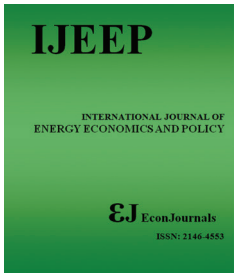

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Enhancing ESG Performance through Corporate Governance: Insights from Emerging Markets

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ABSTRACT

This study examines the impact of corporate governance on Environmental, Social, and Governance (ESG) performance, specifically within the energy sectors of leading firms in Bangladesh and India. As these regions are highly vulnerable to environmental challenges, understanding the role of governance in ESG performance becomes crucial for sustainable energy economics. Using data from the top 50 listed firms across these countries between 2019 and 2021, the research employs content analysis to evaluate ESG disclosure across 26 dimensions, focusing on aspects relevant to energy consumption and management. Findings reveal that corporate governance factors, including board size, presence of independent directors, and female directors, significantly enhance ESG performance. However, the audit committee shows no significant impact. This study emphasizes the importance of robust corporate governance structures in advancing ESG practices in emerging energy markets, offering critical insights for policymakers and corporate managers aiming to improve transparency, accountability, and sustainability in energy-driven economies. The results underscore the need for a comprehensive, region-specific ESG framework to foster sustainable corporate governance across South Asia, particularly within the energy sector.

Keywords: Environmental, Social, and Governance, Corporate Governance, Energy Industry, Energy, Board Diversity
JEL Classifications: G34, M14, Q4, Q43

1. INTRODUCTION

In recent decades, the corporate sector has undergone substantial changes, driven mainly by the global financial crisis, which highlighted the unavoidable interdependence of the global economy. As a result, organizations face increased scrutiny regarding unethical conduct, risk management, oversight, accountability, and strategic stakeholder management skills. Investors are particularly concerned about companies addressing Environmental, Social, and Governance (ESG) issues, which have gained traction as sustainability investing strategies incorporating ESG factors have grown in popularity over the past decade. Incorporating ESG factors into capital allocation decisions can yield positive outcomes for all parties involved. A comprehensive literature review by Koutoupis et al. (2021) on corporate governance and ESG during COVID-19 emphasized the need for further research in developed and emerging markets. Recent studies by Fernandes et al. (2023) and Broadstock et al. (2021) underscored the critical role of ESG in mitigating financial crises and enhancing corporate policy effectiveness. A meta-study by Friede et al. (2015) found that nearly 90% of analyzed scholarly studies demonstrated that businesses with robust sustainability policies also enjoyed better financial performance. KPMG's 2017 survey reported that 78% of the world's largest companies included ESG disclosures in their annual reports, up from 44% in 2011. Benefits of integrating sustainability into business strategy include greater accountability, enhanced reputation, improved business practices, increased brand value, and the formation of competitive

advantage, as supported by Ioannou and Serafeim (2011), Sanchez-Planelles et al. (2020), and Lagasio and Cucari (2019).

Globally, as well as within the South Asian context, most ESG disclosure research has focused on financial performance rather than corporate governance (Abdul Rahman and Alsayegh, 2021; Khan, 2019; Gillan et al., 2010; Ioannou and Serafeim, 2011; Eccles and Serafeim, 2013; Friede et al., 2015). This gap is particularly evident in Bangladesh and India, where ESG studies are limited despite the rising adoption of corporate social responsibility (CSR) and ESG metrics (Masud et al., 2018; Jahid et al., 2022). While several Indian studies have linked ESG performance to financial growth and risk reduction (Beloskar and Rao, 2023; Mulchandani et al., 2022; Sharma et al., 2020), Bangladeshi research remains scarce, with a few exceptions highlighting ESG's impact on innovation and investor decisions (Zhou et al., 2023; Sultana et al., 2018). This study aims to fill the research gap by examining the relationship between ESG disclosure and corporate governance in Bangladeshi and Indian firms, particularly within the energy sector. The region's growing attractiveness to foreign investors and the potential for expanding foreign direct investment necessitates a thorough analysis of ESG reporting drivers. Given South Asia's poor business climate (Bank, 2008), understanding these factors is crucial for promoting sustainable practices and enhancing investor confidence, especially as energy economics becomes a vital consideration.

This study fills a critical research gap and provides practical and theoretical contributions that can drive improvements in ESG reporting and corporate governance practices in South Asia. Doing so helps foster a more sustainable and transparent business environment in the region, aligning with global sustainability goals and investor expectations. The industry's fascination with investment choices is well-deserved. The perception of South Asia among overseas investors is on the upswing, and the region offers excellent potential for expanding foreign direct investment, particularly in energy sectors. It is crucial to analyze the factors that drive ESG reporting by corporations. However, the region's poor business climate is the biggest obstacle to luring foreign direct investment (Bank, 2008). The research gap raised the issue of investigation for Bangladeshi and Indian firms' ESG and corporate governance. Therefore, this study seeks to answer the research question: Why do Bangladeshi and Indian firms disclose ESG information?

