DETERMINANTS OF CAPITAL STRUCTURE: A CASE OF INDIAN CHEMICAL INDUSTRY

Vikas Adhegaonkar*

R. M. Indi**

ABSTRACT

An investment decision of a manager directly affects the future profitability of the business and the financing choice is independent to investment and profitability. But financing choice decision largely affect to the way profit to be distributed among investors. Finance manager decides the strategy by which he can repay the borrowed capital on time to maintain company's goodwill and to maximize shareholder's wealth. The manager is in the dilemma debt or equity as a source of finance. Capital structure is debated subject from last century after M & M proposition on capital structure and firm value. Till date the subject is an area on interest for academic researcher. The research work conducted in developed country is very large as compared to developing countries. After economic reforms managers have free hand to mobilize the funds from domestic to international market. So this is important to study how a finance manager decides capital structure. In this paper attempt has made to find out the determinants of capital structure in Indian chemical industry. The period of the study is 2006 to 2011. Size, profitability, tangibility, non debt tax shield, growth in asset, liquidity and interest coverage ratio has used to analyze their linear relationship with capital structure. Convenience sampling has used to select the sample. Statistical techniques like correlation, multiple regression and ANOVA is used to test the hypothesis. Results show that tangibility, non debt tax shield and interest coverage ratio has linear relationship and rest variable has non linear relationship with capital structure. ANOVA shows the overall model is good.

* Asstt. Professor, G.S.Moze College of Engineering, MBA Dept.

** Professor, Sinhgad Institute of Business Administration and Research.

1 Introduction

Finance manager has to take very pivotal decision on investment in such way to generate additional wealth for shareholders. The decision of financing mix by manager is a controversial from last 60 to 70 years. Various researchers have contributed a lot about capital structure decisions by managers. Firm's capital structure is a combination of owners fund and borrowed fund. Equity is life time fund provided by shareholders in the faith that it will grow in near future. The management's pursue shareholders goal by taking such decisions which will add value to the firm. In contrast, debt fund providers have no long term interest with the firm. They are interested in timely repayment of interest and principle amount. If they failed to receive it on time, firm will pass through a liquidation process. Franklin John (2011) explained the theoretical hireacht of financing. Cash flow is the cheapest source of finance, then debt and in last equity. Manager's pursue a goal of big size firm and expect high salary, bonus, and other benefit in future. They want to hold cash for future projects rather than distributing funds by dividends. At the same time, shareholders are interest in regular and good dividend. Under such complex environment a study of how managers take decisions on firm's financing mix is important. There are two extreme approaches of capital structure 1) Relevance Approach 2) Irrelevance approach. Whether capital structure decisions affect to the value of firm is debatable subject. Pioneering study on this subject by Modigliani and Miller throws light on capital structure and valuation of firm. Still the study is going to confirm the model which is applicable to all size firms.

The first part of the paper introduces with the importance of the subject, second part is related to literature review, third part covers research methodology adopted for the paper, fourth part of paper explains the model used for this paper and fifth part is related to conclusion.

2 Literature Review

David Durand proposed two extreme theories on capital structure i.e. net income approach and net operating income approach. He proved market relevance and irrelevance theory of capital structure. Modigliani and Miller (1958) in his approach states that in the presence of perfect capital market and taxes capital structure decisions are irrelevant. Sindey L. Barton et.al.(1988) state that management attitude i.e. management risk taking propensities will affect the firm's capital structure decisions. Also top management goal also affect capital structure decisions. Milton Harris et.al (1990) proposed in his theory that debt worked as disciplining device against manager's interest. Moreover debt also generates information about i) timely debt repayment ii) in case of default it reveals the information on operating policy. Myres and Maljuf (1984) describe pecking order theory, which explains hierarchy of financing. They describes the

preference for financing that firms first use internal generated funds, then issue debt and lastly firms issue equity shares to meet the investment.

3 Research Methodology

3.1) Sample size:-

Sample size comprises of 11 companies in Indian chemical industry (Goa Carbon Ltd, Godrej Ind., Grauer & Well India Ltd, Gujarat Alkiles and Chemicals Ltd, Guj. Fluro chemicals, Gulf Oil Corporation Ltd, Haryana Leather Chemicals Ltd,Kiri Industries Ltd, Keltech Energies Ltd, Laffons Petrochemicals Ltd, Indokem Ltd)

3.2) Study period :- 2006 to 2011 (6 Years)

3.3) Sampling Technique :- Convenience Sampling

3.4) Variables used in the study:-

3.4)1. **Financial Leverage (FL):-** Financial leverage has used a proxy for capital structure. In empirical research, researcher has described leverage in different way. Rajan and Zingale (1995) adopted four different measures for leverage 1) Total Liabilities to Total Debt 2) Total Debt to Net Assets 3) Total Debt to Capital Employed4) Total debt to Total Asset. So for our study, we used Total Debt to Total Asset as a measure of financial leverage.

