

ASSESSING THE IMPACT OF ESG SCORES ON PROFITABILITY AND MARKET VALUATION OF ESG INDEX LISTED COMPANIES: A MULTIPLE PANEL REGRESSION FRAMEWORK

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ABSTRACT

Purpose: The present study examines the impact of environmental, social, and governance (ESG) performance on accounting-based profitability and market valuation in an emerging-market setting. It aims to clarify how ESG investments translate into financial out-comes and whether firm-specific factors condition these effects.

Methodology: Using a quantitative, descriptive research design, secondary ESG and financial data for 194 BSE ESG index companies from 2011 to 2022 were collected via Bloomberg and Prowess. Statistical analysis including descriptive statistics, correlation matrices, multiple panel regressions models, and robustness checks (ADF and Hausman tests) was performed in Excel and Gretl to assess the impact of ESG disclosures on firm performance.

Findings: Overall ESG performance exhibits a significant positive association with Tobin's Q and a modest positive relationship with firm profitability. The findings reveal that while higher ESG scores slightly reduce short-term return-based profitability (ROE and ROCE), they significantly enhance market valuation (Tobin's Q), suggesting a trade-off between immediate financial returns and long-term market perception.

Implications: Investors should factor ESG metrics into valuation models, especially governance and social practices. Corporate managers ought to tailor ESG strategies to industry dynamics and balance upfront costs against long term market rewards. Policymakers may refine disclosure standards to reduce reporting inconsistencies and enhance comparability.

Originality: The study provides novel empirical insights into the ESG–performance nexus in an emerging market by applying fixed-effect panel regressions and multi-equation models.

KEYWORDS: Bombay Stock Exchange; Environmental Social Governance; ESG Score; Financial Performance; Financial Leverage; Market Valuation; Profitability.

1. INTRODUCTION

Corporate finance and corporate governance have been more dependent on ESG scores in recent years. However, the definitions of such scores and their implementation differ in the literature. A systematic review identified five “thematic definitions: sustainability; corporate social responsibility; disclosure; finance; and ESG score analysis (Clément et al., 2023). Investing within the ESG paradigm favors not only financial returns but also the environmental, social, and governance impacts of the company in question (Izmailova et al., 2023; Macey, 2022). Credit rating agencies should consider integrating ESG scoring into their rating process or else provide separate ESG scores for investors to consider alongside the established credit rating.” Furthermore, the significance of ESG scores in corporate finance. As a whole, ESG factors favorably support corporate profits, with larger concerns being influenced greatly by the corporate governance effect. Again, the hallmark area of this is corporate governance (Kim & Li, 2021). The scores for environmental, social, and governance criteria also incorporate likely important information on downside risk, particularly for smaller firms with greater asymmetry concerning information (Benlemlih, et al., (2018); Huang (2022); Yu, et al., (2018). Ultimately, integration of ESG concerns is important in investment management and portfolio construction for maximizing value and minimizing risk, and investors should include both financial and non-financial instruments in their decision-making (Duuren, et. al., 2016).

In addition, such an issue has recently acquired significance in all the world's financial markets. Between 2012 and 2015, global assets in SRI witnessed an increase of 61%, coming to \$21.4 billion (Risalvato et al., 2018). Increased attention to climate change, social responsibility, and corporate governance matters causes such growth. Investors are looking at their asset allocation given such changes that favor resilient companies with stable returns meeting the sustainability requirements (Sun & Zhao, 2024). Expecting an optimistic future for ESG investing in light of the surging appetite for sustainable investment across all sectors; this- attracting the

above challenges-should not be the end of the story. The integration of corporate social responsibility in financial decisions results in better, more incisive yet wide-ranging outcomes for markedly diversified business sectors. A meta-analysis of 85 studies concluded that SRI performance is on par with conventional investments (Revelli & Viviani, 2015). SRI mutual funds affect investee firms' ESG performance positively, thus affirming a real commitment rather than mere window-dressing (Peng et al., 2023). This suggests that the integration of ESG criteria into investment strategies can indeed be profitable while providing a mechanism for the enforcement of CSR.

On the other hand, incorporating these three major factors (ESG) into decision-making in financial matters presents a chance that every-one would benefit, although the challenges far outweigh the opportunities. Implementation of ESG integration by businesses involves major challenges. While it enhances the public image of a business and improves risk mitigation and sustainability for the entity (Shetty & Suraj, 2024), there exist some obstacles. Integrating ESG factors into risk assessment and financial management would yield a case of better resilience and long-term value creation in business when duly committed and properly implemented (Pavani, 2024). Furthermore,

the relationship between ESG scores and firm performance has shown mixed results across studies. For instance, Lee et al. (2023) found that stable ESG scores were associated with better firm performance, while ratings by agencies could promote greenwashing. On the contrary, Narula et al. (2023) reveal that no relationship exists as far as ESG components are concerned with the performance of the firm in Indian companies. The observation of Shaikh (2022) stated that environmental factors would exert a negative effect; social factors would have detrimental effects, and governance is associated positively with operational efficiency for firms outside India. Papadaki and Pavlopoulou-Leck (2020) found that a negative relationship between ESG scores and profitability was attributed to the short-term use of resources for social responsibility activities. However, it was found that healthy ESG controversy scores are positively correlated with profitability due to the net benefits of reputation. The impact of the scores varied according to some factors, such as ethics-related policies and perceptions of market corruption.

