

Managing Sustainability Reporting and the Cost of Equity: Recent Comparative Evidence from Developed and Developing Markets

A. A. Ousama^{1*}, A. H. Fatima², Labeeba Ahmed³, Amna Riaz⁴

1,3,4 Qatar University, Doha, Qatar

2 International Islamic University Malaysia, Kuala Lumpur, Malaysia

ARTICLE INFO

Article history:

Received 15 June 2026

Revised 6 July 2026

Accepted 10 July 2026

Published 1 August 2026

Keywords:

Sustainability Reporting
ESG Disclosure
Environmental Disclosure
Social Disclosure
Governance Disclosure
Cost of Equity

DOI:

10.24191/MAR.V25i02-12

ABSTRACT

Sustainability reporting encompasses environmental, social, and governance (ESG) information, yet significant gaps remain in ESG disclosure practices among listed companies on stock exchanges worldwide. These gaps pose challenges for information users seeking a comprehensive understanding of companies' financing, performance, and value. This study examined the impact of environmental, social, and governance disclosures on the cost of equity (CoE). Utilizing panel data from 2014 to 2023, the study analysed firms from 42 countries, encompassing both developed and developing economies, using system Generalized Method of Moments (GMM) estimators. The findings revealed that aggregate ESG disclosure was associated with a reduction in CoE across all countries, developed countries, and developing countries. At the component level, governance disclosure emerged as the most valued ESG dimension by equity providers, showing a significant negative association with CoE globally and in developed countries, while environmental and social disclosures did not demonstrate a significant impact on CoE individually. These results suggested that equity providers responded more favourably to overall ESG transparency than to individual disclosure components, and that governance quality signals were particularly valued in developed markets. Policymakers and regulators should consider encouraging comprehensive ESG disclosure frameworks rather than focusing on individual components, while recognising that a one-size-fits-all regulatory approach may not be equally effective across all institutional environments.

^{1*}Corresponding author. E-mail address: osamaanam@gmail.com

1. INTRODUCTION

The Environmental, Social, and Governance (ESG) framework is widely used to evaluate the sustainability of an organization's operations (Peterdy, 2022). Concepts such as Corporate Social Responsibility (CSR) and Socially Responsible Investment (SRI), which emerged in the early 1960s, laid the groundwork for ESG. Prior to the adoption of ESG as an applicable framework, CSR and SRI were the primary approaches to corporate sustainability. These concepts are now considered part of the broader category of Sustainability Reporting (SR). In this study, the term sustainability reporting is used to encompass ESG information.

As economic development has advanced, public interest in environmental protection and employee welfare has grown significantly (Chen et al., 2023). This heightened demand for non-financial information has been spurred by recent corporate scandals, financial crises, climate change, social injustices, and environmental pollution. ESG disclosure has also become increasingly relevant in the context of the United Nations' 2030 Agenda for Sustainable Development, as corporate transparency on environmental, social, and governance matters is closely aligned with several Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth), SDG 13 (Climate Action), and SDG 16 (Peace, Justice and Strong Institutions). Companies that enhance their ESG disclosures not only contribute to SDG achievement but also signal their commitment to responsible business conduct to investors and other stakeholders (Mhiri & Ajina, 2026; Sareen et al., 2026). Despite the growing momentum of ESG reporting, significant gaps remain in ESG disclosure practices among listed companies on stock exchanges worldwide. These gaps pose challenges for information users seeking a comprehensive understanding of companies' financing, performance, and value.

From a managerial perspective, the decision to disclose ESG information is a strategic one. According to Dhaliwal et al. (2011), some companies voluntarily disclose their SR activities as a means of signalling to stakeholders that the company is appropriately governed and is socially and environmentally responsible. Greater disclosure enhances transparency and reduces information asymmetry between the firm and its investors, thereby lowering the perceived risk of the firm. Theoretically, companies with greater transparency should be rewarded by capital markets with a lower cost of capital (Francis et al., 2005; Lopes & de Alencar, 2010; Moneva & Cuellar, 2009), specifically the cost of equity (CoE) in the context of this study. Recent empirical evidence continues to support this view, with studies finding that ESG disclosure is associated with reduced CoE across different markets and institutional contexts (Akin & Akin, 2026; Jafar et al., 2024; Vaitiekuniene & Sapkauskiene, 2026; Yu et al., 2025).

However, the relationship between ESG disclosure and CoE remains theoretically contested. Friedman (1970) argues that company activities should prioritize maximizing shareholders' wealth, as managers are agents of shareholders. Non-financial activities that are not directly related to financial performance may be considered costly and may detract from firm value. ESG disclosures, being non-financial in nature, could fall into this category of additional activities as referred to by Friedman (1970). Contrary to this view, Freeman (1984) proposes stakeholder theory, which argues that companies and their management should be concerned about a broader range of stakeholders, not only shareholders (Matten, 2012), as it is not only shareholders who have dealings with companies that may influence their future. When companies recognize the importance of stakeholders, SR becomes vital as a medium of communication

between the company and its stakeholders. Freeman's (1984) stakeholder theory has been used in a multitude of SR studies to explain the negative relationship between SR disclosure and the cost of capital (Bozec & Bozec, 2011; Chouaibi et al., 2021; Dhaliwal et al., 2011; El Ghouli et al., 2011; Elbannan & Elbannan, 2015; Gonçalves et al., 2013; Mohamed & Faouzi, 2014; Piechocka-Kałużna et al., 2021). On the other hand, other studies (Clarkson et al., 2010; Déjean & Martinez, 2009; Pellegrini et al., 2019) appear more consistent with Friedman's (1970) view, finding that SR disclosure does not necessarily reduce the cost of capital and may even increase it. These conflicting findings suggest that the applicability of either theoretical perspective may depend on contextual factors such as country development status and institutional environment, though this remains an open empirical question.

Most prior literature on SR and cost of capital has been conducted within single-country contexts, predominantly focusing on developed economies, thus lacking a comprehensive comparative analysis between developed and developing countries. Furthermore, while the impact of individual ESG components, namely environmental, social, and governance, has been investigated separately in prior studies, a more systematic comparative analysis across different regions and timeframes is still needed. This study addressed these gaps by investigating whether environmental, social, and governance disclosures reduce CoE in the context of both developed and developing countries. In order to meet this research objective, the study posed two research questions, which are (i) What is the trend of environmental, social, and governance disclosures in developed countries and developing countries over the period 2014–2023? and (ii) Do environmental, social, and governance disclosures reduce the cost of equity in developed and developing countries during the period 2014–2023?

The contributions of this study span theory, practice, and policy. In terms of theory, this study employed a large cross-country panel dataset spanning 42 countries and ten years (2014–2023), encompassing both developed and developing economies, and examined both individual and aggregate ESG disclosure components using system GMM estimation to address endogeneity, revealing that governance disclosure and aggregate ESG disclosure are the dimensions most valued by equity providers across different market contexts. These contributions, along with their implications for theory, practice, and policy, are discussed in detail in the concluding section. In terms of practical contributions, the findings indicated which ESG disclosure dimensions were perceived as valuable by equity providers in developed and developing countries, providing useful guidance to companies seeking to enhance the type of disclosure most valued by their investors in order to lower their CoE. Additionally, the findings are of interest to regulators and policymakers, as the evidence suggested that a "one-size-fits-all" approach to SR regulation may not be equally effective across all institutional environments, and that context-sensitive policy design is warranted.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 Existing Studies on Sustainability Reporting (SR) and Cost of Equity (CoE)

Increased awareness and augmented public interest in non-financial information have led to a substantial body of research examining SR and the cost of capital. It is important to note at the outset that the literature in this area comprises two distinct streams: studies that measure ESG disclosure, that is, the extent to which firms report on their ESG activities, and studies that measure ESG performance, that is,

the quality or outcomes of firms' actual ESG practices. These two concepts are theoretically and empirically distinct, as disclosure reflects transparency while performance reflects substantive ESG outcomes. Bloomberg ESG scores, as used in this study, measure the extent of disclosure rather than the quality of underlying ESG practices. This distinction is important when interpreting and comparing findings across studies, as conflicting results in the literature may partly stem from differences in how ESG is operationalised.

Numerous studies have explored how voluntary ESG disclosures impact the perceptions and decisions of investors, shareholders, and other stakeholders (Piechocka-Kałużna et al., 2021). Research in the UK and Indonesia shows that companies disclose SR information primarily to portray a positive image to stakeholders and respond to stakeholder pressure (Gunawan, 2015; Idowu & Papasolomou, 2007). Beyond stakeholder pressure, companies also disclose SR in the belief that it could improve firm performance. While the majority of studies find a positive association between SR and corporate financial performance (Oh & Park, 2015), others find a negative relationship (Lima Crisóstomo et al., 2011) or no significant relationship (Filbeck & Gorman, 2004), suggesting that the SR-performance relationship is context-dependent. These mixed findings on SR and firm performance foreshadow the similarly mixed results on SR and CoE discussed below.

