

Does Gender Diversity Matters: Board Gender Diversity, ESG Disclosure, and Corporate Financial Performance in BRIC Economies

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Abstract

The study attempts to analyse the impact of ESG disclosure on the Financial Performance (FP) of BRIC. The study also analyses the moderating effect of board gender diversity on ESG disclosure and financial performance. For financial performance, Tobin's q, Return on Asset and Return on Equity have been considered. The ratio of Women in Board composition is considered as board gender diversity. A sample of Brazil Broad-Based index (IBRA), Russia Trading System Index (RTS), Bombay Stock Exchange, Shanghai Stock Exchange (SSE), Johannesburg Stock Exchange/FTSE from 2015–2023 is used. To analyse the dataset, panel regression is performed. To strengthen the research results, robustness and endogeneity analyses are performed. Results of the study reveal that ESG disclosure negatively affects the financial performance and board gender diversity, also interrupts the relationship between ESG disclosure and all three measures of financial performance. The study provides insights to stakeholders and corporate management on ESG disclosure practices and financial performance of BRIC economies.

1. Introduction

Over the years, Environmental, Social, and Governance (ESG) practices has become a vital component of corporate strategies and sustainable development. With the need of the hour and increasing pressure from the shareholders, investors, and regulators, corporates are encouraged to involve in ESG oriented decision-making process. The disclosure of ESG performance enables corporates to provide an insight into the management of the firm's sustainability concerns and their effect on the environment, society and overall governance. ESG disclosure is now a key indicator of corporate reputation, value creation and evidence of corporate sustainability. Consequently, determining whether ESG initiatives lead to better firm financial performance (FP) has attracted considerable attention from academics and industry. Despite the increasing prominence, the studies on the nexus between ESG disclosure and firm FP provide diverse findings; several studies suggest a positive relationship, while others indicate a negative or mixed relationship.

The empirical evidence from the previous literature highlights that the interplay between ESG disclosure and firm performance is contingent on the region or industry type; some studies have analysed region-specific effects on the relationship. Prior researchers have offered positive insights that ESG disclosure improves operational efficiency, stakeholders' relations, and provides a competitive advantage in the industry [1–2]; on the contrary, some research argues that ESG considerations lead to additional costs that affect the profitability of corporates in the short term [3–4]. Therefore, the mixed findings suggest that the interplay between ESG disclosure and FP is context-specific and varies across regions, industry characteristics, and governance-related factors, thereby influencing the effectiveness of sustainability initiatives. BGD has garnered significant scholarly attention as one of the governance mechanisms that may impact ESG initiatives. Female representation on board increases ethical sensitivity, improves shareholders' interests and enhances the execution and supervision of ESG initiatives, hence amplifying their influence on FP. Nevertheless, there are still conflicting empirical findings on the moderating mechanism of BGD, highlighting positive, negative, and negligible moderation effects [5–6].

Given the mixed findings regarding the moderating mechanism of BGD in the nexus between ESG disclosures and firm performance in different regions and industry-specific contexts, the current study seeks to explore the relationship between ESG disclosure and firm FP in BRIC countries. The BRIC countries- India, Brazil, China, Russia and South Africa, represent emerging economies and contribute significantly towards global economic growth and carbon emissions. Nevertheless, BRIC countries continue to show heterogeneity from developed countries in terms of institutional quality, governance mechanisms and female representation on board. These variations offer a unique setting for investigating the nexus between ESG disclosure practices and FP and analysing the moderating role of gender diversity on board in developing economies.

The particular study contributes to the gap by exploring the relationship between ESG disclosure and ROA, ROE and TBQ as measures of firm FP from the period 2015–2023, which relatively few studies have examined from multiple dimensions, considering both market and accounting-based measures within the BRIC economies. Further, the moderating role of BGD is still a new and fragmented concept, which is more explored within developed or individual contexts. The study also includes control variables such as firm size and leverage ratio to consider firm exogenous factors that could affect performance. The results of the analysis will generate meaningful insights into how FP responds to ESG disclosure practices and the moderating role of BGD in BRIC economies.

