Recession Impact on Capital Structure Determinants

Evidences from India

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Abstract

The present study analyzes the important determinants of capital structure of Indian firms with emphasis on the impact of recession. The panel estimations using the fixed effect model have been used on National Stock Exchange 500 firms over a period from 2001 to 2016 to find out the relationship between leverage (Long Term Debt, Short Term Debt, and Total Debt) and 14 explanatory variables. The period of recession has been divided into two phases, i.e., pre-recession and post-recession phases. The empirical findings suggest that profitability, tangibility, liquidity, and debt service capacity seem to be significant determinants of capital structure for both the pre- and post-recession periods. Other variables such as size, cost of debt and financial distress indicate the change in firms' preference for the long-term and short-term debt post-recession. Growth, tax rate, uniqueness, dividend payout ratio, and age indicate significant results in the first phase, but in the second phase, the results are non-significant. These findings confirm that Indian firms do not strictly follow any particular theory; rather, both the pecking order and trade-off theories are merged.

Keywords: Capital Structure, Recession, Pecking Order Theory, Trade-off Theory

INTRODUCTION

The capital structure decisions are of paramount significance in any firm. Since many decades, the companies are struggling to have optimum capital structure. Myers (1984) focused on the concerned reasons behind the firms' choice of their capital structure. The capital structure is a mix of different securities; and in general, a firm can choose any alternative securities that will reduce their cost of

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capital and maximize the market value (Abor, 2005). Academicians and practitioners have been given the challenge of achieving a right capital structure through balanced composition of debt and equity for financing firm's operations and investments (Handoo & Sharma, 2014). The crucial factors that play a significant role in determining a firm's financial decision are still unexplored.

The factors affecting capital structure choice vary from one country to another, even from one industry to the other. Some firms weigh tax benefits of debt (as interest is a tax deductible expense), while others explore the different options of capital structure. Indian firms largely rely on debt in the form of borrowings from banks and financial institutions (Pandey, Singh & Mohaptra, 2017; Bhama, Jain & Yadav, 2016; Pandey & Singh, 2015; Ganguli, 2013). In the last decade, Indian economy has seen that many big companies, financial institutions, and governments are over-

levered. In the past two years, few renowned big corporates in India have even reached the stage of bankruptcy because of their highly levered capital structure. Therefore, it becomes imperative to study the emerging economy like India as a unique case, where corporate firms are highly dependent on debt, which is affected by many factors.

The literature on the impact of recession with respect to capital structure is at the preliminary stage, as there are only few studies in this context (Pattanaik & Sengupta, 2017; Uskumbayeva, 2017; Muijs, 2015; Zhang & Mirza, 2015; Harrison & Widjaja, 2013). Kumar, Colombage & Rao (2017) further viewed that firms located in the emerging markets are still under-examined, which provides more scope for research regarding the determinants of capital structure. Earlier researchers have investigated the capital structure from various parameters, but have failed to explore the impact of recession on capital structure determinants, especially in the Indian context. The decision to increase or decrease the leverage depends on many factors such as prevailing market conditions, investor's acceptance level of debt, cost of debt, etc. According to the existing literature, there are (i) country specific determinants, i.e., macroeconomic conditions of any economy (Lane & Milesi, 2000); (ii) firm specific determinants such as the profitability, size, tangibility, liquidity, non-debt tax shield, uniqueness, etc. (Harris & Raviv, 1991; Rajan & Zingales, 1995). The country specific external determinants affect countries differently (Jong, Kabir & Nguyen, 2008). The crisis that happened in the past had affected countries-experiencing economic losses, changes in the decision of corporate firms etc. Though, the impact could be more or less for different countries.

For instance, in 2008, the world witnessed the global financial crisis that emerged from the United States (US) and affected majority of the countries. This global crisis was the most severe financial crisis, which the world has experienced since the Great Depression of the 1930s. The turning point was the decision made in September 2008 about the failing of Lehman Brothers that had cascading effects (Mohan, 2009). India being one

of these countries could not spare itself from this impact, and as a result, there was economic crisis owing to recession, though the impact on India was relatively lesser than other countries because of the strong fundamental and less exposure of Indian financial sector in the global financial market. The stock market, India's trade and export, withdrawal of FIIs, exchange rate depreciation, and India's handloom sector and tourism were majorly affected.

According to the above given thoughts, the objective of the present study is to explore the most important factors that determine the capital structure of Indian firms in the pre and post-recession phases. The rationale is that these firms are majorly dependent on debt. Hence, we carried out our estimations on the long-term debt as a measure of capital structure. Further, we have done robustness check by using two more proxies for debt, viz., short-term debt and total debt. The work further examines the theory (pecking order or trade-off theory) of capital structure adhered by the Indian firms. The study becomes comprehensive as it tries to explore the impact of all possible determinants (as per literature) on leverage in the form of long-term debt, short-term debt, and total debt, separately. To the best of our knowledge, the study using panel regression for a large data set with longer time span has not been conducted in the Indian context. The paper contributes significantly to the literature by making a modest attempt of analyzing the impact of recession on Indian firms.

