Unveiling the Relationship Between ESG Scores and Firm Performance in India: A System GMM Approach

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Abstract

This paper investigates the impact of Environmental, Social and Governance (ESG) scores as well as individual pillar scores on the firm performance in the Indian context. Even though a lot of research has been conducted world-wide concerning this issue, a conclusive result has not yet been derived. Being an emerging economy, India is at a nascent stage of research related to ESG issues, and past research indicates a mixed result. In order to avoid the potential endogeneity issue, this paper used a dynamic panel approach of system GMM. This paper considered data from 59 non-financial companies listed under the NSE 500 index. Data was collected from the Thomson Reuters Refinitiv Eikon database over a period of 11, spanning from 2010 to 2021. The finding suggested a significantly negative impact of ESG score on firm performance measured by Tobin's Q and ROA, which indicates a non-linear U-shaped relationship. Net profit margin and closing price are used as alternative, dependent variables to check the robustness of the models and show consistent results. The environmental pillar score and social pillar score showed a negative impact on firm performance, whereas the governance pillar score showed a positive impact on market performance but negatively impacted financial performance. The key takeaway from this paper is that, if firms continue to improve ESG disclosure, it will positively impact firm performance in the future.

Keywords: ESG score, Firm performance, Tobins' Q, ROA, NPM, India

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INTRODUCTION

Environmental, Social, and Governance (ESG) has become a crucial strategy for companies and society due to its ability to build reputation and trust, decrease risk, and mitigate regulatory compliance (McKinsey, 2020). By considering ESG factors, companies can not only mitigate risks but also identify new business opportunities. This holistic approach allows organizations to create value for both their shareholders and society at large, fostering sustainable growth and positive impact. However, the researcher needs to quantify how far companies' ESG activities affect their financial performance and market value. The dawn of the new century has witnessed the importance of ESG practices and their impact on a company's proactive policies to increase related disclosure (Huang, 2021; De Silva Lokuwaduge et al., 2022). So, nowadays, most companies are considering sustainability issues as a crucial factor for their long-term existence (Lokuwaduge and Heenetigala, 2017), and for this reason, companies are creating policies and plans to combat pollution, water use, and climate change-related issues aggressively. Additionally, they are anticipated to address issues regarding the rights of employees, the actions of supply chain partners, and the overall effects of their business on the community. The study aims to look into how ESG issues affect business success in India. Even though ESG factors are becoming more significant globally, few thorough studies focus exclusively on the Indian market. By looking at how ESG practices and performance metrics affect the financial performance, market valuation, and risk profile of Indian enterprises, this study aims to close this gap. Furthermore, this research aims to analyze the relationship between factors such as governance score, environmental score, and social score with the financial performance of firms. As a result, it will give firms, investors, politicians, and other stakeholders in India useful insights that will help them make decisions that support ethical and sustainable business practices. ESG reporting in India has evolved over the years. For the first time in 2011, the Ministry of Corporate Affairs (MCA) issued the "National Voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business (NGVs)" (MCA, 2011). Over the years, the Securities and Exchange Board of India (SEBI) has mandated that top-tier companies disclose sustainable related issues. In May 2021, the SEBI released its guidance on reporting requirements relating to sustainability for the top thousand publicly traded companies (measured by market capitalization), following the revised format of the Business Responsibility and Sustainability Report (BRSR). In the year 2021, SEBI made a remarkable decision related to sustainable reporting in India for the top one thousand companies by market capitalization (SEBI, 2021). BSBR is considered an improvement over BRR relating to sustainability reporting to parallel it with the present financial reporting standard, and it was implemented in the financial year 2022-23 (SEBI, 2021). Even though research on ESG and company performance is expanding on a global scale, the Indian setting still has a sizable research gap. The cultural and social environment of emerging nations like India may not have been properly taken into account by ESG models created in developed nations. The interpretation and applicability of ESG criteria can be strongly impacted by variables like regional customs, traditions, and social norms. As a result, models created for developed nations might not sufficiently reflect the special difficulties and goals of emerging nations. Comparing emerging nations to developed nations, there are frequent differences in economic growth stages. Recent years have witnessed a significant increase in the amount of research looking at the association between ESG and firm performance. Though studies related to this area are growing prodigiously, it is still in the infancy stage because a concrete conclusion regarding this relationship is yet to be derived.

This study re-evaluates the ongoing debate surrounding the effects of companies' ESG scores on financial performance, using data specific to the Indian context. As an emerging nation,

India serves as a pertinent case study due to its substantial advancements in policy initiatives and effective industry regulation over recent years. It also confronts significant environmental challenges and grapples with high levels of pollution. To attain this research objective, this study collects ESG-related data and financial performance data of 59 non-financial companies of the NSE 500 index, from the Refinitiv Eikon database spanning the years 2010 to 2020. Employing dynamic modelling techniques, including System GMM, the findings reveal a nuanced, non-linear relationship between ESG score and firm performance. Specifically, the initial levels of ESG disclosure have a negative impact on firms' performance. However, beyond a certain threshold, disclosure starts exerting a positive influence on performance. This non-linear correlation sheds light on the inconclusive nature of existing literature concerning ESG and firm performance. In conclusion, it can be posited that ESG disclosure negatively impacts firm performance in the Indian context.

