

# INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE & MANAGEMENT

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- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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**CAPITAL STRUCTURE DETERMINANTS FOR SUSTAINED PERFORMANCE IN THE ENERGY SECTOR OF INDIA**

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**BANGALORE**

**ABSTRACT**

*Better performance and sustainability in operation is achieved with the help of Capital Structure. Though there are many factors which affects the performance of firms, capital structure plays a major role in determining sustained performance of a sector. So it's important to know the factors which contribute to the firm's capital structure. The study is done to understand the relationship between the determinants of capital structure and the leverage level of the firms in energy sector in India. Using the linear regression, the leverage behaviour of the listed companies are analysed for the period from 2007-2012. The sample consists of eight listed companies. In the study the determinants of capital structure i.e.; capital intensity, tangibility and profitability is taken as dependent variables and debt equity ratio as independent variable.*

**KEYWORDS**

Capital structure, Determinants of Capital Structure, leverage behaviour.

**INTRODUCTION**

Capital structure is one of the most important topics of debate in the field of finance. Capital structure is the mix of both equity and debt used by firms in financing their assets. It's the area in which the financial managers give more importance and it's the most important decision they take up. Their main aim is to reduce the cost of capital and to increase the shareholder's wealth. Capital structure is an effective way to manage the cost of capital. An optimal capital structure is when the cost of capital is minimum. The main objective of the study is to analyse the determinants of capital structure and the leverage level of the firms.

**INTRODUCTION TO CAPITAL STRUCTURE AND ITS DETERMINANTS****CAPITAL STRUCTURE**

Financing and investment are two major decision areas in a firm. In the financing decision the manager is concerned with determining the best financing mix or capital structure for his firm. Capital structure could have two effects. First, firms of the same risk class could possibly have higher cost of capital with higher leverage. Second, capital structure may affect the valuation of the firm, with more leveraged firms, being riskier, being valued lower than less leveraged firms. If we consider that the manager of a firm has the shareholders' wealth maximisation as his objective, then capital structure is an important decision, for it could lead to an optimal financing mix which maximises the market price per share of the firm, Modigliani and Miller (1958, 1963).

**DETERMINANTS OF CAPITAL STRUCTURE**

Capital structure should be designed very carefully. The management of the company should set a target capital structure and the subsequent financing decisions should be made with a view to achieve the target capital structure. Once a company has been formed and it has been in existence for some years, the financial manager then has to deal with the existing capital structure as stated by Jensen (1976, 1986). The company may need funds to finance its activities continuously. Every time the funds have to be procured, the financial manager weighs the pros and cons of various sources of finance and selects most advantageous sources keeping in view the target capital structure: Thus the capital structure decision is a continuous one and has to be taken whenever a firm needs additional finance as suggested by Huang (2006).

The factors to be considered whenever a capital structure decision is taken are: Capital Intensity, Tangibility, Profitability, firm Size, Non Debt Tax Shield based on Amidu (2007).

**CAPITAL INTENSITY RATIO**

Capital intensity, or employment of fixed asset, is generally synonymous with the concept of operating leverage. Thus increased capital intensity implies increased risk of future earnings variation. Therefore, top management's desire to retain control of the firm and concern of creditors to limit risk of default, should result in lower debt levels for firm choosing automation over labour as the primary factor of production. On the other hand, the traditional argument is the more capital intensive a firm is, larger will be the need for long term debt by the firm due to larger financial requirements and it will also have access to assets which could be collateralized.

**TANGIBILITY**

The more tangible firm's asset the ability to issue secured debt. The firm with large amount of fixed asset can borrow at relatively lower rate of interest by providing security of these assets to creditors. Having the incentive of getting debt at lower interest rate, a firm with higher percentage of fixed asset is expected to borrow more as compared to a firm whose cost of borrowing is higher because of having less fixed assets. Thus a positive relationship between tangibility of asset and leverage is expected

**PROFITABILITY**

A profitable firm have access to retained profits, can use these for firm financing rather than accessing outside sources.