The link between SR disclosure and CoE has been examined extensively, particularly in developed country contexts, with most evidence pointing to a negative relationship. In North America, Richardson and Welker (2001) found that companies with higher disclosure policies have lower CoE, while Francis et al. (2005) confirmed that financial and social disclosures reduce CoE in Canadian firms. Similarly, Iqbal et al. (2025) found that higher integrated reporting quality was associated with lower CoE in developed markets, with corporate governance quality playing a moderating role. Dhaliwal et al. (2011) further documented that companies with high CoE in the prior year initiate SR disclosure in the current year, and subsequently enjoy a reduction in CoE, suggesting a strategic dimension to disclosure decisions. Supporting this, multiple studies in the USA (Dhaliwal et al., 2011; Piechocka-Kałużna et al., 2021), Brazil (Gonçalves et al., 2013), and France (Chouaibi et al., 2021) consistently find that companies with higher SR scores enjoy substantially lower CoE. More recently, Chen et al. (2023) found that ESG disclosure scores reduce CoE in China by lowering firms' market risk, while Yu et al. (2025) provided further evidence from an emerging market context, showing that more positive ESG media coverage was associated with lower equity financing costs through enhanced information transparency.

However, not all evidence points in the same direction. Pellegrini et al. (2019) found a U-shaped relationship between ESG disclosure and CoE among Italian oil and gas companies, suggesting that beyond a certain threshold, greater ESG disclosure may actually increase CoE. Similarly, studies by Clarkson et al. (2010) and Déjean and Martinez (2009) found that voluntary environmental disclosure does not necessarily reduce CoE in US and French firms respectively. It is important to note that La Rosa and Bernini (2022) and Becchetti et al. (2023), who find that negative ESG performance increases CoE, measure ESG performance rather than disclosure, and their findings therefore reflect a different theoretical mechanism, namely reputational risk and misconduct, rather than the information asymmetry channel examined in the present study.

Moving beyond single-country studies, international evidence provides a more nuanced picture. Dhaliwal et al. (2014) used data from 31 countries and found that SR disclosure reduced CoE more prominently in more stakeholder-oriented countries. Matthiesen and Salzmann (2017) examined a sample

of 42 countries and found a similar pattern, with the SR-CoE association being stronger in more humane-oriented cultures. These findings suggest that institutional and cultural contexts moderate the ESG disclosure-CoE relationship, which motivates the present study's focus on developed versus developing country differences. Recent cross-country evidence further supports this view: Priem and Gabellone (2024) found that in countries with weaker legal environments, environmental and social factors significantly reduce the cost of capital, while governance factors increase it, and Vaitiekuniene and Sapkauskiene (2026) provided additional evidence from global banking and fintech firms showing that sustainability practices were associated with lower capital costs.

Examining the individual ESG components separately reveals further divergence in findings. With respect to environmental disclosure, Clarkson et al. (2010) found no significant effect on CoE in US firms, and Déjean and Martinez (2009) reached similar conclusions in France. However, in the developing country context of Tunisia, Mohamed and Faouzi (2014) found that environmental disclosure significantly reduces CoE, pointing to the importance of country context. Similarly, Jafar et al. (2024) found that ESG disclosure reduces CoE in Indonesia, with board structures playing a moderating role. With respect to social disclosure, Becchetti et al. (2023) found that corporate misconduct under the social dimension of ESG increases CoE, particularly for firms with higher ESG scores. With respect to governance disclosure, Bozec and Bozec (2011) found that higher corporate governance quality reduces the cost of capital in Canadian firms, and Elbannan and Elbannan (2015) confirmed similar results in Egyptian banks. However, Khanchel and Lassoued (2022) found a dynamic effect where governance disclosure initially decreases CoE but becomes positive over time, while Ramirez et al. (2022) found a significant negative effect only for governance scores, not environmental or social, among Latin American firms. Lou et al. (2025) further showed that ESG rating disagreement, driven primarily by inconsistencies in the governance dimension, increases CoE by undermining investor confidence. Taken together, these findings suggest that among individual ESG components, governance disclosure may carry the strongest signalling value for equity providers, a pattern that is further examined in the present study. Collectively, these findings suggest that the relationship between individual ESG components and CoE is highly context-dependent and varies across countries, time periods, and institutional settings.

The divergence in findings across the literature can be attributed to several factors. First, studies differ in their operationalisation of ESG, as some measure disclosure extent while others measure performance quality, leading to incomparable results. Second, the institutional environment, including legal systems, stakeholder orientation, and cultural values, appears to moderate the ESG-CoE relationship significantly. Third, most prior studies focus on single-country or single-region samples, predominantly in developed economies, limiting the generalisability of findings to developing country contexts. Fourth, the dynamic and potentially non-linear nature of the ESG-CoE relationship means that cross-sectional or short-panel studies may not fully capture how these relationships evolve over time. This study addressed these gaps by examining both individual and aggregate ESG disclosure components across a large cross-country sample of developed and developing economies over the period 2014 to 2023, using system GMM estimation to account for dynamic effects and endogeneity.

2.2 Theoretical Framework and Hypotheses Development

This study investigates the relationship between SR, as indicated by ESG disclosure, and CoE, drawing on two competing theoretical perspectives: Freeman's (1984) stakeholder theory and Friedman's (1970) shareholder primacy view.

This study investigated the relationship between SR, as indicated by ESG disclosure, and CoE, drawing on two competing theoretical perspectives: Freeman's (1984) stakeholder theory and Friedman's (1970) shareholder primacy view.

Freeman's (1984) stakeholder theory argues that companies and their management should be concerned about a broader range of stakeholders, not only shareholders (Matten, 2012). When companies recognize the importance of stakeholders, SR becomes vital as a medium of communication between the company and its stakeholders. From this perspective, ESG disclosure reduces information asymmetry between managers and investors, thereby lowering the perceived risk of the firm and enabling equity providers to accept a lower CoE. This mechanism is supported by signalling theory, whereby voluntary ESG disclosure signals to the market that the firm is well-governed and committed to responsible practices, reducing investor uncertainty (Dhaliwal et al., 2011; Francis et al., 2005).

In contrast, Friedman (1970) argues that managers are agents of shareholders and should focus on maximizing shareholders' wealth. From this perspective, non-financial activities such as ESG disclosure may represent unnecessary costs that detract from firm performance and, consequently, from shareholder value. In such cases, ESG disclosure may be insignificant to CoE, or may even increase it if shareholders perceive it as value-destroying.

The empirical evidence reviewed in Section 2.1 suggests that the applicability of either perspective depends on contextual factors, including the type of ESG disclosure, the country's development status, and the institutional environment. Nevertheless, the majority of prior studies support a negative relationship between SR disclosure and CoE, consistent with Freeman's (1984) stakeholder theory. Based on this body of evidence, the following hypotheses were developed:

H1: There is a negative relationship between the level of environmental disclosure and the cost of equity capital.

Environmental disclosure provides investors with information about a firm's environmental risks, management practices, and compliance with environmental regulations. By reducing uncertainty about environmental liabilities and demonstrating responsible environmental stewardship, environmental disclosure lowers information asymmetry and reduces the perceived risk of the firm. Consistent with Freeman's (1984) stakeholder theory and prior empirical evidence (Jafar et al., 2024; Mohamed & Faouzi, 2014; Yu et al., 2025), firms with higher environmental disclosure are expected to enjoy a lower CoE, though the evidence on this relationship remains mixed across different country contexts.

H2: There is a negative relationship between the level of social disclosure and the cost of equity capital.

Social disclosure signals a firm's commitment to its employees, communities, and other social stakeholders. By demonstrating responsible social practices, firms can enhance their reputation, strengthen stakeholder relationships, and reduce the risk of social controversies that could adversely affect firm value. Consistent with the information asymmetry reduction mechanism (Dhaliwal et al., 2011; El Ghoul et al., 2011) and recent evidence on the financial consequences of social misconduct

(Becchetti et al., 2023), firms with higher social disclosure are expected to enjoy a lower CoE, though the strength of this relationship may vary depending on the institutional and regional context.

H3: There is a negative relationship between the level of governance disclosure and the cost of equity capital.

Governance disclosure provides investors with information about a firm's board structure, executive compensation, audit mechanisms, and other governance practices. Greater governance transparency reduces agency conflicts and information asymmetry between managers and shareholders, thereby lowering investors' perceived risk. Supporting this, Bozec and Bozec (2011) and Elbannan and Elbannan (2015) found that higher governance quality was associated with lower cost of capital. More broadly, governance disclosure appears to be the ESG component most consistently valued by equity providers, as evidenced by Ramirez et al. (2022) who found a significant negative effect only for governance scores among Latin American firms, and by the present study which found a similar pattern across a larger cross-country sample. However, evidence from Khanchel and Lassoued (2022) and Lou et al. (2025) suggests that this relationship may be more complex and dynamic, particularly when there is disagreement about governance quality across rating agencies.

H4: There is a negative relationship between the level of overall ESG disclosure and the cost of equity capital.

When considered in aggregate, ESG disclosure provides a comprehensive signal of a firm's overall sustainability profile to investors. Aggregate ESG disclosure reduces information asymmetry across all three dimensions simultaneously, potentially amplifying the risk-reduction effect on CoE. This is supported by evidence from cross-country studies (Dhaliwal et al., 2014; Matthiesen & Salzmann, 2017) and recent evidence from global markets (Akin & Akin, 2026; Vaitiekuniene & Sapkauskiene, 2026), which found that overall ESG disclosure was associated with lower cost of capital, particularly in developing country contexts where aggregate transparency signals may carry greater informational value.

