



AN EMPIRICAL STUDY OF CAPITAL STRUCTURE PATTERNS IN CEMENT AND STEEL INDUSTRIES OF NORTH EASTERN INDIA

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Abstract

This research explores the capital structure characteristics of some cement and steel firms and their effect on financial performance in the North Eastern Region of India. The study employs secondary financial data and employs ratio analysis, correlation and multiple regression analysis to assess the impact of leverage on firm performance, as measured by Return on Assets (ROA). The results show that capital structure is an important factor in explaining firm performance, with increased leverage having a negative impact on profitability through increased financial risk and interest costs. On the other hand, asset turnover, a measure of operational efficiency, has a positive impact on profitability. The research also highlights significant differences between the industries, with cement companies showing a well-balanced and consistent financing structure, while steel companies have higher leverage and financial risk. In conclusion, the findings highlight the need to achieve a balance in capital structure and improve operational efficiency for better financial performance in capital intensive sectors.

Keywords: Capital Structure, Debt Ratio, Financial Performance, Cement Sector, Steel Sector.

1. INTRODUCTION

Capital structure is a fundamental financial decision made by companies, which involves the mix of debt and equity financing employed by the firm. Selecting the right capital structure affects the cost of capital, profitability, risk and value of the firm. In the field of corporate finance, the question of optimal debt-equity ratio is crucial to enhance shareholders' wealth and ensure financial stability.

In capital-intensive sectors like cement and steel, the importance of capital structure is further emphasized by the substantial investment needs in fixed assets, infrastructure, and technology. These sectors are capital intensive, have high operating costs and long gestation periods, and therefore rely heavily on external finance, especially debt. Debt financing offers benefits like tax shielding and leverage, but over-reliance on debt can lead to higher risks and vulnerability in times of economic downturn or market uncertainty.

Cement and steel industries are crucial for India's economic growth and development, as they are pivotal to infrastructure development, construction, and industrialization. They are strongly correlated with the macroeconomic environment, policy settings and investment cycles. Nonetheless, while crucial, these sectors sometimes experience difficulties such as demand variability, increasing costs and financial resource constraints, which place a premium on effective financial management and capital structure choices.

India's North Eastern Region (NER) is an interesting case for examining capital structure. This region has comparatively lower industrialization, infrastructure constraints and limited access to financial markets than the rest of the country. They face some extra hurdles like increased cost of transportation, access to capital market and economic instabilities. These challenges complicate the financing decision-making process and underline the need to explore the impact of capital structure on financial performance within this particular regional context.

While there have been a number of studies on the capital structure and financial performance in various industries, there is a scarcity of research with a comparative view of cement and steel industries in the North Eastern Region. Also, previous research tends to provide a macro perspective without accounting for regional variations and industry-specific factors.

1.1. Objectives of the Study

The study has the following objectives:

- To analyze the capital structure patterns of selected cement and steel companies and evaluate their impact on financial performance.
- To examine the relationship between leverage (debt ratio) and profitability (ROA) of the firms.
- To compare the capital structure behavior and performance between cement and steel industries in the North Eastern Region of India.

2. LITERATURE REVIEW

Rohit Sofat and Sanjay Singh (2017) undertook a comprehensive empirical investigation to determine the critical factors impacting the capital structure of Indian manufacturing enterprises. The study used statistical and econometric methods to look at the relationship between financing decisions and firm-specific variables such size, profitability, asset tangibility, and growth potential. The results show that profitability is inversely related to leverage, lending credence to the pecking order theory, which postulates that more lucrative businesses would rather raise capital internally rather than take out loans. Companies that are bigger and have more tangible assets are better able to get external loans since they can use their assets as security. Research shows that internal financial factors and external market conditions influence capital structure decisions, which are dynamic and firm-specific.

A. R. Bhatt and K. Mohd (2017) examined the connection between capital structure and profitability with a particular focus on the cement industry in India. The effects of leverage on business performance were assessed using regression and financial ratio analysis in the research. The results showed that profitability measures like return on equity (ROE) and return on assets (ROA) were negatively correlated with debt levels. It follows that taking on too much debt raises the stakes in terms of financial risk and interest expense, which in turn lowers efficiency and profits. A capital structure imbalance can have a negative impact on financial health, even while debt financing offers tax benefits, according to the study. The study found that cement companies need to watch their debt-equity ratios closely if they want to be financially stable and thrive over the long run.