Nonetheless, Indian firms need to increase ESG disclosure to derive benefits in the long run. The study's findings provide valuable insights for Indian policymakers. While this disclosure is the need of the hour and as an emerging economy Indian firm shows negative effects, it is imperative to ensure that listed companies constantly focus on ESG-related information disclosure to receive a positive result soon. This study contributes to the existing body of knowledge in multiple meaningful ways within the Indian context. Firstly, it enriches our comprehension of the connection between ESG scores and corporate performance. Through modelling, this study illuminates the presence of a non-linear correlation between ESG factors and firm performance. This meticulous modelling is of paramount importance and constitutes a primary advancement in this study. Subsequent researchers can draw inspiration from these findings and extend upon them by delving into further non-linear aspects within the relationship between ESG factors and firm performance in the Indian context. Secondly, it contributes to the determinants of firm performance, particularly within the unique landscape of an emerging market like India. Lastly, it is widely acknowledged that issues related to endogeneity cast a shadow over the ESG and corporate governance literature. Addressing this concern is crucial, and this study takes a step forward in mitigating endogeneity issues by using the system GMM technique.

The subsequent sections of this article are structured as follows: section 2 includes a theoretical background and the existing body of literature, and section 3 outlines the meticulous process of data and methodology selection, data sources, and time frame and elaborates on the formulation of hypotheses and model specifications. Moving forward, Section 4 showcases the empirical outcomes and interpretations. Concluding this study, section 5 provides a concise summary and delineates the implications derived from our findings, particularly in the Indian context.

THEORETICAL FOUNDATION and LITERATURE REVIEW

Theoretical Foundation

Earlier studies have produced mixed results concerning the relationship between ESG and firm performance. These results indicate either a positive, negative or neutral relationship between ESG and firm performance (Friede et al., 2015; Lee et al., 2016). Recent developments in accounting research address sustainability reporting using integrated theories (Lokuwaduge and Heenetigala, 2017). Agency theory and stakeholders' theory are considered the most important theories to establish and understand the above relationship. Earlier studies have identified a clear link between these two theories as both theories contemplate firm from a social point of view (Amran et al., 2015; Soobaroyen and Mahadeo, 2016).

In the context of ESG and firm performance, agency theory suggests that there is a potential for conflict of interest between shareholders and management over ESG spending. Shareholders may be concerned that ESG spending will reduce profits, while management may be more interested in pursuing ESG goals for non-financial reasons, such as improving the company's reputation or attracting socially conscious investors. This conflict of interest could lead to agency costs, such as the costs of monitoring managers' ESG spending or the costs of lost profits. According to Watts and Zimmerman (1990), the presence of agency costs is an indication of the informational asymmetries, which are present in corporate transactions. To reduce this information asymmetry between management and shareholders, a sustainability reporting tool may be used. According to the stakeholder theory, a company will become more successful if it handles its connections with all its stakeholders over the period. The stakeholders are people or organizations who gain from or suffer from a firm's actions (Freeman, 1994). This theory also suggests that a company will taste success only when it satisfies all its stakeholders, not just by satisfying the shareholders. Based on these fundamentals, ESG disclosure can be a cause, that influences the firm's financial performance because satisfied stakeholders foster loyalty, which ultimately increases firms' financial performance, reputation, and sustainability. Many studies (Chelawat and Trivedi, 2016; Dalal and Thaker, 2019; Naseem et al., 2020) have found a positive relationship between ESG disclosure and firm performance, as ESG disclosure helps to mitigate conflicts between stakeholders and managers. So, we can conclude that ESG-related policies are helpful in maintaining the bottom line and increasing shareholders' value.

Literature Review

ESG disclosures are linked to a company's competitive advantage since the company offers environmentally and socially responsible solutions (Porter et al., 2019). Many studies conducted in developed nations indicate a positive relationship between ESG disclosure and firm performance due to lower information risk connected to greater ESG disclosure (Cormier and Magnan, 2007; Minutolo et al., 2019; Alareeni and Hamdan, 2020; Nguyen et al., 2022; Lee et al., 2023). On the contrary to developed markets, emerging economies show mixed results of ESG disclosure and firm performance (Bahadori et al., 2021; Jyoti and Khanna, 2021; Naffa and Fain, 2022). International investors are interested in emerging markets because of their tremendous development potential. However, because of the high degree of instability in governmental policy-making and the ensuing difficulties on the economic, political, social, and environmental fronts, businesses functioning in this environment face a variety of difficulties (Pollard et al., 2018). Research carried out by Zhou et al. (2022) on Chinese listed firms indicates a positive impact of ESG performance on market value. An insignificant relationship has been recorded between overall firm performance and different performance indicators of South African firms (Johnson et al., 2019). According to some researchers, the impact of ESG performance on firm performance among Chinese listed companies also reveals a negative impact (Duque-Grisales and Aguilera-Caracuel, 2021; Ruan and Liu, 2021).

Moreover, the research on the link between ESG and company performance is also dominated by globally oriented studies. The findings of Naseem et al. (2020) indicate a statistically significant and favourable association between socially responsible actions and firm performance among firms operating in the Asia Pacific region. Aureli et al. (2020) also find identical results, emphasizing the influence of ESG information on the market valuation of companies listed on the Dow Jones Sustainability Index. This is due to the investors' inclination towards companies' sustainability reports. According to the findings of Diaye et al. (2022), there is evidence to suggest that ESG performance contributes to the long-term

economic growth of a nation. However, the researchers were unable to demonstrate a statistically significant association between ESG performance and short-term economic growth.

