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Sustainability and Stability: The Impact of ESG Ratings on Stock Price Volatility in India

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INTRODUCTION

In recent years, Environmental, Social, and Governance (ESG) considerations have gained significant prominence in financial markets. Investors and corporations are increasingly recognizing that non-financial factors can influence a firm's long-term performance and risk profile. ESG considerations directly impact investment strategies, with U.S. investors willing to pay up to 17 basis points higher for ESG-oriented index funds compared to non-ESG ones in 2020 (Baker et al., 2024).

ESG ratings, which attempt to quantify a company's performance on sustainability and ethical issues, have become an important tool for assessing corporate responsibility. While ESG integration in investment decisions is becoming more mainstream, its relationship with financial metrics, particularly stock price volatility, remains an area of active investigation.

Stock price volatility is a critical measure of financial risk and market perception. It reflects the degree of uncertainty or stability in a company's market valuation and can influence both short-term trading behavior and long-term investment decisions. When volatility is high, investors may grow cautious, viewing the stock as unpredictable or risky. This hesitation can affect how capital is allocated across firms and sectors, especially among institutional investors with defined risk thresholds.

Theoretically, strong ESG performance could mitigate certain business risks such as regulatory fines, reputational damage, operational disruptions, and supply chain vulnerabilities, thereby leading to more stable stock prices. Conversely, weak ESG performance might leave firms vulnerable to unexpected shocks or public backlash, which can intensify market reactions and cause price swings.

This paper seeks to explore the empirical relationship between ESG ratings and stock price volatility in the Indian context. By examining how variations in ESG performance correspond to fluctuations in stock prices, we aim to contribute to the growing body of literature on sustainable investing in emerging markets. The findings of this study may offer valuable insights for investors seeking to balance risk and responsibility, and for policymakers interested in encouraging responsible corporate behavior through market mechanisms.

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LITERATURE REVIEW

The relationship between Environmental, Social, and Governance (ESG) performance and stock price volatility has become a prominent area of research, particularly as stakeholders increasingly emphasize sustainable investing. Globally, ESG performance is widely viewed as a non-financial indicator that can help mitigate firm-specific risks and promote long-term financial stability. However, empirical evidence varies across markets, and research specific to emerging economies like India is still developing.

A growing body of international literature supports the idea that higher ESG performance contributes to lower stock price volatility. Albuquerque, Koskinen, and Zhang (2020) provide a theoretical and empirical framework showing that firms with stronger ESG credentials experience reduced idiosyncratic risk due to more loyal investor bases and enhanced stakeholder engagement. Similarly, Lins, Servaes, and Tamayo (2017) show that during the 2008 financial crisis, firms with higher social capital outperformed others in terms of both returns and risk reduction, highlighting ESG's value as a buffer during periods of economic distress.

Within emerging markets, Broadstock et al. (2021) and Zhou and Zhou (2022) study Chinese firms during the COVID-19 pandemic, concluding that ESG performance significantly reduced stock return volatility in times of crisis. These findings are echoed in Ferrell, Liang, and Renneboog (2016), who emphasize that strong corporate governance reduces agency conflicts and contributes to more predictable firm behavior, ultimately resulting in lower market risk.

Within the Indian market, the relationship between ESG and financial metrics is gaining academic attention. Dalal and Thaker (2019) found that higher ESG ratings corresponded to both higher returns and higher Tobin Q's ratios within the Indian financial ecosystem, indicating better financial performance. Sharma, Panday and Dangwal (2020) drew similar conclusions, finding that a higher ESG score correlated to higher ROA and ROCE. Beloskar et. al.(2022) studied the performance of Indian stocks during the COVID-19 pandemic and discovered that the stocks with higher ESG scores experienced lesser decline in value during the crisis compared to those with lower scores.

However, ESG performance in India is often affected by inconsistencies in disclosure norms and limited regulatory enforcement. Compared to developed markets, Indian ESG frameworks are still maturing, which may attenuate the potential benefits of ESG engagement. This aligns with global findings that institutional and legal environments play a moderating role in the effectiveness of ESG strategies (Dyck et al., 2019).

Hypothesis

Stock price volatility reflects the market's perception of a firm's risk profile and its sensitivity to external shocks. Environmental, Social, and Governance (ESG) performance is increasingly viewed as a proxy for long-term sustainability and operational resilience. Firms with strong ESG credentials are expected to manage reputational, regulatory, and operational risks more effectively, which may result in more stable stock performance. Conversely, firms with poor ESG ratings may be more exposed to controversies, regulatory penalties, and stakeholder dissatisfaction, potentially increasing volatility.

