“ESG, financial and macroeconomic indicators affecting stock returns: Evidence from India’s Nifty100 ESG Index”

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ESG, FINANCIAL AND MACROECONOMIC INDICATORS AFFECTING STOCK RETURNS: EVIDENCE FROM INDIA'S NIFTY100 ESG INDEX

Abstract

ESG investing has emerged as a key factor in corporate strategy and capital investment, although its effects on stock returns in emerging markets such as India remain inconclusive. This paper investigates the effects of ESG scores and the financial performance of firms on the stock returns of firms in the Indian Nifty100 ESG Sector Leaders Index. Based on balanced panel data on 14 firms for 2015–2024, the study employs pooled OLS, random-effects, and fixed-effects models, conducts the Breusch-Pagan LM and Hausman tests to determine the appropriate specification, and finally estimates a two-way fixed-effects model. The empirical findings show that the ESG score has a statistically significant negative correlation with stock returns, indicating a negative relationship between ESG performance and short-term returns in the market. Return on Capital Employed (ROCE) is an important positive factor of stock returns, indicating that capital efficiency is important for stock price growth. The macroeconomic factors are also important: GDP growth has a statistically significant negative correlation with stock returns, whereas the statistical significance of inflation and industrial production is insignificant. There are no significant effects on returns in Earnings per Share (EPS) and Return on Assets (ROA). These findings imply that ESG integration in India is in its early development stage and could introduce short-term adjustment costs where corporate strategy and policy support are necessary to ensure sustainability initiatives are justified in the long-term value creation.

Keywords ESG, Nifty100 ESG, firm performance, stock, macroeconomic indicators, stakeholder theory

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INTRODUCTION

Since ESG (Environmental, Social, Governance) has steadily emerged as a key outline, including three primary criteria used by the global community to assess the sustainable growth of commercial organizations (Zhao et al., 2018), it has grown in importance as a factor that businesses must take into account to achieve green, healthy, and sustainable development in the future. The ESG notion intends to work by bringing together the environment and the growth of the economy, which has caught the interest of international governments (Liu et al., 2024). Additionally, ESG enables firms to combine their social and commercial objectives while making efficient use of their limited resources (Ullah et al., 2019). Moreover, it has been observed that businesses that actively manage ESG sustainability gain from higher shared values for society and the firm (Taliento et al., 2019). Recent trends indicate that ESG and sustainable investing have gained more attention and acknowledgment from investors worldwide, particularly since the COVID-19 pandemic. As a result, there has been tre-

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mendous growth in global ESG investments (Ruan & Liu, 2021), leading to a growing focus of investors towards ESG factors and their impact on valuation (Kräussl et al., 2024). According to Bloomberg Intelligence (2024), despite the geopolitical and economic difficulties, global ESG assets (30 trillion in 2022) will be over 25 percent of global Assets Under Management (AUM) and therefore, regulation and strong demand by investors will continue to drive it to grow to more than 40 trillion by 2030.

At the firm level, ESG adoption plays a significant role in establishing competitive advantage and building reputation. Businesses highlighting and selling their products as environmentally friendly can draw in more investments from the financial markets (Xu et al., 2021). The ESG metrics can also be used as a risk-reduction measure by investors and are becoming a mandatory tool by credit rating agencies (Ashwin Kumar et al., 2016; CRISIL, 2022). Globally Investors' appetite towards ESG-oriented firms has grown tremendously, pushing companies towards implementing stakeholder-oriented strategies to optimize social value (Egorova et al., 2022; Alsayegh et al., 2020). Prior literature is, however, polarized with conflicting results about the direct impact of ESG practices on a company's value (De la Fuente et al., 2022). There is enough literature where the positive relationship between ESG characteristics and financial performance is reported, weak or even negative relationships are found (GSIR, 2020; Aldieri et al., 2023). This mixed result underscores the need for further detailed examination. Additionally, recent studies indicate that while globally ESG integration is gaining popularity (Zhu et al., 2024; Vu et al., 2024; Darolles et al., 2023; Bit & Pasaribu, 2024; Korankye et al., 2025), there is limited empirical support on its role in emerging economies such as that of India, where market and regulatory structures differ substantially.

