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DETERMINANTS OF DEBT CAPITAL IN INDIAN CORPORATE SECTOR: A QUANTILE REGRESSION ANALYSIS

Abstract

Capital obtained from borrowing is called debt capital. Many studies in the past as well as present provided immense evidence about the determinants of capital structure of a firm. In this scenario the present study looking in to the determinants of debt capital in the capital structure. The analysis is based on data collected from 213 listed companies of Bombay Stock Exchange 500 index using capital line data base during the period 2002-2011. Most of the variables show skewed and Kurtic distribution the study relied upon quantile regression analysis as an appropriate tool to find the determinants of debt capital. The study found that for the quantile ranging from 0.05^{th}, 0.25^{th}, 0.50^{th}, 0.75^{th}, and 0.95th. We found that long-term leverage, assets structure and size are positively determining the debt capital at 0.05^{th} quantile. For the quarter quantile (0.25^{th}) and median quantile (0.50^{th}) Financial risk, long term leverage and size are positively and debt capacity is negatively determine the debt capital. More over financial risk and long-term leverage are positively determining the debt capital for 075^{th} quantile. However in case of highest quantile (0.95^{th}) long-term leverage and non-debt tax shield are positively determine the debt capital mean while debt capacity is negatively determine the debt capital.

Key words: debt capital, quantile regression, Bombay stock exchange, capital structure, Indian corporate sector.

JEL Code: E31, C32, G32

Introduction

Debt capital is a significant part of a capital structure. It is the capital that is borrowed from various sources such as banks, public or other financial institutions. Developing country like India we always face problem for rising fund for financing the various projects. So debt capital is one of the sources that cover up the gap. There are immense studies has been conducted in all over the world on capital structure and its determinants. But we find debt capital is less addressed. In this regards the study is organised.

In this study, we have attempted to identify the critical factors determines the debt capital of Indian firms. For the purpose of analysis, a panel model has been estimated for the years 2002 to 2011. Further, for analysis we used quantile regression model which is relatively new in the present context. This is because by having a complete picture of all quantiles, it is possible to consider several different regression curves that correspond to the various percentage points of the distributions and not only the conditional mean distribution, which neglects the extreme relationship between variables. Quantile regression (Koenker and Bassett 1978; Koenker and Hallock 2001) is a method for fitting a regression line through the conditional quantiles of a distribution. It allows the examination of the relationship between a set of independent variables and the different parts of the distribution of the dependent variable. Quantile regression overcomes some of the disadvantages of the conditional mean framework built upon central tendencies, which tend to lose information on phenomena whose tendencies are toward the tails of a given distribution (Hao and Naiman 2007). The use of quantile regression approach is chosen also because of skewed distribution of TDEQ, LDTD, NFATA, CR, SIZE, ROA, DEPTA and INCOVER. Since in such case the usual assumption of normally distributed error terms is not warranted and could lead to unreliable estimates. Furthermore, companies analyzed are fundamentally heterogeneous and it may make little sense to use regression estimators that implicitly focus on the 'average effect for the average company' by giving summary point estimates for coefficients. Instead, quantile regression techniques are robust to outliers and are able to describe the influence of the regressors over the entire conditional distribution of TDEQ, LDTD, NFATA, CR, SIZE, ROA, DEPTA and INCOVER,.

Literature review.

