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Determinants of the Speed of Adjustment to Target Capital Structure: Indian Evidence

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Abstract: The choice of capital structure is guided by the trade-off and pecking order theories. Whereas pecking order behaviour influences capital structure development, firms also move towards a moving target leverage, which is determined by trade-off considerations. To reach definite conclusions, from the empirical examination of various theoretical predictions related to different aspects of capital structure, the system is considered to be stable by assuming that firms always adjust to a target (optimal) capital structure. The present study is an attempt to identify the determinants of the speed of such adjustment of observed capital structure to target capital structure by using data of firms belonging to the Indian manufacturing sector. The model uses the firm-specific target and industry-specific target. The special focus of the study is the impact of liberalization on the speed of adjustment which is captured by introducing a structural break dummy. The methodology used is panel regression analysis. Irrespective of the fact whether a firm is adjusting to a firm –specific target or industry-specific target, the structural break dummy, size and growth rate of a firm seems to have a significant impact on the speed of adjustment.

INTRODUCTION

The increasing techno-socio-economic changes in business and industrial environment have added complexity to the choice of debt and equity and changed the scope of capital structure. To reach definite conclusions about different aspects of capital structure, the system needs to be stable. Starting with Modigliani and Miller (1958), the finance literature[1] recognizes that if there exist an optimal capital structure for a company, then it should reflect some specifically identified market imperfections[2]. If a firm is restricted to a suboptimal capital structure, then it leads to loss in value of a firm. Thus, there is a need for firms to adjust their capital structure to a target (optimal level). The choice of capital structure is guided by two different theories.

The trade-off theory describes the forces underlying the trade-off between the advantageous and disadvantageous effects of debt financing on firm value. On the one hand, increasing leverage by taking on more debt means that the firm can profit more from debt tax shields, which will increase its value (Modigliani and Miller's (1963). On the other hand, higher leverage leads to higher (expected) direct[3] and indirect costs[4] of financial distress, decreasing the firm's value. The second line of reasoning with regard to firms' capital structure choice is the pecking order hypothesis. It argues that, due to asymmetric information between managers and investors, firms prefer internal financing to debt financing and debt financing to issuing shares (Donaldson, 1961; Myers, 1984). In its pure form, the pecking order hypothesis does not mention target leverage as such. Trade-off behaviour and pecking order considerations need not be mutually exclusive, (De Haan *et al.*, 1994). Many empirical studies show that, although trade-off considerations may be important in the longer term, pecking order behaviour may matter or even dominate in the short term (Hovakimian *et al.*, 2001; Kayhan and Titman, 2004; Mayer and Sussman, 2004; Remolona, 1990). (Titman and Tsyplakov 2007) argue that whereas pecking order behaviour influences capital structure development, firms also move towards a moving target leverage, which is determined by trade-off considerations. Thus, how and when firms adjust their capital structure towards target seems to be a matter of concern in corporate finance studies.

However, majority of the empirical studies typically do not capture the nature of the dynamic capital structure adjustments; instead, they consider the system to be stable by implicitly assuming that the observed capital structure instantaneously coincides with the target capital structure for firms. To this end, the present study tries to identify the factors that influence the speed of adjustment of the observed capital structure to the target capital structure.

LITERATURE SURVEY

A small but growing strand of the capital structure literature has studied how and when the observed capital structure adjusts to a target capital structure or the possible factors that determines the speed of adjustment.

Guha- Khasnobis and Bhaduri (2002) made an attempt to provide some insight into the capital structure choice of developing countries through a case study of the Indian corporate sector. They developed a model that explicitly took into account the possibility of adjustment cost to reach

optimal capital structure. The results suggested that restructuring cost is important in adjustment towards an optimal capital structure.

Nivorozhkin (2003) used a dynamic unrestricted capital structure model to examine the determinants of the private companies' target financial leverage and the speed of adjustment to it in two transition economies, the Czech Republic and Bulgaria. He found that Bulgarian companies adjusted much faster to the target leverage than Czech firms. The speed of adjustment was positively related to the distance between target and observed ratio for Bulgarian companies while the relationship was neutral for Czech companies. He argued that the conservative policies of Czech banks and the exposure control were likely responsible for the slower adjustment among the larger companies while the opposite were true for Bulgarian banks and companies.

