

Original Article

A Review of Capital Structure and Automobile Sector Financial Performance in India

Mr. Shailendra¹, Dr. Vineet Singh², Dr. Manish Seth³

¹Assistant Professor, Department of Commerce, Govt. Veer Gend Singh College, Pakhanjore, Distt. Uttar-Bastar Kanker (C.G.).

²Associate Professor, Department of Commerce, Jananayak Chandrashekhar University, Ballia, Uttar Pradesh.

³Assistant Professor, Department of Commerce, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh.

Email-skgmaasturiya@gmail.com

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Abstract

This article reviews the impact of capital structure on the financial performance of the automobile sector in India. Focusing on ten selected automobile firms from 2014-15 to 2024-25, the paper investigates how capital structure parameters (Net Worth, Debt to Equity Ratio, Debt Ratio, Short-term Debt, and Long-Term Debt) influence financial performance parameters (ROA and ROE). For this analysis, the article employs correlation and multiple regression tools to critically examine how internal and external financial choices affect financial performance. Results reveal that the Net Worth (NW), Debt-to-Equity Ratio (DER), Debt Ratio (DR), and Long-Term Debt (LTD) significantly and positively influence the financial performance parameters—Return on Assets (ROA) and Return on Equity (ROE)—of selected automobile firms in India. The findings highlight the necessity for the automobile industry to pinpoint an optimal combination of debt and equity that maximizes profitability while reducing agency costs. This review offers valuable insights for policymakers and financial practitioners looking to improve financial stability and performance in emerging markets.

Keywords: Capital Structure, Debt to Equity Ratio, Debt Ratios, Financial Performance, ROA, ROE.

Introduction

The automobile sector is one of the greatest influential sectors in the global economy, driving innovation, employment, and connectivity. It incorporates the strategy, growth, manufacturing, marketing, and sale of motor vehicles, ranging from passenger cars to commercial trucks. Emerging in the late 19th century with the advent of steam-powered and gasoline-driven vehicles, the industry has evolved significantly, with milestones such as mass production pioneered by Henry Ford, the introduction of electric and hybrid vehicles, and advancements in autonomous driving technology. Today, it plays a crucial role in transportation infrastructure, supporting mobility, logistics, and trade across nations. In addition to technological advancements, the industry faces challenges related to environmental sustainability, shifting consumer preferences, and regulatory compliance. The push towards electric vehicles (EVs) and alternative fuels highlights efforts to reduce carbon emissions and promote greener transportation solutions.

Market Size: The Indian automobile industry was valued at **USD 137.06 billion in 2025** and is projected to reach **USD 203.25 billion by 2030**, growing at a **CAGR of 8.2%**.

- Production & Sales:** India produced **25.9 million vehicles** in FY23, with **19.2 million units** manufactured in December 2024 alone.
- Employment & GDP Contribution:** The sector employs **about 19 million people** and contributes **7.1% to India's GDP**, up from **2.77% in 1992-93**.
- Electric Vehicle Growth:** India sold **100,000 EVs** in 2024, compared to **82,688 in 2023**. The EV market is expected to grow **fivefold to USD 1,318 billion by 2028**.

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Address for correspondence:

Mr. Shailendra, Assistant Professor, Department of Commerce, Govt. Veer Gend Singh College, Pakhanjore, Distt. Uttar-Bastar Kanker (C.G.).

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- **Government Initiatives:** Policies like the **Automotive Mission Plan 2026**, **scrapage policy**, and **production-linked incentive schemes** aim to make India a global leader in the automobile sector.

1 Capital Structure:

Capital structure refers to the mix of debt and equity a company uses to finance its operations and growth. It includes borrowed funds like loans and bonds, along with equity capital from shareholders. The proportion of debt and equity influences a company's financial performance and investment decisions. Researchers have extensively studied capital structure, especially in the automobile industry, to understand its impact on profitability and sustainability. In this study following capital structure components are considered to analyze the problems:

1. **Net Worth:** This represents the total value of an individual's or a company's assets minus liabilities. A positive net worth indicates financial stability, while a negative net worth suggests financial challenges.
2. **Debt Ratio:** This measures the proportion of debt relative to total assets. It is calculated as **Total Debt / Total Assets** and helps assess an entity's financial leverage.
3. **Debt-to-Equity Ratio:** This evaluates a company's financial structure by comparing total debt to total shareholders' equity. It is computed as **Total Debt / Total Equity** and indicates the level of financial risk.
4. **Short-Term Debt:** These are obligations due within one year, including loans, credit lines, and other financial liabilities that must be repaid in the near future.
5. **Long-Term Debt:** This consists of financial obligations that extend beyond one year, such as bonds, mortgages, and long-term loans used for expansion and major investments.

