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Research paper

Exploring Debt Dynamics: The Impact of Capital Structure on Profitability in The Indian Food and Beverage Industry

Rupali S. Ambadkar [1] *, Tejal Mitesh Solanki [2]

[1] *Associate Professor, Department of Accounting and Financial Management, Faculty of Commerce, The Maharaja Sayajirao University of Baroda*
[2] *Research Scholar (JRF), Department of Accounting and Financial Management, Faculty of Commerce, The Maharaja Sayajirao University of Baroda*
**Corresponding author E-mail: rupali.ambadkar-afm@msubaroda.ac.in*

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Abstract

This study examines the impact of Capital Structure on the Profitability of Indian Food and Beverage companies listed on the S&P BSE FMCG Index. The analysis is based on a balanced panel of 40 companies, comprising 400 observations over ten years from 2013 to 2023. Capital structure is represented by three measures: long-term debt to total assets (LDA), short-term debt to total assets (SDA), and total debt to total assets (TDA). Profitability is measured using return on equity (ROE) and return on assets (ROA). Tangibility (TANG), firm size (SIZE), and liquidity (LIQ) serve as control variables. Panel regression techniques using random effects and fixed effects models are employed to test the hypotheses. The results reveal that all debt measures (LDA, SDA, and TDA) have a significantly negative impact on ROA, whereas no significant relationship is found between debt measures and ROE. Tangibility and liquidity significantly negatively impact profitability, while firm size exhibits a significant positive impact. The study contributes to the existing literature and offers practical insights, emphasizing the importance of optimizing debt levels, enhancing liquidity management, and improving asset efficiency as key strategies to drive profitability in Indian Food and Beverage companies.

Keywords: *Capital Structure; Indian Food and Beverage Companies; Liquidity; Panel Regression; Profitability; Size; Tangibility.*

1. Introduction

Capital structure decisions are imperative in shaping companies' growth trajectory and profitability. Understanding and optimising capital structure is essential for companies to maintain their competitive edge, capitalize on market opportunities, and for long-term value creation (Myers, 1984). The search for an optimal capital structure has remained a complex and challenging issue for researchers and finance managers. Capital structure, defined as the mix of debt and equity used to finance a firm's operations, is a critical component of corporate financial strategy, directly impacting a firm's cost of capital, risk profile, and ultimately, shareholder value (Modigliani & Miller, 1958; Jensen & Meckling, 1976). In their seminal work, Modigliani and Miller (1958) proposed that under perfect market conditions, capital structure does not affect a firm's value. However, real-world deviations from these idealized conditions, such as tax advantages, bankruptcy costs, and asymmetric information, influence financing choices (Myers & Majluf, 1984). From a theoretical standpoint, the Trade-Off Theory (Kraus & Litzenberger, 1973) and the Pecking Order Theory (Myers & Majluf, 1984) offer contrasting perspectives on companies' financing decisions. The Trade-Off Theory suggests that a moderate leverage level can maximize firm value by harnessing debt's tax advantages, if firms manage the risk of financial distress effectively (Kraus & Litzenberger, 1973). The Pecking Order Theory implies that firms are inclined to use internal funds before resorting to debt, but potentially restrictive in scenarios where extensive investment is needed to scale operations (Myers & Majluf, 1984).

Despite the extensive development of theories aimed at explaining an optimal capital structure, a universally accepted model that managers can rely on to determine the ideal level of leverage remains elusive. Baker and Martin (2011) emphasize the importance of revisiting capital structure in response to economic changes, advocating for a strategic approach that minimizes costs and maximizes shareholder value. Toraman et al. (2013) highlight that the balance between debt and equity significantly impacts profitability, emphasising the complexity of achieving an optimal capital structure. Pinto and Quadras (2016) pointed out that capital structure is a critical decision in corporate finance as it significantly influences a company's profitability and shareholder value. This implies that to maximize shareholder wealth, corporate managers must carefully consider optimal capital structure decisions to reduce the cost of capital. Therefore, this study strives to explore the relationship between capital structure and profitability in the context of India's Food and Beverage Industry, examining empirical dimensions to provide actionable insights for financial strategy.

As the Indian Food and Beverage Industry continues to expand, understanding how profitability is influenced by capital structure is crucial for both corporate managers and policymakers. Understanding how leverage affects profitability and firm value can guide managers in strategic financing choices that align with operational and market realities. Policymakers can use capital structure research insights to

design regulations promoting financial stability and facilitating sectoral growth. Applying the findings of this study to India's Food and Beverage Industry could offer valuable insights into how companies manage their capital structure to enhance profitability.