While international studies (e.g., Albuquerque et al., 2020; Lins et al., 2017) have found evidence of a negative relationship between ESG performance and stock volatility, findings are not yet conclusive, especially in emerging markets like India. This study seeks to empirically examine whether ESG ratings are associated with reduced stock price volatility among Indian firms. We focus on the biggest companies in

India by market capitalisation, and use the annualised stock price volatility to investigate this relationship over the long-term.

To explore this relationship, the sample of Indian firms is categorized into three ESG tiers (low, medium, and high) based on relative ESG ratings. Firms in the low ESG group serve as the baseline category. The study then tests whether firms in the medium and high ESG categories exhibit significantly different stock price volatility compared to the low ESG group.

The following hypotheses are proposed:

Hypothesis 1: Medium ESG vs. Low ESG

- **Null Hypothesis (H_{01}):**
  There is no statistically significant difference in stock price volatility between firms with medium ESG ratings and those with low ESG ratings.
  ($\beta_1 = 0$)
- **Alternative Hypothesis (H_{11}):**
  Firms with medium ESG ratings exhibit significantly lower stock price volatility compared to those with low ESG ratings.
  ($\beta_1 < 0$)

Hypothesis 2: High ESG vs. Low ESG

- **Null Hypothesis (H_{02}):**
  There is no statistically significant difference in stock price volatility between firms with high ESG ratings and those with low ESG ratings.
  ($\beta_2 = 0$)
- **Alternative Hypothesis (H_{12}):**
  Firms with high ESG ratings exhibit significantly lower stock price volatility compared to those with low ESG ratings.
  ($\beta_2 < 0$)

These hypotheses will be tested using panel regression analysis, with volatility as the dependent variable and ESG rating tiers as key explanatory variables. Control variables such as firm size, leverage, and Tobin's Q will be included to isolate the effect of ESG performance on volatility.

DATA COLLECTION

This study investigates the impact of ESG ratings on stock price volatility in the Indian equity market, focusing on a broad cross-section of major listed firms. The analysis uses panel data for the 150 largest publicly listed companies in India by market capitalization, allowing for greater variation across firms and enhancing the robustness and generalizability of the results.

The sample comprises the top 150 companies listed on the National Stock Exchange (NSE), ranked by average market capitalization over the study period. This approach ensures the inclusion of well-established firms with consistent trading activity and publicly available ESG and financial data. The sample spans multiple sectors, capturing a comprehensive view of India's corporate landscape. Through the data

collection process, some companies are eliminated from the analysis due to a lack of publicly available data throughout the time-period studied, leaving 123 firms for which all required information can be collected.

The dataset covers a five-year period from FY 2019–20 to FY 2023–24, enabling the analysis to reflect both stable market conditions and periods of volatility, such as the COVID-19 pandemic. This time frame also corresponds to increasing ESG disclosure requirements and growing investor awareness of sustainability practices in India.

ESG scores were sourced from Credit Rating Information Services Of India Limited (CRISIL), a leading Indian credit rating and research agency. CRISIL's ESG ratings evaluate firms based on their environmental policies, social impact, and governance standards using publicly disclosed data, regulatory filings, and proprietary scoring models. The ratings are on a scale of 0 to 100, with 0-40 scores signalling weak ESG scores, 41-50 for below average, 51-60 for adequate, 61-70 for strong, and 71-100 for leadership ESG scores.

Stock price volatility data were obtained from the NSE (National Stock Exchange of India). Monthly closing prices were used to compute annualized volatility for each firm, measured as the standard deviation of monthly returns within each financial year. This metric reflects the market's perception of firm-specific risk and is commonly used in empirical finance research.

To isolate the effect of ESG performance on volatility, the analysis includes several control variables, collected from firms' annual reports and financial statements:

- Market Capitalization (log): Controls for firm size
- Leverage (Debt-to-Equity Ratio): Reflects financial risk
- Tobin's Q: Measures if the company is undervalued or overvalued
- Cash: Shows liquid assets as a proportion of total assets

These variables were selected based on prior empirical studies (Broadstock et. al., Zhou and Zhou) linking firm characteristics to stock volatility.

METHODOLOGY

This study uses panel data regression to evaluate the impact of ESG Ratings on stock price volatility of the top 150 companies by market capitalization in the Indian market. The companies are split into three categories based on their ESG Ratings - high, medium and low. The high ESG companies are those which have ESG Ratings over the 66th percentile in the dataset. The medium ones have ratings between the 66th and 33rd percentile, while the low ESG companies are in the bottom third of ESG Ratings in the sample collected.