REVIEW OF LITERATURE

The challenge in the capital structure is the choice of external financing that depends on two opposing theories, i.e., the trade-off theory and pecking order theory (Modigliani & Miller, 1958). The first theory implies that capital structure is determined by trade-off between the costs and benefits of debt, as the excessive debt increases the chances of bankruptcy costs (Kraus & Litzenberger, 1973) and agency costs (Jensen & Meckling, 1976). However, the alternative pecking order theory implies that firms must follow a financing hierarchy (Myers & Majluf, 1984).

In light of the theoretical framework of these two theories, majority of the empirical studies in literature focus on the determinants of the capital structure. Therefore, the factors that affect leverage have been identified across two paradigms (trade off and pecking order theories). Kumar et al. (2017) noted the dominance of pecking order theory in statistically explaining the capital structure of firms.

International Evidences on Capital Structure

While analyzing the studies in the international context, Harris and Raviv (1991) as well as Rajan and Zingales (1995) suggest that most studies use determinants like tangibility of assets, non-debt tax shields (NDTSs), investment opportunities, firm size, volatility, advertisement expenses, R&D expenses, probability of bankruptcy, profitability, and uniqueness to find the determinants of capital structure. These determinants indicate the theory (trade-off or pecking order theory) that has significant impact on the capital structure decision.

Frank and Goyal (2009) observed industry leverage, market-to-book ratio, tangibility, profits, log of assets, and expected inflation as the important factors of market leverage for the US firms. Moosa, Li and Naughton (2011) in their study indicated that size, liquidity, profitability, and growth opportunities as the robust variables of capital structure of Chinese firms. By examining Sub-saharan African Countries, Khemiri and Noubbigh (2018) found the control variables considered in their study to be significant, thus corroborating similar results as seen in the existing literature.

Sen and Oruc (2008) indicated a negative relationship between leverage and profitability, which corresponds well to the explanations of the pecking order theory. Likewise, Tongkong (2012) noted that firm size and growth opportunities have positive relationship with leverage, whereas profitability and leverage are negatively associated. The results supported the pecking order theory because the highly profitable firms tend to have less debt and firms with higher growth opportunities tend to have greater leverage. Vinh Vo (2017)

observed that tangible asset positively explains the long-term leverage but negatively determines the short-term leverage. The coefficient for the preference of long-term debt over short-term debt is also positive and significant. This finding corroborates that firms having more tangible assets for collaterals borrow more long-term debt. Eldomiaty (2008) found that the emerging companies use both the long-term and short-term debts to adjust leverage. However, the use of long-term debt is relatively higher. The results further show that the capital structure decisions are affected to a large extent by two theories: tradeoff and pecking order.

In the context of South African firms, Ramjee and Gwatidzo (2012) observed that asset tangibility, growth, size, and risk are positively related to leverage, while profitability and tax are negatively related to leverage. Their findings indicated the adherence of both the pecking order and trade-off theories of capital structure. Contrary to this, Abor (2005) observed the short-term debt to be an important component of financing for Ghanaian firms, thus indicating a positive association between total debt and profitability, which suggests that the profitable firms depend more on short-term debt as their main financing option.

Indian Evidences

The important determinants that explain capital structure choices of firms in the developed and some developing countries are equally relevant for Indian firms, despite considerable differences in the institutional structures of corporate firms (Chakraborty, 2010). The different corporate debts affecting a firm's performance depends on specific institutional characteristics of the economy, predominantly, the legal environment relating to exit of a *firm and* the nature of corporate debt (Majumdar & Sen, 2010). There is no single theory (trade off vs. pecking order) that can explain the capital structure of India firms; rather it is a mix of both the theories (Chadha & Sharma, 2015).

Bhaduri (2002) suggested that the optimal capital structure is influenced by factors such

as growth, cash flow, size, uniqueness, and industry characteristics. Chadha and Sharma (2015) empirically found that the size, age, asset tangibility, growth, profitability, non-debt tax shield, business risk, uniqueness, and ownership structure are significantly correlated with leverage. Other variables like dividend payout, liquidity, interest coverage ratio, cash flow coverage ratio, inflation, and GDP growth rate are found to be insignificant.

