Impact of Capital Structure Decisions on the Operating Performance of Select Companies in Power Sector of India – A Correlation Analysis

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Abstract

The main objective of this research paper is to analyze the impact of capital structure decisions of power sector companies on their operating performance. The study is based on the analysis of the capital structure of 5 power sector companies which are public enterprises. The study extends from 2004 to 2015 and the behavior of the selected power sector companies' operating performance variables and debt-equity ratio is examined by computing correlation coefficient for the relevant years. Karl Pearson's coefficient of correlation technique is used to study the inter-relationships. The correlation of each of the selected power sector companies' variables vis-à-vis debt-equity ratio is analyzed for understanding the impact. The results show that there exist a positive correlation between liquidity and debt-equity ratio for all the companies except one and similarly negative correlation between EBIT (Earnings before Interest and Tax) and debt-equity ratio for all the companies except one company.

Introduction

Capital structure refers to the combination of different securities known as debt equity ratio in a corporate firm. Capital structure decisions are considered to be one of the most important decisions of a company as it determines the success or failure of the company. A number of theories have been proposed and lot of research has been done in the past few decades on the capital structure decisions. Starting with the seminal paper of Modigliani Miller[1], several competing theories including trade-off theory, agency theory, pecking order theory etc have been developed. Neither the research nor the theory has been able to provide acceptable explanation as to what factors affect the capital structure decisions[2].

A number of researches on capital structure have been conducted in developed countries. But in the developing countries like India the area of capital structure is not fully explored. India as an emerging economy is based on common law with comfortable external debt environment.

It has the potential for enormous expansion and the economy has been growing significantly in recent years. Hence, it becomes important for us to understand the significance of capital structure decisions at the macro and micro level of financing[3].

This paper attempts to explain the capital structure decisions and its determinants in the select companies of Indian power sector.

The financial health of a country is very much dependent on the affordability and utilization of power. The very essence of a country's industrial growth depends on power as it contributes directly to the GDP and minimization of Current Account Deficit by increasing the industrial exports. Power sector is considered to be a core industry as it facilitates overall development across various industrial sectors of the Indian economy,

without which primary and secondary sectors such as manufacturing, agriculture, commercial enterprises and railways cannot grow. Therefore, it is a key sector for India's economic growth, and has shown similar growth trends in the past as compare to the economy. The nation's power sufficiency determines its burgeoning place in the world economy. Thus, power is the most crucial component in the basic infrastructural facilities that affects economic growth and the well-being of our nation. India has abundant resources of power production. It is currently generated by State utilities, Central utilities and Private players. The Indian power sector is evolving from a "nascent phase" to a "developing" phase. With the liberalization, there has been rapid progress of the country but yet "Power for All" is still a distant dream which has to be realized for India's power sector. Almost 40 % of the country's population today still awaits access to electricity[4]

This paper is divided into the following sections. Section 2 gives a brief review of relevant theoretical and empirical capital structure. Section 3 discusses the objectives and methodology. In section 4 results are discussed. Section 5 provides a summary and conclusions.

1. Modigliani Miller (1958)

2. (Brealey and Myers(1991

3. Joy Pathak, (2010)

4. IMC – ERTF(2014)

Literature Review

Theoretical Literature Review

Capital structure decisions in the modern finance world starts with the path breaking paper by Modigliani and Miller (1958) capital structure irrelevance proposition. Modigliani and Miller (1958) illustrates that under certain key assumptions, firm's value is unaffected by its capital structure. Some of the assumptions are as under-there are no transaction costs in the capital markets and there are no bankruptcy costs, all firms belong to the same risk class, corporate taxes are there, growth rate is not considered since all cash flows are perpetuities, firms issue only two types capital i.e., of claims, risk free debt and risky equity, there is free flow of information available to the insider and outsider investors and managers are loyal stewards of owners and always maximize stockholders' wealth. Copeland and Weston (1988)