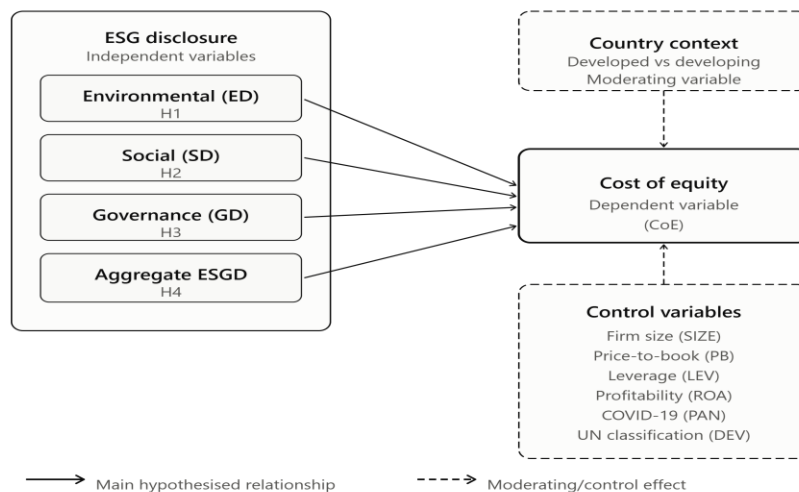


Fig. 1. Conceptual Framework

The conceptual framework presented in Figure 1 illustrated the theoretical relationships examined in this study. Drawing on Freeman's (1984) stakeholder theory and Friedman's (1970) shareholder primacy view, the framework positioned ESG disclosure, comprising environmental (ED), social (SD), governance (GD), and aggregate (ESGD) disclosure scores, as the independent variables hypothesised to influence the cost of equity (CoE). The relationship was examined across two country contexts, namely developed and developing economies, which served as a moderating dimension in the analysis. Firm size, price-to-book ratio, leverage, profitability, and the COVID-19 pandemic period were included as control variables to isolate the effect of ESG disclosure on CoE.

3. RESEARCH METHODOLOGY

3.1 Data and Variables

This study employed recent sample data to examine the impact of ESG disclosure scores on the CoE for leading firms. The analysis utilized panel data consisting of annual information spanning from 2014 to 2023, sourced from the Bloomberg database. Initially, the Bloomberg database included over 11,000 companies within this timeframe. However, companies with incomplete data were excluded from the sample. Consequently, only firms with complete data across all three dimensions of ESG, that is, environmental, social, and governance scores, as well as CoE, were retained for this research. The final sample included 1,115 companies from 42 countries. Of these companies, 916 were from developed countries and 199 were from developing ones, classified according to the United Nations' list of developed and developing countries. Examples of developed countries in the sample include the United States, Japan, France, Australia, and Germany, while developing countries include Thailand, Hong Kong, Brazil, Mexico, and Turkey.

The dependent variable in this study was the cost of equity, proxied by the weighted average cost of equity available in the Bloomberg database. The CoE was calculated using the Capital Asset Pricing Model (CAPM), represented by the formula:

$$\text{Cost of Equity} = \text{Risk-free Rate} + [\text{Beta} \times \text{Country Risk Premium}]$$

where the risk-free rate is the country's 10-year long-term bond rate and the country risk premium reflects the additional return required by investors for bearing country-specific risk. It is worth noting that under this CAPM specification, a negative CoE may arise in rare cases where a firm's beta is negative, indicating that the firm's returns move inversely with the market, and the country risk premium is sufficiently low. In such cases, the formula mechanically produces a CoE below the risk-free rate. While uncommon, this phenomenon is not indicative of a data error and has been documented in prior studies using market-based CoE proxies (Elbannan & Elbannan, 2015).

The independent variables were the environmental disclosure (ED), social disclosure (SD), and governance disclosure (GD) scores, as well as the overall ESG disclosure score (ESGD). Bloomberg monitors companies' ESG disclosure and compiles ESG data on thousands of companies, collecting data from different sources such as annual reports, sustainability reports, press releases, and third-party research. Bloomberg scores companies from 0 to 100 based on the extent of their ESG disclosure. It is important to note that these scores reflect the extent of disclosure rather than the quality of underlying ESG practices. The purpose of these scores is to help investors in assessing the firm's transparency, risks, and opportunities.

The control variables for the study were firm size indicated by total assets, price-to-book ratio, leverage, and profitability indicated by return on assets (ROA). These control variables were derived from prior studies (Houqe et al., 2020). Larger firms are perceived to be less risky than smaller firms and are therefore considered safer (Dhaliwal et al., 2011; El Ghoul et al., 2011). Similarly, firms with higher growth potential, proxied by price-to-book ratio (PB), and profitable firms have lower costs of capital (Dhaliwal et al., 2011) as they are considered to be less risky. Hence, firm size, price-to-book ratio, and profitability were expected to have a negative association with CoE. In contrast, the leverage ratio, measured as Net Debt to EBITDA, was expected to have a positive relationship with the cost of capital (El Ghoul et al., 2011; Wu et al., 2014), as higher leverage relative to earnings is an indication of a higher risk of default. A negative Net Debt to EBITDA ratio indicates that the firm holds more cash than debt, reflecting a net cash position. In summary, the predicted signs of the beta coefficients of the control variables are size (-), price-to-book ratio (-), leverage (+), and ROA (-). To mitigate the influence of extreme values, all continuous variables were winsorised at the 1st and 99th percentiles prior to analysis.

In addition, two dummy variables were incorporated into the study. The first distinguished between developed and developing countries based on the United Nations' official country classification list, and was used to compare ESG disclosure and CoE across these two categories. The second dummy variable accounted for the impact of the COVID-19 pandemic, where the non-pandemic period (2014–2019) was coded as 0 and the pandemic and post-pandemic period (2020–2023) was coded as 1. These dummy variables enabled the study to control for country development status and the unprecedented economic conditions brought about by the pandemic. Table 1 summarizes the definitions, measurements, and sources for all variables used in the study.

Table 1. Variable Description

Variable Description		Measurement	Source	Type of Variable
CoE	Cost of Equity	Weighted average cost of equity derived using CAPM: Risk-free Rate + [Beta × Country Risk Premium], where the risk-free rate is the country's 10-year long-term bond rate	Bloomberg	Dependent
ED	Environmental Disclosure Score	Bloomberg ESG Environmental Disclosure Score, ranging from 0 to 100	Bloomberg	Independent
SD	Social Disclosure Score	Bloomberg ESG Social Disclosure Score, ranging from 0 to 100	Bloomberg	Independent
GD	Governance Disclosure Score	Bloomberg ESG Governance Disclosure Score, ranging from 0 to 100	Bloomberg	Independent
ESGD	The aggregate disclosure of ED, SD, and GD	Equally-weighted aggregate of ED, SD, and GD scores, ranging from 0 to 100	Bloomberg	Independent
SIZE	Firm size, indicated by total assets in billion USD in year t	Natural logarithm of total assets	Bloomberg	Control
PB	Price-to-Book Ratio	Last Price / Book Value Per Share	Bloomberg	Control
LEV	Leverage is Net Debt to EBITDA	(Total Debt - Cash & Cash Equivalents) / EBITDA	Bloomberg	Control
ROA	Return on Assets	Net Profit / Average Total Assets	Bloomberg	Control
DEV	Country development status	Dummy variable: developed countries = 1; developing countries = 0, based on UN country classification	UN Classification	Dummy
PAN	COVID-19 pandemic period	Dummy variable: non-pandemic period (2014–2019) = 0; pandemic period (2020–2023) = 1	—	Dummy

3.2 Empirical Model

This study employed various statistical techniques to analyze the data in relation to the research questions. Initial descriptive analysis was conducted using descriptive statistics, correlation analysis, and paired sample t-tests to answer RQ1, as listed in Section 1.

For a more detailed examination and answer of RQ2, the study utilized a dynamic panel data regression model, as the dataset encompassed 1,115 companies over a ten-year period. The strength of panel data lies in its ability to account for variations across different entities and over time within a time-series framework. Specifically, the dynamic panel data model employed the Generalized Method of

Moments (GMM) estimators for regression analysis. GMM was chosen due to its accuracy and widespread acceptance in handling potential endogeneity issues and providing robust estimates in panel data analysis (Bond, 2002). Two widely used GMM estimators are the difference GMM estimator and the system GMM estimator. The difference GMM estimator, introduced by Arellano and Bond (1991), uses first-differenced equations with appropriately lagged levels as instruments. The system GMM estimator, developed by Arellano and Bover (1995) and further extended by Blundell and Bond (1998), builds on this approach by also including equations in levels, with lagged first differences serving as instruments. All models were estimated using the two-step robust GMM approach in Stata, which provides consistent standard errors in the presence of heteroskedasticity and autocorrelation. The selection between difference GMM and system GMM was made by comparing the coefficient of the lagged dependent variable obtained from each estimator with those from Pooled OLS and Fixed Effects models. If the coefficient of the lagged dependent variable from the difference GMM falls below that of the fixed effects estimator, or outside the bounds established by the fixed effects and pooled OLS estimators, system GMM is preferred as it produces more efficient estimates through additional moment conditions (Blundell & Bond, 1998; Bond, 2002). This determination is discussed further in Section 4.4.