Rajan and Zingales (1995) suggested that the level of gearing in UK companies is positively related to size and tangibility, and negatively correlated with profitability and the level of growth opportunities. However, as argued by Harris and Raviv (1991), 'The interpretation of results must be tempered by an awareness of the difficulties involved in measuring both leverage and the explanatory variables of interest' dependent. Further Alan A. Bevan & Jo Danbolt (2002) studied the difficulties of measuring gearing, and the sensitivity of Rajan and Zingales' results to variations in gearing measures. Based on an analysis of the capital structure of 822 UK companies, Rajan and Zingales' where results were found to be highly definitional-dependent. The determinants of gearing appeared to vary significantly, depending upon which component of debt was analyzed. In particular, significant differences have been found in the determinants of long- and short-term forms of debt. Given that trade credit and equivalent, on average, accounts for more than 62% of total debt, the results are particularly sensitive to whether such debt is included in the gearing measure. Therefore, it was observed that analysis of capital structure is incomplete without a detailed examination of all forms of corporate debt. Aydin Ozkan (2003) conducted study on the determinants of the capital structure of the selected UK firms. He examined the empirical determinants of borrowing decisions of firms and the role of adjustment process. A partial adjustment model was estimated by GMM estimation procedure using data for an unbalanced panel of 390 UK firms over the period of 1984–1996. The results provided positive support for positive impact of size, and negative effects of growth opportunities, liquidity, profitability of firms and non-debt tax shields on the borrowing decisions of the firms.

Huang and Song (2006) studied the determinants of the capital structure of the selected firms in China, by using database containing the market and accounting data (from 1994 to 2003) from more than 1200 Chinese-listed companies to document their capital structure characteristics. As in other countries, leverage in Chinese firms increases with firm size and fixed assets, and decreases with profitability, non-debt tax shields, growth opportunity, managerial shareholdings and correlates with industries. It was found that state ownership or institutional ownership has no significant impact on capital structure and Chinese companies consider tax effect in long-term debt financing. Different from those in other countries, Chinese firms tend to have much lower long-term debt.

Delcoure (2007) investigated, whether capital structure determinants in emerging Central and Eastern European (CEE) countries support the traditional capital structure theory developed to explain western economies. The determinants like Collateral value of assets, size, risk, growth opportunities, profitability and non debt tax shield were studied. The empirical evidence suggested that some traditional capital structure theories are portable to companies in CEE countries. However, neither the trade-off, pecking order, nor agency costs theories explain the capital structure choices. Companies do follow the modified "pecking order." The factors that influence firms' leverage decisions are the differences and financial constraints of banking systems, disparity in legal systems governing firms' operations, shareholders, and bondholders rights protection, sophistication of equity and bond markets, and corporate governance.

Campello and Giambona (2010) studied the relation between corporate asset structure and capital structure by exploiting variation in the saleability of tangible assets. The theory suggests that tangibility increases borrowing capacity because it allows creditors to more easily repossess a firm's assets. Tangible assets, however, are often illiquid. It has been shown that the redeploy ability of tangible assets is a main determinant of corporate leverage. To establish this link, the analysis used an instrumental variables approach that incorporates measures of supply and demand for various types of tangible assets (e.g., machines, land, and buildings). Consistent with a credit supply-side view of capital structure, they found that asset redeploy ability is a particularly important driver of leverage for firms that are likely to face credit frictions (small, unrated firms). The tests have also shown that asset redeploy ability facilitates borrowing the most during periods of tight credit.

Noulas and Genimakis (2011) studied the determinants of the capital structure of the firms listed on the Athens Stock Exchange, using both cross-sectional and nonparametric statistics. The data set is mainly composed of balance sheet data for 259 firms over a 9-year period from 1998 to 2006, excluding firms from the banking, finance, real estate and insurance sectors. The study assessed the extent to which leverage depends upon a broader set of capital structure determinants, got evidences showing that the capital structure varies significantly across a series of firm classifications. The results document empirical regularities with respect to alternative measures of debt that are consistent with existing theories and, in particular, reasonably support the pecking order hypothesis

