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## Article

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# Environmental, social and governance (ESG) disclosure and cost of equity: the moderating effects of board structures

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## ABSTRACT

One of the main issues in the field of sustainable finance is environmental, social, and governance (ESG). This study examines how ESG disclosure impacts the cost of equity. Additionally, it explores how the structure of the board of commissioners moderates this relationship. The structure of the board of commissioners is represented by three key factors: the proportion of independent commissioners, the board of commissioners' size, and the proportion of female commissioners. The sample used in this research was 215 non-financial companies that published sustainability reports (SR) and were listed on the Indonesia Stock Exchange (BEI) with research years 2017, 2021, and 2022 with a total of 309 observations. The research employed Ordinary Least Square (OLS) and Moderated Regression Analysis (MRA) to test the hypotheses. The findings indicate that ESG disclosure negatively impacts the cost of equity. Additionally, the study reveals that a higher proportion of independent commissioners, a larger board of commissioners' size, and a greater proportion of female commissioners mitigate company risk. These factors weaken the negative effect of ESG disclosure on the cost of equity by substituting its risk-reducing benefits. The results of these findings were further validated through additional moderating variable analysis techniques. Specifically, subgroup analysis and regression models incorporating a one-year lag for the ESG variables were employed, yielding consistent results.

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ESG disclosure; cost of equity; board of commissioners; board structures; independent commissioners; board of commissioners' size; female commissioners; sustainable finance

## SUBJECTS

Finance; Business, Management and Accounting; Environmental Economics

## 1. Introduction

Global warming and international conflict drive significant social changes, emphasizing the need to protect the environment and respect societal interests (Garel & Petit-Romec, 2021; Nordhaus, 2019). Consequently, companies are increasingly adopting more ethically responsible and sustainable business practices for long-term success (Chen & Xie, 2022). According to a 2013 survey by the UN Global Compact, which polled 1,000 CEOs worldwide, nearly 93% of respondents acknowledged the importance of environmental, social, and governance (ESG) issues to their business success (UN, 2019). Despite this awareness, companies often underestimate the likelihood of ESG-related risks, assuming that adverse events such as accidents, lawsuits, or government interventions are infrequent (Khan, 2022). However, to prevent long-term negative consequences, it is crucial for companies to actively manage these risks (Henisz & McGlinch, 2019).

The rapid growth in corporate social responsibility (CSR) has garnered significant attention in recent years (Jones et al., 2007). As a result, companies are increasingly integrating ethical and sustainability considerations into their business activities, alongside the traditional goal of profit maximization (Nirino et al., 2019). This shift necessitates a re-evaluation of previously established business models,

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emphasizing practices that support the preservation of the Earth's ecosystem and maintain its natural balance (Kim et al., 2018; Franceschelli et al., 2019). In alignment with this global trend, the Indonesian government has introduced Financial Services Authority Regulation Number 51/POJK.03/2017, mandating sustainable finance practices for financial service institutions, issuers, and public companies. This regulation obliges registered companies to regularly produce sustainability reports, detailing their ESG performance.

ESG is one of the key issues in the field of sustainable finance. ESG represents an evolution and enhancement of the principles underlying the green economy, corporate social responsibility, and responsible investment. According to Eccles et al. (2011), many investors view ESG disclosure as a proxy for evaluating the quality of a company's management. By promoting transparency, ESG disclosure helps to reduce information asymmetry between a company and its stakeholders, particularly investors and creditors. The integration of all ESG dimensions aids in the comprehensive assessment of a company's opportunities, risks, transparency, and future performance (Albarrak et al., 2019). Consequently, institutional investors, asset management companies, financial institutions, and other stakeholders increasingly depend on ESG reports and metrics to gauge performance indicators (Huber & Comstock, 2017). Enhanced transparency not only diminishes information asymmetry but also helps companies maintain a favorable image with stakeholders, as they are perceived to have long-term objectives and adherence to regulations. Thus, ESG disclosure can contribute to a reduction in the cost of equity.

ESG disclosure depends on the company's management; in this case, the board of directors and the board of commissioners. Based on regulations in Indonesia (Financial Services Authority Regulation Number 51/POJK.03/2017), the board of commissioners plays a crucial role in the implementation and disclosure of ESG as the final decision maker in a company's sustainable financial reporting, which will affect the company's cost of equity. As the final decision maker, the board of commissioners plays a vital role in the effectiveness of monitoring and implementing ESG, and the effectiveness of the board of commissioners in carrying out their duties is highly dependent on the characteristics or structure of the board of commissioners. Effective operationalization of ESG activities is crucial for fostering organizational social acceptance and establishing long-term relationships with diverse stakeholder groups (Cormier et al., 2011). The board of directors plays a pivotal role in setting the social agenda of the organization, ensuring responsiveness to various stakeholder needs. Research by Jizi (2017) underscores that the structure of the board significantly impacts the nature and extent of an organization's environmental and social initiatives. Hence, having an effective board that prioritizes the broader interests of all stakeholders and promotes robust ESG practices is in the organization's best interest. This leads to the following research questions:

R.Q.1 Does ESG disclosure affect the cost of equity?

R.Q.2 Does the structure of the board of commissioners moderate the effect of ESG disclosure on the cost of equity?

In this study, we examined data from 215 non-financial companies listed on the Indonesia Stock Exchange (BEI) over the years 2017, 2021, and 2022, resulting in a total of 309 observations. Utilizing ordinary least squares (OLS) analysis and moderated regression analysis (MRA), complemented by subgroup analysis and one-year lag Environmental, Social, and Governance Disclosure (ESGD) analysis, our findings robustly indicate that companies with higher ESG disclosures experience a lower cost of equity. This relationship is attributed to reduced information asymmetry and enhanced ethical standards. Our research offers compelling evidence supporting the beneficial impact of ESG transparency on cost of equity. Additionally, this research uncovered a unique finding: the role of ESG in reducing the cost of equity is significant only when the company has a poorly structured board of commissioners.