As per Modigliani and Miller hypothesis, when the firm chooses a certain proportion of risk free debt and risky equity to finance its assets, all that it does is to divide the total cash flows among investors. It is assumed that the investors and firms have equal access to financial markets, which allows for homemade leverage. The investor can either create, or can get relieve himself of any leverage that the firm took on but was not wanted. As a result, the leverage of the firm has no impact on the market value of the firm. Their paper led subsequently gave clarity on certain aspects but at the same time led to controversy. (Luigi & Sorin 2009)As a matter of fact, irrelevance theory of capital structure can be proved under a range of circumstances. Basically there are two different types of capital structure irrelevance propositions. The traditional arbitrage-based irrelevance propositions provide settings in which arbitrage by investors keeps the value of the firm independent of its leverage. In addition to the original Modigliani and Miller paper, important contributions include papers by Hirshleifer (1966) and Stiglitz (1969). The second irrelevance proposition concludes that "given a firm's investment policy, the dividend payout ratio chosen by the company will neither affect the current price of its shares nor the total return to its shareholders" (Miller and Modigliani, 1961). In other words, in perfect markets, the value of the firm is neither affected by the capital structure choices nor dividend policy decisions. The 1958 paper stirred and inspired a serious research

devoted to disprove irrelevance as a matter of theory or as an empirical matter. This research has shown that the Modigliani-Miller theorem fails under the ever changing market conditions and also due to some of its assumptions. The most commonly used assumptions/elements include consideration of taxes, transaction costs, bankruptcy costs, agency conflicts, poor selection, lack of division between financing and operations, ever fluctuating financial market opportunities, and shareholder/debenture holder clientele effects. Alternative models use differing elements from the above. Given that so many different ingredients are available, it is not astonishing that many different theories have been proposed. Covering all of these would go well ahead of the scope of this paper. Harris and Raviv (1991) provided a review of the development of this theory as of 1991. As an empirical proposition, the Modigliani-Miller's irrelevance proposition is difficult to test. Because the debt and firm value both gives a deceptive impression about the reliability and are also driven by other factors such as profits, collateral, and growth opportunities, we cannot ascertain the structural test of this theory by regressing value on the debt. But it is a fact that fairly reliable empirical relations exist between a number of factors, firm value and corporate leverage and it gives data on how real businesses are financed. Accordingly, MM hypothesis influenced the early development of theories like, the trade-off theory and the pecking order theory.

Trade-off theory asserts that a firm's optimal debt ratio is determined by a trade-off between the losses and gains of borrowing, holding the firm's assets and investment plans constant. The firm will keep on substituting debt for equity, or equity for debt until the value of the firm is maximized. The benefit of raising debt is with respect to tax shield, reduced agency cost, disciplining the managers, and limiting the control of few common stock holders. But there is always the threat of bankruptcy cost and in turn the financial risk of the firm. The empirical relevance of the trade-off theory has often been questioned. Miller (1977) suggested that if trade off theory were true, then firms should have much higher debt levels than we observe in reality.

Pecking order theory also called as Signaling theory claims that the cost of financing increases when the market information is not symmetric. Hence, the firms will prefer internal financing. The firms prefers internal to external financing, and debt to equity if the firm issues securities. In the pure pecking order theory, the firms have no well-defined debt-to-value ratio. But the pecking order theory has not been able to show any significant relevance in determining the firm's capital structure. On the other hand Fama and French (2002) and also Myers and Shyam-Sunder (1999) find that some feature of the data are better explained by the Pecking order theory than by the Trade off theory.

Empirical Literature Review

Hashima Kakkar (2011) in his study aimed at analyzing the capital structure of power industry with special reference to the power grid. 5 years analysis of debt equity ratio, solvency ratio, proprietary ratio, interest coverage ratio, capital gearing ratio and earnings per share were calculated. The other objectives are to examine the company's policy regarding capital structure and the effect of capital structure on the profitability of the company in relation to various ratios. The findings of the study shows that the company is using more and more debt as a source of finance which is reducing its overall cost of capital and increasing its profits, which ultimately increases the return of shareholders. The company's policy of Trading on Equity is one of the reasons of the never-ending success of power grid.