2 Financial Performance: Financial performance reflects how effectively an individual, business, or organization manages financial resources to ensure growth, stability, and profitability. It is evaluated using metrics like revenue, net income, return on investment, and liquidity ratios. Businesses continuously monitor financial performance to make informed investment decisions. Shareholders Wealth Maximization (SWM) is often assessed through Market Price per Share (MPS), indicating the increase in shareholder value over time. Financial statements, including revenue and balance sheets, along with stock market data, help measure a company's success.

Key indicators of financial performance include:

- **Profitability** – Measuring how efficiently a company generates profits relative to expenses.
- **Liquidity** – Evaluating the ability to meet short-term obligations using current assets.
- **Solvency** – Assessing long-term financial stability and debt management.
- **Operational Efficiency** – Analyzing how effectively resources are utilized to maximize output.

Strong financial performance signifies economic stability, investor confidence, and the ability to expand operations. Continuous financial analysis helps businesses make informed decisions and maintain sustainable growth.

The following financial parameters of each sampled Indian automobile company were evaluated. ROA and ROE are key financial metrics used to evaluate a company's profitability and efficiency in utilizing its assets and equity.

1. **Return on Assets (ROA):** This measures how efficiently a company generates profits from its total assets. It is calculated as **Net Income / Total Assets**. A higher ROA indicates better asset utilization and overall financial performance.
2. **Return on Equity (ROE):** This assesses how effectively a company generates profits from shareholders' equity. It is computed as **Net Income / Shareholders' Equity**. A higher ROE signifies strong profitability and efficient use of investor funds.

Both indicators serve as essential tools for investors and analysts in evaluating a firm's financial stability and its capacity to generate profits. This report focuses on assessing how effectively a company utilizes its assets to drive revenue, thereby reflecting its overall financial robustness. In the current study, the financial performance of ten Indian automobile companies—Maruti Suzuki India Ltd, Mahindra & Mahindra Ltd, Tata Motors Ltd, Bajaj Auto Ltd, Hero MotoCorp Ltd, Hindustan Motors, Force Motors Ltd, Ashok Leyland Ltd, Eicher Motors Ltd, and TVS Motors—was analyzed. The dataset spans ten years from 2013–14 to 2022–23.

Literature Review:

A literature review offers a detailed synthesis and evaluation of prior research, theoretical frameworks, and key findings relevant to the chosen topic. It serves as a foundation for understanding the existing body of knowledge, highlighting areas that require further exploration, and guiding future research efforts. The following literature was examined during this study.

Ray (2011). employed Altman's Z-score model to assess financial distress within India's automobile industry. The research encompassed 62 companies listed on the Bombay Stock Exchange (BSE) over the period 2007 to 2010, revealing issues related to capitalization and broader sectoral patterns. The analysis showed a downward trend in Z-scores beginning in 2008, attributed to the global economic downturn, suggesting that many firms were experiencing

moderate financial instability. The study cautioned that without effective regulatory intervention, the risk of widespread corporate insolvency could escalate.

Chisti et.al. (2013) investigated the influence of capital structure on the financial performance of ten automobile firms, focusing on the periods 2007–2008 and 2011–2012. The findings revealed a negative relationship between profitability ratios and the debt-to-equity ratio, suggesting that a higher reliance on debt adversely affects profitability. Conversely, the study identified strong positive correlations between profitability and both the debt-to-asset and interest coverage ratios, indicating that these financial metrics positively contribute to the profitability of the companies analyzed.