Though India is considered an emerging economy, a few research articles relating to the relationship between ESG disclosure and firm performance have been published. Outcomes of this field of research indicate mixed results, i.e., some research reveals a positive relationship, some reveals a negative relationship, and some indicates a neutral relationship between ESG disclosure and firm performance. According to Hasan et al. (2021), ESG score and market-related performance indicators show a significant positive relationship. However, from the whole sample, this study discovers an insignificant association between ESG scores and the accounting-related financial indicator, with inconsistent findings for different industry sectors. Bodhanwala and Bodhanwala (2018) observe a significantly positive impact of ESG disclosure on firm performance and indicate that high ESG compliance has higher profitability and vice versa. Some other Indian research paper also concludes a significant and positive relationship concerning the present context of the study (Chelawat and Trivedi, 2016; Dalal and Thaker, 2019; Kumar and Firoz, 2022; Maji and Lohia, 2023; Sinha and Goel, 2023). Some papers reveal a negative relationship (Jha and Rangarajan, 2020; Jyoti and Khanna, 2021; Singh et al., 2022). A substantial number of the aforementioned studies, both on a global scale and specifically pertaining to Indian firms, have used the panel data regression analysis (Bodhanwala & Bodhanwala, 2018; Chelawat and Trivedi, 2016; Jyoti and Khanna 2021; Ruan and Liu, 2021; Zhao et al., 2018). The benefit of using panel data is it is spread across several variables over a number of periods, which helps reduce the possible errors on the temporal scale while interpreting the results (Bell et al., 2022).

Based on the earlier reviewed literature, it is evident that a substantial number of studies have observed a favourable and significant impact of ESG performance on companies' performance in both developed and emerging markets. A few numbers of research papers have been published so far from the Indian context, which again indicates mixed results. Several research projects carried out in the Indian context are inadequate in envisioning the long-term stance of this relationship. Again, obtaining comprehensive panel data that incorporates diverse accounting-based and market-based indicators, along with an extended temporal scale, is a challenging task that is rarely accomplished within a single study. This develops an academic gap for doing research in the Indian context, with a longer time frame and a wide range of performance indicators, including both accounting-based and market-based indicators.

RESEARCH OBJECTIVE AND DEVELOPMENT OF RESEARCH HYPOTHESIS

With this dynamic business environment and ever-evolving ESG regulatory framework in India, the present paper tries to investigate the overall impact of ESG score on the firm financial performance of NSE 500 index-listed companies. This study also tries to investigate the impact of individual pillar scores of ESG on the firm financial performance. It is important to note that the theoretical framework discussed above serves as the basis for justifying the present empirical study. With this broad objective, the following hypotheses are constructed:

H_{01}: ESG Score (ESGSCO) has no impact on the firm performance of NSE 500 index-listed companies.

H_{02}: Environmental pillar score (ESGENV) has no impact on firm performance of NSE 500 index listed companies.

H_{03}: Social pillar score (ESGSOC) has no impact on the firm performance of NSE 500 index-listed companies.

H_{04}: Governance pillar score (ESGGOV) has no impact on firm performance of NSE 500 index listed companies.

RESEARCH METHODOLOGY

Data & Sample

The primary objective of this research is to analyze the effect of ESG scores collectively as well as individually on companies' firm performance. Again, firm performance is measured by companies' market performance and financial performance. Both financial and ESG related data were collected from Thomson Reuter's Refinitiv Eikon database for 11 years from 2010-11 to 2020-21. The sample size includes companies listed on the NSE 500 index, representing 96.1% of free float market capitalization and about 96.5% of total turnover on the National Stock Exchange. Further, the NSE 500 index offers a wide scope for research due to its broad representation of companies from several industries. Initially, 96 Companies' data were collected as per the availability of ESG data. Then, 37 financial companies were excluded from the analysis and the final data set includes 59 companies.

Definitions of Variables Used

All the variables used in this research are categorized as dependent, independent, and control variables per the study's requirements. Details of these variables, along with scholarly definitions, symbols, and supporting literature, are presented in Table 1.

Table 1. Definitions of Variables

Variables	Symbols	Scholarly Definitions	Supporting Literature
Dependent Variables			
Tobin's Q	TQ	Sum of market capitalization, liabilities and preferred equity divided by total assets	Chelawat and Trivedi, 2016; Wong et al., 2021
Return on Assets	ROA	Ratio of net profit to total assets	Bodhanwala and Bodhanwala, 2018
Net Profit Margin	NPM	Profit after tax as a percentage of total income	Borhan et al., 2014; Arora and Sharma, 2016
Natural Log of Closing Price	LCLP	Log of average of 12 months share closing price	Sinha and Goel, 2023
Independent Variables			
ESG Score	ESGSCO	Refinitiv ESG Score	Eikon, 2022
Environment Pillar Score	ESGENV	Refinitiv environmental pillar score	Eikon, 2022
Social Pillar Score	ESGSOC	Refinitive social pillar score	Eikon, 2022
Governance Pillar Score	ESGGOV	Refinitive governance pillar score	Eikon, 2022
Control Variables			
Natural Logarithm of Total Assets	LnTA	Log of total assets	Maji and Lohia, 2023; Gong et al., 2018
Debt to Equity Ratio	DTER	Ratio of total debt to equity	Samo and Murad, 2019; Alarussi and Gao, 2021
Current Ratio	CRAT	Ratio of Current Asset to Current Liability	Musso & Schiavo, 2008; Yu et al., 2021
Risk	BETA	Risk Factor	Tripathy and Kaur, 2020

Source: Compiled by Authors

Model Development & Estimations

Following baseline model is selected to test the impact of ESG score on firm performance of NSE 500 indexed companies:

$$FP_{it} = \alpha_0 + \beta_1 DV_{it-1} + \beta_2 ESGSCO_{it-1} + \beta_3 (ESGSCO_{it-1})^2 + \varepsilon_{it} \quad (1)$$

$$FP_{it} = \alpha_0 + \beta_1 DV_{it-1} + \beta_2 ESGENV_{it-1} + \beta_3 (ESGENV_{it-1})^2 + \varepsilon_{it} \quad (2)$$

$$FP_{it} = \alpha_0 + \beta_1 DV_{it-1} + \beta_2 ESGSOC_{it-1} + \beta_3 (ESGSOC_{it-1})^2 + \varepsilon_{it} \quad (3)$$

$$FP_{it} = \alpha_0 + \beta_1 DV_{it-1} + \beta_2 ESGGOV_{it-1} + \beta_3 (ESGGOV_{it-1})^2 + \varepsilon_{it} \quad (4)$$