This research makes several contributions to the ESG literature. Firstly, it investigates the moderating influence of board structure on the relationship between ESG disclosure and the cost of equity, an area that has not been explored in previous studies. This novel focus provides valuable insights and extends the existing body of knowledge in this field. Second, previous research examining the impact of ESG

disclosure on the cost of equity in different contexts has produced varying results. Several studies have found that ESG disclosure has a negative impact on the cost of equity (Raimo et al., 2020; Mulchandani et al., 2022; Tarulli et al., 2023; Li et al., 2023; Salvi et al., 2024; Priem & Gabellone, 2024). On the other hand, other research finds that ESG disclosure has a positive impact on the cost of equity (Hutagaol-Martowidjojo et al., 2023; Amarna et al., 2024; Dua & Sharma, 2024).

Prior studies found different results possibly due to differences in context, namely the focus on the characteristics of certain countries and certain industries. Research that focuses on certain industries such as the food and beverage industry (Raimo et al., 2020), basic materials (Hutagaol-Martowidjojo et al., 2023), agricultural (Tarulli et al., 2023), hospitality and tourism (Salvi et al., 2024). Studies focus on certain countries such as developed countries in North America, Western Europe, and Asia Pacific (Raimo et al., 2020), the United States (Li et al., 2023), and 17 European countries (Priem & Gabellone, 2024). Meanwhile, the focus on developing countries primarily targets large emerging economies, particularly the BRICS nations (Dua & Sharma, 2024). Previous studies have provided empirical evidence on countries with relatively stringent sustainability regulations. However, there is a significant gap in the research concerning countries with less stringent sustainability frameworks, such as Indonesia. This study addresses this gap by investigating the context of Indonesia, a country where sustainability regulations are still developing. Furthermore, this research broadens its scope by including a wider range of industries, specifically the non-financial sector, to enhance the generalizability of the findings.

The structure of this article is organized to enhance clarity and readability, following a logical progression of topics. Section 2 delves into the theoretical framework, providing a comprehensive literature review and the development of hypotheses that address the research questions. In Section 3, the focus shifts to the methodology, detailing the sample data and the research methods employed for data collection. Section 4 presents a concise summary of the research findings. Section 5 extends the discussion by examining the results of the robustness tests, ensuring the validity and reliability of the findings. Finally, Section 6 concludes the paper by discussing the practical implications of the research, highlighting its limitations, and offering suggestions for future studies. This structured approach aims to provide a clear and comprehensive understanding of the research process and outcomes.

## 2. Literature review

### 2.1. Stakeholder Theory

Stakeholder Theory posits that a company is not solely driven by its own interests but is also responsible for generating benefits for its stakeholders. The term 'stakeholder' encompasses a wide range of individuals and groups (Harmoni, 2013). Bowmann-Larsen and Wiggen (2004) define stakeholders as all individuals and groups who scrutinize company actions. According to Freeman and McVea (2001), stakeholders are groups or individuals who have the ability to influence or be influenced by the organization's goal-achievement processes. This broad definition underscores the importance of considering diverse perspectives and interests in corporate decision-making to foster sustainable and inclusive growth.

Companies are not solely focused on maximizing profits for their owners and investors, known as shareholders, but also bear the responsibility of providing benefits to society, the social environment, and the government, collectively referred to as stakeholders. It is crucial for companies to maintain good relationships with stakeholders by addressing their desires and needs (Vitolla & Raimo, 2018). This is particularly important for stakeholders who have significant influence over the resources necessary for the company's operations, such as labor, suppliers, and government entities (Hörisch et al., 2014). One effective approach to maintaining these relationships and ensuring that all parties' interests are safeguarded is through conducting ESG disclosures (Hörisch et al., 2020). This practice not only enhances transparency but also demonstrates the company's commitment to sustainable and responsible business practices.

ESG disclosures allow stakeholders to directly assess company performance, thereby influencing their decisions regarding contributions to the company, including funding access (Fonseka et al., 2019; Kleimeier & Viehs, 2016; Orens et al., 2010). By providing transparent information on environmental, social, and governance practices, companies can build trust and credibility with stakeholders, facilitating

better engagement and support. This transparency not only enhances the company's reputation but also improves its ability to secure external funding, demonstrating the practical benefits of robust ESG disclosures.

## **2.2. Legitimacy theory**

Legitimacy theory, developed by Guthrie and Parker (1989), discusses how a social contract can explain the relationship between society and companies. According to Suchman (1995), legitimacy is the general perception or assumption that the actions of an entity are desirable, appropriate, or appropriate within some socially constructed system of norms, values, beliefs, and definitions. Legitimacy theory states that organizations continually try to ensure that they carry out activities in accordance with existing societal boundaries and norms (Deegan, 2002).

Societal expectations play a crucial role in shaping a company's operations and responsibilities. Communities grant companies the right to build facilities and conduct business activities, with the expectation that these companies will, in turn, provide benefits to the community or, at the very least, avoid causing harm, such as environmental damage. As highlighted by Lindawati et al. (2015), modern corporate demands extend beyond mere financial profits to include a significant focus on social and environmental concerns. This shift is driven by the understanding that companies, having profited from the use of community resources, have a duty to give back to society and contribute positively to the environment.

ESG disclosure serves as a crucial communication tool between companies and their stakeholders, demonstrating the company's adherence to community norms and compliance with existing regulations. This practice can significantly enhance the company's reputation and influence stakeholder perceptions, ultimately boosting the company's value in the eyes of stakeholders, including investors and creditors. By showcasing their commitment to social responsibility, companies can gain public approval and regulatory compliance, facilitating smoother operations. This approval also translates to easier access to essential resources, such as affordable funding or lower costs of equity, thereby improving the company's overall operational efficiency and financial stability.

## **2.3. Signaling theory**

Signaling theory, first proposed by Akerlof (1970), posits that when buyers lack sufficient information about a product, they tend to form general perceptions and evaluate all similar products at the same price. This scenario disadvantages sellers of high-quality products while benefiting those offering lower-quality items. The writings of Akerlof (1970) were then developed by Spence (1973), who stated that the owner of the information provides a signal or signal in the form of information that reflects the condition of a company that will be useful for the recipient of the information.