Dave (2014) carried out a trend analysis of Indian two-wheeler automobile companies, evaluating their capital structure, financial outcomes, and growth potential over the period 2000 to 2010 through ratio analysis. The study underscored Bajaj Automobile's accelerated progress relative to its peers and stressed the importance of boosting earnings per share to strengthen financial performance. Furthermore, the research advocated for improved short-term liquidity management to overcome working capital constraints and enhance operational efficiency, thereby supporting long-term industry expansion.

Jani and Bhatt (2015) explored the capital structure financing patterns within India's automobile sector. The study analyzed variables such as debt-to-equity ratio, return on net worth, firm size, interest coverage ratio, and return on capital, employing statistical techniques including regression and correlation for data interpretation. The findings indicated that companies in this sector rely heavily on credit sales and finance their operations through a mix of debt, equity, and internal resources, leading to substantial working capital levels. The authors also noted that service-oriented industries tend to favor equity financing over debt.

Babu and Chalm (2016) analyzed the capital structure dynamics within India's automobile sector using secondary data sources. The study applied various statistical methods, including correlation analysis, multiple regression, T-tests, F-tests, and ANOVA, to evaluate the relationships among key financial variables. Factors such as leverage, profitability, growth, firm size, liquidity, and non-debt tax shields were considered in the analysis. The researchers concluded that long-term financing decisions in the Indian automobile industry align with the pecking order theory.

Tripathi (2021) explored the link between capital structure and financial performance among Indian automobile companies from 2001 to 2014, employing a panel data methodology. The analysis revealed that the debt-to-equity ratio had a notable impact on financial outcomes, while growth emerged as the sole control variable with a positive influence on firm performance. Other variables, including cash flow coverage ratio (CFCR), firm size, and asset tangibility, showed limited significance. The study also emphasized the presence of agency issues, suggesting that elevated leverage can impair financial performance by prompting inefficient investment choices.

Hemaprasanna and Karthikeyani (2023) investigated the capital structure patterns within India's automobile sector, emphasizing the determinants of financial decision-making and the associated risk-return dynamics for shareholders. Drawing on data from ten companies spanning sixteen years (2005–2021), sourced from the ACE Equity database, the study employed correlation analysis, regression models, and step-wise regression techniques. The research identified six critical variables influencing the debt-to-equity ratio: return on equity, firm size, dividend payout ratio, effective tax rate, cost of equity, and cost of debt.

Dsouza et al. (2024) explored the determinants of capital structure in the U.S. automobile industry and their implications for financial performance. Utilizing panel data from 86 companies over the period 2011 to 2022 and adopting a quantitative analytical framework, the study revealed that profitability has a negative influence on both the total debt ratio and short-term debt levels. In contrast, variables such as sales growth, firm size, and asset tangibility were found to have no statistically significant effect. The research offers important insights for strategic financial planning, risk mitigation, and capital structure optimization within the automotive sector.

Research Gap:

Existing studies on capital structure and financial performance in Indian automobile firms often use static models and overlook evolving market dynamics, policy shifts, and segment-specific differences. There's limited insight into how capital structure impacts vary across vehicle categories and economic cycles. A more nuanced, comparative approach is needed to understand these financial implications.

Research Methodology:

1 Objective: The main objective of this research narrated thus: (a) to analyze how various aspects of capital structure influence the financial outcomes of automobile firms in India.; (b) to analyzed association between capital structure parameters (Debt to Equity Ratio (DER), Debt Ratio (DR)) and financial performance parameters (Return on Assets (ROA) and Return on Equity (ROE)).: (c) to analyzed effect of capital structure parameters (Debt to Equity Ratio

(DER), Debt Ratio (DR)) on financial performance parameters (Return on Assets (ROA) and Return on Equity (ROE)).:

2 Hypothesis Development: Based on the literature review, this study examines the impact of capital structure on profitability, addressing gaps in knowledge through empirical analysis. Previous research presents mixed findings: some studies show a positive relationship (Deping & Yongsheng, 2011; Masulis, 1983; Jordan et al., 1998; Frank & Goyal, 2003; Simerly & Li, 2000), others indicate a negative correlation (Rao et al., 2007; Chakraborty, 2010; Majumdar & Chhibber, 2004), while some find no significant association (Amah & Chirnara, 2016). These varied results underscore the need for ongoing investigation, leading to the formulation of null hypotheses.