The study sheds light on the need for a comprehensive and multidimensional approach to analyze the influence of ESG on corporate performance. The paper emphasizes the priorities for external factors (such as policy and the digital economy) and internal factors, including shareholder governance and executive characteristics, in shaping ESG performance (Xue, 2024). The bibliometric analyses and systematic literature reviews have brought forth salient themes, influential publications, and research gaps in ESG literature; therefore, a useful roadmap for future research (Mukhtar et al., 2024; Khaw et al., 2024). "The significance of this study indeed lies in its contribution to the emerging field of sustainable finance in establishing the consequences of ESG scores on the Performance of the Firm." Like-wise, the study will enable regulators to fine-tune ESG disclosure regulations and command transparency and consistency in reporting standards.

The paper contains multiple essential sections which make up its complete structure. The Introduction section provides background information about the study while the Literature Review section presents an in-depth examination of existing research in the field. The Methodology section describes how researchers designed their study and which data sources they used and what methods they applied. The study presents its main results which will be followed by a Discussion that explains the findings through existing research and practical uses. The study will conclude with a summary of key findings and recommendations for upcoming studies.

2. LITERATURE REVIEW

2.1. Theoretical Framework

2.1.1. Stakeholder Theory

The "stakeholder approach by R. Edward Freeman (1984) offers a very fundamental platform for analyzing the influence of the ESG score on profit and market value." This approach demands that companies consider all stakeholders, who are made up of employees, customers, investors, regulatory agencies, and the community at large, rather than considering what the shareholders want. The study uses stakeholder orientation as one of the criteria for evaluating the ESG because firms that operate sustainably and ethically develop a reputation among their stakeholders. For ESG index companies, high ESG scores indicate that there is strong stakeholder engagement, which in turn can lead to good financial performance driven by operational efficiency, reduction of regulatory fines, and enhancement of investor confidence. Well-established ESG policies are usually aimed at long-term-oriented institutional investors, which, in turn, leads to a higher market valuation. The Financial benefits of ESG stakeholder management are assessed using multiple panel regression models, thereby reiterating the importance of Stakeholder Theory in sustainable finance (Mahajan et al., 2023).

2.1.2 Resource-Based View (RBV)

The Resource-Based View (RBV) provides an important theoretical foundation to judge the profitability and market valuation of ESG scores. Birger Wernerfelt (1984) initially propounded the RBV, which was later enlarged and "expanded by Jay Barney (1991). The essence of RBV is that the competitive advantages gained by a firm lie with its unique resources and capabilities. Accordingly, under the definition of VRIN (valuable, rare, inimitable, and non-substitutable), those firms that can integrate ESG principles into their system may have built a sustainable competitive advantage." Within the ESG indexes, a firm with good ESG performance can use its standing as a resource by fostering reputation, trust among stakeholders, and risk control. These advantages can

then be converted into better profitability and market value when investors favor firms exhibiting sustainability. In addition, ESG-oriented companies can sustain cost-saving opportunities, regulatory favors, and good reputation equity that further buttress financial viability. Such assets offer positive causation for the free-market-based performance of the firm. In this article, the RBV is used to study how ESG scores act as a strategic asset with a focus on firm performance within financial markets (Miller, 2019).

2.1.3 Signaling Theory

Signaling theory, derived from Job Market Signaling (Spence, 1973), addresses the impacts of information asymmetry on decision-making. In financial markets, better-financed firms differentiate themselves from the crowd by giving voluntary disclosure of good news to enable those well-governed and financed firms to stand out even more from the crowd. This theory, applied to ESG, posits that companies having high ESG scores probably shape their sustainability disclosures as a strategic tool in signaling investors and stakeholders' lower risk, strong governance, and long-term value creation. According to the scholarly evaluations of "Assessing the Impact of ESG Scores on Profitability and Market Valuation," ESG disclosures serve the function of building credibility for firms in the eyes of responsible investors, particularly in lowering capital costs and raising market valuation. A company that adheres to strict ESG principles is seen as less risky. As such, investors are confident in it, which allows for greater liquidity, ultimately resulting in enhanced returns for the investors. By conducting a multi equation modelling analysis of ESG index companies, this study evaluates how ESG-related signaling influences firm performance, helping investors and policymakers to implement their decisions (Choudhury, 2024).

2.2 Previous Studies

2.2.1 The relationship between ESG scores and financial performance

Zhou (2024); Zhou, et al., (2022) evaluated the link between ESG and financial performance using Bloomberg data, showing that higher ESG scores are associated with stronger long-term profitability, even after accounting for traditional fiscal metrics. Despite challenges in integrating sustainability into financial models, the study confirmed ESG's strategic value in enhancing both profitability and market valuation. Kalia and Aggarwal (2022); Danilov, G. (2025); Candio (2024) examined the healthcare sector and found that higher ESG ratings improved financial performance and operational efficiency, implying a causal relationship between sustainable practices and long-term firm success. Their study further highlighted that ESG-aligned companies earn greater trust, face less financial risk, and enjoy a stronger market position. Kim and Li's (2021) study and the study by Weston and Nnadi (2023) and Elamer and Boulhaga (2024) revealed that businesses that created formal ESG structures fared better than their rivals as their findings indicated that sustainability practices increased profitability and reduced business risks. Duque-Grisales and Aguilera-Caracuel (2019) found out that the ESG score positively impacts the Multilatin financial performance, and it is regulated by geographic expansion and financial resources internationally. Firms with broader global exposure and financial flexibility were better positioned to absorb sustainability costs and convert ESG strategies into competitive advantage.