Banerjee, Heshmati and Wihlborg (2004) have identified a set of variables that are supposed to influence the speed of adjustment towards the target capital structure. The first one is the distance between the actual and target capital structure. They argue that the likelihood of the speed of adjustment should be a positive function of the distance between the actual and target capital structure if firms adjust their capital structure in external capital markets only when deviations are sufficiently large. But, the speed of adjustment and distance from target leverage should be negatively related, if adjustment occurs without transactions in external markets indicating that leverage is adjusted internally by adjusting the dividend policy.

Secondly, size of the firm is also expected to have an impact on the speed of adjustment. If changing capital structure involves substantial fixed costs, then these costs will be relatively smaller for large firms as compared to that of the small firms. Moreover, larger firms may be less rationed due to smaller informational asymmetries. Hence, firms having more information that is available have favourable access to capital markets and should adjust to changes in capital structure more readily. Thus, firm size should be positively related to the speed of adjustment.

Firm growth is another variable on which the speed of adjustment depends. A low-growth firm finds it difficult to bear a fixed cost burden of the debt capital in the view of its no/lesser trade opportunities. Hence it may be argued that it has less choice regarding the source of capital. Further, buying back of debt and raising equity capital sends a negative signal to investors who assume that the firm is short of sufficient reserve to pay back debt or interest thereon. In case of a growing firm, this is not a problem

since, due to more investment opportunities, it is expected that the firm will be earning more returns in future. Thus, a growing firm has the choice of both source and composition of capital. The higher growth rate a growing firm attends, the more it needs fresh finance, which it has to arrange by external financing. In this way its marginal cost of borrowing also decreases which is unlikely for a low-growth firm. Thus, it can be concluded that a growing firm has more chance to achieve the optimal capital structure that will minimize cost of capital faster than a low growth firm.

Farhat, Cotei, Abugri (2006) employed a modified pecking order and trade off model to examine the factors that affect the speed of adjustment to the target leverage and proportion of long-term and short-term debt financing relative to the financing deficit in countries with different institutional settings. The factors affecting the speed of adjustment and the factors affecting the proportion of debt financing relative to the financing deficit, provided more support to the trade-off theory. They concluded that the legal tradition, level of market development and type of financial system influenced the speed of adjustment as well as the proportion of long-term and short-term debt financing.

Drobetz and Wanzenried (2006) using a dynamic adjustment model shed light on the determinants of the target capital structure and the speed of adjustment of Swiss firms. The firm-specific characteristics like distance between observed and target capital structure, growth opportunities and firm size and macroeconomic factors like term spread had significant impact on the speed of adjustment to the target leverage. They document that faster growing firms and those that are further away from their target capital structure adjust more readily. The results also reveal interesting interrelations between the adjustment speed and well-known business cycle variables.

Haas and Peeters (2006) show that the gradual development of the financial systems in Central and Eastern European region has enabled firms during their transition process to reach higher debt levels and to bring their actual capital structure closer to their own target structures. Profitability and age are the most robust determinants of capital structure targets.

Flannery and Hankins (2007) present a theory of capital structure adjustment speed and model the main factors in this process with a modified partial adjustment model. He found that costs and benefits of rebalancing are significant determinants of the observed adjustment process. Financial constraints, external financing costs, the costs of distress, and the tax benefits of debt affect the speed of adjustment. Managerial benefits appear to have less of an impact on the adjustment process.

Byoun (2008) finds overlevered (underlevered) firms rebalance more actively when they are faced with a financial surplus (deficit).

Lockhart (2010) shows that access to credit lines is associated with notably faster speed of adjustment, again due to the lower adjustment costs.

Faulkender, Flannery, Hankins and Smith (2012) argued that large cash flow realizations will lower leverage adjustment costs and induce faster adjustments. Empirically, they find a positive relation between the magnitude of cash flows and speed of adjustment.

Most of the existing studies are in the context of developed countries. The present study makes contribution to the extant literature from three different angles. First, the study determines the speed of adjustment to target capital structure using data from a developing country like India. Secondly, apart from the variables that various theories have argued to influence the speed of adjustment, the model includes financial leverage as one of the determinants of the speed of adjustment. The argument is highly-levered firms or firms for which a large proportion of total capital is financed through debt; as levered capital increases, the overall cost of capital is expected to fall more as compared to less-levered firms. Hence, highly levered firms are supposed to adjust faster to their targets. Thirdly, as new economic reforms were introduced in India in a phased manner, the study looks into how far the liberalisation policies affect the speed of adjustment for firms.