The particular study contributes to the literature as follows: Firstly, it provides an integrated view of the firms in the BRIC economies on ESG- firm performance and the moderating effect of BGD using a panel dataset of 444 non-financial firms from the 2015–2023. Secondly, the analysis includes both accounting and market-based measures of FP to explore the relationship with the panel regression framework, providing a balanced assessment of both measures. Also, the study provides practical insights for stakeholders and corporate management on governance, regulatory framework and sustainability policies. These contributions distinguish the present study from the previous literature and advance the body of knowledge by aligning it to with Sustainable Development Goal (SDG). The existing study analysing the environmental, social and governance dimension which support the “SDG 13 – Climate Action, SDG 5 – Gender Equality, SDG 8 – Decent Work and Economic Growth”. Due to inclusion board gender diversity, corporate attention towards environmental sustainability enhanced and lead to strategic decision-making, encouraging stronger environmental policies, resource efficiency, pollution reduction, and transparent ESG disclosure. Strengthen ESG disclosure have a impact on financial performance results into sustainable development

Further research paper is structured as follows: Section 2 involves a review of literature and hypothesis development; Section 3: Conceptual Model; Section 4: Methodology; Section 5: Results and Discussions of regression analysis; Section 6: Conclusion, along with findings, implications and limitations of the study.

2. Literature Review

2.1 ESG Disclosure and Financial Performance (FP)

ESG is a framework that considers non-financial criteria to evaluate corporate sustainability. It assesses how the firms carry out the sustainable practices, respond to the sustainable matters and use in valuation for growth [7]. Corporates usually record the ESG initiatives individually as Environmental, Social and Governance disclosures, where environmental dimension encompasses the issues related to climate change, waste management and firm's overall impact on the environment. The social dimension assesses the relationship among employees, shareholders, customers, policies, welfare and community relations. Further, the governance dimension embraces the practices of ethical and transparent management, employee and shareholders' rights, style of leadership, board composition and structure. Altogether, this constitutes the overall ESG disclosure, reported by corporates [8]. The corporate disclosure norms influence the firm's performance and outcomes. The corporate's FP reflects its economic and financial outcomes, including liquidity, profitability, and market value. The literature measures the FP in various combinations, combining accounting and market-based indicators such as Torbin's Q, ROE, ROA, ROI, earnings per share and dividend per share. The existing literature studies the concept of ESG disclosure and FP in both ways together, and how the single dimension E,S,G affects the firm's performance, grounded in multiple theoretical backgrounds, along with mixed findings [9].

Several researchers have found a positive influence of ESG disclosure on firm FP. Table 1 depicts the positive impact of ESG disclosure and FP.

Table 1
Positive Relationship between ESG and Financial Performance (FP)

Authors	Sample period	ESG Measurement	FP measurement	Countries	Findings
(Albitar et al., 2020) [10]	2009–2018	ESG Disclosure Score	Tobin's Q	UK	Positive relationship
(Mohammad & Wasiuzzaman, 2021) [11]	2017	ESG disclosure score	Tobin's Q	Malaysia	Positive relationship
(Abdi et al., 2022) [1]	2009–2019	ESG Score	Tobin's Q	Multination	Positive relationship
(Elmghaamez et al., 2024) [7]	2009–2019	ESG Disclosure scores	ROE, ROA, ROC, ROI, Earnings per share, Dividend per share, Tobin's Q	Multination	Positive relationship
(Chung et al., 2024) [2]	2019	ESG disclosure score	Return on asset	Hong Kong	Positive relationship
(Loan et al., 2024) [12]	2018–2022	ESG Score	ROA, ROE	Vietnam	Positive relationship between (E), (G) pillars with FP
(Shalhoob, 2025) [13]	Period of six months	ESG disclosure score	ROI	Saudi Arabia	Positive relationship
Source: Authors Compilation					

The study [10] did a least square analysis considering the period before and after 2013 in the UK and found a positive relation between ESG disclosure and Performance. Further, [1, 7] conducted an analysis in multiple countries, contexts and time periods, find positive relationship between the variables respectively. Other analysis which finds a positive impact of ESG disclosure and FP are as follows: [2, 11–13].

Similarly, the literature also presents a negative and mixed relationship between ESG disclosure and FP. Table 2 depicts the existing literature on the negative and mixed impact of ESG disclosure on FP.

Table 2
Other Studies showing relationship between ESG on Financial Performance (FP)

Authors	Sample Period	ESG Measurement	FP Measurement	Countries	Findings
(Garcia & Orsato, 2020) [14]	2007–2014	Dow Jones Sustainability Index	ROA	Multination	Negative relationship
(Saygili et al., 2022) [15]	2007–2017	ESG Score	ROA, Tobin's Q	Turkey	Negative relationship of Environmental disclosure with firm performance and positive association between Social and governance disclosure.
(Kalia & Aggarwal, 2023) [16]	2020	ESG score	Tobin's Q	Developing and Developed economies	Negative association in the case of developing countries and positive in case of developed economies.
(Rao et al., 2023) [17]	2015–2022	ESG Score	ROE	India	Negative relationship
(Setiani, 2023) [3]	2022	ESG Risk Score	ROA	Indonesia	Negative relationship
(Bahadır & Akarsu, 2024) [4]	2002–2022	ESG Score	ROA, Tobin's Q	Europe	Negative relationship
Source: Authors Compilations					

The above-mentioned research presents a negative and mixed relationship between ESG disclosure and FP. [15] studied the mixed relationship individually and as E, S, and G disclosure on FP and analysed the Environmental score relates negatively, and the Social and Governance dimension relates positively with FP. On the other hand, [16] find mixed results: a negative relationship in developing economies and contradictions in developed economies. While the studies carried out in different geographical contexts depict negative results [3–4, 14, 17].

