

Impact of Firm Size on Leverage: An Empirical Study of Companies Listed on NSE of India



Management

KEYWORDS : Firm Size; Leverage; Capital Structure; Debt Ratio.

Ebrahim Hallajian

Department of Accounting, Islamic Azad University, East Tehran Branch, Tehran, Iran

**Mostafa Hashemi
Tilehnoei**

Department of Accounting, Islamic Azad University, East Tehran Branch, Tehran, Iran

ABSTRACT

The purpose of this paper is to provide an illustrative proof for effect of firm size on leverage. It will be expected that larger firms generally to have higher debt ratios. 139 firms from 13 economic sectors listed on National Stock Exchange of India were selected for this study. According to the empirical results, firm size does not have a significant effect on leverage of Indian firms, but it's effect for some sectors such as Energy, Chemicals and Fertilizers, Textiles, FMCG and Consumer Durables is positive and significant.

Introduction

The purpose of this paper is to furnish an illustrative proof for one of the size effects that is firm size on leverage. Firm size is a firm characteristic variable. Natural log of the firm's total assets is proxy for firm's size. It will be expected that larger firms generally to have higher debt ratios. According to the literature, larger firms are generally more profitable and their earnings are generally less volatile, suggesting that larger firms can support higher debt ratios without substantially increasing the probability of financial distress. Larger firms might be expected to have higher leverage ratio because they have lower direct bankruptcy costs (Barclay, Smith, & Watts, 1995). In addition, larger firms generally are exposed to higher tax rates, which further, motivates them to increase leverage. Larger firms are generally more diversified with huge total assets and are less prone to bankruptcy. This gives an advantage to larger firms to use more debt. Therefore, in this study, a positive effect of firm size is expected on leverage.

Literature Review

Bhaduri (2002) presented evidence, suggests that the optimal capital structure choice can be affected by firm size. Titman & Wessels, (1988) discovered that Short-term debt ratios has negative effect on firm size, probably indicating that firms with small sizes interface relatively high transaction costs when issuing long-term financial securities. Barclay, et al., (1995) found somewhat mixed. According to them firm size coefficient in the pooled regression was negative and statistically significant (implying that bigger firms have less leverage), but the coefficient in the fixed-effect regression was positive and significant (implying the opposite).

Lemmon & Zender (2004) found that, on average, large, profitable, low leverage firms use internally generated funds to finance their growth and allow their leverage ratios to drop over an extended period is consistent with the Pecking order theory.

According to Nivorozhkin (2005) the speed of leverage adjustment tended to decrease with an increase in firm size, indicating potential supply-side imperfections from the exposure control of providers of debt financing. Antoniou, Guney, & Paudyal (2002) used panel data to investigate the determinants of leverage ratio of firms operating in France, Germany and England. The results suggest that the leverage ratio is positively affected by the size of the firm. Huang & Song (2006); Antoniou, Guney, & Paudyal (2008) discovered that the leverage ratio is positively affected by the size of the firm. Frank & Goyal (2008) also found that large firms use debt more actively while small firms use equity more actively.

According to Frank & Goyal (2009) log of assets has a positive effect on market leverage of firm but this result is not reliable for book leverage. Bayrakdaroglu, Ege, & Yazici (2013) discovered that Turkish bigger companies tend to have higher debt ratios when compared with the small companies.

According to Delcours (2007) in the sample of companies in CEE countries (Central Eastern European countries), the effect of the firm size on total and short-term debt is positive and statistically significant, except for the estimation of long-term leverage for the Czech Republic, Poland, and Slovakia. The estimated size coefficient in the long-term leverage model for companies in these countries is negative. These negative relations may be attributed to existence of information asymmetries suggested by Myers and Majulif (1984) and an underdeveloped state of the bond market in these transitional economies. Also, laws dealing with financial distress are still developing, leaving debt holders unprotected in the event of default and forcing companies to acquire funds through short-term loans. The estimated positive effect of firm size on long-term debt for Russian companies is not surprising. Despite some progress in the transition from banking to a market economy, high Russian government ownership in enterprises along with government directing credit programs to preferred sectors with price control in these sectors may have a significant impact on corporate financing patterns.

Research Methodology

Natural log of total assets of each firm at the end of each financial year is a proxy for size of the firm and total debt as a ratio of total assets of each firm at the end of each financial year is a proxy for leverage. This research is an empirical research using Panel data that combines time-series and cross-sectional analysis together for testing the effect of firm size and leverage.