After studying the baseline models, this study tries to observe the impact of other firm characteristics on performance by including control variables. We have developed the following models to test the impact of ESG scores on firm performance in the presence of control variables:

$$FP_{it} = \alpha_0 + \beta_1 DV_{it-1} + \beta_2 ESGSCO_{it-1} + \beta_3 (ESGSCO_{it-1})^2 + C_{it-1} + \varepsilon_{it} \quad (5)$$

$$FP_{it} = \alpha_0 + \beta_1 DV_{it-1} + \beta_2 ESGENV_{it-1} + \beta_3 (ESGENV_{it-1})^2 + C_{it-1} + \varepsilon_{it} \quad (6)$$

$$FP_{it} = \alpha_0 + \beta_1 DV_{it-1} + \beta_2 ESGSOC_{it-1} + \beta_3 (ESGSOC_{it-1})^2 + C_{it-1} + \varepsilon_{it} \quad (7)$$

$$FP_{it} = \alpha_0 + \beta_1 DV_{it-1} + \beta_2 ESGGOV_{it-1} + \beta_3 (ESGGOV_{it-1})^2 + C_{it-1} + \varepsilon_{it} \quad (8)$$

Firm performance includes both market performance (measured by TQ and CLP) and financial performance (measured by ROA and NPM), DV_{it-1} stands for lag of dependent variable represented by market and financial performance variables, while $ESGSCO_{it-1}$, $ESGENV_{it-1}$, $ESGSOC_{it-1}$, and $ESGGOV_{it-1}$ represents a vector of ESG variables and C_{it} represents a vector of control variables for company i at time t. The intercept, denoted by α_0, and the parameter, denoted by β_n, are both variables that need to be estimated. The error term is denoted by ε_{it}. LnTa, DTER, CRAT and BETA are used as control variables for the study.

Method and Procedure of Data Analysis

The data collected has been arranged in a panel structure and analyzed through STATA software. The existing body of literature on corporate governance is plagued by endogeneity concerns (Abdallah et al., 2015; Wintoki et al., 2012). Consequently, this study employs a methodological approach designed to address this type of issue. Endogeneity arises when variables influence each other, complicating causal relationships and leading to biased results. This can happen for various reasons, such as omitted variables, measurement errors, autoregression with autocorrelated errors, and simultaneity. To address endogeneity, researchers can use various econometrics techniques, out of which the two-stage least squares approach is more common and widespread. However, according to García-Meca et al. (2015), this approach has certain drawbacks as it provides inefficient and biased outcomes. To overcome the endogeneity issue, this paper uses the system Generalized Method of Moments (GMM) as it uses its own lag as instruments (Arellano and Bover, 1995; Blundell and Bond, 1998). The conventional methodologies for estimating the coefficients of an equation might give rise to a range of econometric issues. Important concerns related to dynamic panel data are weak instruments, size distortion, correlation among lagged dependent variables and moment conditions. System GMM addressed all these issues by using levels and first differenced estimation as instruments. The GMM technique is commonly regarded as exhibiting asymptotic normality.

Moreover, this technique demonstrates both efficiency and consistency compared to alternative methods that do not use supplementary information. The GMM is characterized by its consistency, efficiency, and adherence to normality because it utilizes the existing

information included within the moment conditions (Windmeijer, 2005). The diagnostic test proposed by Sargan is employed to assess the validity of instruments (sargan, 1958).

DATA ANALYSIS & INTERPRETATIONS

Table 2 depicts the descriptive statistics for all the variables under consideration. The mean value of TQ indicates that most of the Indian listed companies considered for this study are valued three times their intrinsic value. Meanwhile, the mean of ROA and NPM indicates that the average company in the dataset generates more than 10 per cent of its net income from its assets and more than 10 per cent of net income from sales, respectively. For ESG variables, the mean value for ESGSOC is highest, followed by ESGGOV value and ESGENV value. The mean of the overall ESGSCO is 47.29, which indicates that the individual pillar score is around the overall ESGSCO value, and firms need to increase the ESG score in future as the mean score is around 50. Table 3 provides the result of the correlation matrix among ESG, performance, and control variables. Most of the ESG and performance variables are significantly correlated at a 0.05 significance level. Control variables are also correlated with most other variables but do not provide a consistent direction.

Table 2. Descriptive Statistics

Variables	N	Mean	Min	Max	sd	se(mean)	skewness	kurtosis
TQ	649	3.422592	0.035632	40.7535	3.970155	0.155842	3.397452	2.52304
ROA	649	10.31672	-31.79	38.71	8.381054	0.328985	0.37809	4.245329
NPM	649	10.58396	-203.53	44.93	13.30324	0.522198	-7.50534	2 .6646
LCLP	649	6.5182	3.4127	10.5531	1.321	0.2347	5.6537	4.6573
ESGSCO	649	47.29451	2.14	92.44	22.43787	0.880763	-0.15099	2.306623
ESGENV	649	39.79609	0.81	97.33	26.35753	1.034623	0.240546	1.850722
ESGSOC	649	51.06416	2.14	95.97	25.63933	1.006432	-0.26222	2.002083
ESGGOV	649	45.83453	1.4	96.55	25.1241	0.986207	0.114367	2.119131
LNTA	649	12.2676	8.76385	16.08764	1.274303	0.050021	0.215707	2.787928
DTER	649	1.200015	0.01	4.26	1.04326	0.70826	25.2704	4.9858
CRAT	649	1.539091	0.14	6.26	0.932644	0.03661	1.610233	6.51471
BETA	649	0.878136	0.18	2.2	0.365133	0.014333	0.688999	3.362424