Bhayani (2005) concluded that the debt ratio of the Indian companies is positively associated with its asset structure and the growth rate confirms that firms maintaining a large proportion of fixed assets tend to retain a higher debt level. The leverage is negatively related to profitability, business risk, and non-debt tax shield. Firms with high profitability ratios tend to use less debt (Sofat & Singh, 2017; Ganguli, 2013). Likewise, Chakraborty (2010) noted that profitability, firm size, and uniqueness are negatively related to leverage, whereas, tangibility and non-debt tax shields are positively related to leverage. Ganguli (2013) found tangibility to be negatively related to leverage.

Kaur and Rao (2009) found that profitability, growth opportunities, liquidity and business risk, non-debt tax shield, and uniqueness are crucial determinants of the Indian cotton textile industry. Further, their results revealed that the textile firms follow the trade-off theory more than the pecking order theory. Sofat and Singh (2017) found that the asset composition, business risk, and profitability are positively related to debt ratio, whereas, firm size and debt service capacity are negatively related to debt ratio. Their results are in tune with the predictions of pecking order theory. Chaklader and Chawla (2016) in their study supported the trade-off theory for variables such as growth, profitability, size tangibility, and non-debt tax shield. Liquidity is the only independent variable that goes in accordance with the pecking order theory. Jaisinghani and Kanjilal (2017) observed that firms with large assets base are positively affected by increase in debt, but capital structure and profitability are negatively associated in the case of small firms.

Recession Impact

During the 2008 financial crisis, the pecking order theory has more explanatory power than the trade-off and market timing theories (Zhang & Mirza, 2015; Harrison & Widjaja, 2013). Likewise, Muijs (2015) observed the preference for the pecking order theory. During the study period, it is observed that the long-term debt is influenced by the firm size and the short-term debt is influenced by asset tangibility. A considerable rise in the short-term and long-term debt was observed in the starting year of the crisis. Pattanaik and Sengupta (2017) found that there is higher leverage during recession than during the expansion period. Thus, firms were able to access external financing while experiencing adverse macroeconomic shocks. Likewise, Uskumbayeva (2017) noted that during the crisis, leverage increased by 16.76%, but it declined by 18.93% after the crisis.

As far as the determinants are concerned, Harrison and Widjaja (2013) found that during the 2008 financial crisis, tangibility and market to book ratio exert stronger influence on leverage, while profitability and firm size exhibit negative influence on capital structure choice. According to the study of Zhang and Mirza (2015), there was no change in liquidity during both the pre- and post-periods, whereas tax, non-debt tax shield, tangibility, economic development, and inflation have shown significant and distinct change in the post-recession period. Profitability and size have shown a significant change in the short-term debt; the growth has shown association with the total debt during the post-crisis period.

Thus, we tried to do a comprehensive study of the Indian markets for the following reasons: a) To find out the significant determinants of capital structure in India; b) To do a robustness check by using alternative definitions of leverage; c) To investigate if the capital structure determinants change in the pre and post re-cession periods; and d) To find out which theory of capital structure applies to Indian firms.

MEASURES OF FIRM DETERMINANTS AND CONTROL VARIABLES

Measures of Firm Determinants

The empirical literature employs several measures of firm determinants to test its relationship with capital structure. These measures include accounting ratios from the profit and loss statement and balance sheet such as profitability, asset tangibility, non-debt tax shield, firm size, financial distress, uniqueness (Harris & Raviv, 1991; Rajan & Zingales, 1995; Abor, 2005; Sen & Oruc, 2008; Frank & Goyal, 2009; Ramjee & Gwatidzo, 2012; Vinh Vo, 2017), growth (Bhayani, 2005; Moosa et al., 2011; Tongkong, 2012), business risk, age, interest coverage ratio, liquidity, and dividend payout ratio (Chadha & Sharma, 2015; Chaklader & Chawla, 2016).

Financial Leverage

To measure the effect that leverage has on capital structure determinants (factors), we used the following three ratios as the principal explanatory variables:

(1) Long-term debt to assets (LTD)
(2) Short-term debt to assets (STD); and
(3) Total debt to assets (TD)

The long-term, short-term, and total debt to assets ratios are better measures of financial leverage than the ratio of liabilities to total assets (Rajan & Zingales, 1995). The rationale is that it provides a good indication of whether the firm is at risk of default any time. The long-term debt to assets involves measuring the ways of financing total assets using the long-term debt. The short-term debt explains the ways of financing total assets using short-term debt. The combination of both the long-term and short-term debts makes total debt, which measures the extent to which the assets are financed by total debt. These ratios are used by a number of empirical studies (Chen, 2004; Eldomiaty, 2008; Frank & Goyal, 2009; Dawar, 2014; Chadha & Sharma, 2015). Our focus is

primarily on the long-term debt results. The short-term debt and total debt have been used to check the robustness of our results.