Research Hypothesis

H₀: There is no positive effect of firm size on leverage

H₁: There is positive effect of firm size on leverage

Research Model

$$\left(\frac{Debt}{TA}\right)_{it} = \beta_0 + \beta_1(\ln(TA_{it})) + E_{it}$$

Sources of data

For this study companies have been selected that were listed before 31-03-2008 on National Stock Exchange of India (NSE). A number of 139 companies from Automobiles, Industrial manufacturing, Energy, Telecom, Pharmaceuticals, Metals, Construction, IT, Services, Chemicals & Fertilizers, Textile, Fast Moving

Consumer Goods (FMCG) and Consumer durables(CD) listed on NSE were selected for the study that 39 companies were selected from large capital, 38 companies from medium capital and 62 companies from small capital. In this study sector-wise analysis also is considered for this purpose, number of companies according to sector is shown in Table 1

Companies with missing data are not included in this study. Financial and securities sector companies are also eliminated from this study as their financial characteristic and the use of leverage is different from other companies.

Table 1 Number of companies in each sector of companies listed on NSE

Sector	No	Sector	No
Automobiles	11	IT	18
Industrial Manufacturing	10	Services	7
Energy	17	Chemicals & Fertilizers	8
Telecom	6	Textile	6
Pharmaceuticals	12	FMCG	8
Metals	19	Consumer Durables	9
Construction	8		

Empirical results

Table 2 shows the result of panel data analysis that estimates leverage based on size of the firm. This analysis is done for full sample as well as sector-wise of Indian firms listed on NSE that combines time-series as well as cross-sectional analysis.

According to the table 2 results for full sample of Indian firms show that there is no effect of firm size on leverage. Thus, the research hypothesis is rejected. Results of Ogden, Jen, & O'Connor (2003) for US firms was different. They demonstrated that there is a positive effect of firm size on leverage.

The results for Automobiles, Industrial manufacturing, Telecom, Pharmaceuticals, Metals, Construction, IT and Services are same as full sample of Indian firms. The p-value is not significant. Hence, there is no effect of firm size on leverage for these sectors. Figure 1 depicts that there is positive effect of firm size on leverage but with referring to table 2 it can be observed that the effect is not significant at 5% level of significance.

Results of Energy, Chemicals and Fertilizers, Textile, FMCG and Consumer Durables (CD) sectors are more significant than full sample of Indian firms respectively. But with referring to R² it can be observed that this effect for energy sector is not strong. In the case of remaining sectors mentioned in the first of the paragraph, their R² are approximately same and around 20%, it shows that variation in firm size only explains 20% of variation in leverage of these sectors in India. Table 2 Results of regression equation of market-to-book equity ratio against leverage

	N	Intercept	coefficient	R ²
Full sample	139	c	1.161	coefficient 0.066
		t-Statistic	3.711	t-Statistic 1.736
		P-Value	(<0.001)	P-Value (0.083)
Automobile	11	c	0.05	coefficient 0.141
		t-Statistic	0.396	t-Statistic 1.034
		P-Value	(0.694)	P-Value (0.306)
Industrial Manufacturing	10	c	0.092	coefficient 0.089
		t-Statistic	0.569	t-Statistic 0.62
		P-Value	(0.572)	P-Value (0.538)
Energy	17	c	0.7	coefficient -0.258
		t-Statistic	4.47	t-Statistic -2.436
		P-Value	(<0.001)	P-Value (<0.05)