Corporate managers often possess more detailed knowledge about their companies' quality than external investors, leading to an inherent information asymmetry. To bridge this gap, companies provide signals or information to stakeholders, allowing them to effectively communicate their image, intentions, behavior, and performance. This approach, grounded in signaling theory, emphasizes the importance of transparent communication in reducing information asymmetry. By conveying their commitment to society through these signals, companies can enhance stakeholder trust and market perception (Bae et al., 2019). This proactive communication strategy not only aligns with the company's goals but also fosters a positive reputation and stronger stakeholder relationships.

Signals are personal positive or negative information that the signal giver decides to communicate with the recipient (Connelly, 2016). Companies can provide signals by disclosing financial information, such as publishing financial reports, or publishing corporate actions, such as mergers and acquisitions. In line with the development of an era in which stakeholders care about environmental and social issues, the disclosure of non-financial information can also be a signal, such as the publication of a sustainability report containing the company's ESG disclosures. Signaling is crucial for stakeholders to accurately understand a company's position, thereby reducing hesitation to invest. For companies, effective signals facilitate easier and more affordable access to funding sources.

#### **2.4. The effect of ESG disclosure on the cost of equity**

Companies can effectively reduce information asymmetry by providing clear signals to stakeholders, thereby enhancing communication of their corporate image, intentions, behavior, and performance. This reduction in information asymmetry between companies and investors helps decrease investor uncertainty and improves risk assessment (Raimo et al., 2020). When investors feel better informed, they tend to lower their expected returns (Faysal et al., 2020; Priem & Gabellone, 2024). One effective method for achieving this transparency is through ESG disclosures in the company's sustainability report. From the perspective of legitimacy theory, ESG disclosure serves as a transparency tool that helps bridge the information gap between the company and its stakeholders, particularly investors (Amarna et al., 2024). This practice not only fosters trust but also strengthens the company's legitimacy and market position. Bushman et al. (2004) state that corporate transparency is how information reliably reflects a listed company's operating results, financial position, investment opportunities, and risks, as well as corporate governance and value. High levels of corporate ESG disclosure demonstrate a commitment to social and environmental responsibility, which can mitigate information asymmetry and reduce stock price volatility in the market (Jia et al., 2020). According to Shakil (2021), companies with low ESG disclosures tend to have more volatile shares due to perceived irresponsibility. Companies involved in ESG activities exhibit long-term financial performance improvements (Salehi et al., 2018) and are better equipped to withstand periods of crisis (Tanjung, 2023). Eccles et al. (2011) further note that many investors view ESG disclosure as a proxy for assessing management quality. This correlation highlights the importance of transparent ESG practices in fostering investor confidence and stabilizing market performance.

Albarrak et al. (2019) also share the opinion that a combination of all ESG dimensions supports investors' assessment of the opportunities, risks, transparency, and future performance of the underlying company. Therefore, investors increasingly rely on ESG reports and metrics to assess and measure company performance indicators (Huber & Comstock, 2017). Information transparency also helps companies maintain a good image or legitimacy in the eyes of investors because they are considered to have long-term goals and low business risks (Farhangdoust et al., 2020; Salehi et al., 2021). Therefore, ESG disclosures reduce the cost of equity. Previous research, such as that conducted by Raimo et al. (2020), Mulchandani et al. (2022), Tarulli et al. (2023), Li et al. (2023), Salvi et al. (2024), Priem and Gabellone (2024), regarding the influence of ESG on the cost of equity, found that ESG negatively impacts the cost of equity. Based on this explanation, the second hypothesis of this study can be formulated as follows:

H<sub>1</sub>: ESG disclosure has a negative effect on the cost of equity.

#### **2.5. Moderating effect of the proportion of independent commissioners on the effect of ESG disclosure on the cost of equity**

Protecting shareholder interests is significantly bolstered by the presence of independent commissioners (Carter et al., 2003; Shafeeq Nimr Al-Maliki et al., 2023). Independent commissioners can monitor and control company managers' opportunistic actions, which can harm shareholders (Fama, 1980; Fama & Jensen, 1983; Bathula, 2015). Existing empirical evidence generally supports the hypothesis that controlling opportunistic behavior and safeguarding shareholder rights are more effective when there is a higher proportion of independent commissioners on the board of directors (Mazzotta & Veltri, 2014).

The role of independent commissioners is crucial in offering an objective perspective on management and showing heightened sensitivity to the interests of both shareholders and stakeholders (Michelon & Parbonetti, 2012). Independent commissioners can influence ESG activities by enhancing the quality of managerial oversight (Shafeeq Nimr Al-Maliki et al., 2023). Research by Johnson and Greening (1999) demonstrated a positive correlation between the presence of independent commissioners and the enhancement of social and environmental dimensions within companies. Additionally, findings by Ma and Chen (2024) indicate that independent commissioners place significant emphasis on charitable and philanthropic activities linked to corporate social responsibility. These insights highlight the valuable contributions of independent commissioners in promoting ethical and socially responsible business practices.

Webb (2004) suggested that companies involved in social responsibility initiatives tend to have more commissioners. Independent commissioners appreciate the importance of caring for the community, environment, and other stakeholders (Husted & Sousa-Filho, 2019). Independent commissioners play a key role in enhancing communication with stakeholders, thereby improving the oversight of ESG implementation and disclosure. As the proportion of independent commissioners increases, they prioritize expanding ESG disclosures to reduce information asymmetry (Wu & Hu, 2019). This proactive approach helps maintain and protect the business's image and reputation (Lim et al., 2007). Increasing the proportion of independent commissioners enhances the effectiveness of ESG disclosures, reducing information asymmetry between companies and investors. This, in turn, lowers the company's cost of equity. Thus, the fourth hypothesis of this study is:

H<sub>2</sub>: The proportion of independent commissioners moderates the negative influence of ESG disclosure on the cost of equity.

### ***2.6. Moderating effect of board of commissioners size on the effect of ESG disclosure on equity cost***

Board size plays an important role in a board's ability to supervise and control managers (Anderson et al., 2004). A larger board size will be better for company performance because they have a wide-ranging of expertise to help make better decisions, and managers find it more difficult to dominate (Abor & Biekpe, 2007). A larger board of commissioners tends to have more diverse viewpoints in the decision-making process (Husted & Sousa-Filho, 2019). A board of commissioners with diverse experience and knowledge may have more careful learning and decision-making processes, resulting in better and more socially responsible decisions (Detthamrong et al., 2017).

