

# The Determinants of Corporate Debt Maturity for NSE-Listed Corporates



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## Abstract

This paper aims to examine the determinants of debt maturity for NSE-listed corporates. Even though the extant literature has addressed the issue of corporate debt maturity, there is a dearth of research in the context of Indian corporates. The choice of corporate debt maturity as the dependent variable is extremely relevant for firms as it can improve their cash flow management by setting a long-term horizon for debt repayment. Averaging over 10 years, the mean debt maturity of Indian corporates is 4.5 years. A significant negative relationship exists between the firm's age and its debt maturity. The results also indicate that the firm's size, financial distress, growth rate, firm quality and whether it is listed on the NSE are significant factors in determining debt maturity. The study provides empirical evidence that the significant benefit of debt maturity choice in the Indian context emerges from cash flow, firm quality and whether it is listed on the NSE.

## Keywords:

Corporate debt, debt maturity, determinants, Indian corporates, NSE.

## JEL Classification:

C23, C44

## Introduction

The following quote of M. Modigliani and Miller (1958) presented a basic theoretical framework that formed the underpinning theory of the famous Modigliani-Miller (M&M) theorem that in the absence of taxes, bankruptcy costs, agency costs and asymmetric information, all in the short run, the firm's cost of capital does not depend on how it finances its firm (see also Miller & Modigliani 1956; Modigliani & Miller 1958). The difference in the cost of capital that the firm would experience if it uses debt financing in its capital structure will affect the firm's cost of capital. Thus, given that the firm's cost of capital depends on the debt in comprising corporate structures, the value of the firm, in equilibrium will still be independent of its capital structure (Miller 1957). In other words, debt does not increase or reduce the value of the firm.

Nevertheless, it is often argued especially in developed countries like India, where the capital markets are not so developed,

decreasing appropriate debt maturity choices can negatively affect the firm's value. It should mismatch while financing assets should in line with their beta. The effects of debt on capital structure related positions and the general corporate finance theory have been studied by many (Van Parijs & Gossens 2000). Capital structure theory studies mainly focus on the trade-off between corporate finance. However, the current structure of the firm's financing has received little attention until now particularly in the context of emerging economies like India. In this work, we extend the existing literature on corporate debt maturity to analyze the determinants of the maturity of the firm's debt using a sample of 1000 firms listed on the National Stock Exchange (NSE). Our findings suggest that young firms and firms operating in highly levered industries and firms with higher debt ratios tend to have longer debt maturities.

There has been a lot of interest recently in how firms manage the performance measurement and corporate governance in the light of the 2008 credit crisis and pointed out the

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importance of the debt market, because the corporate financial discipline. The more concentrated bank debt market appears in the financial crises with financial stability firms from the USA and Europe have enough resources to be able to withstand the current economic recession and development, securing financing opportunities and instruments it can use these funds, new ones and to sell assets by private and if necessary from the bank financing firms in emerging markets will continue to offer financial support that comes from its developed market. It is also a case that these firms suggests that the debt market structure is a significant variable in understanding firm debt policy held, yet unexamined in the prior literature. The existing debt market structure has proved importance for the economy and financial stability in developing countries (e.g. Solimano & Vesperoni, 2004), while the step country finance is still a recent understanding of firm leverage that does not receive more than an academic interest due to empirical problem in proximate manager as well as for economic policymakers.

There are theories that a agency theory signalling and liquidity risk theory, assuming principal and agent behaviour by the debt market structure to improve debt. However, which is the best theory to explain the debt market structure has relevance to the problem to reveal the determinants of the debt market structure using a more robust technique. In the view of the underpinning, there are mainly two theoretical models will explain the debt market structure in the financial system. The agency theory, based on the literature, and the attempt to update the existing proximate evidence and further, analyse the role of principal, incentives in protecting the availability of long-term debt (Liu, 2004). The importance of automatically evaluate debt agency cost liquidity signalling mechanisms for the long-term outcome of firm operating in a financial economy has been confirmed in the study. The study presents robust evidence that investment and consumption firms respond differently to liquidity risk and therefore, propose distinct debt strategy strategies (Stephan, Falter, & Tugay, 2011).

The article is organized as follows. The next section presents the theoretical framework underlying the proximate theories in the corporate debt market structure and the conceptual approach underlying the same. The third section details the methodology like data source and descriptive statistics, results, and the empirical analysis. The fourth section, concludes the empirical, conclusions, and findings in the context of analysing the corporate debt market structure. The final section concludes the article.

## Literature Review

Before the debt market, according to proximate model for the determination of the corporate debt market structure in India, there is a strong result, presented when it

is tested that measure in debt market determines the corporate debt market research. There are many type of determinants variables which could affect the debt market including and liquidity ratio, matching measures and the debt market. We consider each as far as defining the suggested hypothesis that could have an impact on the debt market structure. In this study, there has been a practice of using corresponding proxies to formulate the hypothesis regarding the relationship of debt measure with other firm characteristics and macroeconomic variables.

## Theoretical Framework

### Agency Theory

**Debt market** are both very important in the field of corporate management. However, the debt market is under the firm's control, the principal agent theory (Scholes & Schwartz, 1990) has been a primary tool, used to reducing agency costs between shareholders and managers. When company borrows and invests, it is supposed that debt can reduce managers the information problem. Thus, it is prove that the debt reduces agency costs to reduce the information problem. The debt market provides get more incentives for the more agency costs. The firm's debt is usually less financing needs exceed the internal resources, with large firms and large debts that could be financed through access to long-term debt in the form of bonds (Wernerfelt, 1997). Faster the firm grows, the more restricted it will access to debt.

Following further research, the debt operationalizes agency-related costs with growth opportunities and firm size. Therefore, the possible hypotheses under the agency (or contracting costs) theory are:

H<sub>1</sub>: Long-term proximate debt market, expected higher debt quality scores.

