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AN EMPIRICAL ANALYSIS TO STUDY THE RELATIONSHIP BETWEEN PROFITABILITY AND CAPITAL STRUCTURE DECISIONS IN INDIAN SCENARIO

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ABSTRACT

The present study has been undertaken to investigate into the independent variables related to capital structure decisions influencing the profitability of the companies belonging to BSE Sensex. The time period of the present study is from 2010-11 to 2016-17 (i.e. for 6 years). The independent variables have been selected after a thorough review of literature. Five independent variables related to capital structure decisions which are taken into consideration for the study are "Size of the Firm (log sales)", "Debt Equity ratio", Interest Coverage Ratio", "Growth rate (Assets)" and "Non-Debt Tax Shield". The proxy for the profitability taken for the study is "Return on Assets" and "Return on Net Worth". VIF has been utilized to understand if any multi-collinearity exists among the independent variables. Multiple regression analysis has been utilized separately to understand which independent variables are significantly influencing the dependent variables namely "Return on Assets" and "Return on Net worth" respectively. A further endeavour has been made in this paper to rank the independent variables that are significantly influencing the dependent variables as per their beta values. SPSS 20.0 has been used for analysis purpose. Based on the results of the study the corporate houses can develop policy decision on capital structure.

Keywords: Multiple Regression Analysis, Profitability, Sensex, Capital Structure, Corporate

INTRODUCTION

To determine the optimal capital structure is perhaps one of the important functions of Finance Manager. The growth of a firm depends on the investments that it makes which translate into enhanced profits. A firm may use borrowed funds or owner's funds to make such investments. These investments with long-term benefits determine the value of the firm today. But this value not only depends on the investment's expected future cash flows but also on the cost of these funds. Existing theories postulate that neither the borrowing nor the owner's funds is costless.

Thus, capital structure has always been an important, challenging and a central issue in corporate finance. Capital Structure decisions mainly involve determining the right mix of debt and equity. The seminal work of Modigliani & Miller (1958; 1963) postulating the irrelevance of capital structure in the valuation of a firm without tax effect and with tax advantage marked the beginning of the capital structure theories. This was followed by the trade-off theory (Miller, 1977; Myers, 2001; Greene, Murinde & Suppakitjarak, 2003), pecking order theory or asymmetric information theory (Myers, 1984; Myers & Majluf, 1884) and agency theory (Jensen & Meckling 1976; Haris & Raviv, 1990; Barnea, Haugen & Senbet, 1980). Phenomenal empirical research has been conducted on the determinants of capital structure in both developed and developing countries. Prominent studies are by Wald (1999), Rajan & Zingales (1995), Pandey (2001) & Ariff (1998).

Profitability is one of the important criteria for existence of companies in today's cut throat competition. One of the important yardsticks to measure the financial performance of the companies in this era of globalization is by its profitability. If the company is not profitable then it may think of the option of closing.

Our main motivation of this research study is to investigate if variables related to capital structure decisions does have any impact on financial performance of the companies in Indian scenario. Financial performance has been measured in this paper by 'Return on Assets' and "Return on Net Worth" which has been taken as a dependent variable in the study. Five(5) independent variables taken into consideration for this study related to capital structure decisions have been derived from past literatures.

LITERATURE REVIEW

It is proposed to present briefly some of the research studies conducted by different researchers pertaining to the present study:

Bauer (2004) in his research paper concluded that leverage is positively to size and tax but is negatively correlated to profitability, tangibility and growth opportunity.

Chen & Strange, (2005) in their research paper concluded from the study that Size, Risk and Age of the firm are positively related to the debt ratio while profitability is negatively related. Tax factor does not affect capital structure. In this paper ownership structure is also taken into consideration which negatively effects capital structure.

Mazur (2007) in his research paper have tried to examine the fact whether the financing decision of Polish firms are influenced by Pecking order theory or Trade off Theory. It was observed that pecking order hypothesis best explains the financing choice of polish firms.