An increase in the size of the board of commissioners leads to better implementation of stakeholder engagement policies and corporate social responsibility practices, allowing the board to balance the interests of all stakeholders more effectively (Brennan & Solomon, 2008). Consequently, a larger board will enhance the effectiveness of ESG disclosures in reducing information asymmetry with stakeholders (Salehi et al., 2024), while also improving the company's reputation and legitimacy (Zimon et al., 2022). This improvement signals good management quality to investors, leading to a lower cost of equity. Based on the explanation, the sixth hypothesis of this study can be formulated as follows:

H<sub>3</sub>: The board of commissioners' size moderates the negative influence of ESG disclosure on the cost of equity.

### ***2.7. Moderating effect of the proportion of female commissioners on the effect of ESG disclosure on cost of equity***

In general, the leadership styles and organizational strategies of female commissioners differ from those of their male counterparts (Glass et al., 2016). Female board members usually focus more on environmental and social welfare, whereas male board members focus more on profit maximization (Arayssi et al., 2020). Women generally care more about stakeholders and avoid strategic actions detrimental to society (Adams et al., 2011). Female board members also offer a variety of social and environmentally friendly solutions that help companies improve their strategic decisions on environmental and social issues (Cumming et al., 2015).

Zahid et al. (2020) observed that women tend to be less power-oriented and more focused on kindness and the protection of humans and nature. Women generally uphold strong moral standards and exhibit greater social sensitivity, emotional intelligence, and empathy (Amorelli & García-Sánchez, 2020). Therefore, a higher proportion of women on the board of commissioners enhances the effectiveness of monitoring actions, benefiting stakeholders. This increased female representation on the board leads to

more effective ESG disclosures, reducing the cost of equity through stringent supervision and transparency, thus minimizing the risk of information asymmetry for investors. Based on this explanation, the eighth hypothesis of this study is:

H<sub>4</sub>: The proportion of female commissioners moderates the negative influence of ESG disclosure on the cost of equity.

### 3. Methodology

#### 3.1. Data sources and samples

This study analyzes data from 215 non-financial companies listed on the Indonesia Stock Exchange (IDX), spanning the years 2017, 2021, and 2022, with a total of 309 observations. The ESG variable measurements were derived from the companies' sustainability reports (SR). Additionally, the OSIRIS database was utilized to obtain variables from financial reports and annual company reports. The data used in this research is publicly available on the Indonesia Stock Exchange (BEI) website and official websites of public companies. As the data is already published and accessible to the public, no additional permissions were necessary for its utilization in this research. We excluded financial companies to avoid bias in our results because the financial industry is highly regulated (Jafar et al., 2024). We also excluded 2018, 2019, and 2020 because the data available in these years could not meet the capital assets pricing model (CAPM) assumptions used to measure the dependent variable in this research, namely, the cost of equity. Specifically, the Ordinary Least Square (OLS) regression technique was used to test the hypothesis in this research. OLS is suitable because it is the easiest regression technique and its estimates are reliable as long as common regression problems are considered. Our data has passed the classic assumption test which is the initial requirement for panel data regression (Gujarati & Porter, 2009). All problems generally associated with regression such as normality, multicollinearity, autocorrelation, and heteroscedasticity are handled in this research by using appropriate steps or measures. We employed moderated regression analysis to examine the data, incorporating a moderating variable as suggested by Ghazali (2011).

#### 3.2. Variable measurement

##### 3.2.1. Dependent variable

Cost of equity (COE) is the minimum profit level investors require for company investments financed by equity. Following Fama and French (1996), Perold (2004), and Zaro et al. (2022), the cost of equity in this study was measured using the capital asset pricing model (CAPM).

$$COE_{i,t} = R_{ft} + \beta_{i,t} (R_{mt} - R_{ft})$$

where  $R_f$  is the risk-free rate of return,  $\beta_i$  (beta) is the company's systematic risk, and  $R_m$  is the market rate of return. We excluded 2018, 2019, and 2020 because in those years Indonesia had  $R_m$ , which was smaller than  $R_f$ , and we excluded several companies that had negative  $\beta_i$  values.

##### 3.2.2. Independent variable

To measure the level of ESG disclosure (ESGD), we adopted sentences as the unit of analysis (Feng, 2010) and a checklist based on the Global Reporting Initiative (GRI) guidelines for assessing the level of discretionary disclosure of ESG information. Specifically, the checklist includes 94 GRI items regarding ESG: environment (GRI 300, 32 items), social (GRI 400, 40 items), and governance (GRI 102, 22 items) (Gjergji et al., 2021). ESG measurements can be carried out using the ESG Score by comparing the amount of ESG disclosed by the company with the total number of disclosure items. ESG measurement is carried out by assigning a value of 1 to each indicator for companies that make ESG disclosures following the indicators and assigning a value of 0 to each indicator for companies that do not make ESG disclosures. The summary of the measurements is presented in Table 1.

**Table 1.** Summary of abbreviations, variables, operationalization, and expected sign.

Abbreviations	Variable	Operationalization	Expected Sign
COE	Cost of Equity	Capital Assets Pricing Model	
ESGD	ESG Disclosure	Comparison of the amount of ESG disclosed by the company with the total number of disclosure items.	Negative
IND	Proportion of independent commissioners	The number of independent commissioners on the company's board to the total board of commissioners	Negative
BSIZE	Board of commissioners' size	The number of commissioners on the company's board	Negative
FEM	Proportion of female commissioners	The number of female commissioners to the total members of the board of commissioners	Negative
SIZE	Firm Size	Natural logarithm of total assets	Negative
AGE	Firm Age	Natural logarithm of company age	Negative
LEV	Leverage	The ratio of total debt to total assets	Negative
ROA	Return on Asset	Net profit divided by total assets	Negative

### 3.2.3. Moderating variables

In this research, board structure is measured using three proxies: (1) the proportion of independent commissioners, calculated as the number of independent commissioners divided by the total number of board members (Umar et al., 2024; Arayssi & Jizi, 2024); (2) the size of the board of commissioners, represented by the total number of board members (Ma & Chen, 2024); and (3) the proportion of female commissioners, determined by the number of female commissioners divided by the total number of board members (Manita et al., 2018). Table 1 provides a summary of these measurements.

