

Determinants of Capital Structure in ESG-Leading Indian Firms: Evidence from NIFTY100 ESG Index Firms

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Abstract

Abstract: This paper focuses on the effect of Environmental, Social, and Governance (ESG) disclosures on capital structure in Indian sustainable firms based on the NIFTY100 ESG Index from 2015 to 2022. The analysis considers firm-level determinants (profitability, firm size, tangibility, growth opportunities, and risk) and both aggregate and pillar-wise ESG disclosure scores, using panel regression models. The results indicate that traditional factors dominate in driving financial leverage, with profitability negatively associated with asset-based leverage. In line with pecking-order and trade-off theories, asset tangibility positively affects leverage. While firm risk is positively associated with the debt-to-assets ratio, this suggests that earnings volatility does not limit borrowing in ESG-leading firms. In contrast, the aggregate ESG disclosure scores do not exhibit a statistically significant impact on leverage, nor do any of the individual E, S, or G pillars. The findings reveal that, among Indian ESG leaders, capital structure is primarily driven by financial fundamentals rather than differences in ESG disclosures.

Keywords: ESG Disclosure; Capital Structure; Financial Leverage; NIFTY100 ESG; Emerging Markets; Panel Data.

INTRODUCTION

The Environmental, Social, and Governance (ESG) framework assesses how effectively firms manage their environmental impact, social responsibilities, and sustainability practices to achieve consistent value creation (Al Amosh et al., 2024; Shan & Zhu, 2024). The ESG performance of firms has received increased attention from

investors, regulators, and other stakeholders, as it is not just an ethical obligation in business. They see it as a way to manage risks and improve performance (Deb et al., 2024; Sinha Ray & Goel, 2023). To enable investors to make informed investment decisions in companies that prioritise sustainability in the Indian market, the National Stock Exchange (NSE) of India instituted the 'NIFTY100 ESG Index', which tracks the performance of firms within the Nifty 100 index

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based on ESG risk scores. Although ESG performance is much prominent in sustainable investing research, ESG-leverage dynamics are less explored in India. The use of debt as part of a firm's capital structure is often defined as leverage. This is a central concept of corporate finance that influences a firm's cost of capital and shareholder value. According to Kraus & Litzenberger (1973) and Modigliani & Miller (1958), "The Trade-Off Theory suggests that firms strive to strike a balance between benefits of debt in the form of taxes and the financial distress cost". Myers & Majluf (1984) state, "The Pecking Order Theory says that companies should follow hierarchy in their capital structure decisions by utilising internal funds first, then borrow money from others, and only use equity (shares) as a last option, due to information asymmetry". These established relations might change if ESG disclosure addresses information asymmetry or perceived stability.

Even though extensive research has examined the relationship between ESG performance and corporate value, comparatively less attention has been paid to whether ESG disclosure affects firms' financing decisions—particularly in emerging economies. Capital structure decisions are integral to corporate financial policy, as they influence risk exposure, cost of capital, and long-term financial flexibility. Nevertheless, it remains uncertain whether sustainability reporting genuinely alters the traditional determinants of leverage, or whether firms predominantly rely on financial fundamentals when structuring their capital.

The motivation for this study arises from the rapid institutionalisation of ESG in India, driven by increased ESG-focused investments and evolving disclosure expectations. Despite the rapid growth of ESG reporting in India, a key practical question remains: does ESG disclosure directly influence capital structure decisions, or do traditional financial determinants continue to shape financing choices even among ESG-leading firms? In a banking-centric financial system like India's, where most lending

relies heavily on collateral, it is uncertain whether enhanced ESG disclosure can significantly lower perceived credit risk enough to affect borrowing capacity. On the other hand, adopting ESG practices could enhance internal funds and increase equity value, thereby reducing dependence on debt. This research primarily aims to identify which of these mechanisms plays a more significant role.

Recent regulatory developments in India enhance the significance of this study. ESG disclosure requirements have gradually become more stringent under the Securities and Exchange Board of India (SEBI), resulting in the adoption of the Business Responsibility and Sustainability Reporting (BRSR) framework as a mandate for the top 1,000 listed companies by market capitalisation to submit a BRSR report alongside their annual reports from the financial year 2022-23. The BRSR has a significant impact on sustainability reporting, transparency, and the harmonisation of Indian disclosure practises with international ESG reporting standards. Moreover, the National Stock Exchange (NSE) launched the NIFTY100 ESG Index to distinguish between companies with relatively better ESG disclosure. Although such regulatory initiatives enhance the quality of reporting and comparability, it is empirically unclear whether increased ESG disclosure will have a quantifiable effect on capital-structure decisions.