T. Manjunatha and K. M. Vikas (2021) looked into the spending habits of India's infrastructure businesses, which, being capital-intensive, have many traits with the cement and steel industries. The research looked at the financial structures of these industries to see how they can sustain massive investments and long-term endeavors. Due to the long gestation periods and large capital requirements of infrastructure development, the data showed that long-term debt financing is heavily used. On the other hand, the study brought attention to the fact that companies risk financial instability when they rely too much on debt, especially in times of economic downturns or changes in market demand. Strategic financial planning, effective use of resources, and a balanced capital structure are the three pillars upon which the authors' insistence on long-term sustainability and resilience rests.

S. Chadha and A. K. Sharma (2016) examined the effects of capital structure on company performance through an empirical study of India's manufacturing industry. Results show a mixed effect rather than a linear link between leverage and profitability, according to the study. Profitability was found to increase with moderate debt levels, thanks to tax shield benefits and better capital efficiency. But beyond a certain point, the expenses of financial distress, the exposure to risk, and the decline in profitability caused by rising debt all rose. According to the results, businesses should weigh the pros and cons of taking on debt in order to make an informed decision. This hypothesis is known as the trade-off theory. The study found that in order to maximize business value and ensure financial stability, it is vital to achieve an optimal capital structure.

3. RESEARCH METHODOLOGY

To investigate the connection between capital structure and financial performance in the chosen cement and steel companies, this section describes the study's methodology, including its research design, data sources, sampling technique, variables, and analytical techniques.

3.1. Research Design

Capital structure trends and their effects on financial performance in the cement and steel industries are investigated in this study using a quantitative and descriptive research approach. Finding correlations between leverage and profitability is the primary goal of this empirical study, which relies on an examination of financial data.

3.2. Area of the Study

Several Indian states, including Assam, Meghalaya, Tripura, and others, make up what is known as the North Eastern Region (NER). The study is undertaken with NER environment in mind, taking into account its distinct economic conditions, infrastructure restrictions, and financial restraints that impact corporate financing decisions. This is despite the fact that many large firms operate across India.

3.3. Data Source and Collection

Secondary data, gathered from sources such as:

- Reports prepared each year by chosen businesses
- Publicly available financial records

- Websites and financial databases of respective companies

In order to guarantee consistency and dependability in the study, the data has been collected for a certain time, often 5-10 years.

3.4. Sample Selection

Companies are chosen using a purposive sample strategy, taking into consideration both the availability of data and the relevance to the business. Four businesses are a part of the research, with two representing each industry. This group includes ACC Ltd. and UltraTech Cement Ltd. from the cement business, and Tata Steel Ltd. and Steel Authority of India Limited from the steel sector. The capital structure and financial performance of these organizations can be analyzed with a balanced basis.

3.5. Variables of the Study

Dependent Variable

- **Return on Assets (ROA):** Indicates how well total assets are being used and how well financial performance is being handled.

Independent Variables

- **Debt Ratio:** Indicates leverage level
- **Current Ratio:** Indicates liquidity
- **Asset Turnover Ratio:** Indicates efficiency
- **Firm Size:** Size measured by total assets/logarithm of assets
- **Sales Growth:** Reflects growth

3.6. Tools and Techniques

The statistical tools used are:

- **Descriptive Analysis:** To describe financial attributes
- **Ratio Analysis:** For capital structure and profitability analysis
- **Correlation Analysis:** To test the associations between variables
- **Regression Analysis:** To examine the effects of independent variables on financial performance

3.7. Model Specification

The multiple regression model used in the study is:

$$ROA = \beta_0 + \beta_1(Debt\ Ratio) + \beta_2(Current\ Ratio) + \beta_3(Asset\ Turnover) + \beta_4(Firm\ Size) + \beta_5(Sales\ Growth) + \epsilon$$

Where:

- β_0 = Intercept
- $\beta_1 - \beta_5$ = Coefficients
- ϵ = Error term

4. RESULTS AND DISCUSSION

Using financial data analysis as its foundation, this section discusses the study's empirical findings, drawing attention to patterns in capital structure and how they have affected the financial performance of certain cement and steel companies.

