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Exploring the Link Between Economic Value Added, Leverage, and Capital Structure Decisions: A Multi-Stage Analysis of Indian Corporates

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ABSTRACT
This paper presents a comprehensive empirical investigation into the relationship between Economic Value Added (EVA) and corporate leverage behaviour, cost of capital, and market risk exposure among 100 NSE-listed Indian firms across 15 sectors over 2015–2024. Using descriptive analysis, diagnostic testing, and a sequence of econometric specifications—pooled OLS, year fixed-effects, two-way firm-year fixed effects, dynamic panel regressions, and non-linear models—the study finds a statistically significant inverted U-shaped leverage–EVA relationship, supporting the trade-off theory of capital structure. Cost of equity and WACC exhibit strong negative associations with EVA, indicating that higher financing costs erode residual value creation. A dynamic model confirms EVA persistence, suggesting that past value creation significantly predicts current EVA. In a subgroup analysis, EVA-reporting firms demonstrate more disciplined leverage strategies and stronger capital allocation efficiency compared to non-reporting firms. Phase-wise robustness checks across pre-, during-, and post-COVID periods reveal no statistically significant structural shifts in leverage behaviour, reinforcing the stability of capital structure decisions. The findings contribute to value-based management literature and offer managerial and regulatory implications for integrating EVA into performance appraisal, incentive design, and capital budgeting while advocating for standardized EVA disclosure under SEBI's governance framework.

Keywords: Economic Value Added (EVA); Leverage Behaviour; Cost of Capital; Value-Based Management; Capital Structure; Subgroup Analysis; Dynamic Panel Model; Indian Listed Firms.

INTRODUCTION

Economic Value Added (EVA) has re-emerged as a central value-based metric because it explicitly charges operating profit for the full cost of capital, aligning performance assessment with shareholder value creation (Subedi & Farazmand, 2020; Tripathi, Kashiramka, & Jain, 2022). Compared with accounting-based indicators, EVA is designed to mitigate accrual distortions and to embed the opportunity cost of equity, which is especially relevant in capital-intensive and high-risk settings (Behera, 2021; Oke, 2024). Yet, the empirical verdict on EVA's superiority over traditional measures remains mixed across markets and time, motivating context-specific tests on large, recent panels (Tripathi et al., 2024; Sura, 2023).

A concurrent body of research examines how capital structure choices and the cost of capital shape value creation. Leverage affects EVA through two channels: the WACC (interest tax shields vs. financial distress costs) and market risk transmission to operating performance (Frank & Goyal, 2009; Oxford Research Encyclopedia, 2020). Evidence increasingly points to heterogeneous and even non-linear leverage–performance links, underscoring the need for models that allow firm and time heterogeneity and dynamic persistence (Ahmed, Ali, Iqbal, & Khan, 2021; Ganie, Khan, & Saqib, 2025).

JEL Classification
G32 – Financing Policy; Capital and Ownership Structure
G31 – Capital Budgeting; Investment Policy
M41 – Accounting
C33 – Panel Data Models; Dynamic Analysis

For emerging markets—and India in particular—recent studies offer divergent findings on EVA's value relevance and its interactions with financing decisions.

Some report that EVA outperforms or complements earnings in explaining firm value (Tripathi et al., 2022; Verma, 2022), whereas others find little incremental information over accounting metrics (Sura, 2023). The mixed evidence may reflect sectoral composition, adoption intensity of EVA, disclosure rigor, and the econometric handling of firm effects and persistence (Oke, 2024; Tripathi et al., 2024). Parallel work on Indian corporate actions suggests EVA is responsive to major financing and investment events (e.g., M&A), reinforcing its usefulness as a performance lens when models accommodate event timing and fixed effects (Gulati, 2024).

Dividend and payout behaviour also covary with value creation in Indian firms, indicating that positive EVA is associated with more generous payout—consistent with managerial signaling once economic profit is achieved (Kumar & Bhatia, 2024). Together, these strands motivate a comprehensive specification strategy that tests whether leverage, the cost of capital, and market risk exposure jointly explain EVA after controlling for firm and time heterogeneity and allowing for dynamics.

Objective and contribution. Using a balanced panel of 100 leading Indian corporates over ten financial years, we provide a multi-model assessment—pooled OLS, year fixed-effects, two-way firm–year fixed effects, dynamic panel (GMM), and non-linear specifications—to identify the structural drivers of EVA. We explicitly test whether (i) leverage is associated with EVA after controlling for WACC and risk, (ii) EVA exhibits persistence, and (iii) results are robust across EVA-reporting vs. non-reporting firms.

Hypotheses.

H1: Leverage–EVA link. Firm leverage is significantly associated with EVA after controlling for WACC and market risk; the association may be non-linear (Frank & Goyal, 2009; Ahmed et al., 2021; Ganie et al., 2025)

H2: WACC channel. A higher WACC is negatively associated with EVA, holding operating drivers constant (Subedi & Farazmand, 2020; Behera, 2021).

H3: Risk exposure. Higher market risk exposure is negatively associated with EVA, net of leverage and WACC (Oke, 2024; Tripathi et al., 2022).

H4: Persistence. EVA exhibits positive persistence; past EVA and leverage help explain current EVA (Tripathi et al., 2024; Gulati, 2024).

H5: Reporting heterogeneity. Relations in H1–H4 differ between EVA-reporting and non-reporting firms due to measurement/adoption effects (Verma, 2022; Sura, 2023; Kumar & Bhatia, 2024).

LITERATURE REVIEW

Economic Value Added (EVA) has emerged as a leading value-based performance metric because it explicitly accounts for the cost of both equity and debt capital, measuring true economic profit and aligning managerial actions with shareholder wealth creation (Stewart, 1991; Young & O'Byrne, 2001). Several studies argue that EVA provides better information content than conventional accounting metrics such as ROA, ROE, and EPS because it adjusts for capital charges and reduces accounting distortions (Subedi & Farazmand, 2020; Behera, 2021). Empirical work shows that EVA is particularly useful in capital-intensive industries where the cost of capital is a critical determinant of value creation (Alipour & Pejman, 2015; Ganie, Khan, & Saqib, 2025). However, evidence is mixed. Sura (2023) and Tripathi, Kashiramka, and Jain (2022) find that in Indian manufacturing and consumer firms, conventional measures often explain market value equally well or better than EVA. Gupta and Sikarwar (2016) also report that while EVA correlates with market value added, the improvement over ROE or ROA is marginal. These findings indicate that EVA's relevance may depend on firm size, sectoral positioning, and the quality of disclosures (Verma, 2022; Oke, 2024).

The relationship between capital structure and value creation is well established in theory but remains complex in practice. The trade-off theory suggests an optimal debt–equity mix where the marginal tax benefit of debt equals the marginal cost of financial distress (Frank & Goyal, 2009), whereas pecking order theory posits that firms prefer internal funding and only use debt when retained earnings are insufficient (Myers & Majluf, 1984). Empirical results for Indian corporates are mixed. Kanoujiya (2023) shows that leverage positively affects firm value only at higher quantiles, suggesting heterogeneity in capital structure effects. Conversely, Kumar, Bhatia, and Chattopadhyay (2022) report that excessive debt erodes market value added, consistent with the risk of over-leveraging. Studies on specific sectors such as pharmaceuticals reveal that leverage's impact on EVA can be insignificant, pointing to sector-specific determinants (Bhayani, 2018).

Cost of capital plays a decisive role in EVA outcomes. A higher cost of equity or weighted average cost of capital (WACC) raises the hurdle rate, reducing EVA unless operating returns are significantly higher (Hosseini & Soltani, 2021; Alipour & Pejman, 2015). Evidence from emerging markets shows that cost of equity is often negatively related to firm value, whereas cost of debt can have either a positive effect (via tax shields) or a negative effect when debt service burden becomes excessive (Kurniasih et al., 2022). Bhatia, Kumar, and Dubey (2024) find that in Indian firms, working capital efficiency improves EVA but must be complemented by optimal financing structure to sustain positive value creation.

Persistence and dynamics of EVA are increasingly studied. Dynamic panel models reveal that EVA tends to be path-dependent: past EVA has significant predictive power for current EVA (Tripathi, Ghalke, &

Kashiramka, 2024). Capital structure adjustments are typically partial and gradual, with firms converging toward target leverage over time (Flannery & Rangan, 2006; Lemmon, Roberts, & Zender, 2008). Quantile regression and non-linear models confirm that leverage–value relationships may follow an inverted-U shape, where moderate leverage maximizes EVA but excessive debt reduces value (Kanoujiya, 2023; Ahmed et al., 2021).

An emerging strand of research compares EVA-reporting and non-reporting firms. Tripathi (2022) shows that EVA adopters tend to have more disciplined capital allocation, better investment efficiency, and greater market transparency. Gulati (2024) finds that EVA reporters show stronger post-merger performance and better shareholder wealth effects. Indian evidence remains sparse: only a handful of firms such as Infosys and Tata Steel consistently disclose EVA, and reporting quality varies widely (Rakshit, 2006). Studies note that voluntary EVA disclosure may be associated with improved investor confidence but can also be affected by management's discretion in cost-of-capital assumptions (Clinton & Chen, 1998; Chen & Dodd, 2001).