There is mixed international evidence regarding the ESG-leverage nexus. Most existing research on ESG and financing decisions is either global or sector-specific (Adeneye et al., 2023; Malik & Kashiramka, 2025; Pucheta-Martínez et al., 2023), providing limited evidence on whether ESG disclosure influences capital structure decisions within ESG-leading firms in India. This study aims to address this gap by examining constituent firms of the NIFTY100 ESG Index. High ESG ratings can augment a company's creditworthiness and access to financing by reducing risk and information asymmetry. (Al Amosh et al., 2024; Malik & Kashiramka, 2025). They may also decrease the

necessity for external debt if sustainable practices and stakeholder support generate internal capital and flexibility. (Pucheta-Martínez et al., 2023). On the contrary, these firms with exceptional ESG scores may also substitute debt with equity financing. (Zhao & Zhang, 2024). These diverse perspectives impel the present study. The problem statement addressed in this paper is: How does ESG disclosure guide the capital structure decisions of firms distinguished as ESG leaders in India?

The main purpose of the study is to analyse the determinants of capital structure in ESG-leading Indian firms that are constituents of the NIFTY100 ESG Index and listed on the National Stock Exchange. Specifically, the analysis aims to (i) determine the traditional firm-level determinants such as profitability, firm size, asset tangibility, growth prospects, and risk, (ii) determine the impact of aggregate ESG score on capital structure, (iii) determine the distinct effects of individual Environmental (E), Social (S), and Governance (G) indicators on capital structure. Therefore, the present study integrates the fields of sustainability and corporate finance by providing evidence to synchronise financial and sustainability goals.

This study contributes in three main ways. First, it provides firm-level evidence from an emerging market where ESG regulation is still evolving, and credit markets are mainly bank-based. Second, by focusing solely on ESG-leading firms, it isolates whether sustainability disclosures alter the relationships between traditional determinants and capital structure. Third, the results shed light on how financing behaviour may be reshaped by ESG integration or coexist with conventional financial determinants. Overall, the research improves understanding of the interaction between sustainability disclosures and capital-structure theory in the Indian institutional setting. This outcome provides valuable insights for business managers to strive for a balance between sustainability and financing choices, for investors to integrate ESG into credit risk evaluation, and for

policymakers to formulate guidelines for sustainable corporate growth.

The rest of the paper is organised as follows: Section 2 presents a literature review and theoretical models. Section 3 provides the data and research methodology. Section 4 postulates empirical results and analysis. Section 5 stipulates the discussion, findings, and implications. The concluding section specifies limitations and future research directions.

Literature Review

This section integrates theoretical background and empirical findings from prior research to discuss the relationship between ESG performance and capital structure.

1. Theories of Capital Structure and Traditional Determinants.

Capital structure choices underpin theories of capital structure. Kraus & Litzenberger (1973) explain, According to the trade-off theory, firms strive to balance the tax advantages of debt with the bankruptcy costs and agency costs to attain the optimal debt level. Tax-deductible interest may boost firm value by increasing debt, but too much borrowing will increase the risk of financial distress". Myers & Majluf (1984) note, "In the pecking order theory, the financing structure of firms shows the use of internal funds instead of debt, with the use of equity being the final resort because of the adverse selection cost and negative signalling problems that may be related to equity issues". These theories have determined traditional determinants of leverage. In line with the 'pecking-order theory', profitable companies that have large internal cash flows are more likely to have lower leverage. On the other hand, as trade-off theory suggests, highly tangible firms with collateral value are better able to take on more debt. The larger the firm, the greater its capacity to increase debt, as it is more diversified and has less information asymmetry. To minimise underinvestment

problems, firms with substantial growth opportunities tend to rely on debt. Earnings volatility reflects the firm's business risk and is expected to affect leverage negatively. The cost of distress can rise with higher debt, as higher-risk firms are more likely to file for bankruptcy. These relationships are well supported, so we analyze these factors in ESG-leading firms. While traditional determinants are established, ESG disclosure introduces new mechanisms affecting financing, such as risk mitigation, reducing information asymmetry, reputation, and lender perception. The key question is whether ESG disclosure significantly influences leverage decisions beyond these factors.

2. ESG and Capital Structure - Global Evidence

The relationship between ESG and capital structure is inconsistent across international evidence. A number of studies report that better ESG performance is associated with lower leverage. Asimakopoulos et al. (2023) show that the ability of U.S. companies to achieve ESG ratings lowers both book and market leverage and refocuses their debt toward bank borrowing, indicating that ESG ratings change the debt structure and, therefore, decrease optimal leverage. A multi-country sample by Pucheta-Martínez et al. (2023) depicts a negative relationship between CSR disclosure and financial leverage in a sample of 48 countries, implying that socially responsible firms use less debt, probably because of reputational advantages, or they prefer to use internal capital.

