

Impact of Profitability on Capital Structure: An Empirical Study of BSE-500 Companies

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1. Introduction:

Capital structure is the combination of debt and equity which refers to the permanent financing of the company. Capital structure includes all long term funds such as long term loans, preference shares and debentures including equity shares and reserves. Again the term capital structure is used to represent the relationship between debt and equity.

Capital structure is the essential function of the financial manager. The financial managers maintain the financial position of the company and financial requirements. The importance of capital structure is large. Capital structure helps to maintain the return maximization, flexible strategy, reducing liquidity, increasing the firm value, reducing the financial risk, minimizes the cost of capital, benefit of tax deduction and optimum utilization of fund.

Profit is the final outcome of the company. Company earns profit to survive and grow for long period. So profit is very much essential. Financial manager always try to evaluate the efficiency of the company in terms of profit. There are so many profitability ratios which measure the operating efficiency of the company.

High gearing capital structure is positively related with asset and negatively related profit margins (Chiang Yat Hung et al.(2002).Mayar(1997) , King and Santor (2008) , Malekian (2012) and Mireku, Mensah and Ogoe (2014) show the negative impact between leverage and firm performance.Fama and French (2002), Gill, Biger and Mathur (2011),Goyal (2013) show the positive relationship between leverage and profitability.Ramchandran and Candasamy(2011),Olokoyo (2013) and Twaresh (2014) observe that capital structure has significant impact on profitability. Ibrahim (2009) and Ebaid(2009) show that capital structure has no impact on firm performance. Muritala (2012) examines that asset turnover ,size ,age and tangibility has positive relation with ROA .Salim and Yadav (2012) shows that there is a negative relationship between ROA, ROE, and leverage .Chinaemerem and Anthony(2012) observe the negative relationship between ROA ROE and financial leverage .

There are so many attributes like **Assets–Tangibility, Age, Growth opportunities , Non –debt tax shields, Uniqueness, Profitability, Size of the firm, Tax brackets , Volatility, class of Industries, Ownership structure** etc. which are the important determinant of capital structure of a firm. Asset-Tangibility is positively related to leverage and the lenders are also willing to give loans with a large proportion of tangible asset because of its salvage value. Older firms' uses long term debts to their capital structure because of its more reputation in the market than that of newer one. Many researchers opine that Firm's financial leverage is influenced by the growth opportunities and it is also inversely related with leverage. High growth firm chooses debt with low maturity and low interest rate. Depreciation operating losses carry forward and investment tax credit are the non-debt tax shield investment which reduces the firms' tax bill.

Literature Review:

Stulz (1990) opined that managerial discretion costs are important for making financial decisions. Managerial costs are two types: overinvestment cost and underinvestment cost. He stressed the cash flow theory. He examined the relationship between cost of managerial discretion and cash flow volatility. He lastly showed firms capital structure depends on probability.

Bhayani (2005) chooses 504 Indian manufacturing companies during 1994-95 to 2003-04. The author uses regression analysis. The author concludes that debt-equity is positively related with asset structure and growth rate. The author also says that leverage has positive impact on profitability.

Tong and Green (2005) select top 50 companies of china for the period of 2001 to 2003. They use regression model and descriptive statistics. They show that there is a significant negative relationship between leverage and profitability. The contradicting results give opportunity for introducing additional variables in new studies. The researcher utilized panel data model through Fixed Effect and Random Effect model which is not used in large scale.

Hans Degryse, Peter De Goeij and Peter Kappert (2010) investigated the inter and intra industries characteristics' affect to the small firm's capital structure decisions. Firm's characteristics are firm size, collateral, profitability, growth opportunities etc. Data has been taken from Robobank, a large financial institution in Netherlands. The authors suggested that the firm size, asset Structure, net debtors, growth opportunities are positively related on long term debt and profitability has negative impact on long term debt i.e. profitability has great impact on short term debt.

Mukherjee and Mahakud (2010) observe 891 manufacturing companies for the period of 1992-1993 to 2007-08. They apply generalized method of moment's technique and correlation matrix. Their studies show that size and profitability have negative impact on capital structure.