ESG has also gained a lot of importance in the Indian context, though still in early stages, as it is no longer considered as an optional but a business strategy. Indian CEOs are expecting ESG investments to provide a high return in the long term during the next five to ten years, with the government making efforts like the Viksit Bharat program and its climate taxonomy developed by the Reserve Bank of India (RBI), highlighting its increased policy relevance (KPMG, 2025). Besides, the growing consumer interest towards sustainable products and global investor attention are becoming the reasons why ESG integration is very significant to Indian companies to stay competitive, build reputation, and ensure long-term growth. Consequently, it is of utmost importance to explore ESG adoption in Indian companies.

1. LITERATURE REVIEW AND HYPOTHESES

ESG criteria have gained significant value in recent years, especially in the area of corporate finance and investment management. While the global corporate environment is unpredictable and dynamic, ESG is considered a significant game-changer for both researchers and professionals. An analysis of 3,332 publicly listed companies across the globe for the period 2011 to 2020 revealed that although ESG efforts may lead to higher costs in the short term, they contribute positively to financial performance over the medium and long run. Further, the findings suggest that being involved in ESG practices will help firms reduce risks and intensify their ability to face external shocks, apparently helping them to improve financial results (Chen et al., 2023). Lately, many companies have started sharing information related to their ESG practices with the shareholders. This has ultimately been a very useful strategy for companies to attract investments from environmentally friendly investors (Li et al., 2018). This shift is largely influenced by the increasing emphasis placed by investors on ESG factors as part of their investment decision-making process. Several researchers have supported the fact that investors who prioritize firms with strong ESG scores aim to build green and sustainable portfolios and are often referred to as responsible investors. These socially responsible investors, while considering financial indicators, also rely on the quality of ESG disclosures to guide their investment choices, with the intent of ensuring that their investments are both ethically sound and sustainable in the future (Atan et al., 2018; Richardson, 2009). Few studies have highlighted that risk-adjusted returns do not al-

ways depend on ESG scores (Aldieri et al., 2023). Another study found that monitoring of ESG practices had led to better returns and lower risk globally (Verheyden et al., 2016). A study investigated the correlation between ESG performance and stock returns in Chinese publicly traded companies, utilizing fixed-effect models on panel data from 2011 to 2020, revealing a positive association, notably pronounced for non-state-owned enterprises in eastern China (Zhu et al., 2024).

While some research experts are of the opinion that investing based on ESG criteria can negatively impact profitability or a company's value. There are other studies that claim the fact that ESG ratings do not consistently have a significant effect on the returns of stocks or performances. There have been numerous studies that support a negative association between company value and ESG performance. An analysis of Chinese listed companies concluded that ESG performance can negatively impact returns of stocks, thereby suggesting that firms engaging in ESG projects may do so to enhance managerial reputation, potentially at the expense of shareholder value, leading to a decline in stock returns (Yu & Xiao, 2022). Prior research has looked at the effects of ESG-related news on U.S. stock returns in the long run. A study using the rolling-portfolio method has found that investor reactions to news related to ESG are short-lived and tend to reverse in the shortest period, and ESG news does not have a long-term influence on stock performance (Vu et al., 2024). A study conducted on UK firms revealed a counterintuitive pattern, where companies with lower ESG scores frequently exhibited higher returns compared to their counterparts with stronger ESG performance. Interestingly, this ESG-related return differential, or premium, was found to be significant primarily in the case of low-liquidity stocks. This observation implies that market liquidity may play an important role in determining the relationship between a corporation's ESG performance and its stock returns (Luo, 2022). Many companies have raised funds by following ESG practices thoroughly. However, there have been studies that governance factors show a positive association, whereas environmental and social factors depict an insignificant association (Parikh et al., 2023). Another research that used causal mediation analysis to examine how ESG information affected stock returns revealed that higher current ESG scores negatively impact future stock returns, with different transmission channels operating across environmental, social, and governance dimensions (Darolles et al., 2023). Thus, the association between ESG scores and stock returns is fundamentally determined by the distribution of investors' ESG preferences in the market.

Furthermore, the association between ESG performance and important financial metrics has been the subject of investigation in a number of recent studies. The majority of theoretical assessments hold that businesses can enhance their reputation and achieve recognition in the market by increasing their environmental performance, which will win them favor from businesses in the supply chain during business operations, hence enhancing their financial results. Pedersen et al. (2021) integrate theoretical modeling with empirical validation to demonstrate that the influence of ESG characteristics on financial performance is not uniformly positive or negative, but rather contingent upon the heterogeneity and intensity of ESG preferences across the investor base. Some studies have shown a negative association between ESG ratings and financial performance (Landi & Sciarelli, 2019), whereas there have been few studies done that depict a positive association (Friede et al., 2015; Xie et al., 2019). A few studies have also claimed that companies that disclose good ESG performance give good financial returns (Aydoğmuş et al., 2022). Typical studies, such as Stanwick and Stanwick (1998), discovered that there is a positive correlation between a company's pollution discharge and profitability as determined by return on total assets; in other words, there is a negative correlation between financial performance and environmental performance. In the context of mergers and acquisitions, Tampakoudis and Anagnostopoulou (2020) investigated how ESG performance affects market value and performance, also exploring the capability usage of the acquiring companies by acquirers.