- Debt reduced and free cash flow generated by profitability.
- Lower risk of bankruptcy.
- Exploit interest rate tax shields.

**FIRM SIZE**

There are two conflicting viewpoints about the relationship of size to leverage of a firm. First large firm don't consider the direct bankruptcy cost as an active variable in deciding the level of leverage as these cost are fixed by constitution and constitute a smaller portion of the total firm's value. And also, larger firms being more diversified have lesser chances of bankruptcy.

**NON DEBT TAX SHIELD**

In order to reduce the tax bill, firm want to exploit the tax deductibility of interest. If they have other tax deductible item which they can use as tax shield other than debt then the leverage is low. So there exist negative relationship between non tax shield and leverage, Zeitun & Tian (2007).

**OBJECTIVES OF THE STUDY**

1. To identify the relationship of the factors which contribute to the capital structure composition of the firm
2. To analyse the relationship between capital structure determinants and leverage behaviour.

**SOURCE OF DATA**

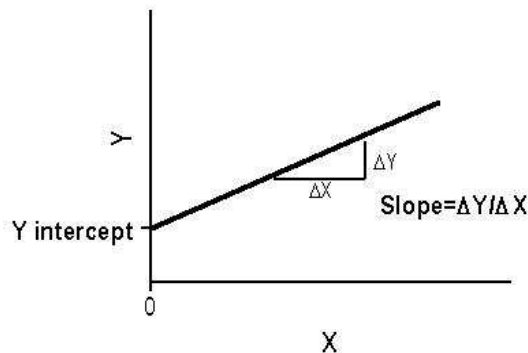
This study is based on the financial data of sample firm from 2010-2012 and has been taken from Prowess of NSE listed companies.

**THE SAMPLE**

As this study has focused on the Energy Sector, initially all the 10 firms (which are listed on the NSE stock exchange, CNX ENERGY) in the energy sector were selected. Then after screening I found 3 companies have with incomplete data, so rest of them were selected for panel data analysis

**MODEL OF STUDY**

The study examines the determinants of capital structure of energy firms in India. Linear regression model is used in this study. Linear regression is a statistical procedure for predicting the value of a dependent variable from an independent variable when the relationship between the variables can be described with a linear model. A linear regression equation can be written as  $Y_p = mX + b$ , where  $Y_p$  is the predicted value of the dependent variable,  $m$  is the slope of the regression line, and  $b$  is the Y-intercept of the regression line.



In statistics, linear regression is a method of estimating the conditional expected value of one variable  $y$  given the values of some other variable or variables  $x$ . The variable of interest,  $y$ , is conventionally called the "dependent variable". The terms "endogenous variable" and "output variable" are also used. The other variables  $x$  are called the "independent variables". The terms "exogenous variables" and "input variables" are also used.

