The Determinants of Leverage of the Listed-Textile Companies in India

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Abstract

This study examines the determinants of leverage of Indian textile firms using panel data analysis. The sample of the study covers 170 Indian textile companies listed on the Bombay Stock Exchange covering the period from 2006 to 2010. Fixed effects regression model was used for the analysis of penal data of sample companies. Firm size, growth in total assets, non-debt tax shields, profitability and asset tangibility are used as explanatory variables, while leverage ratio is the dependent variable in the model. The results show that the variables of size, non-debt tax shields, and tangibility have highly significant positive relationship with the leverage ratio (p<0.01), while on the contrary, growth and profitability have highly significant negative relationship with debt ratio (p<0.01). The results are generally consistent with theoretical predictions as well as previous research papers. This paper adds to the existing literature on the relationship between the firm specific factors and leverage

Keywords: leverage, capital structure, firm-specific factors, textile industry, penal data

1. Introduction

The modern theory of capital structure began with the landmark paper of Modigliani and Miller published in 1958. In this paper, they argued the irrelevance of capital structure to the value of firm under certain restrictive assumptions – no transaction costs, the equality of lending and borrowing rates, no bankruptcy costs, and absence of corporate taxes. The theoretical and empirical literature developed over a period of time suggests that, once the restrictive assumptions are relaxed, firms are able to change their value by altering their leverage or debt-equity ratio. The research in the capital structure field is dominated by two principal theories (1) the trade-off theory and (2) pecking-order theory. The trade-off theory of capital structure is established around the concept of target capital structure that balances between the benefit of debt-tax shields and cost (excess risk-taking by shareholders) of debt financing. In contrast, the pecking-order theory, developed by Myers and Majluf (1984), suggests that managers do not seek to maintain a specific capital structure. Firms prefer to issue debt rather than equity if internally generated cash flows are not sufficient; external equity is offered only as a last resort when company runs out of its debt capacity as informational asymmetry between managers and investors make it costly to raise funds through equity. Asymmetric information term indicates that managers and other insiders have more information about the firms' prospects and risks than do outside investors. Investors, realising this, judge that managers are more likely to offer equity when shares are over-valued. Due to this, investors price equity issues at a discount. Thus, according to pecking-order theory, in general it will be the cheapest for a firm to use from the least to the most expensive source of finance in the following order: internal financing, bank debt, bond market debt, convertible bonds, preference capital, and common equity (Myers, 1984).

The purpose of present study is to investigate the determinants of leverage (or capital structure) decision of Indian textile firms based on a panel data set over a period of five years from 2006-2010 comprising of 170 companies.

The remainder of this paper is organized as follows: section 2 briefly discusses the determinants of leverage. Next, section 3 describes the data, while section 4 presents methodology. Section 5 discusses the results, and finally Section 6 concludes the paper.

2. Determinants of Leverage

Literature on the subject matter suggests a number of factors, which may affect firms' financing decision. See, for example, Titman & Wessles (1988), Harris & Raviv (1991), Rajan & Zingales (1995), Huang & Song

(2002), Akhtar & Oliver (2009) and references cited therein. This study examines the impact of five firm-specific factors – firm size, firm growth rate, non-debt tax shields, profitability, and asset tangibility, on the leverage decision of textile companies in India.

Firm size is measured by taking the natural logarithm of the total assets. The trade-off theory expects a positive relation between leverage and firm size. Since larger firms are likely to be more diversified, have more stable cash flows; lower bankruptcy risk, and have relatively easier access to credit markets. Firm size has been found to be a positive determinant of leverage in most of the empirical studies (e.g., Agrawal & Nagarajan, 1990; Rajan & Zingales, 1995; Wald 1999; Buferna et al., 2005; Supanvanij, 2006; and Akhtar & Oliver, 2009). However, with respect to the pecking order theory, larger firms are expected to have lower information asymmetries making equity issues more attractive. Rajan & Zingales (1995) also argued that the relationship between firm size and leverage should be negative.