Ali (2011) selects 170 BSE listed Indian textile companies for the period of 2006 to 2010. The author uses cross section fixed effect method and OLS method. The author concludes that leverage is positively affected by size and negatively affected by firm's growth and profitability.

Varun Dawar (2014) selects 78 companies out of 100 BSE listed companies. The author uses fixed effect panel regression model. The study period is 2003 to 2012. The study investigates the relationship between leverage and firm performance. The result shows that leverage has negative impact on financial performance.

Seker, Gowri and Ramya (2014) analyzed the capital structure and leverage analysis. They opined that capital structure is the key decision tool which raised the firm value. The study period is 2004-2013. Ratio analysis is used for analyzing the data. They also find out the different factors which influences capital structure. They showed that there is a positive relation among the firm value with its ROE, value of debt and equity.

The authors select 299 companies. The study period is 1998 to 2006. Acedo-Ramirez, M; Ayala-Calvo, J & Rodriguez-Oses, J (2013) utilized panel data methodology and two stages GMM method. Target debt level of a firm depends on NDTs, growth opportunity, investments, debt cost, age and cash flow or profitability. Profitable firms issue more debt in order to limit over investment and maintain capital structure to reduce the amount of tax. Firm always wants to target debt level. To reach the target debt level firms always measure the speed adjustment. The authors also show the different elements or determinants in respect of two theories of capital structure.

Chadha and Sharma (2015) select 422 listed Indian manufacturing companies'. The study period is 2003-04 to 2012-13. They use secondary data. Chadha and Sharma utilize Houseman Test and panel fixed effect regression model. Chadha and Sharma develop three regression models. Debt-Equity has no impact when the performance parameters are ROA and Tobin's Q. But

Debt-Equity has negative impact when the performance parameter is ROE. Size, age, tangibility, sales growth, ownership structure are important determinants of firm performance. Chadha and Sharma conclude that to take capital structure decision many factors are consider consciously.

Bhushan and Mohinder (2016) select 10 companies out of 42 BSE listed companies. The study period is 2009-10 to 2013-14. The authors have used Pearson Product correlation analysis. The author show the positive relationship between capital structure and profitability.

Research Gap:

1. Most of the literary works related to capital structure and profitability are performed in developed countries but this study showed the impact on developing country especially in the context of BSE-500 listed of Indian companies.
2. There are a few studies found which tried to establish a relationship between the capital structure and profitability in terms of return on equity and debt- equity ratio.
3. There are a few studies found which tried to establish a relationship between the capital structure and profitability in terms of return on assets and total debt to total assets.
4. The studies have failed to analyze the factors which effect the capital structure decision of the firm.

Objectives:

The main objective of my study is to identify the impact of capital structure on profitability of BSE 500 companies. The following objectives are consider as sub objectives-

- To reveal the relationship between capital structure and profitability
- To find out the impact of other relevant variables or factors

Data and Sample selection:

- **3.1. Sample:** To measure the impact of capital structure on profitability the data has been collected from the selected BSE-500 Indian companies. In this dissertation, 354 companies were considered and total observations are 6216. The period of study is 18 years and for the period of 2001 to 2018. This study mainly based on the secondary data. The primary source of the data is 'Capitaline Database.
- **Variables:** To examine the relationship between capital structure and profitability of the firm, researcher selected some dependent and independent variables as well as some control variables. The author selects two dependent variables ROE and ROA.
- The researcher also used two independent variables to measure leverage or capital structure ratio viz. Debt-Equity Ratio and Total Debt to total asset ratio. The researcher selects few control variables these are growth, size and liquidity.

