 2025).

From an institutional perspective, this finding suggests that the impact of corporate disclosure is shaped by the surrounding governance and regulatory environment (Jizi, 2017). In this context, ESG disclosure may not operate as an effective risk reducing mechanism, but rather as ambiguous information that increases uncertainty in creditors risk assessment. This highlights the limitation of applying conventional signaling assumptions without considering institutional conditions (Gjergji et al., 2021; Nicolò et al., 2022).

This condition is in line with the findings from You et al. (2025), which emphasize that the effect of ESG disclosure on the cost of debt is contextual and stronger in environments with mature governance and regulatory enforcement. This is consistent with empirical findings in

developing countries, particularly Indonesia. Saputra & Anas (2025) found that ESG disclosure is positively associated with the cost of debt, indicating that creditors remain skeptical about the effectiveness of ESG in reducing default risk. In addition, Zhang et al. (2025) show that inconsistencies in the quality of ESG disclosure can increase information uncertainty, thereby encouraging creditors to set higher risk premiums. Pramadhia & Nainggolan (2025) also emphasize that the role of ESG in funding costs in Indonesia is highly contextual and influenced by the maturity of the market and the credibility of corporate sustainability reporting. Although ESG disclosure is measured as an aggregate score in this study, it is important to acknowledge that each ESG dimension may carry different implications for creditors (Gjergji et al., 2021; Salvi et al., 2024). The environmental dimension is often associated with regulatory compliance costs and long-term environmental risks, which may increase uncertainty in emerging markets. The social dimension reflects corporate relationships with stakeholders, which may not be directly linked to default risk in creditors assessment. Meanwhile, the governance dimension is generally more relevant to creditors, as it directly relates to monitoring mechanisms and risk control. In the Indonesian context, the uneven development of ESG practices across these dimensions may contribute to creditors perceiving ESG disclosure as heterogeneous and potentially ambiguous, thereby increasing rather

than reducing the cost of debt (Jizi, 2017).

The Indonesian institutional context plays a crucial role in explaining the findings of this study. As an emerging market, ESG disclosure practices in Indonesia are still largely voluntary and lack standardized enforcement compared to developed countries (You et al., 2025). This condition may lead to variations in disclosure quality and raise concerns about the credibility of ESG information among creditors (Saputra & Anas, 2025).

Furthermore, regulatory frameworks related to sustainability reporting, although evolving, have not yet fully ensured consistency and comparability across firms (You et al., 2025). As a result, creditors may interpret ESG disclosure not as a reliable signal of lower risk, but rather as an additional layer of information that introduces uncertainty (Pramadhia & Nainggolan, 2025). This explains why ESG disclosure in Indonesia is positively associated with the cost of debt, contrasting with findings from more developed institutional environments (Saputra & Anas, 2025).

The results of the second hypothesis (H2) testing show that the interaction variable between ESG disclosure and the proportion of independent commissioners has a negative and significant effect on the cost of debt, thus supporting the second hypothesis (H2). This finding indicates that the presence of independent commissioners can moderate the relationship between ESG disclosure and cost of debt,

whereby in companies with a higher proportion of independent commissioners, the positive effect of ESG disclosure on cost of debt becomes weaker (Alkhawaja et al., 2023). In other words, independent commissioners play a role in enhancing the credibility of ESG information so that creditors' perception of risk regarding ESG disclosure can be reduced (You et al., 2025). Theoretically, these results are in line with stakeholder theory, which emphasizes the role of governance mechanisms in ensuring the quality and reliability of information provided by companies to external stakeholders (Freeman, 1984). Independent commissioners serve as an objective and independent oversight mechanism, thereby minimizing potential managerial bias and symbolic practices in ESG disclosure. These findings support the studies by Alkhawaja et al. (2023) and Gurol & Lagasio (2023), which show that a high proportion of independent commissioners contributes to improving the quality of ESG disclosure. In the context of creditors, the improvement in the quality and credibility of ESG disclosure is perceived as a signal of better risk management, thereby reducing the cost of debt.

