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DOES CAPITAL STRUCTURE DEPEND ON GROUP AFFILIATION? AN ANALYSIS OF INDIAN CORPORATE FIRMS

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Does Capital Structure Depend on Group Affiliation? An Analysis of Indian Corporate Firms

Indrani Chakraborty*

Abstract

This paper investigates the effect of group-affiliation on the Indian corporate firms capital structure based on data of 875 Indian non-financial firms listed either in the Bombay Stock Exchange or in the National Stock Exchange, for the period 2002-2010. Among the three alternative estimation methodologies applied viz., (i) pooled OLS, (ii) generalized method of moments (GMM)and (iii) 'lagged' time-series analysis, the GMM appears to be the robust one. It is found that the group-affiliated firms have higher level of leverage than the stand-alone firms which can be explained by a combination of factors such as the reduction of the agency cost of debt in case of the group-affiliated Indian firms, better access to external finance in case of the Indian business groups due to better reputation and creation of internal capital markets by the business groups.

Keywords: business groups, India, panel data, GMM estimation, 'lagged' time-series analysis

JEL classification: C13, C23, G30

1. Introduction

Traditional capital structure theories refer to a stand-alone firm. However, the firms that are affiliated to a business group are expected to have a better access to capital markets (both internal and external) than the stand-alone firms (Schiantarelli and Sembenelli, 2000). Hence, capital structure of group-affiliated firms may be different from the comparable stand-alone firms. This paper intends to examine whether the capital structure choices of Indian corporate firms differ because of group-affiliation.

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Business groups, referred to as the Grupos in Latin America, the Chaebols in South Korea, the Keirtsus in Japan,the Business Houses in India, play an important role in a large number of emerging as well as developed economies. According to Leff (1978), a business group is 'a group of companies that does business in different markets under a common administrative or financial control and its members are linked by relations of inter-personal, ethnic or commercial background'. In other words, a business group is a conglomeration of several companies with diversified interests sharing common ownership (Khanna and Palepu, 2000). Business groups are characterized by majority ownership by a single family (Almeida and Wolfenzon, 2006), cross-shareholding and common directorship (Khanna and Rivkin,2006).

While going through the literature, one can identify three main reasons for the formation of business groups (Khanna and Rivkin, 2006). First, groups are formed because of market imperfections and information problems (Leff, 1976;1978). Second, market uncertainties of an individual firm are likely to be reduced by repeatedly engaging with the same partner, instead of searching for a new partner. Finally, groups are formed as a result of owners' desire to diversify risk or through a succession in family-owned companies.

Modigliani and Miller's (1958) irrelevance proposition concerning capital structure choices and firm value led to a large number of theoretical and empirical studies. On the theoretical front, three alternative theories of capital structure emerged over time, viz., the static trade-off theory, the pecking order theory and the agency cost theory.

In the static trade-off theory, a firm is viewed as setting a target debt to equity ratio and gradually moving towards it (Myers, 1984). In other words, this theory assumes that some form of optimal capital structure exists,which can maximize the firm value while simultaneously minimize external claims to the cash flow stream. According to this theory of capital structure, a firm's target leverage is determined by the trade-off between interest tax shields of debt and the cost of financial distress. Affiliation with business group may have implications for this theory of capital structure in several ways. First, larger firms, especially groups, tend to be more diversified (Claessens, Djankov, Fan and Lang, 1999) which reduces

the potential risk of default and raises the group's debt capacity. Second, groups are likely to cross-subsidize other members (Chang and Hong, 2000) and cover debt obligations in the event of a default to protect the group's reputation. Third, the costs arising from information asymmetries at debt renegotiations are smaller within business groups (Hoshi,Kashyap and Scharfstein, 1990). Thus, decreased potential costs of financial distress allow groups to take on more debt. All these factors imply a higher debt level for group-affiliated firms compared to a stand-alone. Some evidence on the differences in the total debt ratio between group affiliated firms and stand-alone firms is reported by e.g. Manos, Murinde and Green (2007) who find significantly higher leverage levels for Indian group affiliates and Lee, Lee and Lee (2000) and Jung, Kim and Kim (2009) who show that Korean Chaebol members are more highly levered than stand-alone.

The pecking order theory of capital structure of Myers and Majluf (1984) states that firms choose to finance new investment, first by internal retained earnings, then by debt and finally by equity. There is no concept of target capital structure for a firm in the pecking order theory. The theory is based on the assumption that firm insiders have more information than outside investors. The pecking order theory has several implications for group affiliation.First, due to the existence of internal capital markets, group-affiliated firms have greater access to internal funds and this should reduce their desire to use external debt. Second, group-affiliation may reduce information asymmetries in member firms (Manos, Murinde and Green, 2007). Dewenter and Warther (1998) corroborate this view in the case of Japanese keiretsus. Finally, belonging to a group increases access to external finance, because the group's reputation may change perception and behaviour of banks and other creditors (Schiantarelli and Sembenelli, 2000).

The agency cost theory (Jensen and Meckling, 1976) proposes that the optimal capital structure is determined by agency costs, which include the costs of both debt and equity issue. The costs related to equity issue may include: (a) the monitoring expenses of the shareholders (b) the bonding expenses of the managers and (c) 'residual loss' due to the divergence of managers' decision from those of the shareholder's (Jensen and Meckling, 1976). On the other hand, debt issue increases the shareholders' and managers'