2. Literature review

According to Panwar (2019), firms conservatively employed debt finance. Studies have identified several determinants of capital structure in Indian Food and Beverage companies, including profitability, growth opportunity, size, risk, non-debt tax shield, liquidity, and asset structure (Priyanka & Singh, 2023; Sisodia & Maheshwari, 2023). These factors significantly influence financial leverage ratios such as short-term debt, long-term debt, total debt, and debt-equity ratio (Priyanka & Singh, 2023).

2.1. National studies

The impact of capital structure on profitability in Indian Food and Beverage companies has been extensively studied, with mixed results. Chadha and Sharma (2015) studied 422 manufacturing companies listed on the Bombay Stock Exchange (BSE). They found that a change in financial leverage creates no impact on the profitability variables as measured by Return on Assets and Tobin's Q. In contrast, a significant negative impact was found with Return on Equity. Revathy et al. (2016) found that capital structure negatively impacted profitability across all three stages of pioneering, growth, and consolidation of manufacturing firms in India. Pandey and Sahu (2017) found that capital structure had a substantial negative influence on accounting performance, as measured by return on assets and return on net worth. Jaisinghani and Kanjilal (2017) examined 1194 manufacturing companies in India using threshold panel regression. The research estimated the threshold size to be around 148 million rupees. Companies with assets exceeding the threshold showed a positive correlation between debt usage in their capital structure and profitability, while those below the threshold demonstrated a negative relationship.
Das and Swain (2018) observed that the capital structure has a negative and statistically significant impact on the profitability as measured by ROA, ROE, and ROCE of the sample company. Similarly, Singh and Bagga (2019) studied Nifty 50 companies and found that an increase in total debt led to a decline in ROA but increased ROE. Pradhan and Gautam (2019) found that the higher the liquid asset ratio, the lower the return on assets and return on equity. Aishwarya (2020) found that the debt ratio has a positive correlation with the return on capital employed and a negative correlation with the return generated by long-term funds and net worth. Desai (2021) observed that firm size moderates the relationship between capital structure and profitability, and debt negatively impacts all performance metrics (ROE, ROA, EPS, Tobin's Q, and MBV ratio). These findings are further supported by Tripathi (2021), who found a negative relationship between capital structure (D/E ratio) and profitability. Patra (2021) indicated a positive relationship between the total debt to total assets ratio and profitability. Babbar and Singh (2024) studied 23 Indian cement companies listed on the NSE and BSE and found a negative relationship between the debt-equity ratio and profitability, and a positive relationship between the interest coverage ratio and profitability. The capital structure decisions of Indian auto-component companies reflect a hybrid approach, drawing from both Trade-off and Pecking Order theories rather than adhering strictly to one (Mistri, 2024).