The empirical literature suggests a number of factors that may influence the capital structure of firms. Bradley et al., (1984), Rajan and Zingales (1995), Kremp et al., (1999) and Frank and Goyal (2002) find leverage to be positively related to the level of tangibility. However, Chittenden et al., (1996) and Bevan and Danbolt (2001) find the relationship between tangibility and leverage to depend on the measure of debt applied. Further, managers of highly levered firms will be less able to consume excessive perquisites, since bondholders more closely monitor such firms. The monitoring costs of this agency relationship are higher for firms with less collateralizable assets. Therefore, firms with less collateralizable assets might voluntarily choose higher debt levels to limit consumption of perquisites (Drobetz and Fix, 2003). Hence, the agency model predicts a negative relationship between tangibility of assets and leverage. Firms with more tangible assets have a greater ability to secure debt. Alternatively, Grossman and Hart (1982) argue that the agency costs of managers consuming more than the optimal level of perquisites is higher for firms with lower levels of assets that can be used as collateral. The monitoring costs of the agency relationship are higher for firms with less collateralizable assets. Consequently, collateral value is found to be a major determinant of the level of debt financing (Omet and Mashharance, 2002). From a pecking order theory perspective, firms with few tangible assets are more sensitive to informational asymmetries. These firms will thus issue debt rather than equity when they need external financing (Harris and Raviv, 1991), leading to an expected negative relation between the importance of intangible assets and leverage.

Titman and Wessels (1988), in their study mentioned that because of bankruptcy risk, managers would not likely to use debt choice. However, since larger firms have a chance to be more diversified, they have relatively little bankruptcy risk (Titmand and Wessels, 1988). Warner (1977) suggests that bankruptcy costs would be higher for smaller firms. Research evidences for this variable are also ambiguous (Drobetz and Fix, 2003). For example, Friend and Hasbrouck (1988), Crutchley and Hansen (1989) and Berger et al., (1997) report a positive relationship between firm's size and leverage, whilst Feri and Jones (1979) suggest that firm's size has a significant impact on leverage even though the sectoral decisions have been observed to vary among industries. Rajan and Zingales (1995) argued that larger firms tend to be more diversified and fail less often, so size may be an inverse proxy for the probability of bankruptcy. Large firms are also expected to incur lower costs in issuing debt or equity. Thus, large firms are expected to hold more debt in their capital structure than small firms. The measure of size used in this paper is the natural logarithm of net sales similar to the approach followed by Drobetz and Fix (2003). They discuss the logarithm of total assets as an alternate; however, they accept the net sales as a better proxy for the measure of size.

Titman and Wessles (1988) and Barclay and Smith (1996) find a negative relationship between growth opportunities and the level of either long-term or total debt. Similarly, Rajan and Zingales (1995) also find a negative relationship between growth opportunities and leverage. They suggest that this may be due to firms issuing equity when stock prices are high. As mentioned by Hovakimian et al. (2001), large stock price increases are usually associated with improved growth opportunities, leading to a lower debt ratio. However, Bevan and Danbolt (2001) find a negative relationship between growth and long-term debt, but find total leverage to be positively related to the level of growth opportunities. On the other hand, Bevan and Danbolt (2001) find short-term debt to be positively related to growth opportunities.

Toy et al., (1974), Kester (1986), Titman and Wessels (1988), Harris and Raviv (1991), Bennett and Donnelly (1993), Rajan and Zingales (1995), and Michaeles et al. (1999), Booth et al. (2001), Bevan and Danbolt (2001) all find leverage to be negatively related to the level of profitability (supporting the pecking-order theory). Whilst Jensen et al. (1992) find leverage to be positively related to the level of profitability (supporting the trade-off theory)

Research methodology

Data source

The study is dealing with the Bombay Stock Exchange 500 index companies. The banking and finance companies are proposed to be kept out of the scope of the study. A period of ten year ranging from 2002 to 2011 is considered for the study. A total of 213 companies have been selected for the final analysis. Capital line data base is used for collecting the financial data for the prescribed period.

Variables used for the study

Based on above analyzed literature we have identified the possible determinants of debt capital. Following are the elements of debt capital:

Asset structure: Agency theory suggests that firms with large fixed assets have comparative advantage in obtaining long-term debt, whereas firms with high sales relative to fixed assets have a comparative advantage in borrowing over shorter periods. In this study we are taking Net fixed assets to total asset (NFATA) as a proxy for Asset structure

Profitability: pecking order theory suggests firms will use retained earnings first as investment funds and then move to bonds and new equity only if necessary. Chang (1999) says profitable firms tend to use less debt. There are some recent studies Wald (1999) for developed countries, Wiwattanakantang (1999) and Booth et al. (2001) for developing countries. Long and Maltiz (1985) find leverage to be positively related to profitability In this study, profitability will be defined as Return on assets (ROA).

