Capital Structure and its Determinants During the Pre and Post Period of Recession : Pecking Order vs. Trade Off Theory

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Abstract

This research study was undertaken to understand if there were any significant changes in variables influencing the capital structure decisions of BSE 500 companies in the post period of recession in comparison with the pre - period of recession. A further endeavor was made in this article to investigate if there was a shift in the financing behavior of the firms during the same period of the study. It was observed from the study that the financing behavior of the firms was explained by the pecking order theory in the pre - recession period and trade off theory during the post - recession period.

Key words : **capital structure, financial leverage, pecking order theory, trade off theory, regression analysis, recession**

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Capital structure decisions are perhaps one of the most important decisions taken by finance managers. It is one of the important and challenging issues in corporate finance. What should be the appropriate mix of debt and equity in capital structure? The answer to this question has been debated in different literatures pertaining to capital structure by different researchers. The enormous work in this area by different researchers has tried to investigate if optimal capital structure exists or not, which will help in maximization of the wealth of the shareholders. The optimal mix of debt and equity in capital structure will help in maximizing the returns for the shareholders, while minimizing the cost of capital. Decisions relating to optimal combination of debt and equity have always raised the inquisitiveness of different researchers all over the globe.

There are a number of capital structure theories which have been propagated and have guided the researchers across the globe to do their research in this area. We have basically focused our research paper on two theories namely - pecking order theory and trade off theory. The pecking order theory basically states that the firms resort to internal finances first and then debt capital as external financing. If required, the last option for a firm as a source of external finance is the equity. Thus, equity financing is the last resort of finance for a firm. The profit earned by a firm is distributed as dividend to the equity shareholders. The firm has the option not to distribute the entire profit as dividend, but retain a part of it as retained earnings for future growth and expansion. Thus, as per pecking theory, if the firm is in need of funds, then it will first resort to the retained earnings as internal finance and then to debt and equity as external finance. The Figure 1 explains the sources of funds as per the pecking order theory.

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Figure 1. Sources of Funds as per the Pecking Order Theory

Retained Earnings (Internal)	→	Debt (External)	→	Equity (External)
(1st Preferred Source)		(2nd Preferred Source)		(Last resort)

As per the pecking order theory, there is no existence of optimal capital structure. Trade off theory basically emphasizes on existence of optimal capital structure. This theory states that the firm should make a detailed cost-benefit analysis before including debt in the capital structure. As stated in the earlier paragraph, one of the important advantages of including debt component in capital structure is the benefit of tax shield derived on the interest component of the debt capital. However, one of the major disadvantages of including debt in capital structure is that the financial risk increases because of the constant interest burden of the debt component. The finance manager should investigate the pros and cons of including debt component in the capital structure. Thus, an optimal capital structure can be achieved with an appropriate mixture of equity and debt in the capital structure so as to minimize the cost as well as to maximize the returns.

Our research paper has tried to investigate what determines the capital structure of a firm during the recessionary period comprising of the pre and post period. It is very important to understand the determinants of capital structure before taking various crucial decisions related to capital structure in an organization. When we were scanning the different past literatures related to capital structure, it was observed that the determinants of capital structure differed from one industry to the other. For example, the capital structure determinants for the textile industry would be differing from the steel or cement industry. Thus, we decided to pursue our research taking a cross section of different industries. It was prudent to take BSE 500 for our research as the index represents 94% of the market capitalization of the Bombay Stock Exchange, which is a major and oldest stock exchange of India. The index also covers all the 20 major industries of India namely cement, textile, pharmaceutical, information technology, etc. Thus, we decided to take BSE 500 for our study as it will include cross sectional industries of major sectors in India rather than concentrating on one specific sector/industry.

We all know about the recent global recession that hit the world beginning from the second half of 2007. Recession is always a frightening word for the common man. It not only leads to the reduction in employment generation coupled with decrease in production, but also has an adverse effect on the GDP (gross domestic product) of the country. Hence, the entire country suffers, and the economy comes to a standstill. Recession also has an effect on a firm's policy. The company may restructure its plans and policies in wake of recessionary situation. The finance manager should understand about the different variables determining the capital structure of the company during the recessionary situation so as to take various important capital structure decisions.

Our entire research work has been segregated into pre - recession period and post - recession period. Pre recession period has been taken from 2001-02 to 2006-07 (total of 6 years) and the post recession period is from 2007-08 to 2012-13 (that is for 6 years). Multiple regression analysis has been utilized in this study to understand the capital structure determinants for the firms which belong to BSE 500 during the pre as well as post recession period . The dependent variable which has been taken in the study is "financial leverage" and 10 independent variables have been taken as probable determinants of financial leverage or capital structure during the pre and post period of recession. Hence, the main purpose for conducting this study is to investigate the determinants of capital structure or financial leverage of BSE 500 companies during the pre and post recession period.