The literature highlights conflicting opinions on the influence of ESG disclosure on FP. Therefore, it is arguable whether ESG has an impact on FP. Thus, in light of the literature previously discussed, as the majority of the studies highlight positive outcomes, the hypotheses are as follows.

H1: There is a positive association between ESG disclosure and the FP of corporates.

2.2 Moderating Mechanism of Board Gender Diversity

BGD is an important governance factor, defined as the percentage of men and women in the corporate board composition. In general, diversity on board facilitate effective decision-making by introducing different perspectives, experiences and attributes. Such a diverse composition is associated with the shareholders' trust, ethical and transparent behaviour, thus emerging as a modern aspect of corporate governance. In a similar vein [18] state that an increase in the percentage of females on board contributes towards significant improvement in a firm's FP. Conversely, few studies have found an insignificant impact of BGD on the relationship between ESG and FP [5, 19].

In view of stakeholders' theory and resource dependency theory, various studies have highlighted that a diverse board helps the corporates to utilize the resources effectively and efficiently, moreover, serves the shareholders' expectancies [20]. Board of directors inclusive of female are vital resource for an organisation that helps in achieving operational efficiencies, monitoring performance, providing innovative solutions and guidance essential for long term business success and sustainability. Consistent with the shareholders' theory, BGD improves the decision making, manages risk and reputation, and shareholders' involvement, all of which ultimately impact the FP. The presence of women on board produces in-depth discussions, provides techniques for problem solving, and offers comprehensive strategies that take ESG considerations into account [6].

While examining the existing literature that studies the relationship between ESG and FP, the environmental dimension, FP and BGD, the majority of the empirical research reveals that the presence of females on board is linked to better corporate FP and sustainability [21]. Based on the theoretical justifications and empirical results, BGD moderates the link between ESG disclosure and a firm's FP; therefore, the following hypothesis can be proposed.

H2 Board Gender diversity has a positive moderating effect between ESG disclosure and FP.

The literature has already examined the moderating mechanism of BGD between ESG disclosure and FP; however, empirical studies in developing economies still yield mixed and inconclusive findings. Moreover, the literature has employed samples from different industries, ignoring the specificity and regulatory activities of financial firm; hence, this study considers the non-financial firms in BRIC economies as a sample of study. In addition, the literature on the relationship between ESG disclosure and FP measures the FP in different ways discussed in literature, limited literature exists that proxy's FP considering all three dimensions: ROA, ROE and Tobin's Q. Therefore, it is vital to examine the moderating effect of BGD between ESG disclosure and FP in BRIC economies with a new lens.

The following sections present a conceptual model, shown in Fig. 1.

3. Material and methods

Source: Authors Compilation

3.1 Data Acquisition and Sampling Strategy

The analysis tests the hypothesis through secondary data from the Bloomberg database, focusing on a panel data set from 2015 to 2023. The sample selection is based on the availability of data and trends of sustainability reporting practices in the BRIC Countries. The study exclusively focuses on the non-financial firms of BRIC economies, considering the following indices of the countries: India (BSE-100 Companies), Russia (Russia Trading System Index), China (Shanghai Stock Exchange), Brazil (Broad Based Index), South Africa (Johannesburg Stock Exchange/ FTSE). A systematic approach to data scrutiny is followed, involving only non-financial firms, as financial firms involve specific operational activities and regulatory frameworks, and excluding firms with non-disclosure and insufficient data availability. After a recurring process, the final sample was narrowed to 444 non-financial firms. The study explores the direct and moderating impact of ESG performance on firm's FP, where the data was collected and is incorporated into a panel regression model.

3.2 Variables

3.2.1 Dependent Variable

Firm FP is measured using Tobin's Q, ROE, and ROA. Previous empirical studies have examined the firm's FP using a single or dual proxies, commonly the market-based or accounting-based indicators [2, 4, 11]. However, the use of Tobin's Q, ROE and ROA as proxies for a firm's FP is confined [7]. Therefore, the study utilizes the three measures to examine the FP. Particularly, Tobin's Q encompass the investors' expectations for future growth, intangible value, as well as forward-looking market valuation, while ROE and ROA reflect the operational effectiveness and managerial efficiencies in producing returns from shareholders' equity and assets. As ESG Disclosure can impact both profitability and market perception, relying on a single proxy may produce biased results.