Table 1: Capital Structure Composition (Average Ratios)

Component	Cement Firms	Steel Firms
Debt Ratio	0.48	0.62
Equity Ratio	0.52	0.38
Long-term Debt (%)	65%	72%
Short-term Debt (%)	35%	28%

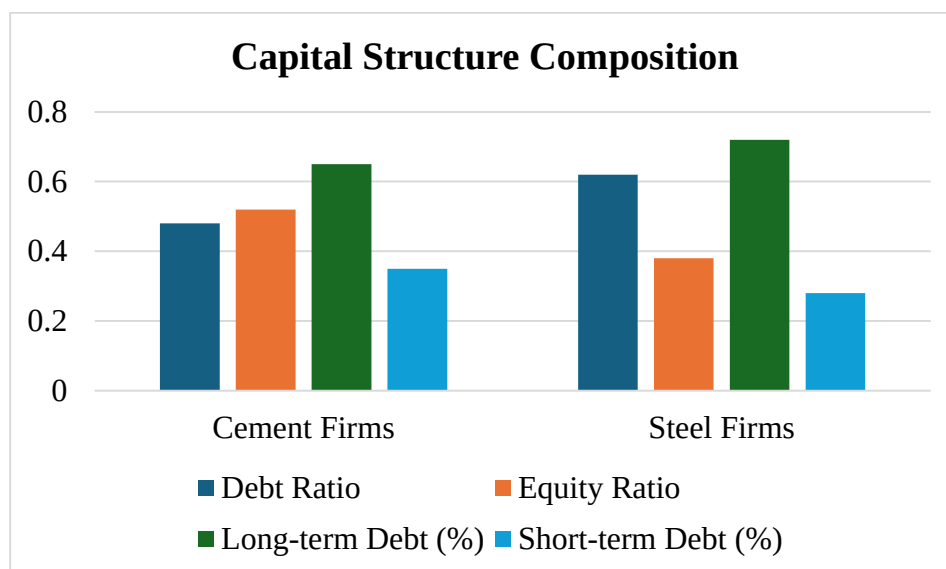


Figure 1: Visual Representation of Capital Structure Composition

Table 1 displays the data that proves that cement and steel companies' capital structure patterns are different. The greater reliance on borrowed cash for steel companies' operations is indicated by their higher debt ratio (0.62) when compared to cement firms' (0.48). Cement companies appear to rely more on internal or shareholder capital, since their equity ratio is 0.52 compared to 0.38 for steel corporations. Cement companies have a lower long-term debt share (65%) and somewhat higher short-term debt usage, whereas steel companies have a higher proportion of long-term debt (72%), which reflects their need to finance large-scale, capital-intensive projects over longer periods. It appears from the data that cement companies have a more cautious and balanced approach to financing, which lowers their financial risk, whereas steel companies use a more leveraged structure, which could increase their returns but puts them at greater risk of financial loss and repayment duties.

Table 2: Profitability and Efficiency Indicators

Indicator	Cement Firms	Steel Firms
Return on Assets	7.10	5.60
Return on Equity	12.50	10.20
Asset Turnover	1.85	1.60

Operating Margin	18%	14%
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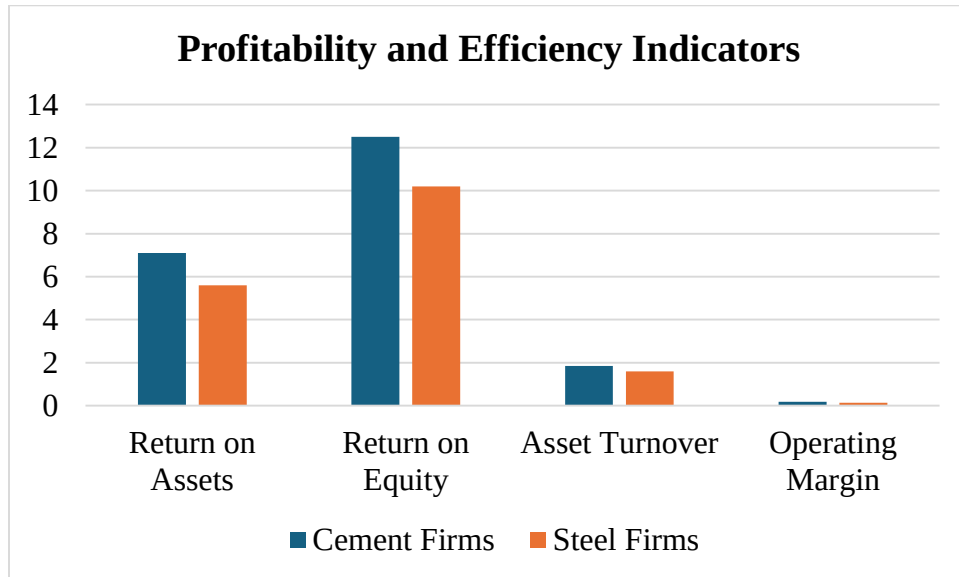