The validity of the GMM specifications was assessed using the Arellano-Bond AR(1) and AR(2) tests for serial correlation in first differences, where the absence of second-order serial correlation (AR(2) $p > 0.05$) is required for the instruments to be valid. The Hansen test of overidentifying restrictions was also reported to assess instrument validity, where a p-value above 0.10 is generally considered acceptable. To limit instrument proliferation and improve the reliability of the Hansen test, instruments were collapsed using the collapse option in Stata's xtabond2 command (Roodman, 2009).

To further validate the findings, robustness checks were conducted by testing the interaction between ESG disclosure components and country development status (DEV) in a pooled model, enabling a formal assessment of whether the effects of ESG disclosure on CoE differ significantly between developed and developing countries. Additional diagnostic tests, including variance inflation factor (VIF) tests for multicollinearity, panel unit root tests for stationarity, and year-by-year trend analysis, were also reported in Table 13.

The dynamic panel model equations are as follows:

$$\begin{aligned} CoE(i,t) = & \alpha + \beta 1 CoE(i,t-1) + \beta 2 ED(i,t) + \beta 3 SD(i,t) + \beta 4 GD(i,t) + \beta 5 SIZE(i,t) + \beta 6 \\ & PB(i,t) + \beta 7 LEV(i,t) + \beta 8 ROA(i,t) + \beta 9 PAN(t) + \varepsilon(i,t) \end{aligned} \quad (1)$$

Equation (1) is Model 1, which refers to when environmental, social, and governance disclosure scores are taken as separate independent variables.

$$CoE(i,t) = \alpha + \beta 1 CoE(i,t-1) + \beta 2 ESGD(i,t) + \beta 3 SIZE(i,t) + \beta 4 PB(i,t) + \beta 5 LEV(i,t) + \beta 6 ROA(i,t) + \beta 7 PAN(t) + \varepsilon(i,t) \quad (2)$$

Equation (2) is Model 2, which refers to when the overall ESG disclosure score is taken as the independent variable. In both equations, *i* represents the company, *t* denotes the time period ranging from 2014 to 2023, *CoE(i,t-1)* refers to the lagged dependent variable used to capture the persistence of the cost of equity over time, and $\varepsilon(i,t)$ refers to the error term.

4. ANALYSIS AND DISCUSSION

4.1 Descriptive Analysis

Table 2 presented the descriptive statistics of all variables, that is, dependent, independent, and control variables, used in the study based on aggregate data for all the firms over the ten years.

Table 1. Descriptive Summary Statistics

	CoE	ED	SD	GD	ESGD	SIZE (bn \$)	PB	LEV	ROA
Mean	10.85	45.21	33.68	59.01	54.98	90.43	2.87	1.91	4.78
Median	10.37	47.33	35.22	86.09	55.31	13.94	1.63	1.15	3.85
St.Dev.	3.24	19.49	16.24	42.84	9.69	313.04	4.02	3.32	6.28
Min.	4.82	0.00	0.00	0.00	30.73	0.00	0.00	-3.75	-14.12
Max.	22.44	92.30	83.83	100.00	86.28	4,820.15	28.46	20.27	27.74

The average CoE for the sample was 10.85%, with a minimum value of 4.82% and a maximum value of 22.44%, indicating significant variability in the cost of equity among the sample of 1,115 firms between 2014 and 2023. This variation was to be expected as the sample covered companies from both developed and developing economies, where companies in the former may be considered lower risk, whereas those in the latter tend to face higher risk and financing costs.

The average Environmental Disclosure (ED) score was 45.21, followed by Social Disclosure (SD) at 33.68 and Governance Disclosure (GD) at 59.01. Governance disclosure being the highest is logical since corporate governance disclosure is often mandated in many developed countries and several developing countries (Fox, 1999). The minimum disclosure scores for ED, SD, and GD were all 0.00, highlighting that some firms had not engaged in any disclosure practices in some of the years. The maximum disclosures showed GD with a maximum score of 100.00, ED with 92.30, and SD with 83.83. The average aggregate ESG disclosure score (ESGD) was 54.98, with a minimum of 30.73 and a maximum of 86.28, indicating a relatively consistent level of overall ESG disclosure among firms, though with some variability.

The average size of companies in this sample, based on total assets, was approximately \$90.43 billion, while the largest company had total assets amounting to \$4,820.15 billion. The vast difference in company sizes was reasonable given that the sample included firms from both developed and developing countries. In terms of leverage, measured as Net Debt to EBITDA, the average ratio was 1.91, with a minimum of -3.75 and a maximum of 20.27. The negative minimum reflected firms that held more cash than debt, resulting in a net cash position, while the positive maximum reflected firms with high debt relative to their earnings. The average Price-to-Book (PB) ratio was 2.87, indicating that, on average, market prices were approximately three times the book value of the firms. Finally, the average Return on Assets (ROA) was 4.78%, with a minimum of -14.12% and a maximum of 27.74%, indicating a broad spectrum of profitability among firms in the sample.

4.2 Correlation Analysis

Table 3 presented the Pearson correlation matrix for the variables in the study. The correlations between CoE and ED, SD, and ESGD were positive and significant but marginal, each being less than 10%. This positive correlation at the bivariate level did not necessarily indicate that ESG disclosure increases CoE, as it may reflect a selection effect whereby firms with higher financing costs were more motivated to disclose ESG information to signal transparency and reduce investor uncertainty. Conversely, the correlation between CoE and GD was significantly negative at 7.1%, which was directionally consistent with our hypothesis that governance disclosure reduces CoE. Among the control variables, ROA had a negative and significant correlation with CoE at -14.1%, indicating that higher profitability was associated with a lower cost of equity. Similarly, PB had a significant negative correlation with CoE at -12.9%, suggesting that firms with higher growth potential enjoyed lower equity financing costs. Firm size was positively and significantly associated with CoE, while LEV showed a small positive but significant correlation, consistent with the notion that higher leverage is associated with greater financial risk. It is important to note that all correlations were relatively low in magnitude, suggesting no serious multicollinearity concerns, which was further confirmed by the VIF tests reported in Table 13.

Table 2. Pearson Correlation Matrix

	CoE	ED	SD	GD	ESGD	SIZE	PB	LEV	ROA
CoE	1.000								
ED	0.046*	1.000							
SD	0.092*	0.272*	1.000						
GD	-0.071*	-0.079*	0.150*	1.000					
ESGD	0.090*	0.667*	0.642*	0.323*	1.000				
SIZE	0.029*	-0.117*	0.002	0.114*	0.010	1.000			
PB	-0.129*	0.007	0.0005	0.137*	0.042*	-0.097*	1.000		
LEV	0.015	0.026*	0.024*	0.071*	0.049*	-0.087*	-0.076*	1.000	
ROA	-0.141*	0.033*	-0.017	0.027*	0.018	-0.138*	0.407*	-0.253*	1.000

Note 1: * $p < 0.05$ significance levels.

4.3 Paired Sample T-Test

Following the descriptive statistics in Section 4.1 and correlation analysis in Section 4.2, Table 4 was referred to in answering RQ1 on the trends of ESG disclosure. Table 4 presented paired sample t-tests comparing the means of CoE and ESG disclosure scores between 2014 and 2023, divided into three panels: Panel A for the overall sample of 42 countries, Panel B for developed countries, and Panel C for developing countries.

Table 3. Paired sample t-test from 2014 to 2023 for CoE and ESG Disclosure

Panel A: All countries	Means		T-Test
	2014	2023	2014-2023
CoE	10.57	11.07	-4.79**
ED	33.69	50.77	-23.76**
SD	25.43	37.22	-19.74**
GD	54.05	69.22	-12.73**
ESGD	45.01	63.13	-72.98**
Panel B: Developed Countries	Means		T-Test
	2014	2023	2014-2023
CoE	10.48	10.71	-2.39**
ED	33.73	50.05	-20.26**
SD	25.16	35.79	-16.13**
GD	58.35	74.41	-11.98**
ESGD	45.44	63.14	-66.86**
Panel C: Developing Countries	Means		T-Test
	2014	2023	2014-2023
CoE	10.97	12.73	-5.93**
ED	33.53	54.06	-13.28**
SD	26.66	43.77	-12.63**
GD	34.28	45.33	-4.37**
ESGD	43.05	63.08	-30.59**

Note 2: * $p < 0.1$, ** $p < 0.05$ significance levels.

For the overall sample of 42 countries, significant trends were observed from 2014 to 2023. The mean CoE increased from 10.57 in 2014 to 11.07 in 2023, with a significant change indicated by a p-value of less than 5%. ED scores increased significantly from 33.69 to 50.77, an increase of 51 percent. This was followed by SD scores, which rose from 25.43 to 37.22, an increase of 47 percent. GD scores

increased from 54.05 to 69.22, an increase of 28 percent. The aggregate ESG Disclosure (ESGD) score saw a notable rise from 45.01 to 63.13, an increase of 41 percent, reflecting a substantial and highly significant increase in overall ESG disclosures over the ten-year period.