Additionally, macroeconomic variables such as economic conditions, regulatory policies, and changing social expectations also play an important role in modulating the efficacy of ESG strategies and their resulting impact on financial performance. Several recent studies have observed

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a considerable increment in the adoption and enforcement of ESG criteria within corporate finance and investment management frameworks. This has also improved the corporate governance practices of organizations (Alsayegh et al., 2020). An analysis using the panel cointegration techniques to study the influence of ESG performance on the GDP per capita across 29 OECD countries indicated a positive association between ESG and GDP per capita over a long period, while such an association was not observed during shorter periods. The findings further suggested that improvements in ESG parameters will contribute to economic growth over time. This defends the need for sustainable practices for long-term economic development (Diaye et al., 2022). Another study examining the association between GDP accuracy and ESG performance in A-share-listed corporations from 2013 to 2021 showed that financial limitations, interventions of the government, and economic indicators significantly impact ESG performance of the companies (Zhu et al., 2024). To assess the association between ESG score, profitability, GDP growth, labor force, and population with Malaysian firms' performance from 2010 to 2020 using the multiple regression technique, the findings proved a significant relationship between ESG score, GDP growth, and population with firms' performance (Ma'in et al., 2022). The correlation between ESG index returns and macroeconomic factors in some developing economies suggests that inflation and GDP significantly influence returns (Bit & Pasaribu, 2024). Research shows ESG-rated companies' equity returns in developing Asian markets react differently to macroeconomic shocks, with strong firms showing less volatility and weaker firms showing more volatility (Baek & Song, 2024). Research on IDX ESG Leaders indices during COVID revealed that ESG ratings do not have a major impact on returns of stocks, whereas the debt-to-equity ratio positively impacts returns (Trisnowati et al., 2022). A few studies have explored how following ESG practices has benefited the companies, especially in highly competitive markets, and that integrating digital transformation with effective ESG strategies can improve innovation and financial success (Korankye et al., 2025).

In summary, the above-reviewed literature demonstrates that ESG performance, financial performance indicators, and macroeconomic factors have been widely studied globally in relation to stock returns. However, the findings remain inconclusive as only a few studies report a positive association, but a few others depict weak, negative, or insignificant effects. This literature gap highlights the necessity of further research in developing economies, like India, where the use of ESG is still nascent, and the market structures of such markets vary dramatically from those of developed economies.

Thus, the paper fills an important gap by concentrating on Indian listed companies where ESG incorporation remains at an initial stage, but is very relevant and important in long-term competitiveness. Furthermore, the present research is based on Stakeholder theory (Freeman, 1984), according to which businesses should strive to provide benefits to all stakeholders of the companies, including shareholders, consumers, governments, and society in general, which will surely guarantee their sustainability in the long run. ESG goes hand in hand with this theory in corporate decision making. Along with ESG scores, financial indicators such as EPS, ROA, and ROCE have to be taken into consideration as they measure a firm's profitability and efficiency. Additionally, macroeconomic factors such as GDP, IIP, and inflation can also be included as they reflect economic forces shaping stock returns.

Given these debates, this study focused on the Indian context and made a significant contribution. This study examines the impact of ESG scores, financial performance, and macroeconomic indicators on stock returns of businesses listed on the NSE Nifty100 ESG Sector Leaders Index. ESG rating itself measures business operations performance as well as ecological and environmental performance (Liu et al., 2024). ESG score is considered the critical variable because (i) Investors are now showing interest and have been investing in companies that are focusing on environmental performance, (ii) Companies' efforts towards sustainability can be seen through ESG, and (iii) the Paris Agreement, SDGs, and recent developments have led to renewed interest in ESG. This study adds to the literature by offering results on the ways in which ESG scores, financial performance, and macroeconomic indicators can impact stock returns in an emerging economy by concentrating on the Indian setting.