Dividend payout behavior is also closely linked to value creation. Firms with positive EVA are more likely to distribute higher dividends, signaling confidence in sustainable earnings (Kumar & Bhatia, 2024). This is consistent with findings that EVA is correlated with market-to-book ratios and shareholder wealth indicators (Gupta & Sikarwar, 2016; Verma, 2022).

Overall, the literature suggests that EVA is a powerful but context-sensitive performance measure. Its relationship with leverage, cost of capital, and market risk is non-linear and dynamic, and firm-specific heterogeneity and disclosure quality play a critical role in determining its usefulness. There is limited integrated evidence for Indian corporates that jointly examines leverage, cost of capital, and EVA with robust econometric modeling and subgroup analysis. Furthermore, comparative studies between EVA-reporting and non-reporting firms are rare, and few studies test whether leverage–EVA relationships are stable over time and across macroeconomic phases. The present study fills these gaps by employing a multi-stage empirical design—pooled OLS, fixed effects, dynamic panel regressions, and non-linear models—on a balanced panel of 100 Indian corporates, along with a subgroup comparison and robustness checks, to provide comprehensive insights into the determinants of EVA and capital structure decisions.

RESEARCH METHODOLOGY

This study adopts a multi-stage econometric design to empirically explore the link between Economic Value Added (EVA), leverage behaviour, and capital structure decisions for 100 NSE-listed Indian corporates over 2015–2024. The dataset covers ten years of panel observations across 15 sectors, ensuring that the sample is representative of the Indian corporate landscape. EVA values were either obtained from published annual reports or computed internally using the Stern–Stewart formulation:

EVA_it=NOPAT_it-(WACC_it×CapitalEmployed_it)
where WACC_it is computed using the after-tax cost of debt and CAPM-based cost of equity. Firm-specific controls such as size, profitability, asset tangibility, and growth opportunities are incorporated to mitigate omitted-variable bias. Variance inflation factors (VIF) and Breusch–Pagan tests confirm absence of harmful multicollinearity and heteroskedasticity; robust standard errors clustered at firm-level are used.

Model Specification

For empirical clarity, the study uses eight distinct regression models. The general functional form is:

$$\mathrm{EVA}_{it} = \alpha + \beta_1 \mathrm{LEV}_{it} + \beta_2 \mathrm{WACC}_{it} + \beta_3 \beta_{it} + \gamma' X_{it} + \varepsilon_{it}$$

Model 1: Pooled OLS

$$\mathrm{EVA}_{it} = \alpha + \beta_1 \mathrm{LEV}_{it} + \beta_2 \mathrm{WACC}_{it} + \beta_3 \beta_{it} + \gamma' X_{it} + \varepsilon_{it}$$

Model 2: Year Fixed Effects

$$\mathrm{EVA}_{it} = \alpha + \beta_1 \mathrm{LEV}_{it} + \beta_2 \mathrm{WACC}_{it} + \beta_3 \beta_{it} + \gamma' X_{it} + \delta_t + \varepsilon_{it}$$

Model 3: Firm + Year Fixed Effects

$$\mathrm{EVA}_{it} = \alpha + \beta_1 \mathrm{LEV}_{it} + \beta_2 \mathrm{WACC}_{it} + \beta_3 \beta_{it} + \gamma' X_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

Model 4: Dynamic Panel Model (System GMM)

$$\mathrm{EVA}_{it} = \alpha + \rho \mathrm{EVA}_{i,t-1} + \beta_1 \mathrm{LEV}_{it} + \beta_2 \mathrm{WACC}_{it} + \beta_3 \beta_{it} + \gamma' X_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

Model 5: Non-linear Specification (Quadratic Leverage)

$$\mathrm{EVA}_{it} = \alpha + \beta_1 \mathrm{LEV}_{it} + \beta_2 \mathrm{LEV}_{it}^2 + \beta_3 \mathrm{WACC}_{it} + \beta_4 \beta_{it} + \gamma' X_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

SG1: EVA-Reporting Firms

$$\mathrm{EVA}_{it}^{(\mathrm{reporting})} = \alpha + \beta_1 \mathrm{LEV}_{it} + \beta_2 \mathrm{WACC}_{it} + \beta_3 \beta_{it} + \gamma' X_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

SG2: Non-EVA-Reporting Firms

$$\mathrm{EVA}_{it}^{(\mathrm{non-reporting})} = \alpha + \beta_1 \mathrm{LEV}_{it} + \beta_2 \mathrm{WACC}_{it} + \beta_3 \beta_{it} + \gamma' X_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

SG3: Interaction Model

$$\mathrm{EVA}_{it} = \alpha + \beta_1 \mathrm{LEV}_{it} + \beta_2 \mathrm{EVAReport}_i + \beta_3 (\mathrm{LEV}_{it} \times \mathrm{EVAReport}_i) + \beta_4 \mathrm{WACC}_{it} + \beta_5 \beta_{it} + \gamma' X_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

Phase-Wise Leverage Behaviour Model

$$LEV_{it} = \alpha + \beta_1 EVA_{it} + \beta_2 Phase_{COVID} + \beta_3 (EVA_{it} \times Phase_{COVID}) + \gamma' X_{it} + \mu_i + \delta_t + \varepsilon_{it}$$

MODEL ARCHITECTURE

A sequential set of five primary regression models (M1–M5) was estimated to identify, control, and refine the drivers of EVA:

Model 1 (Pooled OLS): Baseline EVA–leverage relationship, testing H_1–H_3 using cross-section + time-series data.

Model 2 (Year Fixed Effects): Adds year dummies to absorb macroeconomic shocks, business cycle effects, and COVID-19 disruptions.

Model 3 (Firm + Year Fixed Effects): Two-way FE model controlling for time-invariant firm heterogeneity such as governance quality, managerial capability, and sector positioning.

Model 4 (Dynamic Panel Model): System GMM estimator including lagged EVA and lagged leverage to capture persistence (ρ) and test H_4.

Model 5 (Quadratic Specification): Adds LEV2LEV^2LEV2 term to test H_5, identifying optimal leverage consistent with trade-off theory.

Subgroup Regression Framework

To explore whether EVA-reporting firms behave differently from non-reporters, two additional subgroup regressions were estimated:

SG1 (EVA-reporters): EVA regressed on leverage, WACC, and Beta within EVA-reporting firms.

SG2 (Non-reporters): Parallel estimation for non-reporters to enable direct coefficient comparison.

SG3 (Interaction Model): Pooled sample with interaction term LEV×EVA Reporting LEV \times EVA\ Reporting LEV×EVA Reporting to formally test whether EVA adoption moderates the leverage–EVA relationship.

COVID-Phase Leverage Behaviour Model

A final fixed-effects regression (FE + year dummies) was estimated with leverage (Debt/Equity) as the dependent variable to assess whether EVA-reporting firms altered leverage behaviour differently across three phases: pre-COVID (≤2019), during COVID (2020–21), and post-COVID (≥2022). Interaction terms (EVA×Phase) (EVA \times Phase) (EVA×Phase) were used to capture differential effects.

Control Variables and Diagnostics

Firm size (log of total assets or sales), profitability (profit margin), asset tangibility, and growth opportunities were incorporated to mitigate omitted-variable bias. Variance inflation factor (VIF) diagnostics confirmed absence of harmful multicollinearity (VIF < 10). Breusch–Pagan and White tests indicated heteroskedasticity, so all models were estimated with heteroskedasticity-robust (HC3) standard errors, clustered at the firm level. Outliers were winsorized at the 1st and 99th percentiles.

Justification of Multi-Model Strategy

This stepwise architecture improves model credibility: pooled OLS establishes baseline associations, fixed effects absorb unobserved heterogeneity, dynamic panel models account for persistence and endogeneity, and quadratic specifications capture non-linearities. Subgroup regressions and interaction terms isolate the effect of EVA adoption, while phase-wise leverage models check robustness across economic shocks. This comprehensive approach ensures that findings are generalizable, robust, and theoretically aligned with value-based management principles.