In developed countries, as indicated in Panel B, the mean CoE rose slightly from 10.48 to 10.71, a 3 percent increase that was statistically significant. In developing countries, shown in Panel C, the mean CoE increased more substantially from 10.97 in 2014 to 12.73 in 2023, an 18 percent increase. In both developed and developing countries, the ED, SD, GD, and ESGD scores increased significantly over the period.

When comparing the means across the panels, several trends emerged. ED and SD scores showed parallel growth in both developed and developing countries. ED increased by 49 percent in developed countries and 62 percent in developing countries over the decade, while SD increased by 43 percent in developed countries and 62 percent in developing countries. Notably, although developed countries had a marginally higher average ED in 2014, companies in developing countries showed a more rapid rate of increase over the decade, resulting in a slightly higher average ED by 2023. A similar pattern was observed for SD.

On the other hand, GD showed a significant gap between developed and developing countries. In 2014, the mean GD score was 58.35 in developed countries, compared to 34.28 in developing countries. By 2023, this gap widened further, with developed countries reaching a mean GD score of 74.41 while developing countries had a mean of 45.33. This disparity likely reflected more established governance regulations and guidelines in developed countries. The increase in GD over the decade was 28 percent in developed countries and 33 percent in developing countries, suggesting that developing country firms were making efforts to close the governance disclosure gap, albeit from a significantly lower starting point.

While Table 4 established significant differences between the beginning and end of the sample period, it did not formally examine disclosure trends across all ten years. Therefore, Table 5 reported firm fixed-effects regressions in which ED, SD, GD, and ESGD were each regressed on a linear time trend covering 2014 to 2023, with standard errors clustered at the firm level.

Table 4. Firm fixed-effects estimates of annual ESG disclosure trends, 2014–2023

Disclosure measure	All countries	Developing countries	Developed countries	Developed – Developing
ED	2.049*** (0.076)	2.243*** (0.161)	2.007*** (0.085)	–0.236 (0.182)
SD	1.431*** (0.066)	1.900*** (0.145)	1.329*** (0.073)	–0.571*** (0.163)
GD	1.990*** (0.136)	1.261*** (0.307)	2.148*** (0.151)	0.887*** (0.343)
ESGD	2.085*** (0.029)	2.213*** (0.075)	2.058*** (0.032)	–0.155* (0.082)

Note 3: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$ significance levels.

The results confirmed that all four disclosure measures increased significantly over time across all countries, developed countries, and developing countries. The annual rate of increase in ESGD was 2.085 points per year for all countries, 2.058 for developed countries, and 2.213 for developing countries, all highly significant. Importantly, the pooled interaction tests in the final column revealed that the annual rate of increase in SD was significantly faster in developing countries than in developed countries, while GD increased significantly faster in developed countries. These findings confirmed that while both country groups were improving their ESG disclosures, the patterns differed across disclosure dimensions, with developing countries showing stronger momentum in environmental and social disclosure and developed countries maintaining a faster pace of governance disclosure improvement.

4.4 Dynamic Panel Model Analysis

This section addressed RQ2 by examining whether ESG disclosures reduce the cost of equity (CoE) in developed and developing countries, utilizing system GMM estimators. As a preliminary step, Tables 6 and 7 presented the comparison between Pooled OLS, Fixed Effects, and Difference GMM coefficients for Models 1 and 2, respectively, to determine the appropriate GMM estimator.

Table 5. Choice between Difference and System GMM (Model 1: for separate E, S, G disclosure scores)

	Pooled OLS	Fixed Effects	Difference GMM
L.CoE	0.667** (0.008)	0.269** (0.010)	-0.263** (0.016)
Time effects	Yes	Yes	Yes
Observations	10035	10035	8920

Note 4: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$ significance levels.

Table 6. Choice between Difference and System GMM (Model 2: for overall ESG disclosure score)

	Pooled OLS	Fixed Effects	Difference GMM
L.CoE	0.671** (0.008)	0.270** (0.010)	-0.258** (0.017)
Time effects	Yes	Yes	Yes
Observations	10035	10035	8920

Note 5: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$ significance levels.

In both models, the coefficient of the lagged CoE from the difference GMM fell below that of the fixed effects estimator, and outside the bounds established by the fixed effects and pooled OLS estimators. Specifically, in Model 1 the difference GMM coefficient was -0.263, which was below the fixed effects coefficient of 0.269, and in Model 2 the difference GMM coefficient was -0.258, which was similarly below the fixed effects coefficient of 0.270. Following the selection criteria of Blundell and Bond (1998) and Bond (2002), system GMM was therefore employed for both models.

Model 1: Individual ESG Disclosure Components

Table 8 presented the System GMM regression results for Model 1, which examined the individual effects of ED, SD, and GD on CoE across all countries, developed countries, and developing countries. The validity of the GMM specification was supported by the diagnostic tests. The AR(2) tests confirmed the absence of second-order serial correlation across all subsamples, with p-values of 0.748 for all countries, 0.711 for developed countries, and 0.591 for developing countries, all well above the 0.05 threshold. The Hansen test p-values were 0.402 for all countries and 0.708 for developed countries, indicating valid instruments. For the developing country subsample, the Hansen test p-value of 0.002

should be interpreted with caution, as the relatively small number of groups ($n = 199$) may limit the reliability of the overidentification test in this context. Nonetheless, the AR(2) results confirmed the fundamental validity of the GMM specification for this subsample.

Table 7. Model 1: System GMM results for separate E, S, and G disclosure scores

	All countries	Developed countries	Developing countries
L.COE	1.035** (0.169)	0.913** (0.120)	1.470** (0.348)
L2.COE	-0.287 (0.526)	-0.281 (0.345)	-1.650 (1.058)
L3.COE	0.257 (0.692)	0.365 (0.440)	1.285 (1.081)
ED	-0.003 (0.002)	-0.002 (0.002)	-0.012 (0.009)
SD	0.000 (0.002)	0.001 (0.002)	-0.007 (0.009)
GD	-0.003** (0.001)	-0.002** (0.001)	-0.003 (0.003)
SIZE	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)
PB	0.027 (0.018)	0.027* (0.014)	0.009 (0.037)
LEV	0.010 (0.014)	0.026* (0.014)	-0.081 (0.066)
ROA	-0.033** (0.011)	-0.037** (0.009)	-0.026 (0.033)
PAN	0.874** (0.157)	0.842** (0.139)	1.093** (0.266)
Constant	0.000 (.)	0.000 (.)	0.000 (.)
AR(1)	0.002	0.000	0.152
AR(2)	0.748	0.711	0.591
Hansen test	0.402	0.708	0.002
Sargan test	0.242	0.569	0.001
Number of instruments	11	11	11
Number of groups	1115	916	199
GMM Type	system	system	system
Two-Step	twostep	twostep	twostep
Robust	robust	robust	robust

Note 6: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$ significance levels.

Regarding the ESG disclosure components, GD emerged as the only individual component with a statistically significant negative effect on CoE. The coefficient for GD was -0.003 and significant at the 5% level for all countries, and -0.002 and significant at the 5% level for developed countries. In developing countries, the coefficient for GD was -0.003 but not statistically significant. These results provided partial support for H3, suggesting that governance disclosure was valued by equity providers globally and particularly in developed markets. The finding that governance disclosure was the most consistently valued ESG component was consistent with evidence from Ramirez et al. (2022), who similarly found a significant negative relationship between governance scores and cost of capital among

Latin American firms, and with Lou et al. (2025), who showed that governance-related information uncertainty increases CoE.

In contrast, neither ED nor SD demonstrated a statistically significant effect on CoE in any of the three subsamples. The coefficients for ED were -0.003 for all countries, -0.002 for developed countries, and -0.012 for developing countries, none of which were statistically significant. Similarly, the coefficients for SD were 0.000, 0.001, and -0.007 for all countries, developed countries, and developing countries, respectively, all non-significant. These results did not support H1 or H2, suggesting that individual environmental and social disclosures were not perceived by equity providers as sufficient signals to reduce financing costs when considered in isolation. This was consistent with Clarkson et al. (2010) and Déjean and Martinez (2009), who similarly found no significant effect of environmental disclosure on CoE, and may reflect the argument that investors require a more comprehensive ESG disclosure signal rather than individual component disclosures to meaningfully reduce information asymmetry.

Regarding the control variables, ROA showed a consistent and significant negative association with CoE for all countries (-0.033, $p < 0.05$) and developed countries (-0.037, $p < 0.05$), though not for developing countries. This suggested that financial performance remains a primary determinant of equity financing costs for investors, particularly in developed markets. The COVID-19 pandemic dummy (PAN) was positive and significant across all subsamples, with coefficients of 0.874 for all countries, 0.842 for developed countries, and 1.093 for developing countries, confirming that the pandemic substantially increased the cost of equity across all regions, with a more pronounced effect in developing countries. Firm size (SIZE) showed a weakly significant negative effect for all countries, while PB was weakly significant and positive for developed countries only, suggesting that growth potential carried a modest positive risk premium in developed markets. LEV showed a weakly significant positive effect in developed countries, consistent with the expectation that higher leverage is associated with greater financial risk.