Exogenous or Control Variables

In explaining the firm determinants, we included a number of control variables for measuring the firm related factors. These are profitability, growth, tangibility, size, cost of debt, liquidity, financial distress, business risk, debt serving capacity, tax rate, age, non-debt tax shield, dividend payout ratio, and uniqueness. There are two measures of profitability such as the return on assets (ROA) and the profitability margin on sales (PMS). In this study, profitability (PROF) is defined as earnings before interest and tax (EBIT) divided by total assets (Sofat & Singh, 2016). The negative firm leverage related to profitability indicates that, firms having more profits use less debt (Sen & Oruc, 2008; Tongkong, 2012; Ramjee & Gwatidzo, 2012). Growth (GROW) is calculated as the percentage change in total assets on a year-to-year basis (Chadha & Sharma, 2015). The most widely used factor is the asset tangibility (TAN), which is measured as net fixed assets divided by total asset (Myers & Majluf, 1984; Titman & Wessel, 1988). The natural logarithm of total assets is used as a proxy for firm size (SIZE) (Rajan & Zingales, 1995; Bhaduri, 2002). The cost of debt (COD) is the effective rate that a company pays on its current debt. In this study, it is calculated as interest before tax divided by long-term debt (Handoo & Sharma, 2014). Liquidity (LIQ) is captured by the current ratio in most of the studies and is measured by dividing current assets by current liabilities (Eldomiaty, 2008; Dawar, 2014). Financial distress (FINDIST) is a situation when a company has difficulty in paying off its financial obligations. Firms with high volatility in their income are likely to be less levered (Bhaduri, 2002, Deesomsak, Paudyal & Pescetto 2004). Volatility (standard deviation) of firm's cash flow is used for analyzing firm's probability of financial distress (Handoo & Sharma, 2014). Business risk (BUSRISK) is measured by variability in earnings and is calculated as the standard deviation of EBIT

(Sofat & Singh, 2016; Kumar et al., 2017). The debt service capacity (DSC) is measured as the ratio of operating income to total interest charges, which indicates the ability of firm to meet its interest payments out of its annual operating incomes (Handoo & Sharma, 2014). Tax rate (TAXR) is measured as tax provision divided by the profits before tax (Eldomiaty, 2008). Age (AGE) is the natural logarithm of the year of incorporation. The age of the firm is negatively related to debt in the developed countries and is positively related to the leverage in the developing countries (Kumar et al., 2017). Non-debt tax shield (NDTS) is measured as depreciation and amortization divided by the total assets. In the Asia-Pacific Region, NDTS is positively associated with the debt because firms can take benefit from the tax shield provided through deduction in interest payments (Chakraborty, 2010). Dividend payout ratio (DPR) is the dividend divided by earnings per share.

Exhibit 1: Expected and Empirical Relationship of Determinants with Leverage

Variable	Expected Theoretical Relation	Mostly Reported in Empirical Literature	Theories
Profitability	-	+	Trade-off theory
		-	Pecking order theory
Growth	Long-term debt (-)	+	Pecking order theory
	Short-term debt (+)	-	Trade-off theory
Tangibility	+	+	Trade-off theory
		-	Pecking order theory
Size	+	+	Trade-off theory
		-	Pecking order theory
Cost of debt	-	+	Pecking order theory
		-	Trade-off theory
Liquidity	-	+	Pecking order theory
		-	Trade-off theory
Financial distress	-	+	Pecking order theory
		-	Trade-off theory
Business risk	-	-	Trade-off theory
		+	Pecking order theory
Debt serving capacity	+	+	Pecking order theory
		-	Trade-off theory
Tax rate	+	+	Pecking order theory
		-	Trade-off theory
Age	+	+	Pecking order theory
		-	Trade-off theory
Non-debt tax shield	-	+	Pecking order theory
		-	Trade-off theory
Dividend payout ratio	+	+	Pecking order theory
		-	Trade-off theory
Uniqueness	+	+	Pecking order theory
		-	Trade-off theory

Note: The signs (+/-) have been given based on expectations from the results and literature evidences.

Uniqueness (UNIQ) is the selling cost divided by sales. Exhibit 1 shows the factors determining leverage along with their expected signs and relationships of previous empirical studies.

DATA AND EMPIRICAL MODEL

Sample Selection and Data

The data for this study consisted of the top 500 companies listed on the National Stock Exchange (NSE) as its sample. The list consisting of 500 companies represents the diverse sectors of the economy. To construct the data sample, the historical data was taken from the Capital line data base. We gathered financial data of 16 years from April 2001 to March 2016. The companies have been selected depending on the availability of complete data for all variables that were required in our study. Following the standard practice, we eliminated 71 financial firms (34 banking and 37 other financial firms) and 191 non-financial firms whose financial year ends in any month other than March. The rationale is that, in India, the financial year begins from 1st April and closes on 31st March. Finally, 238 firms were selected with complete date from April 2001 to March 2016. Out of these 238 companies, eight companies were excluded, as their values were coming as outliers. The data was also winsorized at 1% level. After all filtrations, the final sample consisted of 230 firms.