Additionally, using the theoretical lens of Stakeholder Theory (Freeman, 1984), we argue that companies should be able to protect the interests of multiple stakeholders, including investors, regulators, consumers, and society as a whole, to ensure value creation over a longer period. ESG performance is the direct result of such a balance, whereas financial efficiency (EPS, ROA, ROCE) and macroeconomic forces (GDP, IIP, inflation) also influence the way in which firms create shareholder and stakeholder value.

The present study aims to investigate the effects of ESG scores, financial performance and macroeconomic forces on the stock returns of firms.

Accordingly, this study formulates the following hypotheses:

H1: ESG Scores have a significant impact on stock returns.

H2: Financial performance indicators (EPS, ROA, and ROCE) have a significant impact on stock returns.

H3: Macroeconomic indicators (INFLATION, GDP, and IIP) have a significant impact on stock returns.

2. METHODS

This study follows a quantitative panel-data research design to examine the relationship between ESG performance, firm-level financial indicators, macroeconomic variables, and stock returns in the Indian equity market. The population comprises 70 firms listed on the NSE Nifty100 ESG Sector Leaders Index, which consists of ESG-compliant firms across multiple sectors. A purposive sample of 14 firms was selected based on data availability, consistency, and sectoral representation for the period 2015–2024. The selected firms include Zydus Lifesciences, Siemens, Adani Ports and SEZ, Marico, Indian Oil Corporation Ltd., Jindal Steel and Power, Dabur India, Cipla, Tata Motors, Apollo Hospitals, HCL Technologies, Reliance Industries, NTPC, and Eicher Motors.

Annual firm-level ESG scores were obtained from the Refinitiv Eikon database. Financial performance indicators, including Earnings per Share (EPS), Return on Assets (ROA), and Return on Capital Employed (ROCE), were sourced from CMIE Prowess. Macroeconomic variables Gross Domestic Product (GDP), Index of Industrial Production (IIP), and Inflation were collected from Bloomberg. Stock prices were used to compute annualized log-normal stock returns. The dependent variable is annualized log-normal stock returns. The independent variables include ESG score, EPS, ROA, and ROCE. The macroeconomic control variables include GDP growth, IIP growth, and inflation. The dataset used in this study is publicly available in Zenodo at https://doi.org/10.5281/zenodo.18309092

The relationship between variables is estimated using the following panel regression model:

$$R_{it} = \beta_0 + \beta_1 ESGS_{it} + \beta_2 EPS_{it} + \beta_3 ROA_{it} + \beta_4 ROCE_{it} + \beta_5 GDP_t + \beta_6 INFL_t + \beta_7 IIP_t + e_{it}, \quad (1)$$

where *R* stands for Returns, *ESGS* is *ESG* score, *EPS* is Earnings Per Share, *ROA* is Returns on Assets, *ROCE* is Return On Capital Employed, *GDP* Gross Domestic Product, *INFL* is Inflation, and *IIP* is Index for Industrial Production. β_0 is the Intercept term, β_{1-7} are the Coefficients of the Variables, and e_{it} is the Error Term.

The Breusch–Pagan Lagrange Multiplier test is used to compare pooled OLS and random effects models, while the Hausman test is employed to choose between random and fixed effects specifications. Based on diagnostic results, the two-way fixed-effects model is selected for final estimation.

3. RESULTS AND DISCUSSION

The analysis commences by observing the ESG performance of companies presented in Table 1. It indicates the environmental, social, and governance scores of 14 companies constituting the Nifty 100 ESG Sector Leaders Index over a period of 10 years. These annually measured scores reflect each company's ESG performance for the study period. The companies are divided into four categories: Most Sustainable (above the mean score of 80), Above

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Average (score within 50-80), Below Average (score within 30-50), and Poor (mean score below 30). The results indicate that Tata Motors, Reliance Industries, and HCL Technologies are the most sustainable companies. These companies display high mean scores throughout the study period. This reflects stable and strong ESG Initiatives employed by the companies.

Cipla, Marico, and Jindal Steel and Power exhibit above-average performance. This shows a steady improvement in their ESG policies over time. Whereas, Zydus Lifesciences, Eicher Motor, and Indian Oil Corporation are in the below average performance category. These companies have either been inconsistent with their ESG performance or started late with their ESG initiatives. The results also present increasing ESG scores for many companies. Thus, indicating growth of awareness for ESG factors post-signing of the Paris Agreement. It also indicates integration of sustainable practices in business by companies, possibly driven by regulatory intervention.