3.2.2 Independent Variable

ESG Disclosure score are extracted from the Bloomberg, acknowledged as standard database for sustainability reporting based on Global Reporting Initiatives, as it facilitates a metric of disclosure levels for each firm, scaling between 0-100, where 0 reflects the absence of disclosure and 100 signifying the highest disclosure score. The index is established through a systematic collection and evaluation of data points where each data points are weighted according to its significance and relevance in a particular industry by experts. Therefore, because of its standards and reputation, Bloomberg's ESG Disclosure Scores are extensively used in academic research, highlighting their value in empirical research on corporate transparency [22].

3.2.3 Moderating Variable

In the existing literature, BGD is measured in several ways [19]. Although Gender diversity on boards is commonly measured using the Blau Index, it is widely used in socio-economic research [23]. In this study, BGD is proxied by the percentage (%) of women on board. The data for the variable are retrieved from the Bloomberg database, ensuring transparency, reliability, and comparability across firms. The percentage of female members is reported continuously (0-100%), where 0 indicates no females on

board and 100 indicates a high proportion of females, calculated as the number of females present on board divided by the board size.

3.2.4 Control Variables

We controlled those variables that prior research [23–24] has found to impact the relationship between ESD disclosure and FP, such as financial leverage and firm size.

Table 3 represents the Variable Measurements

Table 3 Variable Measurements

Variables	Measurements	Data Sources
<i>Independent Variable</i>		
ESG Disclosure Scores (LogESG)	Bloomberg ESG Disclosure Scores scale from 0 to 100.	Bloomberg
<i>Dependent Variable (Firm Financial performance / Financial performance)</i>		
Tobin's Q (LogTBQ)	Sum of the booked value of debts, market value of common shares, and preferred stocks at the end of the year, divided by Total Assets	Bloomberg
Return on Assets (LogROA)	Net income ÷ total assets at the end of the reporting period	Bloomberg
Return on Equity (LogROE)	Net income ÷ Shareholder's Equity	Bloomberg
<i>Moderating Variable</i>		
Board Gender Diversity (LogWB)	% of Women on Board scaling from (0-100%)	Bloomberg
<i>Control Variable</i>		
Financial Leverage (LogFL)	Long-term debts ÷ total assets	Bloomberg
Firm Size (LogMcap)	Firm size is measured by the natural log of market capitalisation	Bloomberg

Source: Authors Compilation

3.3 Model

To analyse the research objectives, a panel data regression model is employed on the panel dataset from the period 2015–2023. The study uses one dependent variable (for firm i in year t): firm FP, measured using ROA, ROE, and TBQ; one independent variable, ESG disclosure score; two control variables, financial leverage and firm size (LogMcap); and BGD as a moderating variable. Consistent with the similar approach followed in the previous studies [25–26], the current study drives six different model specifications and employs panel regression analysis. The study includes the first three models that analyse the direct effect between ESG scores and firm FP (TBQ, ROE, ROA), respectively, and the next three models analyse the moderating effect between ESG scores and firm FP. The moderating variable, BGD, measured as the percentage of women on board, adds novelty to the current study. The empirical determination of the model fit is done through the Hausman test. If the p-value is below 0.05,

the null hypothesis (H_0) is rejected; the fixed effect model is preferred; conversely, the random effect model is preferred. Therefore, the results reveal that the fixed effects model is appropriate for the empirical results. The models are expressed below.

$$ROA_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 FL_{it} + \beta_3 LogMcap_{it} + \varepsilon_{it} \quad (1)$$

$$ROE_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 FL_{it} + \beta_3 LogMcap_{it} + \varepsilon_{it} \quad (2)$$

$$TBQ_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 FL_{it} + \beta_3 LogMcap_{it} + \varepsilon_{it} \quad (3)$$

$$ROA_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 WB_{it} + \beta_3 (ESG * WB)_{it} + \beta_4 FL_{it} + \beta_5 LogMcap_{it} + \varepsilon_{it} \quad (3)$$

$$ROE_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 WB_{it} + \beta_3 (ESG * WB)_{it} + \beta_4 FL_{it} + \beta_5 LogMcap_{it} + \varepsilon_{it} \quad (4)$$

$$TBQ_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 WB_{it} + \beta_3 (ESG * WB)_{it} + \beta_4 FL_{it} + \beta_5 LogMcap_{it} + \varepsilon_{it} \quad (5)$$