Literature Review

A number of empirical works have been done in the area of determinant of capital structure. In order to select the appropriate independent variables for our study, a thorough literature review has been done by us. Some of the studies referred to by us for our study are as follows :

Amasaveni and Gomathi (2012) tried to investigate into the determinants of capital structure in the pharmaceutical industry in Indian scenario. The study further introspected into the applicability of pecking or trade off theory in the pharmaceutical industry. The study utilized correlation, regression, and factor analysis techniques to determine the influence of the various independent variables on leverage.

Srivastava (2012) tried to investigate into the determinants of capital structure in public limited companies in the Indian scenario during the pre and post period of liberalization. He further made an endeavor in his paper to understand if the financing behavior of the companies taken into consideration for the study reflected a pecking or trade off theory.

Anwar (2012) tried to explore the determinants of capital structure in three types of industries namely cement, textile, and power sector in Pakistan. It was concluded from the study that profitability and tangibility were the two common determinants in all the three types of industries.

Khare and Rizvi (2011) made an attempt to find out the most significant variables having an influence on capital structure decisions of BSE 100 index companies. Further, they also made an endeavor in their paper regarding the applicability of the pecking and trade off theory for the BSE 100 index companies. It was concluded from the study that profitability or returns on assets had the most significant influence on the leverage of the companies taken into consideration for the study.

Maji and Ghosh (2007) investigated whether the capital structure of the Indian companies is explained by static trade off theory or pecking order theory. The paper concluded that the capital structure in Indian scenario is not totally explained by either trade off or pecking order theory. Nadeem and Zongjun (2011) investigated into the determinants of capital structure for the firms in Pakistan. Various theories like pecking order theory, trade off theory, and free cash flow were reviewed in the paper.

Karadeniz, Kandir, Balcilar, and Onal (2009) tried to investigate into the factors determining the capital structure decisions of Turkish lodging companies. Some of the variables influencing the capital structure of the firms included profitability in terms of return on assets, tangibility, as well as tax rates. Further, the paper concluded that neither the pecking order theory nor trade off theory fully explained the leverage of the above companies.

Parlak (2010) investigated into the factors determining the capital structure of the manufacturing companies in Turkish Scenario. The paper concluded that profitability is an important determinant of capital structure of the selected firms. Further, the leverage was also explained by the pecking order theory, indicating that the firms preferred internal financing to debt.

Khan (2010) made an attempt to identify those variables that significantly influenced the capital structure of the paint companies in Pakistan. It was concluded from the study that tangibility, growth, and profitability were the main capital structure determinants of the paint companies. It was also observed that majority of the variables reflected a tilt towards the pecking order theory.

Objectives of the Study

The major objectives focused upon in the present research paper are as follows:

(i) To identify those independent variables which are significant determinants of capital structure (financial leverage) for the firms belonging to BSE 500 during the pre and post-recession period.

(ii) To rank the above significant variables determining the financial leverage on basis of their beta values.

(iii) To further investigate whether the variables significantly determining the capital structure for the BSE 500 companies are reflecting pecking order or trade off theory during the pre and post period of recession.

Research Methodology

(i) Data Source : The present study takes into consideration the companies of BSE 500. Using CMIE Prowess database software, we derived a list of 500 companies belonging to the BSE for the years spanning from 2001-2002 to 2006-2007 (total of 6 years) for the pre recession period and 2007-2008 to 2012-13 (i.e. 6 years) for the post recession period. Those companies which were non-operational during any of this 12 years period, or if the data were unavailable during any year of the study, were excluded. Overall, 450 companies, which satisfied all parameters, were utilized for the study.

(ii) Statistical Methods : Durbin Watson test has been used in this study to test if the data are having time series influence or not. If the data are stationary, then multiple regression analysis can be done, otherwise (if time series) we have to go for panel regression. SPSS 20.0 software has been used to derive the correlation matrix between the financial leverage (which is taken as the dependent variable) and the independent variables for both the pre and post recession period. With the help of this matrix, multi-collinearity problem has been investigated.

The correlation between the independent variables should be least for running multiple regression analysis. If the correlation among the independent variables is very high, then multicollinearity problem is assumed to exist and we cannot continue with the multiple regression analysis.

High correlation has been defined in different ways by different researchers. Lewis-Beck (1980) stated that if the correlation between the independent variables is equal to or more than .80, then multicollinearity problems will be assumed to exist. This reference has been used in this research article. Thus, through correlation matrix, multi-collinearity problem has been investigated and then multiple regression has been applied taking one dependent variable (financial leverage) and 10 independent variables.

Variables Taken in the Study

Financial leverage is taken as a dependent variable in this research paper. Financial leverage is defined as average total assets divided by average total debt. Total debt includes the sum total of both borrowings and current liability & provisions. It has been an endeavor in this study so as to understand the determinants of financial leverage by taking 10 independent variables. The Table 1 consists of the details regarding the dependent and the independent variables taken for the study. The independent variables taken in this study may have some impact on financial leverage.

