

“The Impact of Capital Structure on Financial Performance of National Thermal Power Corporation Limited”

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Abstract:

The primary objective of present research paper is to study the capital structure and its impact on financial performance of NTPC Limited. The study is based on secondary data i.e. ten years' financial statements of NTPC Limited. The secondary data were collected from the annual reports of company, books and websites. The present study is based on financial data covering a period of ten years, from the financial year 2016–17 to 2025–26. The debt to equity ratio and long term debt to equity ratio are used to measure capital structure, whereas return on capital employed ratio, return on equity ratio and return on assets ratio are employed to measure the financial performance of the company. The various ratios, descriptive statistics, correlation analysis and multiple regression analysis are employed for data analysis in this study. The findings indicate that capital structure significantly affects the financial performance of NTPC Limited.

Introduction:

The power sector plays a vital role in the nation's economic development, as it provides the essential infrastructure for industrial growth, commercial activities and domestic consumption. In India, the power sector has undergone significant reforms aimed at increasing efficiency, increasing generation capacity and encouraging sustainable energy development. These reforms have required substantial capital investments, making financing decisions a critical aspect of operational and strategic planning for power companies. The industry is very capital intensive in nature. The infrastructure projects often require long-term debt. This makes the management of capital structure important.

National Thermal Power Corporation Limited (NTPC Limited) is India's largest integrated power utility and one of the leading power generation companies in the world. It was established in the year 1975. The company has played a vital role in ensuring the country's energy security through the generation and supply of electricity. Over the years, NTPC has diversified its operations into renewable energy, coal mining, hydroelectric power, power trading and consultancy services. NTPC Limited's extensive infrastructure investments and ongoing expansion initiatives need considerable capital, which is financed through an appropriate mix of debt and equity. Therefore, examining the impact of its capital structure on financial performance is crucial for understanding the company's financial efficiency.

The capital structure is a critical component of corporate financial management, as it determines the proportion of equity and debt that a firm uses to finance its operations and investments. An optimal capital structure enables a company to minimize its cost of capital, maximize shareholders' wealth and maintain financial stability. Financial performance reveals

the ability of a firm to utilize its resources efficiently to generate profits and create value for shareholders. The financing decisions of a firm affects the profitability and financial performance of the firm. Debt financing can offer several benefits, including tax savings through interest deductibility and the potential to increase shareholder returns through financial leverage. At the same time, excessive reliance on debt can increase financial risk, interest liabilities and the potential for financial distress, which adversely affects a firm's profitability and value. Equity financing, while reducing financial risk, may lead to dilution of ownership and involve a relatively higher cost of capital. Therefore, attaining a suitable balance between debt and equity is necessary for maintaining the financial stability and improving the organizational performance.

Review of Literature:

Sonia and Aishwarya (2025) examined the impact of capital structure on the financial performance of the Indian steel industry, with specific reference to JSW Steel. They analysed data spanning a ten-year period from 2015-16 to 2024-25, covering capital structure ratios (such as debt ratio, debt-equity ratio and interest coverage ratio) and profitability indicators (such as operating profit margin, return on assets, return on equity and return on capital employed). Correlation analysis revealed a negative relationship between debt-related capital structure variables and financial performance. Regression results indicated that capital structure had a significant impact on ROCE ratio and operating profit margin, whereas its impact on the ROE and ROA ratios was not statistically significant. The study found that excessive reliance on debt negatively impacts profitability and recommended maintaining an optimum capital structure to improve financial performance.

Gupta and Chandra (2024) had studied the concept of capital structure and its relationship with financial performance of the company. The study discussed various sources of finance, including equity shares, preference shares, debentures, retained earnings, bank borrowings and public deposits and described their role in shaping a company's capital structure. The authors studied prior research and found mixed evidence regarding the influence of capital structure on the financial performance. While some studies reported a positive relationship between leverage and profitability, others found a negative or insignificant relationship. The study concluded that the impact of capital structure on financial performance differs across industries and market conditions and highlighted the importance of maintaining an optimum balance between debt and equity to maximize the value of the firm and minimize the cost of capital.

Ghosh and Sinha (2024) studied the relationship between capital structure and firm performance among non-financial companies involved in the BSE-100 Indices in India. The

study analysed panel data from 77 companies over the period 2014–2023 and inspected both linear and non-linear relationships between capital structure and performance. The ROA ratio was employed as the measure of financial performance, while the debt to equity ratio signified composition of capital structure. Their research found that the debt equity ratio had a positive and significant influence on the financial performance of firm in the linear model. However, the quadratic regression model showed no significant non-linear relationship between capital structure and ROA. The study concluded that an appropriate debt-equity mix can enhance firm performance, but the relationship may not always follow a non-linear pattern.