4. Results and Discussion

4.1 Descriptive Statistics

Table 4
Descriptive Statistics

Variables	Minimum	Maximum	Mean	Standard Deviation (Std. Dev.)
LogROA	-2.004	9.313	0.701	0.503
LogROE	-1.845	2.798	1.009	0.441
LogTBQ	-1.274	1.915	0.290	0.328
LogESG	0.875	1.924	1.612	0.134
LogWB	- 0.424	1.875	1.175	0.286
LogFL	- 0.508	2.763	0.426	0.293
LogMcap	- 0.946	14.571	10.234	2.047
Source: Authors Compilation				

Table 4 represents descriptive statistics of the variables involved in the analysis. In context of FP, the mean LogROA is 0.701, with values ranging from - 2.004 to 9.313; the mean of LogROE is 1.009, with values spanning between - 1.845 and 2.798; and the mean of LogTBQ is 0.290, with values lying between - 1.274 to 1.915, indicating positive firm FP among the BRIC economies. The standard deviation of LogROA, LogROE and LogTBQ is 0.503, 0.441, 0.328 respectively shows a reasonable level of variation in the firm performance of the sampled firms. Concerning the ESG disclosure score (LogESG), the mean value is 1.612, with a standard deviation of 0.134. The relatively low dispersion around the mean indicates that the sampled firms exhibit generally consistent ESG disclosure practices.

Further evidence of the variance in the level of ESG disclosure of the firms is shown with minimum and maximum values ranging from 0.875 to 1.924. Regarding the BGD, the mean value (LogWB) is 1.175, while the standard deviation is 0.286. The observed variations suggest that female representation on board varies among the sampled firms. The board composition of BRIC companies represents substantial heterogeneity, as evident by the values spanning from – 0.424 to 1.875. As control variables are concerned, the Financial leverage (LogFL) has an average of 0.426 and a standard deviation of 0.293, reflects that the firms’ financing structure varies moderately. The results suggest that the BRIC companies relies on levels of debt financing, reflecting differences in risk profile and financing strategies. In contrast, Firm size (LogMcap), has an average of 10.234 and a standard deviation of 2.047, demonstrates substantial level of heterogeneity in the firm size. The wide dispersion indicates the presence of small and extremely large firms throughout the BRIC economies, which emphasizes the diverse nature of the firms and explains the inclusion of firm size a vital control variable in the analysis.

Comprehensively, the dataset is adequate for further empirical analysis, as the descriptive statistics reveal variation among the study variables. The heterogeneous nature of the BRIC firms is highlighted by the level of dispersion across the variables, also presented by [27], which provides a strong reason for investigating the relationship between ESG disclosure and firm FP, along with the moderating role of BGD.

4.2 Correlation Matrix

Table 5
Correlation Analysis

LogROA	LogROA	LogROE	LogTBQ	LogESG	LogWB	LogFL	LogMcap
	1						
LogROE	0.7116	1					
LogTBQ	0.3806	0.2257	1				
LogESG	-0.0436	0.0472	-0.1295	1			
LogWB	0.0252	0.1410	-0.1054	0.1450	1		
LogFL	-0.3983	0.0406	-0.2428	0.0942	-0.0304	1	
LogMcap	0.0429	0.1630	-0.2183	0.0858	0.2782	-0.0343	1
Source: Authors Compilation							

The analysis shown in Table 5 depicts the Pearson Correlation Coefficient analysis among the studied factors. The correlation between the LogESG score and FP is relatively low, indicating a weak relation with FP measures. LogESG exhibit a positive but weak relationship with LogROE, while showing a negative correlation with LogROA and LogTBQ. Moreover, the correlations between the LogESG and LogROA, LogROE, and LogTBQ are below the conventional threshold, indicating no serious

multicollinearity. The relationship between firm performance measures LogROA and LogROE exhibits a substantial positive correlation, given that both the ratios assess similar dimensions of profitability. LogTBQ and LogROA have a moderate but a positive relationship, indicating that the companies with better accounting performance exhibit higher market valuation. Similarly, relatively low positive correlation between LogROE and LogTBQ. Additionally, there is a comparatively weaker correlation between the moderating variable, LogWB and firm FP measures. In particular, weak but positive relation between LogWB and LogROE, whereas a negative correlation with LogROA and LogTBQ. The results explain that female board representation does not depict a significant and direct correlation with firm FP. The control variables, LogFL shows a strong negative relationship with LogROA and LogTBQ, respectively, suggesting that highly leveraged firms report lower profitability and lower market valuations. Nevertheless, the correlation between LogFL and LogROE is negligible. Firm size (LogMcap), has a weak but positive relationship with LogROE and LogROA but a negative correlation with LogTBQ, suggesting that larger firms might have lower market premiums and growth opportunities. Further, LogESG and LogWB exhibit a positive relation, demonstrating that firms with BGD have better ESG scores, whereas LogESG shows a weak but positive relationship with LogMcap and LogFL. In a similar vein, LogWB is positively correlated with LogMcap, inferring that large firms tend to reflect high BGD.