(i) Tangibility : Tangibility has been defined in this research paper as average net fixed assets and average total assets. The trade off theory assumes a positive relationship between tangibility and financial leverage.

(ii) Profitability : Returns on asset has been taken as a proxy for profitability in this paper. One of the important parameters for measuring the financial performance of a firm is by profitability. The trade off theory indicates a positive relationship between profitability and financial leverage. Pecking order theory, which prefers internal financing to debt component as source of finance, has indicated that profitability and financial leverage are negatively related to each other.

(iii) Size of Firm : Some of the major studies in the past have indicated a relationship between size of the firm and financial leverage. Trade off theory basically states a positive relationship between size and financial leverage. A larger sized firm has better debt bearing capacity, but pecking order theory emphasizes that size and financial leverage are negatively related to each other.

Table 1. List of Dependent and Independent Variables Used in the Study

Category	Variable _Code	Variable Name	Details
Dependent	FL	**Financial Leverage**	Average Total Debt/ Average Total Asset
Independent	1.ICR	**Interest Coverage Ratio**	Average PBIT/Average Interest paid
	2. Profitability	**Return on Assets**	Average Earnings before interest and tax (EBIT)/Average Total Assets
	3.BR	**Business risk**	Standard Deviation of PBIT/ Average PBIT
	4.GR	**Growth rate (Assets)**	Compound Growth Rate of Total Assets
	5.DOL	**Degree of operating leverage**	%change in EBIT to % change in Sales
	6. SIZE_1	**Size of the firm(1)**	Log (Average Total Sales)
	7. SIZE_2	**Size of the firm(2)**	Log(Average Total assets)
	8. TAN	**Tangibility**	Average Net Fixed Assets/Average Total Assets
	9. NDTS	**Non Debt Tax Shield**	Average Depreciation/ Average Total Assets
	10. DPR	**Dividend payout Ratio**	Average Dividend / Average PAT (Profit after Tax)

Two proxies have been used for "size of the firm" in this research study, that is, Log (total sales) and Log (total assets).

(iv) Interest Coverage Ratio : Interest coverage ratio has been defined in this article as the ratio between average earnings before interest and tax and average interest paid. Positive relationship between interest coverage ratio and financial leverage is supported by the trade off theory, but on the other hand, the pecking order theory emphasizes that interest coverage ratio and financial leverage are negatively related to each other.

(v) Dividend Payout Ratio : Dividend payout ratio is defined as the ratio between dividend and total income available to shareholders (profit after tax). Here, dividend includes only dividend paid and proposed. The trade off theory states that dividend payout ratio and financial leverage are positively related to each other.

(vi) Non Debt Tax Shield : Non debt tax shield has been defined in this article as the ratio between the depreciation and total assets. It is the tax deduction enjoyed by the business in the form of depreciation. Trade off theory confirms a negative relationship between financial leverage and non debt tax shield.

(vii) Degree of Operating Leverage : Increase in degree of operating leverage in turn increases the fluctuation in the future profit earnings. Operating leverage and debt level in capital structure are negatively related to each other. There is a greater chance that the business failure will increase if the degree of operating leverage increases. Hence, the organizations will prefer lesser debt in the capital structure. Both the pecking order theory and trade off theory confirms a negative relationship between degree of operating leverage and financial leverage.

(viii) Growth Rate (Assets) : Growth rate is an important determinant of capital structure. Pecking order theory confirms a positive relationship between the growth rate (assets) and financial leverage. It states that the highly growth oriented firms will prefer more debt in their capital structure as their profitability will allow them a cushion against the cost of debt. Thus, if the growth opportunities are less, the organization will prefer lesser debt in the capital structure and it will rely more on internal financing. Trade off theory suggests a negative relationship between growth rate (assets) and financial leverage. If the growth opportunities increase, the firm will prefer less leverage and retain more profit in the business.

(ix) Business Risk : One of the important variables in finance from domain knowledge is business risk. It is defined as the coefficient of variation of earnings before interest and tax. With the increase of business risk, the volatility of the earnings will also increase. Hence, the firms will prefer lesser debt in the capital structure because of increased business risk. Thus, the company will rely more on internal financing rather than debt as a source of financing. A negative relationship is expected between business risk and financial leverage.

Empirical Analysis and Results

Before progressing with multiple regression analysis, two tests are conducted so as to be assured that the analysis will provide correct results.

(1) Durbin Watson Test : Durbin Watson test has been utilized in this paper to check if the data is a time series data or is a stationary one. If it is stationary data, we can progress with the multiple regression analysis. The test has been conducted with the help of SPSS 20.0 software taking the dependent variable (Financial leverage) and 10 independent variables . The average Durbin Watson test result for pre recession period is 1.801 and that of post recession period is 1.836. As the Durbin Watson test results is out of the range of -1.5 to +1.5 (and is also closer to 2), which proves that the data does not have time series influence, but is rather a stationary one. We have also conducted a one to one Durbin Watson test taking the dependent variable and each and every individual independent variable separately.