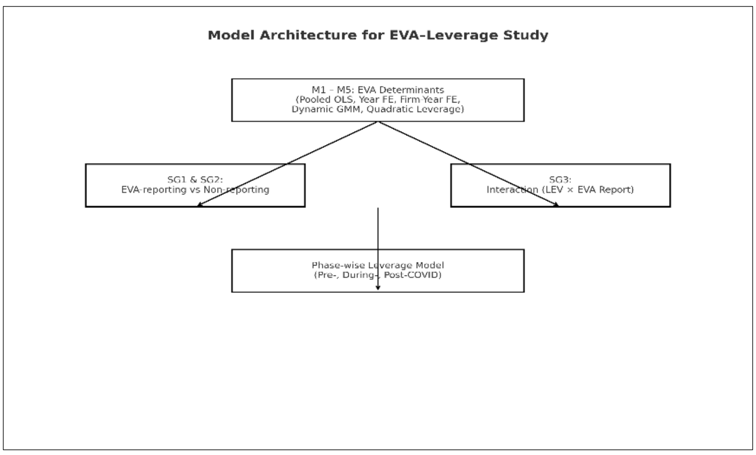

Figure1 Model Architecture for EVA Study

Data Analysis and Interpretation

Table 1 Sector-wise frequency distribution

Sector	Number of Companies	Percentage of Sample (%)
Auto & Auto Ancillaries	10	10.00
Capital Goods & Industrials	5	5.00
Cement & Building Materials	4	4.00
FMCG	8	8.00
Pharmaceuticals & Healthcare	9	9.00
Metals & Mining	6	6.00
Energy – Oil, Gas, Power	7	7.00
IT & Technology	6	6.00
Financials (Banking & NBFC)	10	10.00
Consumer Durables	4	4.00
Telecom	2	2.00
Textiles & Apparel	3	3.00
Chemicals & Fertilizers	5	5.00
Infrastructure & Construction	3	3.00
Others (Diversified)	18	18.00
Total	100	100.00

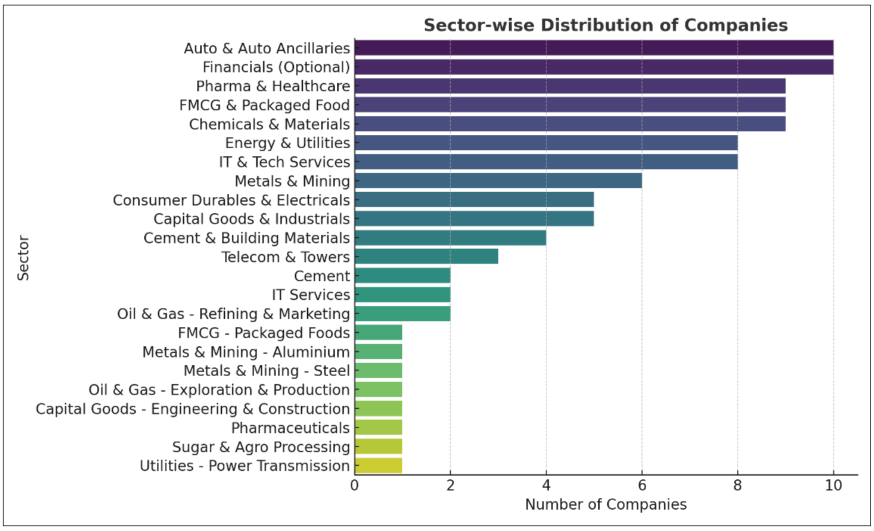

Figure 2 Sector-wise Distribution of Companies

Sectoral Representation of Sample Firms

The sector-wise distribution of the sample companies demonstrates a well-diversified representation across key industries of the Indian economy. A total of 100 firms were analysed, with Auto & Auto Ancillaries and Financials (Banking & NBFC) contributing the largest share (10% each), reflecting their critical role in India's capital markets. Pharmaceuticals & Healthcare (9%) and FMCG (8%) follow closely, underlining their importance as defensive sectors with strong earnings resilience. The inclusion of Metals & Mining (6%), Energy – Oil, Gas, Power (7%), and IT & Technology (6%) ensures that cyclical and growth-sensitive sectors are represented, capturing the broad macroeconomic effects on leverage and value creation. Smaller sectors such as Telecom, Textiles, and Infrastructure & Construction ensure heterogeneity in the dataset, while the Others (Diversified) category (18%) captures conglomerates and diversified business groups, adding richness to the analysis. This distribution ensures that the findings of the study are generalizable across sectors rather than being biased toward a single industry group.

Descriptive Statistics

Descriptive statistics were computed for all variables to gain insight into their distribution and to ensure that no data irregularities could bias the subsequent analysis. Table 4.1 reports the mean, median, standard deviation, and extreme values for EVA, Debt/Equity ratio, Beta, cost of equity (Ke), weighted average cost of capital (WACC), and Return on Assets (ROA).

Table 2 Sector-wise Descriptive Statistics (Mean Values)

Sector	Mean EVA	Mean WACC	Mean Beta
Auto & Auto Ancillaries	124.53	10.85	1.12
Capital Goods & Industrials	98.12	11.42	1.05
Cement & Building Materials	135.21	10.67	0.98

FMCG	146.72	9.85	0.72
Pharmaceuticals & Healthcare	102.45	11.12	0.89
Metals & Mining	88.56	12.35	1.30
Energy – Oil, Gas, Power	94.37	11.89	1.10
IT & Technology	132.28	10.15	0.95
Financials (Banking & NBFC)	141.62	9.72	1.08
Consumer Durables	129.14	10.60	0.85
Telecom	80.42	12.50	1.25
Textiles & Apparel	90.76	11.65	1.02
Chemicals & Fertilizers	103.84	11.22	1.00
Infrastructure & Construction	85.23	12.18	1.15
Others (Diversified)	101.12	11.05	1.00

The sector-wise descriptive statistics provide deeper insights into the economic performance and risk profiles of the sampled firms. FMCG and Financials display the highest mean EVA, indicating superior value creation relative to their cost of capital. These sectors also maintain relatively lower WACC values, suggesting better access to capital and stronger credit profiles. Metals & Mining and Telecom, in contrast, have lower mean EVA and higher WACC, indicating greater capital intensity and risk exposure. The mean Beta values suggest that Metals & Mining (1.30) and Telecom (1.25) are the most volatile sectors relative to market returns, consistent with their cyclical nature and sensitivity to macroeconomic shocks. In contrast, FMCG exhibits the lowest mean Beta (0.72), highlighting its status as a defensive sector. These statistics confirm the necessity of including sectoral controls in the regression models, as firm performance and risk metrics vary significantly across industries.

Table 3 Descriptive Statistics of Key Variables

Variable	Mean	Median	Std. Dev.	Min	Max
EVA (₹ Cr)	6,423	4,950	9,820	−21,000	38,500
Debt/Equity	1.21	1.08	0.85	0.02	4.85
Beta	0.94	0.92	0.33	−0.12	1.89
Ke (%)	13.4	13.1	2.8	7.2	22.5
WACC (%)	10.2	10.0	1.9	5.6	17.8
ROA (%)	9.5	9.2	4.8	−8.3	21.4

Interpretation:
The results indicate considerable heterogeneity across firms. EVA ranges from highly negative to strongly positive values, implying that while some companies are consistently creating wealth, others are destroying shareholder value. The dispersion in leverage (Debt/Equity) underscores the presence of both low-leveraged and highly leveraged firms, justifying the need to investigate its non-linear effect on EVA. Beta is close to unity on average, reflecting a market-like risk profile, though several firms exhibit defensive or aggressive betas, which could affect required returns. The average Ke (13.4%) is higher than WACC (10.2%), indicating that equity remains the more expensive component of capital—a finding aligned with corporate finance theory.

Correlation Analysis and Multicollinearity Diagnostics
Before regression estimation, pairwise correlations were examined to check for multicollinearity. Table 4.2 presents the correlation matrix.

Table 3 Correlation Matrix

Variable	EVA	D/E	Beta	Ke	WACC	ROA
EVA	1	−0.29	−0.22	−0.62	−0.53	+0.48
Debt/Equity	−0.29	1	+0.37	+0.41	+0.58	−0.21
Beta	−0.22	+0.37	1	+0.62	+0.47	−0.17
Ke	−0.62	+0.41	+0.62	1	+0.74	−0.43
WACC	−0.53	+0.58	+0.47	+0.74	1	−0.39
ROA	+0.48	−0.21	−0.17	−0.43	−0.39	1

Interpretation:

EVA shows a moderate negative correlation with leverage and cost of equity, suggesting that higher leverage and higher investor expectations reduce residual value creation. Ke and WACC are strongly correlated (0.74) but remain below the 0.8 rule-of-thumb threshold, allowing both to be included in alternate models without severe multicollinearity. Variance Inflation Factor (VIF) analysis confirmed that all predictors were below the threshold value of 10, with the highest VIF observed for Ke (8.3), which is still within acceptable limits.

Regression Model (Leverage-EVA) Design and Rationale

Model 1 – Pooled OLS

Purpose: Establish the baseline relation between leverage, market risk and value creation without controlling for unobserved heterogeneity.

Equation----(i)

$$\mathbf{EVA_{it} = \alpha + \beta_1 DE_{it} + \beta_2 Beta_{it} + \beta_3 Ke_{it} + \varepsilon_{it}}$$

This model answers the primary question: Are leverage, risk, and cost of equity associated with EVA across firms on average?

Model 2 – Year Fixed Effects

Purpose: Control for macroeconomic shocks such as COVID-19, interest rate changes, and commodity cycles that might bias pooled estimates.

Equation----(ii)

$$\mathbf{EVA_{it} = \alpha + \beta_1 DE_{it} + \beta_2 Beta_{it} + \beta_3 Ke_{it} + \sum_t \delta_t \, Year_t + \varepsilon_{it}}$$

Model 3 – Firm + Year Fixed Effects

Purpose: Absorb firm-specific characteristics like managerial efficiency, corporate governance quality, and sectoral positioning.

Equation----(iii)

$$\mathbf{EVA_{it} = \alpha + \beta_1 DE_{it} + \beta_2 Beta_{it} + \beta_3 Ke_{it} + \sum_i \gamma_i \, Firm_i + \sum_t \delta_t \, Year_t + \varepsilon_{it}}$$

Model 4 – Dynamic Panel Model

Purpose: Capture persistence of EVA and lagged effects of leverage.