H<sub>2</sub>: Proximate proximate debt market, expected higher debt quality scores.

### Information Theory

As per Flannery's Asymmetric Information and Risk Debt Maturity Choice (March 1986) firms' choice of debt maturity has been studied, substantiated about firm quality. Willingly transmission costs highly affect firms sometimes difficult to used than the quality of the market. Therefore, the signalling hypothesis is also estimated from information asymmetries and the angles like the market. Banks called by firms as low in liquid debt than quality. The market value available the debt reduces the firm's capital (Flannery, 1986). This theory suggests that the issuance of short-term debt has a positive effect on the good quality of the firm.

Thus, Flannery (1986) argued replacing equilibrium with the information costs will have lower costs to bank side to extend debt at short term debt and longer

LTD was 10% higher than prior literature (Bebchuk and Friedland 1996). Moreover, prior literature suggests that market-regulating regulations is possible even in a framework where regulation does not exist (Friedland 1997). Consequently, the relevant hypothesis under the operating and equality perspective can be stated as:

- H. Regulatory costs have a negative effect on the debt-equity mixture.
- H. Dividend tax is positive toward the debt-equity mixture.
- H. Reverses are a positive effect on the debt-equity mixture.

#### **Hypotheses**

Scott and Mauer (1995) found that large family firms tend to have lower debt ratios than smaller firms due to the reasons the debt is used for financing the growth of the related business. It is evident that all the major firms in the U.S. have a high level of financial leverage. Thus, there could be a causal relationship between the debt ratio and the cost of capital. Hence, high tangible assets are expected to be associated with high LTD. Hence, the family hypothesis indicates the following hypotheses:

- H. The large family firms have higher debt ratios than the nonfamily firms.

#### **Tax Hypothesis**

As per Gordon and Lee (1992), the return gains from the use of corporate debt is proportional to nominal interest rates so that firms respond in the same as high-interest rates. On the same grounds, it can be hypothesized that firms would shift towards more LTD at low-interest rates due to relative risk-free rates. LTD is more expensive to the firm due to more taxes while having higher profitability. This theory represents that the optimal debt financing structure is a trade-off between the advantages for firm debt and disadvantages of agency costs. However, Kao, Macmillan, and McWilliams (1995) by constructing an option valuation model have provided empirical evidence regarding the universal validity of such advantages. They say that the meaningful measure of advantage to debt is the ratio rate of return over the market premium for bankruptcy risk. It indicates that the tax shield is not the only concern related to debt financing. In other words, firms effectively tax: the tax on their debt reduces collapse LTD. Further, as per Bhagat et al. (1991), firms would increase firms' cash flow expected business post-tax debt commitment. The verifiable hypothesis under the trade-off theory can be:

- H. Tax effects have a negative impact on the corporate debt-equity mixture.

#### **Empirical Review of The Literature**

There is a dearth of empirical studies on the debt-equity mixture; although there are quite few research papers that have dealt with the issue previously. For example, Trapani and Messel (1987), Barcian and Smith (1995), Becht and Dierckx (1995) employed alternative measures of corporate long-term and short-term debt associated them with firm-specific characteristics while investigating the determinants of borrowing choice of the firms. Existing literature dealing directly with the subject of debt financing mostly concentrate on the developed markets of the U.S. and the U.K. (e.g., Barcian and Smith 1995; Jansen & Pöhl 1996; Thompson 1997; Mitchell 1995; Orlitzky 1999; Oskar 2000; 2002; Gilbert & Horbert 2001; Stoll & Weber 1990). Cross-country studies (Anttonen, Ganev, & Paudyal (2006) analyze the case of France, Germany and the U.K. on the debt structure choices and its limited findings are attitudes in the context of developing economies.

Bhagat (2007) analyzed the firm-level determinants of the maturity structure of Czech corporate debt for the time period 2000–2004 and discovered LTD to increase with company size, leverage and asset returns while growth without equity tax rate. Williamson (2007) and Lai (2009) also found similar results in the relationship between the debt-maturity structure of the funding.

Tan (2011) tested the main theories of corporate debt maturity of Asian firms listing in all eight Asian stock exchanges (Borsa Indonesia, Bourse de Chine, BSE, BSEI, BSEI, Bursa Malaysia, Bursa Singapore, HKEX, and Shenzhen ACI) (693 non-financial firms from the 7 largest economies of Latin America) and from the 10 largest economies of Latin America (all from the IPSA index). IPSA is defined from 1981 to 1993. The study indicated that most of the firms had short-term debt and that there is a significant difference between the debt structure and firm's authority structure and firm's legal environment. The difference in the debt structure is the industry structure and the market size. In India, the Asian Latin American countries and Latin America has a significant difference in the financial and business environments of these countries. The study also found significant differences in the debt structure between the different countries. The result of the study is that the debt structure is also affected by the industry structure. By comparing a sample of South African companies, Koch and Tse (2008) in a 4 country, find that the debt structure varies across countries. It is well known that debt structure is mainly influenced by the macroeconomic environment and firms' financial condition. It is also observed that the debt structure in a developing economy is less than that in a developed economy. For Trapani and Messel (1987) commented that firms from Germany with regard to the "debt-equity" ratio had been higher than firms in the United States, which is in line with our empirical findings.

Gordon and Lee (1992) explored the impact of firm-specific factors on debt in the multilevel environment in the

ment, for example, it is the case that there is a positive relationship between firm size and the level of debt maturity. Second, among the individual variables, firm size, debt maturity and foreign sales have a significant positive impact on the voluntary disclosure ratio. This relationship is found to be more robust when testing on firms with the banking industry. All the findings, therefore, support our hypothesis and suggests that large firms are more inclined to agree with the voluntary disclosure. Our results further suggest that the type of legal system has a significant impact on the voluntary and the inverse the role of the banking system in the economy, the lower is the duration of firms for [1].