For our research we have used fourth measure of financial leverage i.e. Total Debt to Total Asset.

3.4)2. **Size of the Business (SZ):-** Number of studies has proved positive relationship between firm size and leverage.Warner (1977) and Titman (1988), Rajan et.al.(1995) argued that large size business tend to be more diversified and hence have positive relationship with the leverage. Size is measured as natural logarithm of sales. Sales prefers over asset as measure of size of the business because it reflects the current value.

3.4)3. **Profitability (PRFT):-** The academic literature has divided on relationship between profitability and financial leverage. Trade off theory proposed positive relationship of profitability with financial leverage, profitability indicates higher debt capacity. In contrast, Myers (1984) suggests that firms prefer first internal funds, then debt and in last equity to finance. Rajan et.al. (1995) argues that profitability has negative relationship

with the leverage. Profitability is measured as EBIT to Total Asset. An Earnings before Interest and Tax is uniform measure to study the firm's profitability.

3.4)4. **Tangibility (TG):-** (Patrik Bauer) theoretical point of view, tangible asset is used as collateral for debt. The trade off theory proposed that firm use its tangible asset as collateral for debt issuance and tangibility has positive relationship with the financial leverage. Jensen (1986) states that debt is a disciplining device and curbs the tendencies of managers by reducing the amount of free cash available for wasteful expenditures. Sidney et.al. (1988), has failed to prove inverse relationship of tangible asset to debt. Tangibility is defined as Fixed Asset to Total Asset.

3.4)5. **Non Debt Tax Shield (NDTS):-** Depreciation is a perfect substitute for tax deductible benefit of debt and hence has negative relationship with the leverage. C. Mishra (2011) Non Debt Tax Shield is defined as Depreciation to Total Asset.

3.4)6. **Growth in Asset (GRWTH):-** Pecking order theory states that growing firm should use less debt for financing. Growth is defined as Incremental Total Asset (i.e. Current Year TA –Previous Year TA) to previous years TA.

3.4)7. **Interest Coverage Ratio (ICR):-** High interest coverage ratio indicates higher debt absorption capacity and the greater likelihood for higher debt presence in the capital structure. Interest coverage ratio is defined as Interest to Earnings before Interest and Tax.

3.4)8. **Liquidity (LIQ):-** High liquid firms use liquid assets to finance their assets and hence they might have negative relationship with financial leverage. Liquidity is defined as current asset to current liabilities.

3.5) Hypothesis :-

This study has tested the following null hypotheses on relation between the defined variables and capital structure in Indian chemical industry

$H_{0:}$- There is no significant relation between financial leverage and size, profitability, tangibility, Non Debt Tax shield, growth in asset, interest coverage ratio, and liquidity.

$H_{1:}$- There is significant relation between financial leverage and size, profitability, tangibility, Non Debt Tax shield, growth in asset, interest coverage ratio, and liquidity.

3.6) Techniques used in study :- Correlation ,Multiple Regression and ANOVA

Specification of the Regression Model:-

Following multiple regression model has been used to test the theoretical relation between the financial leverage and characteristics of the firm.

$$Y = a+b_1X_1+b_2X_2+b_3X_3+ b_4X_{4+} b_5X_{5+} b_6X_{6+} b_7X_7$$

Where

Y = Financial Leverage (FL)

X_1:- Size of firm, X_2:- Profitability, $X_{3:-}$ Tangibility, X_4 :- Growth of Asset, X_5 :- Liquidity,X_6 :- Non Debt Tax shield , X_7 :- Interest Coverage Ratio

4) Result and Discussion

4.1) Correlation Matrix (Problem of multicollinearity)

	FL	*SZ*	*PRFT*	*TG*	*NDTS*	*GRWTH*	*LIQ*	*ICR*
FL	1.00							
SZ	0.18	1.00						
PRFT	-0.20	0.31	1.00					
TG	-0.42	0.10	0.05	1.00				
NDTS	-0.48	-0.06	0.10	0.60	1.00			
GRWTH	-0.01	0.15	0.02	0.18	-0.30	1.00		
LIQ	-0.35	-0.27	0.47	-0.05	0.04	0.00	1.00	
ICR	-0.39	-0.16	0.48	-0.12	0.01	0.04	0.54	1.00

Table No.01- Correlation Matrix

Correlation analysis helps us to find out the association between the variables. Above table shows that financial leverage is negatively associated with the tangibility, non debt tax shield, current ratio and interest coverage ratio also it also shows strong association between them. These 4 variables will help to predict financial leverage. As there is no independent variable has association with each other more than 0.80 hence the model is free from problem of multicollinearity.