incentives to invest in high-risk projects that yield high returns to the shareholders but increase the likelihood of failure that the bond holders have to share if it is realized. If debt-holders anticipate this, a high premium would be charged, which in turn would increase the cost of debt. Thus both equity and debt incur agency costs and hence, the optimal capital structure involves a trade-off between the two types of costs. In the case of group-affiliated firms, we would find that agency conflicts can be mitigated due to monitoring from a large shareholder. A large shareholder may reduce the scope of managerial opportunism resulting in lower agency conflicts between management and shareholders (Shleifer and Vishny, 1986). If a large shareholder serves as active monitor, management may not be able to adjust debt to their own interests. In other words, firms with a large shareholder are likely to have a higher debt ratio. Using a sample of 252 industrial firms within the S&P 500 Anderson ,Mansi and Reeb (2003) find that family ownership is associated with a lower agency cost of debt.Moreover,Anderson and Reeb (2003) find that family ownership is valuable in reducing managerial opportunism. In addition, if the manager is from within the group-affiliated firm, there is no separation of ownership and control and the equityholder's and manager's interests are completely aligned. In such cases, managerial incentives to consume perquisites, expropriate shareholders' wealth and to engage in other non-maximising behaviour would be reduced because of managers' ownership stake (Jensen and Meckling, 1976). However, Fama and Jensen (1983) argue that managerial share-ownership may still have adverse effects on agency conflicts, because this phenomenon may lead to entrenching activities of the management.

We try to explore the implications of these alternative theories of capital structure for Indian corporate firms affiliated to business groups vis-à-vis the stand-alone firms[1]. Like Manos, Murinde and Green (2007), we consider Indian corporate firms for the reasons set out by Khanna and Palepu (2000). First, the Indian economy

1 Indian business groups, referred to as 'Business Houses', date back to the colonial times. About three-fourths of the largest companies in India are family business. There are about 400 business groups in India with variations in size and levels of diversification. For more detailed discussion on the formation and evolution of the Indian business groups see Manos, Murinde and Green (2007).

has a large number of business groups, which will facilitate analyses based on a considerable sample size. Second, it is easy to establish group affiliation, since firms are usually owned and controlled by a single group. Third, Indian business groups are well organized into separate legal entities based on lines of business. The analysis is conducted using a balanced panel data of 875 firms over the period 2002-2010. Altogether 6125 observations have been available for the analysis. Having an impact on corporate capital structure due to the increase in corporate savings in India since 2002 onwards led us to begin our analysis from 2002. Our results show that group-affiliated firms have higher leverage than the stand-alone firms which can be explained by a combination of factors such as the reduction of the agency cost of debt in case of the group-affiliated Indian firms, better access to external finance in case of the Indian business groups due to better reputation and creation of internal capital markets by the business groups.

The remainder of the paper is organized as follows. In section 2 we discuss the methodology. Section 3 deals with data and descriptive statistics. The empirical analysis is presented in section 4. Section 5 concludes.

2. Methodological Framework

In this section we describe the model specifications and the estimation methods used to analyse the firm's capital structure decisions. Variables that may affect the firm's leverage level are based on the capital structure theories discussed in section I. We have used three alternative estimation methodologies and compared the results. These estimation methodologies are: (i) pooled OLS for panel data (ii) Generalized Method of Moments (GMM) estimation for panel data as suggested by Arellano and Bond (1991) and (iii) time-series analysis with lagged dependent variable as discussed in Gul (1999) for three time periods viz., 2002, 2005 and 2009. Justification for using the 'lagged' time-series methodology is discussed later. For panel data, we propose the following general specification:

$$LEV_{it} = \alpha_0 + f(CAPSTV_{it}) + \beta GROUP_{it} + \eta_i + \eta_t + \varepsilon_{it} \quad \ldots\ldots\ldots(1)$$

where LEV_{it} is the leverage, $CAPSTV_{it}$ are the set of traditional explanatory variables for capital structure, $GROUP_{it}$ is the group dummy, η_i is the unobserved firm-specific effects, η_t is the time-

specific effects capturing the effects of macroeconomic factors that are outside the firm's control and ε_{it} is the error term. We discuss first the measures of leverage and then discuss the explanatory variables and their relations with leverage.

2.1. Measures of leverage

Generally two measures of leverage are used in empirical studies, viz., book leverage and market leverage. Book leverage is defined as the book value of total debt divided by the book value of total assets. Market leverage is defined as the book value of total debt divided by the book value of total liabilities plus the market value of total equity. The database that we are using in this study does not provide information on the market value of total equity. Hence, we take only the book value in our measures of leverage. We use two measures of leverage in this study, viz., the ratio of total borrowing to asset (LEV1) and the ratio total liability to sum total of total liability and equity (LEV2). While the first measure was used by Bhaduri (2002), the second was used by Huang and Song (2006), among others. Equity is considered at 365 days average closing price.All the variables are measured in terms of the book value.

2.2. Traditional explanatory variables for capital structure (CAPSTV)

2.2.1. Profitability

According to the pecking order theory, firms use internal sources of financing first and then go for external sources of financing. Firms with higher profitability will prefer internal financing to debt and hence a negative relationship is expected between profitability and leverage. However, according to the static trade-off theory, more profitable firms are supposed to have more debt-serving capacity and more taxable income to shield. Therefore, according to this theory, when firms are profitable they are likely to prefer debt to other sources in order to benefit from tax shield. Hence a positive relationship is expected between profitability and leverage. We consider two alternative measures of profitability. In the first measure, we consider profitability as the ratio of profit before interest, tax and depreciation to total assets (PROF1). In the second measure, we consider profitability as the ratio of cash flows to total assets (PROF2), along the line of Bhaduri (2002).

2.2.2. Tangibility

According to the agency cost theory, there are incentives for

shareholders to invest in a sub-optimal manner because of conflicts between lenders and shareholders. Lenders will take actions to protect themselves by requiring tangible assets as collateral. Firms with high levels of tangible assets will be in a position to provide collateral for debts. If the firm defaults on debt, the tangible assets will be seized but the firm will avoid bankruptcy. It is therefore expected that a positive relationship exists between tangibility and leverage. However, there are mixed empirical evidences on the relationship between tangibility and leverage (Rajan and Zingales, 1995; Wiwattanakantang, 1999; Booth et. al, 2001; Huang and Song, 2006). In the line of Huang and Song (2006) and Bevan and Danbolt (2002) we measure tangibility as the ratio between fixed assets and total assets (TANGY).