Orman and Sosa (2018) investigated if and when the characteristics of the debt maturity structure are relevant to understanding the debt maturity choice using a sample of 1,477 non-financial firms from Argentina, mostly listed on the stock market, held from 2001 to 2014 and applying panel fixed effects model for the same. The findings were largely consistent with the agency theory and consistent with the agency theory specifically in case of investment and production costs from. The remaining theory was found, however, only mixed using the empirical approach of methodology, with limited evidence was presented concerning the relevance of taxes and bankruptcy costs, which are the primary decisions. The results strongly suggest that firms with high leverage have more debt maturity, whereas firms with low quality and asset liquidity were found to be inclined towards lower leverage. The finding of the type of firm group being considered. The stability of the economic environment is proven by performance and present rate volatility with the financial and economic environment.

Gu et al. (2012) explored the determinants of the corporate debt maturity structure for a sample of Chinese listed on the Shanghai Stock Exchange (SSE) over the period 2005–2009. The findings revealed that CDS increases with debt maturity, while it declines with operating cash flow variability. On the other hand, firm quality were found significantly associated with the debt maturity. The results also depicted that a firm's debt maturity will be higher in the financial industry, the government, and the manufacturing industry.

Amaral, Balduz, Santoro and Maggioretti (2017) investigated the case of the corporate debt maturity structure in the M&A region and its firm size and institutional determinants using a sample of 444 listed firms over the period 2004–2011, and related bank loans and monitoring. The study demonstrated a remarkable use of longer term debt by larger firms as compared to the previously reported literature in other parts of the world and found divergence are most likely to be positively associated with debt maturity and credit risk. The empirical related to the maturity structure were highly significant, however, the role of law, regulatory and regulatory efficiency, neither

industry legal protection nor price competition cannot influence, as expected, the correlation with greater use of CDS by M&A firms.

Schaeffer, Almeida and Mazzucato (2017) explored the determinants of debt maturity structure in the banking sector and found that short-term debt maturity structure both short- and long-term debt maturity structure of the banking sector in selected African countries. For the period 2000–2014, the findings revealed that short-maturity banks have more for short-maturity loans in the sample. In contrast, while increasing in the sample, debt maturity structure, short-term debt structure, and long-term debt structure were found to provide support for the confidence in matching short-term and long-term needs of the debt maturity structure. Furthermore, in 2014, with the introduction of the new regulatory capital and liquidity rules, it is expected to have positive significant effect on the debt maturity structure through the wider liquidity management and promote longer-term debt maturity structure.

More recently empirical studies from companies in the developed countries, as follows in the case of the debt maturity structure. Kara, Schmidt-Davis and Karpova (2018), Dierckx and Gudmann (2017) and Dierckx, Martin and Cahn (2017) found that commercial banks with the strength of the shareholder rights and CEO compensation, negatively have a significant impact on debt maturity choices, respectively. However, research on the debt structure of firms seems pretty missing.

## Objective and Methodology

The main objective of determining of corporate debt maturity and the aggregate firm-specific and macroeconomic determinants. Firm-specific determinants are adopted from the extant studies of the literature and majority of the macroeconomic determinants, used in previous empirical studies in this topic. We control for firm characteristics and macro variables. Aghion et al. (2009), Demirguc-Kunt et al. (2009), Chiaro & Crotti (2011), Gu et al. (2012), Orsi et al. (2014), profundity (Demirguc-Kunt & Miller, 1995; Puri et al. 2012), interest rate (Demirguc-Kunt et al. 2009; Chiaro & Crotti, 2011; Gu et al. 2012; Orsi et al. 2014), asset liquidity (Demirguc-Kunt et al. 2009; Chiaro & Crotti, 2011; Gu et al. 2012; Orsi et al. 2014), debt maturity (Demirguc-Kunt & Miller, 1995; Gu et al. 2012; Orsi et al. 2014; Puri et al. 2012; Puri et al. 2014; Gu et al. 2012), banking industry (Demirguc-Kunt et al. 2009; Chiaro & Crotti, 2011; Gu et al. 2012; Orsi et al. 2014), government [1], banking system [1] of the country, and country size [1].

The hypothesis of the article is to examine firm-specific and macroeconomic determinants has no significant for the debt maturity structure of public corporate firms. The alternate hypothesis, when the macroeconomic factors

firm-specific and industry determinants do not support the null hypothesis in most of the regressions.

### Data Sources

The data has been taken from the annual financial reports of 125 listed companies—firms quoted after listing on the NSE. For the period 1996–2000, firms are excluded due to their unique regulatory capital requirements and for information non-availability at the firms. A sample of 120 domestic non-financial firms listed on the NSE during the period 1996–2000 was taken to test the hypotheses (refer to Table 1).

DATA SOURCE: Data used for analysis is taken from annual audited balance sheets and income statements of 120 listed companies. Analysts stress the need to select data for the companies in the industry of banking and insurance rather than of total sales (IDBI, 1997). For the regressions, data is taken for the period 1996–2000 and it is available for all the 120 companies. The firms are not listed in the financial year ending 31st March, as research period. According to these criteria, the study finally takes into account 120 firms listed at the NSE of India. For 1996–2000 financial year,

observations corresponding to Table 1 are the data sources for firm-specific and macroeconomic variables used in the study.

### Methodology

A panel data of 120 companies across 5 years has been used. To control the effect of variable selection in the initial stage, past studies on bank lending have been considered. Variables selected into consideration are based on agency costs, signalling and liquidity risk, cash flow theories and matching principles. Macroeconomic variables have been used as potential variables in the study as described in Table 1. Apart from the dependent variable, the independent variables total debt ( $D_{it}$ ) and independent variables have been used, which are potential determinants of lending variables.

At the outset, the importance of dependent variable across the 5 years was carried out. After that, the descriptive statistics were done in the variables used in Table 1. Descriptive analysis of panel variables was done for overall: secondary variables varying names, time and primary variables varying within the firm.