The study's objective is to determine the elements of corporate governance on ESG disclosure performance to find the empirical answer to the research question. Hence, the study considered the top fifty listed firms from Bangladesh and India during 2019-2021. The primary contribution of this research is an attempt to quantify the level of ESG disclosure across listed Indian and Bangladeshi companies, shedding light on the current disclosure levels for corporate governance across industries. Examining corporate environmental, social, and governance (ESG) reporting drivers is critical in the modern era, particularly in energy-intensive industries. In addition to profitability, corporate governance has grown to be a significant component of ESG disclosure. The findings will highlight potential areas for improvement, which, if taken up by the stock exchange and policymakers and effectively communicated to corporations, could raise the quality of information available to investors. By revealing how companies are incorporating environmental, social, governance, ethical consumer, and human rights issues into their business tactics and operations—an aspect not fully captured in traditional corporate financial statements—the report will act as a means of connectivity between businesses and their investors, customers, and other stakeholder groups in society.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Previous research on corporate governance and ESG disclosure has been extensive, focusing on stakeholder and legitimacy theories, which are most appropriate for describing the reasons and determinants of disclosure practices. Previous studies demonstrate a favorable relationship between the ESG aggregate and its individual aspects and business performance, which is consistent with stakeholder theory. Chopra et al. (2024) revealed the significance of cross-cutting research on ESG, which is significantly related to achieving sustainable development. Singhania and Gupta (2024) empirically documented that ESG disclosure is a firm risk-taking mechanism that reduces idiosyncratic rather than systematic risk. Kartal et al. (2024) conducted a study and reported that ESG principles prominently enhance the disclosure performance of Turkish firms. Tsang et al. (2023) broadly reviewed the ESG pattern globally and documented that it is increasing rapidly, while Khan (2022) discovered ESG disclosure and performance. Wasiuzzaman et al. (2023) stated that strong ESG regulation is required globally to promote financial performance and solve environmental issues. Rezaee et al. (2023) conducted a study between the USA and Europe based on voluntary and mandatory ESG disclosure. They revealed that the USA's voluntary ESG disclosure performance is better than the EU's. Wasiuzzaman and Subramaniam (2023) found that corporate governance elements, particularly board diversity, significantly influence the ESG disclosure performance of developed and developing countries' firms. Mohammad et al. (2023) documented that corporate governance elements like institutional factors, ownership structure, and legal environment dominate ESG disclosure. Cicchiello et al. (2023) documented that regulatory framework positively influences the transparency of ESG disclosure between financial and non-financial firms in the US and Europe. Environmental, social, and corporate governance (ESG) guidelines and procedures are essential for investors to capture long-term value (SSE, 2015). Again, ESG performance affects corporate operating performance, efficiency, remuneration policies, investor trading, and valuation. According to research, improved ESG performance boosts operating performance, efficiency, and firm value (Gillan et al., 2010). Lack of uniform reporting requirements, subjectivity in rating, and accuracy limitations make ESG reports problematic for investors and prevent cross-company comparisons (Bassen and Kovács, 2008). Eccles and Serafeim (2013) discuss the exchange between sustainability initiatives and a company's economic condition, stating that a strategic focus on ESG concerns must remain on the "performance frontier" and mitigate value judgment. Again, ESG disclosure emphasizes the corporate governance of

the company. Strong governance ensures capital is conserved and expanded for long-term sustainability, serving all stakeholders in a company. The ESG materiality framework seeks financial benefits in ESG performance by emphasizing investor and stakeholder ESG concerns (Khan, 2019). Tamimi and Sebastianelli (2017) evaluated 500 companies' ESG disclosures and found varying levels of voluntary disclosure. Governance issues are prioritized over environmental ones. ESG disclosure moderates the adverse effects of flaws and the impact of strengths (Fatemi et al., 2018). Governance disclosure scores influence ESG disclosure scores. Attendance at the board of directors is a significant predictor of both ratings, indicating that more committed boards lead to improved sustainability performance (Shrivastava and Addas, 2014).

Del Gesso and Lodhi (2024) examined a systematic review of theories used in ESG literature and concluded that 32 theories are commonly used in the prior work of ESG. They also reported that stakeholder, legitimacy, institutional, agency, and signaling theories dominate most. Prior literature used mixed theoretical understanding in the ESG discussion. Stakeholder and Legitimacy theory gives businesses a way to succeed in a world that is unstable and uncertain by encouraging them to make voluntary social and environmental disclosures that help them reach their goals and earn the respect of the public. Based on prior literature, the study considered stakeholder and legitimacy theory. The study developed the following hypotheses based on the research objective and theoretical understanding of ESG disclosure.

2.1. Board Size and ESG Performance

Meta-analysis of 24 empirical research to elucidate the association between board size, board independence, and the participation of women on boards and ESG disclosure. Findings indicate that board independence, board size, and the presence of women boost ESG voluntary disclosure significantly (Lagasio and Cucari, 2019). According to a growing body of research, the structure of a company's board of directors may impact its environmental, social, and governance (ESG) performance. There is a favorable relationship between ESG performance and board size or the inclusion of a CSR committee (Birindelli et al., 2018). Therefore, the following hypothesis is proposed.

Hypothesis 1 (H1). There is a significant and positive relationship between board size and ESG disclosure.