Table A1 (Appendix A) overviews descriptive statistics of the financial variables employed in the study for the 14 companies during the study period. The financial indicators studied are Returns, Return on Assets (ROA), Earnings Per Share (EPS), and Return on Capital Employed (ROCE).

The returns statistics indicate that the highest returns are displayed by Reliance Industries Ltd (0.203), followed by Jindal Steel and Power (0.197). This shows strong market performance by both these companies. Tata Motors is the only company exhibiting negative mean returns (-0.050) for the study period, along with a high standard deviation (0.493), indicating significant volatility in the stock. Jindal Steel and Power also displayed high fluctuation in returns with a standard deviation of 0.488. The analysis of Return on Assets reveals that Marico (22.02%), Eicher Motors (17.96%), and HCL Technologies (17.19%) display the highest ROA for the study period. This indicates the most efficient use of assets to generate revenues by these companies. NTPC showed high fluctuations in ROA with a Standard Deviation of 4.386. Whereas, Tata Motors and Apollo Hospitals exhibited less efficient utilization of assets with the lowest average ROA of 1.67% and 3.71%, respectively.

The statistics for EPS reveal that Eicher Motors (78.23%) and Reliance Industries (72.66%) had the highest average EPS for the study period. This demonstrates the strong earning capacity of both these companies. On the contrary, Tata Motors, Jindal Steel and Power, and Apollo Hospitals exhibit high variation with lower EPS. The study on ROCE shows Marico (43.35%), HCL Technologies (25.45%), and Eicher Motors (24.25%) outshine the other companies. The high ROCE percentage indicates exceptional capital efficiency and strong operational performance. Tata Motors (5.78%) and NTPC (7.36%) showed low ROCE, suggesting underutilization of capital by these companies. Thus, the descriptive statistics on the financial determinants indicate that Eicher Motors, Reliance

Table 1. ESG scores of companies for the period from 2015 to 2024

Company	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Mean Score	Performance
Zydus Lifesciences	0.0	27.0	28.7	40.8	38.2	43.1	43.1	44.8	58.2	66.2	39.0	Below Average
Siemens	51.7	49.1	50.1	45.4	48.9	47.8	66.7	69.2	68.5	59.1	55.7	Above Average
Adani Ports &SEZ	23.3	24.1	36.0	47.0	50.5	59.6	67.6	65.9	68.2	73.2	51.5	Above Average
Marico	34.3	39.0	39.4	57.4	56.5	61.1	64.4	66.8	72.1	81.2	57.2	Above Average
Indian Oil Corp ltd	39.9	0.0	0.0	55.4	60.1	62.8	67.0	71.0	70.5	69.4	49.6	Below Average
Jindal Steel & Power	46.3	59.2	53.2	46.4	57.2	61.5	56.9	61.8	60.9	64.7	56.8	Above Average
Dabur India	36.7	36.9	39.4	42.7	55.8	61.8	62.4	58.2	69.2	71.1	53.4	Above Average
Cipla	31.5	43.1	43.6	42.4	62.3	73.3	71.9	82.8	82.5	84.8	61.8	Above Average
Tata Motors	78.6	74.4	77.3	74.5	75.9	83.1	85.2	82.5	86.0	87.3	80.5	Most Sustainable
Apollo Hospital	29.7	30.2	57.3	54.3	53.7	55.0	50.2	53.5	56.7	68.5	50.9	Above Average
HCL Technologies	84.5	84.5	79.8	73.1	71.0	72.6	76.3	72.3	74.1	78.4	76.7	Most Sustainable
Reliance Industries	81.9	80.1	78.3	74.8	79.0	76.6	72.3	80.5	80.4	78.9	78.3	Most Sustainable
NTPC	47.3	48.5	54.3	52.5	48.1	49.2	49.3	50.4	49.7	51.0	50.0	Above Average
Eicher Motors	13.1	19.4	22.0	21.8	27.0	29.6	37.7	42.3	44.7	62.1	32.0	Below Average

Industries, HCL Technologies, and Marico consistently display strong financial performance for the study period. Tata Motors and Jindal Steel and Power are the most volatile in terms of returns and profitability. Lastly, Dabur India and Cipla show balanced performance with moderate returns.