The results of the Durbin Watson Test are given in the Table 2. We can observe from the Table 2 that Durbin Watson test result say for financial leverage and return on assets is 1.979 for the pre-recession period and it is 1.964 for the post-recession period. Similarly, for financial leverage and interest coverage ratio, it is 1.951 and 1.945 for pre and post-recession, respectively. If we analyze all the results, we can say that all the values are beyond the range of -1.5 and 1.5 and are also closer to 2. Hence, we can safely assume that the data is stationary and is not having time series influence. Hence, multiple regression analysis can be done provided that multi-collinearity problem does not exists among the independent variables.

(2) Multi-Collinearity Problem : Multi-collinearity problem is investigated through variance inflation factor and correlation matrix. If the independent variables have a very high correlation amongst them, then multi-

Table 2. Durbin Watson Test to Investigate if the Data has Time Series Influence or Not

Dependent Variable	Independent Variable	Durbin Watson Test (Pre-Recession)	Durbin Watson Test (Post Recession)
Financial Leverage	Return On Assets	1.979	1.964
Financial Leverage	Interest Coverage Ratio	1.951	1.945
Financial Leverage	Tangibility	1.784	1.785
Financial Leverage	Non Debt Tax Shield	1.950	1.966
Financial Leverage	Dividend Payout Ratio	1.932	1.970
Financial Leverage	SIZE_1(Log sales)	1.965	1.991
Financial Leverage	SIZE_2(Log Assets)	1.948	1.947
Financial Leverage	Business Risk	1.966	1.957
Financial Leverage	Growth Rate	1.966	1.901
Financial Leverage	Degree of Operating Leverage	1.945	1.987

collinearity problem seems to exist and the regression analysis will not provide correct results. Variance inflation factor (VIF) is one of the techniques utilized by us to check if there is existence of multi-collinearity problem. It was recommended by Rogerson (2001) that if VIF is greater than 5, then multi-collinearity problem seems to exist. It is observed from the Table 3 that all the independent variables are having VIF less than 5, thus it can be assumed that multi-collinearity problem is not existing among the independent variables.

Table 3. VIF (Pre and Post Period of Recession) to Check Multi - Collinearity Problem

Model		Pre Recession		Post Recession	
		Tolerance	VIF	Tolerance	VIF
1	Return on Asset	.840	1.190	.753	1.329
	Interest Coverage	.958	1.044	.972	1.029
	Tangibility	.950	1.053	.765	1.308
	Non Debt Tax Shield	.836	1.197	.703	1.423
	Dividend Pay Out ratio	.965	1.037	.978	1.022
	Size(Log Asset)	.380	2.630	.437	2.287
	Size(Log Sales)	.379	2.637	.481	2.080
	Business Risk	.984	1.016	.991	1.009
	Growth rate (Assets)	.970	1.031	.828	1.207
	Degree of Operating Leverage	.993	1.007	.995	1.005

Note : VIF means Variance Inflation Factor

The multi-collinearity problem is also investigated through correlation matrix during the pre and post period of recession. We can observe from the Table 4 and Table 5 that all the independent variables are having correlation less than .80. Hence, it can be assumed that multi - collinearity problem is not present for the independent variables during both the pre and post periods of recession. Thus, we safely assume that multi collinearity problem does not exist and we can proceed with the regression analysis by taking the dependent variable as financial leverage and the 10 independent variables.

Table 4. Correlation Matrix (Pre-Recession Period) to Check Multi - Collinearity Problem

		ROA	ICR	TAN	NDTS	DPR	Size_1	Size_2	BR	GR	DOL
Correlation	ROA	1.000	.188	-.047	.162	.128	.157	-.063	.105	.035	.033
	ICR	.188	1.000	-.062	.007	-.014	-.010	-.040	.009	.002	-.007
	TAN	-.047	-.062	1.000	.151	.005	.027	-.025	.047	.110	-.026
	NDTS	.162	.007	.151	1.000	-.012	.094	-.175	.002	-.041	-.008
	DPR	.128	-.014	.005	-.012	1.000	-.013	-.066	.043	-.073	-.048
	Size_1	.157	-.010	.027	.094	-.013	1.000	.733	.032	-.058	-.040
	Size_2	-.063	-.040	-.025	-.175	-.066	.733	1.000	.002	-.044	-.033
	BR	.105	.009	.047	.002	.043	.032	.002	1.000	.031	-.003
	GR	.035	.002	.110	-.041	-.073	-.058	-.044	.031	1.000	.014
	DOL	.033	-.007	-.026	-.008	-.048	-.040	-.033	-.003	.014	1.000

Note: ROA means Return on Assets, ICR means Interest Coverage Ratio, TAN means Tangibility, DPR means Dividend Payout ratio, Size _1 means Log (Average Total Sales),Size _2 means Log (Average Total Assets), BR means Business Risk ,GR means Growth Rate and DOL means Degree of Operating Leverage.