2.2. International studies

According to Cole et al. (2015), capital structure negatively impacts return on assets and operating return. However, the impact on profit margins varies among industries. In the industrial sector, capital structure shows a positive effect on profit margin, while in the energy sector, it demonstrates a negative influence. Interestingly, no significant relationship was observed between capital structure and profit margin in the healthcare sector. Kakanda et al. (2016) observed that while long-term debt had a positive and significant impact on ROE, short-term debt had an insignificant effect, suggesting that capital structure and corporate profitability are positively and significantly correlated. Avcı (2016) observed that D/E had no significant effect on ROE and ROA. According to the study's findings, ROE and ROA are significantly impacted negatively by both STD/TA and LTD/TA. Morri and Jostov (2018) examined 65 listed real estate companies during the Crisis (2007–2009), the Rebound (2009–2014), and the Whole period and observed that leverage hurt adjusted shareholder return during the crisis period and the whole period, and an insignificant positive impact on returns during the recovery period. Ajibola et al. (2018) found that a company's use of long-term debt can yield higher profits in terms of equity return, while short-term debt did not significantly correlate with return on equity. According to the study's findings, return on assets was negatively correlated with all capital structure metrics. Comparing the manufacturing and oil and gas industries from the New York Stock Exchange, Asaolu (2021) found that debt has a significant positive impact on business performance.
Učkar et al. (2021) observed that Croatian enterprises exhibited a significant negative relationship between profitability and capital structure. Habibniya et al. (2022) studied 72 firms in the telecom industry in the United States and concluded that debt financing (TLTA) significantly negatively impacted ROA, whereas equity financing (TETA) significantly positively impacted ROA. The study also found an insignificant relationship between TLTA and ROE. Anozie et al. (2023) observed that short-term debt to total assets and total debt to total equity had a positive but insignificant impact on return on assets, whereas long-term debt to total assets had a negative and significant impact on profitability. Muhammed et al. (2024) analysed 14 commercial banks in Ethiopia and revealed that the loan-to-deposit ratio and the total deposit-to-total asset ratio have a significant positive impact on profitability, while the asset growth ratio, as another measure of capital structure, exhibited a negative effect. Demiraj et al. (2024) reviewed key capital structure theories and recent empirical findings, emphasizing that financing decisions vary significantly across countries and economic settings, and indicated that there is an inverse U-shaped relationship between the firm's financial performance and its capital structure. Ahmed et al. (2024) examined 78 firms listed on the Dhaka Stock Exchange (DSE) and found that higher leverage significantly reduces profitability, indicating the need for cautious debt management in emerging markets. Nguyen (2024) concluded that capital structure plays a pivotal role in shaping the performance of Vietnam's state-invested enterprises, with higher debt levels negatively impacting ROA while positively impacting Tobin's Q. Tran et al. (2025) studied 49 real estate firms listed on the Ho Chi Minh City Stock Exchange from 2007 to 2021 and found that excessive debt harms firm performance in developing economies.
A comprehensive review of existing literature highlights that studies on the relationship between capital structure and firm profitability have been conducted across diverse national contexts and temporal frameworks, yielding varied and often inconclusive findings. Some Indian studies indicated that capital structure hurts profitability (Revathy et al., 2016; Pandey & Sahu, 2017; Das & Swain, 2018; Singh & Bagga, 2019; Tripathi, 2021; Babbar & Singh, 2024), while others concluded positive (Patra, 2021) or mixed impact of capital structure on profitability (Jaisinghani & Kanjilal, 2017; Aishwarya, 2020; Mistri, 2024). International studies also show inconsistent results; some studies found negative effects (Avcı, 2016; Učkar et al., 2021; Ahmed et al., 2024), whereas others indicated positive or insignificant

effects (Kakanda et al., 2016; Ajibola et al., 2018; Asaolu, 2021; Anozie et al., 2023; Muhammed et al., 2024). Such contradictions point out unresolved debates, which need to be revisited constantly, especially as economic and market dynamics change. These variations emphasize the necessity for continuously re-examining this relationship and, therefore, in this context, the present empirical study examines the effect of capital structure on the profitability of Indian Food and Beverage companies.

2.3. Objectives of the study

The following are the main objectives:

- To evaluate the Capital Structure and Profitability of Indian Food and Beverage companies.
- To examine the impact of Capital Structure on the Profitability of Indian Food and Beverage companies.

Aligned with the study objectives, the following hypotheses have been formulated and tested:
H_{01}: Capital Structure has no significant impact on the ROA.
H_{02}: Capital Structure has no significant impact on the ROE.

3. Research methodology

The sample companies are selected from the S&P BSE FMCG Index, which has 77 constituents as of 31st January 2024. From these, 40 companies representing the Food and Beverage Industry were selected for the final sample. A balanced panel of 40 Food and Beverage companies with 400 observations over ten years, from 2013 to 2023, has been employed. The secondary data required for the study have been collected from the CMIE Prowess IQ Database.

3.1. Independent variables

Building on previous research studies, such as Cole et al. (2015), Avcı (2016), Das and Swain (2018), Ajibola et al. (2018), and Desai (2021), the long-term debt to total assets ratio (LDA) has been employed to measure capital structure. Following Avcı (2016), Ajibola et al. (2018), and Desai (2021), the next measure to represent capital structure is the short-term debt to total assets ratio (SDA). The total debt to total assets ratio (TDA) is selected as a third indicator to measure the capital structure (Das & Swain, 2018; Ajibola et al., 2018; Singh & Bagga, 2019; and Habibniya et al., 2022).