We further look into the descriptive statistics for macroeconomic variables employed in this study. Table 2 suggests that the average inflation for the study period has been 5.104. It ranges from 2.110 to 7.350 for the period. With a standard deviation of 1.445, the results suggest that inflation was in control for most of the study period with moderate variations. The statistics for GDP suggest a mean GDP of 5.88 and a standard deviation of 4.363. The high standard deviation indicates that economic conditions were not uniform during the study period. Finally, the statistics for IIP reveal an average IIP growth of 3.280 with a standard deviation of 2.056. Thus, suggesting moderate fluctuation in industrial activity for the period.

Table 2. Descriptive statistics of Indian macroeconomic factors for 2015–2024

Descriptive Statistics	Inflation	GDP	IIP
Mean	5.104	5.880	3.280
Standard Deviation	1.445	4.363	2.056
Minimum	2.110	–5.800	0.400
Maximum	7.350	9.700	7.300

We now examine the relationship between Company returns and the ESG scores, along with financial indicators and macroeconomic factors. These relationships are studied by employing Panel Data Regression Models. These models are estimated through three main approaches, namely, the Pooled OLS, the Fixed-Effect Model, and the Random Effect Model. The Pooled OLS, also known as the Common Effect Model, is the most basic approach. This model is estimated using ordinary least squares. It combines time series and cross-sectional data without accounting for heterogeneity. It is based on the assumption that all individual units behave uniformly over time (Trisnowati et al., 2022). On the contrary, the Fixed Effect Model allows for heterogeneity in the data. It captures these differences using distinct intercepts. The model employs dummy variables to control for the unobserved time-invariant characteristics of each entity. The Random Effect Model treats the differences between individual units as random and uncorrelated. The model incorporates these differences in the error term. The appropriate model for observed data is then selected based on the results of the Bruesch-Pagan Lagrange Multiplier Test (Breusch & Pagan, 1980) and the Hausman Test (Hausman & Taylor, 1981). We proceed with the Pooled Panel OLS model to examine the relationship between variables.

The output of the Pooled Panel OLS Model is depicted in Table 3. The results indicate that the ESG score has a statistically significant negative effect on returns. Additionally, EPS and ROCE show a statistically significant positive relationship with the dependent variable at 5% significance level. When we look at the macroeconomic variables, GDP shows a statistically significant weak negative relationship with the variable at 10% level of significance. We check the appropriateness of this model for our data set by conducting the Breusch-Pagan Lagrange Multiplier Test. This test helps us to compare the Pooled OLS and the Random Effect Specification. The result of the test supports a two -way Random Effect Model with $\chi^2 = 24.36$ ($p = 0.000$). Thus, based on the results, we move to employing a cross-sectional and time-specific Random-Effect Model for the data.

Table 3. Pooled panel OLS regression estimates

Variables	Coefficients	Standard Error	t-statistics	P Value
C	0.3492937	0.1224475	2.8521441	0.00504*
ESG Score	–0.00330	0.0012357	–2.674273	0.00843*
EPS	0.001930	0.0009399	2.0540968	0.04194**
ROA	–0.01220	0.0074734	–1.633263	0.10479
ROCE	0.009715	0.0044881	2.1646000	0.03221**
GDP	–0.01145	0.0066962	–1.710620	0.08950***
IIP	0.020857	0.0140775	1.4816183	0.14082
INFL	–0.02810	0.0171703	–1.636790	0.10405

Note: *, **, and *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

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Table 4 gives the results of the estimated Two-Way Random Effect Model. Similar to the results of the Pooled OLS, a statistically significant negative relationship is observed between returns and a company's ESG scores. Among the financial variables, EPS and ROCE emerge as variables with a positive and significant relationship with the dependent variable at 10% and 5% level of significance, respectively. Other financial and macroeconomic variables do not exhibit a statistically significant relationship with company returns. To determine if the estimated Random Effect Model is sufficient or a Fixed Effect Model would be appropriate, the Hausman Test for model selection is conducted. The null hypothesis of the test is that the Random Effect Model is appropriate. This implies that there is no correlation between the individual effects and the variable.

The test results show that for cross-sectional and time-specific dimensions, the p-values are 1.00, suggesting that the Random Effect Model is suitable. However, when the cross-sectional and time effects are tested jointly, the result produces a chi-square statistic of 13.47 (p = 0.0092), leading to the rejection of the null hypothesis. Therefore, signifying that a fixed effect model is more appropriate for a two-way estimate.