2.2. Independent Director and ESG Performance

Meta-analysis of 24 empirical research studies to clarify that board independence, board size, and the presence of women boost ESG voluntary disclosure significantly (Lagasio and Cucari, 2019) on a selection of 108 listed European and American banks from 2011 to 2016. According to a growing body of research, the structure of a company's board of directors may impact its environmental, social, and governance (ESG) performance. There is a favorable relationship between ESG performance and board size or the inclusion of a CSR committee but a negative relationship with the proportion of independent board members (Hossain and Reaz, 2007; Birindelli et al., 2018). Hence, the following hypothesis is developed:

Hypothesis 2 (H2). There is a significant and positive relationship between independent directors and ESG disclosure.

2.3. Female Director and ESG Performance

Diversity is playing a significant role in the ESG performance. The study indicates that female directors possess distinctive skills, experiences, and inclinations that enable them to lead corporations toward more ESG-oriented strategies (Ginglinger and Raskopf, 2019; Lagasio and Cucari, 2019). A gender-diverse board can improve company disclosure practices by acting as a check and balance to strengthen internal control and safeguard shareholders (García-Sánchez et al., 2019). Female-led boards can potentially encourage more stringent reporting guidelines and closer oversight. Since they can bring social and environmental issues to light, female directors, in particular, are probably better suited to supervise ESG reporting practices (Wasiuzzaman and Subramaniam, 2023). According to García-Sánchez et al. (2019), female directors possess superior preparation for meetings since they are adept at scanning and gathering data about ESG disclosure. Wasiuzzaman and Subramaniam (2023) empirically found that female directors' participation in the board positively influences ESG performances of the developed nations' firms because of balanced power distribution, voice, and responsibility. Thus, the following hypothesis is developed:

Hypothesis 3 (H3). There is a significant and positive relationship between female directors and ESG disclosure.

3.4. Audit Committee and ESG Performance

The board plays a significant role in promoting ESG as it is the key policy maker. Moreover, stakeholders push organizations to show more transparency and integrity regarding ESG issues. Therefore, the audit committee asked the board many questions about ESG investment, policy, and implementation. The audit committee may ask about sustainability risks and opportunities. Further, the audit committee may know the issues of the ESG framework and disclosure regulations that management has promulgated. The study demonstrates a strong positive influence of audit committee activism and independence on the amount of compliance with the GRI rules, showing a beneficial impact of audit committee traits on the quality of ESG reporting. Similarly, Audit committee characteristics positively boost the number of ESG disclosures (Arif et al., 2020; Bamahros et al., 2022). Prior studies reported that audit committees significantly influence the disclosure performance of a corporation. Therefore, we propose the following hypothesis.

Hypothesis 4 (H4). There is a significant and positive relationship between the audit committee and ESG disclosure.

3. DATA AND METHODOLOGY

3.1. Sample Selection

The study is based on secondary data sources. It examines the top 100 listed companies (50 from Bangladesh and India based on market capitalization) between 2019 and 2021. This research includes all 100 publicly traded companies divided into four industries: Financial, Manufacturing, Service, and Energy

Industry (MSCI, 2022). Financial data was collected from the OSIRIS database, while non-financial data (ESG variables) were gathered from annual reports. Corporate governance data was also extracted from annual reports and sustainability statements following Masud et al. (2018). Finally, the study managed 300 firm-year observations during 2019-2021 (Table 1).

3.2. Variables Measurement

3.2.1. Dependent variable

Several techniques exist for assessing firms' environmental, social, and corporate governance disclosure procedures. This study used content analysis, which included twenty-six different areas of environment, social, and governance (ESG). Previous studies used various guides and databases, such as Thomson Reuters and the Global Reporting Initiative (GRI) guides, as referenced by Abdul Rahman and Alsayegh (2021), Sharma et al. (2020), Roca and Searcy (2012), and Zumente et al. (2020). Despite the limitations of content analysis, it is a well-known tool for analyzing the level of disclosure of environmental, social, and governance factors. The ESG disclosure items were derived from annual and sustainability reports. The ESG disclosure guide was created by combining ESG disclosure items from these reports. The ESG disclosure was measured using the ESG disclosure score and its three sub-scores: environment, social, and governance, following Chopra et al. (2024), Kartal et al. (2024), Wasiuzzaman et al. (2023) and Wasiuzzaman and Subramaniam, (2023). The ESG disclosure score was determined by summing all twenty-six contents (Appendix 1). The scoring technique assigned an ESG rating of "1" if the company disclosed the items and "0" if it did not. The scores were then aggregated and evenly distributed across the companies. After the results were applied to the disclosure guide, the total number of companies reporting the items was counted and translated into percentage ranks.

3.2.2. Independent variables

Several ways exist to evaluate companies' environmental, social, and corporate governance disclosure processes. In this study, four independent variables related to corporate governance were taken from previous research. The results of the measurements of the independent variables are summarized in Table 2.

Table 1: Sample description

Panel A: Sample size			
Sample selection	**No. of firms**	**Total observations**	
Total listed company	100	300	
Panel B: Yearly sample by countries			
Sample year	**Bangladesh**	**India**	**Total**
2019	50	50	100
2020	50	50	100
2021	50	50	100
Total	150	150	300
Panel C: Industry			
Financial industry			30
Manufacturing industries			46
Service industry			18
Energy industry			06
Total			100

3.2.3. Control variables

We account for all additional variables that could affect the ESG score to prevent the model from being misspecified. Since the companies are from two different countries, we also consider the GDP rate, which is unique to each nation and measures its level of economic development. In this study, control variables have been derived from past research. The results of the measurements of all variables are summarized in Table 3.