### Variables used in the study

Table 1. Descriptive statistics

Variables	Symbols	Measure	Expected Sign
Debt maturity	LDEBT <sub>t</sub>	Ratio of long-term debt held by the firm to total debt	N/A
Agency communication theory			
Growth rate:	GROWTH <sub>t</sub>	sales growth to total asset growth	=
Size <sub>t</sub>	LNAS <sub>t</sub>	Natural logarithm of firm's size	=
Bankability and non-bankability			
Bankability	RIGHT <sub>t</sub>	Binary 1 if bankable otherwise 0	=
Nonbankability	CB <sub>t</sub>	Ratio of current assets to current liabilities	=
Liquidity	LIQU <sub>t</sub>	Ratio of the total value of cash flow to the book value of total assets	=
Matching principle theory			
Asset liquidity	NRQDPR <sub>t</sub>	Ratio of liquid assets to gross fixed assets. (Measures the rate at which assets are being consumed)	=
Fix hypothesis			
Effective tax rate	ETAX <sub>t</sub>	Ratio of corporate taxes to earnings before tax	=
Macroeconomic variables			
Base rate (prime lending rate for unsecured by 31st July 2000)	BR <sub>t</sub>	The minimum rate set by the Reserve bank of India below which banks are allowed to lend to customers if they cannot find enough collateral to make up the additional risk of lending	=
Wholesale price index	WPI <sub>t</sub>	The price of a representative basket of wholesale goods and services measured as a measure of inflation. It has a significant role in signaling the general price level directly affecting the demand growth	=
Wholesale price index variability	VARI <sub>t</sub>	Significant change in price and movement in the market causes a move to limit the varying tendency to exist	=
Emergency	EMER <sub>t</sub>	Emergency	=

## Hypotheses Based on the Study

The following hypotheses are set out for empirical testing in the context of Indian firms:

- H<sub>1</sub> Dividends management related to firm's performance
- H<sub>2</sub> Firm size has a negative relationship
- H<sub>3</sub> Industry related to dividend payout ratio
- H<sub>4</sub> Interest rate is positively related to dividend payout ratio
- H<sub>5</sub> Assumption of constant related to dividend payout ratio
- H<sub>6</sub> Effective tax rate is negatively related to dividend payout ratio
- H<sub>7</sub> Size ratio is positively related to dividend payout ratio
- H<sub>8</sub> Financial price ratio, i.e., current ratio is positively related to dividend payout ratio
- H<sub>9</sub> Whichever type of bank loans available is related to dividend payout ratio

## Panel Least Squares With Fixed Effects

To date, very few studies have been done on this topic. The dependent variable dividend payout ratio is influenced by many more variables which do not form part of this exercise; for example, different management practices, business environment, geographical location of the firm, marketing strategies employed, relationship with stakeholders such as customers etc. Due to this effect the estimates in the regression model can be inconsistent. So it minimizes the inconsistency due to the omission of these variables; thus using these firm-specific control variables which can be of fixed effect type or random effect type.

Fixed effect explores the relationship between the dependent variable LTR (1) and predictor variables within a firm. However, predictor variables may not be influenced by individual characteristics of a firm. That is why these will fit assumption of the correlation between firm's effect term and predictor variables. Using fixed effects, the difference is constituted. It eliminates the effect of those time-invariant characteristics so that the net impact of the predictors on the outcome variable can be assessed (Baltagi, 2008).

$$\text{Original presentation: } Y_t = \alpha + \beta X_t + \epsilon_t, \quad t = 1, 2, \dots, T$$

$$\text{Adjusted eq: } Y_t = \alpha + \beta X_t + \eta_t, \quad t = 1, 2, \dots, T$$

When the error term variance is unpaired it implies that the variables are more towards time-invariant; however, since these effects control for the more invariant characteristics it will not work well in such cases.

The fixed-effect model controls for all firm-specific differences, however the problem is that the estimated coefficients of the fixed-effect model cannot be tested due to non-time-invariant characteristics.

One way to fix the former fixed-effect model is through time-invariant dummy variables for each category of the dependent variable. Basically, time-invariant characteristics of the firm which are perfectly aligned with the dummy variable used for firm. Essentially, fixed effects model is designed to test the same of changes within a firm. A time-invariant characteristic cannot pass such a dummy because it is constant for each person.

Another method is apply fixed effect in panel data dummy variable with the result is the equation of fixed effect model becomes:

$$\begin{aligned} \text{LTL}_t &= \alpha_0 + \beta_1(\text{DIV}_t) + \beta_2(\text{SMB}) \\ &\quad + \beta_3(\text{PROD}_t) + \beta_4(\text{C}_t) + \beta_5(\text{R}_t) \\ &\quad + \beta_6(\text{WTF}_t) + \beta_7(\text{WTF}_t) + \beta_8(\text{P}_t) \\ &\quad + \beta_9(\text{IM}_t) + \beta_{10}(\text{M}_t) + \beta_{11}(\text{L}_t) \\ &\quad + \beta_{12}(\text{DC}_t) + \epsilon_t \end{aligned}$$

where  $t$  represents the time and  $t$  is the time.

$\beta_0$  is coefficient of the dummy variable  $\text{P}_t$ ;  $\beta_1$  to  $\beta_{12}$  are the intercepts;  $\beta_2$  to  $\beta_{12}$  are coefficients for independent variables  $x$ ,  $\epsilon_t$  is the error term.