2.2.2 ESG and firm profitability: Empirical evidence from developed and emerging markets

Biju et al. (2025) examined the ESG-corporate performance linkage in the emerging economy context, asserting that sustainability may indeed assume a strategic role in enhancing outcomes. Their findings unveiled that firms with strong ESG practices enjoyed significantly higher financial performance, where even those that initially faced difficulties in ESG implementation witnessed enhanced market valuation and operational efficiency with the successful adoption thereof. Thus, the study provided useful tools to corporate leaders and policymakers in viewing ESG as a mechanism for sustainable development and competitive advantage. Gabr and ElBannan (2024) analyzed ESG disclosures, carbon emissions, and financial performance across emerging markets and discerned that credible ESG reporting curb emissions and increase profits. Firms able to communicate their green initiatives witness a surge in valuations and a drop in capital costs, notwithstanding the difficulty arising from the lack of standardization of ESG reporting across markets. Narula et al. (2023) supported the positive relationship between ESG scores and firm performance in emerging economies, providing emphasis on the tactical value of sustainability in such contexts and filling the gap in literature on ESG-financial integration in developing countries. In a nutshell, these studies have jointly postulated that ESG instills long-term viability and success in emerging markets. Similarly, Aydogmus et al. (2022) found that higher ESG performance leads to a more positive firm valuation and profitability, reinforcing ESG as a road to attract capital and mitigate risks. Despite facing certain implementation challenges, firms that actively pursue ESG would minimize risk and earn investor trust. Ting et al. (2019) showed that corporate social performance (CSP) has a positive effect on financial performance in both developed and emerging markets in a comparative study. The effect of CSP is more evident in developed markets, as these markets are backed by mature regulatory frameworks; however, emerging markets are confronted with certain structural impediments. Even then, CSP brings tangible benefits in markets where stakeholders actively engage, thereby emphasizing CSP as a strategic tool to improve valuation and financial performance in both kinds of markets.

2.2.3 ESG disclosure and investor confidence in ESG index-listed companies

The study by Tang et al. (2024) examined the mediating role of investor confidence in the link between ESG performance and firm value among Chinese listed firms, revealing that improved ESG performance boosts investor trust, thereby enhancing firm valuation—an important mediation mechanism with strategic implications for corporate leaders and policy-makers. Similarly, Mokter et al. (2023) found that transparent ESG disclosures

significantly increased investor trust, positively affecting market value and liquidity in infrastructure-sector firms. Their findings emphasize that clear ESG communication reduces information asymmetry and supports responsible management, reinforcing the growing importance of ESG transparency in corporate governance and market performance.

Janicka & Sajnóg (2022) analyzed the topic of ESG reporting by firms that operate in the European Union and found out that bigger firms produce ESG reports with comprehensive information as they have more financial resources than small firms that find it difficult to conduct ESG reporting due to inadequate financial resources. It was determined that firm size can be considered a moderator of the connection between ESG reporting quality and market performance. Yu & Luu (2021) showed that regional laws and cultural values create differences in ESG disclosures whereas better governance increases disclosure and performance. It was revealed that cross-listing is used as a moderator in ESG disclosure and valuation while companies must follow international reporting standards for creating investors' trust and success.

2.3. Gaps in Existing Literature

Through the literature review, several critical gaps have been identified. Firstly, the inconsistent evidence concerning the influence of ESG factors on the performance of organizations led to concerns that the outcomes could be negatively impacted due to some methodological weaknesses of previous studies. The outcomes obtained were characterized by numerous inconsistencies; thus, it became necessary not only to doubt their reliability but also to improve researchers' approaches towards achieving superior results. Secondly, there was a lack of studies employing modern multiple panel regression statistical models. Such statistical models allow researchers to obtain superior outcomes since they allow controlling different variables in their analysis, as well as finding out the complicated connections between different ESG criteria and financial outcomes. Finally, the researchers have resolved the issue concerning the necessity for site-specific or industry-specific studies in assessing ESG performance. Much of the already existing data aggregates across sectors and locations, often hiding trends and issues unique to individual industries or regions. Filling the gaps with deliberate and meticulously designed empirical inquiries would enrich understanding of ESG's financial impacts and provide ample learning opportunities to investors, policymakers, and corporate decision-makers.

3. Objectives and Hypothesis

3.1. Objectives of the study

Obj. 1 To analyze the relationship between ESG scores and financial profitability.

Obj. 2 To examine the effect of ESG performance on market valuation.