Dave et al (2021) examined the impact of capital structure on the financial performance of Tata Steel in India. The study analysed secondary data for ten years from 2011 to 2020. Profit after tax and sales ratios were employed to measure profitability, while interest coverage ratio and debt-to-equity ratio were reflected as capital structure variables. Multiple regression analysis was employed to examine the relationship between capital structure and financial performance. The results showed that interest coverage ratio had an affirmative and significant effect on profitability, while debt-to-equity ratio had an affirmative but statistically insignificant relationship with profitability.

Payal Khandelwal (2019) inspected the relationship between capital structure and financial performance of service companies in India. The study examined 196 companies of service industry that were listed on BSE over the period 2005-2017. The long-term debt-to-capital ratio, short-term debt-to-capital ratio, total debt-to-capital ratio and total debt-to-equity ratio were used as capital structure variables. The return on equity ratio, return on assets ratio, earnings per share and Tobin's Q was used to gage financial performance. Multiple regression analysis was used to analyse data. The results confirmed a significant affirmative relationship between capital structure and financial performance. The study also found that most service companies maintain an appropriate mix of debt and equity as per standard financial rules. The study concluded that appropriate capital structure contributes to better financial performance and increases firm valuation.

Research Methodology:

Objectives of the Study:

- To study the capital structure of National Thermal Power Corporation Limited.
- To measure the relationship between capital structure and financial performance of National Thermal Power Corporation Limited.
- To assess the impact of capital structure on financial performance of National Thermal Power Corporation Limited.

Time Period of the Study:

The present study is based on financial data covering a period of ten years, from the financial year 2016–17 to 2025–26.

Sources of Data:

The secondary data used for the study were collected from the annual reports of the company, books and websites.

Variables of the study:

For the purpose of this study, the debt to equity ratio and long term debt to equity ratio are used as measures of capital structure, whereas return on capital employed ratio, return on equity ratio and return on assets ratio are employed as measures of financial performance of the company.

1. Independent Variables (Capital Structure Ratios):

- Debt to Equity Ratio
- Long Term Debt to Equity Ratio

2. Dependent Variables (Financial Performance Ratios):

- Return on Capital Employed Ratio
- Return on Assets Ratio
- Return on Equity Ratio

Formulation of Hypotheses:

The following hypotheses have been formulated for the study:

1. H₀: There is no significant impact of capital structure on financial performance of NTPC Limited.
2. H₀: There is no significant impact of capital structure ratios on ROCE ratio of NTPC Limited.
3. H₀: There is no significant impact of capital structure ratios on ROA ratio of NTPC Limited.
4. H₀: There is no significant impact of capital structure ratios on ROE ratio of NTPC Limited.

Tools and Techniques of Analysis:

The selected ratios, descriptive statistics, correlation analysis and multiple regression analysis have been for the data analysis.

Limitations of the Study:

- The present study is limited to NTPC Limited only.

- Only selected capital structure and financial performance variables are considered in present study.
- The study is based solely on secondary data so the limitations of secondary data may apply to the study.
- The findings of the study are based on historical financial data and may not accurately reflect or predict the future financial performance and capital structure decisions of NTPC Limited.
- The study is limited to ten-year period only.

Data Analysis and Interpretation:

Table- 1 Descriptive Statistics of Selected Ratios

Year	DER	LTDER	ROCE	ROA	ROE
2016-17	1.1	1.06	7.94	4.31	10.95
2017-18	1.19	1.13	7.04	3.73	10.18
2018-19	1.48	1.32	7.54	3.96	12.33
2019-20	1.62	1.48	7.74	3.06	9.76
2020-21	1.57	1.44	7.84	3.66	11.63
2021-22	1.55	1.34	8.53	4	12.31
2022-23	1.5	1.28	9.68	3.79	11.5
2023-24	1.46	1.18	9.93	4.33	12.95
2024-25	1.34	1.09	9.4	4.46	12.72
2025-26	1.32	1.02	8.63	4.93	13.55
Mean	1.41	1.23	8.43	4.02	11.79
S. D.	0.17	0.16	0.98	0.52	1.22
Min.	1.1	1.02	7.04	3.06	9.76
Max.	1.62	1.48	9.93	4.93	13.55

The descriptive statistics reveal that NTPC Limited maintained a stable capital structure and steady financial performance during the study period. The mean debt to equity ratio and long term debt to equity ratio were 1.41 and 1.23 respectively, indicating a stable financing strategy. The mean ROCE, ROA and ROE ratios were 8.43%, 4.02%, and 11.79%, showing satisfactory profitability and efficient utilization of capital and assets. The relatively low standard deviations of all variables reveal limited year to year fluctuations, emphasizing the company's financial stability and prudent management of capital resources.