Empirical Model

To capture the relationship between leverage and firm's determinants, we formulate the following regression model:

$$LTD_{it} = \alpha + \beta PROF_{it} + \beta TAN_{it} + \beta SIZE_{it} + \beta GROW_{it} + \beta COD_{it} + \beta LIQ_{it} + \beta BUSRISK_{it} + \beta FINDIST_{it} + \beta TAXR_{it} + \beta DSC_{it} + \beta NDTS_{it} + \beta UNIQ_{it} + \beta DPR_{it} + \beta AGE_{it} + \varepsilon_{it} \qquad (1)$$

$$STD_{it} = \alpha + \beta PROF_{it} + \beta TAN_{it} + \beta SIZE_{it} + \beta GROW_{it} + \beta COD_{it} + \beta LIQ_{it} + \beta BUSRISK_{it} + \beta FINDIST_{it} + \beta TAXR_{it} + \beta DSC_{it} + \beta NDTS_{it} + \beta UNIQ_{it} + \beta DPR_{it} + \beta AGE_{it} + \varepsilon_{it} \qquad (2)$$

$$TD_{it} = \alpha + \beta PROF_{it} + \beta TAN_{it} + \beta SIZE_{it} + \beta GROW_{it} + \beta COD_{it} + \beta LIQ_{it} + \beta BUSRISK_{it} +$$

$$\beta FINDIST_{it} + \beta TAXR_{it} + \beta DSC_{it} + \beta NDTS_{it} + \beta UNIQ_{it} + \beta DPR_{it} + \beta AGE_{it} + \varepsilon_{it} \qquad (3)$$

where LTD_{it} is the long-term debt to assets for firm i at time t; STD_{it} the short-term debt to assets for firm i at time t; TD_{it} the total debt for firm i at time t; $\beta PROF_i$ the profitability for firm i at time t ; βTAN_{it} the tangibility for firm i at time t; $\beta SIZE_{it}$ the firm size for firm i at time t; $\beta GROW_{it}$ the growth for firm i at time t; βCOD_{it} the cost of debt for firm i at time t; βLIQ_{it} the liquidity for firm i at time t; $\beta BUSRISK_{it}$ the business risk for firm i at time t; $\beta FINDIST_{it}$ the financial distress for firm i at time t; $\beta TAXR_{it}$ the tax rate for firm i at time t; βDSC_{it} the debt serving capacity for firm i at time t; $\beta NDTS_{it}$ the non-debt tax shield for firm i at time t; $\beta UNIQ_{it}$ the uniqueness for firm i at time t; βDPR_{it} the dividend payout ratio for firm i at time t; βAGE_{it} the firm age for firm i at time t; α is the intercept; β is the coefficient of concerned explanatory variables; ε_{it} is the error term.

RESEARCH METHODOLOGY

Initially, the pooled regression was run to validate the findings in the context of other Indian studies. We noted asset tangibility, profitability, size, debt service capacity, and dividend payout ratio to be the major determinants affecting the capital structure, significant at 1percent and 5 percent. The results are close to the findings of Handoo & Sharma (2014). Recent Indian studies (Jaisinghani & Kanjilal, 2017; Chaklader & Chawla, 2016; Chadha & Sharma, 2015; Dawar, 2014) have employed panel regression to perform the empirical evaluation.

The present study employed the panel data regression methodology to conduct the analysis, as it captures the systematic differences across cross section and time period. To check whether the set of control variables suffer from the problem of multicollinearity, the correlation among different pairs were obtained. We noticed that none of the correlation coefficient values was significant enough to be treated for multicollinearity. The regressions were run using the White Error Correction Test to check for heteroskedasticity.

In order to examine the appropriateness of the fixed effect model (FEM) or random effect model (REM) for the panel data, Hausman test was used, which follows a chi-square distribution. The Hausman specification test (Hausman, 1978) compares a random effect model to its fixed counterpart. The null hypothesis is that the individual effects are uncorrelated with the other regressors. The results (in Table 1) have rejected the null hypothesis, which indicate the suitability of FEM over REM. The two-way FEM was used in this work to analyze the results.

Recession Impact

The main focus of this study is to examine the recession effect on the determinants of capital structure, the period has been divided into two phases; 2001-2008 is the pre-recession phase and 2009-2016 is the post-recession phase. Prior to the application of FEM, we tested the results using the two-way REM through the application of the dummy variables for both the pre and post-recession periods. This was conducted to check whether there was any significant difference in both the periods. The results are not presented owing to paucity of space. We observed a notable change in the periods. There was a negative impact on the long-term and total debt post-recession; the impact was positive for the short-term debt, which corroborates that firms tend to use more short-term debt during the post-recession period. The reliance on long-term debt was declined over time.