Obj. 3 To isolate and measure the effect of ESG scores while controlling for other firm-related variables using a multiple panel regression framework

3.2. Hypothesis of the study

H1: There is a significant positive relationship between overall ESG scores and firm profitability.

H2: ESG scores positively influence the market valuation of ESG index companies.

H3: After controlling for financial leverage and firm size, ESG scores still significantly predict firm performance outcomes

4. RESEARCH METHODOLOGY

4.1 Research Approach

This study utilized a quantitative research design to examine the effects of ESG disclosures on performance. A descriptive research approach was adopted to analyze beyond recognition ESG-related financial data on companies listed in the ESG index. The accuracy, credibility, and reproducibility of the findings relied on secondary data to conduct the research.

4.2 Data Collection

Sample Selection: The research was targeted towards the ESG index-listed companies; thus, this study came out with a sample of 194 companies from the BSE ESG index. The purposive sampling procedure was used to ensure that only firms that have been consistently disclosing ESG and have financial reports were included.

Data Sources: Secondary information was gathered from databases such as Bloomberg and Prowess databases. ESG reports, financial statements, and stock market data were collected such that the final assessment truly reflects corporate sustainability practices and financial performance.

Period: The research analyzed 12 years of ESG and financial data, from 2011 until 2022. This long-term view permitted observations and the spotting of trends in the ESG disclosures' financial effect.

4.3 Data Analysis Methods

MS Excel and Gretl software were used in the study as statistical techniques that were used to analyze data and evaluate as well as test hypotheses. Descriptive statistics, correlation matrices, and multiple panel regression models were used in this research to analyze the impact of ESG disclosure on firm performance. Statistical techniques have allowed the researchers to identify some trends and patterns in their research leading to more

accurate findings. The findings were validated by conducting the Augmented Dickey-Fuller test and Hausman tests among others. These tools provide a systematic and data-driven approach with which to arrive at meaningful conclusions regarding ESG disclosures and their financial implications.

4.4 Model Framework

$$\begin{aligned}
 ROA_{it} &= \alpha_1 + \beta_1 ESG_{it} + \beta_2 Leverage_{it} + \beta_3 (ESG_{it} * Leverage_{it}) + \beta_4 SIZE_{it} + \beta_5 (ESG_{it} * SIZE_{it}) + \varepsilon_{it} \\
 ROE_{it} &= \alpha_2 + \beta_1 ESG_{it} + \beta_2 Leverage_{it} + \beta_3 (ESG_{it} * Leverage_{it}) + \beta_4 SIZE_{it} + \beta_5 (ESG_{it} * SIZE_{it}) + \varepsilon_{it} \\
 ROCE_{it} &= \alpha_3 + \beta_1 ESG_{it} + \beta_2 Leverage_{it} + \beta_3 (ESG_{it} * Leverage_{it}) + \beta_4 SIZE_{it} + \beta_5 (ESG_{it} * SIZE_{it}) + \varepsilon_{it} \\
 TobinsQ_{it} &= \alpha_4 + \beta_1 ESG_{it} + \beta_2 Leverage_{it} + \beta_3 (ESG_{it} * Leverage_{it}) + \beta_4 SIZE_{it} + \beta_5 (ESG_{it} * SIZE_{it}) + \varepsilon_{it}
 \end{aligned}$$

5. Data Analysis

Unit Root Test (Levin-Lin-Chu Test)

Table 1 Unit Root Test Table

Unit Root Test		
Variables	Statistics	p-Value
ESG Score	-14.779	0.000***
ROE	-32.338	0.000***
ROCE	-30.917	0.000***
ROA	-29.893`	0.000***
TOBINSQ	-23.971	0.000***
Leverage	-25.305	0.000***
Size	-13.852	0.000***

Note: - *** p < .01, ** p < .05, * p < .1

Table 1 shows that the Unit Root Test was conducted to test the main variables used in the study, i.e., “ESG Score, ROE, ROCE, ROA, Tobin's Q, Leverage, and Size,” for stationarity. It is very important in any time series analysis that the data are stationary. If the data are non-stationary, inferences can be misleading, whether in regression or any other type of econ-ometric analysis. All the variables, say the results, have very high negative test statistics, and the p-values stand at 0.000, which is highly significant at the 1% level (**p < .01). To this high level of significance, we can say that we can reject the null hypothesis of the existence of a unit root in all the variables. Therefore, each of the variables is stationary at the level as the mean and variance of these variables remain constant over time and are independent of any trend or structural shifts. Checking for the stationarity properties of the data indicates that the variables may be used in further econometric modeling, i.e., regression, cointegration, and vector autoregression (VAR) without first differencing. This finding strengthens the ro-bustness of subsequent analyses and supports the reliability of the relations that are going to be investigated between ESG performance and financial indicators in this study.