### 3.2.4. Control variables

Firm size (SIZE). Previous studies have found that large companies can control risk because of their strong financial and strategic positions (Benlemlih & Girerd-Potin, 2017). Larger companies tend to have lower risk, which results in a lower cost of equity. Conversely, smaller companies generally face higher risks and, therefore, higher costs of equity. According to Gholami et al. (2023), company size can be measured using the natural logarithm of total assets. Additionally, company age (AGE) is defined by the length of time the company has been in existence. The age of a company marks the onset of its operational activities and reflects its ability to sustain its presence in the business world. Consequently, companies that have been established for a long time tend to have lower risks and a reduced cost of equity. Referring to Pukthuanthong et al. (2013), company age is measured using the natural logarithm of the company's age. Leverage (LEV) measures the extent to which debt finances company expenses and is negatively related to the cost of equity (COE) since higher leverage can reduce agency risk due to external monitoring by financial institutions (Goss & Roberts, 2011). According to Nicolò et al. (2022), leverage is measured as long-term debt divided by total assets. Return on Assets (ROA) assesses a company's ability to generate profits from its resources, such as assets, capital, or sales (Setiawan & Gestanti, 2022; Wijaya et al., 2022; Singh et al., 2021; Wijaya et al., 2021; Hidayatulloh & Setiawan, 2020; Setiawan & Rachmansyah, 2019). A negative relationship is expected between ROA and COE. Hamrouni et al. (2019) suggest that profitability can be measured as net profit divided by total assets. Table 1 provides a summary of these measurements.

## 3.3. Econometrics model

The following is the regression model used in this research:

$$COE_{i,t} = \beta_0 + \beta_1 ESGD_{i,t} \quad (1)$$

$$COE_{i,t} = \beta_0 + \beta_1 ESGD_{i,t} + \beta_2 LNSIZE_{i,t} + \beta_3 LNAGE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 ROA_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$COE_{i,t} = \beta_0 + \beta_1 ESGD_{i,t} + \beta_2 IND_{i,t} + \beta_3 ESGD_{i,t} * IND_{i,t} + \beta_4 BSIZE_{i,t} + \beta_5 ESGD_{i,t} * BSIZE_{i,t} + \beta_6 FEM_{i,t} + \beta_7 ESGD_{i,t} * FEM_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$COE_{i,t} = \beta_0 + \beta_1 ESGD_{i,t} + \beta_2 IND_{i,t} + \beta_3 ESGD_{i,t} * IND_{i,t} + \beta_4 BSIZE_{i,t} + \beta_5 ESGD_{i,t} * BSIZE_{i,t} + \beta_6 FEM_{i,t} + \beta_7 ESGD_{i,t} * FEM_{i,t} + \beta_8 LNSIZE_{i,t} + \beta_9 LNAGE_{i,t} + \beta_{10} LEV_{i,t} + \beta_{11} ROA_{i,t} + \varepsilon_{i,t} \quad (4)$$

## 4. Result and discussion

### 4.1. Descriptive statistics

Table 2 provides an overview of the data for the dependent variable COE, the number of observations (*N*) used by non-financial companies in 2017, 2021, and 2022, namely 309 observations. The dependent variable in this research, namely COE, has an average of 0.08, which reflects that the average minimum profit required by investors is quite low, at 8%. The independent variable in this study, namely ESGD, had an average of 0.41. This reflects that the average level of ESG disclosure in non-financial companies in Indonesia is still very low; that is, the average value of disclosure is still below 50%.

The moderating variable in this research, namely IND, has a minimum value of 0.25 and a maximum value of 1.00. This illustrates that there are still non-financial companies in Indonesia that do not comply with regulations regarding the minimum proportion of independent commissioners, namely 30% of the total number of members of the board of commissioners. The BSIZE moderating variable had an average value of 4.36 with a minimum of 2 and a maximum value of 10. This shows that the average number of members of the board of commissioners in non-financial companies in Indonesia is four to five. The FEM moderation variable has a minimum value of 0.00 and a maximum value of 1.00. This means that several non-financial companies in Indonesia do not have female commissioners, and there are non-financial companies in Indonesia whose entire boards of commissioners are women. The average value of the FEM variable is 0.13, which means that there is still very little involvement of women on the boards of commissioners in non-financial companies in Indonesia.

Table 3 presents the Pearson correlation coefficients for all variables. This was found to be less than 0.90, indicating no multicollinearity problem between variables.

### 4.2. The effect of ESG disclosure on the cost of equity

The regression test results using Models 1, 2, 3, and 4 support Hypothesis 1 (H1), indicating that ESG disclosure significantly reduces the cost of equity, as shown in Table 4. The robustness of these findings is further validated by regression tests using a one-year lag for ESG disclosure, which consistently demonstrate a significant negative effect on the cost of equity, as evidenced in Table 8. These results align with the findings of Garzón Jiménez and Zorio-Grima (2021), Raimo et al. (2020), Mulchandani et al. (2022), Tarulli et al. (2023), Li et al. (2023), Salvi et al. (2024), and Priem and Gabellone (2024). This study finds that corporate social responsibility actions communicated through ESG disclosure can reduce information asymmetry and increase legitimacy among company stakeholders, which, as a result, will have a positive impact on the company's financial condition because the company will find it easier to access external funding, including access to funding through capital markets (Garzón Jiménez & Zorio-Grima, 2021). The results of this study provide evidence that companies that make better ESG disclosures have a lower cost of equity.