To observed the change in the pre and post-recession period, we ran FEM to find out the variables that affected the leverage more in both the cases. The findings on the same were shown in the empirical results section.

FINDINGS AND ANALYSIS

Descriptive Results

This section presents the various estimated results and discusses the implications of the descriptive and empirical findings. The summary statistics of dependent and independent variables have been presented in Table 2. The data points reflected the mean values of both the dependent and independent variables across the full sample period – the pre and post-recession periods. The major focus of this study is on the impact of capital structure determinants in the pre and post-recession phase; hence, the t-test values indicate significant difference at 1 percent for the explained and explanatory variables such as long-term debt, short-term debt, total debt, profitability, tangibility, size, growth, financial distress, tax rate, debt service capacity, non-debt tax shield, and age. This indicates that there has been a change in the variables in both the periods.

Empirical Results

Tables 3 and 4 present the regression results using the two-way FEM to test the relationship between capital structure and firm determinants measured by long-term debt, short-term debt, and total debt (Models 1, 2, and 3). In Table 3, it is observed that profitability, tangibility, size, and financial distress are common among all the models for the total period. The results are largely in tune with the findings of the capital structure of Indian firms (Bhayani, 2005; Jaisinghani & Kanjilal, 2017; Chaklader & Chawla, 2016; Chadha & Sharma, 2015; Handoo & Sharma, 2014).

Profitability seems to have negative association with leverage, thus corroborating that firms with high

Table 1: Hausman Test Result

Test Summary	Chi-sq. Statistic	Chi-sq. d.f.	Prob.
Specification: Model 1 (LTD)	574.02	14	0.00
Specification: Model 2 (STD)	173.52	14	0.00
Specification: Model 3 (TD)	92.84	14	0.00

Variables	Mean (Full sample period)	Mean (Pre-recession)	Mean (Post-recession)	Difference of Means (t-test)
LTD	0.19	0.23	0.15	18.32***
STD	0.13	0.12	0.14	−5.11***
TD	0.32	0.35	0.28	10.80***
PROF	0.19	0.20	0.18	4.11***
TAN	0.42	0.45	0.37	17.04***
SIZE	3.10	2.78	3.43	−70.76***
GROW	0.20	0.25	0.15	3.02***
COD	2.43	1.68	3.18	−1.85
LIQ	2.69	2.67	2.71	−0.60
BUSRISK	0.32	0.29	0.35	−0.64
FINDIST	401.92	292.05	511.79	−7.56***
TAXR	0.21	0.31	0.09	5.85***
DSC	142.45	84.42	200.48	−5.07***
NDTS	0.28	0.32	0.25	14.05***
UNIQ	0.05	0.05	0.05	5.50
DPR	25.58	26.02	25.15	0.56
AGE	1.49	1.42	1.56	−62.61***

Note: *** Significant at 1 per cent level.

profitability ratios tend to use less debt (Sofat & Singh, 2017; Ganguli, 2013) following the pecking order hypothesis. Tangibility and size are positively related to leverage, thereby confirming the fact that large firms that maintain bulky assets base tend to maintain high leverage (Bhayani, 2005). These results confirm to the adherence of trade-off theory. Liquidity is negatively associated with debt and goes in accordance with the pecking order theory (Chaklader & Chawla, 2016). Higher liquidity ensures positive working capital and therefore funds can be saved for long-term investments. Age is positively associated with the long-term and total debt. The findings of Kumar et al. (2017) further confirmed that age is positively related to leverage in the developing countries, and the alternative sources of finance are limited. Therefore, large firms rely more on formal sources of finance, mainly debt, but like to keep their debt in limits as indicated by the negative association of cost of debt and leverage. This corroborates the fact that the increased cost of debt restrains firms from issuing more debt; and henceforth, firms adjust their capital structure following the trade-off theory.

Tax rate, debt service capacity, uniqueness, and dividend payout ratio have statistically negative relationship with the short-term debt. These findings indicate that firms have least preference for short-term debt for the given determinants, thus confirming that the results support the pecking order theory. Growth, business risk, and non-debt tax shield indicate that there is no significant relationship with leverage in our study.

The above findings depict the results for the full sample period. Positive and negative signs indicate the increase and decrease of leverage effect. To further examine the determinants indicating the change in the pre and post-recession periods, the regression using FEM were ran, and the results have been demonstrated in Table 4.