The existing model indicates the presence of heteroscedasticity in regression model ($\chi^2(1) = 256.53, p < 0.001$) which is performed by “Breusch-Pagan Test”. The model also faces the problem of autocollinearity ($F(1,438) = 51.486, p < 0.001$) performed with the “Wooldridge Test”. Before moving with model testing, unit root test and VIF are checked, all variables are stationary at zero level and no multicollinearity is faced as the VIF values are below the threshold level of 5 [31].

4.3 Results Estimations

4.3.1 Direct Effect Models

Table 6
Direct Effect Metrix

Variables	LogROA	LogROE	LogTBQ
LogESG	-0.1896 ^{***}	-0.1767 ^{**}	-0.1151 ^{***}
	(-2.68)	(-2.59)	(-3.35)
LogFL	-0.2342 ^{***}	0.2511 ^{***}	-0.0392 [*]
	(-5.39)	(6.01)	(-1.87)
LogMcap	-0.0096 ^{**}	0.0402 ^{***}	-0.0826 ^{***}
	(-2.37)	(10.40)	(-42.31)
Constant	1.2056 ^{***}	0.8665 ^{***}	1.3390 ^{***}
	(10.46)	(7.82)	(23.98)
Number of firms	444	444	444
Within R ²	0.0138	0.0406	0.3523
F-statistics	16.13	48.82	633.03
Prob > F	0.0000	0.0000	0.0000
Note: ^{***} , ^{**} , and [*] denotes statistical significance level at 1%, 5% and 10% level.			
Source: Authors Compilation			

Table 6 presents the results of a fixed-effects model (FE model) examining the direct effect of ESG disclosure scores on firm FP. The results are presented for each measure of FP: LogROA, LogROE and LogTBQ. The findings indicate that ESG scores have a statistically significant negative impact on all three measures of firm FP. The findings align with [17, 28]. Particularly, there is a substantial negative impact of ESG scores on ROA, indicating that a decrease in a firm's accounting profitability is linked with an increase in ESG performance. These results align with [28]. Likewise, ROE is negatively impacted by ESG disclosure practices, suggesting that firms with better ESG disclosure practices produce low returns for shareholders. These results are similar to [26]. Additionally, ESG disclosure exhibit a statistically significant and negative impact on TBQ, suggesting an inverse relationship: an increase in ESG performance leads to a decrease in the firm's market value. The results are consistent with [29]. Therefore, the results indicate that firms allocate substantial resources in disclosure practices related to environmental, social and governance. Moreover, the firms may incur high costs in reporting practices and implementing ESG-related policy frameworks; hence, these practices enhance the shareholders' confidence, corporate reputation and transparency over the long term, but the short-term financial benefits may outweigh the related costs. Consequently, firms experience low market value and profitability, which is explained by the negative relationship between firm ESG scores and FP.

For the control variables, financial leverage (FL), exhibits a significant negative effect on ROA and TBQ, indicating that highly leveraged firms demonstrate low profitability and firm value. The results are consistent with [30]. Conversely, financial leverage and ROE have a positive and statistically significant impact, implying that corporates employing high debt could generate higher returns for investors. The positive coefficient indicates that the use of debt financing may increase earnings attributable to equity holders, thereby improving shareholders' returns. The overall results imply that firms operating with leverage may be utilising the borrowed funds to finance profitable ventures and enhance overall equity performance. Further, Firm size (LogMcap) indicates mixed findings across models. Firm size has a significant and negative effect on ROA. It means large organisations may experience operational inefficiencies that decreases the asset profitability. Contrarily, firm size has a significant and positive impact on ROE and TBQ, implying that large firms benefit from strong investor confidence and economies of scale.

Finally, the results reveal the varying impact of ESG disclosure scores on firm FP measures. The within R^2 values for the three models is 1.38%, 4.06% and 35.23%, explaining within firm variations in ROA, ROE and TBQ, respectively. Comparatively, a higher value of within R^2 of Tobin's Q model indicates that ESG scores and both the control variables, financial leverage and firm size are more strongly associated with market-based performance dimensions than accounting-based performance measures. Thus, H1 is rejected as ESG scores exhibit a statistically significant but negative relationship with the three measures of FP. Rather, the results indicate a significant and negative impact of ESG scores on ROA, ROE, and Tobin's Q.