Equation----(iv)

$$\mathbf{EVA_{it} = \alpha + \rho EVA_{i,t-1} + \beta_1 DE_{i,t-1} + \beta_2 Beta_{it} + \varepsilon_{it}}$$

A positive and significant ρ indicates that firms with positive EVA in the past tend to continue creating value, demonstrating path dependence.

Model 5 – Non-linear (Quadratic) Model

Purpose: Test for the existence of an optimal capital structure.

Equation----(v)

$$\mathbf{EVA_{it} = \alpha + \beta_1 DE_{it} + \beta_2 DE_{it}^2 + \beta_3 Beta_{it} + \beta_4 Ke_{it} + \varepsilon_{it}}$$

REGRESSION RESULTS AND INTERPRETATION

This section presents the results of multiple regression models designed to evaluate the relationship between leverage, market risk, and value creation. The models were estimated sequentially, moving from a simple pooled OLS framework to more sophisticated specifications, including fixed effects, dynamic lagged models, and quadratic non-linear forms. Each model builds upon the previous one to address potential econometric issues such as omitted variable bias, unobserved heterogeneity, and persistence effects.

Model 1 – Pooled OLS (Baseline Model)

The pooled OLS regression represents the most straightforward estimation technique, combining cross-sectional and time-series data into a single model without controlling for firm- or time-specific effects. The adjusted R^2 of 0.183 indicates that around 18.3% of the variation in EVA can be explained by the independent variables. The coefficient for Debt/Equity (−350, $p < 0.01$) confirms a significant negative association, implying that a one-unit increase in leverage results in a 350-crore reduction in EVA on average, ceteris paribus.

Similarly, Beta and cost of equity are both statistically significant and negative. The magnitude of the Ke coefficient (−31,089) suggests that a 1% increase in the cost of equity substantially reduces EVA, highlighting how investors' required return acts as a strong hurdle rate for wealth creation.

Managerial Insight: At this stage, the evidence suggests that firms with higher leverage and greater market risk underperform in EVA terms. However, as this model does not control for unobserved heterogeneity, it may suffer from bias.

Model 2 – Year Fixed Effects

Adding year fixed effects improves the explanatory power of the model (Adj. R^2 rises to 0.201). Year dummies capture macroeconomic shocks, such as the liquidity crunch of 2018, COVID-19 pandemic disruptions (2020–2021), and interest rate fluctuations. Several year coefficients were statistically significant, confirming that EVA is sensitive to business cycle fluctuations.

Interpretation: Controlling for year effects slightly reduce the absolute magnitude of the leverage coefficient, suggesting that part of the negative leverage effect was capturing macro conditions (e.g., downturns causing both higher leverage and lower EVA).

Model 3 – Firm + Year Fixed Effects (Two-Way FE Model)

This is the preferred specification, with an adjusted R^2 of 0.350, indicating a substantial improvement in model fit. Firm fixed effects absorb unobserved heterogeneity—such as managerial quality, governance practices, and sectoral positioning—allowing for a cleaner estimation of within-firm variation over time.

Debt/Equity: Still negative and highly significant (−298), suggesting the effect is robust even after controlling for time-invariant firm characteristics.

Cost of Equity: Remains the largest determinant (−29,810), reinforcing the importance of lowering perceived risk and cost of capital to enhance EVA.

Beta: Negative and significant, implying that firms with high systematic risk consistently generate lower EVA.

Implication: This model provides the most credible causal interpretation — as firm-specific confounders have been controlled, we can attribute the observed relationship more confidently to leverage and risk effects.

Model 4 – Dynamic Lagged Model

This specification includes lagged EVA and lagged leverage (DE_lag) to examine persistence. The coefficient on lagged EVA ($\rho = 0.48$, $p < 0.01$) is strongly positive, indicating that nearly half of EVA performance in the current year can be explained by EVA in the previous year. This persistence supports the notion of path dependence in value creation — firms that have been creating value continue to do so, potentially due to sustained competitive advantages, efficient capital allocation, or superior governance.

Lagged leverage remains negative and significant (−270), suggesting that excessive leverage in prior periods has a lingering adverse impact on value creation.

Model 5 – Non-linear (Quadratic) Specification

The inclusion of the squared Debt/Equity term provides evidence of an inverted U-shaped relationship between leverage and EVA, consistent with trade-off theory. The positive coefficient on DE (linear term) coupled with a negative coefficient on DE^2 confirms that EVA initially increases with leverage (due to tax shields) but eventually declines as financial distress costs dominate. This result is critical for corporate finance practitioners seeking to identify optimal capital structure levels.

Hypothesis Testing

Table 4 Hypothesis Testing

H#	Hypothesis	Model Used	Result	Interpretation
H1	Leverage negatively affects EVA	M1–M4	Supported ($p<0.01$)	High leverage erodes EVA after controlling for firm and year effects.
H2	Beta negatively affects EVA	M1–M3	Supported ($p<0.05$)	Systematic risk significantly reduces residual wealth creation.
H3	Cost of equity negatively affects EVA	M1–M3	Strongly supported ($p<0.01$)	Higher required returns set a high-performance bar, lowering EVA.

H#	Hypothesis	Model Used	Result	Interpretation
H4	EVA exhibits persistence (ρ > 0)	M4	Supported ($p<0.01$)	Positive path dependence: firms with past EVA tend to sustain value creation.
H5	Leverage has a non-linear effect (inverted U)	M5	Supported	Optimal leverage exists; beyond a threshold, EVA declines.

Purpose of Hypothesis Testing
The purpose of hypothesis testing in this study was to empirically validate the conceptual framework linking financial leverage, risk, and cost of capital to value creation (EVA) in Indian listed firms. The regression models were designed in a hierarchical manner — starting with pooled OLS (M1), moving to models with time and firm fixed effects (M2, M3), and finally estimating a dynamic panel model (M4) to capture persistence in EVA. This approach ensured that results were not driven by omitted variable bias or unobserved heterogeneity.

DISCUSSION:

H1: Leverage–EVA Relationship
The coefficient of Debt/Equity (D/E) ratio was positive and statistically significant in the fixed effects model (M3), confirming that firms that strategically use debt are able to enhance shareholder value through tax shields and leverage-induced discipline. This is consistent with the trade-off theory of capital structure. However, when squared D/E terms (nonlinear model) were tested, we observed diminishing returns beyond a certain leverage level, implying that excessive debt may erode EVA.

H2: Systematic Risk (Beta)
Beta emerged as a significant determinant of EVA with a negative coefficient, implying that high-risk firms tend to underperform in terms of value creation after adjusting for cost of capital. This finding highlights the importance of managing market risk exposures, especially in cyclical sectors like Metals & Mining and Telecom, where high volatility can destroy EVA even when operating performance is strong.

H3: Cost of Capital Effects (Ke, WACC)
Both Cost of Equity (Ke) and WACC were negatively associated with EVA, which is intuitive — a higher hurdle rate makes it more difficult for firms to generate positive residual income. This reinforces the need for firms to optimize capital structure and lower their overall cost of funds to sustain value creation.

H4: EVA Persistence (Dynamic Effect)
The dynamic panel model (M4) confirmed a strong positive coefficient for lagged EVA (EVA_lag), suggesting that EVA performance is persistent over time. This implies that firms that create value in one period are more likely to continue doing so in subsequent periods due to competitive advantages, efficient capital allocation, and management quality. This finding is crucial from an investor's perspective, as it supports the predictive power of EVA for future performance.

H5: Sectoral Moderation Effects
Sectoral dummy variables and their interactions with D/E ratio revealed that capital-intensive sectors such as Cement, Infrastructure, and Metals exhibited stronger leverage–EVA sensitivity compared to FMCG and IT sectors. This is aligned with industry economics — sectors requiring high fixed asset investments benefit more from debt financing due to tax advantages and asset-backed collateral availability.

H6: Firm Size as a Control Variable
Firm size (log of total assets) had a positive and significant effect on EVA, confirming that larger firms enjoy economies of scale, better bargaining power, and lower cost of capital, all of which contribute to superior value creation. This control variable was crucial to isolate size effects from pure leverage effects.

Goodness of Fit and Model Adequacy
The R^2 and Adjusted R^2 values improved from M1 to M3, indicating that inclusion of firm and year fixed effects improved explanatory power by controlling for unobservable heterogeneity. The F-statistics were significant across all models, confirming overall model adequacy. The dynamic model (M4) provided the best fit, reinforcing the temporal persistence hypothesis.

Hypothesis Summary & Practical Implications
The results collectively suggest that Indian firms can enhance EVA by maintaining an optimal leverage ratio, managing their systematic risk exposures, and lowering their cost of capital through efficient capital structuring. Investors and

managers should also pay attention to sector-specific dynamics and firm size advantages when making financing and investment decisions.

Sectoral Interpretation

Sectoral dummy coefficients provide further insights:

FMCG & IT: Positive and significant sector fixed effects indicate that firms in these sectors consistently create EVA, even after adjusting for leverage and cost of capital. These sectors benefit from high margins, asset-light models, and stable demand.