**HYPOTHESIS**

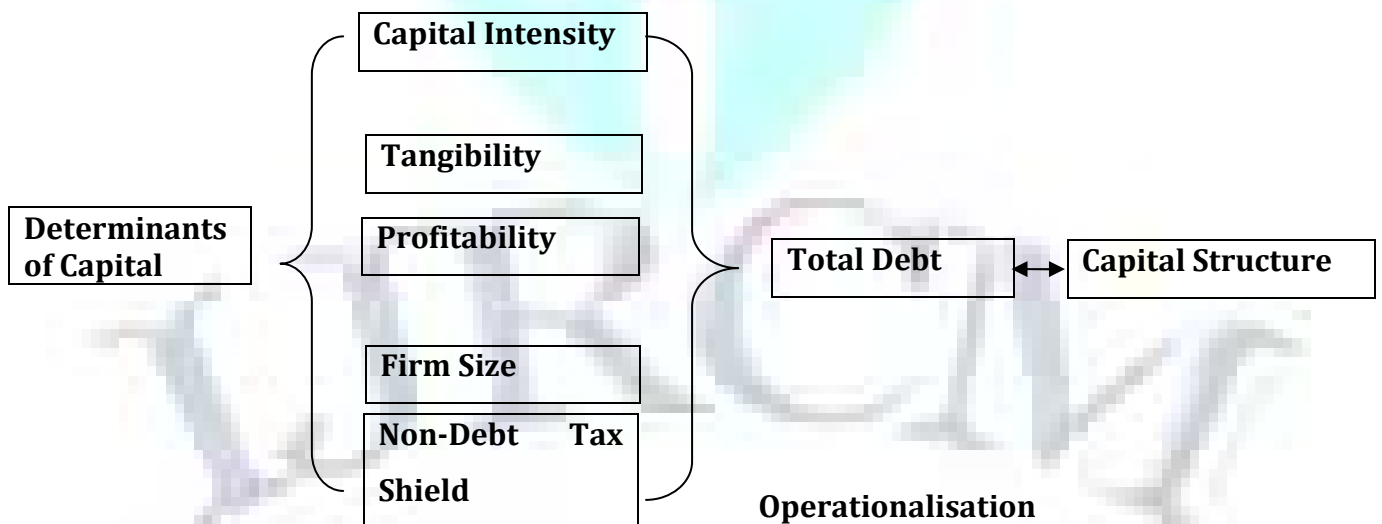
**NULL**

- H<sub>0</sub> 1: There is no significant relationship between Capital Intensity Ratio on Total Debt ratio.
- H<sub>0</sub> 2: There is no significant relationship between Tangibility Ratio on Total Debt ratio.
- H<sub>0</sub> 3: There is no significant relationship between Profitability Ratio on Total Debt ratio.
- H<sub>0</sub> 4: There is no significant relationship between Firm Size on Total Debt ratio.
- H<sub>0</sub> 5: There is no significant relationship between Non Debt Tax Shield on Total Debt ratio.

**ALTERNATIVE HYPOTHESIS**

- H<sub>1</sub> 1: There is significant relationship between Capital Intensity Ratio on Total Debt ratio.
- H<sub>1</sub> 2: There is significant relationship between Tangibility Ratio on Total Debt ratio.
- H<sub>1</sub> 3: There is significant relationship between Profitability Ratio on Total Debt ratio.
- H<sub>1</sub> 4: There is significant relationship between Firm Size on Total Debt ratio.
- H<sub>1</sub> 5: There is significant relationship between Non Debt Tax Shield on Total Debt ratio.

**CONCEPTUAL FRAMEWORK**



**OPERATIONALISATION**

Key concept and variables used in the conceptual frame work are operationalized as follows:

**KEY CONCEPT AND SELECTED VARIABLE**

Variable	Indicator	Measurement Level	Measurement
Capital Structure	Total Debt	Ratio	Total Debt/Total asset
Capital Structure Determinants	Capital Intensity	Ratio	Total Asset/Sales
	Tangibility	Ratio	Total gross fixed asset/Total Asset
	Profitability	Ratio	EBIT/Total Asset
	Firm Size	Value	Log of sales
	Non Debt Tax Shield	Ratio	(Earning After Interest & Tax/.5)/Total Asset



**DEPENDENT VARIABLE**

- Total Debt Ratio

**INDEPENDENT VARIABLES**

- Capital Intensity Ratio
- Tangibility Ratio
- Profitability Ratio
- Firm Size
- Non Debt Tax Shield

**MEANING OF VARIABLES**

**Pearson correlation:** This represents the degree of correlation between the variables.

- When the value is zero (0) it represents that there is no correlation between variables.
- When the value is one (1) it represents that there is a positive correlation between variables.
- When the value is minus one (-1) it represents that there is a negative correlation between variables.
- When the value lies between -1 & 0 and 0 & 1 it represents the strength of relationship between the variables.
  - If the value lies between -0.25 & 0 and 0 & 0.25 the variables are negatively insignificant and positively insignificant respectively.
  - If the value lies between -0.50 & -0.25 and 0.25 & 0.50 the variables shares negatively moderate relationship and positively moderate relationship respectively.
  - If the value lies between -0.75 & -0.50 and 0.50 & 0.75 the variables shares negatively satisfactory relationship and positively satisfactory relationship respectively.
  - If the value lies between -0.75 & -1.00 and 0.75 & 0.1 the variables shares negatively high degree of relationship and positively high degree of relationship respectively.