2.2.3. Firm size

The effect of firm size on leverage is ambiguous. Rajan and Zingales (1995) argue that larger firms generally disclose more information to outsiders than smaller ones. Larger firms with less asymmetric information problems should tend to have more equity than debt and hence have lower leverage. Therefore, following the pecking order theory, it is expected that the size of the firm would be negatively related to leverage. On the other hand, according to the trade-off theory, larger firms tend to be more diversified and thus less prone to bankruptcy. This argument suggests that firm size should be positively related to leverage. There is empirical evidence in support of both the theories(Booth et.al, 2001; Huang and Song, 2006; Bevan and Danbolt, 2002 among others).We use natural logarithm of sales as a proxy for the firm size (SIZE).

2.2.4. Growth Opportunities

Firms with higher growth opportunities would need more fund. According to the pecking order theory, there will be stronger preference for external financing, especially for debt. Hence we expect a positive relationship between growth and leverage. On the other hand, as discussed earlier, firms with growth opportunities may invest sub-optimally and therefore creditors will be more reluctant to lend for longer periods (Myers, 1977). In such a situation the problem can be solved by short-term financing or by convertible bonds (Titman and Wessels, 1988). Therefore we expect short-term debt to be positively related to growth if growing firms go for short-term financing instead of long-term financing. In this study we

use two alternative measures of growth opportunities. Following Titman and Wessels (1988) we take the percentage change in total assets (GRTH1) as our first measure. Our second measure of growth opportunities is the percentage change in sales over the year (GRTH2), following Chen et.al. (1999).

2.2.5. Non-debt tax shields

Firms are likely to favour debt because they can benefit from the tax shield due to interest deductibility. Thus we expect a positive relationship between effective tax rate and leverage. However, DeAngelo and Masulis (1980) argue that non-debt tax shields (such as tax deductions for depreciation and investment tax credits) are substitutes for the tax benefits of debt financing and a firm with larger non-debt tax shields is expected to use less debt. Therefore, an increase in non-debt tax shield can affect leverage negatively. Following Huang and Song (2006) we use the ratio of depreciation and amortization to total assets as the measure of non-debt tax shields (NDTS) in this study.

2.2.6. Uniqueness

Titman (1984) argues that a firm's leverage should depend on the uniqueness of its product. If a firm offers unique products, its customers, workers and suppliers suffer relatively high costs in case of liquidation and hence the costs of bankruptcy increase. Accordingly, the trade-off theory predicts a negative relationship between uniqueness and leverage. We use research and development expenditure over sales as the measure of uniqueness (UNIQUE).

2.2.7. Free cash flow

The free cash flow hypothesis of Jensen (1986) states that managers endowed with excessive free cash flows will invest sub-optimally rather than paying the free cash flow out to shareholders. According to Jensen (1986) there is a positive relationship between free cash flow and leverage. However, the pecking order theory argues that the use of internal funds is preferred to debt to the firms. Consequently, firms with excessive free cash flow are expected to have lower levels of debt. Thus the pecking order theory predicts a negative relationship between free cash flow and leverage. In this study we define free cash flow (FCF)as operating income before tax, depreciation and amortization after deducting

the total tax paid and dividends paid in line of Brailsford, Oliver and Pua (2002).

2.3. Group dummy

Group dummy is used to signify business group affiliation. We define group affiliation as the percentage of ownership by the promoter. A firm is said to be affiliated to a business group if the share of promoters equity holding is not less than 51%. This criterion is used in earlier studies by McConaughy et.al. (1998), Mishra and McConaughy (1999), Mishra et. al. (2001) and Chang (2003). We use a dummy variable for group affiliation (GROUP) which takes value 1 if it is affiliated to a business group and 0 for standalone firms. Possible relationships between group dummy and leverage from the perspective of different capital structure theories are discussed in section I. From those discussions, it emerges that the relationship may be positive or negative subject to empirical validation.

Before concluding this section we discuss the methodology in some more detail. Since we have two alternative measures of leverage (LEV1 and LEV2), two alternative measures of profitability (PROFT1 and PROFT2) and two alternative measures of the variable growth opportunities (GRTH1 and GRTH2) we will use the following eight alternative model specifications for the pooled OLS and GMM estimations for panel data:

Model 1: $LEV1_{it} = \alpha_0 + f(PROFT1, TANGY, SIZE, GRTH1, NDTS, UNIQUE, FCF) + \beta\ GROUP_{it} + \eta_i + \eta_t + \varepsilon_{it}$ .....(2)

Model 2: $LEV1_{it} = \alpha_0 + f(PROFT1, TANGY, SIZE, GRTH2, NDTS, UNIQUE, FCF) + \beta\ GROUP_{it} + \eta_i + \eta_t + \varepsilon_{it}$ .....(3)

Model 3: $LEV1_{it} = \alpha_0 + f(PROFT2, TANGY, SIZE, GRTH1, NDTS, UNIQUE, FCF) + \beta\ GROUP_{it} + \eta_i + \eta_t + \varepsilon_{it}$ .....(4)

Model 4: $LEV1_{it} = \alpha_0 + f(PROFT2, TANGY, SIZE, GRTH2, NDTS, UNIQUE, FCF) + \beta\ GROUP_{it} + \eta_i + \eta_t + \varepsilon_{it}$ .....(5)

Model 5: $LEV2_{it} = \alpha_0 + f(PROFT1, TANGY, SIZE, GRTH1, NDTS, UNIQUE, FCF) + \beta\ GROUP_{it} + \eta_i + \eta_t + \varepsilon_{it}$ .....(6)

Model 6: $LEV2_{it} = \alpha_0 + f(PROFT1, TANGY, SIZE, GRTH2, NDTS, UNIQUE, FCF) + \beta\ GROUP_{it} + \eta_i + \eta_t + \varepsilon_{it}$ .....(7)