Source: Compiled by Authors

Table 3. Correlation matrix

	TQ	ROA	NPM	ESGSCO	ESGENV	ESGSOC	ESGGOV	LNTA	DTER	CRAT	BETA
TQ	1										
ROA	0.5436*	1									
NPM	0.1300*	0.5603*	1								
ESGSCO	-0.1171*	-0.0668	0.0438	1							
ESGENV	-0.2028*	-0.1325*	-0.0016	0.5914*	1						
ESGSOC	-0.1556*	-0.1032*	0.0141	0.5484*	0.5030*	1					
ESGGOV	0.1108*	0.1031*	0.0686	0.3644*	0.1821*	0.1982*	1				
LNTA	-0.5127*	-0.4371*	-0.1320*	0.3863*	0.5085*	0.4709*	0.0308	1			
DTER	-0.0317	-0.1296*	-0.1600*	0.0165	-0.0085	0.0082	0.0518	0.0402	1		
CRAT	0.1611*	0.4229*	0.3244*	-0.0259	-0.0396	-0.0197	0.0882*	-0.1983*	-0.0353	1	
BETA	-0.3185*	-0.5208*	-0.2370*	0.0910*	0.2008*	0.1654*	-0.1453*	0.3258*	0.0454	-0.3480*	1

Source: Compiled by Authors

Table 4 and Table 6 represent the baseline model estimations based on equations 1 to 4. These equations only consider the firm-level ESG variables and exclude the firm-level control variables to determine the impact of ESG score on firm performance represented by TQ ROA, respectively. The included variables are used in their lagged form in the models, which will help to mitigate the potential problem of reverse causality in econometric formulation. Similarly, table 5 and Table 7 represent the estimation of equations 5 to 8, which includes firm-level control variables. More specifically, these models are extensions to the earlier models, in which authors want to determine the impact of ESG scores on firm performance measured by TQ and ROA by including control variables.

Results presented in Table 4 indicate that overall ESGSCO impacts the firm performance measured by TQ. The coefficient of ESGSCO indicates a significant but negative impact on firm performance. To be more precise, a rise in ESGSCO declines the firm performance. The outcome aligns with Friedman's' agency theory' propositions and is consistent with the earlier research (Jha and Rangarajan, 2020; Jyoti and Khanna, 2021; Singh et al., 2022). These findings for Indian enterprises confirm Friedman's 1962 claim that sustainability expenditures lower financial performance. Companies with higher sustainability performance are no different from those with lower performance. Because accounting measures primarily rely on book value derived from the firm's internal and historical records. So, this may not have much impact due to improved sustainability performance. Another reason may be that Indian companies did not follow ESG reporting rigorously, as it was not mandatory. Social dimension reporting in India increased after 2015 due to the rule changes in the Companies Act 2013. The Security and Exchange Board of India recently mandated that the top thousand companies be mandated by market capitalization for sustainability reporting. So, the ESG reporting story for India is not too old. Rather, it is at the beginning stage. This may relate to Barnett and Salomon's (2012) finding that firms may experience a period of lower financial performance while investing in social performance. Analyzing the impact of individual pillars of ESG on firm performance indicates a mixed result. The ESGENV and ESGSOC coefficients show a significant but negative impact on financial performance, whereas ESGGOV has a statistically significant and positive impact. These results are similar to the earlier work conducted by Chiong (2010). The positive impact of ESGGOV may be due to high market confidence in the company's strategic positioning, innovation, and growth prospects. It may indicate that investors perceive robust governance practices as indicative of long-term value and sustainability, ultimately influencing market sentiment and stock valuations. This suggests that effective corporate governance fosters investor trust and contributes significantly to enhancing overall market performance metrics.

ESGSCO2 indicates the square of the ESG score, which will help determine the linearity of the dynamic panel data models. The coefficient of ESGSCO2 is significant and positive, which indicates the relationship between ESGSCO and firm performance is not linear and exhibits a curvilinear pattern. The same interpretation may be drawn for ESGENV2 and ESGSOC2, whereas ESGGOV2 shows a statistically significant and negative relationship. The coefficient holds an economic significance as it indicates the existence of a threshold limit for the company's related engagements. It means that if the firm continues to improve the ESG score beyond the limit in the future, it will positively impact TQ, but the impact is very negligible. The coefficients of ESGENV2 and ESGSOC2 could be explained in the same pattern. However, ESGGOV2 provides a contradictory view that a firm should not improve the governance pillar beyond a certain threshold, which ultimately negatively affects the firm's performance.

Even after including the control variables, the coefficient of ESGSCO is significantly negative, indicating that an increase in ESGSCO is associated with a decrease in TQ. However, the quadratic term ESGSCO2 has a significantly positive coefficient, suggesting that the relationship between ESGSCO and TQ is non-linear, with TQ initially decreasing but then increasing as ESGSCO improves. However, the impact of ESGENV and ESGGOV is significantly positive, whereas ESGSOC is significantly negative. These outcomes suggest that the impact on the dependent variable is stable even after including the control variables. When we analyze the control variable, the log of total assets (LnTA) is found to be negatively significant with TQ where, whereas AGE, DTER, CRAT, and BETA are positively significant with TQ for all the models.

