

Effect of Corpus Composition on Financial Performance: A Study of NSE Listed Energy Sector Companies

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Abstract- Optimal Debt-equity mix is the most discussed concept in financial grounds. Debt and equity have their own positive and negative impact on firm's financial performance of the organization. More debt will increase the burden of the organization whereas; lesser debt will not give leverage to equity shareholders. Similarly, more equity will not have burden as payout is not compulsory but less equity will have issues with respect to decision making in the board. Hence, achieving a perfect balance between debt and equity is a need of every organization to provide decent return to their owners. As this decision cannot be generalized to all industries, different industries across the country have to be analysed independently. In this study, an attempt is made to study the impact of capital structure on financial performance of leading Energy sector companies listed in NSE for the period of 2011 to 2020. The trends and statistical significance of financial mix practices (Capital Structure Ratio (Debt-equity ratio, Total Debt, Fixed Asset to Funded Debt, Capital Gearing ratio), Profitability Ratios (Net Profit Margin, ROE and ROA)) are analysed using the following tools - ratio analysis, correlation and multiple regression analysis.

Keywords—Financial Mix, Capital Structure, Profitability, Financial Performance, NSE

I. INTRODUCTION

Capital structure is the optimal blend between debt and equity of the company. Obtaining a perfect mix of debt-equity is a crucial decision for any business organization as this decision has an effect on value of firm, financial performance and also on the ability of the company to deal with its competitive environment. From David Durand till Modigliani & Miller, Capital structure is been tested on various beliefs. Debt and equity has its own advantages and pitfalls with respect to different companies. Pecking order theory suggests that there is no optimal debt-equity mix. Hence, several theories with respect to capital structure exist but very less exposure is seen on their empirical relevance. In this article, an attempt is made to study the trends and the effect of capital structure on financial performance of leading energy sector companies listed on NSE in India.

the various table text styles are provided. The formatter will need to create these components, incorporating the applicable criteria that follow.

II. LITERATURE REVIEW

Jibin et. al., (2021), their study investigates the impact of capital structure on financial performance of pharmaceutical companies listed in BSE. The results revealed a negative relationship between capital structure and profitability and positive relationship between equity and profitability ratios. The study used correlation and multiple regression analysis. The study concludes stating capital structure is statistically influenced by ROA and Net Profit Margin but not ROE.

Lisy et. al., (2020), the researchers studied the capital structure and financial performance of manufacturing and

allied sector at Nairobi Stock Exchange, Kenya. Multiple regression tools were used to analyze the data. Results of the study disclosed that retained earnings and equity have negative influence and ROE have positive influence on financial performance.

Deepmala (2019), this paper aims at studying the relationship between capital structure and financial performance of Indian banks listed in NSE. Results were obtained using Multivariate Regression Analysis tool, it was concluded that there exist a positive significant relationship between Capital structure and financial performance.

Megha (2018), in this paper financial performance is measured by ROA, ROE and EPS. Long term debt to asset, Short term debt to asset and Total debt to asset ratios are considered as determinants of Capital Structure. Statistical tools like descriptive statistics, correlation matrix and regression models were used in the study. Findings of the study disclosed a positive relationship between determinants of capital structure and financial performance.

Abdul et., al., (2017), this research paper determines firm performance of Pakistani companies listed in Chemical, Food and Care products, Cement, Pharmaceutical, Auto assembler and Textile sector with debt to equity ratio. Descriptive statistics, pearson correlation coefficient and multiple linear regression tools were used. Findings reveal that EPS, ROE and ROA are significantly correlated to Debt to equity ratio, while debt to equity ratio founds a significant impact on size and ROA.

III. OBJECTIVES OF THE STUDY

1. To study the trends of Capital Structure and Profitability practices in Energy Sector Companies listed on NSE.

- To study the impact of Capital Structure and its consequences on Financial Performance.

IV. HYPOTHESIS OF THE STUDY

H0: There is no significant relationship between capital structure and financial performance of the energy sector companies.

H1: There is a significant relationship between capital structure and financial performance of the energy sector companies.

V. RESEARCH METHODOLOGY

Research Design: Descriptive research design is used in this study to analyze the effect of capital structure on financial performance of leading Energy Sector Companies listed on NSE, India.