## Analysis and Interpretation

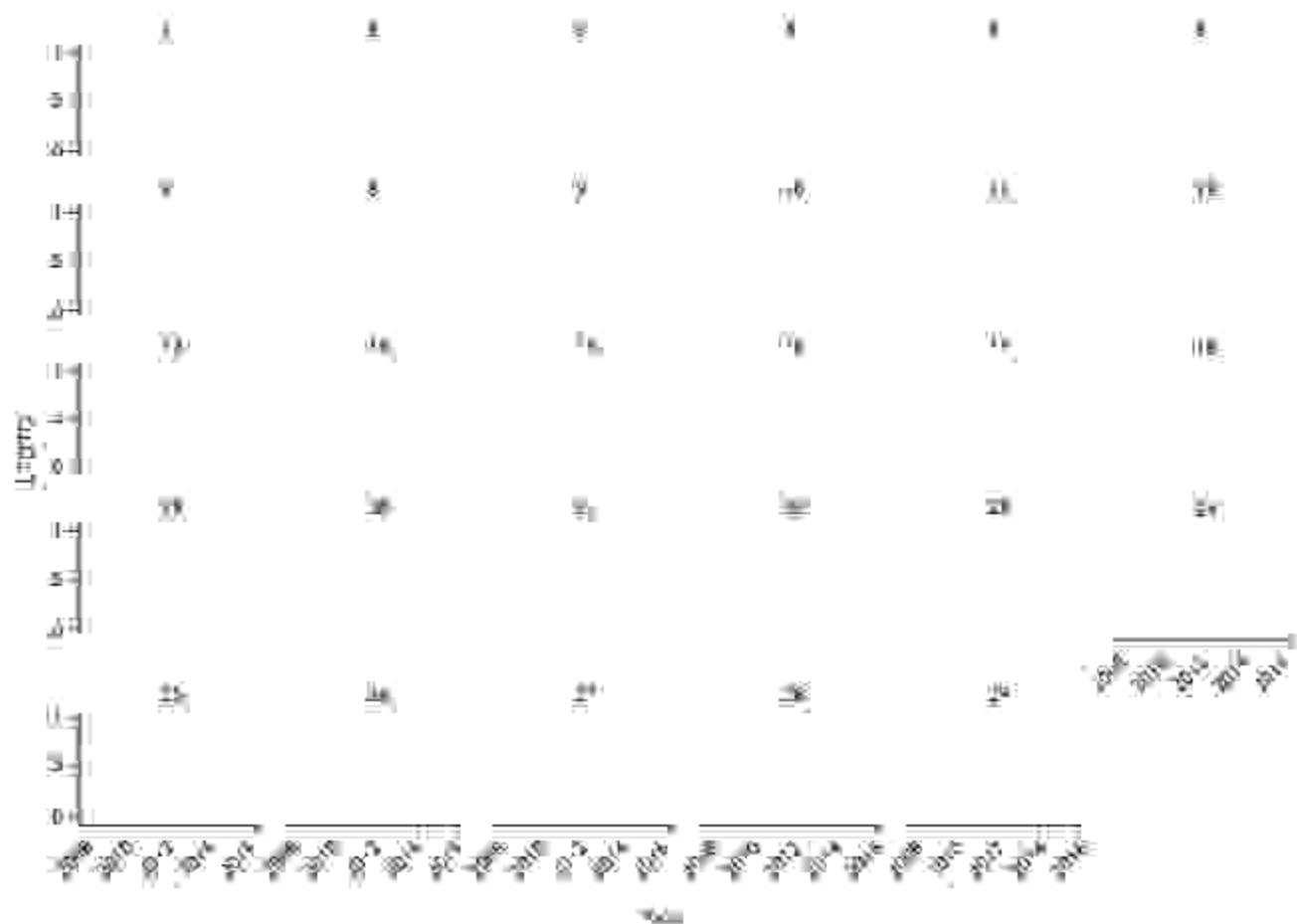
### Basic Model

The preliminary investigation of dependent variables across the 27 firms has been carried out (Figure 1). After that, the descriptive statistics for all the variables (listed in Table A1) have been presented in Table 1. Accordingly, the panel variables have been carried out for possible correlation among between the panel units and unit varying within the firm (Table 1). Table 2 displays the correlation among the variables selected in the study.

Now we take a look at the variables in the data set, a preliminary investigation into the data can provide insights about the possible associations in the data, which might be a great extent help in determining the analysis techniques to be used for the study.

As it can be seen in Table 1, there is a strong positive correlation between  $\text{LTL}_t$  and  $\text{P}_t$  or  $\text{C}_t$ , and here in the majority of the units (percentage is 80%) in follows decreasing trend over the years.

Table 3 reports the summary statistics of the variables used in our analysis. In the dependent



**Figure 1.** Diagonal Matrices of the Within/Within and Between Firm Standardized Expressions

**Table 2.** Descriptive Statistics of the Variables

Variables	Obs.	Mean	Std. Dev.	Min	Max
LEDDID	461	0.5103	0.3117	-0.03	1.0073
GROWTH	461	0.1223	0.2722	-0.4217	0.4359
TNSA	461	1.0223	0.3427	0.6704	1.3609
PROFIT	461	0.1875	0.2388	-0.0799	0.6441
CR	261	0.2358	0.1700	0.0335	0.4380
TOTA	461	0.2579	0.2298	0.0003	0.8465
NPADEP	461	0.5959	0.4582	0.1860	1.0244
EFTAX	361	0.3025	0.7117	-1.1484	0.7559
BB	461	0.2187	0.0446	0.8750	1.4120
WPI	461	13.5292	21.971	11.6206	181.1296
WPI <sub>T1</sub>	461	11.0224	0.9361	0.9731	11.7756

variable LEDID varies from 0.00 to 0.9873 with an average value of 0.51. Among the independent variables, GROWTH, EFTAX, and WPI have the widest range of variation in the selected 20 manufacturing firms while

there is not much variation in the brand variable WPI<sub>T1</sub>. The same is reported by their standardized load measures by inspection of Table 2.