Different studies show the significance of firm-specific factors and institutional context. Firms prefer more equity financing in markets where ESG transparency leads to higher valuations, thereby reducing debt ratios. According to Zhao and Zhang (2024), companies with high environmental and governance performance in China use equity financing and reduce debt utilisation. These results suggest the existence of an equity substitution mechanism in which ESG strength helps to alleviate debt dependence. On the other hand, the study

reveals financial difficulties may be evaded if firms have strong ESG credentials in Europe. Morais et al. (2024) show a supply-side effect in which creditors are willing to lend to firms with strong ESG performance, thereby reducing the likelihood of "zero-leveraged" firms.

However, other researchers conclude that ESG enhances debt capacity. In emerging markets, Malik and Kashiramka (2025) report a positive relationship between ESG disclosure and both book and market leverage, attributing it to reduced information asymmetry and increased lender confidence, especially among financially constrained companies. Morais et al. (2024) demonstrate that creditors are more likely to lend to companies with better ESG performance, thereby reducing the likelihood of zero-leverage firms. Adeneye et al. (2023) show that ESG performance also affects how quickly firms respond to target capital structure, indicating that ESG affects dynamic leverage behaviour. All these findings indicate that ESG can improve borrowing capacity by enhancing creditworthiness. Lee and Koh (2024) demonstrate that ESG performance lowers firm risk among U.S. financial firms, indicating that ESG can moderate leverage through risk mitigation. Al Amosh et al. (2024) demonstrate that ESG performance and capital structure can be jointly determined, suggesting the possibility of reverse causality. On the whole, international evidence shows that ESG can reduce leverage, increase leverage, change the debt composition, and influence leverage adjustment processes. The direction of the association appears institutionally contingent.

3. ESG and Capital Structure in India

Limited studies across various institutional contexts have directly analysed the impact of ESG metrics on capital structure decisions, providing mixed results. In India, ESG studies have largely focused on firm performance rather than financing structure. As reported by Dalal and Thaker (2019), Deb et al. (2024), and Sinha Ray and Goel (2023), higher ESG

scores are associated with better financial performance and market valuation. Sharma et al. (2020) demonstrates that a firm's good financial performance is associated with better ESG disclosure, while firms with high leverage are likely to have lower levels of ESG disclosure. Yadav and Asongu (2025) demonstrate that ESG enhances firm value when firms are experiencing financial distress but do not explicitly examine corporate capital structure decisions.

The literature on ESG and leverage in emerging markets such as India and China suggests that ESG leaders insist on lower debt levels, corresponding to the equity substitution effect or conservative financial policy. Conversely, research conducted in broader or developed contexts indicates that ESG strengths could improve debt capacity and leverage. Interestingly, existing research does not explicitly test ESG-leading firms; it is therefore unclear whether ESG reporting strength adds explanatory value when making capital structure choices in companies already defined as sustainability leaders. The purpose of this study is to empirically determine the dominant pattern among India's NIFTY 100 ESG firms. Each of the pillars (E, S, G) will be examined to determine if a specific dimension impacts the relationship.

4. Research Hypotheses

Drawing on established capital structure theories and prior empirical evidence, the following hypotheses are tested:

Traditional Determinants:

- H1: "There is no significant relationship between profitability and leverage amongst ESG-leading Indian companies".
- H2: "There is no significant relationship between firm size and leverage among ESG-leading Indian companies".
- H3: "There is no significant relationship between asset tangibility and leverage in ESG-leaders in

India".

- H4: "There is no significant relationship between growth opportunities and leverage among ESG-leading Indian companies".
- H5: "There is no significant relationship between firm risk and leverage in ESG-leading Indian firms".

ESG Impact:

- H6: "There is no significant relationship between ESG and leverage among Indian firms that lead in ESG".
- H7a: "There is no significant relationship between environmental (E) performance and leverage".
- H7b: "There is no significant relationship between social (S) performance and leverage".
- H7c: "There is no significant relationship between governance (G) performance and leverage".

Data and Methodology

1. Sample and Data Sources

This study examines a sample of Indian firms that are constituents of the NIFTY100 ESG Index and listed on the National Stock Exchange (NSE). The thematic equity index maintained by NSE selects NIFTY 100 firms based on low ESG risk scores. The study is constrained by limited ESG data availability and focuses on a sample of 35 firms with ESG disclosure scores available for 2015-2022, yielding 280 firm-year observations. The sample period is restricted to 2015-2022 to ensure consistency of firm-level data due to limited historical data and the unavailability of firm-level ESG scores for Indian firms in the Bloomberg database for later periods, as well as to account for transitional adjustments and reporting lags after the implementation of the BRSR framework. Panel data at the firm level was obtained exclusively from the 'Centre for Monitoring Indian Economy (CMIE) Prowess', along with ESG scores from Bloomberg. Financial firms were excluded from

the current study due to their unique capital structures and regulatory systems.