The test results show that the interaction variable between ESG disclosure and board size has a positive and marginally significant effect on the cost of debt, thus supporting the third hypothesis (H3) to a limited extent. This finding indicates that the size of the board of commissioners moderates the relationship between ESG

disclosure and the cost of debt, whereby in companies with a larger board size, the effect of ESG disclosure on increasing the cost of debt tends to be stronger (Agustina & Anwar, 2021). Theoretically, these results can be explained through the perspectives of stakeholder theory and corporate governance theory. Although a larger board size has the potential to provide diversity of expertise and perspectives in the oversight of ESG reporting (Freeman, 1984), an overly large board size can also reduce the effectiveness of decision-making and internal coordination (Agustina & Anwar, 2021).

These findings are in line with the results of research by Agustina & Anwar (2021) and Kalbuana et al. (2022), which show that large board size can reduce the effectiveness of supervisory functions. In the context of emerging markets such as Indonesia, the complexity of coordination in large boards has the potential to increase governance uncertainty, so that ESG disclosure is perceived as an additional source of information that does not necessarily reduce credit risk (Agustina & Anwar, 2021; You et al., 2025; S. Zhang et al., 2024).

In the fourth hypothesis (H4), the interaction variable between ESG disclosure and the proportion of female representation did not have a significant effect on the cost of debt, so the fourth hypothesis (H4) was not supported. This finding indicates that female representation on the board of commissioners has not been able to moderate the relationship between ESG disclosure and the cost of debt in non-financial companies in Indonesia

(Garcia-Blandon et al., 2024). Thus, the existence of female representation has not consistently influenced how creditors interpret the credibility of ESG disclosure in assessing financing risk. Theoretically, these results are not entirely in line with the predictions of legitimacy theory, which states that gender diversity on the board can strengthen social legitimacy and increase stakeholder trust in the company (Suchman, 1995). However, in the context of creditors, social legitimacy built through gender diversity does not necessarily translate into reduced credit risk. Creditors tend to focus on financial stability and structural risk control mechanisms, so the presence of female representation is not yet considered a strong enough signal to influence the determination of the cost of debt.

These findings are consistent with the results of Garcia-Blandon et al. (2024), which show that an increase in the proportion of female representation does not result in a significant change in the cost of debt. In addition, empirical evidence in Indonesia by Aditia & Kuang (2024) also found that the proportion of female representation does not have a significant effect on debt costs, which is due to the low level of female representation in the board structure. Therefore, these results indicate that the role of female representation as a governance mechanism in the context of ESG and cost of debt is still limited and quite dependent on the level of representation and influence of women in the board's decision-making process (Tyrowicz et al., 2020).

These findings confirm that in designing corporate governance structures, attention should not only be paid to quantitative aspects such as the number of board members, but also to the extent to which the board is able to perform its supervisory and decision-making functions effectively and efficiently. This study shows that board characteristics play an important role in shaping creditors perceptions of risk towards companies, particularly in assessing the credibility of ESG information disclosed. Therefore, companies need to consider the optimal balance of board structure so that the supervisory function continues to run effectively and does not create governance complexities that actually increase financing risks. Overall, this study contributes to enriching the literature on the role of internal company factors and governance mechanisms in influencing the cost of debt, and shows that the structure of the board of commissioners can strengthen or weaken the relationship between ESG disclosure and a company's cost of debt.

## **Conclusion and Recommendation**

### **Conclusion and Implications**

This study aims to analyze the effect of ESG disclosure on the cost of debt and examine the role of board of commissioners characteristics as a moderating variable in non-financial companies listed on the Indonesia Stock Exchange for the period 2020–2024. The results show that ESG disclosure has a positive and significant effect on the cost of debt. These findings indicate that in the

context of Indonesia as a developing country, increased ESG disclosure is not yet fully perceived by creditors as a risk-reducing signal, but is still viewed as ambiguous information or reflecting increased complexity and operational costs of the company.