3.2. Dependent variables

From the prior research, Return on Equity (ROE) has been recognized as a prominent measure to indicate profitability and is thus selected for this study. Following the previous research by Das and Swain (2018), Ajibola et al. (2018), Singh and Bagga (2019), Asaolu (2021), and Desai (2021), the profit after tax to net worth ratio is employed to measure the return on equity (ROE). The next measure to indicate profitability is the return on assets (ROA), calculated as the ratio of profit before interest and tax to total assets (Das & Swain, 2018; Ajibola et al., 2018; Singh & Bagga, 2019; Asaolu, 2021; Desai, 2021; Habibniya et al., 2022).

3.3. Control variables

To account for other potential factors affecting firm value, the study includes firm characteristics such as Size, Tangibility, and Liquidity as control variables. Following Chadha and Sharma (2015), Desai (2021), and Habibniya et al. (2022), Size was included as a control variable. The natural logarithm of net sales is used to denote firm size. Following Chadha and Sharma (2015), Avcı (2016), and Habibniya et al. (2022), the next control variable is Tangibility, represented by the ratio of fixed assets/total assets. Liquidity is included as a third control variable measured by a ratio of current assets/current liabilities (Singh & Bagga, 2019; Desai, 2021; Habibniya et al., 2022).

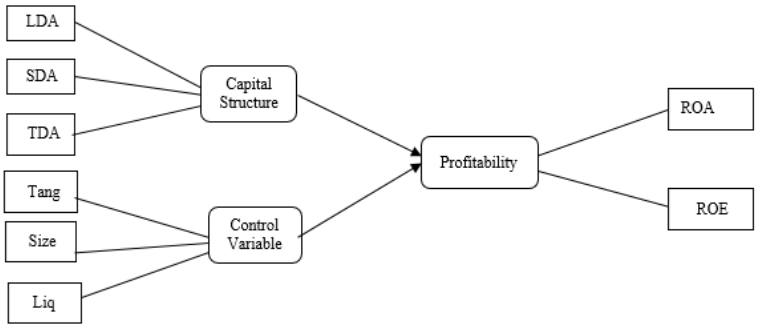

Fig. 1: Conceptual framework.

3.4. Methodology followed

Panel data regression has been employed for data analysis. Panel data offers greater information, increased variability, and reduced collinearity among variables (Baltagi, 2009). Breusch and Pagan (1980) derived a Lagrange multiplier (LM) test to select the best model between the Pooled OLS and the REM. This test is based on the null hypothesis that the variance across entities is zero, meaning the Pooled OLS model is appropriate (Breusch & Pagan, 1980). Hausman (1978) derived a test to determine the most suitable model between the FEM and REM. It is based on the null hypothesis that the REM is appropriate. (Hausman, 1978). The Fixed Effect Redundant test (F-test) is employed to determine the best-fit model between the pooled OLS and the FEM. The null hypothesis states that the Pooled OLS approach best explains the model. Descriptive statistics are used to evaluate the capital structure and profitability. The study used a correlation test and VIF to test multicollinearity. The Durbin-Watson test detects autocorrelation, with its statistics ranging from 0 to 4, where the value of 0 indicates a perfect positive correlation, 4 indicates a perfect negative correlation, and 2 signifies no serial correlation (Durbin & Watson, 1950).

4. Results and discussion

4.1. Analysis of capital structure and profitability

Table 1: Descriptive Statistics of Key Variables

	LDA	SDA	TDA	ROA	ROE	TANG	SIZE	LIQ
Mean	0.12	0.36	0.48	0.14	0.18	0.31	7.31	1.81
Median	0.11	0.34	0.49	0.12	0.15	0.30	7.37	1.44
Maximum	0.44	0.86	0.91	0.50	1.09	0.72	11.10	8.28
Minimum	0.00	0.07	0.11	-0.13	-0.35	0.03	4.95	0.44
Std. Dev.	0.10	0.16	0.20	0.09	0.15	0.15	1.19	1.15

Source: Compiled by author.

Table 1 displays descriptive statistics of 400 observations, providing an in-depth look into firms' capital structure and profitability. The mean values indicate that firms finance 12.4% of their assets with long-term debt and 35.5% with short-term debt, resulting in a total debt-to-asset ratio of 47.9%, reflecting a moderate reliance on debt, with a greater emphasis on short-term liabilities, suggesting a strategic approach to managing their financial resources. The mean value of the tangibility ratio is 30.6%, indicating that a significant portion of firms' assets are tangible. The liquidity ratio suggests that current assets are approximately 1.805 times current liabilities, suggesting strong short-term financial health. ROA and ROE averages 14.4% and 18%, respectively, reflect considerable returns on assets and equity.