The findings of this research can be interpreted through the lens of signaling theory. By making ESG disclosures, companies communicate vital information about their image, intentions, behavior, and performance to investors, thereby reducing information asymmetry and the associated uncertainty risks (Raimo et al., 2020). These results highlight the growing reliance of investors on ESG reports and metrics to evaluate corporate performance indicators (Huber & Comstock, 2017). For investors, companies with higher ESG disclosure levels are perceived as having better management quality and greater social and

**Table 2.** Descriptive Statistics.

Variable	<i>N</i>	Minimum	Maximum	Mean	Std.Deviation	VIF
COE	309	0.03	0.31	0.08	0.06	
ESGD	309	0.05	0.91	0.41	0.16	1.24
IND	309	0.25	1.00	0.44	0.12	1.08
BSIZE	309	2	10	4.36	1.76	1.79
FEM	309	0.00	1.00	0.13	0.19	1.02
SIZE	309	22.94	33.66	29.42	1.72	1.87
AGE	309	1.39	4.75	3.47	0.58	1.16
LEV	309	0.00	0.95	0.28	1.54	1.27
ROA	309	-7.59	0.59	0.30	0.45	1.24

**Table 3.** Pearson correlation.

	COE	ESGD	IND	BSIZE	FEM	SIZE	AGE	LEV	ROA
<b>COE</b>	1								
<b>ESGD</b>	-0.196**	1							
<b>IND</b>	-0.186*	-0.043	1						
<b>BSIZE</b>	-0.156**	0.333**	-0.233**	1					
<b>FEM</b>	-0.078	-0.103	-0.103	-0.113*	1				
<b>SIZE</b>	-0.115*	0.374**	0.374**	0.607*	-0.098	1			
<b>AGE</b>	-0.085	0.193**	0.193**	0.335*	-0.101	0.321**	1		
<b>LEV</b>	0.038	0.009	0.033	-0.074	0.034	-0.194**	-0.081	1	
<b>ROA</b>	0.011	0.049	-0.031	0.100	0.028	0.248	0.101	-0.174**	1

\*\*, \*, significant at level 5%, and 10%.

**Table 4.** Regression analysis results.

Variable	Model 1	Model 2	Model 3	Model 4
Constant	0.116*** (12.001)	0.167*** (2.654)	0.322*** (6.576)	0.246*** (3.037)
ESGD	-0.077*** (-3.507)	-0.063*** (-2.582)	-0.432*** (-4.013)	-0.440*** (4.000)
IND			-0.256*** (-3.092)	-0.258*** (3.087)
ESGD×IND			0.462** (2.519)	0.456** (2.471)
BSIZE			-0.023*** (-4.073)	-0.026*** (-4.097)
ESGD×BSIZE			0.041*** (3.511)	0.044*** (3.611)
FEM			0.026 (0.577)	0.028 (0.597)
ESGD×FEM			-0.195 (-1.599)	-2.000 (-1.626)
SIZE		-0.001 (-0.553)		0.003 (1.242)
AGE		-0.004 (-0.691)		-0.002 (-0.287)
LEV		0.012 (1.166)		0.011 (1.160)
ROA		-0.035 (-1.001)		-0.035 (-1.030)
N	309	309	309	309
R <sup>2</sup>	0.039	0.047	0.122	0.131

\*\*\*, \*\*, \*, significant at level 1%, 5%, and 10%.

( ): t-statistics.

environmental responsibility. Such transparency helps companies maintain a positive image and legitimacy in the eyes of investors, as they are seen to have long-term goals and low business risk. Albarrak et al. (2019) further argue that comprehensive ESG dimensions enhance investors' assessments of a company's opportunities, risks, transparency, and future performance.

#### 4.3. Moderating effect of the proportion of independent commissioners on the effect of ESG disclosure on the cost of equity

The regression test results in Table 4, using Models 3 and 4, indicate that a higher proportion of independent commissioners significantly reduces the cost of equity. This relationship suggests that as the proportion of independent commissioners in a company increases, the company's cost of equity decreases. The cost of equity is largely determined by the uncertainty investors face in achieving their desired returns, which hinges on the availability of accessible information for evaluating the company's prospects. Consequently, the risk of information asymmetry is a critical factor (Broye et al., 2017). The presence of independent commissioners helps mitigate this risk by enhancing transparency and improving the overall quality of information available to investors. According to Bhojraj and Sengupta, (2003), the possibility of losses incurred by investors depends on the availability of credible information to evaluate a company's business risks accurately.

**Table 5.** Sub group analysis of the proportion of independent commissioners.

Variable	IND LARGE	IND SMALL
Constant	0.263*** (2.474)	0.102 (1.306)
ESGD	-0.005 (-0.131)	-0.110*** (-3.676)
SIZE	-0.005 (0.214)	0.001 (0.288)
AGE	-0.008 (-0.806)	0.000 (-0.045)
LEV	0.014 (0.867)	0.049* (1.662)
ROA	-0.039 (-0.688)	-0.028 (-0.631)
N	141	168
R <sup>2</sup>	0.041	0.112

\*\*\*, \*\*, \*: significant at level 1%, 5%, and 10%.

() : t-statistics.

Research by Beasley (1996) found that companies with a greater proportion of independent commissioners were less likely to commit financial statement fraud. Sengupta (1998) documents that companies with a high disclosure quality have a low cost of equity. The results show that the proportion of independent commissioners is related to the cost of equity by reducing the risk of information asymmetry (Abu Afifa et al., 2023). Companies with a large proportion of independent commissioners tend to disclose higher-quality financial reporting. This reduces the risk of information asymmetry for investors, enabling them to accurately assess the company's risks. As a result, from the investors' perspective, companies with a larger proportion of independent commissioners present a lower business risk, leading to a reduced cost of equity (Faysal et al., 2021).

The findings of this study indicate that while the proportion of independent commissioners has a significant negative direct effect on the cost of equity, its moderating role reveals that a higher proportion of independent commissioners weakens the negative impact of ESG disclosure on the cost of equity. This suggests that the effectiveness of ESG in reducing the cost of equity is more pronounced in companies with a smaller proportion of independent commissioners. This conclusion is further supported by the subgroup analysis presented in Table 5, which shows that ESG disclosure significantly lowers the cost of equity in companies with a smaller proportion of independent commissioners but not in those with a larger proportion. This indicates that the proportion of independent commissioners and ESG disclosures have a substitutive rather than a complementary effect. Consequently, a higher proportion of independent commissioners weakens the negative impact of ESG disclosures on the cost of equity. These results indicate that when companies make ESG disclosures with a large proportion of independent commissioners, the role of ESG in reducing the cost of equity will become less significant because other mechanisms can reduce company risk, which will reduce the cost of equity.