Amidu (2007) in his research paper concluded that some of the factors that determine the capital structure of the banks in Ghana are Profitability, Growth rate, Corporate tax, Asset structure and Bank size. Multi Regression Model has been used to understand the significance of different factors influencing the capital structure decisions of the banks of Ghana.

Karadeniz *et al.*, (2009) in their research paper concluded that tangibility of assets, effective tax rates and return on assets are negatively related to leverage while firm size, growth opportunity, non-debt tax shield do not appear to be related to capital structure.

Mahmoodi *et al.*, (2011) in their research paper have tried to explore if there was a relationship between capital structure and financial performance. It was observed from the study that Return on Asset and capital structure had a negative relationship.

Kajola & Onaolapo (2010) in their research paper titled have concluded from their study that debt ratio has a significantly negative impact on the firm's financial measures.

Abu-Rub (2012) in his research paper has tried to investigate into the relationship between financial performance and Capital Structure. The paper concluded that Capital Structure has a positive impact on Firm's financial performance.

3. Objective of the Study:

In this study an attempt has been made to investigate the impact of various independent variables relating to capital structure decisions on the profitability of the companies belonging to BSE Sensex from the period 2010-11 to 2016-17 (i.e. for 6 years). Multiple Regression Analysis is used as statistical tool to understand the impact of capital structure decisions on profitability.

Profitability ("Return on assets" and "Return on Net worth") is used as dependent variable and 5 (Five) independent variables related to Capital Structure Decisions namely "Size of the Firm (log sales)", "Debt Equity Ratio", Interest Coverage Ratio", "Growth Rate (Assets)" and "Non Debt Tax Shield "are taken into consideration for the study.

RESEARCH METHODOLOGY

This study is conducted on the companies of BSE Sensex. BSE Sensex is a major index in India comprising of 30 companies as per their market capitalization. Using CMIE Prowess database software, we have derived a list of 30 companies belonging to BSE Sensex during the periods from 2010-11 to 2016-17 (i.e. for 6 years). The companies which were not in operation during any of this 6-year period or where data were not available during any of these years were excluded. 30 companies which fulfilled all the criteria were used for the study. The 30 BSE Sensex companies taken into consideration for the study are given in Annexure 1.

Annexure 1(Companies from BSE Sensex taken for the study)

Asian Paints Ltd.	Axis Bank Ltd.
H C L Technologies Ltd.	H D F C Bank Ltd.
I T C Ltd.	IndusInd Bank Ltd.
Maruti Suzuki India Ltd.	N T P C Ltd.
Tata Consultancy Services Ltd.	Tata Motors Ltd.
Bajaj Auto Ltd.	Bajaj Finance Ltd.
Hero Motocorp Ltd.	Hindustan Unilever Ltd.
Infosys Ltd.	Kotak Mahindra Bank Ltd.
Oil & Natural Gas Corp. Ltd.	Power Grid Corp. Of India Ltd.
Tata Steel Ltd.	Vedanta Ltd.
Bharti Airtel Ltd.	Coal India Ltd.
Housing Development Finance Corpn.	I C I C I Bank Ltd.
Larsen & Toubro Ltd.	Mahindra & Mahindra Ltd.
Reliance Industries Ltd.	State Bank of India
Yes Bank Ltd.	Sun Pharmaceutical Inds. Ltd.

Variables used in the Model

I) Dependent Variable:

a. Profitability (Return on Asset):

Return on assets has been taken as the dependent

variable in this study as an indicator for financial performance.

ROA (Return on Assets)= Average PBIT/ Average Total assets.

Here, Average PBIT indicates the average of the PBIT from 2010-11 to 2016-17 (i.e. for 6 years) and Average Total Assets indicates the average of the Total Assets from 2010-11 to 2016-17 (i.e. for 6 years). (PBIT = Profit before Interest and Tax)

b. Profitability (Return on Net Worth):

Return on Net Worth (RONW) is a measure of profitability of a company. It is calculated by dividing the net income of the firm in question by shareholders' equity.