Non-Debt Tax shield : According to Modigliani and Miller (1958), if interest payments on debt are tax-deductible, firms with positive taxable income have an incentive to issue more debt. That is, the main incentive for borrowing is to take advantage of interest tax shields. In the framework of the trade-off theory, one hypothesizes a negative relationship between leverage and non-debt tax shields. The ratio of depreciation to total assets (DEPTA) has been taken as a measure of Non-Debt Tax shield.

Debt capacity: it measures the ability of firms to pay interest on debt. We have taken interest coverage ratio as a proxy for measuring the debt capacity (INTCOVER)

Financial risk*:* the ability of a firm to meet its long-term fixed expenses and to accomplish long-term expansion and growth Total debt to equity (TDEQ) is taken as a proxy to measure the financial risk of the firm.

Liquidity: the measure of firm's ability to meet short term obligations. Current ratio (CR) is used for measure of liquidity.

Long-tem leverage: it measures the percentage of firm's assets that are financed with loans and financial obligations lasting more than one year. The ratio provides a general measure of the financial position of a company. Long term debt to total assets (LDTA) taken as a proxy for long term leverage

Size: From the theoretical point of view, the effect of size on leverage is ambiguous. As Rajan and Zingales (1995, p. 1451) claim: "Larger firms tend to be more diversified and fail less often, so size (computed as the logarithm of total assets) may be an inverse proxy for the probability of bankruptcy. If so, size should have a positive impact on the supply of debt

We have taken two depended variables as natural logarithm of total debt (LnDEBT) and total debt to total assets (TDTA) for checking the sensitivity of the results.

Model

In estimations process, firstly, we introduce estimation technique of quantile regression in brief, and then apply it to our dataset. Standard least squares regression techniques provide summary point estimates that calculate the average effect of the independent variables on the 'average company'. However, this focus on the average company may hide important features of the underlying relationship. As Mosteller and Tukey (1977, pp.266) correctly argued, "What the regression curve does is give a grand summary for the averages of the distributions corresponding to the set of *x*'s. We could go further and compute several regression curves corresponding to the various percentage points of the distributions and thus get a more complete picture of the set. Ordinarily this is not done, and so regression often gives a rather incomplete picture. Just as the mean gives an incomplete picture of a single distribution, so the regression curve gives a correspondingly incomplete picture for a set of distributions". Quantile regression techniques can therefore help us obtain a more complete picture of the underlying relationship between Liquid ratios and its determinants. In our case, estimation of linear models by quantile regression may be preferable to the usual regression methods for a number of reasons. First of all, we know that the standard least-squares assumption of normally distributed errors does not hold for our database because the values for all variables in our case are non-normal Financial risk (TDEQ), Long term leverage (LDTA), Asset structure (NFATA), Liquidity (CR), profitability (ROA), Non-debt tax shield (DEPTA) and debt capacity (INCOVER) follow a skewed distribution (see the evidence in Table 1). While the optimal properties of standard regression estimators are not robust to modest departures from normality, quantile regression results are characteristically robust to outliers and heavy tailed distributions. In fact, the quantile regression solution $\hat{\beta}_0$ is invariant to outliers of the dependent variable that tend to $\pm\infty$ (Buchinsky, 1994). Another advantage is that, while conventional regressions focus on the mean, quantile regressions are able to describe the entire conditional distribution of the dependent variable. In the context of this study, all determinants of debt capital are of interest in their own right, we don't want to dismiss them as outliers, but on the contrary we believe it would be worthwhile to study them in detail. This can be done by calculating coefficient estimates at various quantiles of the conditional distribution. Finally, a quantile regression approach avoids the restrictive assumption that the error terms are identically distributed at all points of the conditional distribution. Relaxing this assumption allows us to acknowledge company heterogeneity and consider the possibility that estimated slope parameters vary at different quantiles of the conditional distribution of all determents of debt capital.