Source of Data: The data comprises of six leading energy sector companies listed on National Stock Exchange (NSE), India for a period of 10 years (2011 to 2020). The required data for the study will be collected from annual reports of the selected energy sector companies. The companies are as follows: Bharat Petroleum, Gas Authority of India, National Thermal Power, Oil & Natural Gas, Power Grid and Reliance.

Methodology: The data collected will be analyzed further by using ratio analysis to study the trend practices of capital structure and profitability. Correlation, multiple regression analysis tools will be used to identify the effect of capital structure on financial performance.

Independent Variables (Capital structure)

- Debt-equity Ratio:** The ratio measures the extent of debt over equity.
- Total Debt Ratio:** The ratio describes the difference in asset and owner's fund over its total assets.
- Fixed Asset to Funded Debt:** This ratio measure the portion of fixed asset investment out of long term borrowings.

- Capital Gearing Ratio:** It is obtained by dividing the common equity by fixed interest or dividend bearing funds.

Dependent Variables (Profitability Ratios)

- Net Profit Margin:** The ratio describes the portion of Net income out of total revenue.
- Return on Equity (ROE):** This ratio measures the net income a company generates for equity it owns.
- Return on Assets (ROA):** The ratio describes the portion of net worth over its total assets.

VI. MODEL SPECIFICATION

Multiple linear regression analysis is used to measure the significant relationship between Capital Structure (Debt-equity, Total Debt Ratio, Fixed Asset to Funded Asset Ratio and Capital Gearing Ratio) and Profitability (Net Profit Margin, ROE, ROA) of energy sector companies [13].

The following three regression models are formulated to estimate the relationship between capital structure and financial performance of selected energy sector companies.

$$\text{Net Profit Margin} = \alpha + \beta_1(x_1) + \beta_2(x_2) + \beta_3(x_3) + \beta_4(x_4)$$

$$\text{ROE} = \alpha + \beta_1(x_1) + \beta_2(x_2) + \beta_3(x_3) + \beta_4(x_4)$$

$$\text{ROA} = \alpha + \beta_1(x_1) + \beta_2(x_2) + \beta_3(x_3) + \beta_4(x_4)$$

α =Intercept

x_1 = Debt-equity Ratio

x_2 =Total Debt Ratio

x_3 =Fixed Asset to Funded Debt Ratio

x_4 =Capital Gearing Ratio

$\beta_1, \beta_2, \beta_3, \beta_4$ = Regression co-efficients

VII. DATA ANALYSIS

The data collected of 6 energy sector companies listed on NSE for a period of 10 years (2011 to 2020) is analysed using selected capital structure and profitability ratios. The descriptive statistics results are as presented below:

TABLE NO - 1: Descriptive statistics of selected companies

Ratio	Company	Maximum	Minimum	Mean	Median	SD	CV	Correlation
Debt/Equity	Bharat Petroleum Corporation Ltd.	1.42	0.50	0.95	0.89	0.37	38.45	0.41
	Gas Authority of India Ltd.	0.35	0.02	0.17	0.16	0.12	71.14	0.56
	National Thermal Power Corporation Ltd.	1.41	0.59	0.94	0.95	0.28	30.24	-0.98
	Oil & Natural Gas Corporation Ltd.	0.13	0.00	0.04	0.00	0.05	139.53	-0.64
	Power Grid Corporation of India Ltd.	2.48	1.81	2.25	2.28	0.18	8.20	-0.28
	Reliance Industries Ltd.	0.54	0.30	0.39	0.39	0.07	17.86	-0.29
Total Debt	Bharat Petroleum Corporation Ltd.	0.77	0.64	0.71	0.71	0.05	6.37	0.57
	Gas Authority of India Ltd.	0.46	0.31	0.39	0.41	0.06	16.33	0.72
	National Thermal Power Corporation Ltd.	0.65	0.46	0.56	0.58	0.07	11.80	-0.98
	Oil & Natural Gas Corporation Ltd.	0.34	0.25	0.31	0.32	0.04	11.35	0.07
	Power Grid Corporation of India Ltd.	0.76	0.72	0.75	0.75	0.01	1.84	-0.39