Turki SF Alzomaia(2014) analyzes the capital structure of listed firms in Saudi Arabia, using data which are firm specific to study the determinants of leverage. The study is based on an analysis of the capital structure of 93 Saudi listed companies. The study extends from 2000 to 2010 and employs cross-sectional pool data methodology. The results show that there exists both positive and negative relationship of certain factors

with the leverage of the firm. Some factors like size and growth of the firm have positive relationship with leverage whereas tangibility of assets, profitability and risk has negative relationship with leverage. On the other hand, the results show there are negative relationships between tangibility of assets, profitability, risk and leverage.

N R Parasuraman and P Janaki Ramudu (2013) demonstrated as to how Indian firms went about in designing their capital structure positions. Regression with ENTER & STEP method has been used. The analysis revealed that the capital structure decisions of Indian firms depended largely on profitability as well as ROCE and RONW in most of the years.

Joy Pathak (2010) examines the relative importance of six factors in the capital structure decisions of publicly traded Indian firms using two independent ordinary least square regressions. The objective of this paper is to build on previous studies on the Indian capital market and model all the important factors affecting capital structure decisions of Indian firms post liberalization policy by Government of India. It has been found that firm specific factors such as tangibility of assets, growth, firm size, business risk, liquidity, and profitability have significant influences on the leverage structure chosen by firms in the Indian context.

Frank and Goyal (2007) in this paper trade-off, pecking order and market timing theory has been analyzed. Factors such as industry median, market to book asset ratio, tangibility, profitability, firm size and expected inflation has been considered for leverage decisions. The empirical evidence seems convincingly consistent with some versions of the tradeoff theory of capital structure.

Kakani & Reddy (1998) this paper provides an empirical examination of the determinants of various capital structure theories. It attempts to develop and test a new theory on capital structure for large manufacturing firms in India. For different empirical and managerial implications short term and long term debt instruments have been measured. The results found are contrary to the classical financial theory.

Baral (2004) has made an attempt to examine the determinants of capital structure -size, business risk, growth rate, earning rate, dividend payout, debt service capacity, and degree of operating leverage-of the companies listed to Nepal Stock Exchange Ltd. Eight variable multiple regression model has be used to evaluate the influence of descriptive variables on capital structure. This study shows that size, growth rate and earning rate are statistically significant determinants of capital structure of the listed companies of Nepal Stock Exchange

Harris & Raviv (1991) this paper focuses on the theories of capital structure theories based on agency cost, asymmetric information, market interactions and corporate control considerations. This paper is developed on the modern theory of capital structure of Modigliani & Miller (1958) where the corporate tax is excluded. Hence, the author has concentrated on the non-tax driven capital structure theories. .According to the author there are four determinants of capital structure and changes in the leverage is due to the changes in the stock prices.

Xiaoyan Niu (2008) talks about the capital structure choice and determinants related to many different firm specific factors. This thesis initially present several traditional capital structure theories, such as trade-off theory, agency cost theory and theory of pecking order. It suggests seven determined factors influencing the capital structure decisions and the correlations among these factors and the choice of capital structure.

Objectives of the study and Methodology:

The main objective of this study is to analyze the impact of capital structure decisions on the operating performance of selected companies of power sector in India. Debt-equity structure has been taken as a quantitative measure of capital structure.

Five operating performance variables of Indian power sector companies which have close interaction with capital structure decisions viz., asset structure (ratio of fixed assets to total assets), liquidity (ratio of current assets to current liabilities), EBIT (in absolute terms, i.e., in rupee value), size of investment (represented by the sum of gross fixed assets and current assets) and turnover (represented by sales) are selected for analysis. Karl Pearson's Coefficient of Correlation is used analyze the interrelationship between the debt equity ratio and the selected operating performance variables. Inferences have been drawn based on the results of the analysis.

Sample consists of 5 public sector power companies of India i.e., CESC, NTPC, Kalpataru power, NHPC and Neyveli lignite for over a period of 2004-2015. The data are annual and are derived from the financial statements of these companies from money control.com.

Behaviour of the Variables

1. Debt-Equity ratio: Debt and equity are the two major components of capital structure of any company. In this paper, both the variables are taken at book values. The analysis of the data reveals the following: In CESC, there is steep decline in debt-equity ratio due to repayment of major portion of debt. In case of NTPC and NHPC, there is gradual increase in the ratio due to borrowing of the debt. In other two companies, the pattern is zig zag i.e., increase, decrease and again increase in the level of debt equity ratio.