Theoretical Framework:

From the above theoretical discussion the researcher fit a few regression models.

$$\text{PROF}_{.nt} = \alpha + \beta_1 \cdot \text{CS}_{nt} + \beta_2 \cdot \text{Growth}_{nt} + \beta_3 \cdot \text{Size}_{nt} + \beta_4 \cdot \text{CR}_{nt} + e_{nt}$$

Where, PROF_{.nt} denotes profitability of the firm. n=No. of company

t=Time period, CS= Capital Structure Ratio, CR= Current Ratio/Liquidity

- **Model -1**

$$ROE = \alpha + \beta_1 \cdot DER_{nt} + \beta_2 \cdot GROWTH_{nt} + \beta_3 \cdot SIZE_{nt} + \beta_4 \cdot LIQUIDITY_{nt} + e_{nt}$$

H_0 : There is no significant relationship present between ROE and Debt-Equity Ratio

H_1 : There is a significant relationship present between ROE and Debt-Equity Ratio

▪ **Model -2**

$$ROE = \alpha + \beta_1 \cdot TDTA_{nt} + \beta_2 \cdot GROWTH_{nt} + \beta_3 \cdot SIZE_{nt} + \beta_4 \cdot LIQUIDITY_{nt} + e_{nt}$$

H_0 : There is no significant relationship present between ROE and Total Debt to Total Asset Ratio

H_1 : There is a significant relationship present between ROE and Total Debt to Total Asset Ratio

▪ **Model -3**

$$ROA = \alpha + \beta_1 \cdot DER_{nt} + \beta_2 \cdot GROWTH_{nt} + \beta_3 \cdot SIZE_{nt} + \beta_4 \cdot LIQUIDITY_{nt} + e_{nt}$$

H_0 : There is no significant relationship present between ROA and Debt-Equity Ratio

H_1 : There is a significant relationship present between ROA and Debt-Equity Ratio

▪ **Model -4**

$$ROA = \alpha + \beta_1 \cdot TDTA_{nt} + \beta_2 \cdot GROWTH_{nt} + \beta_3 \cdot SIZE_{nt} + \beta_4 \cdot LIQUIDITY_{nt} + e_{nt}$$

H_0 : There is no significant relationship present between ROA and Total Debt to Total Asset Ratio.

H_1 : There is a significant relationship present between ROA and Total Debt to Total Asset Ratio.

Data Analysis, Findings and Interpretation:

Descriptive Statistics

	ROE	ROA	DER	TDTA	GROWTH	SIZE	LIQUIDITY
Mean	8.280728	0.133749	0.758686	0.232934	0.337225	7.072719	1.640923
Median	4.144897	0.118652	0.430000	0.206908	0.132562	7.133615	1.300000
Maximum	933.4505	1.927666	15.60000	18.09259	321.6562	13.08002	35.65000
Minimum	-47.75417	-3.811321	0.000000	0.000000	-1.000000	-3.218876	0.000000
Std.Dev	22.62273	0.119567	1.139972	0.339219	5.444190	1.812042	1.503622
Skewness	21.72141	-4.798115	3.912517	27.90943	45.67941	-0.556986	7.308608
Kurtosis	686.4052	212.1837	26.59938	1333.259	2378.792	5.654596	97.48335
Total Observations-6216							

- .Source: Computed by the author
- The mean values of two dependent variables are 8.28 and 0.13 respectively. The result of Standard deviation showed that the lowest variable is ROA and the highest variable is ROE. The lowest standard deviations express the standard position of the companies and the highest standard deviation showed the volatility position of the companies. The results of skewness are 21.72 and -4.80 respectively. The results of kurtosis are 686.41 and 212.18 respectively. There are two independent variables viz. debt-equity ratio and total debt to total asset ratio. The mean value of two capital structure ratios, debt-equity ratio (DER) and Total debt to Total Asset (TDTA), are 0.758 and 0.233 respectively. The standard deviations of these variables are 1.14 and 0.34 respectively. The results of skewness are 3.91 and 27.91 respectively. The results of kurtosis are 26.60 and 1333.26 respectively.
- **Correlation Matrix:**
- The degree of correlation shows the direction of the variables which may be positive, negative and zero. The correlation matrix shows that size and liquidity have positive relationship with ROE. The correlation matrix also

shows that size and liquidity have positive relationship with ROA. The correlation matrix also shows that DER, TDTA and Growth have negative relationship with ROE. Again there is a positive relationship present between size and liquidity with ROE. DER, TDTA and Growth have negative relationship with ROA and liquidity and size have positive relationship with ROA.