**R Square (R<sup>2</sup>):** It measures the strength of regression relationship between the variables, a measure how well a regression line fits the data.

- When the value of R<sup>2</sup> is 0.9 or above upto 1 it suggests that there is high strength in the relationship between the variables.
- When the value of R<sup>2</sup> is 0.8 or above upto 0.9 it suggests that there is good strength between the variables.
- When the value of R<sup>2</sup> is 0.6 or above upto 0.8 it suggests that there is satisfactory strength between the variables.
- When the value of R<sup>2</sup> is below 0.6 upto -1 it suggests less variation in the data.

**P Value:** If P value is less than 0.05 then we reject H<sub>0</sub> and accept H<sub>1</sub>.

**T stat:** If T stat is more than +/- 2 then it suggests that there is significant correlation between the variables.

**DATA ANALYSIS AND INTERPRETATION**

The following tables state the relationship between the dependent variables and independent variables of the study.

**TABLE 1: TABLE SHOWING THE RELATIONSHIP BETWEEN CAPITAL INTENSITY RATIOS ON TOTAL DEBT RATIO**

Company Name	H <sub>0</sub>	H <sub>1</sub>
BPCL		✓
GAIL		✓
IOC	✓	
NTPC	✓	
TATA	✓	
POWERGRID	✓	
ONGC	✓	

From the above table it is evident that higher capital intensity ratio means variation in the future earnings and more requirements for debt in the future. In the analysis of seven companies in the energy sector reveals that only two companies have relationship between capital intensity ratios on the leverage of the firm. This means that in majority of the companies in energy sector, there is less impact on leverage by capital intensity ratio. This is good as there is no much variation in the future earnings of the companies and fewer requirements for debt in future and it safeguards the asset from being collateralized. Thus, it is clear that energy sector which is a capital intensive industry relies more on its internal funding rather than external funding. Thus, it proves the hypothesis that there is no significant relationship between Capital intensity Ratio on Total Debt Ratio

**TABLE 2: TABLE SHOWING THE RELATIONSHIP BETWEEN TANGIBILITY RATIOS ON TOTAL DEBT RATIO**

Company Name	H <sub>0</sub>	H <sub>1</sub>
BPCL		✓
GAIL	✓	
IOC		✓
NTPC		✓
TATA	✓	
POWERGRID	✓	
ONGC	✓	

From the above table it is understood that there is relation between tangibility ratio and total debt ratio exists only for three companies. This means that only in three companies there is high leverage value. The tangibility ratio is the asset structure of the company. When it is more it means the existence of more tangible assets which can be used as collaterals for debt and can be used at the time of bankruptcy. So when there is relation between the variables it indicates the presence of more tangible assets which helps to create more leverage value for the firm. The other companies which do not have any relation between the variables are in a danger position as they have fewer assets which can be used as collateral to raise debt. So from the analysis it is proved that most of the companies are relying on tangible assets to fund their debts.

**TABLE 3: TABLE SHOWING THE RELATIONSHIP BETWEEN PROFITABILITY RATIOS ON TOTAL DEBT RATIO**

Company Name	H <sub>0</sub>	H <sub>1</sub>
BPCL		✓
GAIL		✓
IOC		✓
NTPC	✓	
TATA	✓	
POWERGRID	✓	
ONGC	✓	

From the above table it is evident that three companies out of seven companies shows that there is relation between profitability ratio and total debt ratio. This means that the firms have less profit and they go for debt financing which increases the use of debt in the firm. The other four firms shows that there is no relation between the profitability ratio and total debt ratio which means that their profit is higher and they go for internal financing which does not affect the leverage of the firm. Therefore from the above analysis it is evident that almost all the firms in energy sector use internal finance rather than debt financing.