#### **4.4. Moderating effect of board of commissioners size on the effect of ESG disclosure on cost of equity**

The regression test results in Table 4, using Models 3 and 4, reveal that the size of the board of commissioners has a significantly negative effect on the cost of equity. This indicates that companies with larger boards tend to have a lower cost of equity. According to Cheng (2008), larger boards are associated with more conservative management practices, which reduce company risk. Additionally, Upadhyay (2015) found that companies with more board members benefit from a more transparent information environment, as decisions are less susceptible to abrupt changes. These factors contribute to a lower perceived risk by investors, thereby reducing the cost of equity.

From an agency theory perspective, the board is seen as a unit responsible for protecting shareholder value either through monitoring management or by providing advice to management. Social psychology literature related to group decision-making provides evidence that groups with more members will have

**Table 6.** Sub-group analysis of the board of commissioners size.

Variable	IND LARGE	IND SMALL
Constant	-0.177* (-1.719)	0.281*** (2.827)
ESGD	-0.053* (-1.868)	-0.075** (-2.010)
SIZE	0.008** (2.356)	-0.005 (-1.410)
AGE	0.008 (0.835)	-0.003 (-0.345)
LEV	0.026 (0.812)	0.013 (0.878)
ROA	-0.021 (-0.474)	-0.035 (-0.690)
N	130	178
R <sup>2</sup>	0.079	0.067

\*\*\*, \*\*, \*: significant at level 1%, 5%, and 10%.  
(): t-statistics.

a better decision-making process because it will trigger more discussion and each group member will try to seek more information (Kogan & Wallach, 1966). From an investor's perspective, a company with a larger board of commissioners is perceived to have lower business risk. Consequently, investors demand a lower return, resulting in a reduced cost of equity.

The findings of this study indicate that while the size of the board of commissioners has a significantly negative direct effect on the cost of equity, its moderating role reveals a different dynamic. Specifically, a larger board of commissioners weakens the negative impact of ESG disclosure on the cost of equity. This suggests that the effectiveness of ESG disclosures in reducing the cost of equity is more pronounced in companies with smaller boards. This conclusion is further supported by the subgroup analysis presented in Table 6, which shows that ESG disclosure significantly lowers the cost of equity to a greater extent in companies with smaller boards compared to those with larger boards.

These findings reinforce the evidence that the size of the board of commissioners and ESG disclosure have a substitutive, rather than complementary, effect. As a result, a larger board of commissioners diminishes the negative impact of ESG disclosure on the cost of equity. These results indicate that when making ESG disclosures in companies with large boards of commissioners, the role of ESG in reducing the cost of equity will be less significant because other mechanisms can reduce company risk, which will reduce the cost of equity.

#### **4.5. Moderating effect of the proportion of female commissioners on the effect of ESG disclosure on the cost of equity**

The regression test results in Table 4, using Models 3 and 4 and the moderated regression analysis (MRA) technique, indicate that the proportion of female commissioners does not moderate the effect of ESG disclosure on the cost of equity. However, the subgroup analysis in Table 7 reveals that the negative effect of ESG disclosure on the cost of equity is significant only in companies with a small proportion of female commissioners and not in those with a large proportion. This inconclusive result may be attributed to the proportion of female commissioners acting as a homogenizer-moderating variable. According to Sharma et al. (1981), a homogenizer-moderating variable arises when the error term is a function of the moderator variable. Consequently, dividing the total sample into homogeneous subgroups with respect to error variance can enhance the predictive accuracy of the classical model for specific subgroups. Therefore, the homogenizer moderating variables can only be identified through subgroup analysis.

The results of the sub-group analysis in Table 7 show that the proportion of female commissioners and ESG disclosure has a substitute effect (replace each other) and not a complementary effect (complement each other), which means that companies make ESG disclosures in companies with a higher

**Table 7.** Sub-group analysis of the proportion of female commissioners.

Variable	IND LARGE	IND SMALL
Constant	0.128 (1.323)	0.203** (2.401)
ESGD	-0.024 (-0.657)	-0.086*** (-2.636)
SIZE	0.000 (0.046)	-0.003 (-0.882)
AGE	-0.013 (-1.427)	0.003 (0.327)
LEV	0.001 (0.018)	0.012 (0.982)
ROA	-0.040 (-0.650)	-0.036 (-0.822)
N	123	186
R <sup>2</sup>	0.032	0.072

\*\*\*, \*\*, \*: significant at level 1%, 5%, and 10%.  
(): t-statistics.

proportion of female commissioners. is large, the role of ESG in reducing the cost of equity will be insignificant because other mechanisms can reduce company risk, which will reduce the cost of equity. These results indicate that a large proportion of female commissioners is an effective mechanism for reducing company risk. Abad et al. (2017) argue that a higher representation of female commissioners in the meeting room improves the monitoring process and possibly reduces the risk of information asymmetry and the cost of equity. Francoeur et al. (2008) documented how female commissioners tend to bring new perspectives on complex agendas that can help address information issues. Konrad et al. (2008) show that, compared to men, female commissioners improve communication and broaden board discussions to address different stakeholder concerns.

## 5. Robustness test

### 5.1. Sub-group analysis

Table 5 shows the results of the subgroup analysis of the proportion of independent commissioners with COE as the dependent variable. The results in Table 5 show that in the subgroup with a large proportion of independent commissioners, ESGD has an insignificant negative effect on COE, while in the sample subgroup with a small proportion of independent commissioners, ESGD has a significant negative effect with a significance level of 1%. Therefore, the results of the subgroup analysis are following the main results of this study, namely, that the proportion of independent commissioners weakens the negative influence of ESGD on COE.

Table 6 shows the results of the sub-group analysis of the board of commissioners' size with COE as the dependent variable. The results in Table 6 show that in the sub-group with a large board of commissioners, ESGD has a significant negative effect on COE with a significance level of 10%, while in the sample sub-group with a small board of commissioners, ESGD has a significant negative effect with a significance level of 5%; thus, it can be concluded that the effect of ESGD on COE in the large BSIZE group is weaker than in the small BSIZE group. Therefore, the results of the subgroup analysis are in accordance with the primary results of this study, namely, that the size of the board of commissioners weakens the negative influence of ESGD on COE.