	ROE	ROA	DER	TDTA	GROWTH	SIZE	LIQUIDITY
ROE	1.0000						
ROA	0.2227 (0.0000)	1.0000					
DER	-0.0624 (0.0000)	-0.2363 (0.0000)	1.0000				
TDTA	-0.0649 (0.0000)	-0.3925 (0.0000)	0.4300 (0.0000)	1.0000			
GROWTH	-0.0069 (0.5856)	-0.0181 (0.1532)	-0.0040 (0.7503)	0.0327 (0.0100)	1.0000		
SIZE	0.1992 (0.0000)	0.1182 (0.0000)	-0.0403 (0.0015)	-0.1097 (0.0000)	.00014 (0.9095)	1.0000	
LIQUIDITY	0.0058 (0.6452)	0.0573 (0.0000)	-0.0657 (0.0000)	-0.1025 (0.0000)	-0.0076 (0.5505)	-0.1927 (0.0000)	1.0000

▪ Unit root test:

Unitroot test is used to check the panel data variables and also test these variables are unit root or not i.e. stationery or non-stationery. Panel data takes the stationery property of these variables. There are various methods to test the stationery property. If the data is not stationery then the defect result or spurious result will be come as a whole the panel data model will be failed to express the truth effect of the researcher study. The tested Hypothesis will be-

- Ho: Panels are unit roots
- Ha: Panels are stationary
- Levin, Lin & Chu Unit root test result
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Variables	Statistic	P.Value
ROE	-5.97355	0.0000
ROA	-16.5456	0.0000
DE	-633.988	0.0000
TDTA	-192.008	0.0000
GROWTH	-24.4011	0.0000
SIZE	-22.7221	0.0000
LIQUIDITY	-21.4172	0.0000

- From the above table it is clear that the p-value of all the variables are less than 5% so the null hypothesis is rejected that means alternative hypothesis is accepted. So it is explained that data is stationery at level. Stationery data is very much inevitable to test the panel data model.

Multicollinearity Test:

Independent variables	Collinearity Statistics	
	Tolerance	VIF
TDTA	0.7965	1.26
DER	0.8143	1.22
SIZE	0.9459	1.06
LIQUIDITY	0.9469	1.06
GROWTH	0.9985	1.00

- Dependent Variable: ROA and ROE
- Above table shows that among the independent variables there is no collinearity problem. The VIF of all the independent variables are lies below 10. So the researcher model is free from Multicollinearity problem

6. Models of panel data analysis:

- $PROF_{nt} = \alpha + \beta_1 \cdot LR_{nt} + e_{nt}$
- Where, $PROF_{nt}$ denotes firm profitability. LR =Leverage ratios or capital structure ratios n =No of company
- t =Time period
- **Model-1**
- $ROE = \alpha + \beta_1 \cdot DER_{nt} + \beta_2 \cdot GROWTH_{nt} + \beta_3 \cdot SIZE_{nt} + \beta_4 \cdot LIQUIDITY_{nt} + e_{nt}$

	FIXED EFFECT	RANDOM EFFECT
CONSTANT	-15.06648 (0.0000)	-14.01372 (0.0000)
DER	-0.863018 (0.0025)	-0.914002 (0.0008)
GROWTH	-0.000295 (0.9943)	-0.003023 (0.9416)
SIZE	3.290396 (0.0000)	3.136004 (0.0000)
LIQUIDITY	0.444884 (0.0287)	0.475283 (0.0157)
Total Observations	6216	6216
R-square	0.455793	0.045163
F statistic	13.74307	73.44374
Prob(F-statistic)	0.000000	0.000000
Durbin-Watson stat	0.626384	0.590872

- Source: Computed by the author
- The researcher first selects Return on equity (ROE) as a dependent variable, which measured the firm's profitability. For this first model the researcher takes debt equity as independent variable. After checking the Hausman test the researcher selects Random Effect model. From the above random effect model, the result showed that R-Square is very low that means independent variables could not explain the model. The result also showed that p-value is less than 5% and coefficient is not equal to zero. So this model is fitted. The co-efficient of debt-equity is -0.9140 which

signify the negative impact on ROE. From the empirical analysis it is found that there is significant relationship lies between profitability and Debt-Equity Ratio as a proxy of capital structure. Growth has not significant impact on ROE because the p-value of growth is more than 5% .Size and Liquidity has positive significant impact on ROE.