Fixed Asset to Funded Debt	Reliance Industries Ltd.	0.56	0.43	0.47	0.47	0.04	7.49	-0.75
	Bharat Petroleum Corporation Ltd.	2.63	0.81	1.64	1.74	0.67	40.67	-0.60
	Gas Authority of India Ltd.	46.28	3.28	13.07	6.87	15.01	114.86	-0.57
	National Thermal Power Corporation Ltd.	1.90	1.43	1.76	1.81	0.15	8.46	0.86
	Oil & Natural Gas Corporation Ltd.	91.01	0.00	13.73	3.03	28.03	204.17	0.03
	Power Grid Corporation of India Ltd.	1.58	1.45	1.51	1.51	0.05	3.11	0.56
	Reliance Industries Ltd.	3.10	1.45	2.28	2.25	0.49	21.70	0.08
Capital Clearing	Bharat Petroleum Corporation Ltd.	59.83	8.29	27.49	21.54	18.36	66.77	-0.47
	Gas Authority of India Ltd.	405.26	47.79	169.43	135.41	117.59	69.40	-0.40
	National Thermal Power Corporation Ltd	47.78	16.75	31.73	28.73	9.92	31.25	0.98
	Oil & Natural Gas Corporation Ltd.	379792	68.82	44380	1697	118920	267.96	0.20
	Power Grid Corporation of India Ltd.	13.15	6.49	9.27	9.05	2.33	25.10	0.98
	Reliance Industries Ltd.	105.88	35.08	68.74	63.69	23.11	33.62	0.19
Net Profit Margin (%)	Bharat Petroleum Corporation Ltd.	3.93	0.61	2.08	0.89	1.26	60.25	-0.46
	Gas Authority of India Ltd.	10.80	4.36	7.76	0.16	1.87	24.03	0.25
	National Thermal Power Corporation Ltd.	18.35	10.06	13.85	0.95	2.33	16.83	0.79
	Oil & Natural Gas Corporation Ltd.	31.03	13.15	22.31	0.00	4.72	21.17	0.77
	Power Grid Corporation of India Ltd.	31.77	26.78	28.77	2.28	1.41	4.89	0.71
	Reliance Industries Ltd.	12.53	5.51	8.52	0.39	2.57	30.16	-0.59
Return on Equity (%)	Bharat Petroleum Corporation Ltd.	27.36	8.08	18.45	20.14	7.19	38.98	-0.28
	Gas Authority of India Ltd.	18.50	7.52	13.55	14.36	3.71	27.36	0.51
	National Thermal Power Corporation Ltd.	15.70	8.90	11.86	12.19	2.00	16.85	0.82
	Oil & Natural Gas Corporation Ltd.	22.24	6.92	13.67	12.71	4.87	35.62	0.87
	Power Grid Corporation of India Ltd.	16.84	12.62	14.67	14.60	1.57	10.69	-0.71
	Reliance Industries Ltd.	13.39	7.28	10.77	11.03	1.72	15.95	0.89
Return on Assets (%)	Bharat Petroleum Corporation Ltd.	9.78	2.00	5.64	5.89	2.83	50.14	-0.36
	Gas Authority of India Ltd.	11.12	4.34	8.16	8.89	2.08	25.44	0.24
	National Thermal Power Corporation Ltd	7.83	3.09	5.30	5.11	1.58	29.82	0.94
	Oil & Natural Gas Corporation Ltd.	14.63	4.53	9.35	8.68	3.12	33.37	0.89
	Power Grid Corporation of India Ltd.	4.23	3.15	3.67	3.71	0.35	9.60	-0.60
	Reliance Industries Ltd.	7.12	3.19	5.71	5.86	1.15	20.15	0.92

Source: Excel Output

The above table describes the capital structure and Profitability ratios of selected 6 energy sector companies for a period of ten years as below;

Power Grid Corporation India Ltd. occupies the first place in terms of magnitude with the ratio 2.25, followed by Bharat Petroleum Corporation Ltd. with 0.95, National Thermal Power Corporation Ltd. with 0.94 and so on. Almost two companies have decline in debt-equity ratio over the years. In terms of variations Oil & Natural Gas Corporations Ltd. leads from front with 139.53, followed by Gas Authority of India Ltd. with 71.14 and so on. The overall performance of debt-equity ratio as per the descriptive statistics, Gas Authority of India Ltd. and Bharat Petroleum Corporation Ltd. tops in the list.