Based on the Hausman Test results, we estimate a Fixed Effect Model to examine the relationship between variables and to control for unobserved heterogeneity across companies and time. Table 5 provides the estimates for the model. The results exhibit a statistically significant negative relationship between ESG Score (-0.00467, p = 0.0143) of a company and its returns, hence supporting Hypothesis H1. The results highlight that ESG investments, while potentially value-enhancing in the long run, often lead to high upfront costs for a company. In many cases, companies may also have to redirect funds from core profit-generating activities to ESG initiatives, leading to a weakening of revenues. Further, firms operating in emerging markets may experience opportunity costs when focusing on ESG.

These results are consistent with Stakeholder Theory (Freeman, 1984), which states that businesses should create long-term value by focusing on meeting the expectations of different stakeholders, such as customers, regulators, employees, and communities, even though such actions might reduce short-term profitability. The significant negative relationship between ESG and stock returns is therefore reflected in a transition stage of ESG integration in India, which is at the stage of stakeholder-oriented investments, not yet turning into concrete, tangible financial returns. In the long term, with increased strength of firms in their ESG governance and trust of stakeholders, the returns of these investments would become sustainable and reputational benefits in line with the theoretical predictiveness of the Stakeholder model.

Among the financial variables, ROCE shows a significantly positive (0.012326, p = 0.0327) relationship with company returns at the 5% significance level. ROCE determines the efficiency of a company in utilizing its capital employed to generate profits. A high ROCE value suggests strong managerial efficiency and asset productivity. Thus, a high ROCE is favorable for company performance. Other financial variables – EPS and ROA – do not show any statistically significant connection with the dependent variable in this model. Therefore, Hypothesis H2 is partially supported.

Table 4. Random effect model estimates

Variables	Coefficients	Standard Error	t statistics	Probability
C	0.362422	0.2958640	1.2249645	0.22277
ESG Score	–0.00339	0.0012260	–2.770189	0.00641*
EPS	0.001575	0.0008779	1.7951378	0.07491***
ROA	–0.00891	0.0068923	–1.293359	0.19814
ROCE	0.007876	0.0041407	1.9020533	0.05934**
GDP	–0.01175	0.0190416	–0.617544	0.53793
IIP	0.021189	0.0401932	0.5271950	0.59894
INFL	–0.02767	0.0485991	–0.569498	0.56998

Note: *, **, and *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5. Fixed effect model result estimates

Variables	Coefficients	Standard Error	t-statistics	Probability
C	0.327389	0.1597113	2.0498847	0.04257
ESG Score	–0.00467	0.0018825	–2.484872	0.01434*
EPS	0.000708	0.0016181	0.4378136	0.6623
ROA	–0.00470	0.0104123	–0.452019	0.6520
ROCE	0.012326	0.0057045	2.1607431	0.0327**
GDP	–0.01434	0.0070360	2.038597	0.0437**
IIP	0.022963	0.145309	1.5803285	0.11668
INFL	–0.02206	0.0179072	–1.232293	0.22026

Note: *, **, and *** indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

When we observe the results for macroeconomic variables, they show a statistically significant negative relationship between GDP and returns. While this may be in contrast to the common perception, the negative relationship can be explained by several factors. During times of economic growth, input costs rise, and competitive pressure intensifies. This has an impact on company profitability. Also, in certain sectors that are susceptible to cyclicality, a rise in GDP may lead to a rise in volatility and thus affect stock returns. Other variables – IIP and Inflation – do not indicate any statistically significant relationship with the variables. Consequently, Hypothesis H3 is partially supported. These results align with other studies done by Bunjaku (2024) and Kushwaha (2024) in recent years. Thus, the Fixed Effect Model gives us an insight into the relationship dynamics between Stock returns, ESG scores, Financial Performance, and Macroeconomic indicators in the Indian market. The results show that ESG integration with business is at a very nascent stage in India. While these initiatives may be strongly emphasized, they exert a short-term financial burden on companies in emerging economies like ours. The importance of capital efficiency in driving firm performance reinforces the positive effect of ROCE on stock returns, and finally, the negative relationship between GDP and stock returns emphasizes that stock returns are influenced not just by economic growth, but other factors, such as investor sentiments and economic policies, play an even more significant role.