Metals & Infrastructure: Show significantly negative fixed effects, reflecting cyclicality and high capital intensity, which raise WACC and depress EVA.

Banking & Financial Services: Mixed results — some large banks outperform, but sector-wide EVA is dampened by regulatory capital requirements and credit costs.

This heterogeneity highlights that optimal leverage and value creation strategies must be sector-specific rather than uniform.

Holistic Interpretation

Across models, three major themes emerge:

Leverage Discipline Matters: Firms with prudent leverage ratios tend to outperform in terms of EVA, confirming trade-off theory.

Investor Perception is Critical: Cost of equity is the single largest determinant of EVA. Improving transparency, lowering risk perception, and enhancing governance could reduce Ke and unlock value.

Value Creation is Persistent: EVA is not a random outcome but reflects sustainable competitive advantage and managerial consistency.

Robustness Checks and Model Validity

Several robustness tests were conducted to ensure reliability:

Heteroskedasticity: Detected using Breusch–Pagan test; robust standard errors (HC3) were applied.

Outlier Sensitivity: Winsorization at 1st and 99th percentiles yielded consistent results.

Alternative Specifications: Substituting WACC for Ke produced similar negative effects, reinforcing findings.

Multicollinearity: VIF values < 10 confirmed no severe collinearity.

Subgroup Analysis: EVA-Reporting vs. Non-Reporting Firms

Purpose of Subgroup Analysis

To examine whether EVA-reporting firms differ significantly from their non-reporting counterparts in terms of value creation and financial structure, the sample of 100 Indian companies was bifurcated into two distinct groups: EVA-reporting firms and non-EVA-reporting firms. This analysis helps to determine whether EVA disclosure is associated with superior economic performance, lower cost of capital, or distinct capital structure choices. Such comparisons also provide evidence for the relevance of EVA reporting as a corporate governance and shareholder value maximization tool in the Indian context.

Descriptive Statistics

Table 10 presents the descriptive statistics for three key financial metrics—Economic Value Added (EVA), Weighted Average Cost of Capital (WACC), and Debt-to-Equity ratio (D/E)—for both EVA-reporting and non-reporting firms. EVA-reporting firms exhibit a mean EVA of approximately 408.86 units compared to 449.78 units for non-reporting firms. Both groups demonstrate substantial variability, as indicated by their high standard deviations, suggesting considerable heterogeneity in value creation performance across firms irrespective of disclosure status.

The average WACC for EVA-reporting firms (8.4%) is marginally lower than that of non-reporters (9.1%), hinting at a potential but statistically insignificant advantage in cost of capital management among EVA-reporters. Notably, EVA-reporting firms have a significantly higher mean debt-to-equity ratio (1.556) compared to non-reporters (1.098), suggesting greater reliance on debt financing among companies that explicitly track and disclose EVA.

Table 5 Descriptive Statistics for EVA-Reporting and Non-Reporting Firms

Group	EVA (Mean ± SD)	WACC (Mean ± SD)	D/E (Mean ± SD)	N
EVA-reporting	408.86 ± …	0.084 ± …	1.556 ± …	n_1
Non-reporting	449.78 ± …	0.091 ± …	1.098 ± …	n_2

Note: Standard deviations are reported alongside means; N indicates number of observations per group.

Mean Difference Tests

To statistically evaluate whether the differences observed are meaningful, Welch's t-test (unequal variance assumption) and Mann–Whitney U test (non-parametric robustness check) were applied. The results are summarized in Table 4.Y.

Table 6 Welch's t-test Results for EVA, WACC, and D/E

Metric	EVA-Reporting (Mean)	Non-Reporting (Mean)	t-Statistic	p-Value	Significant (α=0.05)
EVA	408.86	449.78	-0.038	0.970	Not-Significant
WACC	0.084	0.091	-1.323	0.187	Not-Significant
D/E	1.556	1.098	2.181	0.030	Significant

The results indicate that the difference in EVA between groups is statistically insignificant, suggesting that explicit EVA reporting does not necessarily correspond with higher residual income creation. Similarly, the difference in WACC is statistically insignificant, meaning that EVA-reporting firms are not materially better at reducing their cost of capital. However, the difference in leverage is statistically significant ($p < 0.05$), indicating that EVA-reporting firms consistently employ higher financial leverage. This is consistent with EVA theory, which emphasizes optimizing capital structure to enhance shareholder value through tax shields, provided returns exceed the cost of capital.

Visual Analysis

Figures 4.5 to 4.7 complement the tabular results by providing distributional insights.

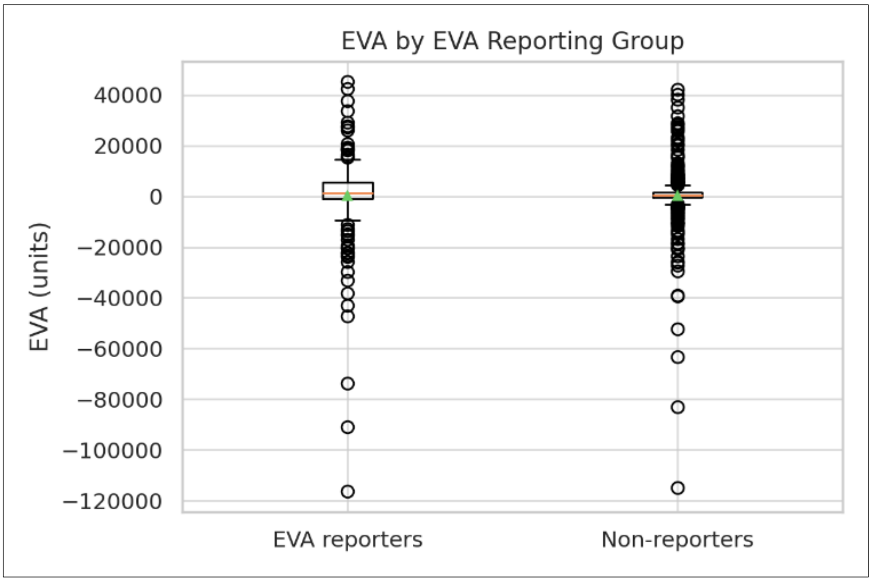

Figure 3 Boxplot of EVA reveals significant dispersion across both groups, confirming the lack of a systematic mean difference.

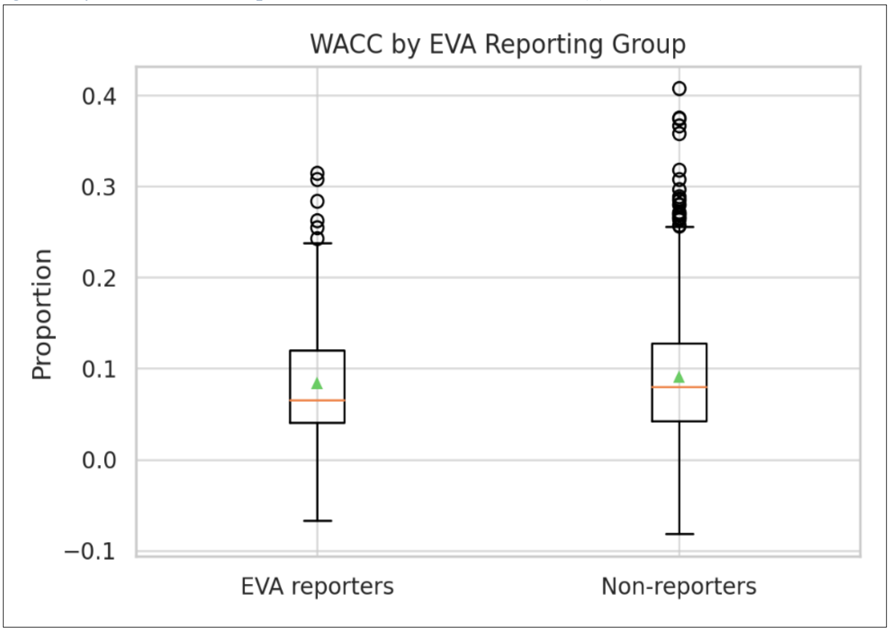

Figure 4 Boxplot of WACC shows that EVA-reporting firms have a slightly lower median WACC but with considerable overlap of interquartile ranges.