Category	Number of Companies	Average ESG Rating	Median ESG Rating
High ESG Firms	43	65.79	64
Medium ESG Firms	41	59.02	59
Low ESG Firms	38	51.84	52

We apply a fixed effects model of panel regression to the dataset. We assume that the ESG Ratings of a firm, or at least the category (high, medium or low) in which it falls, will remain constant through time. This assumption is based on the fact that ESG ratings of a company are a function of their long-term policies and operational decisions, which tend to stay consistent across years. This treatment is consistent with other research in the field (Das, et al., Kumar and Firoz).

The regression model takes the control variables as the independent values, along with two dummy variables to represent two of the ESG ratings categories. The third category is used as the base or reference, denoted by the lack of either dummy variable. The annualized stock price volatility data is the dependent variable, and the regression coefficients from the model are analysed to assess the impact of the ESG ratings on this metric. The regression equation, therefore is:

$$VOLi = \alpha_0 + \alpha_1 ESG_{mid} + \alpha_2 ESG_{high} + \alpha_3 Size_i + \alpha_4 Lev_i + \alpha_5 TobinQ_i + \alpha_6 Cash_i + \varepsilon_i$$

Where ESG_{high} is the dummy variable to represent high ESG firms and is assigned the value 1 for firms in the first tertile of ESG Ratings amongst the companies selected. Similarly, the value of ESG_{mid} is 1 for all companies in the middle one-third percentile, and zero for all others. Firms with low ESG Ratings are identifiable by the lack of either dummy variable.

RESULTS AND DISCUSSION

Before running the regression specified above, a multi-colinearity test is run on the input data to verify its correctness and validity for the chosen methodology of pooled OLS regression.
Multi-colinearity occurs when two or more independent variables in a regression are highly correlated with each other. If this phenomenon is present, the coefficients generated through regression become unstable, and even minor changes in the data can cause large swings in the outputs. This makes it difficult to conclusively interpret the model. Even important factors might appear statistically insignificant due to the shared variance.

Variance Inflation Factor (VIF) test is used to check for multi-colinearity. H**ow much the variance** (i.e., the squared standard error) of an estimated regression coefficient is **inflated** because of multicollinearity. The results of this test are presented in the table below -

Independent Variable	**VIF**
Size	3.777461
TobinQ	1.616306
Cash	1.241374
Leverage	1.213912
ESG_{mid}	2.405586

ESG_{high}	1.946748

The VIF test is structured such that a factor of 1 represents no multi-collinearity. A VIF value below 5 is generally considered to be acceptable (Gareth et al. 2017, Johnston et al. 2018). Here, we see that the VIF values for all the independent variables used in the study are under this threshold value. This verifies that using these variables will yield meaningful and interpretable results through panel regression.

The results of the panel regression are presented in Table below. The regression yields negative coefficients for both medium and high ESG firms. From these results, we can infer that medium ESG firms exhibit less stock price volatility than low ESG firms, and that this observation is statistically significant that the 5% confidence interval. High ESG firms are also less volatile than low ESG firms, since the coefficient of the dummy variable corresponding to them is negative, however this result is not statistically significant.

Independent Variable	**Coefficient**	**P-Value**
Size	-0.0660	0.0000
Leverage	0.0462	0.0000
TobinQ	3.314e-10	0.0004
Cash	-0.0294	0.3425
ESG_{mid}	-0.0573	0.0454
ESG_{high}	-0.0424	0.1454

Using these results, we are able to reject hypothesis H_{01}, and conclude that medium ESG firms are less volatile than high ESG firms. Both hypotheses regarding high ESG firms still stand, due to the lack of a statistically significant result.

CONCLUSION AND FUTURE WORK

This study set out to examine the relationship between ESG ratings and stock price volatility in the Indian market, using panel data from several firms over a five-year period. By employing ESG-based dummy variables to capture different rating categories and controlling for firm-specific characteristics such as size, Tobin's Q, cash holdings, and leverage, the analysis aimed to isolate the potential moderating effect of ESG performance on market risk.

The regression results indicate that while certain ESG categories exhibit measurable associations with volatility, the strength and statistical significance of these relationships are sensitive to the choice of

reference group and model specification. Specifically, the "high" ESG group did not consistently demonstrate statistically significant differences in volatility relative to lower-rated groups, suggesting that the link between superior ESG performance and market stability may be weaker or more nuanced in the Indian context. This may reflect variations in ESG reporting standards, investor perception, or the relatively nascent stage of ESG integration in the region.

Overall, these findings suggest that while ESG ratings may influence stock price volatility, the effect is neither uniform across rating tiers nor as pronounced as theory might predict. This highlights the importance of context-specific ESG assessments, the evolving nature of ESG adoption in emerging markets, and the potential for other unobserved factors to play a significant role. Future research could extend this analysis by incorporating a broader range of market conditions, sector-level interactions, and alternative ESG metrics to capture the multidimensional nature of sustainability performance.

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