The quantile regression model, first introduced by Koenker and Bassett (1978), can be written as:

$$y_{it} = x_{it}^{'}\beta_0 + \varepsilon_{\theta it} \text{ with } Quant_\theta(y_{it} \mid x_{it}) = x_{it}^{'}\beta_0 \qquad (1)$$

where *i* denotes company, *t* denotes time, y_{it} is the dependent variable, x_{it} is a vector of regressors, β is the vector of parameters to be estimated, and ε is a vector of residuals. $Quant_\theta(y_{it} \mid x_{it})$ denotes the θ^{th} conditional quantile of y_{it} given x_{it}. The θ^{th} regression quantile $0 < \theta < 1$, solves the following problem:

$$\min_{\beta}\frac{1}{n}\left\{\sum_{i,t:y_{it}\geq x_{it}^{'}\beta}\theta\,|\,y_{it}-x_{it}^{'}\beta\,|+\sum_{i,t:y_{it}<x_{it}^{'}\beta}(1-\theta)\,|\,y_{it}-x_{it}^{'}\beta\,|\right\}=\min_{\beta}\frac{1}{n}\sum_{i=1}^{n}\rho_{\theta}\varepsilon_{\theta it} \quad (2)$$

where $\rho_{\theta}(\cdot)$, which is known as the 'check function', is defined as":

$$\rho_{\theta}(\varepsilon_{\theta it})=\begin{Bmatrix}\theta\varepsilon_{\theta it} & if\theta\varepsilon_{\theta it}\geq 0\\ (\theta-1)\varepsilon_{\theta it} & if\theta\varepsilon_{\theta it}<0\end{Bmatrix} \quad (3)$$

Equation (2) is then solved by linear programming methods. As one increases θ continuously from 0 to 1, one traces the entire conditional distribution of y_{it}, conditional on x_{it} (Buchinsky 1998).

Here the study assume that *Y (LnDEBT or TDTA)* is the function of TDEQ, *LDTA*, NFATA, CR, SIZE , ROA, DEPTA and INCOVER, which can be, in linear equation form, written as:

$$\begin{aligned}Y_{it}&=\alpha+\beta_1TDEQ_{it}+\beta_2LDTA_{it}+\beta_3NFATA_{it}+\beta_4CR_{it}+\beta_5SIZE_{it}\\&+\beta_6ROA_{it}+\beta_7DEPTA_{it}+\beta_8INCOVR_{it}+\varepsilon_{it}\end{aligned} \quad (4)$$

Where Y_{it} = *LnDEBT and TDTA*. However, in this model company and time effects are ignored therefore, by incorporating unobserved company effect in the equation (4) we get following equation:

$$\begin{aligned}Y_{it}&=\alpha+\beta_1TDEQ_{it}+\beta_2LDTA_{it}+\beta_3NFATA_{it}+\beta_4CR_{it}+\beta_5SIZE_{it}\\&+\beta_6ROA_{it}+\beta_7DEPTA_{it}+\beta_8INCOVR_{it}+u_{it}\end{aligned} \quad (5)$$

where $u_{it}=\mu_i+\varepsilon_{it}$, with μ_i being companies' unobservable individual effects. The difference between a polled OLS regression and a model considering unobservable individual effects lies precisely in μ_i. When we consider the random effect model the equations 6 and 7 will be same however in that case μ_i is presumed to be having the property of zero mean, independent of individual observation error term ε_{it}, has constant variances σ_{ε}^2, and independent of the explanatory variables.