Table 2: Correlation Matrix

Variables	LDA	SDA	TDA	TANG	SIZE	LIQ
LDA	1					
SDA	0.12*	1.00				
TDA	0.59**	0.87**	1.00			
TANG	0.53**	-0.05	0.23**	1.00		
SIZE	-0.02	-0.10*	-0.09	-0.01	1.00	
LIQ	-0.38**	-0.59**	-0.67**	-0.38**	0.01	1.00

Source: Compiled by author.
Note: *at 5% significance, **at 1% significance.

Table 2 represents the correlation matrix employed to detect multicollinearity among the independent variables. The correlation matrix reveals that debt ratios have no significant correlation with firm size. While tangibility positively correlates with debt ratios, liquidity negatively correlates with all debt ratios. The study employed the VIF test to further evaluate multicollinearity. "The variance inflation factor shows how the variance of an estimator is inflated by the presence of multicollinearity" (Gujarati, 2009). A VIF below 10 is considered acceptable, whereas a value of 10 or above indicates multicollinearity. (Gujarati, 2009).

Table 3: Variance Inflation Factor (VIF)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
LDA	1.0980	1.1152	-	-	-	-
SDA	-	-	1.8019	2.0176	-	-
TDA	-	-	-	-	1.8356	1.8135
TANG	1.0641	1.0349	1.0631	1.0364	1.0466	1.0548
SIZE	1.0702	1.2596	1.1000	1.3461	1.1274	1.0928
LIQ	1.1234	1.1803	1.7840	1.7871	1.7464	1.7654

Source: Compiled by author.

Table 3 reveals that VIF values for these variables range from a minimum of 1.0349 to a maximum of 1.8356, confirming that the problem of multicollinearity does not exist among the independent variables, as VIF is within the limits (Gujarati, 2009).

Table 4: Stationarity Test Results

Variables	Augmented Dickey-Fuller (ADF) test Model form	Test Statistics	P-value	Inference
LDA	Individual Intercept	136.984	0.0001	Stationary**
	Trend and Intercept	124.198	0.0011	Stationary**
SDA	Individual Intercept	119.778	0.0027	Stationary**
	Trend and Intercept	110.020	0.0146	Stationary**
TDA	Individual Intercept	137.980	0.0001	Stationary**
	Trend and Intercept	117.578	0.0040	Stationary**
ROA	Individual Intercept	116.334	0.0050	Stationary**
	Trend and Intercept	110.503	0.0135	Stationary*
ROE	Individual Intercept	129.653	0.0004	Stationary**
	Trend and Intercept	141.103	0.0000	Stationary**
TANG	Individual Intercept	119.946	0.0026	Stationary
	Trend and Intercept	123.471	0.0013	Stationary**
SIZE	Individual Intercept	207.735	0.0000	Stationary**
	Trend and Intercept	137.799	0.0001	Stationary**
LIQ	Individual Intercept	122.497	0.0016	Stationary**
	Trend and Intercept	100.202	0.0629	Stationary

Note: **Stationary at 1% significance, * Stationary at 5% significance.

The ADF test in Table 4 indicates that all the given series, LDA, SDA, TDA, ROA, ROE, TANG, and SIZE are stationary at a 5% significance level or LIQ, at 10%. significance level.

4.2. Results of regression analysis

This study utilizes six regression models, presented in Equations 1 to 6, to analyze the impact of capital structure on profitability. The panel regression equations as per the preferred model are as follows:

$$ROA_{it} = a_{it} + \beta_1 LDA_{it} + \beta_2 Tang_{it} + \beta_3 Size_{it} + \beta_4 Liq_{it} + \varepsilon_{it} + \mu_{it} \ldots \quad (1)$$

$$ROE_{it} = a_{it} + \beta_1 LDA_{it} + \beta_2 Tang_{it} + \beta_3 Size_{it} + \beta_4 Liq_{it} + \varepsilon_{it} + \mu_{it} \ldots \quad (2)$$

$$ROA_{it} = a_{it} + \beta_1 SDA_{it} + \beta_2 Tang_{it} + \beta_3 Size_{it} + \beta_4 Liq_{it} + \varepsilon_{it} + \mu_{it} \ldots \quad (3)$$