Table 7 shows the results of the subgroup analysis of the proportion of female commissioners with COE as the dependent variable. The results in Table 7 show that in the subgroup with a large proportion of female commissioners, ESGD has an insignificant negative effect on COE, while in the sample subgroup with a small proportion of female commissioners, ESGD has a significant negative effect with a significance level of 1%. Therefore, in the subgroup analysis, the proportion of female commissioners weakened the negative influence of ESGD on COE.

**Table 8.** ESGD one-year lag.

Variable	Model 1	Model 2	Model 3	Model 4
Constant	0.073*** (9.257)	0.025 (0.506)	0.141*** (8.327)	0.045 (0.823)
ESGD	-0.035* (-1.664)	-0.048** (-2.150)	-0.123*** (-4.152)	-0.132*** (-4.454)
IND			-0.101*** (-2.651)	-0.097** (2.520)
ESGD*IND			0.156** (2.130)	0.131* (1.745)
BSIZE			-0.007** (-2.252)	-0.010*** (-2.725)
ESGD*BSIZE			0.010* (1.702)	0.011* (1.901)
FEMALE			0.008 (0.185)	0.008 (0.187)
ESGD*FEM			-0.177 (-1.566)	-0.172 (1.528)
SIZE		0.002 (1.058)		0.004* (1.870)
AGE		-0.003 (-0.649)		-0.002 (-0.336)
LEV		0.029* (1.723)		0.021 (1.338)
ROA		0.049* (1.741)		0.043 (1.640)
N	217	217	217	217
R <sup>2</sup>	0.013	0.045	0.158	0.193

\*\*\*, \*\*, \*: significant at level 1%, 5%, and 10%.  
(): t-statistics.

## 5.2. ESGD one-year lag

Table 8 presents the regression results using four regression models with the ESGD one-year lag as the independent variable and the COE variable as the dependent variable, highlighting the analysis's robustness. The results of the four analysis models show the same results as the main results.

## 6. Conclusion, limitations, and suggestions for future research

This research aimed to examine the influence of environmental, social, and governance on the cost of equity in non-financial companies listed on the Indonesia Stock Exchange (BEI). Furthermore, this research examines the moderating effect of board structures. The results of our research provide strong evidence that companies with high ESG disclosures have a lower cost of equity because they have low information asymmetry and are more ethical. Furthermore, this research uncovers a unique finding: the role of ESG in reducing the cost of equity is significant only when the company has a poorly structured board of commissioners. This provides compelling evidence for the substitution effect. In companies that have a good board structure, ESG disclosure does not have a significant impact on the cost of equity but it does have a significant negative effect on companies with a poor board structure. Companies with a strong board structure are perceived by investors as having lower risk, which leads to a reduced cost of equity. Conversely, companies with a weaker board structure need to implement other mechanisms to mitigate risk, such as engaging in robust ESG activities and disclosures. These practices can help compensate for the deficiencies in board structure by enhancing transparency and accountability, thereby reducing overall company risk.

This study makes both theoretical and practical contributions. Theoretically, it expands the scientific literature on environmental, social, and governance (ESG) by providing empirical evidence on the influence of ESG on the cost of equity within the context of developing countries, particularly Indonesia. Previously, most research on this topic has focused on developed countries, such as those in America and Europe. This study further contributes by examining the moderating effects of board characteristics – specifically, the proportion of independent commissioners, the board of commissioners' size, and the proportion of female commissioners – on the relationship between ESG and the cost of equity. This aspect has not been explored before. Additionally, a unique finding of this research is that the role of

ESG in reducing the cost of equity is significant only when the company's board of commissioners is less structured. This insight provides a novel perspective on the interaction between board composition and ESG effectiveness.

The practical implications of this research can be implemented in several ways. First, the findings can guide companies in making non-financial disclosures, as the research provides compelling evidence that investors consider such disclosures when making decisions about investment. Additionally, the research highlights that when a company's board of commissioners has a weaker structure, the role of ESG in reducing the cost of debt and equity becomes more crucial. Second, the results offer new insights for company management and shareholders. Specifically, ESG and board structure have a substitution effect. When a company has a well-structured board of commissioners – with a large size and a high proportion of independent commissioners and female commissioners – maintaining existing ESG practices is beneficial. However, when the proportion of independent commissioners, the size of the board, and the proportion of female commissioners are small, increasing ESG activities can help reduce corporate risk. Finally, the findings are particularly relevant for policymakers, who can use this evidence to create clearer and stricter regulations to encourage corporate sustainable activities. The strong evidence that investors consider ESG activities in their investment decisions underscores the importance of such policies in promoting corporate sustainability.

Although this research provides new insight into the relationship between ESG disclosure and the cost of equity, this research has several limitations that can provide opportunities for future research. First, the sample used in this research is very small because there is still minimal ESG disclosure made by non-financial companies in Indonesia. Therefore, further research can provide empirical evidence by using a larger sample of companies in developing countries. Furthermore, this study only considers ESG reporting based on the information provided in corporate sustainability reports. The application of these criteria results in limited observational data, as the mandatory publication of sustainability reports in Indonesia did not begin until 2021. Consequently, this research may not fully capture ESG information provided by other sources, such as company websites, annual reports, and AGMs, thereby introducing a limitation regarding the quality of ESG data in this study. Future research could address this by including the corporate life cycle to determine at which stages companies make the most ESG disclosures. This approach would offer deeper insights into the behavior of company management in making non-financial disclosures.

### Author contributions

Rosmiati Jafar: Drafting the paper, analysis, and interpretation of the data. Basuki Basuki: Revising it critically for intellectual content; and the final approval of the version to be published. Windijarto Windijarto: Revising it critically for intellectual content; and the final approval of the version to be published. Rahmat Setiawan: Revising it critically for intellectual content; and the final approval of the version to be published. Zulnaldi Yaacob: Revising it critically for intellectual content; and the final approval of the version to be published.

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## Data availability statement

The data that support the findings of this study are available from the corresponding author, Rahmat Setiawan, at [rahmatsetiawan@feb.unair.ac.id](mailto:rahmatsetiawan@feb.unair.ac.id) upon reasonable request.

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