The paper is organized as follows. The next section presents the sample and methodology and the summary statistics of the leverage ratio, optimality ratios and adjustment speeds for both firm-specific targets and industry-specific targets. It is followed by the main model attempting to identify the determinants of the speed of adjustment. The last section summarizes the main points.

SAMPLE AND METHODOLOGY

The time period covers a span of 25 years which can be separated into two phases.

The period preceding the initiation of reforms: 1986-87 to 1990-91. This includes the crisis period of 1990-91. The post-liberalisation period stretches from 1991-92 to 2011-12.

The sample consists of firms from eight different industries belonging to the Indian Manufacturing sector. The panel regression technique- a different methodology as compared to most of earlier studies is used in this study. Since this is an estimation technique simultaneously involving both cross-sectional and time series data, the estimates are expected to be

more accurate and efficient. The regression is run at the industry level and hence the total number of industry- years is 200. The list of industries included in the sample is given in appendix.

Definitions: Target leverage, optimality ratios and adjustment speed

The study of the dynamics of capital structure of Indian firms begins with the definitions of target leverage, optimality ratios and adjustment speed. Target leverage is that particular combination of debt- equity, which maximizes the value of the firm. In other words target leverage is the optimal leverage. The optimality ratio is the ratio between the target leverage and the actual or observed leverage. The speed of adjustment is the rate at which a firm adjusts to its target leverage ratio. It may be defined as the ratio between the per period change in leverage and the distance between the target leverage and the leverage in the previous period.

CALCULATION OF TARGETS

Before going into the empirical analysis of convergence of debt-ratios to their targets, it is necessary to calculate the targets. Since targets are unobservable, and it is difficult to obtain little direct information on what these targets are, many of the previous studies were forced to use crude estimates such as historical averages. Most of the previous studies have worked with cross-sectional data, but here panel data has been used, which includes data across groups of firms and also over time. Therefore, like the other studies if time averages of leverage ratios are used as proxy for targets, then it tends to remove the fluctuations and it is expected that capital structures will automatically converge to their targets. The present model uses two specifications for the target, the firm-specific target and the industry-specific target. The firm-specific targets are endogenised by using estimated targets. The firm-specific targets are obtained by estimating a regression equation of observed debt-ratios on its determinants. The most common determinants are firm size, proportion of collaterals held by a firm and bankruptcy risk or the ability to cover debt[5]. The targets are allowed to vary across firms. Since, the idea is that each firm has an optimal structure to which it adjusts; the targets are obtained by estimating the regression equation where the dependent variable is the time series mean of the observed debt-ratios and the regressors are the time series means of the determinants of leverage ratios. The estimated debt-ratios are used as firm-specific targets. Industry targets[6] are obtained as the ratio of the arithmetic mean of the total debt of all the firms present in the industry at a particular point of time to the arithmetic mean of total assets of those firms.

SUMMARY STATISTICS

Table 1
Summary Statistics of the ratio of Book value of Debt to Book value of Assets

Variable	*Definition*	*Mean*	*Median*	*Std Dev*
dtta	BVD/(BVD+BE)	0.1916	0.1686	0.1285

Table 2
Summary Statistics of Optimality ratio and Speed of adjustment. Target: Firm specific

Industry	*Optimality Ratio*	*Speed of Adjustment*
	Mean (Median)	*Mean (Median)*
B &DS	1.0885	0.2817
	(0.7746)	(0.2765)
AVEH	1.2815	0.2877
	(0.8858)	(0.2825)
EM&A	1.2116	0.3907
	(1.0281)	(0.3855)
OMPR	0.3530	0.4283
	(0.2734)	(0.4231)
CFER	1.4619	0.3593
	(0.9946)	(0.3541)
D&PH	1.1295	0.3724
	(0.7741)	(0.3672)
CEMT	1.1884	0.2186
	(1.0142)	(0.2134)
P&PR	1.3840	0.3338
	(1.0326)	(0.3286)

Table 3
Summary Statistics of Optimality ratio and Speed of adjustment.
Target: Industry-specific