$$ROE_{it} = a_{it} + \beta_1 SDA_{it} + \beta_2 Tang_{it} + \beta_3 Size_{it} + \beta_4 Liq_{it} + \varepsilon_{it} + \mu_{it} \ldots \quad (4)$$

$$ROA_{it} = a_{it} + \beta_1 TDA_{it} + \beta_2 Tang_{it} + \beta_3 Size_{it} + \beta_4 Liq_{it} + \varepsilon_{it} + \mu_{it} \ldots \quad (5)$$

$$ROE_{it} = a_{it} + \beta_1 TDA_{it} + \beta_2 Tang_{it} + \beta_3 Size_{it} + \beta_4 Liq_{it} + \varepsilon_{it} + \mu_{it} \ldots \quad (6)$$

Table 5: Dependent Variable (ROA) - Model 1

	POLS		REM		FEM	
Variables	Coeff.	T-stat.	Coeff.	T-stat.	Coeff.	T-stat.
LDA	-0.1220	-2.45*	-0.2336	-4.37**	-0.2497	-4.17**
TANG	-0.0830	-2.49*	-0.0666	-1.80	-0.0622	-1.50
SIZE	0.0249	7.43**	0.0259	3.96**	0.0296	2.79**
LIQ	0.0113	2.91**	-0.0020	-0.49	-0.0054	-1.20
R^2	0.2174		0.1126		0.6645	
Adjusted R^2	0.2095		0.1036		0.6240	
F - statistics	27.4373**		12.5274**		16.3982**	
Durbin Watson	0.6305		1.3305		1.4933	
Breusch Pagan	0.0000					
Hausman	0.2497					

Source: Compiled by author, *at 5% significance, **at 1% significance.

Table 5 represents the outcomes of Equation 1 with ROA as a dependent variable. The Breusch Pagan and F-test indicate that POLS is inappropriate. The Hausman test confirms that REM is preferred. The results reveal that LDA has a significant negative effect on ROA. However, tangibility and liquidity have insignificant impacts on ROA, while size has a significant positive impact on ROA. R-squared signifies that the independent variables explain 11.26% of ROA variability. The Durbin-Watson test statistic is 1.3305, indicating no serial correlation.

Table 6: Dependent Variable (ROE) – Model 2

	POLS		REM		FEM	
Variables	Coeff.	T-stat.	Coeff.	T-stat.	Coeff.	T-stat.
LDA	0.2526	2.83**	-0.0456	-0.44	-0.1180	-0.97
TANG	-0.2565	-4.30**	-0.1930	-2.73**	-0.1736	-2.06*
SIZE	0.0415	6.91**	0.0528	4.85**	0.0928	4.29**
LIQ	-0.0025	-0.37	-0.0212	-2.68**	-0.0342	-3.75**
R^2	0.1452		0.0795		0.5268	
Adjusted R^2	0.1365		0.0702		0.4697	
F - statistics	16.7735**		8.5289**		9.2179**	
Durbin Watson	0.7045		1.0964		1.2642	
Breusch Pagan	0.0000					
Hausman	0.0057					

Source: Compiled by author, *at 5% significance, **at 1% significance.

Table 6 represents the outcomes of Equation 2 with ROE as a dependent variable. The results of the Breusch Pagan and F-test indicate that POLS is inappropriate. The Hausman test confirms that FEM is preferred. The results reveal that LDA has an insignificant effect on ROE. However, tangibility and liquidity have a significant negative impact, whereas size has a significant positive impact on ROE. R-squared indicates that the independent variables explain 52.68% of ROE variation. The Durbin-Watson test statistic is 1.2642, indicating no serial correlation.

Table 7: Dependent Variable (ROA) – Model 3

	POLS		REM		FEM	
Variables	Coeff.	T-stat.	Coeff.	T-stat.	Coeff.	T-stat.
SDA	-0.1704	-5.15**	-0.0939	-2.28*	-0.0576	-1.18
TANG	-0.1790	-5.75**	-0.1015	-2.74**	-0.0630	-1.49
SIZE	0.0229	6.96**	0.0256	3.98**	0.0364	3.24*
LIQ	-0.0033	-0.67	-0.0056	-1.09	-0.0076	-1.35
R^2	0.2555		0.0857		0.6495	
Adjusted R^2	0.2480		0.0764		0.6071	
F - statistics	33.8935**		18.46**		15.3393**	
Durbin Watson	0.6668		1.495		1.4607	
Breusch Pagan	0.0000					
Hausman	0.0592					

Source: Compiled by author, *at 5% significance, **at 1% significance.