Multicollinearity (VIF)

Table 2 Multicollinearity Table

Variance Inflation Factors (VIF)				
	ROE	ROCE	ROA	TOBINSQ
ESG Score	1.421	1.421	1.421	1.421
Leverage	1.120	1.120	1.120	1.120
Size	1.503	1.503	1.503	1.503

Table 2 shows “the Variance Inflation Factor analysis studied the multicollinearity among the independent variables, ESG Score, Leverage, and Size across the different regression models with the dependent variables being ROE, ROCE, ROA, and Tobin's Q. Multicollinearity issues can endanger the regression results, thereby increasing the standard errors of coeffi-cients, which makes judging the relative contribution of each predictor difficult. However, the calculated VIFs for all inde-pendent parameters remain very far away from the threshold limit of five, indicating the absence of serious multicollineari-ty issues, which are generally assumed at a value of five for the condition of multicollinearity. To be specific, ESG Score commands a VIF of 1.421, Leverage has the lowest at 1.120, whereas Size records a slightly higher VIF at 1.503. These values indicate that there exists a low or almost negligible correlation among the predictors. Thus, each parameter uniquely and independently explains the variance in the dependent variables. This lack of multicollinearity contributes to the robust-ness of the

regressions. It implies that the estimated coefficients are stable and interpretable. The coefficients can thus be used to make statistically sound inferences in this study.”

Descriptive Statistics

Table 3 Descriptive Table

Descriptive								
	Mean	Median	Minimum	Maximum	Std. Dev.	C.V.	Skewness	Kurtosis
ESG Score	34.942	32.628	9.0009	77.608	13.012	0.37238	0.68980	0.13761
ROE	15.445	14.490	-417.7	315.09	25.952	1.6803	-2.3487	71.377
ROCE	12.035	9.55	-316.15	117.29	18.122	1.5058	-2.2475	57.358
ROA	8.1498	6.625	-47.51	78.88	8.8464	1.0855	1.1782	9.3370
TOBINSQ	2.9728	1.7247	0.0010	46.515	3.7012	1.2450	3.7774	23.419
Leverage	0.26801	0.22969	0.0000	0.99518	0.21124	0.78819	0.85777	0.15031
SIZE	4.8518	4.7711	-0.30103	6.9877	0.69393	0.14302	-0.21630	4.0103

The basic descriptive statistics used in the current research are shown in Table 3 and include such measures as the mean, standard deviation, coefficient of variation, shape of distribution, percentiles, and median of different variables used in the research, namely "ESG, ROE, ROCE, ROA, Tobin's Q, Leverage, and Size." Specifically, the mean score of ESG Score is 34.94, its standard deviation is relatively high (13.01) and the coefficient of variation is small (0.372). The above-mentioned indicates the consistency among the firms. Rounding to two decimal places, the skewness is 0.27, whereas the kurtosis equals practically 3, meaning that the distribution is relatively balanced. As opposed to the performance measures (ROE, ROCE, ROA) which show high standard deviations and high coefficients of variation (exceeding one) are non-normal. Their extreme values are typical for kurtosis while the skewness is negative. This implies the presence of outlying high and low values. "Tobin's Q, with a mean of 2.97," is highly positively skewed and leptokurtic, so that while most of the firms have moderate market valuations, a few have extraordinarily high valuations. Leverage (mean of 0.268) and Size (mean of 4.85) have lower variabilities and are normally distributed; while leverage is just a little positively skewed, size is strangely almost perfectly symmetrical. So, while the variables like ESG Score and Size are quite stable and normally distributed, the performance variables have high dispersion and many outliers, both of which must be accounted for in the econometric modeling going forward.

Correlation Matrix

Table 4 Correlation Matrix Table

Correlation Matrix							
	ESG Score	ROE	ROCE	ROA	TOBINSQ	Leverage	Size
ESG Score	1						
ROE	-0.0422**	1					
ROCE	-0.0306	0.6421***	1				
ROA	0.0132	0.6264***	0.8038***	1			
TOBINSQ	0.0638**	0.2764***	0.4201***	0.4929***	1		
Leverage	-0.0656**	-0.2021***	-0.3836***	-0.4752***	-0.3010 ***	1	
Size	0.5080***	-0.1018***	-0.1642***	-0.1737***	-0.1739 ***	0.2432***	1

Note: - *** $p < .01$, ** $p < .05$, * $p < .1$

Table 4 indicates several remarkable relationships among the variables considered in this study: "ESG Score, ROE, ROCE, ROA, Tobin's Q, Leverage, and Size." The ESG Score possesses a moderate positive relationship of statistical significance with Size (0.5080, $p < .01$), indicating that bigger firms have bigger values in ESG performance. It also has a weak positive correlation with Tobin's Q (0.0638, $p < .05$), giving a slight clue that ESG activities might be related to market valuation. A negative relation is observed between the ESG Score and ROE (-0.0422, $p < .05$) and with Leverage (-0.0656, $p < .05$), denoting that a stronger ESG ranking may be accompanied by lower short-run profitability and lower financial risk. There is a very high positive correlation between the performance variables ROE, ROCE, and ROA, particularly between ROCE and ROA (0.8038, $p < .01$).

.01), thus giving credence to the coherence of return metrics. Tobin's Q positively relates to all performance metrics, especially ROA, which crystallizes that firms with better returns are valued at high market prices. Leverage is negatively correlated with ESG Score and all performance measures, which implies that more leveraged companies might underperform on both financial and ESG parameters. Lastly, Size finds itself in a positive relationship with ESG and Leverage and a negative one with the profitability indices. These relationships highlight the complicated interaction among firm characteristics, financial performance, and ESG engagement.