▪ **Models-2**

▪ $ROE = \alpha + \beta_1.TDTA_{nt} + \beta_2.GROWTH_{nt} + \beta_3.SIZE_{nt} + \beta_4.LIQUIDITY_{nt} + e_{nt}$

	FIXED EFFECT	RANDOM EFFECT
CONSTANT	-16.03217 (0.0000)	-14.82280 (0.0000)
TDTA	-0.957125 (0.2158)	-1.207367 (0.1122)
GROWTH	0.002473 (0.9524)	0.000138 (0.9973)
SIZE	3.356913 (0.0000)	3.183870 (0.0000)
LIQUIDITY	0.482969 (0.0175)	0.509925 (0.0095)
Total Observations	6216	6216
R-square	0.455086	0.043815
F statistic	13.70396	71.15199
Prob(F-statistic)	0.000000	0.000000
Durbin-Watson stat	0.626191	0.590654

▪ Source: Computed by the author

▪ The researcher selects Return on equity (ROE) as a dependent variable, which measured the profitability. For this second model the researcher takes total debt to total asset (TDTA) as independent variable. Hausman test supports the Random Effect Model. The result showed that R-Square is very low (4.3%) that means independent variables could not explain the model. The result also showed that Prob (F-statistic) is less than 5% and coefficient is not equal to zero. So this model is fitted. The co-efficient of total debt to total asset (TDTA) is -1.207367 and p-value is 11%. So this variable is not significant. Size and Liquidity has positive impact on ROE.

▪ **Models-3**

▪ $ROA = \alpha + \beta_1.DER_{nt} + \beta_2.GROWTH_{nt} + \beta_3.SIZE_{nt} + \beta_4.LIQUIDITY_{nt} + e_{nt}$

	FIXED EFFECT	RANDOM EFFECT
CONSTANT	0.041618 (0.0000)	0.058175 (0.0000)

DER	-0.013944 (0.0000)	-0.016833 (0.0000)
GROWTH	0.000263 (0.2642)	0.000154 (0.5117)
SIZE	0.014374 (0.0000)	0.012065 (0.0000)
LIQUIDITY	0.000585 (0.6130)	0.001670 (0.1261)
Total Observations	6216	6216
R-square	0.369520	0.045880
F statistic	9617181	74.66545
Prob(F-statistic)	0.000000	0.000000
Durbin-Watson stat	1.248453	1.172779

▪ Source: Computed by the author

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▪ The researcher selects ROA as a dependent variable which measured the profitability. For this third model the researcher takes Debt-Equity ratio (DER) as an independent variable. The researcher selects fixed effect model after checking Hausman test (p-value is 0.0000). From the above fixed effect model the result showed that R-Square is 37% that means the variation can explained by independent variables. The result also showed that p-value of the model is less than 5% and Durbin-Watson value is 1.23. So this model is fitted. From the empirical analysis it is found that insignificant negative relationship lies between profitability and Debt-Equity. So this model is accepted. Growth and liquidity has not significant impact on ROA. Size has positive impact on ROA.