Growth is measured as the change in total assets between two consecutive years divided by previous year total assets. Growth opportunities are viewed as intangible assets of firm. Firms with significant future growth opportunities are likely to face difficulties in raising finance from debt market because intangible assets are not fully collateralisable. Thus, firms with high intangible growth opportunities will use more of equity rather than debt in their capital structure. The empirical studies that support the above theoretical prediction include: Titman & Wessels, 1988; Rajan & Zingales, 1995; Gaud et al. 2005; and Akhtar & Oliver, 2009. However, pecking order theory suggests that firms with high growth opportunities are anticipated to have higher information asymmetries, and are expected to have more of debt and less of equity in their capital structure.

Non-debt tax shield (NDTS) is defined as a ratio of total annual depreciation to total assets. Non-debt tax shields such as tax deduction for depreciation and investment tax credits are considered to be the substitutes for tax benefits of debt financing (DeAngelo & Masulis, 1980). Therefore non-debt tax shields are expected to have negative impact on leverage. The empirical studies that support above theoretical prediction include Kim & Sorensen (1986), Wald (1999) and Huang & Song (2002).

Profitability is defined as earnings before interest and taxes scaled by book value of assets. The pecking-order theory postulates that firms with higher profits (high internally generated funds) prefer to borrow less because it is easier and more cost effective to finance from internal fund sources. So, as per this theory, there will be a negative relation between leverage and profitability. In contrast, trade-off theory suggests that this relationship would be positive. Since profitable firms are less likely to go bankrupt, and hence can avail more debt at cheaper rates of interest. But most empirical studies find a negative relationship between leverage and profitability in line with the pecking-order theory (e.g., Titman & Wessels, 1988; Rajan & Zingales, 1995; Wald, 1999; Chen, 2003; Supanvanij, 2006; Kim & Berger, 2008; and Akhtar & Oliver, 2009, among many others).

Tangibility is measured as a ratio of net fixed assets divided by total assets. Since tangible assets are used as collateral, firms with large amount of fixed assets can borrow on favourable terms by providing the security of these assets to the lenders. Therefore, a high ratio of fixed assets-to-total assets should have a positive impact on firm leverage. Empirical as well as theoretical studies generally predict a positive relation between leverage and asset tangibility. The positive relation between tangibility and leverage is found in Titman & Wessels (1988), Rajan & Zingales (1995), Wald (1999), Chen (2003), Supanvanij (2006), and Akhtar & Oliver (2009).

This study expects a positive impact of firm size and tangibility on leverage, and a negative relationship of growth, NDTS and profitability with leverage. The leverage ratio, *Leverage,* is measured as book value of long-term debt/book value of total assets. Table 1 summarizes the determinants of leverage, theoretical predicted effects of explanatory variables on leverage and the results of major empirical studies.

Table 1: Definitions of Explanatory Variables, Theoretical Predicted Sings of Relationship and the Results of Major Empirical Studies

Variables	Definitions	Theoretical predictions	Signs of major empirical studies
Size	Natural log of total assets	+ (trade-off) -(pecking order)	+
Growth	Annual change in the book value of total assets	-(trade-off) +(pecking order)	-

NDTS	Total annual depreciation/total assets	-(trade-off)	-
Profitability	Earnings before interest and taxes/book value of assets	+ (trade-off)	-
		-(pecking order)	
Tangibility	Net fixed assets/total assets	+ (trade-off)	+
		+(pecking order)	

3. The Data

This study investigates the impact of five firm-specific variables on firms' leverage choice decision. The sample of study contains 170 Indian companies in the textile Industry listed on the Bombay Stock Exchange (BSE) whose published financial information for the period 2005-2010 was constantly available on CMIE PROWESS database as of March 31, 2011. The panel data analysis is done for observations of five consecutive years starting from 2006-2010. In this way, the sample of the study consists of 850 firm-year observations.