Model 2: Aggregate ESG Disclosure

Table 9 presented the System GMM regression results for Model 2, which examined the effect of aggregate ESGD on CoE. The AR(2) tests confirmed the absence of second-order serial correlation across all subsamples, with p-values of 0.569, 0.552, and 0.459 for all countries, developed countries, and developing countries, respectively. The Hansen test p-values were 0.494 for all countries and 0.649 for developed countries, indicating valid instruments. As with Model 1, the Hansen test for the developing country subsample ($p = 0.003$) should be interpreted with caution given the small sample size, though the AR(2) results supported the fundamental validity of the specification.

Table 8. Model 2: System GMM results for overall ESG disclosure score

	All countries	Developed countries	Developing countries
L.COE	1.320** (0.437)	1.045** (0.193)	1.525** (0.464)
L2.COE	0.285 (1.145)	-0.083 (0.483)	-2.016* (1.178)
L3.COE	-0.425 (1.481)	0.163 (0.603)	1.803 (1.130)
ESGD	-0.042* (0.023)	-0.028** (0.011)	-0.058** (0.027)
SIZE	-0.000** (0.000)	-0.000** (0.000)	-0.000* (0.000)
PB	0.057 (0.045)	0.039* (0.020)	0.026 (0.049)
LEV	0.010 (0.018)	0.029* (0.015)	-0.069 (0.080)
ROA	-0.035** (0.015)	-0.035** (0.009)	-0.021 (0.039)
PAN	0.830** (0.239)	0.850** (0.147)	1.156** (0.329)
Constant	0.000 (.)	0.000 (.)	0.000 (.)
AR(1)	0.000	0.000	0.113
AR(2)	0.569	0.552	0.459
Hansen test	0.494	0.649	0.003

	All countries	Developed countries	Developing countries
Sargan test	0.338	0.488	0.001
Number of instruments	9	9	9
Number of groups	1115	916	199
GMM Type	system	system	system
Two-Step	twostep	twostep	twostep
Robust	robust	robust	robust

Note 7: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$ significance levels.

The coefficient for aggregate ESGD was negative and statistically significant across all three subsamples. For all countries, the coefficient was -0.042 and significant at the 10% level, indicating that higher overall ESG disclosure was associated with a reduction in CoE. For developed countries, the coefficient was -0.028 and significant at the 5% level, and for developing countries, the coefficient was -0.058 and significant at the 5% level. These results provided full support for H4, confirming that aggregate ESG disclosure consistently reduces CoE across both developed and developing markets. The stronger effect in developing countries (-0.058 vs -0.028) suggested that comprehensive ESG disclosure carried greater informational value in markets where information asymmetry is typically higher, consistent with Dhaliwal et al. (2014) and Matthiesen and Salzmann (2017), who found that ESG disclosure effects were stronger in contexts characterised by greater information needs.

The finding that ESGD was significant in all three subsamples, while individual ESG components were largely not, suggested that equity providers responded more favourably to the holistic signal provided by comprehensive ESG disclosure than to individual disclosure dimensions in isolation. This was an important practical insight: companies seeking to reduce their CoE through ESG disclosure should focus on developing a comprehensive and balanced disclosure profile across all three dimensions rather than emphasising any single component.

Regarding control variables in Model 2, ROA remained negative and significant for all countries (-0.035, $p < 0.05$) and developed countries (-0.035, $p < 0.05$), though not for developing countries, consistent with Model 1 findings. SIZE showed a negative and significant effect across all three subsamples, suggesting that larger firms enjoyed lower CoE. PAN was consistently positive and significant across all regions, confirming the pandemic's adverse effect on equity financing costs. PB showed a weakly significant positive effect in developed countries only, consistent with the Model 1 findings. LEV showed a weakly significant positive effect in developed countries, further supporting the expected positive relationship between leverage and CoE.

Table 10 summarised the outcomes of the four hypotheses across the three subsamples.

Table 10. Hypothesis Outcome Summary

Hypothesis	All Countries	Developed Countries	Developing Countries	Overall Verdict
H1: ED negatively related to CoE	Not supported	Not supported	Not supported	Not supported
H2: SD negatively related to CoE	Not supported	Not supported	Not supported	Not supported
H3: GD negatively related to CoE	Supported ($p < 0.05$)	Supported ($p < 0.05$)	Not supported	Partially supported
H4: ESGD negatively related to CoE	Supported ($p < 0.10$)	Supported ($p < 0.05$)	Supported ($p < 0.05$)	Fully supported

Robustness Checks

To formally test whether the effects of ESG disclosure on CoE differ significantly between developed and developing countries, Table 11 presented pooled interaction models in which each ESG disclosure variable was interacted with the country development dummy (DEV). The interaction results in Table 11 showed that none of the ED, SD, or GD interaction terms with the developed country dummy were statistically significant in Model 1, suggesting that the effects of individual ESG components on CoE did not differ significantly between developed and developing countries. For Model 2, the ESGD interaction term with the developed country dummy was also not significant, indicating that the aggregate ESG disclosure effect did not differ significantly between the two country groups.

Table 9: Pooled interaction

	Model1	Model2
L.COE	1.037** (0.166)	1.309** (0.406)
L2.COE	-0.280 (0.516)	0.255 (1.063)
L3.COE	0.246 (0.678)	-0.385 (1.370)
ED	-0.003 (0.004)	

	Model1	Model2
SD	0.003 (0.005)	
GD	-0.003 (0.002)	
ED × developed country	0.001 (0.004)	
SD × developed country	-0.003 (0.005)	
GD × developed country	0.001 (0.002)	
ESGD		-0.043* (0.025)
ESGD × developed country		0.002 (0.004)
SIZE	-0.000* (0.000)	-0.000** (0.000)
PB	0.028 (0.018)	0.056 (0.041)
LEV	0.010 (0.014)	0.010 (0.018)
ROA	-0.033** (0.011)	-0.035** (0.015)
PAN	0.870** (0.154)	0.837** (0.222)

	Model1	Model2
Constant	0.000	0.000
	(.)	(.)
AR(1)	0.001	0.000
AR(2)	0.734	0.556
Hansen test	0.421	0.501
Sargan test	0.260	0.344
Number of instruments	14	10
Number of groups	1115	1115
GMM Type	system	system
Two-Step	twostep	twostep
Robust	robust	robust

Note 8: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$ significance levels.

Table 12 further summarised the formal tests of differences between developed and developing country effects. This was further confirmed by Table 12, which showed that the developed minus developing difference in the ESGD effect had a p-value of 0.20, indicating no statistically significant difference. For individual components, the ED difference had a p-value of 0.03, suggesting a marginally significant difference, while the GD difference had a p-value of 0.07, suggesting a weakly significant difference. These results indicated that while the direction of ESG disclosure effects was broadly similar across developed and developing countries, there were some marginally significant differences in the magnitude of governance and environmental disclosure effects, warranting further investigation in future research.

Table 12: Formal tests of differences between developed and developing countries

Variable	Developing-country effect	Developed-country effect	Developed – developing difference	Difference p-value
ED	-0.003	-0.0027	0.0007	0.03
SD	0.003	-0.0004	-0.003	0.41
GD	-0.003	-0.002**	0.006	0.07
ESGD	-0.043*	-0.041*	0.002	0.20

Note 9: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$ significance levels.

Additional robustness checks reported in Tables 13 and 14 confirmed that all variables were stationary at level form (Table 14), and that no multicollinearity issues existed across all models, with mean VIF values of 1.15 and 1.22 for Models 1 and 2, respectively (Table 13).

Table 13. Variance Inflation Factor (VIF) for Multicollinearity test

Variable	Model 1	Model 2
ED	1.16	
SD	1.13	
GD	1.10	
ESGD		1.35
SIZE	1.07	1.04
PB	1.23	1.20
LEV	1.10	1.09
ROA	1.30	1.30
PAN	1.10	1.35
Mean VIF	1.15	1.22

Table 14. Im-Pesaran Shin Unit Root Test

Variable	I(0)
COE	-8.499***
ED	-8.340***
SD	-7.329***
GD	-4.198***
ESGD	-8.288***
SIZE	-2.626***
PB	-5.278***
LEV	-4.320***
ROA	-4.466***

5. CONCLUSION AND POLICY IMPLICATIONS

This study comprehensively examined the relationship between SR represented by ESG disclosures and the CoE across both developed and developing countries. The results provided nuanced insights into how ESG disclosures influenced CoE, contributing significantly to the existing literature and offering practical implications for corporations and policymakers.

Addressing RQ1 on the trend analysis, the analysis showed that both developed and developing countries had significantly improved their ESG disclosures over the study period. The substantial improvement of ED, SD, and GD, as well as ESGD, was indicative of companies all over the world taking sustainability reporting seriously. This could be due to the demands of their stakeholders, which tended to be in line with Freeman's (1984) view of the importance of stakeholders.

However, CoE was decided by shareholders, who were the equity providers and not various stakeholders. The findings revealed that when examining individual ESG disclosure components, governance disclosure (GD) emerged as the only component with a significant negative effect on CoE, both globally and in developed countries. Environmental and social disclosures did not demonstrate a significant individual effect on CoE in any subsample. These results suggested that equity providers responded selectively to individual ESG components, valuing governance transparency above environmental and social disclosures when considered in isolation. Financial performance, as measured by ROA, remained a significant and consistent determinant of CoE globally and in developed countries, broadly consistent with Friedman's (1970) argument about companies focusing on financial performance for shareholders'

interests, though this interpretation remained tentative given that formal cross-group tests did not reveal statistically significant differences between developed and developing countries.