When comes to leverage position of the companies, Power Grid Corporation India Ltd. stands first with 0.75, followed by Bharat Petroleum Corporation Ltd. with 0.71 and so on. Gas Authority of India Ltd. Varies max when compared to other companies with 16.33% of coefficient of variation, followed by National Thermal Power Corporation Ltd. and so on. As per the overall descriptive statistics, Gas Authority of India Ltd. and Bharat Petroleum Corporation Ltd. top the list in the usage of debt [14].

Oil & Natural Gas Corporations Ltd. leads in terms of fixed asset to funded debt with 13.73, followed by Gas Authority of India Ltd. with 13.07 and so on. In terms of variations Oil & Natural Gas Corporations leads with 204.17, followed by Gas Authority of India Ltd. with 114.86 and so on. By and large

as per the descriptive statistics National Thermal Power Corporation Ltd. and Power Grid Corporation India Ltd. stands top.

In terms of capital gearing ratio, Oil & Natural Gas Corporations Ltd. leads by 44380.44, followed by Gas Authority of India Ltd. by 169.43 and so on. In terms of its variations Oil & Natural Gas Corporations Ltd. varies max with 267.96, followed by Gas Authority of India Ltd. with 69.40 and so on. With respect to descriptive statistics on the whole Power Grid Corporation India Ltd. and National Thermal Power Corporation Ltd. has performed better in capital gearing ratio.

Profitability ratios of the study reveal that, Power Grid Corporation India Ltd., Bharat Petroleum Corporation Ltd. And Oil & Natural Gas Corporations Ltd. stands first by 28.77, 18.45 and 9.35 in case of Net Profit Margin, Return on Equity and Return on Asset ratios. When it comes to variation, Bharat Petroleum Corporation Ltd. varies max compared to other companies by 60.25, 38.98 and 50.14 in the case of Net Profit Margin, Return on Equity and Return on Asset ratio. By and large as per the descriptive statistics National Thermal Power Corporation Ltd. tops in terms of Net Profit Margin, Return on Asset and Reliance Industries Ltd. tops in terms of Return on Equity.

Table No.2: 6 Companies Aggregate Value of Parameters

Parameters	Debt Equity Ratio	Total Debt Ratio	Fixed Asset to Funded Debt Ratio	Capital Gearing Ratio	Net Profit Margin	Return on Equity	Return on Asset
2011	0.68	0.52	2.70	709	15.29	14.72	7.43
2012	0.80	0.54	5.38	592	15.16	14.41	7.15
2013	0.87	0.54	1.66	791	14.82	15.47	7.16
2014	0.81	0.54	1.59	63331	13.71	15.03	6.80
2015	0.76	0.54	17.14	8680	12.65	13.58	5.94
2016	0.74	0.52	2.36	59	13.67	13.66	5.96
2017	0.74	0.51	3.16	72	14.11	13.61	5.98
2018	0.76	0.52	8.27	69	13.91	13.52	6.01
2019	0.80	0.53	10.12	83	13.82	13.78	6.16
2020	0.94	0.57	4.29	91	11.70	10.50	4.47

Source: Annual Reports

The above table describes the trends of all selected parameters of Capital Structure and Profitability. Debt-equity has fluctuating trend, showing increasing trend for the beginning three years then sloping downwards for four years, later on have steadily increased signifying growth in debt and slothful trend in owners' fund. Total debt ratio have increasing trend till 2015, sloped down for the next two years then progressed till 2020 which shows increase in debt. Fixed asset to funded

debt and Capital gearing ratio have huge fluctuations over the years. Net profit margin is been constant for the first two years then starts decreasing for three years, positive slope is seen for next two years followed with downward slope till 2020 signifying reduced proportion of profit. Return on Equity projected positive trend up to 2014 then suffers turbulence for the later years. Return on Asset portrays decreasing trend till 2017, then increases gradually for two years, followed by decreasing slope in the year 2020 indicating the declining returns from total assets.