H0₁: There is no significant association between capital structure parameters (Debt to Equity Ratio (DER), Debt Ratio (DR)) and financial performance parameters (Return on Assets (ROA) and Return on Equity (ROE)).:

H0₂: There is no significant effect of capital structure parameters (Debt to Equity Ratio (DER), Debt Ratio (DR)) on financial performance parameters (Return on Assets (ROA) and Return on Equity (ROE)).:

3 Sample size: This study examines a sample of ten automobile firms listed on the National Stock Exchange of India (NSE). A single sector was selected to ensure accurate findings and minimize erroneous results. Economic risk, as a key factor, fluctuates in corporate settings and influences decisions regarding capital structure.

4 Nature and type of research: The research employs a descriptive approach, focusing on existing phenomena while also exploring new facts and interpretations. This process involves careful observation, narration, and documentation of the subject as it unfolds naturally.

5 Source of Data: This study relies on secondary data sources, gathered from annual reports, books, online resources, magazines, newspapers, and the National Stock Exchange of India, among others.

6 Sampling Technique: In this study, the judgment sampling method was applied, chosen based on expertise and informed professional evaluation.

7 Period of study: The period of study spans 2014-15 to 2024-25, which includes the COVID-19 pandemic period.

8 Variables: In this study, three independent variables—debt-to-equity ratio, debt ratio, and long-term and short-term debt — were considered to assess total liabilities, including both long-term and short-term liabilities, relative to total assets. These assets comprised both fixed and current assets of the firms. However, only one independent variable was incorporated into the multiple regression analysis. Two performance metrics served as dependent variables: (a) Return on Assets, calculated as net income divided by total assets; and (b) Return on Equity, representing the ratio of net income to equity shareholders.

Results and Discussion:

1 Relationship Between Capital Structure and Financial Performance.

The Pearson correlation coefficient measures the relationship between selected variables, ranging from +1 to -1. The correlation analysis between capital structure and the financial performance of ten automobile companies, presented in Table 4.1, indicates a significant association. Here's the correlation result table, including only the selected variables under Capital Structure (DR, DER, LTD, STD) and Financial Performance (ROE, ROA):

Table 1 Pearson's coefficient of correlation between capital structure and financial performance of different Indian Automobile Companies from 2013-14 to 2022-23

Variables	DR	DER	STD	LTD	ROA	ROE
Debt Ratio (DR)	1.00					
Debt-to-Equity Ratio (DER)	0.049	1.00				
Short-Term Debt (STD)	0.795	0.130	1.00			
Long-Term Debt (LTD)	0.846	0.097	0.543	1.00		
Return on Assets (ROA)	-0.084	0.088	0.013	-0.260	1.00	
Return on Equity (ROE)	0.077	0.033	0.460	-0.126	0.341	1.00

Source: Researcher computation

2 Regression Analysis

Regression analysis has been conducted to regulate the effect of capital structure on the financial performance of Indian automobile companies. In this section, we have discussed the relationship between different capital structure parameters with the parameters of monetary presentation. This section sheds light on the testing of hypotheses based on results obtained through regression analysis.

2.1 Capital Structure vs Return on Assets (ROA)

The standardized coefficients reveal a significant relationship between capital structure parameters—Debt to Equity Ratio, Debt Ratio, Short-Term Debt, and Long-Term Debt—and Return on Assets (ROA) in Indian automobile companies (p-values: 0.0021, 0.0070, 0.0203, 0.0070). This association varies as both positive and negative. The R² value of 0.981 indicates that 97.25% of ROA variance is explained by capital structure, while 1.90% is due to other

factors. The Durbin-Watson statistic of 1.97 suggests a positive autocorrelation, confirming their interrelationship. The computed F-value (1668.80, p=0.000) establishes that capital structure significantly ($p \leq 0.05$) affects ROA in these companies

Table 2 Regression summary for Capital Structure (independent variable) and Return on Assets (Dependent Variable).