Table- 2 Correlation Analysis of Selected Ratios

	<i>DER</i>	<i>LTDER</i>	<i>ROCE</i>	<i>ROA</i>	<i>ROE</i>
DER	1				
LTDER	0.85978	1			
ROCE	0.18108	-0.235	1		
ROA	-0.5178	-0.8324	0.43516	1	
ROE	0.04362	-0.3972	0.59161	0.81646	1

The correlation analysis reveals that capital structure had a diverse relationship with the financial performance of NTPC Limited. The debt to equity ratio shows weak positive associations with ROCE ratio and ROE ratio, while showing a moderate negative association with ROA ratio. Conversely, the long term debt-to-equity ratio exhibits negative relationships with all the selected financial performance indicators. The overall debt-equity structure has only a limited association with profitability during the period of study.

Multiple Regression Analysis:

To measure the impact of capital structure on financial performance of NTPC Limited, the following three multiple regression models have been established:

Model- 1 To measure the impact of capital structure ratios on ROCE

Model- 2 To measure the impact of capital structure ratios on ROA

Model- 3 To measure the impact of capital structure ratios on ROE

Model- 1 To measure the impact of capital structure ratios on ROCE:

H₀: There is no significant impact of capital structure ratios on ROCE ratio of NTPC Limited.

H₁: There is a significant impact of capital structure ratios on ROCE ratio of NTPC Limited.

$$ROCE = \beta_0 + \beta_1 DER + \beta_2 LTDER + \varepsilon$$

Where,

ROCE = Return on Capital Employed Ratio

DER = Debt-to-Equity Ratio

LTDER = Long-Term-Debt to Equity Ratio

β_0 = Intercept

β_1 & β_2 = Regression coefficients

ε = Error term

Table- 3 Multiple Regression Analysis of ROCE, DER and LTDER

<i>Regression Statistics</i>	
Multiple R	0.786194224
R Square	0.618101358
Adjusted R Square	0.50898746
Standard Error	0.68464804

Observations	10
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ANOVA					
	df	SS	MS	F	Significance F
Regression	2	5.310609429	2.6553	5.664735391	0.034420597
Residual	7	3.281200571	0.46874		
Total	9	8.59181			

	Coefficients	Standard Error	t Stat	P-value
Intercept	7.740440178	1.916375079	4.03911	0.004938465
DER	8.409866677	2.618228392	3.21204	0.014815982
LTDER	-9.073405018	2.770139395	-3.2754	0.013572249

The regression statistics show that the multiple correlation coefficient (R) is 0.786, indicating a strong relationship between ROCE ratio and the selected capital structure ratios. The coefficient of determination (R^2) is 0.618, which indicates that 61.81% of the variation in ROCE ratio is explained by DER and LTDER and 38.19% of the variation in ROCE ratio is explained by other factors. The ANOVA results reveal that the calculated F-value is 5.6647 with a significance value of 0.0344, which is less than the 5 percent level of significance. This shows that the overall regression model is statistically significant. Here, null hypothesis is rejected and alternative hypothesis is accepted. So, there is a significant impact of capital structure ratios on ROCE ratio of NTPC Limited.

Model- 2 To measure the impact of capital structure ratios on ROA:

H0: There is no significant impact of capital structure ratios on ROA ratio of NTPC Limited.