Table No. 3: Correlation Matrix

	Return on Equity (%)	Return on Assets (%)	Net Profit Margin (%)	Debt-Equity Ratio	Total Debt Ratio	Fixed Asset to Funded Debt Ratio	Capital Gearing Ratio
Return on Equity (%)	1						
Return on Assets (%)	-0.09	1					
Net Profit Margin (%)	-0.19	-0.13	1				
Debt-Equity Ratio	0.30	-0.87	0.48	1			
Total Debt Ratio	0.52	-0.90	0.05	0.89	1		
Fixed Asset to Funded Debt Ratio	-0.09	0.93	0.09	-0.68	-0.83	1	
Capital Gearing Ratio	-0.03	0.72	0.41	-0.46	-0.63	0.66	1

Source: Excel Output

The above table shows the relationship between capital structure and profitability ratios and also the dependency of one variable with another. The diagonal elements in the table are equal to one because of the correlation of variables among themselves. It can be observed that ROE and Net Profit Margin are positively correlated with Debt-Equity Ratio by 0.30 and 0.48 and ROA is negatively correlated by -0.87. Similarly, Total Debt Ratio has positive correlation between ROA and Net Profit Margin by 0.52 and 0.05 and negative correlation with ROA by -0.90. There exist a positive relationship between ROA and Net Profit Margin with Fixed Asset to Funded Debt Ratio by 0.93 and 0.09 and negative relationship with ROE by -0.09. Capital Gearing Ratio has a positive correlation with ROA and Net Profit Margin by 0.72 and 0.41 and negative correlation with ROE by -0.03.

TABLE NO. 4: RESULTS OF MULTIPLE REGRESSION ANALYSIS

Dependent Variable	R-square	p-value
Net Profit Margin	99.90%	0.0081<0.05
ROE	99.90%	0.0379<0.05
ROA	99.80%	0.0591>0.05

Source: Excel Output

The above table gives the highlights of results obtained through regression analysis. It can be observed that Net Profit Margin and ROE have p-values obtained less than the standard alpha value 0.05 that is, 0.0081 and 0.0379 by falling in the accepted region. But, when it comes to ROA results, the p-value obtained is greater than the standard limit that is, 0.0591. R² determines closeness of data fitted on the regression line. It can be observed that, all the three models have very close fit that is, 99.9% of the variation in Net Profit Margin and ROE is caused by the variations in the independent variables like debt-equity ratio, total debt ratio, fixed asset to funded debt ratio and capital gearing ratio. 99.8% variation is caused to ROA because of the variations in the independent variables like debt-equity ratio, total debt ratio, fixed asset to funded debt ratio and capital gearing ratio. The models obtained with respect to Net Profit Margin, ROE and ROA are as mentioned below:

$$\text{Net Profit Margin} = 39.35553 + 23.13076(\text{Debt-Equity Ratio}) - 83.1478(\text{Total Debt Ratio}) - 0.23263(\text{Fixed Asset to Funded Debt Ratio}) + 0.000253(\text{Capital Gearing Ratio})$$

From the above model it can be observed that, debt-equity ratio positively affects Net Profit Margin because when the debt-equity ratio increases by unit 1, the Net profit margin increases by 23.13076 units keeping all other variables constant. Total Debt Ratio and Fixed Asset to Funded Debt Ratio negatively affects Net profit margin. That is, when the Total debt ratio and fixed asset to funded debt ratio increases by unit 1, the Net profit margin decreases by 83.1478 and 0.23263 units keeping all other variables constant. Capital Gearing Ratio has positive effect on Net profit Margin that is,

when Capital gearing ratio increases by unit 1, Net profit margin increases by 0.000253 units keeping all other variables constant. Overall it can be concluded that, it is necessary to reduce the co-efficients of Total debt ratio and Fixed Asset to Funded debt ratio and increase the co-efficients of Debt-equity ratio and Capital gearing ratio to increase the Net Profit Margin (Financial Performance).