2. Variables and Measurement

The two dependent variables for capital structure choices via leverage in this study are (i) 'Debt-to-Equity Ratio', which is total debt divided by total equity, and (ii) 'Debt-to-Total Assets Ratio', calculated as total debt divided by total assets. Total debt is defined as the sum of short-term borrowings and long-term debt obligations and is consistent with current conventions in the capital-structure literature. This broad measure summarises total exposure to leverage, thereby avoiding the isolation of maturity-specific effects. Combining short- and long-term aspects, the analytical framework captures the overall dependence of firms on external debt financing. The explanatory variables include the total 'ESG Disclosure Score', as well as the score of each of the pillars of 'Environmental', 'Social' and 'Governance'. ESG scores range from 0 to 100 on an absolute scale, representing transparency of ESG reporting. Higher disclosure levels translate to

increased scores. The individual (E, S, or G) pillar scores are also available for analysing their impact on leverage. ESG performance may increase leverage by lowering risk and enhancing creditworthiness, or through improved internal reputation and resource efficiency, may substitute debt.

The existing literature and theoretical models shed light on the impact that firm-specific features, including profitability, size, asset tangibility, growth prospects, and risk, have on leverage. According to the pecking-order theory, profitable firms show a reduced dependency on external financing. Greater access to capital markets and reduced information asymmetry positively affect leverage for larger firms. The collateralization of assets, as a measure of tangibility, will be positively associated with leverage. Firm's growth negatively impacts leverage due to higher agency costs and underinvestment risks. A firm's earnings volatility is quantified using a three-year rolling standard deviation of ROA. An increase in risk deters debt financing because it raises bankruptcy costs. Table 1 presents detailed descriptions and definitions of these variables.

Table 1 : Description of study variables

S. No.	Name of Variable	Abbreviation	Description	Expected Sign	Proxy Variable
1	Debt-to-Equity Ratio	Levg_1	Total debt divided by total equity	Dependent	Leverage measure
2	Debt-to-Assets Ratio	Levg_2	Total debt divided by total assets	Dependent	Leverage measure
3	ESG Score	ESG	Composite ESG disclosure score	+/-	Bloomberg ESG Disclosure Score
4	Environmental Score	ENV	Environmental sub-score from ESG	+/-	Environmental disclosure score

5	Social Score	SOC	Social sub-score from ESG	+/-	Social disclosure score
6	Governance Score	GOV	Governance sub-score from ESG	+/-	Governance disclosure score
7	Return on Assets	Firm Profitability	PAT 'net of prior period and extraordinary transactions, divided by average total assets'	-	Profitability
8	Firm Size	Log_FirmSize	Natural log of market capitalisation (in ₹ crores)	+	Firm size
9	Tangibility	Tangibility	Net property, plant, and equipment divided by total assets	+	Tangible assets
10	Growth Opportunities	Growth	Market capitalisation divided by net worth	-	Growth potential
11	Firm Risk	Risk	3-year rolling standard deviation of ROA (volatility of operating returns)	-	Earnings volatility

3. Model Specification

This study uses panel regressions to investigate the factors influencing capital structure in ESG-leading Indian companies. Fixed Effects (FE) and Random Effects (RE) specifications are used to regulate unobserved firm-specific characteristics that remain constant over time. The Hausman test is used to determine the appropriate specification of each dependent variable. In addition, panel data reduces multicollinearity, improves estimation efficiency, and yields empirically robust findings that are also consistent with best practices in econometric analysis (Baltagi, 2008; Wooldridge, 2010). Each model uses firm-clustered robust standard errors, and multicollinearity is assessed using correlation matrices and variance inflation factors.

We use the regression equations (1) and (2) given below to investigate the relationship between composite ESG disclosure and firm leverage

$$\text{Levg_1}_{it} = \alpha_i + \beta_1 \text{ESG}_{it} + \beta_2 \text{Firmprofitability}_{it} + \beta_3 \log_ \text{Firm Size}_{it} + \beta_4 \text{Tangibility}_{it} + \beta_5 \text{Growth}_{it} + \beta_6 \text{Risk}_{it} + \epsilon_{it} \dots (1)$$

$$\text{Levg_2}_{it} = \alpha_i + \beta_1 \text{ESG}_{it} + \beta_2 \text{Firmprofitability}_{it} + \beta_3 \log_ \text{Firm Size}_{it} + \beta_4 \text{Tangibility}_{it} + \beta_5 \text{Growth}_{it} + \beta_6 \text{Risk}_{it} + \epsilon_{it} \dots (2)$$