4.2) Regression Analysis

	Coefficients	**Standard Error**	**t Stat**	**P-value**
Intercept	0.34	0.31	1.08	0.28
SZ	0.01	0.01	0.64	0.53

PRFT	0.14	0.30	0.47	0.64
TG	-0.28	0.14	-2.07	0.04
NDTS	-3.88	1.77	-2.20	0.03
GRWTH	0.00	0.00	-0.41	0.69
LIQ	-0.04	0.03	-1.36	0.18
ICR	0.00	0.00	-2.74	0.01
R	**0.68**	**R^2**	**0.46**	
F Value	**7.23**	**Significance**	**0.00**	

Table No.02 - Regression Results

F value shows that overall model is significant and R^2 indicates that 46% variation in financial leverage has explained by these variables. Analysis of individual variables shows that tangibility, non debt tax shield and interest coverage ratio are significant determinants of financial leverage. Size of business, profitability, growth in asset and current ratio shows non linear relationship with financial leverage and null hypothesis has accepted. Depreciation and interest expenses reduces tax liability of a company and negative coefficient associated with non debt tax shield shows that the chemical companies are substituting depreciation for tax benefits by debt financing. 1 unit increase in depreciation reduces financial leverage by -3.88 units which is highest coefficient in the model and showing strong determinants of financial leverage. Hence hypothesis has rejected that there is no relationship between financial leverage and non debt tax shield. Interest coverage ratio is significant determinant of financial leverage but coefficient associated with it does not provide any direction to predict. On the basis of statistical result hypothesis of interest coverage ratio has rejected. Tangibility has found negative relationship with financial leverage. Every unit increase in fixed assets reduces -0.28 units in financial leverage. So hypothesis that there is no relationship with financial leverage and tangibility has rejected.

5) Conclusion

In this paper, the study has conducted in Indian chemical industry to find out the determinants of capital structure. 11 companies has selected by convenience sampling has used to select the sample. The study includes time period of 6 years from 2006 – 2011. Seven variables (size, profitability, tangibility, non debt tax shield, growth in asset, liquidity and interest coverage ratio)has used to find out their relationship with capital structure. The R^2 explains 46% variation in dependent variable and f value shows that overall model is significant. Out of seven variables tangibility, liquidity and interest coverage ratio found significant determinants of capital structure.

References:-

1) Chandra Shekhar Mishra, Vinod Gupta, (2011), "Determinants of capital structure a study of manufacturing sectors PSU in India" International Conference On Financial Management and Econonmics, vol.11, pp247-252
2) Franklin John, Muthusamy K., (2011), " Impact of leverage on firms investment decision", International Journal of Scientific and Engineering , Reserarch, Vol.02, Issue 04, pp1-16
3) Jensen M, (1986), "Agency cost of free cash flow , corporate finance and takeovers", Americal Accounting Review, Vol.76, pp. 323-339
4) Myers Stewart C, and Majluf N.S.,(1984), "Corporate financing and investment decisions when firms have information that investors do not have ", Journal of Financial Economics, pp.187-221.
5) Milton Harris, Artur Raviv, (1990), "Capital Structure and the informational role of debt", The Journal of Finance, Vol., XLV, No.02.
6) Patrik Bauer, (2004), "Determinants of capital structure choice empirical evidence from the Czech Republic" , Finance a uver- Czech Journal
7) Rajan, ZIngales ,(1995), "What do we know about capital structure? Some empirical evidence form international data", Journal of Finance, Vol.50, pp.1421-1460.
8) Sidney L. Barton, Paul L. Gordon , (1988), "Corporate Strategy and capital structure" , Strategic Management Journal, Vol.09, 623-632.
9) Titman, Sheridan and Roberto Wessels, (1988), "The determinants of capital structure choice", Journal Of Finance, Vol.43, pp1-19.
10) Warner J.B.,(1977), "Bankruptcy cost: some evidence", Journal Of Finance, Vol.32, pp.337-347.