Industry	*Optimality Ratio*	*Speed of Adjustment*
	Mean (Median)	*Mean (Median)*
B &DS	1.4248	0.1883
	(0.9631)	(0.1817)
AVEH	1.7882	0.2146
	(1.2812)	(0.2080)
EM&A	2.4303	0.1957
	(1.2560)	(0.1891)
OMPR	0.5378	0.3692
	(0.4401)	(0.3626)

contd. table 3

Industry	*Optimality Ratio*	*Speed of Adjustment*
	Mean (Median)	*Mean (Median)*
CFER	1.7786	0.2420
	(1.0551)	(0.2354)
D&PH	2.3758	0.0893
	(0.9681)	(0.0827)
CEMT	0.9340	0.2448
	(0.7877)	(0.2382)
P&PR	1.4493	0.0990
	(1.0992)	(0.0924)

Table 4
Summary Statistics of optimality ratio and adjustment speed across pre and post-liberalisation periods. Target: Firm –specific

Period	*Optimality Ratio*	*Speed of Adjustment*
	Mean (Median)	*Mean (Median)*
Pre-liberalisation	1.0197	0.2778
	(0.7551)	(0.2626)
Post-liberalisation	1.2403	0.4132
	(0.8738)	(0.4083)

Table 5
Summary Statistics of optimality ratio and speed of adjustment across Pre and Post-liberalisation periods. Target: Industry-specific

Period	*Optimality Ratio*	*Speed of Adjustment*
	Mean (Median)	*Mean (Median)*
Pre-liberalisation	1.7708	0.1963
	(1.1116)	(0.1694)
Post-liberalisation	10.7448	0.1911
	(1.4330)	(0.1837)

The sample mean being greater than sample median in table 1 show that the distribution of the leverage ratio or debt to total assets is positively skewed. This implies that majority of the firms are concentrated towards the higher end of the leverage ratio.

Table 2 show optimality ratios and adjustment speed across different industry groups when firms adjust to a firm-specific target. It is found that the mean optimality ratios are frequently different from their targets for all the industry classes excepting for the metal products industry. In this industry firms are overlevered and in others firms seem to be under levered.

So far as the median optimality ratios are concerned, it is observed that they are not very far away from the targets for all the industry classes, leaving out the metal products industry. The median optimality ratio suggests firms in the cement, electrical machinery and appliances, chemical fertilizers and paper industry firms nearly converge to their targets. The dispersions in the mean and median optimality ratios across all industry classes are low. The adjustment speed does not vary substantially across industries. The dispersion between the adjustment speed of the median firm and the average firm within each industry group is very negligible.

Table 3 show optimality ratios and adjustment speed across different industry groups when firms adjust to an industry-specific target. Judging by the mean optimality ratios firms in most of the industries seem to be under levered. But firms in the highly leveraged cement industry are very close to their target whereas firms within the next most-levered metal products industry seem to have over adjusted. Following the median optimality ratios, the firms in the breweries and distilleries industry, chemical fertilizer industry and drugs and pharmaceuticals industry and paper industry converge to their targets. The median firm in the cement industry seems to overadjust along with the median firm in the metal products industry. Again, the speed of adjustment is almost the same across industry classes and the dispersion between average and median firm's speed of adjustment tends towards zero as in the case of firm-specific targets.

Table 4 show optimality ratios and adjustment speed across the pre and post-liberalisation periods when firm adjusts to firm –specific targets. When the mean optimality ratios are considered, it is found that average Indian firms in the pre-liberalisation period are slightly underlevered. But in the post-liberalisation period the optimality ratios are far away from the targets. This may reflect the fact that many Indian firms favoured deleveraging in the post-liberalisation era, which was prone to operating and business risks. But the median firm in the pre-liberalisation period is close to its target whereas in the post-liberalisation period almost totally adjusts to the target leverage. The speed of adjustment of an average firm and a median firm is higher in the post-liberalisation period as compared to that in the pre-liberalisation period. The sign of the structural break dummy also confirms this.

Table 5 show optimality ratios and adjustment speed across the pre and post-liberalisation periods when firm adjusts to industry –specific targets. The mean and median optimality ratios again indicate that Indian firms in general are underlevered in both the pre and post-liberalisation period. But, the median value shows that firm is at its target in the pre-liberalisation period. The dispersion is very high in the post-liberalisation period. The

mean ratios do not differentiate the speed of adjustment to industry-specific target between the pre-liberalisation period and the post-liberalisation period; but the median values show that the speed of adjustment is higher in the post-liberalisation period. So, does the structural break dummy.