Table 2: Descriptive Statistics of Leverage and Explanatory Variables (N = 170)

	2006		2007		2008		2009		2010	
	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev	Mean	Std. dev
Leverage	0.3888	0.1749	0.4237	0.1808	0.4399	0.1856	0.4475	0.2000	0.4411	0.2069
Size	4.8023	1.3880	5.0494	1.4125	5.1965	1.4572	5.2441	1.5073	5.3768	1.4896
Growth	0.3740	1.4881	0.3524	0.5084	0.1836	0.2603	0.0755	0.2478	0.3490	2.3981
NDTS	0.0399	0.0193	0.0380	0.0191	0.0388	.0193	0.0399	0.0194	0.0387	0.0207
Profitability	0.0873	0.0602	0.0767	0.0695	0.0641	0.0611	0.0340	0.0827	0.0619	0.1234
Tangibility	0.4604	0.1604	0.4808	0.1695	0.4698	0.1724	0.4819	0.1751	0.4543	0.1750

Table 2 presents the descriptive statistics of leverage and other firm-specific factors for all 170 firms during the period 2006-2010. During the period 2006-2010, leverage and total assets increased constantly. Over the same periods of time, annual change in assets, non-debt tax shields (depreciation), profitability and assets tangibility remained reasonably stable. On the other hand, there was a decline in the firm growth rate and profitability during the year ending March 31, 2009, due to appreciation in the value of Indian rupee against US dollar and the resulting decline in the value of textile exports from India.

4. Methodology

This paper uses panel data set over a period of five years between 2006-2010 to investigate the linkage between leverage and the firm specific factors. Three alternative methods of penal data regression i.e. pooled-ordinary least squares (OLS) method, fixed effects method, and random effects method can be employed to estimate the model of leverage. The simple pooled OLS method assumes no firm or time-specific effects and if they are, then least squares estimators will be a compromise, not likely to be a good predictor of the cross-section units over a period of time. The redundant fixed effects tests were employed to test the null hypothesis of no fixed effects in the cross-sectional and time series data. The results in Table 3 indicate that cross-section fixed effects are significant whereas period fixed effects are found to be non-significant. Thus, the simple pooled OLS regression model is not appropriate for this panel data set.

Table 3: Redundant Fixed Effects Tests

Effects Test	Statistic	d.f.	p-value
Cross-section F	16.036	(169,671)	0.0000
Cross-section Chi-square	1374.611	169	0.0000

Period F	0.762	(4,671)	0.5505
Period Chi-square	3.850	4	0.4266
Cross-Section/Period F	15.719	(173,671)	0.0000
Cross-Section/Period Chi-square	1376.924	173	0.0000

Table 4: Correlated Random Effects -Hausman Test

Effects Test	Chi-square statistic	Chi-square d.f.	p-value
Cross-section random	23.4556	5	0.0003

Table 4 describes the results of Hausman (1978) specification test for the selection of fixed effects model versus random effects model. Hausman test for cross-section random effects has Chi-square test statistic = 23.4556, Chi-square d.f. = 5 with *p*-value = 0.0003. The null hypothesis of cross-section random effects is rejected. In this case, the fixed effects estimation is preferred to random effects model. The fixed effects regression equation can be expressed as:

Leverage $_{it} = \alpha_i + \beta_1$ Size $_{it} + \beta_2$ Growth $_{it} + \beta_3$ NDTS $_{it} + \beta_4$ Profitability $_{it} + \beta_5$ Tangibility $_{it} + \varepsilon_{it}$

Where i =1, 2, 3,…, 170 for the sample companies, and t = 1, 2, 3, 4, 5 (time period). α is the intercept of the equation. β_1, β_2, β_3, β_4, β_5 = are the coefficients for the five explanatory variables in the model. ε represents the error term.

5. Empirical Results

The estimation results using Eviews 7.1 in Table 5 indicate that estimated coefficients of all the five explanatory variables used in the model – firm size, growth of the firm, non-debt tax shields, profitability, and asset tangibility are significant at 1 percent level of significance. The results of the study are generally consistent with *a priori* expectations. R-squared statistic shows that approximately 86 percent of variation in the firm's leverage can be explained by movements in the value of independent variables used in the model and the rest of 14 percent is due to the extraneous factors. F-statistic indicates that overall significance or goodness of fitness of the model is very high.