3.3. Model

The study employed a balanced panel data regression model to avoid potential heteroscedasticity in cross-sectional firm-year observations. The research establishes if fixed or random effects are consistent with the model. The results of the Hausman test showed that the fixed effect model fit our data well. Ordinary least square (OLS) regression was used in the study. Our regression model is shown in the below:

$$ESG = \alpha + \beta_1 BDSIZE + \beta_2 INDEP + \beta_3 BDFEM + \beta_4 Audit + \beta_5 SIZE + \beta_6 CapIn + \beta_7 ROA + \beta_8 Cash + \beta_9 LEV + \beta_{10} MB + \beta_{11} Emp + \beta_{13} GDP + \beta_{14} Yeardummy + \beta_{15} Industrydummy + \varepsilon$$

4. RESULTS AND ANALYSIS

Table 4 shows the descriptive statistics for the variables of the entire sample. The sample size (N) is 300. According to the descriptive statistics, Bangladeshi and Indian enterprises attempt to disclose ESG information, with a mean value of 20. However, inconsistency is observed as the variation ranges from a minimum of 10 to a maximum of 25. Companies attempt to maintain an average board size of 11 members. The variables of female directors, independent directors, and audit committee members show consistency as their standard deviations approach the mean. However, they are not more numerous in proportion to the board size. The company's size indicates that its assets fall within a specific range, while the standard deviation (SD) for risk is far from the mean. Capital intensity shows consistency, as the standard deviation is close to the mean. ROA indicates that the company's profitability is within the range, but the standard deviation for risk is far from the mean. The company's cash value suggests that its size is within the range, though the standard deviation for risk is distant from the mean. The MB ratio, leverage, and GDP rate show consistency, with the standard deviation close to the mean. The complete forms of the variables are displayed in Table 4.

Table 5 presents the correlation matrix of the study. Pearson Pairwise Correlation indicates noteworthy links between the study's leading indicators. Specifically, a company with a large board size, a proportional number of independent directors, and women on the board can positively and significantly impact ESG disclosure. The audit committee does not play a significant role in the ESG reporting process. Firm size and capital intensity are negatively correlated with ESG disclosure. ESG disclosure negatively correlates with leverage, while the MB ratio correlates positively with ESG disclosure. There is no association between the GDP rates of India and Bangladesh and ESG disclosure. Our analysis revealed a mean VIF of 2.57 and a maximum VIF of 5.70.

Table 2: Independent variables

Independent variable	Pre. sign	Measurement	Sources
BDSIZE	+	Presence of total board members.	Lagasio and Cucari, 2019. Birindelli et al., 2018
INDEP	±	The board's total number of independent directors is divided by board size.	Hossain and Reaz, 2007. Lagasio and Cucari, 2019. Birindelli et al., 2018
BDFEM	+	The dummy variable measures gender diversity. If the company has at least one female director on the board, it is considered one; otherwise, it is 0.	Ginglinger and Raskopf, 2019. Lagasio and Cucari, 2019; Birindelli et al., 2018
Audit	+	Audit committee members are divided by total board size.	Arif et al., 2020. Bamahros et al., 2022

Table 3: Control variables

Control variable	Pre. Sign	Measurement	Sources
Size	±	Firm Size is measured by the natural logarithm of total assets.	Bamahros et al., 2022. Helfaya and Moussa, 2017; Ra, 2021
CapIn	+	Capital Intensity is calculated by dividing total capital into total assets.	Xu and Wu, 2021. Barrymore and Sampson, 2021
ROA	+	Return on assets is measured by dividing net income into total assets.	De Villiers et al., 2011 Kim and Li, 2021. Garcia and Orsato, 2020
Cash	+	Cash indicates the total cash and cash equivalent of the firms.	Garcia and Orsato, 2020
LEV	±	Leverage is calculated by dividing total debt into total assets.	Fernández-Gago et al., 2018 Birindelli et al., 2018. Kim and Li, 2021. Garcia and Orsato, 2020
MB	±	Market Book ratio is measured by dividing market capitalization into the book value of equity.	de Villiers et al., 2011 Ra, 2021 Abdi et al., 2020
EMP	+	Employees are measured by the natural logarithm of the total number of employees.	Nekhili et al., 2019. Finger and Rosenboim, 2022
GDP	±	Gross domestic product.	World Bank, 2022 Fernandez-Feijoo et al. (2013).

Table 4: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ESG	300	19.96667	3.349071	10	25
BDSIZE	300	10.73667	3.691351	5	22
INDEP	300	0.375767	0.177366	0.080	0.750
BDFEM	300	0.846667	0.360911	0	1
Audit	300	0.423167	0.153596	0.180	0.860
Size	300	148.3267	84.35492	4	289
CapIn	300	2.848601	6.457355	0.017	52.573
ROA	300	124.2433	74.38243	4	254
Cash	300	134.7633	69.97826	4	209
LEV	300	0.589612	0.259122	0.048	0.958
MB	300	148.2167	84.7379	4	292
Emp	300	144.6033	81.18248	4	260
GDP	300	4.163657	5.206373	−6.596	8.900

GDP: Gross domestic product

Therefore, the observed results do not demonstrate significant multicollinearity among the tested components.