Furthermore, the results of the study show that the proportion of independent commissioners can moderate the relationship between ESG disclosure and cost of debt negatively and significantly, indicating that strong oversight mechanisms can enhance the credibility of ESG disclosure in the eyes of creditors. Furthermore, board size also moderates this relationship positively and significantly on a marginal basis, suggesting that an overly large board size has the potential to reduce the effectiveness of oversight and weaken the role of ESG disclosure in reducing perceptions of financing risk. Meanwhile, the proportion of female representation was not found to moderate the relationship between ESG disclosure and cost of debt, indicating that female representation on boards in the Indonesian context is not yet strong enough to influence creditors risk assessments.

These findings confirm that the relationship between ESG disclosure and cost of debt is contextual and cannot be explained solely through signaling theory. The results reinforce the relevance of stakeholder theory by showing that creditors assess ESG disclosure selectively and consider corporate governance quality as the main determinant of the credibility of non-financial information.

This finding implies that the cost of debt is the result of creditors decisions based on risk perception, not solely on corporate strategy. Therefore, companies cannot directly reduce the cost of debt by increasing ESG disclosure, but need to ensure that ESG practices are supported by an effective governance structure, particularly through the role of independent commissioners and optimal board size management. These findings highlight the importance of considering ESG dimensions and the institutional environment in interpreting the relationship between ESG disclosure and the cost of debt, particularly in emerging markets such as Indonesia.

For creditors, these findings emphasize the importance of assessing ESG disclosure holistically by considering the quality of corporate governance in the financing risk assessment process. From a policy perspective, these findings suggest that regulators should strengthen the standardization and enforcement of ESG disclosure practices to improve the credibility and comparability of sustainability information (Saputra & Anas, 2025). In the Indonesian context, where ESG reporting is still evolving, more consistent regulatory guidelines may help reduce information asymmetry and enhance creditors confidence in assessing corporate risk (You et al., 2025).

From a corporate governance perspective, the results highlight the importance of effective board structures in enhancing the credibility of ESG disclosure (Jizi, 2017). Companies should ensure an optimal

proportion of independent commissioners and maintain a balanced board size to strengthen oversight functions without creating coordination inefficiencies. This is particularly important in improving how ESG information is interpreted by creditors in financing decisions (Salvi et al., 2024).

#### **Limitation and Recommendation**

This study has limitations related to research design and data availability, not methodological negligence. First, this study uses Refinitiv ESG scores as a proxy for ESG disclosure due to considerations of data consistency, cross-company comparability, and the limited availability of uniform sustainability reports during the observation period. The use of third-party ESG scores limits the ability of this study to distinguish in depth between the substantive quality of ESG implementation and the level of formal disclosure, but was chosen to maintain the validity and replication of the study. Therefore, future studies can use a mixed method approach by combining quantitative analysis and interviews with credit analysts or banking parties. This approach is recommended not as a substitute, but as a complement to explore risk assessment mechanisms that cannot be captured through secondary data, which are methodologically outside the scope of this study. The second limitation of this study is that it focuses its analysis on non-financial companies because the financial sector has fundamentally different regulatory characteristics, risk structures, and debt cost setting mechanisms. Mixing the financial and non-financial sectors

has the potential to cause estimation bias and obscure the interpretation of results, so sample restrictions were deliberately imposed to maintain the homogeneity of risk characteristics and improve the accuracy of causal inference. Therefore, future research could examine the quality of ESG disclosure in more granular detail, for example by analyzing each ESG component or using a content-based sustainability report index, which requires an intensive manual coding and inter-rater validation process. Third, this study uses a pooled OLS approach with the assumption that the relationship between ESG disclosure, board of commissioners characteristics, and cost of debt is homogeneous across companies and relatively stable throughout the observation period. This approach was chosen to maintain model simplicity and readability of moderation effects, but as a consequence, this study does not fully capture the potential differences in creditor behavior across companies or changes in creditor responses to ESG disclosure over time. Future research may consider more dynamic panel approaches, such as fixed effects or dynamic models, to capture corporate heterogeneity and changes in creditor responses to ESG disclosure in greater depth. This development requires more complex assumptions and model specifications as well as additional testing, which is methodologically beyond the scope of this study but has the potential to enrich our understanding of the dynamics of cost of debt determination.

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