Figure 2: Visual Representation of Profitability and Efficiency Indicators

Table 2 shows that cement and steel companies are very different in terms of operational efficiency and profitability. When compared to steel companies, cement companies show better utilization of total assets and shareholder funds with greater Return on Equity (12.50) and Return on Assets (7.10). Similar to how steel companies have a lower asset turnover ratio (1.60), cement companies have a higher ratio (1.85), indicating that they are more efficient at turning their assets into revenue. Additionally, the cement industry's operating margin (18%) is still higher than the steel industry's (14%), indicating superior cost management and operational efficiency. The findings show that cement companies are better at managing their resources and making a profit, while steel companies are less efficient and have lower earnings. This could be because steel companies have to deal with higher input costs, more volatile markets, and a heavier financial load.

Table 3: Correlation Between Key Variables

Variables	ROA	Debt Ratio	Asset Turnover	Growth
ROA	1	-0.46	0.52	0.33
Debt Ratio	-0.46	1	-0.29	0.21

Asset Turnover	0.52	-0.29	1	0.27
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Table 3 shows that there are significant correlations between financial performance and critical explanatory variables based on the correlation data. Higher levels of debt are linked to lower levels of profitability, possibly as a result of the increased interest load and financial risk, as indicated by the moderate negative connection between the debt ratio and ROA (-0.46). On the other hand, there is a substantial positive correlation between asset turnover and ROA (0.52), which indicates that companies with more efficient operations and better use of their assets usually have greater returns. In addition to efficiency characteristics, growth shows a positive link with ROA (0.33), which suggests that expanding enterprises may see greater profitability, although to a lesser level. Excessive debt can have a negative impact on performance, but operational efficiency is key to increasing profitability, and growth only significantly affects financial outcomes.

Table 4: Regression Output Summary

Variable	Beta Value	Direction	Impact Level
Debt Ratio	-1.10	Negative	High
Current Ratio	0.70	Positive	Moderate
Asset Turnover	1.35	Positive	High
Firm Size	0.30	Positive	Low
Sales Growth	0.55	Positive	Moderate

Model Fit: $R^2 = 0.64$

The factors that affect financial success can be better understood from the regression findings that are shown in Table 4. Excessive reliance on debt raises financial load and risk, as the negative coefficient of the debt ratio (-1.10) shows that more leverage considerably lowers profitability. The most important component in enhancing a company's performance, according to asset turnover, which has the largest positive coefficient (1.35), is operational efficiency. Better liquidity management and company expansion promote profitability, however their influence is minor, as indicated by the positive contributions of the current ratio (0.70) and

sales growth (0.55). When compared to other variables, the small positive effect of firm size (0.30) suggests that it has minimal influence. With an R² of 0.64, these variables appear to account for a sizable chunk of the variance in profitability. Optimal leverage is critical to avoid unfavorable financial consequences, even while growth and efficient operations boost performance.

5. CONCLUSION

The study concludes that industries like cement and steel, which rely on capital investments, have capital structure as one of their key performance indicators. Research shows that a healthy combination of debt and equity helps keep costs down and boosts performance, but going overboard on debt reduces profits because of all the extra money you have to pay back and all the risk you take on. The utilization of assets in particular stands out as an operational efficiency component that significantly contributes to increased profitability for businesses. Further comparisons show that steel businesses are more susceptible to market swings and have higher leverage, whereas cement companies are more conservative and have more consistent financing patterns. Firms must prioritize efficiency gains while implementing an ideal capital structure plan that strikes a balance between risk and return. This strategy will boost financial results and make the region more competitive in the long run, which is particularly important given the specific economic circumstances in India's northeast.

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