Model 7: $LEV2_{it} = \alpha_0 + f(PROFT2, TANGY, SIZE, GRTH1, NDTS, UNIQUE, FCF) + \beta\ GROUP_{it} + \eta_i + \eta_t + \varepsilon_{it}$ .....(8)

Model 8: $LEV2_{it} = \alpha_0 + f(PROFT2, TANGY, SIZE, GRTH2, NDTS, UNIQUE, FCF) + \beta\ GROUP_{it} + \eta_i + \eta_t + \varepsilon_{it}$ .....(9)

For GMM estimation,as suggested by Arellano and Bond (1991), there will be a lagged dependent variable term on the right hand side of each of the above specifications as an instrumental variable. The advantage of this method of estimation is that it takes care of the estimation problem that arises normally with panel data because of the non-exogenous nature of the firm-specific variables (Drobetz and Wanzenried, 2006). For example, the shocks that affect the leverage of the firms are also likely to affect the regressors such as profitability and firm size. The GMM estimation method takes into account such problems and provides consistent parameter estimates.

The 'lagged' time series analysis, as described by Gul (1999) is used in this study to compare the results from the GMM estimation. However, the 'lagged' time series could not be applied on all the eight alternative model specifications described above, since it is used here to avoid the possibility of spurious correlation between the variables, LEV1 and GRTH1,as both are dependent on total assets. This particular estimation method is, therefore, concerned with two alternative specifications only with cross-section data at a particular time point with lagged dependent variable as follows:

Model 1: $LEV1 = \alpha_0 + f((PROFT1, TANGY, SIZE, GRTH1, NDTS, UNIQUE, FCF) + \beta\ GROUP + \varepsilon$ .....(10)

Model 2: $LEV1 = \alpha_0 + f((PROFT2, TANGY, SIZE, GRTH1, NDTS, UNIQUE, FCF) + \beta\ GROUP + \varepsilon$ .....(11)[2]

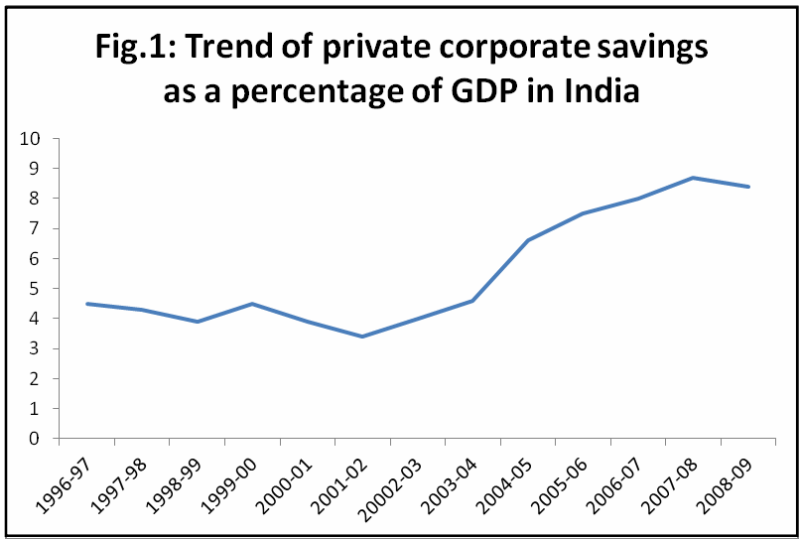
3. Data and descriptive statistics

Our sample targets all Indian corporate firms, listed either in the Bombay Stock Exchange or in the National Stock Exchange for the period 2002-2010. However, several adjustments seem pertinent for our analysis. First, banks, insurance companies and investment trusts are not included because their balance sheets have a different structure from those of the non-financial firms. We, therefore,

2 'Lagged' time series models, used in this analysis, refers to the use of lagged dependent variable. For example, when we are running the models (1) and (2) for the year 2002, all the regressors are for the year 2002 and the values for the dependent variable refers to the year 2001. Similar interpretation holds for other years.

specifically focus on non-financial firms. Second, it was not possible to collect data for many variables for a large number of non-financial firms during the sample period due to missing observations. These adjustments leave a balanced panel of 875 firms with an aggregate of 6125 observations. The data have been taken from the Centre for Monitoring Indian Economy's database PROWESS.

Our analysis starts from 2002, since corporate savings have gone up substantially from this year as depicted in Fig.1. This phenomenon would have impact on corporate capital structure. Corporate savings serve two purposes. They provide self-insurance against future adverse shocks, and second they provide liquidity to meet current adverse shocks. There is another benefit of holding liquid assets by corporate firms. The firms save transaction costs to raise funds and do not have to liquidate assets to make payments (Opler et.al., 1999). Increased corporate savings mean growth in profitability and resulting increase in retained earnings. The use of internal funds rather than external funds decreases leverage by increasing the value of existing equity. With increased internal funds, firms pay back debt when it becomes due instead of making investment. Conversely, with a deficit in internal funds, the firms decrease cash holdings and eventually raise debt. Thus, there is an inverse relationship between corporate savings and leverage.



The summary statistics of the major variables for selected years (2002, 2006 and 2010) as well as for the entire period 2002-2010 are presented in Table 1. The series LEV1 (measured by the ratio between total borrowings to asset) shows a rising trend from 2002 to 2006 but it falls in 2010. On the other hand, LEV2 (measured by the ratio between total liability and the sum total of total liability and equity) shows a consistently decreasing trend over the years. The two measures of leverage differ sharply both in individual years as well