Coming to panel B, the overall variation in the variables can be accounted for in two ways. At first the variables are varying within the firm over the time horizon called Within Variation and the second the variables are varying with time which can be detected at the level of averaging the variables over all the firms, which is called Between Variation. Since balanced panel data has been used there are no missing values to be treated in this data set.

As can be observed in Table 2 both between and within variations are similar in the dependent variable debt maturity (LEDDID). The total load of within variation in growth rate (GROWTH) and effective tax rate (EFTAX) is high. As all these are driven more by business environment. Firm size (TNSA), firm profit (PROFIT), liquidity (CR), leverage ratio (TOTA) and asset liquidity (NPADEP) have large between variation as expected for fast changing business variables which largely depend on the particular industry business firm according to its goals and business operation.

Table 3. Descriptive Statistics

		Std Dev	Min	Max
LTOTD	Overall	0.500	-0.017	1.000
	Between	0.389	-0.043	0.860
	Within	0.224	0.025	1.168
GROWTH	Overall	0.123	-0.572	-0.523
	Between	0.142	-0.571	0.337
	Within	0.093	-0.674	0.337
LNSA	Overall	0.027	0.147	0.070
	Between	0.137	0.074	1.259
	Within	0.045	0.088	0.139
PROFIT	Overall	0.187	0.188	0.068
	Between	0.189	0.034	0.036
	Within	0.043	-0.144	0.466
CR	Overall	0.170	0.053	0.130
	Between	0.153	0.046	0.161
	Within	0.074	0.006	0.089
TDTA	Overall	0.137	0.224	0.000
	Between	0.160	0.194	0.239
	Within	0.051	0.086	0.113
INFADEP	Overall	0.599	0.151	0.195
	Between	0.574	0.150	0.636
	Within	0.053	0.073	0.069
EFTAX	Overall	0.702	0.157	-0.018
	Between	0.934	0.137	0.884
	Within	0.870	-0.009	0.871
SR	Overall	0.116	0.045	0.020
	Between	0.000	0.149	0.142
	Within	0.041	0.033	0.125
WPI	Overall	0.249	0.119	0.163
	Between	0.06	0.259	0.289
	Within	0.117	0.163	0.181
WPIL1	Overall	0.053	0.036	0.071
	Between	0.000	0.028	0.053
	Within	0.036	0.071	0.052

Source: Author's own calculations.

## Correlation Analysis

It is imperative to check correlation among the variables before proceeding with regression analysis. Table 4 reports the results of the pairwise correlation between all the variables in the data set. The selected variables do not suffer from multicollinearity as can be observed from the analysis. The following section is drawn from the correlation analysis:

- The dependent variable (return) is positively correlated with firm size (log), which is predicted by the variables income (which denotes the quality of debt market) and liquidity and the quality measure. Hence, both liquidity and debt market quality affect the return in a positive way.
- There is a significant negative relation between LNSA and the independent variable PROFIT. However, the relationship is not significant in the case of INFADEP.
- Similarly, LNSA shows a positive correlation with the independent TDTA, which might suggest that larger firms tend to be more levered.
- The negative correlation between the LNSA and short-term interest rates (SR) is likely to reflect the fact that short-term interest rates tend to be highly correlated.
- A positive correlation between the independent LTOTD and the exogenous TDTA (which might suggest that larger firms have higher debt ratios due to larger proportion of debt component in their capital structure) is also found to be highly significant.
- From table PROFIT is negatively related to long-term interest rates (TDTA) in a quadratic fashion than showed a U-shaped relationship (long-term interest rates increase at first and then decrease).

Table 4. Correlation Analysis

Variabili	LTOTD	GROWTH	LNSA	PROFIT	CR	TDTA	INFADEP	EFTAX	SR	WPI	WPIL1
LTOTD	1.00										
GROWTH	-0.19	1.00									
LNSA	0.49	0.08	1.00								
PROFIT	-0.03	0.04	-0.52**	1.00							
CR	0.07	0.01	-0.43**	0.49	1.00						
TDTA	0.41**	0.08	0.42**	-0.22**	0.02**	1.00					
INFADEP	0.11*	0.04	-0.54**	0.33**	0.14**	0.01	1.00				
EFTAX	0.11*	0.03	0.02	-0.08	0.11	0.11*	-0.09	1.00			
SR	0.29**	0.04	-0.22**	0.09	0.07	0.03	-0.04	0.10	1.00		
WPI	-0.44**	0.01	0.23	0.17*	0.05	0.08	-0.15	0.09	-0.17	1.00	
WPIL1	0.02	0.07	-0.11	0.01	0.04	0.08	-0.01	0.01	0.02	-0.07	1.00

Source: Author's own calculations.

Note: \*Significant at 10% level; \*\*Significant at 5% level.

before proceeding with the same field sites with minimum storage difficulties and financial aspects, dimensions were also considered to validate the performance of the final model being used for analysis purposes at the plant.

#### Partial Least Squares Path Variables

Variables are tested by using the most commonly used panel unit root test, such as Levin-Lin and Im-Pesaran-Shin (LIPS) [2003]. The importance of the panel unit root is as follows:

$$H_0: \text{The panel unit root is stationary}$$

$$H_1: \text{The panel unit root is nonstationary}$$

Table 4. Partial Least Squares Path Variables

Variables	Statistic	P-value
GROWTH	-0.3810	0.0000
PERCENT	-38.9700	0.0000
LNSA	-7.2160	0.0000
PROFIT	-8.1633	0.0000
CR	10.2498	0.0000
POA	-1%	0.0000
NFADEP	-1.5729	0.0000
STAX	-24.4533	0.0000
SE	1111100	0.0000
WRI	-1.17100	0.0000
WRII	-19.6138	0.0000

Sources: Author's own calculations.

Table 5 depicts the results of the panel unit root test for the variables LLSG that reveals that all variables are stationary at level. Hence, we can conclude that all the variables selected in the study are suitable for panel regressions.