Table 7 represents the outcomes of Equation 3 with ROA as a dependent variable. The results of the Breusch Pagan and F-test indicate that POLS is inappropriate. The Hausman test confirms that REM is preferred. The results reveal that SDA has a significant negative impact on ROA, tangibility has a significant negative impact, size has a significant positive impact, whereas liquidity has an insignificant impact on ROA. R-squared indicates that the independent variables explain 8.57% of the variability in ROA. Durbin-Watson test statistics (1.495) indicate no serial correlation.

Table 8: Dependent Variable (ROE) – Model 4

	POLS		REM		FEM	
Variables	Coeff.	T-stat.	Coeff.	T-stat.	Coeff.	T-stat.
SDA	-0.0483	-0.79	0.0483	0.61	0.1835	1.90
TANG	-0.1966	-3.41**	-0.1928	-2.71**	-0.1671	-1.99*
SIZE	0.0406	6.66**	0.0565	4.86**	0.1134	5.09**
LIQ	-0.0117	-1.29	-0.0174	-1.73	-0.0209	-1.87
R^2	0.1293		0.0788		0.5303	
Adjusted R^2	0.1204		0.0694		0.4736	
F - statistics	14.6592**		8.4435**		9.3485**	
Durbin Watson	0.6715		1.1203		1.3065	
Breusch Pagan	0.0000					
Hausman	0.0221					

Source: Compiled by author, *at 5% significance, **at 1% significance.

Table 8 represents the outcomes of Equation 4 with ROE as a dependent variable. The results of the Breusch Pagan and F-test suggest that POLS is inappropriate. The Hausman test confirms that FEM is preferred. The results reveal that SDA has an insignificant impact on ROE, tangibility has a significant negative impact, size has a significant positive impact, whereas liquidity has an insignificant impact on ROE. R-squared indicates that the independent variables explained 53.03% of the variability in ROE. The Durbin-Watson test statistic is 1.3065, indicating no serial correlation.

Table 9: Dependent Variable (ROA) – Model 5

	POLS		REM		FEM	
Variables	Coeff.	T-stat.	Coeff.	T-stat.	Coeff.	T-stat.
TDA	-0.1516	-5.64**	-0.1564	-4.63**	-0.1541	-3.81**
TANG	-0.1265	-4.39**	-0.0902	-2.47*	-0.0668	-1.61
SIZE	0.0230	7.04**	0.0212	3.23**	0.0213	1.85
LIQ	-0.0041	-0.85	-0.0129	-2.55*	-0.0152	-2.82**
R^2	0.2647		0.1197		0.6619	
Adjusted R^2	0.2573		0.1108		0.6211	
F - statistics	35.5542**		13.4258**		16.2078**	
Durbin Watson	0.6417		1.2835		1.4372	
Breusch Pagan	0.0000					
Hausman	0.4202					

Source: Compiled by author, *at 5% significance, **at 1% significance.

Table 9 represents the outcomes of Equation 5 with ROA as a dependent variable. The Breusch Pagan and F-test indicate that POLS is inappropriate. The Hausman test confirms that REM is preferred. The results reveal that the TDA, tangibility and liquidity have a significant negative impact on ROA, whereas size has a significant positive impact on ROA. R-squared indicates that the independent variables explained 11.97% of the variability in ROA. The Durbin-Watson test statistic is 1.2835, showing no serial correlation.

Table 10: Dependent Variable (ROE) – Model 6

	POLS		REM		FEM	
Variables	Coeff.	T-stat.	Coeff.	T-stat.	Coeff.	T-stat.
TDA	0.0459	0.92	0.0100	0.15	0.0774	0.94
TANG	-0.1779	-3.31**	-0.1989	-2.81**	-0.1703	-2.02*
SIZE	0.0419	6.87**	0.0553	4.73**	0.1082	4.63**
LIQ	-0.0017	-0.19	-0.0203	-2.03*	-0.0276	-2.52*
R^2	0.1297		0.0781		0.5268	
Adjusted R^2	0.1209		0.0687		0.4696	
F - statistics	14.7214**		8.3622**		9.2156**	
Durbin Watson	0.6792		1.1143		1.2814	
Breusch Pagan	0.0000					
Hausman	0.0531					

Source: Compiled by author, *at 5% significance, **at 1% significance.