In terms of aggregate ESGD, that is, sustainability reporting as a whole, the findings revealed that overall ESG disclosure significantly reduced CoE across all countries, developed countries, and developing countries. This suggested that equity providers responded more favourably to the comprehensive signal provided by aggregate ESG disclosure than to individual components in isolation. In developed countries, financial performance as measured by ROA and growth potential as measured by PB also contributed to lower CoE, indicating that equity providers in these markets considered both financial and non-financial indicators when assessing risk. These findings were broadly more consistent with Freeman's (1984) stakeholder theory, as comprehensive ESG disclosure was valued across all market contexts, though the relative importance of financial indicators suggested that Friedman's (1970) perspective remained relevant, particularly for individual ESG components.

In developing countries, aggregate ESGD had a stronger negative effect on CoE (-0.058) compared to developed countries (-0.028), suggesting that comprehensive ESG disclosure carried greater informational value in markets where information asymmetry is typically higher. This was promising as shareholders in developing countries seemed to have recognized the value of comprehensive sustainability reporting. Thus, in the context of developing countries, the findings were more consistent with Freeman's (1984) stakeholder theory when ESG information was reported holistically. However, it is important to note that individual disclosure of ED, SD, and GD did not significantly reduce CoE in developing countries, indicating that investors in these markets require a comprehensive and balanced ESG disclosure profile rather than isolated disclosure on individual components.

In terms of contributions, this study made several notable additions to the existing literature. First, unlike most prior studies that focus on a single country or region, this study employed a large cross-country panel dataset spanning 42 countries and ten years (2014–2023), encompassing both developed and developing economies, which enabled a more comprehensive and comparative assessment of the ESG disclosure–CoE relationship across diverse institutional and regulatory contexts. Second, this study examined the individual and aggregate effects of ESG disclosure components, namely environmental, social, and governance, on CoE separately, providing a more granular understanding of which dimensions of sustainability reporting are valued by equity providers. Third, by applying system GMM estimation, this study addressed endogeneity concerns that had been largely overlooked in prior studies. Fourth, the study period captured a critical phase of sustainability reporting evolution, including the COVID-19 pandemic period (2020–2023), enabling analysis of ESG disclosure trends and their financial implications in a period of heightened uncertainty.

The results of this study had several implications for regulators and policymakers in developed and developing countries. A "one-size-fits-all" approach did not seem to be appropriate in terms of sustainability reporting regulation. Even though both developed and developing countries had shown improvement in ESG disclosures over the ten-year period, shareholders did not seem to respond uniformly to these disclosures. Therefore, regulators should carefully consider the consequences to companies and should not impose regulations without taking into account the benefits and costs to companies as well as their stakeholders. For example, if shareholders perceive non-financial disclosures

as costs, then companies would not attain the benefits of reduced CoE. More importantly, regulations that are deemed effective in developed countries may not be equally effective in developing countries, and vice versa. Rather than mandating blanket ESG disclosure requirements, policymakers should consider encouraging disclosure practices that are contextually appropriate and that align with the information needs of investors in their respective markets.

The findings of this study should also be of interest and beneficial to companies in developed and developing countries. This study explained that governance disclosure was valued globally and in developed countries in terms of reducing CoE for individual ESG components, while comprehensive aggregate ESG disclosure reduced CoE across all markets. Therefore, if companies want to aim for lower CoE, they should prioritise governance transparency as a baseline and develop a comprehensive and balanced ESG disclosure profile across all three dimensions. Companies in developing countries should be particularly aware that the reduction in CoE is most effectively achieved through comprehensive ESGD rather than focusing on individual disclosure dimensions, that is, ED, SD, or GD, in isolation. Nevertheless, they cannot forsake their financial performance measures.

The above findings should be of interest to future researchers as they offered preliminary, descriptive insights into the circumstances under which Friedman's (1970) and Freeman's (1984) perspectives appear more applicable. In general, in relation to equity providers, the former viewpoint seemed to prevail as shareholders still focus on profit. However, in terms of ESGD in developing countries, the evidence was more consistent with the latter. Thus, even though countries seemed to have become more advanced in terms of sustainability reporting, future research may be interested to discover the reasons why equity providers still do not view individual ESG components favourably, particularly in developing countries.

Despite the above contributions, this study acknowledged several limitations that should be considered when interpreting the findings. First, the sample was subject to survivorship and large-firm selection bias, as only firms with complete data across all variables for the full study period were included, and Bloomberg ESG coverage tends to skew towards larger and more prominent firms, which may limit the generalisability of the findings. Second, the cost of equity was measured using a single market-based proxy derived from the CAPM framework, and the use of alternative implied cost of equity measures may yield different results. Third, Bloomberg ESG scores reflect the extent of disclosure rather than the quality of the underlying ESG practices, meaning that higher scores indicate greater transparency but do not necessarily imply superior sustainability performance. Fourth, the developing country subsample comprised only 199 firms, which may constrain the robustness and representativeness of the developing country findings. Fifth, while GMM estimation mitigates endogeneity concerns, the associational nature of the evidence means that causal inferences should be drawn with caution.

Future research could build on these findings by exploring the dynamic and non-linear relationships between ESG disclosures and CoE over more extended periods and across more diverse economic settings. Moreover, examining the impact of specific ESG initiatives and policies on financial performance would provide deeper insights into the mechanisms through which sustainability practices influence corporate finance. Future research may also benefit from incorporating alternative CoE proxies, expanding the developing country sample, and employing quasi-experimental designs to establish more robust causal relationships. By addressing these areas, future research can continue to enhance our

understanding of the financial implications of ESG disclosures and support the development of more effective sustainability reporting frameworks globally.

6. ETHICS STATEMENT

The authors declare that this research did not involve human or animal subjects. All data used in this study were obtained from publicly available secondary sources and databases. No experimental procedures, human participants, or animal subjects were involved in this research. Therefore, no institutional ethics committee approval was required.

7. CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

8. AUTHORS' CONTRIBUTIONS

A. A. Ousama: Conceptualisation, methodology, and writing – original draft; **A. H. Fatima:** Conceptualisation and writing – review and editing; **Labeeba Ahmed:** Data collection, formal analysis, and writing – original draft; **Amna Riaz:** Data collection, formal analysis, and writing – original draft.

9. DECLARATION OF GENERATIVE AI IN THE WRITING PROCESS

During the preparation of this work, the author(s) used Claude and ChatGPT to improve the readability and language quality of the work and to check the references. After using these tools/services, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

10. DATA AVAILABILITY/SUPPLEMENTARY MATERIALS

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

11. REFERENCES

- Akin, I., & Akin, M. (2026). Mandated ESG disclosure and its effects on earnings quality and cost of capital: Evidence from European stock markets. *Corporate Social Responsibility and Environmental Management*, 33(2), 2196–2209. <https://doi.org/10.1002/csr.70280>
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58(2), 277–297. <https://doi.org/10.2307/2297968>
- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29–51. [https://doi.org/10.1016/0304-4076\(94\)01642-D](https://doi.org/10.1016/0304-4076(94)01642-D)

- Becchetti, L., Cucinelli, D., Ielasi, F., & Rossolini, M. (2023). Corporate social irresponsibility: The relationship between ESG misconduct and the cost of equity. *International Review of Financial Analysis*, 89, Article 102833. <https://doi.org/10.1016/j.irfa.2023.102833>
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143. [https://doi.org/10.1016/S0304-4076\(98\)00009-8](https://doi.org/10.1016/S0304-4076(98)00009-8)
- Bond, S. R. (2002). Dynamic panel data models: A guide to micro data methods and practice. *Portuguese Economic Journal*, 1(2), 141–162. <https://doi.org/10.1007/s10258-002-0009-9>
- Bozec, Y., & Bozec, R. (2011). Corporate governance quality and the cost of capital. *International Journal of Corporate Governance*, 2(3/4), 217–236. <https://doi.org/10.1504/IJCG.2011.044376>
- Chen, Y., Li, T., Zeng, Q., & Zhu, B. (2023). Effect of ESG performance on the cost of equity capital: Evidence from China. *International Review of Economics & Finance*, 83, 348–364. <https://doi.org/10.1016/j.iref.2022.09.001>
- Chouaibi, Y., Rossi, M., & Zouari, G. (2021). The effect of corporate social responsibility and the executive compensation on implicit cost of equity: Evidence from French ESG data. *Sustainability*, 13(20), Article 11510. <https://doi.org/10.3390/su132011510>
- Clarkson, P., Fang, X., Li, Y., & Richardson, G. D. (2010). The relevance of environmental disclosures for investors and other stakeholder groups: Are such disclosures incrementally informative? SSRN. <https://doi.org/10.2139/ssrn.1687475>
- Déjean, F., & Martinez, I. (2009). Environmental disclosure and the cost of equity: The French case. *Accounting in Europe*, 6(1), 57–80. <https://doi.org/10.1080/17449480902896403>
- Dhaliwal, D., Li, O. Z., Tsang, A., & Yang, Y. G. (2014). Corporate social responsibility disclosure and the cost of equity capital: The roles of stakeholder orientation and financial transparency. *Journal of Accounting and Public Policy*, 33(4), 328–355. <https://doi.org/10.1016/j.jaccpubpol.2014.04.006>
- Dhaliwal, D. S., Li, O. Z., Tsang, A., & Yang, Y. G. (2011). Voluntary non-financial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. *The Accounting Review*, 86(1), 59–100. <https://doi.org/10.2308/accr.00000005>
- El Ghoul, S., Guedhami, O., Kwok, C. C. Y., & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of Banking & Finance*, 35(9), 2388–2406. <https://doi.org/10.1016/j.jbankfin.2011.02.007>
- Elbannan, M. A., & Elbannan, M. A. (2015). Economic consequences of bank disclosure in the financial statements before and during the financial crisis. *Journal of Accounting, Auditing & Finance*, 30(2), 181–217. <https://doi.org/10.1177/0148558X14552723>
- Filbeck, G., & Gorman, R. F. (2004). The relationship between the environmental and financial performance of public utilities. *Environmental and Resource Economics*, 29(2), 137–157. <https://doi.org/10.1023/B:EARE.0000044602.86367.ff>
- Fox, M. B. (1999). Required disclosure and corporate governance. *Law and Contemporary Problems*, 62(3), 113–127. <https://doi.org/10.2307/1192228>
- Francis, J. R., Khurana, I. K., & Pereira, R. (2005). Disclosure incentives and effects on cost of capital around the world. *The Accounting Review*, 80(4), 1125–1162. <https://doi.org/10.2308/accr.2005.80.4.1125>
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