Equations (3) and (4) examine the link between components of ESG disclosure and firm leverage:

$$\text{Levg_1}_{it} = \alpha_i + \beta_1 \text{ENV}_{it} + \beta_2 \text{SOC}_{it} + \beta_3 \text{GOV}_{it} + \beta_4 \text{Firmprofitability}_{it} + \beta_5 \log_ \text{Firm Size}_{it} + \beta_6 \text{Tangibility}_{it} + \beta_7 \text{Growth}_{it} + \beta_8 \text{Risk}_{it} + \epsilon_{it} \dots (3)$$

$$\text{Levg_2}_{it} = \alpha_i + \beta_1 \text{ENV}_{it} + \beta_2 \text{SOC}_{it} + \beta_3 \text{GOV}_{it} + \beta_4 \text{Firmprofitability}_{it} + \beta_5 \log_ \text{Firm Size}_{it} + \beta_6 \text{Tangibility}_{it} + \beta_7 \text{Growth}_{it} + \beta_8 \text{Risk}_{it} + \epsilon_{it} \dots (4)$$

Where: i= firm; t=time; α_i = firm-specific unobserved

heterogeneity; ϵ_{it} = idiosyncratic error term

4. Robustness Check

To validate our results, we ran several robustness tests. Initially, we re-evaluated the static models using different methods (fixed effects, random effects, and pooled OLS), and the Hausman test confirmed the preferred estimator in each case. Our findings are supported by consistent results from two dependent variables (debt-to-equity ratio and debt-to-assets ratio). Third, multicollinearity was ruled out based on VIF scores below 5. All regression specifications are run using 'robust standard errors' clustered at the firm level to account for possible heteroscedasticity and intra-group correlation. These diagnostics enrich the validity and reliability of our empirical findings.

Empirical Results and Discussion

1. Descriptive Statistics and Preliminary Analysis

Table 2 shows the main features of the sample firms, including 280 firm-year observations. The average Lev_{g_1} (debt-to-equity ratio) is about 0.3656, and the average Lev_{g_2} (debt-to-asset ratio) is about 0.1345. This trend indicates that ESG-based companies have moderate debt financing. The mean ESG score is 48.48, with the governance pillar (82.08) having the highest mean, followed by the environmental (32.63) and social (30.61) pillars, indicating variability across the sustainability dimensions. Large dissimilarity in operational performance is also observed, with a mean of 11.04. Most firms are large, with average log-firm size (11.05) and tangibility (0.22), indicative of moderate asset intensity, but growth opportunities are highly variable, and firm risk is moderate. The identified variations support the use of panel data techniques to account for firm-specific heterogeneity in leverage behaviour.

Table 2 : Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Levg_1	280	0.3656	0.6312	0	5.8361
Levg_2	280	0.1345	0.1568	0	0.6089
ESG	275	48.481	10.7672	27.271	76.984
ENV	275	32.627	20.8614	0.4228	81.184
SOC	275	30.61	12.0798	7.104	60.55
GOV	275	82.08	6.8528	57.676	98.615
Firm Profitability	280	11.036	11.1488	-8.8661	73.795
Log_Firmsize	280	11.048	0.979	8.4938	14.394
Tangibility	280	0.2215	0.1541	0.0043	0.6871
Growth	280	8.1376	11.4735	0.239	86.096
Risk	210	0.0228	0.0234	0.0004	0.1355

Table 4 presents the Pearson correlation coefficient matrix for the study variables. The two dependent variables, debt-to-equity (Levg_1) and debt-to-assets (Levg_2), have a strong positive correlation ($r = 0.8666$, $p < 0.01$), confirming consistent capital structure metrics.

A limited linear relationship is displayed by the weak, statistically insignificant positive correlation between the overall ESG score and both leverage ratios. The social score across the ESG dimensions shows a small positive correlation with both leverage measures ($r \approx 0.14$, $p < 0.05$), suggesting that socially conscious efforts may influence capital structure choices. The leverage and governance scores show a weak, insignificant negative correlation.

The profitability of firms and leverage ratios are found to have a negative correlation ranging from -0.434 to -0.534, with a p-value of less than 0.01, consistent with the 'pecking order theory' that more profitable firms are less reliant on external funding. Firm size and growth opportunities are negatively correlated with leverage. On the other hand, there is a significant positive correlation between tangibility, in line with the 'trade-off theory', according to which tangible assets are used as collateral against debts. Risk shows no meaningful correlation with leverage; however, it is negatively correlated with ESG performance, especially in the governance area. Better ESG results are linked with less volatile earnings. The results in Table 3(a) and (b) of variance inflation factors are in line with the results of the correlation matrix. The findings are consistent with the theoretical assumptions, which suggest that both financial and ESG variables should be included in a multivariate regression framework to determine their combined effect on the firm's leverage.