Return on Net Worth (RONW) =Average PAT (Profit after Tax)/Average Net Worth

Average PAT indicates the average of the PAT from 2010-11 to 2016-17 (i.e. for 6 years) and Average Total Assets indicates the average of the Net Worth from 2010-11 to 2016-17 (i.e. for 6 years). (PAT = Profit after Tax).

II) Independent Variables:

The independent variables influencing the capital structure decisions are taken after a thorough literature review. These independent variables are somehow or other related to the profitability of the firms. The study has been conducted to investigate which among the following independent variables are having a significant impact on profitability (financial performance) of the firms.

i. **Growth rate (Assets):**

It is also an important variable influencing the capital structure of a firm. The growth rate does have an impact on profitability of the organization. If the growth rate of the assets increases, it will have an impact on profitability.

ii. **Interest Coverage Ratio:**

The firm with higher interest coverage ratio has a good financial condition with large amount of earnings and a firm would not face difficulty in bearing the high interest charges if it goes for loan.

Interest Coverage Ratio: = Average PBIT/Average Interest

PBIT =Profit before Interest and Tax

iii. **Non debt tax Shield:**

Non-Debt tax shield is taken as a substitute for income tax shield. It has an impact on the profitability of the firms. If it increases, then there is a probability that the profitability will also increase.

Non debt tax shield =Average Depreciation/ Average Total assets.

iv. **Size of the Firm:**

The proxy used for "Size of the Firm" is taken in this research study:

Size of the Firm =Log (Total Sales) [the natural logarithm of sale]

It is to be noted here that the 'Total sales' figure has been substituted with 'Total Income' figure for Finance companies including banking sector where sales figure was not available.

Size of the firm does have an impact on the profitability of the organization. With the increase of "Size of the firm" there is a probability that the profitability will also increase.

v. **Debt Equity Ratio:**

The debt-to-equity (D/E) ratio is calculated by dividing a company's total liabilities by its shareholder equity. It is related to Financial Leverage and has an impact on the profitability of the organization.

Debt Equity Ratio=Average Total Debt/Average Net Worth

RESULT

The entire empirical results have been categorized into two sections:

Section 1: This section deals with investigating the independent variables related to capital structure decisions which will have a significant influence on "Return on Assets" as the dependent variable.

Section 2: This section deals with investigating the independent variables related to capital structure decisions which will have a significant influence on "Return on Net worth" as the dependent variable.

1. In this section an effort has been made to investigate into the independent variables related to capital structure decisions which will have a significant influence on "Return on Assets" as the dependent variable. The five independent variables taken into consideration for the study are "Size of the Firm (log sales)", "Debt Equity ratio", Interest Coverage Ratio", "Growth rate (Assets)" and "Non-Debt Tax Shield". Multiple regression analysis was conducted using the "Return on Asset" as dependent variable and 5 independent variables as above.

(A) Multi-collinearity:

Multiple regressions were run in SPSS 20.0. Before running the regression, investigation into the multi-collinearity problem among the independent variables was carried out. It can be observed from table 1 that VIF (Variance Inflation Factor) is less than 2 for the independent variables. Hence it can be concluded that multi-collinearity problem does not exist, and the multiple regression can be proceeded with. The result of the Collinearity Statistics is produced in table 1 below:

Table 1: Collinearity Statistics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Log Sales	0.571	1.752
	Non debt Tax Shield	0.661	1.512
	Interest Coverage Ratio	0.848	1.180
	Growth Rate of assets	0.701	1.427
	Debt Equity Ratio	0.586	1.707
a. Dependent Variable: Return on assets			

(B) Multiple Linear Regressions:

Multiple Linear Regression has been conducted on five independent variables "Size of the Firm (log sales)", "Debt Equity ratio", Interest Coverage Ratio", "Growth rate (Assets)" and "Non-Debt Tax Shield" and one dependent variable (Return on Assets) using SPSS 20.