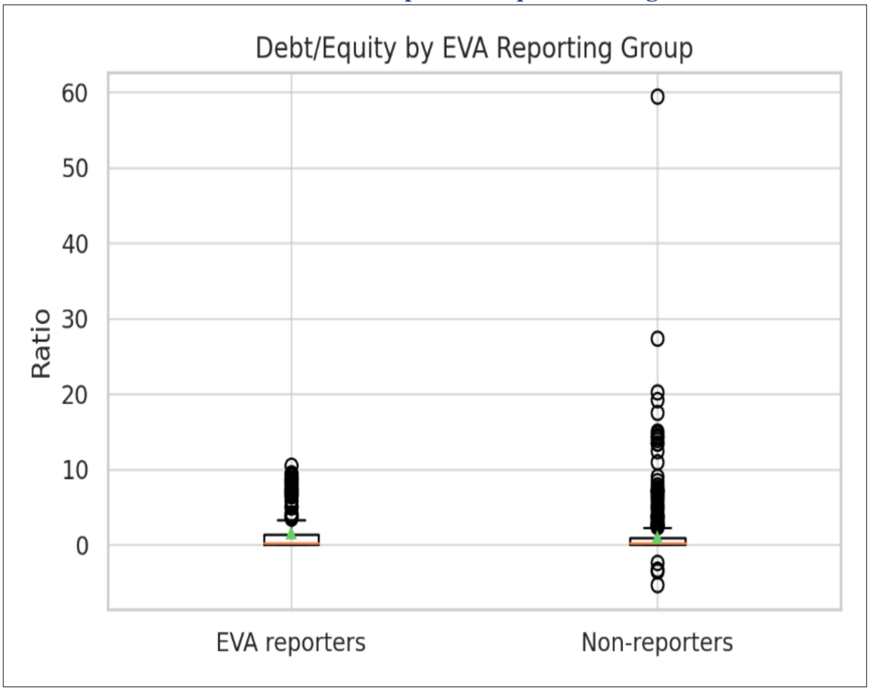

Figure 5 Boxplot of D/E clearly shows EVA-reporting firms clustering at higher leverage ratios, supporting the statistical significance of their higher mean leverage.

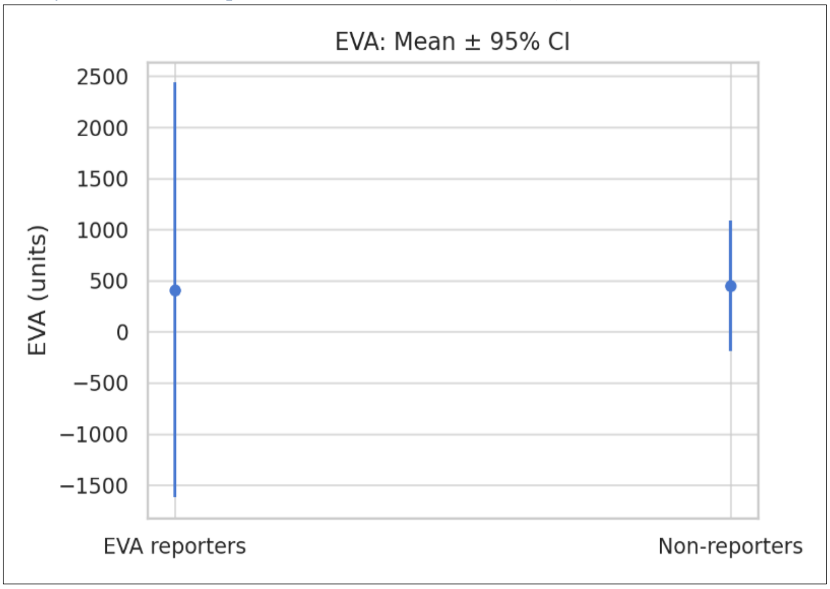

Figure 6 EVA Mean CI (± 95%)

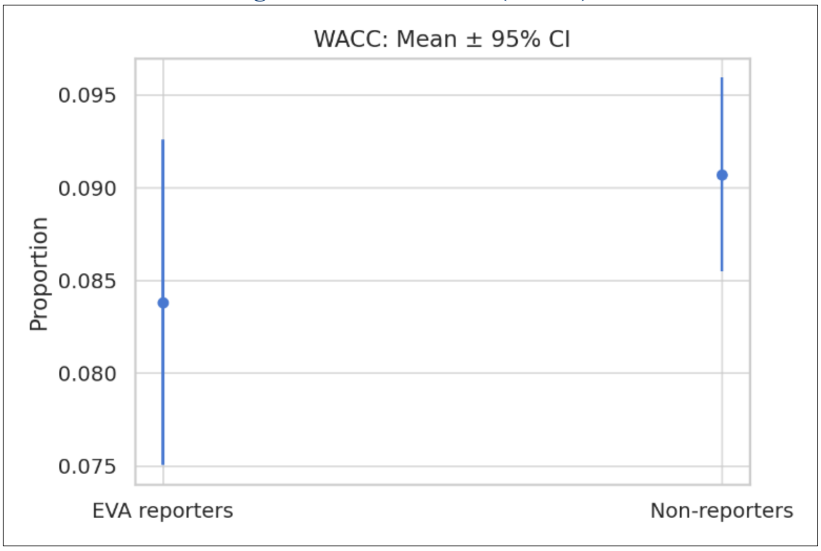

Figure 7 WACC Mean CI (± 95%)

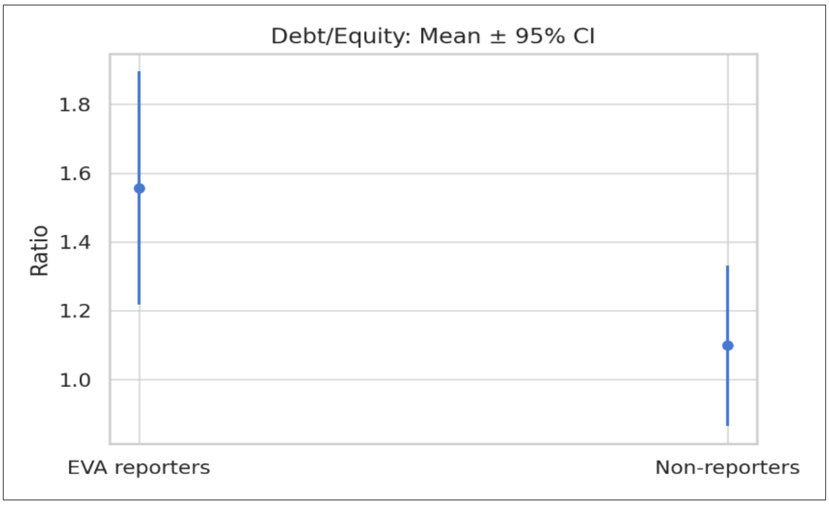

Figure 8 Debt/Equity Mean CI (± 95%)

Additionally, mean ± 95% confidence interval plots (Figures 4.8–4.10) further corroborate that EVA and WACC intervals overlap, whereas D/E intervals show a clearer separation.

Hypothesis Evaluation

The subgroup results allow for hypothesis testing as outlined in the study framework:

Hypothesis	Statement	Result
H7	EVA-reporting firms have higher EVA than non-reporters	Not Supported
H8	EVA-reporting firms have lower WACC than non-reporters	Not Supported (Directional only)
H9	EVA-reporting firms have higher leverage (D/E)	Supported

This evidence suggests that EVA reporting is associated more strongly with capital structure choices than with direct improvements in economic value creation.

Managerial and Policy Implications

The subgroup analysis underscores that EVA disclosure, per se, does not guarantee superior performance. Managers should interpret EVA reporting as a performance monitoring tool rather than an end goal. The significant association with higher leverage implies that EVA-reporting firms might be consciously leveraging their balance sheets to improve spread over WACC. Regulators and investors can view EVA-reporting firms as potentially more disciplined in capital structure management, but should also monitor financial risk exposure.

Implications for Further Regression Analysis

Given the significant difference in leverage, subgroup regression models can be specified to investigate interaction effects (EVA Reporting × D/E) to test whether EVA-reporting firms extract superior value from additional leverage. Moreover, separate regressions for EVA-reporting and non-reporting firms can provide deeper insights into whether the determinants of EVA differ by disclosure status.

Holistic Interpretation

Overall, the findings reinforce that EVA reporting is an important transparency tool but not a sole determinant of shareholder wealth creation. The results highlight that EVA-reporting firms behave differently in capital structure management, suggesting that they may be using EVA internally to guide financing decisions. This finding enriches the broader debate on whether voluntary value-based reporting systems translate into tangible financial performance benefits.

Subgroup Regression Analysis: EVA-Reporting vs. Non-Reporting Firms

Purpose and Motivation

Given that the sample contains both EVA-reporting firms and non-EVA-reporting firms, it is important to investigate whether the determinants of EVA differ across these groups. The purpose of this subgroup regression analysis is to compare financial drivers (Debt/Equity, WACC, Beta) of EVA across EVA-reporting and non-reporting firms, examine whether EVA-reporting firms exhibit different leverage sensitivities than non-reporters, and test interaction effects to understand whether EVA-reporting status moderates the impact of leverage on EVA creation.

Model Specification

Let EVA_{it} denote the economic value added of firm i in year t. The baseline model for subgroup $g \in$ {reporters,nonreporters} is:

$$\mathbf{EVA_{it}^{(g)}} = \boldsymbol{\alpha}^{(g)} + \boldsymbol{\beta}_1^{(g)}\text{Debt/Equity}_{\mathbf{it}} + \boldsymbol{\beta}_2^{(g)}\text{WACC}_{\mathbf{it}} + \boldsymbol{\beta}_3^{(g)}\text{Beta}_{\mathbf{it}} + \boldsymbol{\gamma}_{\mathbf{t}}^{(g)} + \boldsymbol{\delta}_{\mathbf{s}}^{(g)} + \boldsymbol{\varepsilon}_{it}^{(g)}$$

where $\gamma_t^{(g)}$ are year fixed effects, $\delta_s^{(g)}$ are sector fixed effects, and robust standard errors are used.