H1: There is a significant impact of capital structure ratios on ROA ratio of NTPC Limited.

$$ROA = \beta_0 + \beta_1 DER + \beta_2 LTDER + \varepsilon$$

Where,

ROA = Return on Assets Ratio

DER = Debt to Equity Ratio

LTDER = Long-Term-Debt to Equity Ratio

β_1 & β_2 = Regression coefficients

ε = Error term

Table- 4 Multiple Regression Analysis of ROA, DER and LTDER

Regression Statistics	
Multiple R	0.91809
R Square	0.84289

Adjusted R Square	0.798
Standard Error	0.2318
Observations	10

ANOVA					
	df	SS	MS	F	Significance F
Regression	2	2.01788	1.00894	18.777	0.001537242
Residual	7	0.37613	0.05373		
Total	9	2.39401			

	Coefficients	Standard Error	t Stat	P-value
Intercept	6.64095	0.64883	10.2352	1.8E-05
DER	2.29199	0.88646	2.58554	0.03618
LTDER	-4.746	0.9379	-5.0602	0.00146

The regression statistics indicate that the multiple correlation coefficient (R) is 0.918, indicating a strong relationship between ROA ratio and the selected capital structure ratios. The coefficient of determination (R²) is 0.8429, which reveals that 84.29% of the variation in Return on Assets ratio is described by DER and LTDER and 15.71% of variation in ROA ratio is explained by other factors. The results of ANOVA show that the calculated F-value is 18.777 with a significance value of 0.0015, which is less than the 5% of significance. This shows that the overall regression model is statistically significant. Here, null hypothesis is rejected and alternative hypothesis is accepted. So, there is a significant impact of capital structure ratios on ROA ratio of NTPC Limited.

Model- 3 To measure the impact of capital structure ratios on ROE:

H0: There is no significant impact of capital structure ratios on ROE ratio of NTPC Limited.

H1: There is a significant impact of capital structure ratios on ROE ratio of NTPC Limited.

$$ROE = \beta_0 + \beta_1 DER + \beta_2 LTDER + \varepsilon$$

Where,

ROA = Return on Equity Ratio

DER = Debt-to-Equity Ratio

LTDER = Long Term Debt to Equity Ratio

β_0 = Intercept

β_1 & β_2 = Regression coefficients

ε = Error term

Table- 5 Multiple Regression Analysis of ROE, DER and LTDER

<i>Regression Statistics</i>	
Multiple R	0.85243
R Square	0.72664
Adjusted R Square	0.64854
Standard Error	0.72335
Observations	10

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	9.73576	4.86788	9.30355	0.010680254
Residual	7	3.6626	0.52323		
Total	9	13.3984			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	12.4286	2.02469	6.13851	0.00047
DER	10.5576	2.76621	3.81661	0.00657
LTDER	-12.608	2.92671	-4.3079	0.00353

The regression statistics show that the multiple correlation coefficient (R) is 0.852, indicating a strong relationship between ROE ratio and the selected capital structure ratios. The coefficient of determination (R^2) is 0.7266, meaning that DER and LTDER account for 72.66% of the variation in Return on Equity ratio while other factors account for 27.34%. The ANOVA results reveal that the computed F-value is 9.304 and its significance value of 0.01, which is less than the 5% level of significance. This shows that the overall regression model is statistically significant. Here, null hypothesis is rejected and alternative hypothesis is accepted. So, there is a significant impact of capital structure ratios on ROE ratio of NTPC Limited.

Overall, based on above these three multiple regression models it is said that there is significant impact of capital structure on financial performance of NTPC Limited.

Conclusion:

The present study had inspected the impact of capital structure on the financial performance of National Thermal Power Corporation Limited. The debt-to-equity and long-term debt-to-equity ratios were used to assess the capital structure, while the return on capital employed, return on assets and return on equity ratios were used to gauge the financial performance.

The descriptive analysis indicated that NTPC maintained a stable capital structure and consistent financial performance throughout the study period. The company exhibited

relatively low fluctuations in both leverage and profitability indicators, reflecting sound financial management and a balanced financing strategy.

The results of correlation analysis showed that capital structure and financial performance had a mixed association. The debt to equity ratio showed weak positive relationship with ROCE ratio and ROE ratio and a moderate negative relationship with ROA ratio. However, the long term debt to equity ratio revealed negative relationship with all selected profitability ratios.

The multiple regression analysis further confirmed that capital structure significantly influences the financial performance of NTPC Limited. The regression models for Return on capital employed ratio, Return on Assets ratio and Return on Equity ratio were found to be statistically significant, suggesting that DER and LTDER combined effect on profitability and efficiency metrics of the company. The results showed that a substantial proportion of the variations in ROCE ratio (61.81%), ROA ratio (84.29%) and ROE ratio (72.66%) were explained by the selected capital structure variables. The present study found that there is a significant impact of capital structure on financial performance of National Thermal Power Corporation Limited.

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