Table 3 (a) : Test for multicollinearity among explanatory variables

Variable	VIF	1 / VIF
Firm Profitability	1.69	0.5905
Growth	1.44	0.6959
ESG Score	1.31	0.7644
Risk	1.26	0.7949
Log_FirmSize	1.23	0.813
Tangibility	1.09	0.9206
Mean VIF	1.34	

Table 3 (b) : Test for multicollinearity among explanatory variables

Variable	VIF	1 / VIF
Firm Profitability	1.8	0.562
Environmental Score	1.8	0.564
Social Score	1.5	0.675
Growth	1.5	0.688
Log Firm Size	1.4	0.731
Governance Score	1.4	0.736
Risk	1.4	0.741
Tangibility	1.1	0.89
Mean VIF	1.5	

Table 4 : Correlation Matrix

Variable	Levg_1	Levg_2	ESG	ENV	SOC	GOV	Firm Profitability	Log_Firmsize	Tangibility	Growth	Risk
Levg_1	1										
Levg_2	0.8666***	1									
ESG	0.0459	0.0446	1								
ENV	0.0227	0.0069	0.9332***	1							
SOC	0.1396**	0.1391**	0.7877***	0.5852***	1						
GOV	-0.0978	-0.0553	0.4877***	0.3264***	0.1726***	1					
Firmprofitability	-0.4338***	-0.5337***	-0.2941***	-0.2642***	-0.1603***	-0.2996***	1				
Log_Firmsize	-0.2336***	-0.2442***	0.2471***	0.2348***	0.1088*	0.2582***	0.2722***	1			
Tangibility	0.3817***	0.4154***	0.1158*	0.1433**	0.026	0.0643	-0.2746***	-0.0924	1		
Growth	-0.1616***	-0.2531***	-0.2602***	-0.2595***	-0.1908***	-0.1011*	0.4388***	0.2763***	-0.0423	1	
Risk	0.0512	0.0341	-0.2665***	-0.2564***	-0.0749	-0.3200***	0.3715***	0.0855	-0.0691	0.0234	1

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

2. Regression Results

Table 5 shows the outcome of the Hausman test, which measures the appropriateness of the 'fixed-effects and the random-effects' estimator to each model. The null hypothesis of the test is that the difference between the

coefficients is not systematic, indicating that random effects are consistent and efficient.

The Chi-square test yields significant values in the models where Lev_{g_1} ('Debt/Equity Ratio') is the dependent variable (Models 1 and 3). This implies that the null hypothesis is rejected in favour of the fixed-effects model. Thus, the fixed effects are the most appropriate specification to test the factors that affect the 'debt-to-equity ratio'.

The Hausman test on Lev_{g_2} ('Debt/Assets Ratio') is divergent. Model 2 yields a significant test (Chi-square = 19.13, p = 0.004), indicating the presence of fixed effects. In comparison, Model 4 yields a non-significant value (Chi-square = 1.16, p = 0.997), which justifies the use of random effects. Therefore, the Model 2 should be estimated with fixed effects, whereas the Model 4 should be estimated with random effects.

Table 5 : Hausman Model Specification Test

‘Hausman’s Test for Fixed or Random Effects’ ‘Ho: difference in coefficients not systematic’				
	Dependent Variable: Lev _{g_1} ('Debt/Equity Ratio')		Dependent Variable: Lev _{g_2} ('Debt/Assets Ratio')	
	Model 1	Model 3	Model 2	Model 4
Chi-Square	59.31	49.92	19.13	1.16
Prob.> Chi-square	0.0000	0.0000	0.004	0.997

Table 6 presents regression results examining the association between ESG disclosures, the traditional firm-level determinants, and leverage, using fixed- and random-effects analyses. The coefficients of the two leverage equations (Lev_{g_1} = 0.0002, Lev_{g_2} = 0.00001) obtained in the ESG Disclosure Score indicate that there is no quantifiable linear effect of ESG performance on leverage among ESG-leading companies in India. Disaggregating the ESG pillars into environmental, social, and governance, each pillar shows no significant coefficients. These results imply that overall ESG performance or its dimensions are not meaningful determinants of capital structure in this sample; among ESG leaders, such disclosures may not be sufficiently differentiated to affect leverage, or internal financing may offset any ESG-related credit benefits. Therefore, the null hypothesis H6-7c cannot be rejected.