To examine the relationship between ESG performance and corporate governance of companies, ordinary least squares regression (OLS regression) was done. Table 6 reports the regression results for the research. Analysis shows that the adjusted r^2 of ESG is 0.483, which means that 48% of the variance in the dependent variable can be explained by the independent variable with support from the control variable.

Firms' Board Size positively and significantly impacts ESG reporting. The board size regression coefficient is positive and highly correlated with ESG disclosure at 1%. This implies that having a large board size has a significant positive impact on ESG disclosure. Larger board sizes create pressure to offer more ESG disclosure. So, we accept H1. That supports the consequences from Lagasio and Cucari (2019) and Birindelli et al. (2018). Next, Independent directors positively and significantly influence ESG reporting. The independent director regression coefficient is positive and significantly associated with ESG disclosure at 1%. Therefore, the greater the number of independent directors, the greater the favorable influence on ESG disclosure. Therefore, we accept H2. That supports the result of Lagasio and Cucari (2019). Next, female directors positively and significantly impact ESG reporting. Here, we see that the regression coefficient for Female directors is positive and significantly associated with ESG disclosure at a 1% level. That means when the number of female directors is higher, it

Table 5: Correlation matrix

Variable	ESG	BDSIZE	INDEP	BDFEM	Audit	Size	CapIn	ROA	Cash	LEV	MB	Emp	GDP
ESG	1												
BDSIZE	0.4421	1											
	(0.0000)												
INDEP	0.3531	−0.052	1										
	(0.0000)	(0.3697)											
BDFEM	0.3084	0.0575	0.3582	1									
	(0.0000)	(0.3213)	(0.0000)										
Audit	−0.4467	−0.6878	−0.1285	−0.1813	1								
	(0.0000)	(0.0000)	(0.026)	(0.0016)									
Size	−0.0675	0.011	−0.2518	−0.0867	0.0226	1							
	(0.2437)	(0.8496)	(0.0000)	(0.1342)	(0.6969)								
CapIn	−0.0095	0.0189	0.0657	0.0652	0.0567	−0.1375	1						
	(0.8712)	(0.7482)	(0.2627)	(0.2665)	(0.3345)	(0.0188)							
ROA	0.2299	−0.1507	0.3293	0.1611	0.0386	−0.1511	0.0365	1					
	(0.0001)	(0.009)	(0.0000)	(0.0052)	(0.5056)	(0.0087)	(0.534)						
Cash	0.1234	0.2035	−0.2834	−0.091	−0.1675	0.2628	−0.1893	−0.1925	1				
	(0.0327)	(0.0004)	(0.0000)	(0.1159)	(0.0036)	(0.0000)	(0.0012)	(0.0008)					
LEV	−0.0505	0.2647	−0.3654	−0.1523	−0.1928	0.1268	−0.1934	−0.3974	0.3636	1			
	(0.3833)	(0.0000)	(0.0000)	(0.0082)	(0.0008)	(0.0281)	(0.0009)	(0.0000)	(0.0000)				
MB	0.1351	−0.1671	0.5243	0.335	0.0595	−0.3089	0.2475	0.3785	−0.2541	−0.529	1		
	(0.0192)	(0.0037)	(0.0000)	(0.0000)	(0.3044)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)			
EMP	−0.0922	−0.0834	0.0356	0.1078	0.0937	0.0859	0.0985	0.0723	0.0948	−0.2002	0.1403	1	
	(0.1109)	(0.1497)	(0.5388)	(0.0621)	(0.1051)	(0.1379)	(0.0929)	(0.2119)	(0.1012)	(0.0005)	(0.015)		
GDP	−0.2144	−0.0146	−0.3062	−0.1243	0.0584	0.0861	−0.082	−0.1258	0.0436	0.1096	−0.1697	−0.0102	1
	(0.0002)	(0.801)	(0.0000)	(0.0314)	(0.3136)	(0.1369)	(0.1625)	(0.0294)	(0.4518)	(0.058)	(0.0032)	(0.8606)	

Table 6: Regression results

Variable	ENV	SOC	GOV	ESG
BDSIZE	0.1361***	0.1310***	0.0435***	0.3156***
	(0.0299)	(0.0266)	(0.015)	(0.0562)
INDEP	1.2289**	3.0508***	0.6935**	5.1793***
	(0.5947)	(0.5289)	(0.2989)	(1.1168)
BDFEM	0.6330***	0.5864***	0.1918	1.4108***
	(0.232)	(0.2063)	(0.1166)	(0.4357)
Audit	−1.1824	0.7625	−0.5662	−1.0819
	(0.7334)	(0.6522)	(0.3686)	(1.3773)
Size	0.0006	−0.0011	−0.0009*	−0.0013
	(0.001)	(0.0009)	(0.0005)	(0.0019)
CapIn	0.0052	0.0052	0.0037	0.0168
	(0.0127)	(0.0113)	(0.0064)	(0.0238)
ROA	0.002	0.0035***	0.0012**	0.0068***
	(0.0012)	(0.0011)	(0.0006)	(0.0023)
Cash	0.002	0.0027**	0.0018**	0.0069***
	(0.0014)	(0.0012)	(0.0007)	(0.0026)
LEV	−0.0673	−0.4701	−0.1944	−0.904
	(0.4245)	(0.3775)	(0.2133)	(0.7972)
MB	−0.0016	−0.0015	0.0001	−0.0029
	(0.0013)	(0.0012)	(0.0007)	(0.0024)
Emp	−0.0024**	−0.001	−0.0011**	−0.0046**
	(0.001)	(0.0009)	(0.0005)	(0.0018)
GDP	−0.0359	−0.0555**	0.0012	−0.0895
	(0.029)	(0.0258)	(0.0146)	(0.0545)
Year Dummy	Included			
Industry Dummy	Included			
N	300	300	300	300
F	10.8843***	13.2966***	9.0601***	17.0134***
r2	0.4031	0.452	0.3598	0.5135
r2_a	0.3661	0.418	0.3201	0.4833