$$\text{ROE} = -10.05368 - 4.29866(\text{Debt-Equity Ratio}) + 44.81725(\text{Total Debt Ratio}) + 0.51738(\text{Fixed Asset to Funded Debt Ratio}) + 0.000063(\text{Capital Gearing Ratio})$$

From the above model it can be observed that, debt-equity ratio negatively affects ROE because when the debt-equity ratio increase by unit 1, the ROE decreases by 4.29866 units keeping all other variables constant. Total Debt Ratio, Fixed Asset to Funded Debt Ratio and Capital Gearing Ratio positively affects ROE. That is, when the Total debt ratio, Fixed asset to funded debt ratio and Capital gearing ratio increases by unit 1, the ROE increases by 44.81725, 0.51738 and 0.000063 units keeping all other variables constant. Overall it can be concluded that, it is necessary to reduce the co-efficient of Debt-equity ratio and increase the co-efficients of Total debt ratio, fixed asset to funded debt ratio and capital gearing ratio to increase the ROE (Financial Performance).

$$\text{ROA} = 4.21834 - 1.58007(\text{Debt-Equity Ratio}) + 3.63816(\text{Total Debt Ratio}) + 0.21311(\text{Fixed Asset to Funded Debt Ratio}) + 0.000025(\text{Capital Gearing Ratio})$$

From the above model it can be observed that, debt-equity ratio negatively affects ROA because when the debt-equity ratio increase by unit 1, the ROA decreases by 1.58007 units keeping all other variables constant. Total Debt Ratio, Fixed Asset to Funded Debt Ratio and Capital Gearing Ratio positively affects ROA. That is, when the Total debt ratio, Fixed asset to funded debt ratio and Capital gearing ratio increases by unit 1, the ROE increases by 3.63816, 0.21311 and 0.000025 units keeping all other variables constant. Overall it can be concluded that, it is necessary to reduce the co-efficient of Debt-equity ratio and increase the co-efficients of Total debt ratio, fixed asset to funded debt ratio and capital gearing ratio to increase the ROA (Financial Performance). Hence, as per the overall analysis regression models obtained, it can be revealed that in case of Net Profit Margin and ROE, null hypothesis (H₀) is rejected and alternative hypothesis (H₁) is failed to reject (accepted). Therefore, there is a significant relationship between capital structure and financial performance of energy sector companies with respect to Net Profit Margin and ROE. In case of ROA, null hypothesis (H₀) is failed to reject (accepted) and alternative hypothesis (H₁) is rejected. In terms of ROA, it can be stated that, there is no significant relationship between capital structure and financial performance of the energy sector companies.

VIII. MAJOR FINDINGS AND CONCLUSION

Firstly, as per the results obtained from descriptive statistics, Gas Authority of India Ltd. and Bharat Petroleum Corporation Ltd. leads in terms of its overall performance with respect to Debt-equity and total debt ratio. National Thermal Power Corporation Ltd. and Power Grid Corporation India Ltd. lead

when it comes to fixed asset to funded debt and capital gearing ratio. Coming to performance of profitability ratios, National Thermal Power Corporation Ltd. leads in terms of Net Profit Margin, Return on Asset and Reliance Industries Ltd. leads in terms of Return on Equity. Secondly, from the results correlation it can be found that Net Profit Margin has positive relationship between all the selected capital structure ratios (Debt-equity, Total debt, Fixed asset to funded debt and Capital gearing ratio), ROE has positive relationship with debt-equity ratio, total debt ratio and negative relationship with respect to fixed asset to funded debt and capital gearing ratio. ROA projects positive relationship with fixed asset to funded debt and capital gearing ratio, negative relationship with debt-equity and total debt ratio. Thirdly, with respect to results obtained from multiple regression analysis, statistically it can be revealed that there is a significant relationship between capital structure and financial performance of energy sector companies with respect to Net Profit Margin and ROE. Whereas in case of ROA, there is no significant relationship between capital structure and financial performance of the energy sector companies. Regression model fits only in case of Net Profit Margin and ROE and not for ROA.

The results of the study can be used by the companies, investors in understanding the implication of capital structure on financial performance of energy sector companies. For further research, we suggest for widening the scope of the study, by increasing the number of companies and also can study the inter-relationship of capital structure and financial performance with respect to various industries.

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