Table 1: Summary statistics for leverage and its determinants

Variables	2002		2006		2010		2002-2010			
	Mean	Std.dev.	Mean	Std.dev	Mean	Std.dev.	Mean	Std.dev	Min.	Max.
LEV1	0.351	0.521	0.381	1.777	0.297	0.440	0.341	0.831	0	51.777
LEV2	0.748	0.298	0.613	0.306	0.588	0.360	0.665	0.316	0	1
PROFT1	0.106	0.106	0.135	0.143	0.133	0.109	0.128	0.173	-3.607	5.355
PROFT2	0.095	0.094	0.061	0.141	0.079	0.122	0.078	0.147	-1.833	5.985
TANGY	0.699	0.339	0.693	0.418	0.673	0.501	0.693	0.426	0.005	8.248
SIZE	4.455	1.923	4.849	2.139	5.222	2.299	4.865	2.138	-4.605	12.707
GRTH1	5.076	19.463	20.722	48.887	13.424	39.098	14.562	45.999	-89.801	1753.807
GRTH2	4.739	41.794	22.725	108.82	20.336	200.867	21.728	168.519	-99.997	7790.909
NDTS	0.039	0.029	0.034	0.025	0.030	0.023	0.034	0.026	0	0.576
UNIQUE	1.928	9.519	4.652	31.627	8.979	62.018	5.191	40.448	0	1476.61
FCF	665.767	4390.974	1222.271	8094.698	2129.855	13550.36	1337.325	9410.33	0.02	313579.9

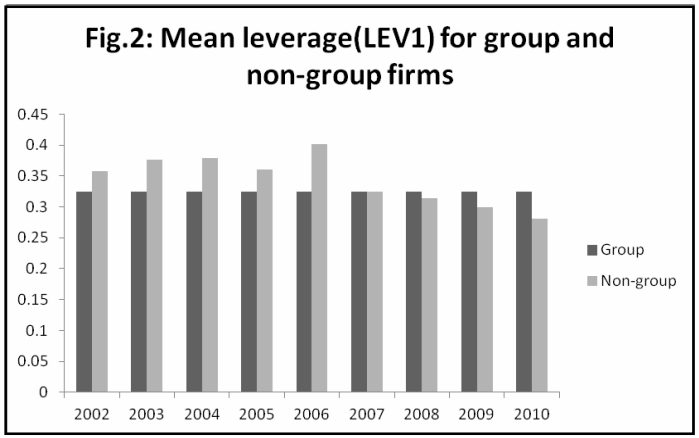
Table 2: Correlation coefficients between variables

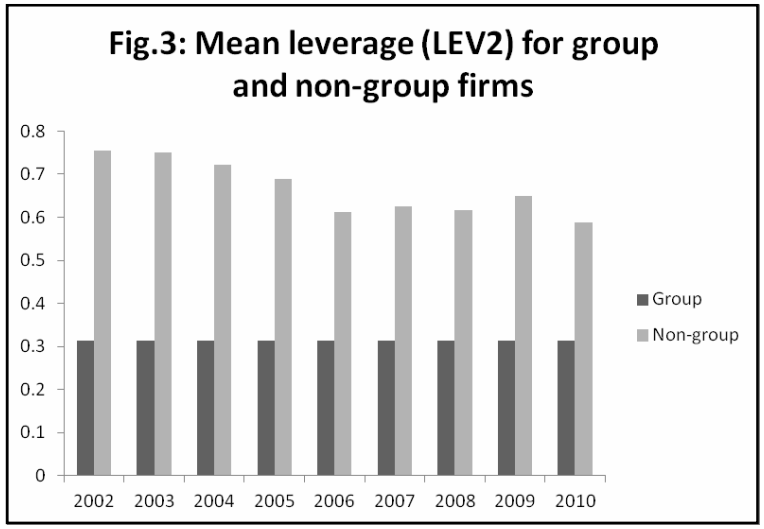
	LEV1	LEV2	PROFT1	PROFT2	TANGY	SIZE	GRTH1	GRTH2	NDTS	UNIQUE	FCF
LEV1	1.00										
LEV2	0.027	1.00									
PROFT1	-0.056	-0.029	1.00								
PROFT2	-0.104	-0.001	0.506	1.00							
TANGY	0.213	-0.001	0.073	0.188	1.00						
SIZE	-0.130	0.213	0.166	0.135	-0.142	1.00					
GRTH1	-0.050	0.007	0.096	-0.050	-0.144	0.113	1.00				
GRTH2	-0.005	-0.004	0.023	-0.022	-0.011	-0.028	0.218	1.00			
NDTS	0.138	-0.028	0.081	0.170	0.618	-0.061	-0.153	-0.035	1.00		
UNIQUE	-0.023	0.039	0.022	0.021	-0.054	0.235	0.021	-0.005	-0.035	1.00	
FCF	-0.016	0.053	0.019	0.003	-0.026	0.326	0.016	-0.003	-0.030	0.288	1.00

as during the entire period 2002-2010. During the entire period, LEV1 is 0.341 whereas LEV2 is 0.665. Over the years, the firms have grown in size, both measures of growth opportunities show significant changing patterns, and the variable UNIQUE (measured by the research and development expenditure over sales) shows a rising trend.

Table 2 reports the correlation coefficients between the variables. The two alternative measures of leverage are not correlated, as the correlation coefficient is 0.027. It appears from Table 2 that the sample of 875 firms, used in the regression analysis, does not appear to suffer from multicollinearity. The highest correlation coefficient is 0.618 between tangibility (TANGY) and non-debt tax shields (NDTS).

For both the measures of leverage, LEV1 and LEV2, we compare the mean values of the group-affiliated firms with that of the stand-alone firms. Fig.2 shows the picture for LEV1. It is evident that mean leverage was lower for the group-affiliated firms during 2002-2006, then in 2007 mean leverage became the same for both types of firms and since 2008 mean leverage for group-affiliated firms became higher than that of the stand-alone firms. On the other hand, for LEV2, mean leverage is higher for stand-alone firms compared to that of the group-affiliated firms throughout the period 2002-2010. One striking point from Fig.3 is that the mean leverage of group-affiliated firms remained the same over the entire study period. Mean leverage of the stand-alone firms, on the other hand, decreased substantially in 2010 compared to that in 2002.