Table 4. ESG and Tobin's Q

	TQ	**TQ**	**TQ**	**TQ**
L.TQ	0.637***	0.639***	0.636***	0.632***
	(1396.16)	(1600.66)	(1409.61)	(799.03)
ESGSCO	-0.0257***			
	(-38.06)			
ESGSCO2	0.000382***			
	(46.37)			
ESGENV		-0.0274***		
		(-77.81)		
ESGENV2		0.000381***		
		(62.56)		
ESGSOC			-0.0449***	
			(-73.36)	
ESGSOC2			0.000547***	
			(79.58)	
ESGGOV				0.0162***
				(21.71)
ESGGOV2				-0.000112***
				(-14.73)
CONSTANT	1.413***	1.475***	1.763***	0.836***
	(60.09)	(151.73)	(133.45)	(51.33)
N	590	590	590	590
chi2	2313122.5	3645256.7	2494574.7	1327398.1
p	0	0	0	0
Sargan (Chi2/Pvalue)	57.85232/0.3008	58.33/0.2858	58.28164/ 0.2873	58.58549/0.2780
Abond	3.0298/0.87314	3.0382/.64561	3.0021/0.74321	3.0198/.79358

** p<0.05, ** p<0.01, *** p<0.001* Source: Compiled by Author

Table 5. ESG and Tobin's Q with Control Variables

	TQ	TQ	TQ	TQ
L.TQ	0.580***	0.589***	0.581***	0.585***
	(196.71)	(434.01)	(185.52)	(371.52)
ESGSCO	-0.0400***			
	(-32.40)			
ESGSCO2	0.000720***			
	(46.39)			
ESGENV		0.0154***		
		(2.56)		
ESGENV2		0.000160***		
		(4.01)		
ESGSOC			-0.0416***	
			(-23.13)	
ESGSOC2			0.000653***	
			(25.03)	
ESGGOV				0.00450**
				(2.86)
ESGGOV2				-0.0000384
				(-1.98)
LNTA	-1.486***	-1.418***	-1.494***	-1.301***
	(-89.87)	(-71.62)	(-52.07)	(-64.70)
AGE	0.0229***	0.0256***	0.0215***	0.0255***
	(14.37)	(13.25)	(17)	(27.84)
DTER	0.00662***	0.00694***	0.00744***	0.00665***
	(7.8)	(7.88)	(10.63)	(12.97)
CRAT	0.514***	0.505***	0.488***	0.455***
	(23.16)	(31.39)	(36.36)	(44.4)
BETA	1.532***	1.594***	1.328***	1.744***
	(14.92)	(28.15)	(23.33)	(30.62)
CONSTANT	16.45***	15.04***	16.82***	13.69***
	(93.13)	(85.39)	(58.71)	(67.43)
N	590	590	590	590
chi2	1186051.5	4956435.8	228465.8	1222007.9
p	0	0	0	0
Sargan (Chi2/Pvalue)	56.19733/ 0.3561	54.47177/ 0.4183	53.43638/0.4574	54.49723/ 0.4173
Abond	3.1888/.93725	3.1664/.50394	3.2265/.41459	3.1394/.63091

** p<0.05, ** p<0.01, *** p<0.001* Source: Compiled by Authors

Table 6 indicates a significant but negative impact of ESG score on firm financial performance measured by ROA. This result aligns with the research conducted by Alareeni and Hamdan (2020) and Oprean-Stan et al. (2020). This relationship could arise due to additional expenditure made by a firm to maintain high ESG standards, which may affect the return in the short-run, or firms in the process of transitioning to sustainable practices may experience disruption during the adjustment period, and sensitive industries face more challenges in initial years to maintain legal compliances. All individual pillar scores, including ESGENV, ESGSOC and ESGGOV, also have a significantly negative impact on ROA. Inverse ESGGOV impact on financial performance may be signalling a

potential trade-off between stringent governance practices and short-term profitability. This negative impact suggests that companies emphasizing robust governance may prioritize risk aversion and long-term sustainability over immediate financial gains. Investors should be cognizant of this nuanced dynamic, recognizing that superior governance may come at the expense of near-term financial metrics, reflecting a strategic focus on the quality and longevity of earnings rather than immediate profitability. The coefficient of ESGSCO2, ESGENV2, ESGSOC2 and ESGGOV2 depicts the positive and significant impact of all these variables on ROA, which indicates the relationship among these variables is not linear and exhibits a curvilinear pattern. It means, in the future, if the firm continues to improve the ESG score beyond the limit, it would positively impact ROA. Table 7 presents the extended model, which includes the control variable. Even after considering the control variables, the impact of ESGSCO, ESGENV, ESGSOC and ESGGOV on ROA is significantly negative. LNTA, DTER, CRAT, and AGE are also negatively impacting ROA.

The study conducts diagnostic tests, including autocorrelation (abond) and instrument validity assessments (Sargan). Results, displayed at the bottom of the table 4 to 7, affirm the appropriateness of the employed system. Additionally, the significance of lag dependent variable supports dynamic modelling choice. Insignificance in autocorrelation and Sargan tests signal the absence of autocorrelation and validate instrument suitability. As the p value of all the models is 0, all null hypothesis is rejected. So, ESGSCO, ESGENV, ESGSOC, and ESGGOV significantly impact firm performance.