2. Operating Performance Variables:

A Asset Structure: As the fixed assets demand long term funds, their proportion in the total asset structure has a direct bearing on the determination of the proportion of long term funds in the capital structure. In CESC, there has been a sudden decline in the fixed asset proportion during 2006-07 and later it have increased gradually where as in case of other four companies, the proportion of fixed assets to total assets was gradually declining when compared to the base year level.

B **Liquidity:** The concepts and conventions of finance suggest that a portion of long term funds should be invested in current assets so as to ease the firm from short term risks and to ensure liquidity by reducing the burden of current liabilities. Some of the components of liquidity like interest charges and dividends will influence the debt-equity mix. The liquidity ratio in all the five companies has remained more or less constant compared to the base year i.e., 2004.

C **EBIT:** If the size of the debt is huge, then the interest burden will be very heavy due to which the earnings available to the owners will be very less. In case of CESC and Neyveli Lignite, the profits have gradually decreased over the decade compared to the base year. In NTPC and NHPC, the profits of both the companies have more or less remained constant compared to the base year. But in case of Kalpataru power the pattern has been a kind of roller coaster where there is sudden increase and sudden decrease in the profits of the company till 2010 and from thereon it's a gradual increase in the profits.

D **Size of Investment:** As suggested by Archer and Faerber (1966) the total investment represented by the sum of gross block and current assets has been adopted to represent the size of investment in public enterprises. The only controversy to measure the size of investment is different methods of valuation adopted by various firms. But this problem does not arise in case of public enterprises as all of them normally follow uniform depreciation and other accounting policies. CESC, NHPC and Neyveli lignite showed a significant growth in the size of investment. In case of NTPC, it remained almost constant and a very gradual increase of size of investment was witnessed in Kalpataru power.

E **Turnover:** The size of turnover of a company represents the efficiency attained for a given investment in capital. Therefore, the size of investment and turnover are very much interrelated. The selection of turnover as one of the variable of operating performance is

also influenced by the premise that it represents the growth of a firm. There is a significant increase in the turnover in case of CESC and NTPC. There is a gradual increase in the turnover in case of NHPC and Kalpataru. But Neyveli lignite witnessed a drop in 2006-07 and there on a significant increase in the turnover.

Correlation:

The analysis of correlation between each of the selected operating performance variables and debt-equity ratio i.e., capital structure is presented in this section. Also the inference on the impact of debt-equity on all the selected operating performance variables is presented. For the purpose of this analysis, it is assumed that the selected variables are independent with respect to one another. But in reality, the size of turnover and size of investment are likely to be mutually associated with debt-equity ratio. This phenomenon of multi-co linearity among independent variables has been kept in mind while using the correlation technique. The analysis reveals the following:

1. Asset Structure and Debt-Equity Ratio: Asset structure refers to the fixed asset proportion to total assets. Higher the ratio of fixed assets to total assets, more will be the requirement of long-term funds, which directly influences the capital structure. Therefore there should be a close association between both the ratios. In all the power sector companies, asset structure ratio showed a positive association with debt-equity ratio. In case of CESC and Kalpataru, the positive correlation is due to a decline in both the variables. In case of other three companies, there is a marginal increase in the debt-equity and a small decrease in the asset structure ratio. The following inferences can be drawn from the data:

a) The state enterprises have utilized a major portion of funds raised through debt for financing current assets.

b) The decline in fixed assets proportion to total assets followed by a marginal increase in debt-equity ratio indicate that major portion of funds is utilized to finance the growing needs of working capital.

c) None of the 5 companies have made an effective use of leverage to meet the fixed asset investment.

2. Liquidity and Debt-Equity Ratio: Liquidity ratio is directly influenced by the proportion of long-term funds invested in current assets and therefore it is ideally supposed to be linearly related to the debt-equity ratio. The liquidity of public sector power companies showed a very low degree of correlation with debt-equity ratio. CESC showed negative correlation on account of a significant decline in debt equity and a liquidity remaining more or less the same. NTPC, Kalpataru and Neyveli lignite companies showed a positive correlation but it was meager due to marginal increase in debt equity and a slight decrease in liquidity over the decade. Positive correlation in NHPC is the result of significant increase in both the variables and indicated the policy of financing a major portion of working capital through current liabilities.