4. Empirical Analysis

We first estimate the eight alternative model specifications discussed in section 2 by applying the pooled OLS method, reported in Table 3. It is evident from Table 3 that the models represent poor fit as the adjusted R-squares values are as low as 0.07 or less. Moreover, when the firm specific effects exist and are unobservable, OLS estimation leads

to an omitted variables bias because of the potential correlation between fixed effects and the regressors (Hsiao, 1985). In such cases GMM estimation gives more preferred models.

We report the GMM estimation results for eight alternative model specifications in Table 4. We carry out two-step GMM estimation, since they are more efficient than one-step estimation and since the Sargan over-identifying restriction is heteroscedasticity-consistent only if they are based on the two-step estimation (Arellano and Bond, 1991; Blundell and Bond, 1998). The efficiency of the GMM estimator, however, depends on the assumption that the lagged values of the dependent and the other explanatory variables are valid instruments and that the error terms do not exhibit serial correlation. To address these issues Arellano and Bond (1991) proposed three tests. The first test is to test the hypothesis that there is no first order serial correlation of the error term. Under the null hypothesis of no serial correlation, the test statistic is distributed

Table 3: Pooled OLS estimation of the models

Explanatory variables	Model(1)	Model(2)	Model(3)	Model(4)	Model(5)	Model(6)	Model (7)	Model (8)
Constant	0.283 (0.030)*	0.282 (0.030)*	0.253 (0.030)*	0.250 (0.030)*	0.503 (0.011)*	0.501 (0.011)*	0.498 (0.011)*	0.496 (0.011)*
PROFT1	-0.265 (0.054)*	-0.267 (0.053)*			-0.124 (0.020)*	-0.126 (0.020)*		
PROFT2			-0.773 (0.063)*	-0.771 (0.064)*			-0.080 (0.024)*	-0.079 (0.024)*
TANGY	0.373 (0.027)*	0.374 (0.027)*	0.408 (0.027)*	0.409 (0.027)*	0.049 (0.010)*	0.050 (0.010)*	0.050 (0.010)*	0.051 (0.010)*
SIZE	-0.039 (0.005)*	-0.039 (0.005)*	-0.033 (0.004)*	-0.034 (0.005)*	0.035 (0.001)*	0.035 ().002)*	0.035 (0.002)*	0.034 (0.002)*
GRTH1	-0.00007 (0.0002)		-0.0002 (0.0002)		-0.00007 (0.00007)		-0.0001 (0.00007)***	
GRTH2		-0.000016 (0.00005)		-0.00003 (0.00005)		5.68e-06 (0.00002)		8.28e-07 (0.00002)
NDTS	0.594 (0.438)	0.602 (0.437)	0.814 (0.435)**	0.851 (0.434)**	-0.621 (0.167)*	-0.604 (0.166)*	-0.635 (0.167)*	-0.612 (0.167)*
UNIQUE	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	-0.00005 (0.00009)	-0.00005 (0.00009)	-0.00005 (0.00009)	-0.00005 (0.00009)
FCF	1.95e-06 (1.05e-06)	1.96e-06 (1.05e-06)	1.51e-06 (1.04e-06)	1.55e-06 (1.04e-06)	-7.67e-07 (4.01e-07)**	-7.60e-07 (4.01e-07)**	-7.47e-07 (4.02e-07)***	-7.31e-07 (4.02e-07)**
GROUP	0.005 (0.019)	0.005 (0.019)	0.003 (0.019)	0.004 (0.019)	-0.017 (0.007)*	-0.017 (0.007)*	-0.017 (0.007)*	-0.018 (0.007)*
Adj. .R-square	0.06	0.06	0.07	0.07	0.05	0.05	0.05	0.05

Note: Standard error is presented in parentheses.

** represents significance at 1% level.*

*** represents significance at 5% level*

**** represents significance at 10% level*

as a standard normal. The second is to test that there is no second order serial autocorrelation of the error term, which is distributed as a standard normal under the null hypothesis of no serial correlation. The third is the Sargan test of over-identifying restrictions. This tests the validity of the instruments and is asymptotically distributed as χ^2 under the null of instrument validity.

Turning to the results of GMM estimation, as reported in Table 4, we observe that the Sargan test reveals that the null hypothesis of instruments validity is rejected at 1 per cent level of significance for all the eight alternative model specifications. This indicates that it is appropriate to treat firm-specific characteristics as exogenous. The test statistics of first and second order serial correlations show that models (1)-(4) are not misspecified as there are no significant unobserved firm-specific effects. However, for models (5) –(8), both the first order and second order serial correlations are significant either at 1 per cent or at 10 per cent level which can be taken as evidence for the existence of misspecification. We, therefore, focus our attention on the analysis of models (1)-(4) only.

We now interpret the estimates of the coefficients for models (1)-(4). The coefficient of lagged leverage ratio is positive and significant in all the four models. This result clearly indicates that Indian firms adjust very quickly towards the target leverage ratio, which indicates that the cost of being off target is relatively high compared to the cost of adjusting the debt ratio.

The coefficients of both the measures of profitability, PROFT1 (measured as the ratio of profit before interest, tax and depreciation to total assets) and PROFT2 (measured as the ratio of cash flow to total assets) are negatively significant at 1 per cent level in all the four models. A relatively large negative coefficient of profitability is consistent with the pecking order theory that predicts a preference for internal finance over external finance. These findings suggest that the high profit firms use less debt because they have more internal funds and vice versa.