Table 5. Correlation Matrix (Post Recession Period) to Check Multi-collinearity Problem

		ROA	ICR	TAN	NDTS	DPR	SIZE_1	SIZE_2	BR	GR	DOL
Correlation	ROA	1.000	.051	-.108	.250	.065	-.275	.035	-.038	-.208	-.030
	ICR	.051	1.000	-.115	-.072	.015	-.067	-.107	.001	.074	.010
	TAN	-.108	-.115	1.000	.358	-.078	-.101	.071	-.030	-.250	.006
	NDTS	.250	-.072	.358	1.000	-.001	-.254	.115	-.022	-.244	-.022
	DPR	.065	.015	-.078	-.001	1.000	-.038	.047	.013	.003	.030
	Size_1	-.275	-.067	-.101	-.254	-.038	1.000	.627	-.035	-.051	.026
	Size_2	.035	-.107	.071	.115	.047	.627	1.000	-.041	-.226	.030
	BR	-.038	.001	-.030	-.022	.013	-.035	-.041	1.000	-.028	-.006
	GR	-.208	.074	-.250	-.244	.003	-.051	-.226	-.028	1.000	-.030
	DOL	-.030	.010	.006	-.022	.030	.026	.030	-.006	-.030	1.000

Note: ROA means Return on Assets, ICR means Interest Coverage Ratio, TAN means Tangibility, DPR means Dividend Payout Ratio, Size _1 means Log (Average Total Sales),Size _2 means Log (Average Total Assets), BR means Business Risk ,GR means Growth Rate, and DOL means Degree of Operating Leverage.

The entire analysis in this section is segregated into two subsections. The first subsection deals with the analysis related to the pre recession period, and the second subsection deals with the analysis related to the post recession period.

(3) Pre - Recession Analysis (2001-02 to 2006-07) : The regression analysis is run in SPSS 20.0 taking financial leverage as the dependent variable and 10 independent variables during the pre recession period. *R* square is basically the coefficient of determination which states the percentage of the dependent variable explained by the independent variables taken together. It is basically observed from the Table 6 that *R*- square is .469 , which implies that the dependent variable can be explained to the extent of 46.9% by the 10 independent variables during the pre - recession period.

Table 6. Regression Results (*R* square) (Pre Recession Period) to Determine Coefficient of Determination

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate
1	.685	.469	.457	.17580

It can be observed from the Table 7 (regression results) that the following independent variables have a significant influence on the "financial leverage" of the companies belonging to BSE 500 during the pre recession period :

(i) Return on assets with *t* - value of -2.057 and *p* - value of .040.

(ii) Tangibility of *t* - value of 8.664 and *p* - value of .000.

(iii) Size (Log assets) with *t* - value of 2.116 and *p* - value of .035.

(iv) Size (Log sales) with *t* - value of -3.017 and *p* - value of .003.

It can be observed from the above results that 'tangibility' is a major independent variable influencing the financial leverage for the companies belonging to BSE 500 followed by 'return on assets' and 'size of the firm' in terms of log assets and log sales.

Table 7. Regression Results (Pre Recession Period) to Identify the Significant Independent Variables

Model		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		B	Std. Error	Beta		
1	(Constant)	.320	.049		6.496	.000
	Return on Asset	-.211	.103	-.078	-2.057	.040
	Interest Coverage	-1.283E-005	.000	-.029	-.824	.410
	Tangibility	.312	.036	.308	8.664	.000
	Non Debt Tax Shield	-.653	.440	-.057	-1.485	.138
	Dividend Pay Out ratio	.011	.025	.015	.434	.664
	Size(Log Asset)	.032	.015	.120	2.116	.035
	Size(Log Sales)	-.048	.016	-.171	-3.017	.003
	Business Risk	-.001	.001	-.023	-.644	.520
	Growth rate (Assets)	.005	.022	.009	.249	.803
	Degree of Operating Leverage	4.713E-005	.000	.016	.464	.643

Further regression analysis is done using SPSS 20 after removal of the insignificant variables. Those variables which have *p* - value greater than 0.05 as well as the *t*-values are within the range of -2 to +2 are considered to be insignificant, and hence, can be removed from further analysis.

It can be observed from the Table 6 that dividend payout, degree of operating leverage, growth rate, non debt tax shield, interest coverage ratio, and business risk are insignificant variables and not so important in the model.