3. EBIT and Debt-Equity Ratio: EBIT includes interest charges and as such the leverage effect is incorporated in itself. It is because of this reason; EBIT will have a linear and high degree of positive correlation with debt-equity ratio. If the size of EBIT is sufficient and encouraging, the additional funds required by the firm should be in the form of debt and thus the debt-equity ratio keeps on increasing. But all the power companies except CESC showed a low and negative correlation revealing that profitability and debt-equity ratio moved in opposite directions and as such, did not exercise any specific and mutual influence. CESC showed a positive correlation due to declining trend in both the EBIT and debt-equity ratio. The following inferences can be drawn from the analysis.

a) Power sector companies showed negative correlation between EBIT and debt-equity ratio with negative or low degree of correlation. All the companies have to introduce appropriate capital structure policies, different from those, which are vogue, to derive all possible gains from the leverage

b) Efficient business enterprises usually present a positive trend in any operating activity but this positive trend can be misleading with the case of CESC where the correlation is positive but it is due to entirely a different situation.

4. **Size of Investment and Debt-Equity ratio:** A larger asset base of a business enterprise call for more long-term funds. Factors like earnings and the prevailing cost of sources of finances available influence the assets and debt-equity proportion. A greater proportion of incremental funds year after year would be sought normally from debt sources rather than the equity in any company. Therefore, the correlation between the size of investment and debt-equity ratio of a firm is supposed to be positive and high. Of the total five companies, two of them showed a negative and three of them showed positive correlation. The following inferences can be drawn from the analysis.

a) The capital structure decisions of power companies do not appear to have aimed at maximization of profitability, because they did not plan to gain from the introduction of high debt in their capitalization.

b) The rate of flow of equity funds into capital structure appears to be greater than that of debt funds in power sector companies. This might have happened due to the government policy.

c) Very few profitable public sector power companies such as NHPC and NTPC have employed debt in the capital structure to their best advantage as is obvious from the high degree of positive correlation between debt-equity ratio and size of investment.

5. **Turnover and Debt-Equity Ratio:** Turnover is an indicator of growth of a business enterprise and influence the debt-equity mix. Turnover of an enterprise will have a direct influence on the additional requirements of funds. It is usually seen that size of investment and turnover are mutually associated with debt-equity ratio. By and large debt-equity ratios of power companies have a higher degree of association with turnover than with size. The data showed a negative correlation in case of CESC and Kalpataru. Neyveli lignite showed a positive but low negligible correlation. NTPC and NHPC showed a positive and high degree of correlation with an increase in both the variables. Therefore, among the five companies, NTPC and NHPC could lever up its profits. The following inferences can be drawn from the data.

a) The coefficient of correlation between turnover and debt equity ratio is negative in case of CESC and Kalpataru due the reason that the debt equity of both the companies are declining and turnover is increasing i.e., both the variables are moving in opposite direction.

b) NTPC and NHPC have proved that by taking advantage of high leverage, it has considerably improved its turnover.

Concluding Remark:

From the above analysis, it can be concluded that the process of capital structure planning is an ongoing process and needs continuous monitoring and revision in different situations. The finance executives of public power sector companies have to pay adequate attention to the multi-dimensional implication of the capital structure. In order to achieve optimal capital structure, they need to study the correlation of different associated variables and their judgment in decision making plays a crucial part in influencing the capital structure planning process.

Correlation between Debt-Equity ratio and operating performance variables					
Variable	CESC	Kalpataru	Neyveli	NTPC	NHPC
Asset Structure	0.721	0.075	-0.684	-0.919	-0.564
Liquidity	-0.265	0.178	0.44	0.028	0.527
EBIT	0.532	-0.179	-0.024	-0.403	-0.428
Size of Invt	-0.834	-0.836	0.233	0.627	0.818
Turnover	-0.696	-0.865	0.294	0.961	0.737

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