The effects of traditional financial variables are more consistent and align with existing capital structure theories. There is a significant negative relationship between firm profitability and Lev_{g_2} (-0.0039, p < 0.05) in support of the 'pecking order theory' that interprets that profitable firms are not as dependent on external debt. In the case of lev_{g_1}, profitability is negative and insignificant. Thus, H1 was partially rejected for asset-based leverage. Firm size is statistically insignificant in explaining leverage, hence H2 cannot be rejected. Leverage shows a strong positive relationship with Tangibility in all models (Lev_{g_1} = 4.18, Lev_{g_2} = 0.43, p = 0.01), supporting the hypothesis that asset-backed collateral has a significant positive impact on debt capacity and aligning with the trade-off theory. Therefore, rejecting H3. Growth opportunities exhibit a marginally significant, positive influence on Lev_{g_2} regressions (0.0013, p = 0.10), which is unexpected but could reflect a strategic expansion funded through debt in the asset-based leverage measure. Overall, H4 cannot be rejected. Surprisingly, risk is positively correlated with Lev_{g_2} (0.3862, p < 0.01), i.e., the debt-to-asset ratio. Such

earnings volatility does not appear to limit borrowing among ESG-leading firms and may be driven by growth-oriented financing needs rather than by signs of distress. Thus, we reject H5 for the asset-based leverage model.

It is helpful to reflect on these results in the light of the preceding literature. This result of no significant ESG effect is, in part, consistent with the literature, which reported mixed or no effects of ESG on financial policies, but inconsistent with Malik & Kashiramka (2025), who found improved access to debt with ESG. The companies under analysis might already enjoy comparatively high access to funds, and the alteration in ESG does not correlate with the disparity in leverage.

Table 6 : Regression Results

Explanatory Variables	Dependent Variable: Lev ₁ (Debt/Equity Ratio)				Dependent Variable: Lev ₂ (Debt/Assets Ratio)			
	Model 1		Model 3		Model 2		Model 4	
	Fixed-effects regression		Fixed-effects regression		Fixed-effects regression		GLS random-effects regression	
	Coefficient	Robust clustered SE	Coefficient	Robust clustered SE	Coefficient	Robust clustered SE	Coefficient	Robust clustered SE
ESG	0.0002 (0.03)	0.0059182			-0.0001 (-0.03)	0.00131		
Firm Profitability	-0.0230 (-1.64)	0.0140576	-0.0225 (-1.50)	0.0150626	-0.0039** (-2.22)	0.0017607	-0.0047** (-2.51)	0.0018784
Log Firm Size	-0.0292 (-0.43)	0.0681539	-0.0306 (-0.47)	0.0653251	-0.0065 (-0.65)	0.0099847	-0.0067 (-0.62)	0.0106555
Tangibility	4.1833*** (5.20)	0.8039558	4.1688*** (4.74)	0.879239	0.4317*** (5.61)	0.0769712	0.4157*** (6.74)	0.0616484
Growth	0.0057 (1.11)	0.0051522	0.0057 (1.20)	0.0047892	0.0013 (1.64)	0.0007849	0.0013* (1.72)	0.0007426
Risk	1.8642 (1.50)	1.239539	1.9239 (1.35)	1.429843	0.3862*** (2.83)	0.1365886	0.4387*** (2.60)	0.1684307
Constant	-0.0688 (-0.08)	0.8180507	0.2999 (0.26)	1.144854	0.1384 (1.07)	0.1288319	0.3794* (1.74)	0.2178584
ENV			0.0008 (0.14)	0.0056441			0.0003 (0.47)	0.0006986
SOC			0.0004 (0.07)	0.0059099			0.0002 (0.34)	0.0007126
GOV			-0.0047 (-0.53)	0.0088026			-0.0030 (-1.64)	0.0018505
Number of Observations	205		205		205		205	
R-squared (within)	0.4781		0.48		0.3198		0.3561	
F-statistic	22.69		19.64		10.01		59.99	
Prob > F	0.0000		0.0000		0.0000		0.0000	

Note: 't-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively'

Discussion of Findings and Implications

This study offers important insights into the factors driving the capital structure of ESG-leading companies in India. In terms of traditional determinants, our results show that the leverage is driven by profitability, tangibility, and earnings volatility. Conversely, leverage determination is not a significant issue that depends on firm size and growth opportunities. The relationship between profitability and leverage is always negative, particularly in the debt-to-assets model, thus supporting the 'Pecking Order Theory' according to which firms prefer to finance themselves internally (Myers & Majluf, 1984). Tangibility is a strong and stable positive determinant, supporting the Trade-Off Theory, as companies with greater tangible assets are more likely to acquire debt (Kraus & Litzenberger, 1973; Pucheta-Martinez et al., 2023). The volatility of earnings shows a positive relationship with leverage, contrary to the common belief that risk-averse companies avoid debt, suggesting that expansion-related volatility or sectoral dynamics, rather than distress risk, is the cause (Lee & Koh, 2024).

The total ESG disclosure score does not have any substantial direct impact on leverage. This demonstrates that, despite being a key to greater stakeholder involvement, ESG performance has no statistically significant effect on capital structure among ESG leaders in India (Sharma et al., 2020). In the same way, the statistical significance of the individual 'ESG pillars', including environmental, social, and governance, in explaining leverage behaviour is insignificant (Zhao & Zhang, 2024). Even though ESG practices can improve a firm's reputation, they do not directly change its debt policies in this sample (Morais et al., 2024).