The regression results after removal of the above insignificant variables are depicted in the Table 8. It is interesting to note from the Table 8 that the regression results (after the removal of insignificant variables) reflect that size (log asset) with *t* - value of 1.727 and *p* - value of .085 is no longer significant. Thus, we can conclude that the following independent variables have a significant influence on the financial leverage or capital structure for the companies belonging to the BSE 500 during the pre - recession period :

(i) Profitability ratio (return on assets) [*t* - value of -2.347 and *p* - value of .019],

(ii) Tangibility [*t* - value of 9.028 and *p* - value of .000] and,

(iii) Size (log of sales) [*t* - value of -2.652 and *p* - value of .008].

(4) Post Recession Analysis (2007-2008 to 2012-13) : Similar to the pre - recession period, regression analysis is also run for the post recession period using SPSS 20.0. It is observed from the regression results (i.e. Table 9) that the coefficient of determination (*R*-square) is .502, that is, the financial leverage is explained to the extent of 50.2 % by the 10 independent variables taken together. The results are depicted in the Table 8.

It is also observed from the regression results in Table 10 that the following independent variables have a significant influence on the financial leverage for the companies belonging to the BSE500 during the post recession period :

(i) Return on Asset : *t* - value of -2.564 and *p* - value of .011.

(ii) Tangibility: *t* - value of 4.468 and *p* - value of .000.

(iii) Size (Log asset) : *t* - value of -5.482 and *p* - value of .000.

(iv) Size (Log sales) : *t* - value of 4.118 and *p* - value of .000.

Table 8. Regression Results - After Removal of Insignificant Variables (Pre Recession Period) to Identify the Significant Independent Variables

Model		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		B	Std. Error	Beta		
1	(Constant)	.303	.045		6.677	.000
	Return on Asset	-.231	.099	-.086	-2.347	.019
	Tangibility	.316	.035	.313	9.028	.000
	Size(Log Sales)	-.040	.015	-.141	-2.652	.008
	Size(Log Asset)	.025	.014	.093	1.727	.085

Table 9. Regression Results (*R* square) (Post-Recession Period) for Determining Coefficient of Determination

Model	*R*	*R* Square	Adjusted *R* Square	Std. Error of the Estimate
1	.709	.502	.490	.17678

Table 10. Regression Results (Post Recession Period) to Identify the Significant Independent Variables

Model		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		B	Std. Error	Beta		
1	(Constant)	.446	.073		6.111	.000
	Return on Asset	-.307	.120	-.103	-2.564	.011
	Interest Coverage Ratio	-1.510E-005	.000	-.052	-1.470	.142
	Tangibility	.183	.041	.169	4.468	.000
	Non Debt Tax Shield	-.293	.562	-.022	-.522	.602
	Dividend Pay Out Ratio	.030	.015	.070	1.987	.048
	Size(Log asset)	-.100	.018	-.288	-5.482	.000
	Size(Log sales)	.071	.017	.206	4.118	.000
	Business Risk	.001	.002	.020	.586	.558
	Growth Rate(Asset)	-.074	.020	-.144	-3.782	.000
	Degree of Operating Leverage	-2.487E-005	.000	-.008	-.242	.809

(v) Growth Rate (Asset) : *t* -value of -3.782 and *t* - value of .000.

The results are depicted in the Table 10. It can be observed from the Table 10 that independent variables namely interest coverage ratio, business risk, dividend payout, degree of operating leverage, and non debt tax shield are having *p*- value which is higher than 0.05 and *t*- values are lying within -2 to +2. Hence, these independent variables are insignificant and not important for the model. These insignificant variables need to be removed, and regression analysis is to be performed again.

The results of the regression analysis after the removal of the above insignificant variables is given in the Table 11. It is very interesting to observe from the Table 11 that when regression analysis is conducted after removal of insignificant variables, only three independent variables have a significant influence on the financial leverage having *p* - value of less than .05 and *t* - value outside the range of 2 to +2. The variables which are

Table 11. Regression Results - After Removal of Insignificant Variables (Post Recession Period) to Identify the Significant Independent Variables

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		B	Std. Error	Beta		
1	(Constant)	.428	.066		6.470	.000
	Return on Asset	-.180	.112	-.059	-1.607	.109
	Tangibility	.277	.035	.273	7.938	.000
	Size(Log asset)	-.053	.014	-.152	-3.679	.000
	Size(Log sales)	.018	.013	.060	1.437	.151
	Growth Rate(Asset)	-.067	.017	-.144	-3.842	.000

significantly determining the financial leverage during the post recession period are as follows:

(i) Tangibility [*t* - value of 7.938 and *p* - value of .000].

(ii) Size (Log of Assets) [*t* - value of - 3.679 and *p* - value of .000].

(iii) Growth rate (Assets) [*t*- value of -3.842 and *p* - value of .000].

Thus, from the empirical analysis in this section, we observe the following points:

(i) The data is not a time series one, but is stationary for both the pre and post recession period, hence multi – regression analysis can be conducted [Durbin Watson test (see (1) Durbin Watson Test)].