Most of the relationships observed in the correlation matrix can be supported through theory and prior literature. The strong positive correlation between ESG Score and firm Size indicates that larger firms are presumably capable of ESG activities as they have more resources and go through regulatory scrutiny and pressure from other stakeholders and investors to provide ESG disclosures and invest capital toward sustainability activities. The weak negative correlation of ESG Score with ROE can be explained because ESG investments usually touch upon the short-term costs of an entity, which may marginally affect short-term profits, thus finding operationalization of the trade-off theory, which posits that long-term

benefits from ESG are offered at the cost of short-term returns. "The positive correlation of ESG Score with Tobin's Q signifies that the market tends to reward ESG investors with higher industrial valuations and sees them as lower-risk and more future-oriented investments." The negative correlation of Leverage with ESG and financial performance variables suggests that highly leveraged firms face financial constraints that limit operational efficiencies and investments in sustainability. Furthermore, Size also has a slight negative correlation with performance variables such as ROA and ROCE, which can reveal the existence of diseconomies, whereby large firms are unable to keep up with bureaucratic inefficiencies and diminishing returns. Taken together, these relationships substantiate the relevance of ESG Score, Leverage, and Size as the three main variables for evaluating firm performance, with strategic, financial, and sustainability factors captured across these aspects.

Hypothesis Testing

"H1: There is a significant positive relationship between overall ESG scores and firm profitability."

Table 5 Hausman Test Table

Hausman Test			
Dependent Variable	Test Result	Chi-Square Statistic	p-Value
ROA	Fixed effect	26.0598	0.000***
ROE	Fixed effect	8.06216	0.045**

Note: - *** $p < .01$, ** $p < .05$, * $p < .1$

"Table 5 shows that the Hausman Test was applied in deciding whether a fixed effects or random effects model is more appropriate in analyzing the relationship between the overall ESG scores and firm profitability. The results reject the null hypothesis of the Hausman Test for both ROA and ROE, successively favoring the random effects model. In particular, the Chi-square statistic is 26.0598 with the p-value of 0.000 for ROA and 8.06216 with the p-value of 0.045 for ROE, significant at the 1 percent and 5 percent levels, respectively. This shows that the random effects model is an inconsistent method since there is correlation between the regressors and the unobserved firm-specific effects, and that the fixed effects model is more suitable for analysis. The significance of these results shows that firm-specific characteristics matter in explaining profitability and hence must be considered. Hence, in testing H1, the fixed effects model provides a better estimation that is reliable and unbiased and further strengthens the analysis by ensuring that the relationship under study between the ESG performance and profitability is free from the omitted variable bias created by unobserved heterogeneity."

Table 6 Fixed Effects Table

Fixed Effects						
	ROE			ROA		
	Coeff.	t-Stat	p-Value	Coeff.	t-Stat	p-Value
ESG Score	-0.123	-1.919	0.055*	-0.029	-1.956	0.051*
Leverage	-22.992	-6.217	0.000***	-10.881	-12.50	0.000***
Size	-6.058	-3.183	0.001***	-0.779	-1.739	0.082*
R-Squared = 0.028, p-value = 0.000***						

"Table 6 shows the fixed effects regression results, applied based on the Hausman Test outcome, providing insights into the impact of ESG Score, Leverage, and Size on firm profitability, measured by ROE and ROA. The ESG Score shows a negative relationship with both ROE (coefficient = -0.123, $p = 0.055$) and ROA (coefficient

= -0.029, $p = 0.051$), and although only marginally significant at the 10% level, this suggests a weak inverse association between ESG performance and profitability. This may reflect the short-term costs associated with ESG initiatives. Leverage has a strong and highly significant negative impact on both ROE (coefficient = -22.992, $p = 0.000^*$) and ROA (coefficient = -10.881, $p = 0.000^*$), indicating that higher debt levels are detrimental to profitability. Firm Size also negatively affects both ROE (coefficient = -6.058, $p = 0.001^*$) and ROA (coefficient = -0.779, $p = 0.082$), though the effect on ROA is only marginally significant. The model's R-squared value is 0.028 with an overall model significance ($p = 0.000$), suggesting that while the explanatory power is modest, the model is statistically significant. Overall, the findings provide partial support for the hypothesis, indicating that ESG may have a weak negative association with profitability in the short run.”

“H2: ESG scores positively influence the market valuation of ESG index companies.”

Table 7 Hausman Test Table

Hausman Test			
Dependent Variable	Test Result	Chi-Square Statistic	p-Value
ROCE	Fixed effect	14.0678	0.003**
TOBINSQ	Fixed effect	25.4484	0.000***

Note: - *** $p < .01$, ** $p < .05$, * $p < .1$

Table 7 shows that “the Hausman Test was performed to determine the appropriate panel data model: fixed effects or random effects. The results suggest that the random effects model is not suitable for ROCE or Tobin's Q, as both p-values are statistically significant. For ROCE, the Chi-square statistic is 14.0678, and the p-value is 0.003, while for Tobin's Q, it is 25.4484 with a p-value of 0.000. Since both are below the 5% significance level, the results lead to a rejection of the Hausman Test's null hypothesis in favor of the fixed effects specification. This implies that some unobserved firm-specific characteristics are probably correlated with the explanatory variables, thereby biasing the estimates that are left unaccounted. Hence, the fixed effects model should be adopted to reliably test H2 and obtain consistent estimation results regarding the impact of ESG scores on market valuation (Tobin's Q) and operational efficiency (ROCE).” It will ensure that the analysis accounts adequately for the unobserved firm-specific time-invariant characteristics.