Independent Variables	Dependent Variables	Coefficient	SE	t-value	Sig
Intercept		51.8500	6.9563	7.4680	0.0847
DER	ROA	0.0357	0.0059	8.1764	0.0021
DR	ROA	0.1231	0.0192	8.8950	0.0070
STD	ROA	-0.0092	0.0018	-7.2331	0.0203
LTD	ROA	0.0245	0.0042	7.8894	0.0070

MODEL SUMMARY					
Multiple R	0.9909		F-Value	1668.80	
R Square	0.9725		Sig.	0.000	
Adjusted R ²	0.8452		DW-Value	1.968	
Standard Error	4.9795				

Source: Research computation

2.2 Capital Structure vs Return on Equity Ratio (ROE)

The standardized coefficients reveal a significant relationship between capital structure parameters—Debt to Equity Ratio, Debt Ratio, and Short-Term Debt—and Return on Equity (ROE) in Indian automobile companies (p-values: 0.0403, 0.0455, 0.01510). This association includes both positive and negative correlations. The R² value of 0.8869 indicates that 88.69% of ROE variance is explained by capital structure, while 11.31% is attributed to other factors. The Durbin-Watson statistic of 1.851 suggests a positive autocorrelation, reinforcing their interrelationship. The computed F-value (1629.49, p=0.000) confirms that capital structure significantly ($p \leq 0.05$) influences ROE in these companies.

Table 3 Regression summary for Capital Structure (independent variable) and Return on Equity Ratio (Dependent Variable).

Independent Variables	Dependent Variables	Coefficient	SE	t-value	Sig
Intercept		1.76708	0.40217	4.39387	0.14246
DER	ROE	-0.00102	0.00034	-9.97942	0.04031
DR	ROE	-0.01042	0.00111	-9.39618	0.04550
STD	ROE	0.00440	0.00010	43.40988	0.01510
LTD	ROE	-0.00101	0.00024	-4.19866	0.14885

MODEL SUMMARY					
Multiple R	0.9100		F-Value	1639.49	
R Square	0.8869		Sig.	0.0190	
Adjusted R2	0.8793		DW-Value	1.851	
Standard Error	0.2879				

Source: Research computation

The multiple regression analysis confirms a significant correlation between capital structure and financial performance in Indian automobile companies. The model summary indicates that capital structure is a significant predictor ($p \leq 0.05$) of financial parameters, including Return on Assets (ROA) and Return on Equity (ROE). The findings validate the alternative hypotheses, affirming that capital structure significantly influences financial performance. Consequently, the null hypotheses H01 and H03 are rejected. These results establish that capital structure plays a crucial role in shaping the financial outcomes of Indian automobile companies.

conclusions

The Pearson correlation and regression analyses establish a significant relationship between capital structure and financial performance in Indian automobile companies ($p \leq 0.05$). All the selected parameters of capital structure directly influence profitability, liquidity, and long-term sustainability. The study identifies key financial predictors such as Debt-to-Equity Ratio, Debt Ratio, Short-Term Debt, and Long-Term Debt, impacting financial performance across leading automobile firms, including Maruti Suzuki, Tata Motors, Mahindra & Mahindra, Bajaj Auto, Hero MotoCorp, Ashok Leyland, and TVS Motors. The rejection of the null hypothesis confirms that capital structure significantly

influences financial performance in the sector. These insights are crucial for financial management, investment strategies, and policy-making, aiding companies in optimizing capital structures, strengthening financial stability, improving shareholder value, and enhancing competitive positioning. The findings serve as a strategic guide for businesses to adapt their financial models, refine ownership structures, and achieve sustainable growth in India's dynamic automobile industry.

Recommendations

1. Expanding Sector Analysis: Future studies can examine capital structure dynamics across different industries, particularly emerging sectors like electric vehicles (EVs) and auto-component manufacturing.
2. Macroeconomic Influences: Investigate how interest rates, inflation, and policy changes impact capital structure decisions and financial performance.
3. Debt-Equity Optimization: Research on ideal debt-equity ratios and their role in improving profitability and stability in Indian firms.
4. Technological Impact: Analyze how automation, AI-driven financial modeling, and digital transformation influence capital structure decisions.
5. Strategic Capital Allocation: Maintain a balanced debt-equity ratio to ensure financial stability and optimized returns.
6. Investment in Innovation: Prioritize R&D for EVs, smart vehicle technology, and sustainability to remain competitive.

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