Further, due to the advantages (as stated above) of quantile regression estimation technique over OLS, fixed and random effect models in the study, we examined at the 5th, 25th, 50th, 75th and 95th quantiles respectively:

$$Q_{.05}(LnDEBT_{it}) = \alpha_{.05} + \beta_{.05,1}TDEQ_{it} + \beta_{.05,2}LDTA_{it} + \beta_{.05,3}NFATA_{it} + \beta_{.05,4}CR_{it}$$
$$+ \beta_{.05,5}SIZE_{it} + \beta_{.05,6}ROA_{it} + \beta_{.05,7}DEPTA_{it} + \beta_{.05,8}INCOVER_{it} + \varepsilon_{.5it}$$

$$Q_{.25}(LnDEBT_{it}) = \alpha_{.25} + \beta_{.25,1}TDEQ_{it} + \beta_{.25,2}LDTA_{it} + \beta_{.25,3}NFATA_{it} + \beta_{.25,4}CR_{it}$$
$$+ \beta_{.25,5}SIZE_{it} + \beta_{.25,6}ROA_{it} + \beta_{.25,7}DEPTA_{it} + \beta_{.25,8}INCOVER_{it} + \varepsilon_{.5it}$$

$$Q_{.50}(LnDEBT_{it}) = \alpha_{.50} + \beta_{.50,1}TDEQ_{it} + \beta_{.50,2}LDTA_{it} + \beta_{.50,3}NFATA_{it} + \beta_{.50,4}CR_{it}$$
$$+ \beta_{.50,5}SIZE_{it} + \beta_{.50,6}ROA_{it} + \beta_{.50,7}DEPTA_{it} + \beta_{.50,8}INCOVER_{it} + \varepsilon_{.5it}$$

$$Q_{.75}(LnDEBT_{it}) = \alpha_{.75} + \beta_{.75,1}TDEQ_{it} + \beta_{.75,2}LDTA_{it} + \beta_{.75,3}NFATA_{it} + \beta_{.75,4}CR_{it}$$
$$+ \beta_{.75,5}SIZE_{it} + \beta_{.75,6}ROA_{it} + \beta_{.75,7}DEPTA_{it} + \beta_{.75,8}INCOVER_{it} + \varepsilon_{.5it}$$

$$Q_{.95}(LnDEBT_{it}) = \alpha_{.95} + \beta_{.95,1}TDEQ_{it} + \beta_{.95,2}LDTA_{it} + \beta_{.95,3}NFATA_{it} + \beta_{.95,4}CR$$
$$+ \beta_{.95,5}SIZE_{it} + \beta_{.95,6}ROA_{it} + \beta_{.95,7}DEPTA_{it} + \beta_{.95,8}INCOVER_{it} + \varepsilon_{.5it}$$

We used *sqreg* module of STATA 11 for simultaneous quantile regression estimation and obtain an estimate of the entire variance-covariance of the estimators by bootstrapping with 100 bootstrap replications. Simultaneous quantile regression is a robust regression technique that accounts for the non-normal distribution of error terms and heteroskedasticity (Koenker and Bassett 1978; Koenker and Hallock 2001). Unlike traditional linear models, such as OLS regression, that assume that estimates have a constant effect, simultaneous quantile regression can illustrate if independent variables have non-constant or variable effects across the full distribution of the dependent variable. To examine this, baseline OLS regression models were also executed.

Results and findings

First all the result of descriptive statistics has been presented. The below table 1 shows the result of descriptive statistics

Table .1 Descriptive statistics

Variables →	LNDEBT	TDTA	TDEQ	LDTA	NFATA	CR	SIZE	ROA	DEPTA	INCOVR
Mean	5.975875	0.443396	1.007676	0.267406	0.434992	4.866612	7.038033	0.114257	0.043285	17.23973
Median	6.163619	0.460239	0.826405	0.234036	0.419210	2.763861	7.025809	0.071615	0.035004	3.830596
Maximum	11.21053	3.147554	14.06111	1.846757	2.859302	978.8801	12.29655	19.77503	4.529018	2097.818
Minimum	-4.605170	-10.66074	-118.9910	-5.857143	-5.168972	0.174078	0.000000	-0.657790	-0.353096	-60.88889
Std. Dev.	1.973677	0.346337	3.557411	0.262140	0.346790	24.71969	1.588410	0.509962	0.105328	91.43339
Skewness	-0.840755	-15.37175	-23.34732	-5.592094	-3.535128	31.66942	-0.127940	30.96050	36.48031	14.17935
Kurtosis	5.132693	505.0901	717.8080	147.4001	75.43358	1169.454	4.200754	1113.316	1546.721	252.9809
Jarque-Bera	654.6073	22457271	45540362	1861661.	470074.3	1.21E+08	133.7716	1.10E+08	2.12E+08	5617402.
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	12728.61	944.4334	2146.350	569.5747	926.5339	10365.88	14991.01	243.3683	92.19732	36720.63
Sum Sq. Dev.	8293.307	255.3724	26942.87	146.2992	256.0402	1300953.	5371.568	553.6697	23.61891	17798579
Observations	2130	2130	2130	2130	2130	2130	2130	2130	2130	2130