Table 3: Regression Results of Capital Structure and Determinants for the Full Period

	Long-term Debt		Short-term Debt		Total Debt	
Explanatory Variable	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
PROF	−0.19	−8.87***	−0.15	−9.19***	−0.35	−14.32***
TAN	0.15	8.30***	0.03	2.14**	0.18	9.69***
SIZE	0.08	6.25***	−0.04	−4.15***	0.04	3.94***
GROW	0.00	1.39	−0.00	−1.35	0.00	0.24
COD	−0.00	−3.29***	−0.00	−0.48	−0.00	−1.80
LIQ	−0.00	−3.50***	−0.00	−0.02	−0.00	−3.14***
BUSRISK	−0.00	−0.76	−0.00	−0.33	−0.00	−0.99
FINDIST	0.00	2.51***	0.00	2.01**	0.00	3.49***
TAXR	−0.00	−1.39	−0.00	−4.11***	−0.00	−2.76***
DSC	−0.00	−0.68	−0.00	−3.77***	−0.00	−3.19***
NDTS	−0.03	−0.81	0.00	0.27	−0.02	−0.45
UNIQ	0.00	0.05	−0.30	−1.92**	−0.29	−1.91**
DPR	0.00	1.30	−0.00	−4.08***	−0.00	−1.97**
AGE	0.08	2.33***	−0.01	−0.33	0.07	1.99**
R2	0.65		0.55		0.69	
Adjusted R2	0.62		0.52		0.66	
SE of regression	0.12		0.11		0.14	
Mean dependent var	0.19		0.13		0.32	
SD dependent var	0.19		0.16		0.24	
F-statistic	24.37		16.24		29.15	
Prob. (F-statistic	0.00		0.00		0.00	
Akaike info criterion	−1.41		−1.53		−1.01	
Schwarz criterion	−0.97		−1.09		−0.58	
Hannan-Quinn criter.	−1.26		−1.37		−0.86	
Durbin-Watson stat	0.81		0.67		0.57	

Note: *** and ** Significant at 1 and 5 per cent level.

The findings indicate that few variables such as profitability, tangibility, liquidity, and debt service capacity seem to be significant in both the phases; however, there is no change in their signs. For instance, profitability indicates negative association with leverage in both the periods, thus confirming the acceptance of Pecking Order Hypothesis (POH). It is also significant to note that in the post-recession period, the coefficient values of long-term debt has declined and the short-term debt has inclined. These results to some extent are in tune with the findings of Pattanaik and Sengupta (2017), and Muijs (2015). Thus, there is a shift in firms' preference between the long-term and short-term debt. The signs of tangibility and liquidity are within the expected lines in both the periods, thus indicating adherence to the trade-off

theory. Though debt service capacity is significant, the signs are reverse to our expectations. The coefficient values have become highly negative for the short-term debt in the second phase.

Other variables such as size, cost of debt, and financial distress indicate the change in firms' preference for the long-term and short-term debt in the post-recession period. For instance, in the case of size, the results seem to be significant for both long-term and short-term debt in the pre-recession period, but the results are in favor of only long-term debt in the post-recession period. Similar kinds of observations have been made for the cost of debt and financial distress. It is equally important to note that the result of determinant size is positive for the long-term debt

Table 4: Pre and Post-recession Results of Capital Structure and Determinants

Explanatory Variable	Pre-recession						Post-recession					
	Long-term Debt		Short-term Debt		Total Debt		Long-term Debt		Short-term Debt		Total Debt	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
PROF	-0.23	-6.30***	-0.16	-5.92***	-0.39	-8.88***	-0.15	-3.71***	-0.19	-6.71***	-0.35	-7.99***
TAN	0.10	3.09***	0.04	1.67	0.15	4.47***	0.10	4.84***	0.02	0.73	0.12	4.14***
SIZE	0.14	4.50***	-0.06	-3.61***	0.07	2.38***	0.06	2.82***	0.02	0.56	0.08	1.54
GROW	0.00	2.31***	-0.00	-2.29**	0.00	0.33	0.00	1.57	0.00	0.15	0.00	0.81
COD	-0.00	-1.00	-0.00	-1.33	-0.00	-1.96**	-0.00	-1.96**	0.00	2.25**	-0.00	-0.49
LIQ	-0.00	-1.88**	-0.00	-0.39	-0.00	-2.16**	-0.00	-2.65***	-0.00	-0.70	-0.00	-2.65***
BUSRISK	0.00	0.52	-0.00	-0.20	0.00	0.80	-0.00	-1.13	-0.00	-0.41	-0.00	-0.53
FINDIST	0.00	1.09	0.00	1.51	0.00	2.90***	0.00	2.45***	-0.00	-0.56	0.00	0.40
TAXR	-0.00	-1.06	-0.00	-1.73	-0.00	-2.55***	0.00	0.02	-0.00	-0.93	-0.00	-0.42
DSC	-0.00	-2.04**	-0.00	-1.95**	-0.00	-2.15**	-0.00	-1.02	-0.00	-4.17***	-0.00	-3.06***
NDTS	0.00	0.08	0.00	0.12	0.00	0.11	-0.05	-1.13	-0.00	-0.11	-0.05	-1.82
UNIQ	0.05	0.44	-0.45	-3.09***	-0.40	-2.95***	0.01	0.30	0.09	0.79	0.10	0.78
DPR	0.00	0.72	-0.00	-0.87	-0.00	-0.41	0.00	0.83	-0.00	-2.71***	-0.00	-1.08
AGE	0.01	0.23	0.03	0.66	0.04	0.72	0.39	6.56***	-0.04	-0.50	0.35	4.59***
R2	0.71		0.63		0.76		0.78		0.74		0.85	
Adjusted R2	0.66		0.57		0.72		0.74		0.70		0.83	
SE of regression	0.12		0.10		0.13		0.08		0.08		0.10	
Mean dependent var	0.23		0.12		0.35		0.15		0.14		0.29	
SD dependent var	0.20		0.16		0.25		0.16		0.15		0.23	
F-statistic	15.50		10.79		20.02		22.42		18.48		35.93	
Prob. (F-statistic	0.00		0.00		0.00		0.00		0.00		0.00	
Akaike info criterion	-1.31		-1.57		-1.07		-2.06		-1.98		-1.71	
Schwarz criterion	-0.56		-0.82		-0.32		-1.31		-1.23		-0.96	
Hannan-Quinn criter.	-1.03		-1.30		-0.80		-1.79		-1.71		-1.44	
Durbin-Watson stat	1.21		0.94		0.96		1.04		1.02		0.79	