▪ **Model-4**

$$ROA = \alpha + \beta_1.TDTA_{nt} + \beta_2.GROWTH_{nt} + \beta_3.SIZE_{nt} + \beta_4.LIQUIDITY_{nt} + e_{nt}$$

	FIXED EFFECT	RANDOM EFFECT
CONSTANT	0.089965 (0.0000)	0.099960 (0.0000)
TDTA	-0.112058 (0.0000)	-0.116615 (0.0000)
GROWTH	0.000425 (0.0572)	0.000341 (0.1251)
SIZE	0.010007 (0.0000)	0.008509 (0.0000)
LIQUIDITY	-0.000632 (0.5646)	0.000216 (0.8348)
Total Observations	6216	6216
R-square	0.431527	0.140457
F statistic	12.45602	253.7339

Prob(F-statistic)	0.000000	0.000000
Durbin-Watson stat	1.190356	1.115502

- Source: Computed by the author
- The researcher selects ROA as a dependent variable, which is another measure of the profitability. For this forth model the researcher takes Total debt to Total Asset (TDTA) as an independent variable. The researcher used fixed effect model. From the above fixed effect model, the result showed that R-Square is 43.15%. The result also showed that Prob (F-statistic) value is less than 5% .So this model is fitted. The co-efficient of TDTA is -0.112058 which signifies the negative impact on ROA. Growth and Liquidity has not significant variable in this model as their p-value is more than 5%. Only size has positive impact on ROA.

Findings:

1. From the descriptive analysis the average value of ROE and ROA are 8.28 and 0.13 and standard deviation are 22.62 and 0.12.
2. The average value of DER and TDTA are 0.76 and 0.13 and their standard deviations are 1.14 and 0.34.
3. Skewness measures the degree of asymmetry of distribution. The SK of ROE, DER, TDTA, Growth and liquidity are positively skewed and ROA and size are negatively skewed.
4. Kurtosis measures the peakness of the distribution. The kurtosis value of all the dependent and independent variables are more than 3 so this distribution is leptokurtic.
5. DER has less inverse effect on ROE and more inverse impact on ROA both 1% significance values.
6. TDTA has less inverse impact on ROE and more inverse impact on ROA at 1% significance level.
7. Growth has no significant impact at 1% and 5% significance level.
8. Size has significant impact on ROA and ROE at 1% level.
9. Liquidity has positive impact on ROE but it is not significant at 1% and 5% level. Again it has positive impact on ROA at 1% level.
10. Out of four models 3 and 4th models are nicely fitted .DER has negative impact on ROA at 1% level which is not very much significant.
11. TDTA has negative impact on ROA at 1% level.
12. Growth has positive impact but this variable is not significant at 1% and 5% significance level
13. Size has positive impact both the two models at 1% and 5% level.
14. Liquidity has not impact on profitability on both models.

Conclusion: Most of the literary works related to capital structure and profitability are performed in developed countries but this study showed the impact on developing country especially in the context of BSE-500 listed of Indian companies. The researcher used two performance parameters these are return on asset (ROA) and return on equity (ROE). The researcher also used two parameters to show the capital structure measure. These two measures are Debt equity ratio (DER) and total debt to total asset (TDTA). The empirical test showed that TDTA have an impact on ROA but not ROE. The empirical results expressed that capital structure has negative impact on firm performance. There are so many contradictory results which showed in previous. Fama and French, 2002; Berger and Bonaccorsi di Patti, 2006 and Ghosh et al, 2000 showed the positive result. Gleason et al, 2000 and Simerly and Li, 2000 showed the negative relationship between capital structure and profitability. Growth has positive impact on profitability but the p-value is more 5%. So this variable is not suitable to justify

this model. Again Liquidity has not impact when ROA as the measure of profitability but the p-value is more 5%. So this variable also is not suitable to justify this model. Size has positive impact when ROA and ROE as the measures of profitability. The study has some limitation because there are many variables which are not considered such as corporate governance, time factor, political stability etc.

Limitation of the study:

The study has following limitations:

- The non-availability of data of many firms which are included in Capitaline database.
- There are so many profitability ratios; the researcher only takes two ratios viz. ROE and ROA.
- The researcher only takes size, growth and liquidity as control variables but other factors are not considered.
- The researcher only takes two capital structure ratios other may be considered.
- This study only takes BSE-500 companies.
- Industry classification is not considered in this model.

Scope for future research:

The limitation of present study gives the opportunity for further research. The researcher studies the developing country's data especially in India. Other developed countries study may be consider with the help of different factors

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