Table 5: Results of Fixed Effects Estimation

Predictors	Coefficient	Std. Error	t-statistic	p-value
(Constant)	-0.1166	0.0474	-2.4576	0.0142
Size (Ln assets)	0.0829	0.0087	9.5455	0.0002
Growth	-0.0100	0.0027	-3.7556	0.0000
NDTS	1.1758	0.3049	3.8567	0.0001
Profitability	-0.1669	0.0446	-3.7394	0.0002
Tangibility	0.1849	0.0388	4.7694	0.0000

No. of Observations = 850

$R^2 = 0.8601$

Adjusted $R^2 = 0.8240$

S.E. of regression = 0.0800

F-statistic = 23.8470

Prob(F-statistic) =0.0000

Durbin-Watson stat = 1.3430

Firm size has a positive impact on leverage consistent with the predictions of trade-off theory, and with the findings of Rajan & Zingales (1995), Pandey (2001), Buferna et al. (2005), Supanvanij (2006), and Akhtar & Oliver (2009). This finding indicates that large textile firms in India use more debt as compared to small firms.

The relationship between leverage and *growth in total assets* is found to be negative, and is consistent with the predictions of trade-off theory. This finding is also consistent with other studies including Smith and Watts (1992), Barclay & Smith (2005), Buferna et al. (2005), Supanvanij (2006), and Akhtar & Oliver (2009). This result indicates that growing textile firms in India rely less on debt and more on internal funds (retained earnings) or equity to finance their fresh investment opportunities.

The *non-debt tax shields (NDTS)* are positively related to leverage contrary to the predictions of trade-off theory. This finding is also in contrast with the predictions of DeAngelo & Masulis (1980) that non-debt tax shields can serve as an alternative to debt tax shield. However, the positive association between NDTS and leverage is in line with Bradley et al. (1984). One possible explanation for this finding may be that expected income streams of textile firms in India, against which interest expenses and NDTS (depreciation), can be deducted are very high as compared to the total of debt and non-debt tax deductions. Therefore, depreciation does not work as a substitute to the tax benefits of debt financing in the Indian textile firms. The regression co-efficient suggests that for a 1 percent increase in depreciation (NDTS), firm's debt-equity ratio will increase by about 1.1758 percent.

Tangibility or collateral value of assets is estimated to have positive impact on leverage. This finding is in line with the findings of previous studies such as Titman and Wessels, (1988), Rajan & Zingales (1995), Wald (1999), Supanvanij (2006), Akhtar & Oliver (2009). This result indicates that with a 1 percent increase in the firm's collateralisable assets, relative to total assets, there is 0.1849 percent rise in debt-equity ratio or leverage ratio of firm.

Profitability is negatively associated with the leverage, and is consistent with the predictions of pecking-order theory. This result is also consistent with most previous studies (e.g., Rajan & Zingales, 1995; Wald, 1999; Chen, 2003; Supanvanij, 2006; and Akhtar & Oliver, 2009, among others). The coefficient estimate of -0.1669 implies that, for a 1 percent increase in the earnings before interest and taxes, relative to total assets, the debt-equity ratio of firm will decline by about 0.1669 percent. This finding suggests that textile firms in India prefer to finance new investments using internal fund sources or external equity.

6. Conclusion

The results of the study based on the fixed effect estimation show that all the five explanatory variables in the model: firm size, growth, non-debt tax shields, profitability, and asset tangibility have strong significant influence on firm's leverage. The positive effect of firm size, tangibility and a negative effect of firm growth, and profitability, on leverage confirm the predictions of capital structure theories as well as previous research papers. The results of the present study have delivered some insights into the financing behavior of Indian textile firms. Nevertheless, this study covers only the determinants of long term debt-to-assets of sample textile companies. Future research may investigate the determinants of short term debt-to-assets and total debt- to-assets.

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