- Friedman, M. (1970, September 13). The social responsibility of business is to increase its profits. *The New York Times Magazine*, 32–33, 122–126.
- Gonçalves, R. de S., Medeiros, O. R. de, Niyama, J. K., & Weffort, E. F. J. (2013). Social disclosure e custo de capital próprio em companhias abertas no Brasil. *Revista Contabilidade & Finanças*, 24(61), 113–124. <https://doi.org/10.1590/S1519-70772013000200003>
- Gunawan, J. (2015). Corporate social disclosures in Indonesia: Stakeholders' influence and motivation. *Social Responsibility Journal*, 11(3), 535–552. <https://doi.org/10.1108/SRJ-04-2014-0048>
- Houqe, M. N., Ahmed, K., & Richardson, G. (2020). The effect of environmental, social, and governance performance factors on firms' cost of debt: International evidence. *The International Journal of Accounting*, 55(3), Article 2050014. <https://doi.org/10.1142/S1094406020500146>
- Idowu, S. O., & Papasolomou, I. (2007). Are the corporate social responsibility matters based on good intentions or false pretences? An empirical study of the motivations behind the issuing of CSR reports by UK companies. *Corporate Governance: The International Journal of Business in Society*, 7(2), 136–147. <https://doi.org/10.1108/14720700710739787>
- Iqbal, M. A., Sarkar, M. A. R., Alharthi, M., Jalal, M. J. E., Rahman, M. N., & Yang, Y. (2025). Effect of integrated reporting quality disclosure on cost of equity capital in developed markets: Exploring the moderating role of corporate governance quality. *PLOS ONE*. <https://doi.org/10.1371/journal.pone.0324147>
- Jafar, R., Basuki, B., Windijarto, W., Setiawan, R., & Yaacob, Z. (2024). Environmental, social and governance (ESG) disclosure and cost of equity: The moderating effects of board structures. *Cogent Business & Management*, 11(1). <https://doi.org/10.1080/23311975.2024.2429794>
- Khanchel, I., & Lassoued, N. (2022). ESG disclosure and the cost of capital: Is there a ratcheting effect over time? *Sustainability*, 14(15), Article 9237. <https://doi.org/10.3390/su14159237>
- La Rosa, F., & Bernini, F. (2022). ESG controversies and the cost of equity capital of European listed companies: The moderating effects of ESG performance and market securities regulation. *International Journal of Accounting & Information Management*, 30(5), 641–663. <https://doi.org/10.1108/IJAIM-03-2022-0047>
- Lima Crisóstomo, V., de Souza Freire, F., & Cortes de Vasconcellos, F. (2011). Corporate social responsibility, firm value and financial performance in Brazil. *Social Responsibility Journal*, 7(2), 295–309. <https://doi.org/10.1108/174711111111141549>
- Lopes, A. B., & de Alencar, R. C. (2010). Disclosure and cost of equity capital in emerging markets: The Brazilian case. *The International Journal of Accounting*, 45(4), 443–464. <https://doi.org/10.1016/j.intacc.2010.09.003>
- Lou, Z., Li, S., Tong, J., & Zhao, J. (2025). ESG rating disagreement and the cost of equity capital. *Global Finance Journal*, 66, Article 101123. <https://doi.org/10.1016/j.gfj.2025.101123>
- Matten, D. (2012). Why do companies engage in corporate social responsibility? Background, reasons and basic concepts. In J. Hennigfeld, M. Pohl, & N. Tolhurst (Eds.), *The ICCA handbook on corporate social responsibility* (pp. 1–46). Wiley. <https://doi.org/10.1002/9781119202110.ch1>
- Matthiesen, M.-L., & Salzmänn, A. J. (2017). Corporate social responsibility and firms' cost of equity: How does culture matter? *Cross Cultural & Strategic Management*, 24(1), 105–124. <https://doi.org/10.1108/CCSM-11-2015-0169>
- Mhiri, C., & Ajina, A. (2026). Corporate SDG performance and the cost of equity capital. *Journal of Financial Reporting and Accounting*, 1–19. <https://doi.org/10.1108/JFRA-07-2025-0565>

- Mohamed, T., & Faouzi, J. (2014). Does corporate environmental disclosure affect the cost of capital? Evidence from Tunisian companies. *Global Journal of Management and Business Research*, 14(4), 1–8.
- Moneva, J. M., & Cuellar, B. (2009). The value relevance of financial and non-financial environmental reporting. *Environmental and Resource Economics*, 44(3), 441–456. <https://doi.org/10.1007/s10640-009-9294-4>
- Oh, W., & Park, S. (2015). The relationship between corporate social responsibility and corporate financial performance in Korea. *Emerging Markets Finance and Trade*, 51(S3), 85–94. <https://doi.org/10.1080/1540496X.2015.1039903>
- Pellegrini, C. B., Caruso, R., & Mehmeti, N. (2019). The impact of ESG scores on cost of equity and firm's profitability. *New Challenges in Corporate Governance: Theory and Practice*, 3, 71–82.
- Peterdy, K. (2022). ESG (environmental, social and governance). Corporate Finance Institute. <https://corporatefinanceinstitute.com/resources/esg/esg-environmental-social-governance/>
- Piechocka-Kaluźna, A., Tłuczak, A., & Łopatka, P. (2021). The impact of CSR/ESG on the cost of capital: A case study of US companies. *European Research Studies Journal*, 24(3B), 536–546.
- Priem, R., & Gabellone, A. (2024). The impact of a firm's ESG score on its cost of capital: Can a high ESG score serve as a substitute for a weaker legal environment? *Sustainability Accounting, Management and Policy Journal*, 15(3), 676–703. <https://doi.org/10.1108/SAMPJ-05-2023-0254>
- Ramirez, A. G., Monsalve, J., González-Ruiz, J. D., Almonacid, P., & Peña, A. (2022). Relationship between the cost of capital and environmental, social, and governance scores: Evidence from Latin America. *Sustainability*, 14(9), Article 5012. <https://doi.org/10.3390/su14095012>
- Richardson, A. J., & Welker, M. (2001). Social disclosure, financial disclosure and the cost of equity capital. *Accounting, Organizations and Society*, 26(7–8), 597–616. [https://doi.org/10.1016/S0361-3682\(01\)00025-3](https://doi.org/10.1016/S0361-3682(01)00025-3)
- Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal*, 9(1), 86–136. <https://doi.org/10.1177/1536867X0900900106>
- Sareen, V., Upadhyay, P., Bag, S., & Yadav, V. S. (2026). Bridging ESG disclosure and the SDGs: A thematic synthesis of influencing factors. *Business Strategy and the Environment*, 1–22. <https://doi.org/10.1002/bse.70812>
- Vaitiekuniene, R., & Sapkauskiene, A. (2026). Sustainability practices and capital costs: Evidence from banks and financial technology firms in global markets. *International Journal of Financial Studies*, 14(1), Article 20. <https://doi.org/10.3390/ijfs14010020>
- Wu, S., Lin, F., & Wu, C. (2014). Corporate social responsibility and cost of capital: An empirical study of the Taiwan stock market. *Emerging Markets Finance and Trade*, 50(S1), 107–120. <https://doi.org/10.2753/REE1540-496X5001S107>
- Yu, H., Liang, C., Wang, W., & Liu, X. (2025). Does environmental, social, and governance news coverage affect the cost of equity? A textual analysis of media coverage. *Frontiers in Public Health*, 13, Article 1509167. <https://doi.org/10.3389/fpubh.2025.1509167>



© 2026 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY-NC-ND) license (<http://creativecommons.org/licenses/by/4.0/>).