*P<0.10 (10%) **P<0.05 (5%) ***P<0.01 (1%)

significantly impacts ESG disclosure. Therefore, we accept H3. That reinforces the results of Ginglinger and Raskopf (2019), Lagasio and Cucari (2019), and Birindelli et al. (2018). Finally, the audit committee has a negative but insignificant relationship with ESG reporting. Therefore, we reject H4. It implies that the most critical audit committee responsibilities are audit

Table 7: Robustness test of ESG sustainability disclosure

Variable	ESG (Model=1)	ESG (Model=2)	ESG (Model=3)	ESG (Model=4)	ESG (Model=5)	ESG (Model=6)
BDSIZE	0.0173***	0.0121***	31.5574***	0.2014***	0.3239***	0.3119***
	(0.0032)	(0.0022)	(5.6162)	(0.0586)	(0.0758)	(0.0562)
INDEP	0.2913***	0.1992***	5.1793***	2.0370***	4.3665***	3.5284***
	(0.0629)	(0.043)	(1.1168)	(0.3863)	(1.3844)	(1.2065)
BDFEM	0.0839***	0.0543***	1.4108***	1.4384***	1.4108**	1.1160**
	(0.0246)	(0.0168)	(0.4357)	(0.4286)	(0.5645)	(0.4307)
Audit	−0.0335	−0.0416	−1.0819	−1.5458	−1.8276	−0.9325
	(0.0776)	(0.053)	(1.3773)	(1.3545)	(1.6532)	(1.4318)
Size	−0.0001	−0.0000	−0.0013	−0.0018	−0.0004	−0.0013
	(0.0001)	(0.0001)	(0.0019)	(0.0018)	(0.0021)	(0.0019)
CapIn	0.0011	0.0006	0.0168	0.0081	0.0076	0.0498*
	(0.0013)	(0.0009)	(0.0238)	(0.0235)	(0.0244)	(0.0296)
ROA	0.0004***	0.0003***	0.0068***	0.0055**	0.0073***	0.0066***
	(0.0001)	(0.0001)	(0.0023)	(0.0023)	(0.0025)	(0.0024)
Cash	0.0003**	0.0003***	0.0069***	0.0053**	0.0056***	0.0034
	(0.0001)	(0.0001)	(0.0026)	(0.0025)	(0.0021)	(0.0027)
LEV	−0.0711	−0.0348	−0.904	−1.4783*	−1.3671	−0.7622
	(0.0449)	(0.0307)	(0.7972)	(0.7908)	(0.9502)	(0.7986)
MB	−0.0002	−0.0001	−0.0029	−0.0023	−0.0027	−0.0007
	(0.0001)	(0.0001)	(0.0024)	(0.0024)	(0.0028)	(0.0025)
Emp	−0.0003***	−0.0002**	−0.0046**	−0.0041**	−0.0059***	−0.0106***
	(0.0001)	(0.0001)	(0.0018)	(0.0018)	(0.002)	(0.0033)
GDP	−0.0052*	−0.0034	−0.0895	−0.0835	−0.1273*	−0.0935*
	(0.0031)	(0.0021)	(0.0545)	(0.0537)	(0.0674)	(0.0553)
Year Dummy				Included		
Industry Dummy				Included		
N	300	300	300	300	209	266
F	16.5951***	17.0134***	17.0134***	17.7195***	19.1932***	16.2998***
r2	0.5073	0.5135	0.5135	0.5237	0.6308	0.5277
r2_a	0.4767	0.4833	0.4833	0.4941	0.5979	0.4953

*P<0.10 (10%) **P<0.05 (5%) ***P<0.01 (1%)

processing, formulation, and financial oversight, while the ESG report has no role in ESG.

Regarding the regression coefficient control variables, Table 6 shows that size is negatively associated with ESG disclosure, supporting the conclusion of Ra (2021). A company's size does not impact the ESG score; companies with more liquid assets (cash) and higher profitability are more likely to disclose ESG information. Capital intensity is positively associated with the ESG score, reinforcing the findings of Xu and Wu (2021) and Barrymore and Sampson (2021). ROA is positively and significantly associated with ESG disclosure (1%). Cash and cash equivalents are also positively and significantly associated with ESG disclosure (1%). Higher profitability (ROA) and more liquid assets (cash) present a significant positive impact on ESG disclosure due to their obligations to diverse stakeholder groups, supporting the findings of Kim and Li (2021) and Garcia and Orsato (2020). Leverage is negatively associated with ESG disclosure, which supports the findings of Garcia and Orsato (2020). Companies with higher leverage are negatively associated with ESG disclosure. Companies with a higher MB ratio are also negatively associated with ESG disclosure, supporting the conclusion of Ra (2021). The number of employees does not play a significant role in ESG disclosure, as it is negatively associated with ESG disclosure. Due to a lack of diversity and expertise, employees are not seen as crucial players in ESG disclosure. The GDP rates of India and Bangladesh have no impact on ESG disclosure, supporting the findings of Fernandez-Feijoo et al. (2013).