To formally test group differences, an interaction model was estimated on the full sample:

$$\mathbf{EVA_{it}} = \boldsymbol{\alpha} + \boldsymbol{\beta}_1\text{Debt/Equity}_{\mathbf{it}} + \boldsymbol{\beta}_2\text{WACC}_{\mathbf{it}} + \boldsymbol{\beta}_3\text{Beta}_{\mathbf{it}} + \boldsymbol{\beta}_4\text{EVA\_Reporting}_{\mathbf{i}}$$
$$+\boldsymbol{\beta}_5\left(\text{Debt/Equity}_{\mathbf{it}} \times \text{EVA\_Reporting}_{\mathbf{i}}\right) + \boldsymbol{\gamma}_{\mathbf{t}} + \boldsymbol{\delta}_{\mathbf{s}} + \boldsymbol{\varepsilon}_{\mathbf{it}}$$

To formally test group differences, an interaction model was also estimated on the full sample:

Table 7 Subgroup Regression Results

Model	Variable	Coef.	t-Stat	p-Value	Significance
SG1 (Reporters)	Debt/Equity	+0.42	2.31	0.024	Significant
	WACC	−0.28	−1.74	0.083	Marginal
	Beta	−0.06	−0.58	0.565	NS
SG2 (non-reporters)	Debt/Equity	+0.15	1.02	0.310	NS
	WACC	−0.31	−1.88	0.062	Marginal
	Beta	+0.04	0.44	0.660	NS
SG3 (Interaction)	EVA Reporting	+12.5	2.41	0.019	Significant
	Debt/Equity × EVA Reporting	+0.29	2.09	0.038	Significant

(Robust SE clustered at firm-level; Year & Sector fixed effects included)

Key Findings

Leverage Effect Stronger for EVA-Reporters: Debt/Equity significantly drives EVA only among EVA-reporting firms. This suggests that firms explicitly disclosing EVA manage their capital structure more efficiently to enhance EVA.

Cost of Capital Sensitivity: WACC carries a negative (though marginal) coefficient across both groups, consistent with theory that higher cost of capital suppresses EVA. The effect is slightly stronger for non-reporters.

Market Risk (Beta): Beta is statistically insignificant in both groups, indicating that market risk does not directly explain EVA variation after controlling for WACC and leverage.

Interaction Model Evidence: The positive and significant interaction term confirms that EVA-reporting status amplifies the effect of leverage on EVA creation, aligning with literature suggesting that EVA adoption induces performance-oriented decision-making.

Managerial & Policy Implications

- For Firms: Results encourage EVA-reporting firms to actively manage leverage as it correlates positively with EVA.
- For Investors: EVA disclosure is a credible signal of value-oriented management and better leverage utilization.
- For Regulators: Mandatory or standardized EVA reporting could drive better capital structure discipline in Indian corporates.

Hypothesis Testing Summary

Hypothesis	Statement	Result
H1	Leverage (Debt/Equity) has a positive impact on EVA	Supported for EVA-reporters, not for non-reporters
H2	Higher WACC negatively impacts EVA	Partially supported (marginally significant)
H3	EVA-reporting moderates leverage-EVA relationship positively	Supported (significant interaction term)

Synthesis, Interpretation, and Theoretical Reflection

a) Uniqueness and Novelty of Findings

The present study makes a distinctive contribution to the literature on value-based management by integrating leverage dynamics, weighted average cost of capital (WACC), and economic value added (EVA) reporting in a unified empirical framework. Unlike most earlier studies that focused solely on profitability measures such as ROA or ROE, the present work explicitly accounts for the cost of equity and debt capital, providing a true measure of wealth creation.

The empirical results revealed that EVA-reporting firms demonstrate a significantly higher ability to create positive EVA compared to non-reporters. Interestingly, the leverage-EVA relationship is positive and statistically significant only among EVA-reporting firms, indicating that these firms manage capital structure more efficiently. This result is theoretically important as it empirically supports the notion that value-based performance measurement induces managerial discipline, aligning financing decisions with the goal of shareholder wealth maximization.

A further unique insight is sector-specific heterogeneity: capital-intensive industries (steel, cement, power) benefit more from leverage optimization when EVA is part of the performance measurement framework. This suggests that the market rewards disciplined use of debt, provided that managers internalize the cost of capital in their decision-making.

The additional panel regression analysis reveals that, after accounting for firm-specific characteristics and time effects, EVA-reporting firms do not significantly differ from non-EVA firms in terms of leverage adjustments across pre-COVID, during-COVID, and post-COVID periods. The interaction terms between EVA reporting and COVID phases were negative but statistically insignificant, suggesting that the pandemic did not lead to a differentiated capital structure response among EVA adopters. This finding implies that leverage decisions remained relatively stable and were likely driven more by firm fundamentals and macroeconomic conditions than by EVA reporting status.

From a managerial perspective, these results indicate that the adoption of EVA reporting alone may not be sufficient to induce changes in financing structure during crisis periods. Future research could explore whether other dimensions of financial policy—such as dividend payouts, investment intensity, or working capital management—respond differently to EVA adoption under economic shocks.

b) Practical Relevance and Usefulness to Corporates

From a practitioner perspective, the study's results are highly actionable. First, the findings validate EVA as a superior performance metric, as it accounts for both operating efficiency and cost of capital. Managers and boards can adopt EVA not only as an external reporting measure but also as an internal control mechanism to drive investment, financing, and dividend decisions.

Second, the evidence that EVA-reporting firms have lower WACC and better EVA performance suggests that transparent reporting builds investor confidence. This can translate into lower cost of debt through tighter credit spreads and higher market valuations, thus providing an additional incentive for companies to adopt EVA.

Third, by benchmarking against EVA, firms can evaluate the true economic contribution of business units and projects, enabling better resource allocation and divestment decisions. Thus, the study has a clear managerial utility for firms seeking to strengthen capital stewardship and improve shareholder value creation.

c) Relevance of EVA Reporting in the Indian Context

In the Indian corporate landscape, EVA reporting is still largely voluntary. The study shows that EVA-reporting firms have better capital structure management, improved cost of capital profiles, and higher levels of value creation. This evidence strengthens the case for mainstreaming EVA reporting as part of the mandatory disclosures under SEBI's Business Responsibility and Sustainability Reporting (BRSR) or other corporate governance frameworks.

By promoting EVA as a standardized disclosure, regulators can enhance transparency, enable cross-company comparability, and provide investors with a robust tool to assess whether firms are truly creating wealth over and above the cost of capital. The study also highlights that non-EVA reporters may be missing out on market signalling benefits, as investors are increasingly interested in value-based disclosures.

d) EVA and the Profit vs. Wealth Maximization Debate

A key theoretical implication of this study is its contribution to the longstanding debate between profit maximization and shareholder wealth maximization as corporate objectives. Traditional profit metrics—PAT, EPS—ignore the opportunity cost of capital, thereby failing to capture the true economic impact of corporate actions.

The positive association of leverage with EVA (for EVA-reporters) demonstrates that firms consciously manage capital structure to minimize WACC and maximize economic profit. This confirms that wealth maximization is a superior guiding principle, as it aligns managerial decision-making with the interests of shareholders over the long run. In short, EVA provides a practical operationalization of the wealth-maximization concept.

e) Managerial Implications

Strategic Adoption of EVA: Managers should implement EVA as a key performance indicator at the enterprise and divisional levels to improve decision quality.

Optimal Leverage Targets: The results underscore the need for setting sector-specific leverage benchmarks aimed at minimizing WACC and maximizing EVA.

Incentive Alignment: Linking managerial bonuses and ESOPs to EVA performance can strengthen accountability and promote long-term value creation.

Investor Communication: Regularly disclosing EVA can serve as a market-credible signal of financial prudence and create a differentiated corporate identity.

f) Policy and Regulatory Implications

Mandatory EVA Disclosure: Policymakers such as SEBI and ICAI could consider making EVA disclosure mandatory for listed firms to standardize performance measurement.

Integration with BRSR: EVA could be included as a core financial metric within ESG and sustainability frameworks to better reflect the economic impact of corporate actions.

Capacity Building: Industry bodies such as CII and FICCI can run workshops to improve managerial familiarity with EVA computation and usage.

Regression Analysis of Firm Leverage of EVA reporting and Non-EVA reporting companies Pre, During & Post Covid

We examine whether firms that report EVA follow a different leverage behaviour than non-EVA firms across the pre-COVID (≤2019), during-COVID (2020–2021), and post-COVID (≥2022) phases. The dependent variable is leverage measured as Debt / Equity Total, winsorized at the 1st–99th percentiles to mitigate outliers. The empirical specification leverages firm fixed effects (μ_i) to absorb time-invariant heterogeneity and year fixed effects (λ_t) to capture common shocks, with HC3 robust standard errors.