It is evident from the table 1 that data is not normal JB test is showing significance for the entire variable. Except LnDEBT and SIZE all the other variables are skewed and all the variables are leptokurtic. In this regards, use of quantile regression estimation is more appropriate. Therefore, we applied quantile regression estimation technique and report result of quantiles $\theta \in \{0.05, 0.25, 0.50, 0.75, 0.95\}$ in Table 2 below.

The table 2 is showing the detailed result of the quantile regression analysis of the five different levels of quantiles. Intercept is negative significant at all the quantiles. LDTA, SIZE is positively significant at one percent and irrespective of the quantiles. Except 075^{th} quantile INCOVER is negatively significant at one percent. NFATA is positively significant at one percent for 0.05^{th}quantile, but not showing significance for , 0.25^{th} and 0.50^{th} quantile however it is negatively significant at five percent for 0.75^{th} quantile and 0.95^{th} quantiles. More over TDEQ is also showing a positive significant for 0.25^{th} , 0.50^{th}, 0.75^{th} quantiles and not showing any kind of significance for the lowest and the highest quantile CR is showing a negative sign for all the quantiles but showing significant in case of 0.25^{th} one percent, 0.50^{th} five percent and $.75^{th}$ ten percent. DEPTA is positively significant at one percent in case of 0.75^{th} and five percent 0.95^{th} quantiles in all other case it is not showing significance. However ROA is showing a positive significance only in case of 0.95th quantile at ten percent.

Table. 2 The results of quantile regression (*LnDEB*T as depended variable)

Quantiles → Variables ↓	0.05	0.25	0.50	0.75	0.95
Intercept	-3.172679*** (0.2924817)	-1.669691*** (0.0988708)	-1.172084*** (0.0598456)	-0.949921*** (0.0772779)	-0.3263046** (0.1493908)
TDEQ	0.0240182 (0.0219364)	0.0595731** (0.0231893)	0.1442089** (0.0584529)	0.1439594* (0.0739453)	0.0012872 (0.0397512)
LDTA	1.686838*** (0.1738422)	1.404327*** (0.1444145)	0.8395466*** (0.1716214)	0.5330363*** (0.1982177)	0.6740811*** (0.13692)
NFATA	0.6291282*** (0.2082153)	0.0821966 (.0781603)	-0.0486673 (0.0621118)	-0.1235509** 0.0524114	-0.1938213** (0.089436)
CR	-0.0064154 (.004945)	-0.007062*** (0.0024337)	-0.0048604** (0.0021343)	-0.0042073** (0.0016825)	-0.0023756 0.0015325
SIZE	1.137778*** (.0246746)	1.033643*** (0.0074918)	1.004645*** (0.0051693)	0.9987096*** (0.0036921)	0.9740217*** (0.0124237)
ROA	0.0981194 (0.2110982)	0.0752516 (0.3378423)	0.0057159 (0.3262197)	0.3588151 (0.3024154)	0.3594284* (0.1869178)
DEPTA	-1.657918 (1.400501)	0.5008244 (0.7665524)	0.785583 (0.763093)	1.61532*** (0.5753142)	2.186291** (0.8847655)
INCOVER	-.033249 *** (0.0060154)	-0.020006*** (0.0037367)	-0.010488*** (0.0026682)	-.003453 (0.0027075)	-0.000747*** (0.0001298)
Model summary					
Pseudo R^2	0.6664	0.6948	0.7173	0.7324	0.7613
Notes: 1. ***, **, and *denote significance at 1, 5 and 10 % level of significance respectively.					