4.1. Robustness Results

Our research comprises firms from two distinct regions. Consequently, we undertake a robustness test to determine our empirical findings' validity and ensure that regional differences do not distort the connection between corporate governance and ESG performance. As a result, we re-estimate the empirical model by dividing the sample into six sub-samples. We use the following models: Model 1 (ESG = Ln of ESG), Model 2 (ESG = ESG/Total ESG contents), Model 3 (Board Size = percentage of board size), Model 4 (Independent Director = Dummy variable if the company has at least four independent directors = 1, otherwise 0), Model 5 (Cash = cash/assets), and Model 6 (Employee = Employee/assets). The results show that board size, independent directors, and female directors have a significantly positive relationship with ESG disclosure, whereas the audit committee has a negative relationship with ESG disclosure. We found the same result for every model. Additionally, ROA, cash, and capital intensity positively impact ESG disclosure. Again, size, leverage, and employee number hurt ESG disclosure. MB ratio and GDP rate hurts ESG disclosure. Every outcome is parallel to our OLS regression result (Table 7).

The research used a balanced panel data regression model to analyze the data and exclude the possibility of heteroscedasticity in cross-sectional firm-year observations. The study determines if the model is consistent with fixed or random effects. Table 8 shows the results of the fixed and random effect models. Results are almost similar in both the fixed and random effect models.

Table 8: Fixed effect model and random effect model

Variable	ESG (Fixed effect model)	ESG (Random effect model)
BDSIZE	0.3156***	0.3151***
	(0.0562)	(0.0563)
INDEP	5.1793***	5.2946***
	(1.1168)	(1.0939)
BDFEM	1.4108***	1.4165***
	(0.4357)	(0.4393)
Audit	−1.0819	−1.4474
	(1.3773)	(1.3819)
Size	−0.0013	−0.001
	(0.0019)	(0.0019)
CapIn	0.0168	0.0101
	(0.0238)	(0.0238)
ROA	0.0068***	0.0065***
	(0.0023)	(0.0023)
Cash	0.0069***	0.0073***
	(0.0026)	(0.0026)
LEV	−0.904	−1.1257
	(0.7972)	(0.7986)
MB	−0.0029	−0.0016
	(0.0024)	(0.0024)
Emp	−0.0046**	−0.0048***
	(0.0018)	(0.0019)
GDP	−0.0895	−0.041
	(0.0545)	(0.029)
IndustryDummy	Included	
N	300	300
F	18.827***	
r2	0.5076	
r2_a	0.477	

Table 9: Hausman test

Variable	(b)	(B)	(b-B)	sqrt (diag[V_b-V_B])
	Fe	re	Difference	S.E.
BDSIZE	0.3156	0.3151	0.0004	0.0060
INDEP	5.1793	5.2946	−0.1153	0.2684
BDFEM	1.4108	1.4165	−0.0057	0.0127
Audit	−1.0819	−1.4474	0.3655	0.1421
Size	−0.0013	−0.0010	−0.0003	0.0001
CapIn	0.0168	0.0101	0.0066	0.0034
ROA	0.0068	0.0065	0.0003	0.0005
Cash	0.0069	0.0073	−0.0004	0.0002
LEV	−0.9040	−1.1257	0.2217	0.0932
MB	−0.0029	−0.0016	−0.0014	0.0005
Emp	−0.0046	−0.0048	0.0002	0.0001
GDP	−0.0895	−0.0410	−0.0485	0.0467
I1	−1.6692	−1.8071	0.1379	0.0982
I2	−2.7119	−2.8599	0.1480	0.0937
I3	−1.3004	−1.5076	0.2071	0.1043

b=consistent under Ho and Ha. B=inconsistent under Ha, efficient under Ho. Test: Ho: difference in coefficients not systematic. Chi2 (2) = (b-B)'[(V_b-V_B) ^ (−1)] (b-B) = 6.64. Prob>chi2=0.0362

(V_b-V_B is not positive definite)

To ensure whether it is a fixed effect model or a random effect, in Table 9, we have done the Hausman test.

Here, we see the P = 0.0362, <0.05. Therefore, we can say that the fixed effect model fits our data well.

4.2. The Role of ESG Integration in Energy Economics and Economic Growth

The integration of ESG criteria into the energy sector is vital for achieving sustainable economic outcomes. As highlighted by Zatonatska (2024), the application of ESG standards is becoming increasingly important in shaping corporate strategies and investment decisions within the energy sector. This is complemented by the work of Meng and Shaikh, who discuss how investors are increasingly incorporating ESG factors into their investment strategies, thereby influencing the sustainability of energy projects (Meng and Shaikh, 2023). The focus on corporate social responsibility (CSR) within the energy sector further underscores the economic, environmental, and social impacts of energy consumption (Lu et al., 2019).