Table 6. ESG and ROA

	ROA	**ROA**	**ROA**	**ROA**
L.ROA	0.739***	0.711***	0.757***	0.735***
	(106.18)	(96.27)	(170.13)	(102.43)
ESGSCO	-0.0265***			
	(-18.20)			
ESGSCO2	0.000406***			
	(16.77)			
ESGENV		-0.0823***		
		(-7.95)		
ESGENV2		0.000955***		
		(7.17)		
ESGSOC			-0.0132***	
			(-4.39)	
ESGSOC2			0.000299***	
			(7.33)	
ESGGOV				-0.0403***
				(-6.12)
ESGGOV2				0.000445***
				(5.62)
CONSTANT	2.622***	3.842***	1.982***	3.155***
	(26.27)	(18.8)	(28.82)	(33.02)
N	590	590	590	590
chi2	32977.3	36234.9	36396.7	21824.3
p	0	0	0	0
Sargan (Chi2/Pvalue)	57.665/ 0.3068	54.80752/ 0.4059	56.68974/ 0.3391	56.38867/ 0.3494
Abond	3.7655/1.3417	3.744/1.38	3.7774/1.3539	3.7795/1.3556

** $p<0.05$, ** $p<0.01$, *** $p<0.001$* Source: Compiled by authors

Table 7. ESG score and ROA (Including Control Variables)

	ROA	ROA	ROA	ROA
L.ROA	0.603***	0.607***	0.612***	0.614***
	(47.92)	(40.14)	(53.67)	(64.76)
ESGSCO	-0.0245**			
	(-2.87)			
ESGSCO2	0.000485***			
	(4.27)			
ESGENV		-0.0528***		
		(-5.25)		
ESGENV2		0.000662***		
		(4.61)		
ESGSOC			-0.0370***	
			(-4.53)	
ESGSOC2			0.000672***	
			(6.67)	
ESGGOV				-0.0397***
				(-6.34)
ESGGOV2				0.000491***
				(6.28)
LNTA	-1.382***	-1.293***	-1.617***	-1.379***
	(-8.95)	(-10.74)	(-12.21)	(-9.83)
AGE	-0.0364***	-0.0113	-0.0438***	-0.0169*
	(-5.24)	(-1.40)	(-5.66)	(-2.20)
DTER	-0.0284***	-0.0287***	-0.0281***	-0.0296***
	(-274.49)	(-199.66)	(-335.48)	(-238.39)
CRAT	-0.243***	-0.259**	-0.303***	-0.256***
	(-5.36)	(-2.76)	(-7.59)	(-5.81)
BETA	1.266***	1.461***	1.152***	1.485***
	(5.46)	(12.02)	(6.59)	(7.18)
CONSTANT	21.61***	19.92***	24.86***	21.03***
	(11.53)	(13.8)	(14.99)	(12.77)
N	590	590	590	590
chi2	225328.3	728101	725596.9	3899014.6
p	0	0	0	0
Sargan (Chi2/Pvalue)	48.43812/0.6522	49.89282/0.5959	52.29814/0.5014	51.07002/0.5496
Abond	3.8699/ 1.2737	3.856/1.3859	3.8667/1.2937	3.8729/1.3027

** p<0.05, ** p<0.01, *** p<0.001* Source: Compiled by Authors

Testing the robustness or stability of results is of utmost importance to ascertain the reliability of reported findings, ensuring that variations do not influence them in specifications. In order to test the robustness, the present paper used CLP and NPM as alternative measures of market performance and financial performance accordingly. The model for the robustness test is similar to the earlier baseline extension models by simply putting CLP and NPM in the dependent variable place, and the derived results are presented in Tables 8 and 9. Earlier research has shown that net profit margin is an important variable in measuring firm performance using financial ratios (Andonova and Ruíz-Pava,

2016), and closing price is an important market performance indicator (Sinha and Goel, 2023). Even after changing the dependent variables, the result is consistent with the earlier results presented in Table 5 and Table 7. This result is consistent with earlier research (Buallay, 2019; Giannopoulos et al., 2022). So, we can conclude that the impact of ESG score on firm performance is significantly negative irrespective of the market measure (TQ and CLP) or accounting measure (ROA and NPM).

Table 8. Robustness Test with CLP (Including Control Variables)

	LCLP	LCLP	LCLP	LCLP
L.LCLP	0.742***	0.743***	0.735***	0.728***
	(113.59)	(70.87)	(72.79)	(69.87)
ESGSCO	-0.0123***			
	(-2.74)			
ESGSCO2	0.00168***			
	(1.98)			
ESGENV		0.00352**		
		(3.21)		
ESGENV2		0.00268**		
		(2.63)		
ESGSOC			-0.00352***	
			(-4.3)	
ESGSOC2			0.00406***	
			(4.29)	
ESGGOV				0.00500***
				(3.99)
ESGGOV2				-0.00391**
				(-3.07)
LNTA	-0.0892***	-0.101***	-0.0687***	-0.0729***
	(-5.62)	(-5.87)	(-3.56)	(-4.95)
AGE	-0.00503***	-0.00619***	-0.00648***	-0.00735***
	(-4.59)	(-4.80)	(-3.94)	(-6.41)
DTER	0.000953***	0.000938***	0.000893***	0.000901***
	(21.45)	(19.56)	(26.28)	(21.9)
CRAT	0.0566***	0.0526***	0.0545***	0.0538***
	(7.88)	(12.25)	(11.12)	(12.46)
BETA	0.691***	0.692***	0.706***	0.684***
	(19.88)	(19.32)	(29.78)	(20.39)
_CONS	2.374***	2.474***	2.166***	2.248***
	(15.74)	(13.49)	(13.68)	(15.53)
N	577	577	577	577
chi2	39726.9	24001.1	21607.4	16206.7
p	0	0	0	0
Sargan (Chi2/Pvalue)	58.328/0.2859	58.196/0.29	58.277/0.287	58.215/0.289
Abond	-4.9285/.790	-5.014/.708	-4.939/0.801	-4.870/0.767

** p<0.05, ** p<0.01, *** p<0.001* Source: Compiled by Authors

Table 9. Robustness Test with NPM (Including Control Variables)