Note: *** and ** Significant at 1 and 5 per cent level.

and negative for the short-term debt. Hence, the results confirm our expectations for long-term debt by only following the trade-off theory. The cost of debt is negative for long-term but positive for short-term debt in the second phase. The results are contradictory to our expectations for financial distress determinant, which indicates that in spite of firms being in the distress situation, they still continue to have long-term debt, especially in the post-recession period.

Some other factors such as growth, tax rate, uniqueness, dividend payout ratio, and age indicate that the results are significant in one phase but non-significant in the other. Growth, tax rate, and uniqueness seem to have significant but contradictory evidences in comparison to our expectations. These results exhibit mix of both the theories. The findings are in tune for age, following the POH post-recession, which indicates that old firms are more inclined toward long-term debt issuance than young firms. The results are non-significant for business risk and non-debt tax shield.

SUMMARIES OF FINDINGS AND CONCLUSION

In continuation of the seminal work of Modigliani & Miller (1958), a massive literature investigates the relationship between capital structure and its determinants. Most of these studies explore this relationship in the developed and developing countries; however, the emphasis from the perspective of recession is less. The present study examines the impact of capital structure determinants on the leverage of listed firms in India for the sample period. The study equally emphasizes to examine the impact of recession on capital structure decisions. Using 14 explanatory variables and three measures of leverage (LTD, STD, and TD), the panel regression results indicate that profitability, tangibility, size, and financial distress have been found to be significant across all models. Firms with high profitability tend to use less debt, following POH. Mature large firms with bulky assets base tend to maintain high leverage. Thus, age is positively associated with long-term debt. Liquidity and cost of debt are negatively associated with debt. Tax rate, debt service capacity,

uniqueness, and dividend payout ratio have statistically negative relationship with short-term debt. Therefore, these results confirm the pecking order theory. Growth, business risk, and non-debt tax shield indicate that there is no significant relationship with leverage in our study.

Further scrutinization of the determinants have indicated a change in the pre and post-recession periods, we noted that variables such as profitability, tangibility, liquidity, and debt service capacity seem to be significant in both the phases. Other variables such as size, cost of debt and financial distress indicate the change in firms' preference for the long-term and short-term debt during the post-recession phase. Growth, tax rate, uniqueness, dividend payout ratio, and age indicate significant results in one phase but non-significant in the other. Growth, tax rate, and uniqueness seem to have significant but contradictory evidences in comparison to our expectations. To sum up, Indian firms' capital structure decisions are affected by many determinants. There is no single theory that firms strictly follow; rather, both the pecking order and trade-off theories adhere to the Indian context.

Our study has provided different implications both for the academia and corporate finance managers. For academia, evidence is provided for the determinants of capital structure over a large sample base for longer period. We have also provided some insights about the determinants that have become important in the post-recession phase. We have further tried to link the significant determinants with the capital structure theories and provided some directions for future research. The study can further be explored by considering more countries in the Asian context as only one country has been studied so far in this work. The work could further be extended to conduct the sectoral analysis for exploring the presence of any difference in the relationship given for the specific attributes particular to an industry.

For corporate Finance managers, we have empirically showed the important factors to be considered before designing their capital structure. Thus, the study contributes to the corporate finance literature, especially in relation to the emerging markets.

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