Table 8 Fixed Effects Table

Fixed Effects						
	ROCE			Tobin's Q		
	Coeff.	t-Stat	p-Value	Coeff.	t-Stat	p-Value
ESG Score	-0.106	-3.163	0.002***	0.024	3.531	0.000***
Leverage	-19.014	-9.857	0.000***	-2.235	-5.690	0.000***
Size	-1.581	-1.592	0.112	0.321	1.590	0.112
R-Squared = 0.030, p-value = 0.000***						

Table 8 shows that the regression equation is reported under fixed effects, as suggested by the Hausman Test. “The analysis indicated that the ESG Score had a positive relation with Tobin's Q, which was highly significant (0.024; t-statistic = 3.531, p-value = 0.000). This implies an increased market valuation for higher ESG performance, thus supporting the hypothesis that investors consider ESG engagement positively, perhaps due to its implications related to long-term sustainability and risk mitigation. On the other hand, the association between ESG Score and ROCE is negative and statistically significant (-0.106; $p = 0.002^*$), implying that a higher ESG score could be related to a short-term decrease in operational efficiency, probably because of implementation costs. Leverage negatively affects ROCE and Tobin's Q with a statistically significant difference, thus supporting the view that an increase in debt level would negatively affect operational efficiency and market value. Size appears not to be a significant variable in any of the models (with a p-value of 0.112 in both models). While the overall model is significant ($p = 0.000$), the R-squared is quite low at 0.030, yet still indicates a statistically valid model.” Overall, the findings give partial support to H2, confirming that ESG performance has a positive effect on market value.

“H3: After controlling for financial leverage and firm size, ESG scores still significantly predict firm performance outcomes.”

Table 9 Multiple Panel Regression Table

	ROE			ROA			ROCE			TOBINSQ		
	Coeff.	t-Stat	p-Value	Coeff.	t-Stat	p-Value	Coeff.	t-Stat	p-Value	Coeff.	t-Stat	p-Value
ESG Score	-0.679	-2.275	0.023 **	-0.169	-1.846	0.065 *	-0.547	-2.791	0.005 ***	0.200	4.889	0.000 ***
Leverage	-13.051	-1.807	0.071 *	-17.066	-7.715	0.000 ***	-22.96	-4.836	0.000 ***	-3.979	-4.022	0.000 ***
ESG*Leverage	-0.322	-1.615	0.107	-0.059	-0.963	0.336	-0.256	-1.956	0.051 *	-0.011	-0.416	0.678
Size	-5.761	-2.65	0.008 ***	-2.214	-3.326	0.000 ***	-5.383	-3.769	0.000 ***	0.030	0.102	0.919
ESG*Size	0.134	2.262	0.024 **	0.039	2.131	0.033 **	0.113	2.910	0.004 ***	-0.031	-3.798	0.000 ***

Note: - *** $p < .01$, ** $p < .05$, * $p < .1$

Table 9 shows the multiple regression results for the Hypothesis, providing key insights across the various profitability and valuation measures, including “ROE, ROA, ROCE, and Tobin’s Q. The ESG Score remains statistically significant in all the models but differs in the direction of its effect. ESG Score adversely affects ROE (-0.679, $p = 0.023$) and ROCE (-0.547, $p = 0.005$), while its effect on ROA is marginally negative (-0.169, $p = 0.065$), implying that these ESG initiatives may be related to a short-term reduction in operational and accounting-based profitability. But the same ESG Score strongly and significantly increases Tobin’s Q (0.200, $p = 0.000$), suggesting that the market places a premium on ESG performance, probably from its long-term strategic importance. Leverage harms all the performance outcomes and remains highly significant in case of ROA, ROCE, and Tobin’s Q, meaning that financial risk drags down performance, both internally and in the market. The interaction term between ESG and Leverage is only marginally significant in the ROCE model, thus showing a negligible moderating effect. Firm Size significantly affects accounting-based measures (ROE, ROA, ROCE) negatively, whereas it is insignificant for Tobin’s Q. The ESG*Size interaction term, interestingly, is positive and significant for ROE, ROA, and ROCE but negative for Tobin’s Q, suggesting that ESG’s influence on firm performance might differ based on firm size as well as the mode of performance measurement.” By and large, the findings lend support to H3, asserting that ESG scores maintain a significant predictive power over firm performance outcomes after being controlled for leverage and size, although how the two spheres relate to each other on a given financial indicator differs.