	NPM	**NPM**	**NPM**	**NPM**
L.NPM	0.205***	0.204***	0.201***	0.206***
	(205.31)	(123.77)	(133.89)	(246.71)
ESGSCO	-0.0752***			
	(-18.42)			
ESGSCO2	0.00140***			
	(23.11)			
ESGENV		-0.116***		
		(-11.39)		
ESGENV2		0.00184***		
		(9.95)		
ESGSOC			-0.192***	
			(-14.46)	
ESGSOC2			0.00279***	
			(17.84)	
ESGGOV				-0.138***
				(-35.35)
ESGGOV2				0.00163***
				(33.27)
LNTA	-8.227***	-8.004***	-8.159***	-8.045***
	(-77.90)	(-115.38)	(-35.46)	(-62.45)
AGE	0.324***	0.324***	0.285***	0.363***
	(36.05)	(34.55)	(27.59)	(38.91)
DTER	-0.0888***	-0.0880***	-0.0845***	-0.0907***
	(-71.68)	(-91.62)	(-61.37)	(-59.15)
CRAT	2.174***	2.144***	2.232***	2.151***
	(51.06)	(44.37)	(25.27)	(33.43)
BETA	10.18***	10.49***	8.115***	10.42***
	(70.03)	(87.54)	(99.49)	(83.02)
CONSTANT	82.27***	80.29***	85.69***	80.32***
	(64.09)	(91.6)	(26.17)	(50.33)
N	590	590	590	590
chi2	366262.6	139597.7	167293	270861
p	0	0	0	0
Sargan (Chi2/Pvalue)	54.64844/ 0.4117	55.08118/0.3958	52.91952/ 0.4773	55.98944/ 0.3633
Abond	1.8552/.02097	1.8801/.13171	2.0764/.07196	2.0366/.06638

** p<0.05, ** p<0.01, *** p<0.001*

Source: Compiled by Authors

Conclusion

The surge in sustainable investing observed in recent years reflects a profound shift towards responsible financial practices, magnified by the impact of the Covid-19 pandemic. This movement has transcended traditional boundaries, as both institutional and retail investors emphasize the integration of sustainability criteria into their investment decisions. Among the various avenues of

sustainable investing, ESG investing stands out as a pivotal subset, employing a rigorous best-of-class methodology to screen global stocks and debt instruments. The global embrace of ESG principles has prompted international policymakers to formulate comprehensive guidelines for ESG filters, thereby underscoring its significance. Numerous countries are embarking on the path of mandating ESG disclosures, with India's proactive approach being particularly noteworthy. As a nation grappling with significant environmental challenges, India has taken bold steps, making it obligatory for the top one thousand listed companies by market capitalization to transparently disclose their ESG initiatives. This commitment is evident in a larger global effort for sustainability. As nations work together to institutionalize ESG practices, the path forward is clear: by leveraging financial mechanisms, businesses and investors can play a pivotal role in shaping a more sustainable and resilient future for all.

This research suggests that the effects of ESG practices on company performance seem differently when measured using accounting-based metrics, which include financial ratios and disclosures, and market-based metrics, such as TobinsQ and closing stock prices. The market reacts dynamically to a company's ESG activities because it combines investor emotion and expectations. Good ESG practices improve a company's standing with stakeholders, win over socially conscious investors, and increase stakeholder confidence. Consequently, rising stock prices and market capitalization frequently reflect such positive opinions. In comparison, accounting-based metrics provide a more methodical and quantitative framework for assessing how ESG activities affect the bottom line. This research attempts to demonstrate the concrete effects of ESG practices on a firm's financial health by evaluating important financial metrics, such as return on assets and net profit margin. A strong foundation for comprehending how ESG factors may affect long-term financial sustainability and operational effectiveness is provided by accounting-based metrics.

The present paper tries to establish a relationship between ESG scores and firm performance in the Indian context. Numerous papers have been published on this issue worldwide, but no concrete conclusion has been evident. But for India, research related to this field is in its beginning stage, as SEBI recently made it mandatory for the top-tier listed companies to publish sustainability reports. So, more research will be required in the future to determine the impact of ESG scores on firm performance in the Indian context. Earlier research in India suggests mixed results regarding this issue. This could happen due to the use of different econometric modelling and datasets. This paper considers NSE 500 listed companies to investigate the impact of ESG scores on firm performance. Moreover, this paper uses the system GMM model to encounter endogeneity issues and establish a non-linear relationship between ESG score and firm performance.

The outcome of this research contributes to the existing literature on ESG and firm performance linkage. The findings of this paper provide many important insights related to this issue in the Indian context. First, ESG scores significantly but negatively impact the company's performance, as measured by TQ and ROA. Even while testing the robustness of the model, we replaced TQ with LCLP and ROA with NPM, but the result is consistent with the original model. So, we can conclude that ESG score negatively impacts market-based measures (TQ and LCLP) and accounting-based measures (ROA and NPM). Second, our study also investigates the impact of individual pillars of ESG and finds that ESGENV and ESGSOC negatively impact both market and financial performance. In contrast, ESGGOV positively impacts the market performance but negatively impacts financial performance. Third, the square of ESGSCO indicates a positive signal, meaning if the firm continues to improve ESG score in future, it may positively impact performance. Fourth, it reveals a U-shaped relationship between ESG disclosure score and firm performance.

Further studies can be carried out by considering more companies and different time periods. Sectorial analysis can also be conducted by researchers in the Indian context to find out the industries that have a significant impact on sustainability.

Policy Implications

The findings of this study might aid corporations in fortifying their ESG disclosure protocols to guarantee clear and open communication of the long-term strategic advantages of ESG practices. Demonstrating profitable results may help investors' expectations match and build trust in the business's sustainability efforts. It could motivate businesses to explain how, over time, their ESG actions support value generation and financial resilience. The policyholders can consider offering rewards for socially conscious and ethical capital investments. They may consider providing tax breaks or credits to investors dedicated to backing businesses with strong environmental, social, and governance (ESG) policies. This would encourage a market atmosphere that prioritizes sustainability above cyclical volatility.

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