DETERMINANTS OF THE SPEED OF ADJUSTMENT

The regression equation estimated to identify the determinants of the speed of adjustment is

$$\delta_{it} = \sum_{j=1}^{8} \alpha_i + \beta_1\, dist_{jt} + \beta_2\, size_{jt} + \beta_3\, gtta_{jt} + \beta_4\, dtta_{jt} + \beta_5\, lib_{jt} + e_{jt} \qquad (1)$$

where j represents the industry group.

size :firm size defined as the natural logarithm of net sales,

dist**:** distance from the target defined as the absolute value of the debt gap or the difference between target leverage and leverage in the previous period;

gtta : the growth rate of the firm defined as the proportional change in the total assets of a firm from the previous period,

dtta: the debt ratio, defined as the ratio of total debt to total assets,

lib: the structural break dummy

δ_{jt} is the estimated speed of adjustment. The results for the two alternative targets, the firm-specific target and the industry-specific target are reported in tables 6 and 7 respectively.

Table 6
Determinants of Speed of Adjustment. Target: Firm –specific

Variables	*Co-efficients and t-ratios in parentheses*
dist	0.4860 (1.84)*
size	0.0354 (2.35)*
gtta	2.2148 (2.97)**
dtta	-0.4761 (2.92)**
lib	0.0718 (2.70)*
lib	0.0718 (2.70)*
R2 = 0.54	F (12,187) = 13.57, N=200

** indicates significant at .01 level, * indicates significant at .05 level

Table 7
Target: Determinants of Speed of Adjustment. Target: Industry-specific

Variables	*Co-efficients and t-ratios in parentheses*
dist	-0.1536 (0.75)
size	-0.0822 (6.16)**
gtta	0.1201 (1.89)*
dtta	-0.0931 (0.69)
lib	0.1384 (5.77)**
R2 = 0.63	F (12,187) = 19.82, N=200

** indicates significant at .01 level, * indicates significant at .05 level

Irrespective of the fact whether a firm is adjusting to a firm –specific target or industry-specific target, the structural break dummy, size and growth rate of a firm is turning out to be significant. The structural break dummy is having a positive impact on the speed of adjustment indicating that in the post-liberalisation period, the firms in general adjust faster to their targets as compared to the pre-liberalisation period. Firm size is having a positive impact on the speed of adjustment when firm-specific target is taken into consideration, consistent with the theoretical predictions. But it is having a negative impact when industry-specific target is considered. In case of both the targets, the growth rate of a firm is having a positive influence on the speed of adjustment indicating that high growth firms achieve their target faster than low growth firms. The coefficient of the distance variable is positively significant with respect to a firm-specific target. An increase in the distance from actual to target leverage increases the speed of adjustment in case of Indian firms. This indicates that the large adjustments of leverage are less costly relative to smaller ones. The leverage variable is significant only when firms adjust to firm-specific target. The negative influence of the leverage variable does not confirm to the conjecture.

CONCLUSION

The basic motive of the paper is to explore empirically the existence of stability in the financial structure of firms belonging to the Indian corporate sector. Since, stability requires the adjustment of actual capital structure towards the target or optimal capital structure, the speed of adjustment and its determinants herein plays a significant role. The intertemporal

analysis implies Indian firms partially converge to a target capital structure irrespective of whether the target is firm-specific and time-invariant or industry-specific varying with time. There is a marked difference in adjustment speed across pre and post-liberalisation period. Moreover, it seems that the speed of adjustment is sensitive to the nature of the target. Firm size and growth rate of a firm are important determinants of the speed of adjustment, when estimated speed of adjustment is taken as the dependent variable. The gamut of reforms that were introduced in the Indian financial sector also had a strong impact on the speed with which firms adjust to their targets.

Notes

1. See Modigliani and Miller (1958).
2. Capital market imperfections mean problems of unobserved actions (moral hazard) and/or asymmetric information (adverse selection), that makes adjustment costly.
3. Direct costs include the legal and administrative costs of liquidation or reorganization.
4. Indirect costs refer to the impaired ability to conduct business and to agency costs of debt that are specifically related to periods of high bankruptcy risk (such as the incentive for stockholders to select risky projects) (Ross *et al.,* 2002).
5. See Marsh (1982).
6. See Das and Roy (2007)

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Appendix

Industry No.	*Industry name*	
1	Breweries and Distilleries	B&DS
2	Automobile vehicles	AVEH
3	Electrical machinery & appliances	EM&A
4	Metal products	OMPR
5	Chemical fertilizers	CFER
6	Drugs & pharmaceuticals	DP&H
7	Cement	CEMT
8	Paper	P&PR