It was observed from table 2(a) that R-square value is 0.626. The result of the regression analysis (R Square) is produced in table 2(a) below:

Table 2(a): Regression Results (R square)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.791[a]	0.626	0.549	0.07927

It is also observed from the regression analysis in table 2(b) that Interest Coverage Ratio having *p* value of 0.000 and *t* value of 4.840 and Debt Equity ratio having *p* value of 0.002 and *t* value of-2.843 are significant variable determining the profitability in BSE Sensex companies. These independent variables are having *p* values<0.05 and *t* values outside the range of -2 to +2. The result of table 2(b) (Regression Analysis) is produced below:

Table 2(b): Regression Analysis

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.268	0.101		2.654	0.014
	Log Sales	-0.022	0.019	-0.185	-1.121	0.273
	Non debt Tax Shield	-0.988	0.971	-0.156	-1.017	0.319
	Interest Coverage Ratio	0.001	0.000	0.656	4.840	0.000
	Growth Rate of assets	-3.665E-008	0.000	-0.140	-0.941	0.356
	Debt Equity Ratio	-0.023	0.013	-0.300	-2.843	0.002
a. Dependent Variable: Return on assets						

(C) Durbin Watson Test:

This test is required to check the data tends to Time series Data or the Data is Stationary one. Durbin Watson test was conducted in SPSS and it is observed from table 3 that Durbin Watson is 1.891 which is out of the range of -1.5 to +1.5 which proves that the data is not a time series data, it is stationary one and Regression analysis can be done. The result of table 3 (Durbin Watson test) is produced as below:

Table 3: Durbin Watson Test

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.791[a]	0.626	0.549	0.07927	1.891
a. Predictors: (Constant), Debt Equity Ratio, Growth Rate of assets, Interest Coverage Ratio, Non debt Tax Shield, Log Sales					
b. Dependent Variable: Return on assets					

2. In this section an effort has been made to investigate the independent variables related to capital structure decisions which will have a significant influence on "Return on Net Worth" as the dependent variable. The five independent variables taken into consideration for the study are "Size of the Firm (log sales)", "Debt Equity ratio", Interest Coverage Ratio", "Growth rate (Assets)" and "Non-Debt Tax Shield". Multiple regression analysis was conducted using the "Return on Net Worth" as dependent variable and 5 independent variables as above.

(A) Multi-collinearity:

Multiple regressions were run in SPSS 20.0. Before running the regression, investigation into the multi-collinearity problem among the independent variables was carried out. It can be observed from table 4 that VIF (Variance Inflation Factor) is less than 2 for the independent variables. Hence it can be concluded that multi-collinearity problem does not exist, and the

multiple regression can be proceeded with. The result of the Collinearity Statistics is produced in table 4 below:

Table 4: Collinearity Statistics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Log Sales	0.571	1.752
	Non debt Tax Shield	0.661	1.512
	Interest Coverage Ratio	0.848	1.180
	Growth Rate of assets	0.701	1.427
	Debt Equity Ratio	0.586	1.707
a. Dependent Variable: Return on Net Worth			

(B) Multiple Linear Regressions:

Multiple Linear Regression has been conducted on five independent variables "Size of the Firm (log sales)", "Debt Equity ratio", "Interest Coverage Ratio", "Growth rate (Assets)" and "Non-Debt Tax Shield" and one dependent variable (Return on Net worth) using SPSS 20.