CONCLUSION

This study aimed to investigate how ESG performance, firm-level financial indicators, and macroeconomic factors affect the stock returns of companies listed on the NSE Nifty100 ESG Sector Leaders Index in India with panel data analysis. The empirical findings indicate that the relationship between ESG scores and short-term stock returns is statistically significant. This means that high ESG performance is linked to low market returns during the operating period. Return on Capital Employed (ROCE) is one of the financial indicators that reveals a strong positive relationship with stock returns, indicating that capital efficiency is an important variable in the increase of shareholder value. Moreover, GDP growth exhibits a statistically significant negative relationship with stock returns, implying that economic growth in an emerging market setting does not imply an increase in equity returns. According to these results, the study concludes that ESG integration in India is at a transitional point and can be accompanied by short-term adjustment costs to firms, and capital efficiency is one of the major drivers of market performance. Hence, corporate strategy and regulatory policy ought to emphasize reinforcing ESG structures using fiscal incentives, green financing, and improved sustainability reporting to achieve long-term goals in sustainability and value creation to shareholders.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Table A1. Descriptive statistics of financial variables for 2015–2024

Company	Returns	ROA	EPS	ROCE
Zydus Lifesciences				
Mean	0.081	11.759	18.489	17.393
Standard Deviation	0.337	3.305	7.006	3.248
Minimum	–0.315	6.530	10.724	13.169
Maximum	0.680	16.929	35.178	22.820
Siemens				
Mean	0.146	6.570	28.762	13.133
Standard Deviation	0.190	1.424	11.301	4.698
Minimum	–0.168	4.920	16.771	7.370
Maximum	0.405	9.259	53.026	24.040
Adani Port and Special Economic Zone				
Mean	0.117	7.440	23.547	11.424
Standard Deviation	0.214	1.107	8.506	2.190
Minimum	–0.201	6.030	12.324	8.369
Maximum	0.413	9.430	40.625	15.050
Marico				
Mean	0.126	22.023	8.246	42.353
Standard Deviation	0.135	1.427	1.992	3.753
Minimum	–0.089	20.620	5.583	37.530
Maximum	0.330	25.340	11.511	49.859
Indian Oil Corporation Ltd				
Mean	0.039	5.872	12.987	15.059
Standard Deviation	0.258	2.306	8.286	6.001
Minimum	–0.349	2.299	4.586	4.710
Maximum	0.417	9.029	32.962	22.559
Jindal Steel & Power				
Mean	0.197	3.073	21.333	9.446
Standard Deviation	0.488	5.147	39.416	8.345
Minimum	–0.456	–2.230	–23.596	1.020
Maximum	1.086	11.210	86.492	24.870
Dabur India				
Mean	0.094	16.021	9.069	23.780
Standard Deviation	0.101	1.987	1.410	4.436
Minimum	–0.033	12.810	7.111	17.870
Maximum	0.229	18.940	10.715	30.220
Cipla				
Mean	0.075	8.602	28.410	11.773
Standard Deviation	0.209	2.807	11.377	4.748
Minimum	–0.158	4.780	18.122	6.330
Maximum	0.539	13.880	51.248	19.070
Tata Motors				
Mean	–0.050	1.667	10.901	5.781
Standard Deviation	0.493	3.831	24.240	5.917
Minimum	–0.917	–3.209	–22.507	–1.890
Maximum	0.965	9.160	52.783	15.380
Apollo Hospitals				
Mean	0.140	3.714	33.800	9.702
Standard Deviation	0.313	2.041	23.039	3.547
Minimum	–0.217	1.430	7.242	4.520
Maximum	0.731	6.639	66.565	14.630

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Table A1 (cont.). Descriptive statistics of financial variables for 2015–2024

Company	Returns	ROA	EPS	ROCE
HCL Technologies				
Mean	0.080	17.190	41.854	25.451
Standard Deviation	0.243	2.418	11.173	3.961
Minimum	–0.238	13.180	29.058	18.180
Maximum	0.510	20.220	58.496	30.880
Reliance Industries Ltd				
Mean	0.203	4.604	72.664	7.829
Standard Deviation	0.151	1.261	22.789	1.308
Minimum	0.065	3.500	42.913	5.190
Maximum	0.532	7.800	104.740	9.450
NTPC				
Mean	0.069	5.514	13.484	7.361
Standard Deviation	0.181	4.386	3.718	1.108
Minimum	–0.181	3.200	9.158	6.370
Maximum	0.291	17.170	19.727	9.140
Eicher Motors				
Mean	0.109	17.960	78.231	24.252
Standard Deviation	0.182	5.788	30.090978	10.77302
Minimum	–0.270	9.970	46.900	11.150
Maximum	0.330	27.950	144.41452	39.040