(ii) Multi-collinearity problem does not exist between the independent variables during the pre and post recession period [variance inflation factor (VIF) and correlation matrix ((2) Multi-Collinearity Problem)].

(iii) Variables found significantly influencing the financial leverage are as follows:

Pre Recession Period : Return on assets, Tangibility, and Size (Log of Sales).

Post Recession Period : Tangibility, Size (Log of Assets), and Growth rate (Assets).

Pecking Order Theory vs. Trade Off Theory

An attempt has been made in this section to investigate if the financing behaviour of the companies reflects pecking or trade off theory during the pre and post period of recession. After reviewing the past literatures, the expected signs for pecking order and trade off theory for different independent variables related to financial leverage are given in the Table 12. Negative sign of a particular independent variable in Table 12 means that it is negatively influencing the financial leverage or capital structure decisions. For example, if profitability is negatively influencing the financial leverage, it means that as the profitability increases, the firms prefer less in their capital structure.

Positive sign of a particular independent variable means that it is positively influencing the financial leverage or capital structure decisions. For example, if size of a firm has a positive sign, it means that if the size increases, then the firm prefers to increase the debt component in the capital structure. The expected signs for independent variables for pecking and trade off theory are given in the Table 12.

Table 12. Expected Sign for Independent Variables for Pecking Order and Trade Off Theory Derived from Past Literatures

Variables	Expected sign (Pecking)	Expected sign (Trade off)
Size	negative	positive
Profitability	negative	positive
NDTS	not mentioned	negative
Growth Rate	positive	negative
Tangibility	negative	positive
Operating Leverage	negative	negative
Interest Coverage ratio	negative	positive
DPR	not mentioned	positive

Note: NDTS means Non Debt Tax Shield, DPR means Dividend Pay out Ratio

Table 13. Observed Sign of the Independent Variables and Explanation of the Financing Behavior

Significant Variables	PRE RECESSION PERIOD		POST RECESSION PERIOD	
	Observed Sign	Theory Explained	Observed Sign	Theory Explained
Size	negative	Pecking	negative	Pecking
Profitability(ROA)	negative	Pecking		
Tangibility	positive	Trade Off	positive	Trade Off
Growth Rate			negative	Trade Off

Note: ROA means Return on Assets

The observed sign in the Table 13 is taken on the basis of beta values of the independent variables found significantly influencing the financial leverage during the pre and post period of recession. The beta values are derived from the Table 8 (pre - recession period) and Table 11 (post - recession period). The observed sign in Table 13 is reconciled with the expected sign in Table 12 so as to derive the financing behavior (pecking order or trade off theory) for the firms belonging to the BSE500 during the pre and post period of recession. A very interesting phenomena is observed from the Table 13 regarding the financing behavior of the firms belonging to the BSE500. It is seen that the financing behavior of the firms has changed from pecking order theory to trade off theory from the pre to post recession period.

It can be observed (refer to Table 13) that during the pre - recession period, the size of the firm and profitability reflect a negative sign, thus depicting pecking order theory, while tangibility reflects a positive sign, thus indicating trade off theory. Hence, as the majority of the significant independent variables are indicating pecking order theory, thus it can be concluded that the financing behavior of the firms belonging to BSE500 is explained by the pecking order theory.

It can be observed (from the Table 13) that tangibility and growth rate highlight the trade off theory while size of the firm depicts pecking order theory during the post-recession period. Thus, as the majority of the significant independent variables indicate tilt towards the trade off theory, hence it can be safely assumed that the financing behavior of the firms belonging to BSE 500 is explained by trade off theory during the post recession period. The observed sign and explanation of the financing behavior is produced in the Table 13.

We can infer from the analysis that the firms belonging to BSE500 preferred internal financing as the source of fund generation during the pre recession period, giving second priority to debt and then to equity. During the post

recession period, the firms preferred external finance in the form of debt component in the capital structure after making a proper cost- benefit analysis of raising funds through debt. The firms investigated the merits and demerits of the debt before inclusion of an optimal amount of debt component in the capital structure.

Conclusion

The major objectives focused upon in the present paper included to identify those variables that significantly influenced the capital structure of the companies during the pre and post period of recession. As per the analysis, it is observed that profitability, tangibility, and size (Log sales) are the significant variables influencing the capital structure in the pre-recession period, while tangibility, size (log assets), and growth rate are the significant variables during the post-recession period.

We further observe that there is a significant difference between composition of variables influencing the capital structure during the pre and post period of recession, which is, in fact, one of our objectives. It is observed from the above paragraph that growth rate has replaced profitability during the post-recession period in comparison to the pre-recession period. Another objective set in this paper is to rank the significant variables as per their beta values. Thus, an attempt has been made in this section to rank the different significant variables influencing the financial leverage as per their beta values during the pre and post recession period. Beta values are taken as absolute values for ranking the significant variables influencing the financial leverage irrespective of their original values (whether positive or negative).