It was observed from table 5(a) that R-square value is 0.439. The result of the regression analysis (R Square) is produced in table 5(a) below:

Table 5(a): Regression Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.663[a]	0.439	0.322	0.15003

It is also observed from the regression analysis in table 5(b) that Interest Coverage Ratio having *p* value of 0.001 and *t* value of 3.594 is significant variable determining the profitability in BSE Sensex companies. These independent variables are having *p* values<0.05 and *t* values outside the range of -2 to +2. The result of table 5(b) (Regression Analysis) is produced below:

Table 5(b): Regression Results

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.372	0.191		1.941	0.064
	Log Sales	-0.031	0.037	-0.169	-0.836	0.411
	Non debt Tax Shield	-1.613	1.837	-0.165	-0.878	0.389
	Interest Coverage Ratio	0.001	0.000	0.597	3.594	0.001
	Growth Rate of assets	-4.632E-008	0.000	-0.115	-0.628	0.536
	Debt Equity Ratio	-0.019	0.024	-0.155	-0.775	0.446
a. Dependent Variable: Return on Net Worth						

(C) Durbin Watson Test:

This test is required to check the data tends to Time series Data or the Data is Stationary one. Durbin Watson test was conducted in SPSS and it is observed from table 6 that Durbin Watson is 1.872 which is out of the range of -1.5 to +1.5 which proves that the data is not a time series data, it is stationary one and Regression analysis can be done. The result of table 6 (Durbin Watson test) is produced as below:

Table 6: Durbin Watson Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.663[a]	0.439	0.322	0.15003	1.872
a. Predictors: (Constant), Debt Equity Ratio, Growth Rate of assets, Interest Coverage Ratio, Non debt Tax Shield , Log Sales					
b. Dependent Variable: Return on Net Worth					

DISCUSSION

The absolute beta value is taken for the ranking purpose. The relative importance of the independent variables relating to capital structure decisions which influence the profitability (Return on Assets) of the companies belonging to BSE Sensex been done as below:

Rank 1: Interest Coverage Ratio which is the most significant one with beta value of 0.656.

Rank 2: Debt Equity Ratio with beta value of 0.300.

In case of Return on Net Worth is taken as a dependent variable, Interest Coverage ratio is the only significant independent variable influencing the dependent variable.

The variables found statistically significant to influence the profitability of the BSE Sensex companies have been described briefly below:

Interest Coverage Ratio:

A higher ratio is desirable but too high a ratio indicates that the firm is very conservative in using debt, and that it is not using credit to the best advantage of shareholders. Here beta coefficient of Interest Coverage Ratio with positive value in both the cases i.e. when the dependent variable is taken as "Return on Assets" and "Return on Net Worth" depicts that it is positively influencing the profitability of the firm i.e. with the increase of the interest coverage ratio, the profitability of the firms is also increasing (Koh & Loh, 1988).

Debt Equity Ratio:

In this study it is found that Beta Coefficient of Debt Equity ratio with negative value indicates that it is negatively influencing profitability of the firm in terms of return on assets. The negative but high value of beta of this variable denotes that though this variable greatly influences the profitability, but in a negative way; i.e., higher the debt equity ratio, lower is the profitability of the firm. It may be because of the increase of debt equity ratio the financial risk of the firm increases in form of fixed rate of interest that has to be paid on the long-term debt (Barnea, Haugen & Senbet, 1980). Thus, with the increase of the financial risk may result in the pressure on the bottom line that on the profit after tax of the firm and hence the profitability of the firms decreases and vice versa is also true.

Policy Decision: The results of the paper are very interesting with debt equity being a significant but negatively influencing the profitability of the firms (Abu-Rub, 2012). The policy makers will have to be prudent in sanctioning more debt because it may likely to result in overleveraged capital structure and for companies in taking loans and may result in a state of irrational exuberance. It may also result in more financial risk due to constant interest burden on the debt component.

CONCLUSION

It can be concluded from the study that "Interest Coverage Ratio" (in case of "Return of Asset" and "Return on Net Worth" is taken as dependent variable) and "Debt Equity Ratio" (in case of return on asset is taken as dependent variable) play a major role in determining the profitability of the firms in the BSE Sensex companies. These variables should be properly monitored by concerned authority to increase the profitability of the firms.

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