4.3.2 Moderating Effect Model

Table 7
Moderating Effect Metrix

Variables	LogROA	LogROE	LogTBQ
LogESG	-0.1821**	-0.2993***	0.0000
	(-2.33)	(-3.98)	(0.00)
LogFL	-0.2290***	0.2500***	-0.0361*
	(-5.25)	(5.97)	(-1.27)
LogMcap	-0.0082*	0.0301***	-0.0730***
	(-1.66)	(6.45)	(-31.10)
LogESG_LogWB	-0.0119	0.0753***	-0.0739***
	(-0.57)	(3.78)	(-7.40)
Constant	1.2002***	1.0247***	1.1932***
	(9.77)	(8.69)	(20.20)
Number of Firms	444	444	444
Within R ²	0.0139	0.0446	0.3628
F-statistics	12.13	40.12	494.19
Prob > F	0.0000	0.0000	0.0000
Note: ***, **, and * denotes statistical significance level at 1%, 5% and 10% level respectively.			

Table 7 presents the results of the moderating effects of BGD in the relationship between ESG and firm FP, measured using ROA, ROE and TBQ. The results indicate that ESG scores continue to have a negative and statistically insignificant impact on ROA (5% significance, $p < 0.05$) and a positive effect on ROE (1% significance, $p < 0.01$), while their impact on TBQ remains negative but significant ($p > 0.10$). The moderation effect is negative and statistically insignificant with ROA, suggesting that, with an increase in female representation on the board, the impact of ESG scores on ROA becomes less positive and the impact remains unchanged. These findings are consistent with [32]. On the other hand, the moderation effect is positive and statistically significant at the level of 1% ($p < 0.01$) in the case of ROE, indicating that the association between ESG scores and ROE is positively influenced by the BGD. These findings are similar with [25]. The estimations suggest that as the percentage of female representation on board increases, so does the positive impact of ESG scores on shareholders' returns. As a result, companies with more women on board are better equipped to convert their ESG practices into high returns for their shareholders. While the moderation effect is negative but significant with TBQ at a 1% significance level ($p < 0.01$), indicating a weak moderation effect between ESG scores and firm performance. These

findings are contrary to [10]. The estimates suggest that even though gender diversity on boards may enhance stakeholder involvement and governance quality, these advantages may not be fully reflected in market valuations. For the control variables, in the case of financial leverage, the results remain consistent with the direct effect model, while firm size exhibits a positive impact on ROE, but a negative impact on ROA and TBQ.

The overall results reveal that BGD partially moderates the relationship between ESG and firm FP. In particular, the relationship between ESG scores and ROE is considerably strengthened by gender diversity on board, suggesting that it improves companies' ability to generate shareholder value from ESG practices. However, the moderation effect between ESG and ROA is insignificant, while depicting a significant weak relationship between ESG and TBQ. The Within R^2 values of the three models is 1.39%, 4.46% and 36.28%, explaining the variation between the independent and dependent variables. A comparatively higher value of within R^2 of TBQ models indicates that ESG scores, both the control variables and BGD, are pertinent in explaining market-based performance. Thus, H2 is partially supported, as women on board significantly moderate the relation between ESG disclosure scores and ROE and TBQ, but not with ROA as measures of firm FP.

5. Conclusion

The study examines the effect of ESG disclosure practices on firms' FP and investigates the moderating mechanism of BGD in BRIC countries using panel data regression during the period 2015–2023. The study utilizes ROA, ROE (accounting-based measures) and Tobin's Q (market-based measure) to assess the FP comprehensively. The findings of the analysis reveal that ESG disclosure practices has a significant negative impact on the firm's FP, suggesting that increased ESG initiatives and engagement in the disclosure practices in BRIC economies may lead to short-term implementation costs that negatively impact profitability and market value rather than immediate financial or market gain. The results of the moderation mechanism reveal that female representation on board does not significantly impact the relation between ESG disclosure and ROA. Nonetheless, the relationship between ESG disclosure and ROE is positive and considerably strengthened by female representatives on board, indicating that the presence of females on board enhances the effect of ESG initiatives in generating returns for shareholders. On the contrary, BGD negatively moderates the relationship between ESG disclosure and Tobin's Q, suggesting that the investors in BRIC economies may not immediately recognise and reward the benefit of ESG investments and enhanced BGD combined. Therefore, the mixed magnitude of moderation suggests that the influence of a gender-diverse board on the relationship between ESG disclosure and firm performance is contingent on the performance measures employed. The study extends the existing literature on ESG by offering evidence from BRIC countries, where the governance factors, regulatory framework, institutional settings and sustainability practices vary from developed economies. The analysis demonstrates that the relationship between ESG and firm performance varies depending on different institutional settings, where BGD plays a critical role in shaping the relationship.