In the context of developing countries, the dynamics of energy consumption and economic sustainability are critical. For instance, Ali (2024) illustrates the complex interplay between clean and dirty energy consumption and its implications for economic viability. Similarly, Bekun (2022) highlights the negative relationship between CO_2 emissions and renewable energy, suggesting that a shift towards renewable sources can enhance economic sustainability. This is particularly relevant in light of global efforts to mitigate climate change and promote sustainable practices. Liao (2023) emphasizes the significant impacts of green energy projects on the economic, environmental, and social dimensions of sustainability, reinforcing the notion that green energy consumption is integral to economic growth.

Additionally, studies have noted that countries with higher renewable energy consumption tend to experience better economic conditions (Inglesi-Lotz, 2016). This aligns with findings from Can and Ahmed, who note that energy consumption is paramount for sustainable growth, linking it to resource and environmental sustainability (Can and Ahmed, 2022). The emphasis on sustainable energy practices is echoed by Taranto et al., who introduce energy cost as a critical component of production costs, advocating for sustainability accounting within energy economics (Taranto et al., 2023).

5. DISCUSSIONS AND CONCLUSION

In recent years, environmental, social, and governance (ESG) measures have gained popularity, acceptance, and influence in India and Bangladesh. The subject of investment options has been fascinating in the business world. Examining corporate environmental, social, and governance (ESG) reporting drivers is critical today. In addition to profitability, corporate governance has become an essential component of ESG disclosure. This article investigates the determinants influencing the ESG disclosure agenda across publicly traded companies in India and Bangladesh. According to the studies, board size, independent directors, and female directors all significantly and directly influence ESG reporting. The audit committee is not acting as a critical player in ESG reporting. Firms aim to maintain a diverse board to enhance their ESG disclosure. Regarding economic performance (firm profitability and liquid assets), highly prominent firms are frequently subject to pressures from the media, regulators, and society.

As a result, these firms release more ESG information to fulfill their accountability to various stakeholder groups, who may hold them socially responsible, and to convey and convince the public that they are meeting societal expectations to alleviate such pressures. India and Bangladesh's GDP rates have little influence on ESG disclosure. Firms with diverse board compositions strive to publish their sustainability policies to demonstrate that their products and services are attractive and beneficial to various stakeholder groups, thereby gaining legitimacy in society. The study significantly contributes to the policy level as Bangladesh and India face severe environmental problems. In mitigating environmental problems, corporations have to play a vigilant role in promoting ESG disclosure. The study reveals that effective corporate governance mechanisms significantly enhance ESG practices while proactively management likes to invest in ESG. Moreover, a higher level of ESG reporting sends a confidence signal to the diverse stakeholders. By incorporating board gender diversity, firms can mitigate external pressure regarding diversity issues. Therefore, effective corporate governance helps to increase the ESG disclosure that deliberately promotes the ESG performance of the top Bangladeshi and Indian firms. Developing a joint corporate governance framework is necessary to enhance ESG disclosure performance between both countries.

Despite the contribution, this study has certain shortcomings. The main limitation is the sample size and number of years of the study. The small number of observations and firms is insufficient to conclude the whole industry of both countries. Future studies may include more firms and years, along with ownership variables. Additionally, the impact of COVID-19 on ESG reporting might be an important area of focus. This is essential because the institutional environment and accountability requirements constrain an organization's sustainability initiatives and ESG information disclosure. Exploring these directions will enhance the legitimacy of businesses.

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APPENDIX 1

Environmental	
1. Pollution reduction	Does the company take the initiative to reduce pollution?
2. Resource conservation	Does the company take the initiative to conserve resources?
3. Environmental management	Does the company take initiative in environmental management?
4. Green initiatives	Does the company adopt green initiatives?
5. Recycling policies and recycling ratio	Does the company take the initiative to create recycling policies?
6. Research and development	Does the company take the initiative in R&D intensity?
7. Efforts to decrease the usage of paper	Does the company adopt paperless work management?
8. Use of electric vehicles	Does the company use electric vehicles?
9. Renewable energy	Does the company use renewable energy sources?
Social	
1. Employment Information	Does the company disclose employment information?
2. Diversity and Equal Opportunity	Does the company provide equal opportunity for men and women?
3. Training and Development	Does the company provide training to its employees?
4. Health and Safety	Does the company maintain a health and safety policy?
5. Child and forced labor policy	Does the company adopt a child and forced labor policy?
6. Human Rights	Does the company maintain a human rights policy?
7. Community Development	Does the company take initiative in community development?
8. Product Responsibility	Does the company maintain a product responsibility policy?
9. Donations and charities	Does the company invest in donations and charities?
Governance	
1. Board Responsibility	Does the board of directors perform their duties?
2. Audit Committee	Does the company have an Audit Committee?
3. Nomination and Remuneration Committee	Does the company have a Nomination & Remuneration Committee?
4. Shareholder rights	Does the company look up its shareholder rights?
5. Incentivized pay	Does the company pay incentives?
6. Codes and Policies	Does the company have a code and policies?
7. Ethics and anti-corruption policy	Does the company maintain an ethics and anti-corruption policy?
8. Collective bargaining	Does the company have a collective bargaining group?