Table 4: Two-step GMM estimation of the models

Explanatory variables	Model(1)	Model(2)	Model(3)	Model(4)	Model(5)	Model(6)	Model (7)	Model (8)
Constantt	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.002)	-0.00007 (0.002)	-0.011 (0.001)*	-0.010 (0.0010)*	-0.011 (0.001)*	-0.011 (0.001)*
$ÄLEV_{it-1}$	0.122 (0.0004)*	0.122 (0.0004)*	0.133 (0.0007)*	0.134 (0.0007)*	0.453 (0.030)*	0.453 (0.029)*	0.451 (0.030)*	0.452 (0.029)*
PROFT1	-0.544 (0.003)*	-0.551 (0.003)*			-0.006 (0.010)	-0.005 (0.010)		
PROFT2			-0.714 (0.028)*	-0.706 (0.027)*			0.0008 (0.011)	-0.003 (0.011)
TANGY	0.172 (0.017)*	0.182 (0.009)*	0.277 (0.019)*	0.319 (0.009)*	-0.011 (0.012)	-0.020 (0.012)***	-0.013 (0.014)	-0.021 (0.014)
SIZE	-0.004 (0.009)	0.0007 (0.010)	-0.004 (0.011)	-0.008 (0.012)	0.002 (0.006)	-0.001 (0.006)	0.002 (0.006)	-0.0006 (0.006)
GRTH1	-0.0003 (0.0001)*		-0.0006 (0.0001)*		0.00009 (0.00003)*		0.00008 (0.011)***	
GRTH2		-0.00001 (0.00001)		-0.00001 (0.00001)		5.86e-06 (0.00002)		6.67e-06 (0.00001)
NDTS	1.227 (0.343)*	1.600 (0.341)*	.706 1(0.309)*	2.007 (0.308)*	-0.191 (0.127)	-0.231 (0.133)***	-0.172 (0.128)	-0.209 (0.134)
UNIQUE	0.00009 (0.0003)	0.00009 (0.0003)	0.00009 (0.0003)	0.0001 (0.0004)	0.0002 (0.00008)**	0.0002 (0.00009)***	0.0002 (0.00008)**	0.0002 (0.00009)***
FCF	6.96e-06 (4.36e-06)	6.63e-06 (4.34e-06)	5.8e-06 4.83e-06	6.93e-06 4.77e-06	5.54e-07 (6.89e-07)	6.18e-07 7.24e-07	5.38e-07 6.93e-07	6.06e-07 (7.29e-07)
GROUP	0.005 (0.002)***	0.005 (0.003)***	-0.0001 (0.003)	-0.0007 (0.003)	0.004 (0.003)	0.004 (0.003)	0.004 (0.003)	0.004 (0.003)
Correlation 1	-1.02	-1.02	-1.03	-1.03	-8.63	-8.73	-8.61	-8.71
Correlation 2	1.00	1.00	1.01	1.02	-1.72	-1.68	-1.72	-1.68
Sargan test (df)	113.76 (27)	103.39 (27)	99.71 (27)	99.89 (27)	278.15 (27)	273.70 (27)	278.08 (27)	274.02 (27)

Note: same as in Table 3.

The coefficient estimate of the variable TANGY, measured by the ratio of fixed assets to total assets, has a positive coefficient and it is significant at 1 per cent level in all the four models. This result is consistent with the view that there are various costs viz., agency costs or bankruptcy costs, associated with the use of debt and these costs may be moderated by collateral such as the fixed assets. This result, therefore, supports the trade-off theory.

The variable, SIZE, measured by natural logarithm of sales, is negatively related to leverage but insignificant in all the four models.

The variable GRTH1 (measured by percentage change in total assets) is negatively significant at 1 per cent level in models (1) and (3). The inverse relationship supports the view that the cost of financial distress of high growth firms is relatively high and the agency cost of debt is relatively high. Because of the high cost of debt managers would be reluctant to issue debt which in turn will lead to lower leverage ratio. This finding, therefore, supports the agency cost of debt financing for the Indian firms. The other measure of growth opportunities, GRTH2 (measured by percentage change of sales over years) is also negatively related to leverage in models (2) and (4) but not significant.

The coefficient of the variable NDTS is positively significant at 1 per cent level in all the four models. This finding implies that firms with a high level of non-debt tax shield prefer more debt possibly because they can benefit from tax shield due to interest deductibility. Thus our finding contradicts the trade-off theory which emphasizes the substitution between non-debt and debt tax shields.

The variable UNIQUE (proxied by research and development expenditures over sales) is positively related to leverage in all the four models but not significant.

The variable FCF (free cash flow) appears to have a positive relationship with leverage in all the four models. But the coefficients are not statistically significant.

The most important variable in our analysis, GROUP, is positively significant at 10 per cent level in models (1) and (2). However, this variable has negative but insignificant coefficient in models (3) and (4). The implication of the positive coefficient of GROUP is that the group-affiliated firms have higher level of leverage than their counterpart of stand-alone firms. Thus leverage decisions of group-

affiliated Indian firms are significantly different from those of the stand-alone firms. The explanation for such behaviour can be traced from our earlier discussion in section 1, which includes the reduction of the agency cost of debt in case of the group-affiliated Indian firms as observed by Anderson, Mansi and Reeb (2003) in U.S. , better access to capital markets (both internal and external) in case of the Indian business groups due to better reputationas argued by Schiantarelli and Sembenelli (2000) and smaller costs due to informational asymmetries at debt renegotiations within a business group as stated by Hoshi, Kashyap and Scharfstein (1990). Our finding supports the earlier study by Manos, Murinde and Green (2007) on Indian corporate firms which has some methodological limitations discussed later in detail.