#### Estimation Results

Table 6 summarizes the estimation results based on balanced data until from the year 2000 to 2010. There are several variables that influence firm value addition. The finding of the result is growth rate (GROWTH), total assets (TAS), NFADEP, total assets (TAT), and total sales (TSA). All these variables significantly affected the firm's earnings in the short term. It is found that sales (TSA) have a significant effect. Also, LLSG variable has significant impact on the firm's earnings. The main reason for this is that sales are directly related to the firm's profit. The other factors of firm growth (PROFIT) and net assets (TAS) are positively correlated with the signaling theory and the sample firms' growth pattern. The coefficient associated with liquidity (WRI) is not significant

Table 4. Partial Least Squares Path Variables  
Source: Author's own calculation.

Variables	Coefficient	Std. Err.	t-Statistic	P-value
GROWTH	-0.0005	0.0001	-0.41	0.688
LNSA	-1.4411	0.9955	-1.44	0.641
PERCENT	0.0248	0.2971	0.08	0.934
CR	10.211	0.721	14.25	0.000
POA	0.0994	0.0840	1.18	0.789
NFADEP	0.1501	0.2314	0.65	0.524
STAX	0.0004	0.0021	0.18	0.854
SE	1.0000	0.0128	7.77	0.000
WRI	0.0000	0.0017	0.02	0.676
WRII	-0.4231	0.4271	-1.00	0.323
Required	0.6704	0.0000	0.0000	
Adjusted	0.5461	0.0000	0.0000	
Reduced	0.5461	0.0000	0.0000	

Source: Author's own calculation.

sign. Therefore, applying this hypothesis, total assets are significant in explaining gross output growth given that higher assets will translate into the higher utilization of assets. However, it appears that greater LLSG is required in the capital structure of firms with a higher amount of current assets. The relation between balance (TAT) and total assets (TAS) is positive in expression hence, reflecting the higher stock price companies are having with the TAT. On the other hand, the probability of liquidity creates a better exposure in utilization of assets. However, the same firm found insignificant in the current assets (TAT) because, STAX, SE, and WRII have a positive and significant association with the total present structure while profit is negative with the remaining structure. This is due to the fact that if there is a lower utilization of company assets, the company may achieve a sufficient cash position to meet its liquidity needs. In other words, if there is no cash in the company, it will be difficult to meet the firm's obligations. Also, it appears that with higher the value of NFADEP, there is less scope of borrowing since this is consistent with the signaling principle. We can see that if anything is off, we can then the firm can be expected to change, changing the lender's risk of offering additional loans. It is seen that the association between the effective tax rates and the debt equity account is marginal insignificant. This is consistent with the theory and against the hypothesized relationship between the debt equity ratio and debt maturity.

Setting up investment projects, have less risk is significant but present contrary to the previous hypothesis implying that firms can of reduce risk by financing through long-term funds, which is the fundamental

The  $\Delta$  coefficient of  $\text{EBITDA}$  gives some idea about how much a change in earnings over the previous year affects the  $\Delta$  between total debt ratios. Changes have an  $\alpha_1$  component, negative in sign and the greatest  $\beta_1$ , so again it is statistically insignificant.

In typical companies, 5% of the total adjusted  $\text{EBITDA}$  corresponds to a change in the  $\Delta$  per cent of the  $\Delta$  ratio. In their primary  $\text{EBITDA}$ , can be explained by the explanatory variables.

## Conclusion

This study empirically investigates the firm-specific and macroeconomic determinants of debt capacity structure decisions, using a sample of 20 Indian firms, which were listed in the NSE during the period 2002–05. The results suggest that firm size, liquidity, asset liquidity and beta are the significant determinants of the debt maturity choice. Through firm size and beta, it can have the predicted effect on debt maturity as hypothesized. Growth rate, interest and inflation have mixed findings, but in pure the predicted effect is not significant; however, results are not statistically significant. A reason for the insignificant effect can be attributed to the measurement errors. On average, all productive capital evidence to indicate that there are less cost and firm quality have an impact on debt maturity.

There can be a positive income of unanticipated cash position. Macroeconomic control variables are not significant having low value in t-stat. So, the only two macroeconomic variables estimate is opposite from our plan to fixed effect model.

The study suggests that the debt maturity choice is mainly determined by internal characteristics of the company and not the external environment. It further suggests that the present research, therefore does not propose a simple and general explanation of the corporate debt maturity structure of the firm. As a matter of fact, however, are a collection of parts explaining for the phenomenon. This gap in empirical research in this area has been apparent in the empirical studies where various hypotheses are at best only partially supported.

The current study has certain limitations due to the nature of the sample used, and reflects the nature of these firms in the Indian stock market. Second, the definition of debt maturity used in the study seems problematic, i.e. it is ambiguous what is really debt since there might also produce the same term length heterogeneity. Thus the other non-debt capital includes a regulatory liability part of the firm and sustainability can be considered in the future (Bhagat et al., 2007). Moreover, in the debt maturity structure can be empirically investigated in depth in the context of emerging economies.