Blow table 3 shows the quantile regression taking TDTA as depended variable. Except the highest quantile TDEQ is positively significant all other quantiles. LDTA is positively significant for the entire levels quantiles. NFATA is positively significant at one percent for 0.05th and 0.25th quantile it is positively significant at five percent for 0.50th quantile, rest of the cases it is not showing significance. CR is showing a negative coefficient for all the quantile but not showing significance. SIZE is positively and ROA is negatively for the 0.05th and 0.25th quantiles and rest of the quantile both the variable shows a negative sign but not significant. DEPTA is positively significant at five percent only in case of 0.95th quantile. INCOVER is negatively significant except 0.05th quantile. And intercept shows a positive significant in case of 0.25th 0.50th and 0.95th quantile rest if is not significant.

Table. 3. The result of quantile regression (TDTA as dependent variable).

Quantiles → Variables ↓	0.05	0.25	0.50	0.75	0.95
Intercept	-0.042825 (0.0281795)	0.1586303*** (0.0336635)	0.268581*** (0.0283557)	0.3728805 (0.0355503)	0.6484716*** (0.0799168)
TDEQ	0.0338703*** (0.0056686)	0.0484498*** (0.0142713)	0.0924928*** (0.0313927)	0.0880802** (0.0418176)	0.0038658 (0.0230252)
LDTA	0.4323955*** (0.0540278)	0.5252582*** (0.0582818)	0.354753*** (0.0864862)	0.247185** (0.1191513)	0.3890096*** (0.0818434)
NFATA	0.1092845*** (0.0205209)	0.0550827*** (0.0146253)	0.036265** (0.0150144)	0.0350195 (0.0246802)	-0.0275753 (0.0633866)
CR	-.0005963 (0.0005054)	-0.0004336 (0.0005238)	-0.0002732 (0.0003629)	-0.0003591 (0.0003952)	-0.0000437 (0.0005861)
SIZE	0.0189786*** (0.00332)	0.0067707*** (0.0022941)	-0.0000813 (0.0018877)	-0.0024787 (0.0024036)	-0.0138607 (0.008696)
ROA	-0.465797*** (0.1757478)	-0.481799*** (0.1685674)	-0.2440804 (0.1549977)	-0.157909 (0.102909)	-0.1047172 (.0912688)
DEPTA	0.0672267 (0.0880161)	0.0208223 (0.1146667)	-0.001297 (0.0787773)	0.0012769 (0.2653576)	1.989116** (0.8509665)
INCOVER	-0.0003546 (0.0002783)	-0.0004052 ** (0.0001961)	-0.0004487** (0.0001834)	-0.0002499** (0.0001148)	-0.000251*** (0.0000742)
Model summary					
Pseudo R^2	0.5361	0.4674	0.4178	0.3359	0.2072
Notes: 1. ***, **, and *denote significance at 1, 5 and 10 % level of significance respectively.					

Conclusion

The study was intended to identify the determinants of debt capital for Indian firms using a panel framework. For the analysis, we have taken 213 firms (from the BSE 500 index firms based on the availability of data) during the period 2002-2011, comprising of a panel model with fixed and random effects. However, most of the variables show skewed leptokurtic distribution and therefore, we relied upon quantile regression analysis as an appropriate tool and quantiles used for our case are $\theta \in \{0.05, 0.25, 0.50, 0.75, 0.95\}$

The study has used two depended variable as LnDEBT and TDTA for checking the sensitivity of the analysis. We found that the lowest quantile (0.05^{th}) LDTA, NFATA and SIZE are positively determining the debt capital. For the quarter quantile (0.25^{th}) and median quantile (0.50^{th}) TDEQ, LDTA, SIZE are positively and INTCOVER is negatively determine the debt capital. TDEQ and LDTA are positively determining the debt capital in case of 075th quantile. However in case of highest quantile (0.95^{th}) LDTA and DEPTA are positively determine the debt capital mean while INTCOVER is negatively determine the debt capital.

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