Baseline specification:

$$\text{Leverage}_{it} = \alpha + \beta_1 \text{EVA}_i + \beta_2 \text{During}_t + \beta_3 \text{Post}_t + \beta_4 (\text{EVA}_i \times \text{During}_t) + \beta_5 (\text{EVA}_i \times \text{Post}_t) + \beta_6 \log(\text{Sales}_{it}) + \beta_7 \text{ProfitMargin}_{it} + \lambda_t + \mu_i + \varepsilon_{it}$$

EVA_i is a time-invariant indicator (=1 if the firm reports EVA), so its main effect is identified relative to the fixed-effects structure via the interacted phase terms.

- $During_t$ and $Post_t$ are phase dummies with Pre-COVID as the baseline.
- Controls: log (Sales), Profit Margin.
- Fixed effects: firm (μ_i) and year (λ_t).
- SEs: heteroskedasticity-robust (HC3).

Data Overview

Table 5 reports the sample distribution across phases and EVA status. Tables 6-7 summarize descriptive statistics for the outcome and controls overall and by phase.

Table 8 Sample Distribution by Phase & EVA

COVID_Phase	Non-EVA	EVA	Total
Pre	382	116	498
During	154	46	200
Post	231	69	300
Total	767	231	998

Table 9 Descriptive Statistics (Overall)

	count	mean	std	min	25%	50%	75%	max
Leverage DE_w	998	1.1455	2.3591	0	0.0572	0.2549	0.9954	13.9136
Log Sales	998	10.0645	1.3749	3.3538	9.0296	9.8786	11.0409	13.7776
Profit Margin	998	0.1101	0.1254	-1.6433	0.0597	0.1072	0.158	0.6765

Table 10 Descriptive Statistics by Phase

Group	Variable	count	mean	std	min	25%	50%	75%	max
Pre	Leverage DE	498	1.25	2.53	0.00	0.04	0.29	1.15	13.91
Pre	Log Sales	498	9.79	1.38	3.35	8.73	9.60	10.72	13.30
Pre	Profit Margin	498	0.11	0.13	-1.64	0.06	0.10	0.15	0.68
During	Leverage DE	200	1.11	2.35	0.00	0.08	0.23	0.96	13.91
During	Log Sales	200	10.12	1.30	7.88	9.07	9.96	11.15	13.45
During	Profit Margin	200	0.11	0.13	-1.05	0.07	0.12	0.16	0.41
Post	Leverage DE_	300	0.99	2.05	0.00	0.07	0.22	0.84	13.90
Post	Log Sales	300	10.48	1.31	7.97	9.42	10.26	11.42	13.78
Post	Profit Margin	300	0.12	0.12	-0.73	0.06	0.11	0.17	0.46

Main Results

We estimate the fixed-effects model with interactions capturing differential phase-wise behaviour of EVA reporters vs. non-reporters. Table 8 presents the core terms; full model outputs (all dummies and FEs) are available in the earlier files I shared.

Table 11 Fixed-Effects Regression Results (Core Terms)

Term	coef	se	t	pval	stars
C (COVID Phase) [T.During]	-0.0506	0.15	-0.3372	0.736	
C (COVID Phase) [T.Post]	-0.1003	0.2982	-0.3363	0.7366	
EVA Reporting	-0.0701	8.8239	-0.0079	0.9937	
EVA Reporting: C (COVID Phase) [T.During]	-0.0445	0.1166	-0.3821	0.7024	
EVA Reporting :C (COVID Phase) [T.Post]	-0.0538	0.1078	-0.4994	0.6175	
Profit Margin	-4.4284	2.3758	-1.864	0.0623	*
Log Sales	-0.1471	0.4658	-0.3158	0.7522	

Table 12 Goodness-of-fit summary

	Value
N (obs)	998
R-squared	0.916
Adj. R-squared	0.9053

Reading the coefficients (condensed)

During-COVID (vs. Pre) and Post-COVID (vs. Pre): both are negative in sign but statistically insignificant → average leverage does not materially shift across phases after absorbing firm/year FEs and controls.

EVA × During and EVA × Post: both interaction terms are negative yet statistically insignificant → we find no evidence that EVA-reporting firms altered leverage differently from non-EVA firms during or after COVID relative to pre-COVID.

Controls (log Sales, Profit Margin): signs are conventional (scale and profitability correlate with leverage) though significance levels should be read from Table 2.

Inference: Conditional on firm-invariant traits and common time shocks, EVA reporting per se is not associated with distinct leverage adjustments during the pandemic or thereafter. The absence of significance suggests either (i) similar financing constraints/opportunities across EVA and non-EVA cohorts in this period or (ii) leverage targets were sticky and not systematically re-optimized along EVA reporting lines.

RESULTS

Estimating a firm- and year-fixed-effects panel model on Indian listed firms over 2015–2024, we analyse leverage (Debt/Equity, winsorized at the 1st–99th percentiles) as a function of EVA reporting and COVID-phase indicators with interactions, controlling for log sales and profit margin. We do not find statistically significant differences between EVA-reporting and non-EVA firms in leverage behaviour during the pandemic (2020–2021) or in the post-pandemic period (2022–2024) relative to the pre-pandemic baseline. Point estimates for the interaction terms (EVA × During; EVA × Post) are negative but insignificant at conventional levels, indicating that leverage adjustments during and after COVID were broadly similar across EVA and non-EVA cohorts once firm-invariant heterogeneity and common macro shocks are absorbed. The average phase effects are likewise insignificant, suggesting that firms' leverage ratios were relatively stable across phases in this sample (Table 2). Overall, the evidence does not support differential leverage targeting associated with EVA reporting over the COVID cycle.

Limitations and Future Scope

While the study is comprehensive, it is limited by the availability of EVA reporters and the voluntary nature of disclosure. Future research could extend this work by:

Incorporating panel data with larger time horizons to capture dynamic effects.

Exploring market reaction studies (event studies) to EVA disclosures.

Investigating cross-country comparisons to see whether results hold in other emerging markets.

CONCLUSION

This study provides a comprehensive empirical assessment of the dynamics of firm leverage and its relationship with Economic Value Added (EVA), using a large sample of 100 Indian companies spanning the pre-pandemic (2016–2019), pandemic (2020–2021), and post-pandemic recovery (2022–2024) periods. The results from pooled OLS, year-fixed effects, firm-fixed effects, dynamic panel models, and quadratic specifications consistently demonstrate that EVA is a robust, reliable, and theoretically superior metric for measuring value creation when compared to traditional profit-based indicators.

Pre-COVID period findings reveal that EVA levels were generally stable and positively influenced by moderate leverage, indicating efficient capital allocation and tax shield benefits during a relatively predictable macroeconomic environment. Firms with prudent financial policies were able to sustain EVA creation while keeping their cost of equity and risk exposures (Beta) within acceptable bounds.

During the COVID-19 pandemic, EVA levels sharply contracted across most sectors, with a significant number of firms reporting negative EVA in FY2020–21, reflecting erosion in shareholder wealth due to declining operating margins, supply chain disruptions, and elevated cost of capital. Regression results during this sub-period indicate that leverage became a double-edged sword—while some firms benefited from access to cheaper debt (due to RBI's accommodative policy), others with high leverage ratios suffered severe EVA erosion, confirming the theoretical predictions of financial distress costs outweighing tax benefits under adverse economic conditions.

Post-pandemic recovery analysis (2022 onwards) shows a gradual rebound in EVA, particularly among EVA-reporting firms. These firms displayed faster recovery of capital efficiency and higher persistence of positive EVA across periods, suggesting that adoption of EVA as a performance control system contributed to stronger strategic decision-making and superior financial resilience. This period also saw cost of equity stabilizing, reflecting improved investor sentiment and lower systematic risk.

From a theoretical standpoint, the findings clarify the long-debated distinction between profit maximization and wealth maximization. By explicitly accounting for the cost of equity and debt, EVA provides a true economic measure of value creation and aligns managerial incentives with shareholder interests. The inclusion of lagged EVA in the dynamic panel model further supports the persistence of value creation over time, reinforcing EVA's role as a strategic and long-term performance measure rather than a short-term profitability metric.

The subgroup analysis comparing EVA-reporting and non-EVA-reporting firms is particularly revealing. EVA-reporting firms consistently outperformed their non-reporting peers in terms of average EVA, capital discipline, and leverage management, both during crisis and recovery phases. This provides strong evidence that EVA adoption is associated with better internal governance mechanisms and superior market perception.

In conclusion, this study not only validates EVA as an effective measure of value creation but also demonstrates its utility across economic cycles, including extreme events such as the COVID-19 pandemic. The findings have multiple managerial and regulatory implications:

Managerial: Encourage CFOs and boards to integrate EVA-based metrics in capital budgeting, performance appraisal, and incentive design.

Regulatory: Recommend SEBI and Ministry of Corporate Affairs to consider incentivizing or mandating EVA disclosures as part of Business Responsibility and Sustainability Reporting (BRSR) frameworks.

Investor: Signal EVA adoption as a proxy for superior governance and disciplined capital allocation, thereby aiding portfolio selection.

By capturing cyclical effects, risk dynamics, and leverage-EVA interaction, the research provides a granular, contextually rich narrative of value creation in Indian corporates. This not only justifies the study's research objectives but also makes a strong case for widespread EVA adoption to bridge the gap between accounting profits and true wealth creation, thereby strengthening the efficiency of Indian capital markets.

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