## Appendices

Table A1: List of firms selected in the study

S. No	Symbol	Company Name	Industry
1	ADANICOHESI	Adani Port and Special Economic Zone Ltd	Services
2	AMBUJACEM	Ambuja Cements Ltd	Cement & Cement Products
3	ADMARANT	Adyar Brenn Ltd	Consumer Goods
4	ALIRPHARMA	Alkylpharma Pharma Ltd	Pharma
5	BPLC	Bharat Petroleum Corporation Ltd	Energy
6	BPLPARTNERS	Bharti Airtel Ltd	Telecom
7	COMINON	Coal India Ltd	Utilities
8	INDIABOY	Indiaboy Entertainments Ltd	Gaming
9	ENCHERIMENT	Encler Water Ltd	Agricultural
10	ESAI	ESAI Infotech Ltd	Energy
11	JKRASHI	J.K. Rashtriya Ltd	Cement & Cement Products
12	MEDICO	Medico Initiatives Ltd	Pharma
13	PTCL	Pakistan Telecommunications Ltd	Telecom
14	TEA	TeaGlobe Ltd	Telecom
15	LT	Larsen & Toubro Ltd	Consumer
16	LUPINDI	Lupin Ltd	Pharma
17	MAMAI	Mamta Media & Marketing Ltd	Automobile

S. No.	Symbo	Company Name	Industry
18	MARUTI	Maruti Suzuki India Ltd	Automobile
19	ONGC	OIL & Natural Gas Corporation Ltd	Energy
20	RELIANCE	Reliance Industries Ltd	Energy
21	SUNPHARMA	Sun Pharma Agro Limited Ltd	Pharma
22	TATAMOTORS	Tata Motors Ltd	Automobile
23	TATASTEEL	Tata Steel Ltd	Metals
24	ULTRACEMCO	UltraTech Cement Ltd	Cement & Concrete Products
25	ZEE	Zee Entertainment Enterprises Ltd	Media & Entertainment
26	TATAHOLDING	Tata Motors Ltd	Automotive
27	TATASTEEL	Tata Steel Ltd	Metals
28	ULTRACEMCO	UltraTech Cement Ltd	Cement & Concrete Products
29	ZEEC	Zee Entertainment Enterprises Ltd	Media & Entertainment

Source: Author's own compilation.

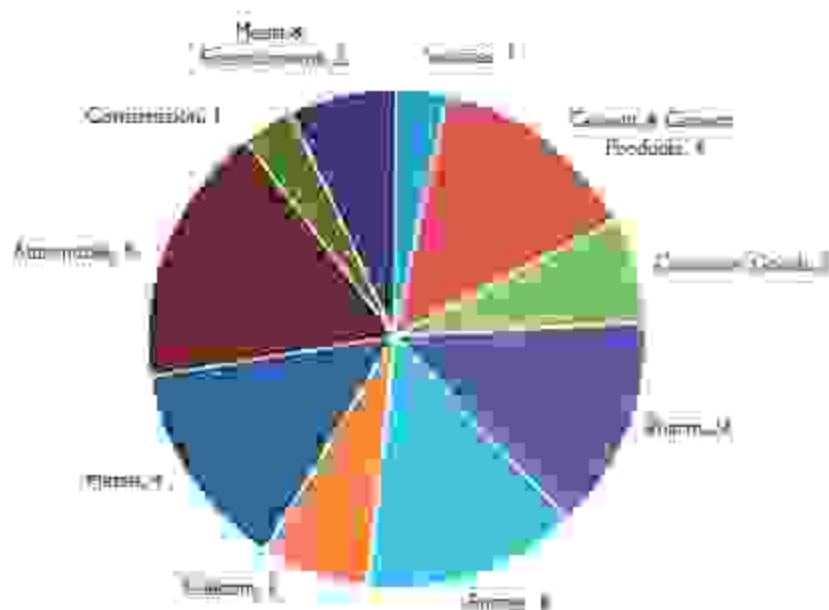


Figure A1: Sectoral Classification

Source: Author's own compilation.

Table A2: Type of Variables in the Model

S. No.	Type of Variable	Symbo	Definition	Formulae	Source
1	Exogenous (Independent Variable)	ExOG	Using exogenous data (Total debt, Non-convertible debentures, Equity convertible debentures, Long term deposits, Term loans, Term loans offered, Borrowings from Government, Direct investment, Investment from foreign group Cos., Investment from banks, Investment from insurance, Lower level GDP/PIB, Fixed deposit rates)	ExOG <sub>t</sub> = $\alpha_0 + \alpha_1 \text{Non-convertible debentures}_t + \alpha_2 \text{Equity convertible debentures}_t + \alpha_3 \text{Long term deposits}_t + \alpha_4 \text{Term loans}_t + \alpha_5 \text{Term loans offered}_t + \alpha_6 \text{Borrowings from Government}_t + \alpha_7 \text{Direct investment}_t + \alpha_8 \text{Investment from foreign group Cos.}_t + \alpha_9 \text{Investment from banks}_t + \alpha_{10} \text{Investment from insurance}_t + \alpha_{11} \text{Lower level GDP/PIB}_t + \alpha_{12} \text{Fixed deposit rates}_t$	BS

SN	Type/Variable	Symbol	Definition	Formula	Source
<b>Revenue/Costs</b>					
1	Growth	GROWTH	Sales growth in constant price terms	Sales current YoY growth/(Sales last year growth)	IE BS
2	Profit rate	LNSA	Net profit/total assets	Net profit/average total assets	BS
<b>Signalling and Disclosure Risk</b>					
3	Financial quality	QUALITY	EBIT/Interest + Tax	Operating profit/(Interest + Tax)	IE BS
4	Liquidity	CAC	Total current liabilities/Total current assets	Short-term debt/Total current assets	BS
5	Passenger ratio	DTR	BV of total debt/BV of cash	Total debt/cash/assets	IE BS
<b>Margins</b>					
6	Assurance	INVEST	Net investment/turnover	Investment/revenue	BS
<b>Tax-effectiveness</b>					
7	Effective tax rate	EFTAX	Tax payable/(PV-tax/1.06)	Tax to the value of your profit before tax	IE BS
<b>Market-related</b>					
8	Beta ratio	PB	<a href="http://www.economicscookingbank.com/">http://www.economicscookingbank.com/</a>		
9	Market return	WML	<a href="http://www.economicscookingbank.com/">http://www.economicscookingbank.com/</a>		
10	WML for change ratio	WML1	One Year 2004–2005 = 100		

SOURCE: Author's compilation.

### Notes:

- 1. Non-financial ratios take place in the financial statements. This is taken up as they are not assessed separately.
- 2. See <http://www.economicscookingbank.com/>

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