Further, the study provides the implications from both the theoretical and practical perspectives. The study expands the stakeholder theory by revealing that the financial effects of ESG initiatives are not universally favourable and positive. Although the stakeholder theory emphasises that addressing the stakeholders' interests improves firm performance, but the strong negative correlation between ESG disclosure and all three measures of FP demonstrates that in emerging economies, the expenses of implementing ESG initiatives may exceed the short-term financial gains. The results imply that the value created for stakeholders through ESG initiatives may be realized over an extended period. The study also advances the resource-based view and agency theory by examining the moderating effect of BGD as a governance factor. The positive moderating effect on ROE demonstrates that the female representation on board improves the effectiveness of ESG initiatives through enhanced monitoring and an independent perspective, and improves strategic decision-making. The negative moderation effect on Tobin's Q and insignificant impact on ROA indicate that the impact remains non-uniform across dimensions of firm performance. The study also provides implications for corporate managers, regulators, policy makers and investors in BRIC countries. Corporates should adopt a strategic, long-term approach to ESG implementation rather than viewing these initiatives as a way to satisfy stakeholder expectations and regulatory requirements. The organisations can strengthen the governance through a diverse board, which can further improve the quality and transparency of disclosure practices, and enhance the effectiveness of sustainable practices and promote long-term value creation. The findings also emphasise the need to design a conducive institutional framework and standardised practice of ESG reporting for effective adoption of sustainability practices. Overall, the study suggests that ESG disclosure practices must be evaluated along with the quality of governance in order to facilitate effective investment, managerial and regulatory decisions that support sustainable growth in corporates.

Besides valuable contributions, the study has certain limitations that open directions for future research. Firstly, the generalizability of findings may not apply to other institutions, as the study analyses the relationship between ESG disclosure and firm performance in BRIC economies. Secondly, the study employs integrated ESG disclosure scores and measures BGD through the percentage of women on board, solely, without considering the separate pillars and other characteristics of governance. Moreover, the current study relies on panel regression, offering strong empirical insights; omitted variable biases and endogeneity may affect the findings. Future researchers may overcome these limitations by analysing the individual E,S,G pillars, incorporating and exploring more governance factors, employing advanced methodological techniques and conducting longitudinal and comparative studies across distinct institutional contexts.

Declarations

Ethics approval and consent to participate:

This study used only secondary data obtained from publicly available databases and did not involve human participants, interviews, surveys, or the collection of personally identifiable information. Therefore, ethical approval and informed consent were not required for this study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests

Consent to Participate declaration:

Not Applicable

Clinical Trial Number:

Not applicable.

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Figures

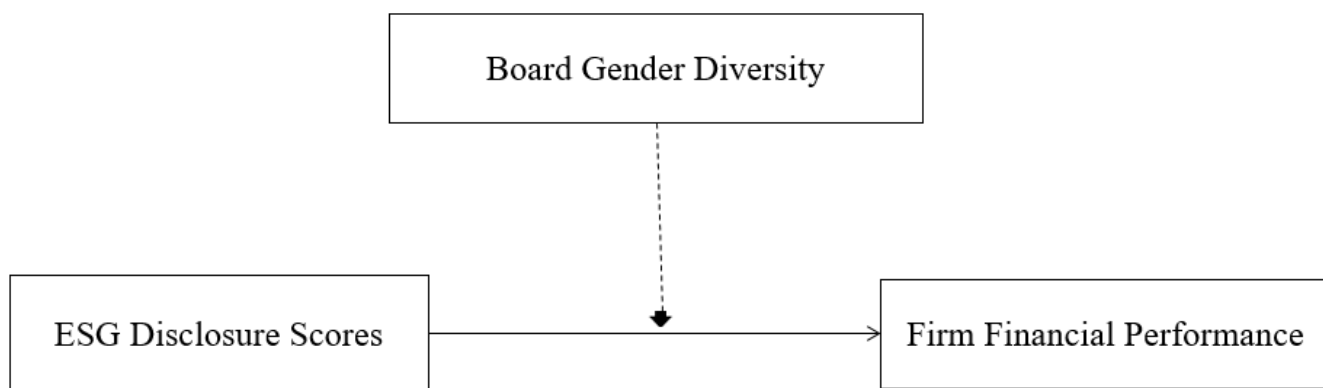


Figure 1

Conceptual Model

Source: Authors Compilation