**TABLE.4: TABLE SHOWING THE RELATIONSHIP BETWEEN FIRM SIZE ON TOTAL DEBT RATIO**

Company Name	H <sub>0</sub>	H <sub>1</sub>
BPCL		✓
GAIL		✓
IOC	✓	
NTPC		✓
TATA	✓	
POWERGRID		✓
ONGC	✓	

From the above table it is evident that out of the seven companies analysed, four companies' shows that there is a relation between the size of the firm and the leverage of the firm. The results show that the bigger the firm less debt the firm will raise. This is due to their ability to earn high profits from their business and the availability of internal finance. From the above analysis it is proved that 57% of the companies show relation between firm size and the total debt of the firm. This shows that they go for internal finance rather than debt financing.

**TABLE.5: TABLE SHOWING THE RELATIONSHIP BETWEEN NON DEBT TAX SHIELDS ON TOTAL DEBT RATIO**

Company Name	H <sub>0</sub>	H <sub>1</sub>
BPCL		✓
GAIL		✓
IOC		✓
NTPC		✓
TATA	✓	
POWERGRID	✓	
ONGC		✓

From the above analysis almost all the companies shows a relation between non debt tax shield and leverage level. This means that they get benefit of tax shield irrespective of the use of debt. As most of the companies use internal finance of funds they prefer non debt tax shields as they have less benefits of tax shields like interest on debts.

**FIXED EFFECT MODEL(OVER ALL ANALYSIS OF ENERGY SECTOR)**

Dependent Variable: TDR?				
Method: Pooled Least Squares				
Date: 02/13/13 Time: 06:35				
Sample: 2000 2012				
Included observations: 13				
Cross-sections included: 7				
Total pool (balanced) observations: 91				
Cross sections without valid observations dropped				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.572642	0.155654	3.678954	0.0004
CIR?	-0.022300	0.012493	-1.785050	0.0781
TR?	-0.032297	0.039755	-0.812409	0.4190
PR?	0.511595	0.281947	1.814510	0.0734
FS?	-0.002653	0.028948	-0.091659	0.9272
NDS?	-0.969710	0.217028	-4.468135	0.0000
Effects Specification				
R-squared	0.920748	Mean dependent var	0.372664	
Adjusted R-squared	0.909713	S.D. dependent var	0.173698	
S.E. of regression	0.052193	Akaike info criterion	-2.945430	
Sum squared resid	0.215201	Schwarz criterion	-2.614327	
Log likelihood	146.0171	Hannan-Quinn criter.	-2.811851	
F-statistic	83.43809	Durbin-Watson stat	1.062781	
Prob(F-statistic)	0.000000			

Fixed effect model is a statistical model that represents the observed quantities in terms of explanatory variables that are treated as if the quantities were non random. In panel data analysis, the fixed effect model is used to refer to an estimator for the coefficients in the regression model. It imposes time independent effects for each entity that are possibly correlated with the regressors. The coefficient in the above table shows the significance of each independent variable on the dependent variable. While capital intensity ratio, tangibility ratio, firm size and non-debt tax shields shows negative significance, profitability ratio shows a positive significance of 51% to total debt ratio of the firm. The probability table shows whether there is significant relation between the independent variables and dependent variable. From the above analysis except non- debt tax shields, all other independent variables value is above 0.05 which shows that there is a relation between the independent variables and the dependent variables. Therefore from the analysis it is proved that the determinants of capital structure namely capital intensity ratio, tangibility ratio, profitability ratio and firm size influences the capital structure of the firms in energy sector

**FINDINGS OF THE STUDY**

- The majority of the companies in energy sector, there is less impact on leverage by capital intensity ratio. This is good as there is no much variation in the future earnings of the companies and fewer requirements for debt in future and it safeguards the asset from being collateralized. Thus, it is clear that energy sector which is a capital intensive industry relies more on its internal funding rather than external funding.
- From the above analysis it is evident that 57% of the firms in energy sector use internal finance rather than debt financing because they have higher profits in order to finance their capital.
- The analysis proved that 57% of the companies are relying on tangible assets to fund their debts.