It is observed from the Table 14 that tangibility ranks as the most significant variable influencing the capital structure for the companies belonging to BSE500 during both the pre and post period of recession. There are basically two types of assets for firms, namely (a) tangible assets like plant and machinery, land and building, etc. and (b) intangible assets like goodwill, etc. Tangibility is having a positive beta, which means that it is influencing the financial leverage in a positive manner. This advocates the trade off theory. The reason for the positive sign of the beta may be attributed to the fact that tangible assets can be used as collateral, hence it reduces bankruptcy costs. It can send a positive signal to creditors who would be more willing to give loans to the company. Thus, the corporates will have more access to debt market. Thus, it confirms a positive relation between tangibility and leverage in this paper. The firms would like to have more debt in the capital structure and prefer to raise funds through debt after a thorough cost- benefit analysis.

It is also observed that size of the firm is a significant variable influencing the financial leverage during the pre and post period of recession. In both the periods, this independent variable is having a negative beta, implying that with the increase of size, the firms prefer to have lesser debt in their capital structure. During the pre recession period, size of the firm in terms of log sales is a significant variable, while in case of the post recession period, size of the firm in terms of log assets is a significant variable influencing financial leverage. The negative beta of this independent variable confirms the pecking order theory. The firms belonging to the BSE500 relied more on internal financing rather than debt as a preferred source of finance. It may be common for a large-size firm to have lower debt, but smaller size firms preferring large leverage may be attributed to the pecking order theory. The prevalence of information asymmetry during the recession period may have resulted in the managers of smaller firms preferring more debt rather than equity as external financing.

Profitability (return on assets) is a significant variable influencing the capital structure during the pre recession period. It has a negative beta implying that with the increase of profitability, the firms prefer to retain more and depend more on retained earnings as the preferred source of financing rather than debt or equity. The negative beta of the return on assets ratio confirms the pecking order theory.

Growth rate (assets) is a significant variable influencing the financial leverage during the post recession period. The negative beta value depicts that with the increase of growth opportunities, the firms prefer to have less component of debt capital. The negative beta of this independent variable confirms the trade off theory where the

Table 14. Ranking of the Significant Independent Variables as per their Beta Values (During the Pre and Post Period of Recession) to Determine the Most Important Independent Variable

Period	Significant Variables	Beta	Impact on Financial Leverage (based on beta values)	Rank
Pre Recession	1) Tangibility	.313	Positive	1
	2)Size(Log Sales)	.141	Negative	2
	3)Profitability (ROA)	.086	Negative	3
Post Recession	1) Tangibility	.273	Positive	1
	2) Size(Log asset)	.152	Negative	2
	3) Growth Rate(Asset)	.144	Negative	3

Note: ROA means Return on Assets

companies carefully analyze the pros and cons before including more debt component in the capital structure (see Table 14).

Another objective set in this paper included investigating whether the significant variables influencing leverage are reflecting pecking order theory or trade off theory. As observed in earlier paragraphs, an interesting trend is noticed in the financing behavior of the firms belonging to BSE500 during the pre and the post period of recession. The firms are found to be shifting from pecking order theory of financing during the pre recession to trade off theory of financing during the post recession period.

Thus, the firms are basically relying on internal finance as the preferred source of finance during the pre recession period. During the post recession period, the organizations prefer to have an optimal capital structure (right mixture of equity and debt) so as to reduce the costs and maximize the returns associated.

Research Implications

When we reviewed the past studies, it was found that none of the studies tried to capture the changes in capital structure determinants during the post recession period compared to the pre recession period. We also extended the present work to capture the changes in the financing behavior of the companies during the post period of recession compared to pre period of recession. The previous studies were generalized in nature without showing the effect of recession. The work is unique in itself as per our best of knowledge as none of the studies previously had been conducted to such an extent. Apart from this, we took a database of 500 companies from BSE500 index for this study. The sample size with which we worked was also very large. The results of the present study would greatly benefit the managements of corporate entities as well as present and prospective investors to understand and capture the changes in capital structure determinants and financing behaviour of the firms in the Indian scenario during the post recession period compared to the pre recession period.

Limitations of the Study and Scope for Further Research

The present research study has been undertaken so as to determine the financing behavior of the firms belonging to BSE500 during the pre and post recession period as well as to identify those variables which have a significant influence on the capital structure of the companies. The study has been undertaken taking into consideration two important theories related to capital structure, namely pecking order theory and trade off theory. Other theories like agency theory or bankruptcy theory can also be taken into consideration while determining the financing behavior of the companies. Further, the study is basically country specific (as it concentrates on BSE500, which is a major index in India) and also somewhat time specific.

The study can be extended to other global indices or specific sectors (like cement, steel, information technology, etc) can also be taken into consideration for future research in this area.

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