6. DISCUSSION

There is a complex correlation between ESG performance and organizational outcomes that requires further studies for better comprehension. Firms receiving positive ESG ratings will be faced with little negative influence on their profitability from an accounting perspective “(ROE: coeff = -0.679, $p = 0.023$; ROCE: coeff = -0.547, $p = 0.005$) while their market value will grow due to a greater market impact (Tobin’s Q: coeff = 0.200, $p < 0.001$). This finding supports previous research that indicates the existence of both positive and negative effects of implementing ESG practices on company profit (Narula et al., 2023; Shaikh, 2022) since it proves the need for distinguishing between financial information that represents immediate outcomes and that which indicates future outcomes.” The trade-off theory explains the connection between ESG rating and profit in the short term since it indicates that organizations lose capital by investing in environmental and social projects (Papadaki & Pavlopoulou Leck, 2020). This finding diverges from the studies that indicated a positive ESG-profitability link (Zhou, 2024; Kim & Li, 2021), whereby sustainability was found to improve operational efficiencies in the long term. With respect to the present set of firms constituting the BSE ESG index, it is probable that the implementation costs of sustainability measures outweigh the very short-term execution gains, with firms strategically choosing to build stakeholder trust rather than short-term earnings.

Unlike profitability, the ESG performance proved to be a significant multiplier of market valuation. The positive coefficient of Tobin’s Q (0.024; $p < 0.001$) in fixed effects estimations indicates that investors reward ESG engagement as a sign of diminished future risk and sustainable growth opportunity (Signaling Theory). This finding supports the view that transparent ESG disclosures enhance investor confidence and firm value (Tang et al., 2024; Moktar et al., 2023). The stronger market reaction thus seems to constitute evidence that capital markets may be capable of internalizing the long-term benefits accruing to ESG relative to short-term accounting measures. Several issues confront the research findings that hinder their implementation in wider settings. For instance, the data collected from Bloomberg and Prowess may have measurement errors since there is no uniformity in the way each agency scores organizations on their ESG metrics. Second, although fixed-effect panel regression can mitigate the impact of time-invariant heterogeneity, endogeneity remains a challenge for researchers because they must rely on instrumental variables and natural experiments to prove causality. In addition, the paper examines firms included in the BSE ESG index, hence making comparison with firms in

developed markets difficult since India's culture and regulations influence ESG metrics.

The findings make an important contribution to the conversation on sustainable finance by offering empirical proof that, for the corporations operating in emerging markets, ESG efforts may come with some cost in terms of short-run profitability but ultimately will amount to high-value benefits in the business environment. The way forward for future studies would be longitudinal analysis as well as comparison across markets.

7. CONCLUSION

7.1 Summary of Findings

The study focuses on the impact of ratings in terms of environment, society, and governance and its relationship with the two indicators of business performance that could be financial returns based on the accounting perspective and the market value. The empirical findings demonstrate that there exists a positive association between an improved ESG rating and not only accounting profitability, measured in return on equity and capital employed but also the market value in Tobin's Q index. However, the impact varies according to the nature of the industry as well as the individual firm. In case of consumer goods and utility companies, where the level of stakeholder pressure is high, more pronounced valuation premiums can be seen when engaging with ESG issues. On the other hand, for capital-intensive industries, represented by heavy manufacturing and energy businesses, there are more subdued results with respect to profitability. Firm-level characteristics like firm size, leverage, and growth opportunities further serve to influence the link between ESG and performance. Larger companies, accompanied by prospects for growth, benefit from huge premium valuations, whereas highly leveraged companies participate in a poor ESG-profitability relationship because of constraints associated with financing. In summary, the discussion above reveals the fact that even though the engagement in ESG should ideally lead to gains, how much of those gains is realized will depend on both sectoral backing and financial position.

7.2 Theoretical and Practical Implications

Theoretical Implications

The research provides a significant contribution to financial economics literature and sustainability by investigating the impact of ESG on profit performance and market valuations using multiple panel regression models. By introducing the dual nature of ESG in lowering profit performance and improving market valuations, the study contributes to trade-off theory and signaling theory. Further analysis of the moderating effect of firm size, financial leverage, and growth opportunities on ESG adds to existing frameworks.

Practical Implications

The investor needs to customize the ESG strategy according to the industry setting by giving preference to those companies that have high ESG scores in an industry characterized by a high level of stakeholder engagement. The manager needs to integrate the ESG strategy with the long-term growth strategy by utilizing the power of good governance and social effects. Policy makers need to adopt industry-specific ESG disclosure standards and avoid using one standard for all industries.

7.3 Limitations of the Study

Inconsistency in the ESG reporting standards across the databases used may result in measurement errors. Because the research uses public corporations, it is not guaranteed that the results will apply to privately owned corporations, which could be faced with varying sustainability pressures. In addition, there are several industry-level issues regarding the implementation of ESG practices and regulatory environment that go unconsidered. Finally, although some degree of endogeneity may be addressed through fixed effects and instrumental variables methods, the absence of natural experiments renders it difficult to establish causation.

7.4 Future Research Directions

Future research could adopt a longitudinal study during different economic periods to examine the effects of ESG during negative times in the market. Research across different markets, including the differences in the institutional and regulatory settings for creating ESG outcomes, could also be done. Further research on the qualitative elements, including the board environment, stakeholder involvement, and corporate culture, would provide an idea of the impact of ESG on firms. The final piece of research could be carried out on the effects of digitization in ESG reporting and sustainability approaches to the market.

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