- From the analysis it is proved that 57% of the companies show relation between firm size and the total debt of the firm. This shows that they go for internal finance rather than debt financing.
- Most of the companies use internal finance of funds they prefer non debt tax shields as they have less benefits of tax shields like interest on debts.
- From the above over all analysis by using fixed effect model it understood that there is a relation between Total Debt Ratio with CIR,TR,PR and FS in order to finding out the leverage in capital Structure, so above mentioned variables are affecting the leverage of the firm's capital structure.

Capital structure is an important area of a company. It shows the level of debt and equity employed in the firm. Taking decisions on the capital structure is therefore an important decision to be made. The project examines the determinants of capital structure and the effects of these determinants on the leverage level of the firms. The study uses only one measure of leverage i.e.; the total debt ratio. The determinants used in the study are capital intensity ratio, tangibility ratio, profitability ratio, firm size and non debt tax shields. These determinants affect the capital structure of the firm. The study analyses these affects on the structure.

Capital intensity is the employment of fixed asset. The more the capital intensity ratio means more variation in the future earnings. When capital intensity ratio is more it results in more use of debt in the firm. From the study it is analysed that there is no much relation between the capital intensity ratio and total debt which implies that the firm uses less debt in the firm.

Tangibility ratio is the asset structure of the firm. It shows the level of tangible assets employed in the firm. The more level of tangible asset in the firm, the firm can use more debt in the firm as they have more assets to be kept as collaterals. In the analysis, 57% of the companies in the energy sector have less tangibility ratio which means that the assets available as collateral is less and they have to go for internal financing rather than debt to reduce their chances of bankruptcy.

Profitability ratio is the capacity of the firm to earn profits. When profitability is high the use of debt is reduced by the firms as they have profits to finance their fund requirements. Those firms go for internal financing. In the study it is proved that 57% of the companies in energy sector have profits to finance their funds. This shows that the use of debt is low and they go for internal financing.

Firm size also affects the leverage of a firm. When the firm size is large their capacity to earn profit will be more and they will have enough internal funds to meet their requirements. This will reduce the level of debt in the firms. In the study it is clearly understood that 57% of the firms in energy sector are large enough to have internal financing.

Non debt tax shields are those components which allow a firm to get tax deduction without using debt in the firm. Debts are used by the firm to reduce the amount of tax. From the above analysis it is understood that in almost all the companies the level of non debt tax shield is high. This means that the firms are getting the benefit of tax shield without using debt in the firms. They benefit from these non debt tax shields due to the use of internal finance.

From the whole study on the determinants of capital structure in the energy sector shows that almost all the companies in the energy sector uses more of internal financing rather than debt funds. This also proves the ability of the firm to raise enough funds for their requirements through other ways than through debts.

## MANAGERIAL IMPLICATIONS

- The companies should try to minimise their capital intensity ratio. Higher capital intensity ratio means high variations in the future returns which means high requirement for debt in the future. High debt is not good for the company which leads to great leverage in the firm. So in order to reduce the variations in the future earnings, capital intensity ratio should be minimised.
- The companies should try to increase their tangibility ratio. Higher tangibility ratio shows more tangible assets in the firm. This will help to raise debt when required as assets are available as collateral. More assets will also help the company during bankruptcy.
- If the firm wants to reduce the use of debt in the future, they have to increase their profitability ratio. More profits mean more internal funds available for the company to meet its requirements. This reduces the amount of debt to be raised by the company. Thus more profits helps to reduce the debt fund of the firm which helps the firm from large leverage.
- Large firms can go for more debt funds. Large firms have the ability to meet high debt ratio. They will have the ability to pay back the debt in time as their business is large and earn good returns from the business. So the firms have to evaluate their firm size before raising debt funds.
- Firms also have to look their non-debt tax shield before raising debt funds. More non debt tax shield use less debt funds in their companies. So the companies if required more debt fund in the future has to bring down their non-debt tax shields.

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