The explanatory power and direction of the traditional capital structure determinants remain unaffected by the ESG-leader sample. The results support the 'Pecking Order' and 'Trade-Off' theories among high-ESG companies, suggesting that these

firms adhere to traditional financial principles when determining leverage (Deb et al., 2024). Although ESG factors play an essential role in the long-term strategic goals and reputational capital, they have yet to influence the financial structuring of the leading ESG firms in India.

1. Policy Implications

The empirical results presented herein serve as a key point of reference for future research aimed at filling the gap between investment practice and the realm of policy.

For Corporate Managers: It is important that firms that focus on sustainability recognise that excellent ESG disclosures do not necessarily lead to changes in debt capacity. Traditional factors that determine a firm's capital structure, such as profitability and asset tangibility, remain crucial in shaping leverage decisions. Therefore, managers ought to base capital structure judgments on strong financial fundamentals, but realise that ESG investments yield strategic and reputational dividends rather than instant changes in leverage.

For Investors and Creditors: Investors can be assured that ESG-leader firms have reasonable debt levels and are not over-levered. The creditors are advised to consider ESG scores alongside traditional financial measures, without assuming that high ESG scores always translate into high creditworthiness. However, since ESG practices are empirically associated with improved governance and risk management, ESG frontrunners might be strong despite earnings volatility.

For Policymakers: Regulatory bodies such as SEBI and the Ministry of Corporate Affairs should view the conservative leverage behaviour of ESG-leading firms as a positive indicator that greater disclosure and ESG performance did not lead to excessive borrowing. This finding supports the continued calls for ESG transparency. Another way policymakers could contribute to sustainable finance is by

encouraging ESG investments through preferential lending terms, enhanced green bond issuance, or subsidies. Increasing audit standards, enhancing board independence, and streamlining disclosure systems can all help protect both financial and non-financial sustainability.

2. Theoretical Contribution

The research enhances the existing literature on capital structure by examining how environmental, social, and governance (ESG) disclosure influences established financing theories within an emerging institutional environment predominantly led by banks. Although the common view in sustainability research suggests that ESG disclosure can reduce information asymmetry and boost creditor confidence, our findings show that these effects are not statistically significant in encouraging leverage behaviour among ESG-leading Indian companies.

The results reinforce the relevance of Pecking Order and Trade-Off theories by demonstrating that traditional factors, especially profitability and asset tangibility, remain dominant as drivers of leverage even in companies focused on sustainability. Therefore, it appears that ESG disclosure functions more as a reputational and strategic instrument rather than a direct influence on capital structure choices within the Indian context.

In theory, the findings highlight the institutional contingency of ESG-finance relationships. The sustainability disclosure would not replace the conventional risk-evaluation procedures in credit markets, where collateral decisions and financial fundamentals are fundamental to the lending choices. In line with this, the research contributes to capital-structure theory by showing that ESG disclosure is not always able to transform financing behaviour but rather engages with institutional characteristics, thus modulating its theoretical impact.

CONCLUSION

The paper examines how ESG disclosures affect leverage in top Indian ESG firms, using panel regressions on NIFTY100 ESG Index firms for 2015 and 2022. Through firm-level panel regression models, the study assesses aggregate ESG disclosures and their sub-elements of Environmental, Social, and Governance, while controlling for other traditional financial factors. The empirical findings indicate that there is no statistically significant relationship between ESG disclosure and leverage. Aggregate ESG scores and pillar-specific measures do not explain debt-to-equity or debt-to-asset ratios in the sample. On the contrary, traditional determinants, especially asset tangibility and profitability, still have explanatory power. Leverage has a consistent positive relationship with tangibility, and asset-based leverage decreases with profitability. There are no systematic influences of firm size and growth. The volatility of earnings is positively related to asset-based leverage, suggesting that risk may not limit borrowing for ESG-leading companies to the same extent. In general, the results indicate that, despite the relevant firms' focus on sustainability, capital structure decisions remain largely motivated by financial fundamentals, rather than by ESG disclosure intensity. The integration of ESG does not seem to replace traditional financing behaviour, but instead to coexist with it.

Future Research Limitations and Scope

The sample used in the study is limited to the members of the NIFTY 100 ESG Index, which limits the extent to which the results can be generalised to the broader range of Indian industries and to the smaller firms. ESG scores are based on external agency evaluations, whose methodologies and levels may differ. To allow a more thorough comparative analysis, the scope should be extended to include mid-cap and non-ESG companies, investigate sector-specific or SME ESG-leverage relationships, and include qualitative methods. Furthermore, the

scholars should examine the effects of ESG reporting quality on leverage decisions and on access to sustainable financing instruments.

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