Telecom	6	c	0.648	coefficient -0.226	0.051
		t-Statistic	2.611	t-Statistic -1.225	
		P-Value	(<0.05)	P-Value (0.231)	
Pharmaceuticals	12	c	0.216	coefficient 0.009	0.000
		t-Statistic	0.986	t-Statistic 0.07	
		P-Value	(0.328)	P-Value (0.944)	
Metals	19	c	0.491	coefficient -0.193	0.037
		t-Statistic	3.44	t-Statistic -1.901	
		P-Value	(<0.01)	P-Value (0.06)	
Construction	8	c	0.511	coefficient -0.239	0.057
		t-Statistic	3.319	t-Statistic -1.517	
		P-Value	(<0.01)	P-Value (0.138)	
IT	18	c	0.193	coefficient -0.076	0.006
		t-Statistic	2.211	t-Statistic -0.719	
		P-Value	(<0.05)	P-Value (0.474)	
Services	7	c	-0.077	coefficient 0.299	0.09
		t-Statistic	-0.326	t-Statistic 1.802	
		P-Value	(0.747)	P-Value (0.081)	
Chemical & Fertilizers	8	c	-0.515	coefficient 0.509	0.259
		t-Statistic	-2.636	t-Statistic 3.644	
		P-Value	(<0.05)	P-Value (<0.01)	
Textile	6	c	-0.506	coefficient 0.451	0.204
		t-Statistic	-1.359	t-Statistic 2.677	
		P-Value	(0.185)	P-Value (<0.05)	
FMCG	8	c	0.623	coefficient -0.474	0.225
		t-Statistic	4.436	t-Statistic -3.317	
		P-Value	(<0.001)	P-Value (<0.01)	
Consumer Durables	9	c	-0.118	coefficient 0.337	0.113
		t-Statistic	-1	t-Statistic 2.343	
		P-Value	(0.323)	P-Value (<0.05)	

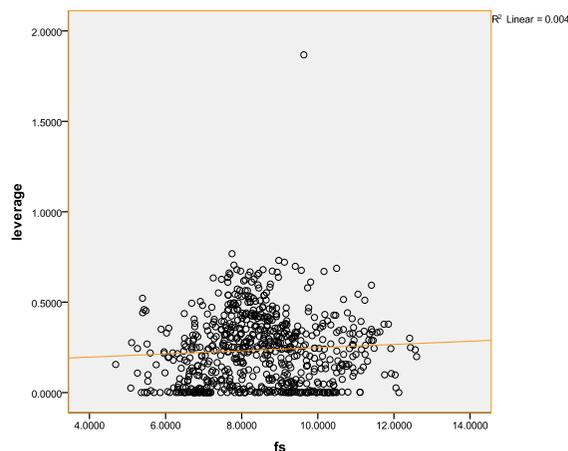


Figure 1 the effect of firm size on leverage of Indian firms as a whole.

Conclusion

This study is an empirical research based on effect of firm size on leverage of Indian firms. 139 firms from 14 economic sectors listed on National Stock Exchange of India were selected for this study. According to the empirical results there is no significant effect of firm size on leverage of Indian firms but this effect for some sectors such as Energy, Chemicals and Fertilizers, Textiles,

FMCG and Consumer Durables is positive and significant. However, R^2 of these effects are not as much as strong to explain the variations of leverage of Indian firms.

References

1. Antoniou, A., Guney, Y., & Paudyal, K. (2002). The Determinants of Corporate Capital Structure: Evidence from European Countries: University of Durham, Department of Economics and Finance.
2. Antoniou, A., Guney, Y., & Paudyal, K. (2008). The determinants of capital structure: capital market-oriented versus bank-oriented institutions. *Journal of Financial and Quantitative analysis*, 43(1), 59.
3. Barclay, M. J., Smith, C. W., & Watts, R. L. (1995). The determinants of corporate leverage and dividend policies. *Journal of applied corporate finance*, 7(4), 4-19.
4. Bayraktaroglu, A., Ege, I., & Yazici, N. (2013). A Panel Data Analysis of Capital Structure Determinants: Empirical Results from Turkish Capital Market. *International Journal of Economics and Finance*, 5(4), p131.
5. Delcours, N. (2007). The determinants of capital structure in transitional economies. *International Review of Economics & Finance*, 16(3), 400-415.
6. Frank, M., & Goyal, V. (2008). Profits and capital structure. Paper presented at the AFA 2009 San Francisco Meetings Paper.
7. Frank, M. Z., & Goyal, V. K. (2009). Capital structure decisions: which factors are reliably important? *Financial Management*, 38(1), 1-37.
8. Huang, G., & Song, F. M. (2006). The determinants of capital structure: evidence from China. *China Economic Review*, 17(1), 14-36.
9. Lemmon, M., & Zender, J. (2004). Debt capacity and tests of capital structure theories.
10. Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, 13(2), 187-221.
11. Nivorozhkin, E. (2005). Financing choices of firms in EU accession countries. *Emerging Markets Review*, 6(2), 138-169.
12. Ogden, J. P., Jen, F. C., & O'Connor, P. F. (2003). *advanced corporate finance: policy and strategies* (pp. 146-186). New Delhi: Pearson Education (Singapore).
13. Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance*, 43(1), 1-19.