Table 10 represents the outcomes of Equation 6 with ROE as a dependent variable. The results of the Breusch Pagan and F-test indicate that POLS is inappropriate. The Hausman test confirms that REM is preferred. The results reveal that TDA has an insignificant impact on ROE, tangibility and liquidity have significant negative impacts, whereas size has a significant positive impact on ROE. R-squared indicates that the independent variables have explained 7.81% of the variability in ROE. The Durbin-Watson test statistic is 1.1143, showing no serial correlation.

The regression analysis revealed that capital structure has a significant negative effect on ROA, resulting in the rejection of the first null hypothesis. Whereas capital structure has no significant impact on ROE, supporting the acceptance of the second null hypothesis.

5. Conclusion

The significant negative impact of all debt measures (LDA, SDA, and TDA) on return on assets (ROA) indicates that higher debt levels, whether short-term or long-term debt, negatively impact the profitability of Indian Food and Beverage companies. These findings are consistent with previous studies by Revathy and Santhi (2016), Pandey and Sahu (2017), Singh and Bagga (2019), and Habibniya et al.

(2022), whereas they contradicted the findings of Patra (2021) and Anozie et al. (2023). It is observed that reliance on short-term debt is notably higher than long-term debt and might be introducing risks like refinancing costs and liquidity pressures, potentially limiting profitability. Tangibility emerges as a key determinant of profitability as it has a significant negative impact on both return on assets (ROA) and return on equity (ROE). This indicates inefficiencies in leveraging tangible assets effectively to drive profitability. Firm size has a significant positive impact on profitability, indicating that larger firms benefit from their well-established market presence, economies of scale, and improved access to resources and capital, enabling them to achieve higher returns than smaller firms. The significant negative influence of liquidity on profitability indicates inefficient working capital management practices, leading to reduced profitability.

5.1. Theoretical implications

This study contributes important findings to the ongoing debate between the Trade-Off and Pecking Order theories of capital structure. The significant negative relationship between all debt measures and profitability might indicate the adverse effect of leverage as described by the Trade-Off Theory, in which debt levels beyond the optimal point cause financial distress costs to outweigh the tax benefits, thereby reducing firm performance (Kraus & Litzenberger, 1973). The reliance on short-term debt over long-term financing is broadly consistent with Pecking Order Theory, which suggests firms prefer internal funds first, then debt, and only reluctantly turn to equity (Myers & Majluf, 1984). The preference for short-term borrowing may be a unique feature of the FMCG industry in India, potentially reflecting a strategic choice shaped by market structure and cost considerations. In the Indian FMCG context, this pattern of financing may also be influenced by practical constraints such as underdeveloped long-term debt markets and high issuance costs.

5.2. Suggestions and recommendations

The results indicate that higher dependence on short-term financing, inefficient use of liquidity, and fixed assets negatively affect profitability. It is suggested that Indian food and beverage companies should strategically optimize their debt levels by reducing excessive debt reliance and enhancing the efficient utilization of fixed assets to improve profitability. Moreover, while larger firms benefit from economies of scale and a stable market presence, conservative liquidity policies can negatively impact profitability and should be avoided. The study suggests that Indian policymakers should strengthen access to long-term finance through RBI incentives and relaxed credit norms for industry. They should introduce credit guarantees and refinancing schemes to reduce short-term borrowing needs.
The findings of this study can be relevant beyond the Indian context and have important implications for emerging markets and consumer-oriented industries that face similar structural problems that hold back, including restricted access to long-term capital, overreliance on short-term borrowing, and under-performing asset utilization. The findings suggest that firms facing these environments could also benefit from rebalanced capital structures, refined liquidity management strategies, and alignment of asset strategies to enhance profitability and competitive positioning in emerging markets.

5.3. Future research directions

This study offers meaningful contributions; however, there are still several promising directions for further research. Future investigations could evaluate the potential non-linear association between debt and firm performance, determining whether moderate levels of leverage enhance profitability before adverse impacts arise. Applying dynamic panel estimation techniques, such as the System GMM method, could address the endogeneity concerns and capture the long-term impact of financing choices. Extending research across sectors or countries, and incorporating macroeconomic and governance variables, could offer a more comprehensive perspective, linking firm-level financing strategies to broader economic and institutional frameworks.

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