Table 5: 'Lagged' time-series estimation of the models

	2002		2005		2009	
Explanatory variables	Model (1)	Model (2)	Model (1)	Model (2)	Model (1)	Model (2)
Constant	0.483 (0.104)*	0.480 (0.104)*	1.029 (0.200)*	1.002 (0.201)*	0.148 (0.045)*	0.130 (0.045)*
PROFT1	-0.462 (0.300)		-0.619 (0.252)*		-0.317 (0.076)*	
PROFT2		-0.010 (0.329)		-0.224 (0.411)		-0.425 (0.104)*
TANGY	0.018 (0.101)	0.013 (0.102)	0.162 (0.198)	0.200 (0.199)	0.417 (0.037)*	0.424 (0.037)*
SIZE	-0.054 (0.017)*	-0.062 (0.017)*	-0.151 (0.032)*	-0.160 (0.032)*	-0.003 (0.006)	-0.0003 (0.006)
GRTH1	-0.001 (0.001)	-0.002 (0.001)	0.0009 (0.002)	0.0005 (0.002)	0.0007 (0.0006)	0.0002 (0.0005)
NDTS	3.382 (1.184)*	3.218 (1.194)*	0.847 (3.222)	0.495 (3.246)	-2.428 (0.787)*	-2.433 (0.787)*
UNIQUE	-0.0001 (0.003)	-0.00009 (0.004)	0.001 (0.002)	0.002 (0.002)	-0.0001 (0.0002)	-0.0001 (0.0002)
FCF	5.98e-06 (7.74e-06)	6.64e-06 (7.74e-06)	0.00001 (0.00001)	0.00001 (0.00001)	1.28e-07 (1.05e-06)	-1.35e-07 (1.06e-06)
GROUP	0.086 (0.065)***	0.086 (0.064)***	-0.085 (0.128)	-0.084 (0.128)	0.032 (0.027)**	0.036 (0.027)***

Note: Same as in Table 3

Finally, we discuss the results from an alternative estimation method, 'lagged' time-series method applied by Gul (1999), as reported in Table 5. This estimation method is applied in our analysis for three years viz., 2002, 2005 and 2009 and for two alternative model specifications as discussed in section 2. It is evident from Table 5 that the variable SIZE is negatively significant in both the model specifications in 2002 and 2005 but not in 2009. The other variable that is positively significant in both the models in 2002 is NDTS. However, the same variable has a negative significant coefficient in 2009. PROFT1 is negatively significant for model (1) in 2005 and 2009. In 2009, PROFT2, in model (2) is also negatively significant. The coefficient of the variable TANGY is positively significant in both the models in 2009. Last but the most important variable, GROUP, appears to have a positive significant effect on leverage in both the models in 2002 and 2009 but not in 2005. This finding is in line with our earlier results from GMM estimation. However, as the finding with respect to this variable differs in 2005, it questions the methodology used by Manos, Murinde and Green (2007). These findings suggest that, if one is carrying out the analysis with a sample of firms covering only one year, as done by Manos, Murinde and Green (2007), then the results may be sensitive to the particular year's data. Drawing a generalized inference from such an exercise may be unsubstantiated. The reason for such findings is due to the fact that in India any corporate firm's affiliation to a group changes from time to time as was evident from our sample. Comparing all the three estimation methodologies applied in our analysis, we come to the conclusion that the results from GMM estimation method are the robust ones and could be considered as a methodological improvement over a similar study by Manos, Murinde and Green (2007).

5. Conclusion

This paper investigates the effect of group affiliation on the Indian corporate firms capital structure based on the data of 875 Indian non-financial firms, listed either in the Bombay Stock Exchange or in the National Stock Exchange, for the period 2002-2010. Three alternative estimation methodologies are used viz., (i) pooled OLS for panel data (ii) Generalized Method of Moments (GMM) estimation for panel data (Arellano and Bond, 1991) and (iii) 'lagged' time series analysis for three time periods, 2002, 2005 and 2009, as

discussed in Gul (1999) and the results are compared. GMM allows us to control for unobserved firm-specific effects and the endogeneity problem whereas the 'lagged' time series method is applied to avoid the problem of spurious correlation between the variables, LEV1 (a measure of leverage) and GRTH1 (a measure of growth opportunities) as both are dependent on total assets. The analysis starts from the year 2002 as the corporate savings in India started to increase since this year which has some impact on corporate capital structure. This study may be considered as an improvement over the earlier existing literature on Indian corporate firms through the application of some methodologically advanced estimation techniques.

Among the three alternative estimation methodologies,GMM estimation method, appears to be the robust one. The findings from GMM show that the traditional explanatory variables for capital structure, drawn from the three important capital structure theories viz., trade-off theory, pecking order theory and agency cost theory, explain the leverage decision of firms which is consistent with both the theoretical and empirical literature. The most important finding, which is the focus of this study, is that the group-affiliated firms have higher level of leverage than the stand-alone firms. This finding may be considered as an empirical support to the theories on business groups and internal capital markets which states that companies affiliated to business groups are expected to have better access to capital markets (both internal and external) than what comparable stand-alone companies have (Schiantarelli and Sembenelli, 2000). Moreover, due to lower costs of financial distress, group-affiliated firms prefer debt to equity, in line of the argument by Hoshi, Kashyap and Scharfstein (1990). Our 'lagged 'time series analysis also supports the above finding for the years 2002 and 2009 but not for 2005. This suggests that the results of this kind of exercise, based on single year's data, are sensitive to the choice of the year.

How does group-affiliation help emerging economy firms like in India could not be answered from this study. For this purpose one has to look into the effect on firm performance of group-affiliation which is not addressed in this study. However, one answer to this type of questions may be derived from the study by Fisman and Khanna (2004) who observed that the group-affiliated firms are

more likely, in the sense of making higher profitability, to locate in less-developed regions of India than the stand-alone firms. The reason suggested by the authors was that the group-affiliated firms overcome the difficulties that impair production in under developed regions due to the scale and scope of groups and the de facto property rights enforcement within groups in environment where legal enforcement was lacking. Before concluding some discussion on the issue of corporate governance in the context of business groups or family controlled firms is imperative. In the case of stand-alone firms, the corporate governance problem that is much discussed in the literature is that the managers would fail to act for the shareholders. It is suggested that agency problems might be minimized in firms controlled by families. However, in family business group firms a different kind of agency problem arises. In this setup the managers may act for the controlling family and not for the minority shareholders (Morck and Yeung, 2003). The kind of agency problems that arise in family controlled business groups are the use of pyramidal structure as discussed by La Porta et.al. (1999) and Almeida and Wolfenzen(2006), the entrenchment of controlling families and 'tunnelling', another way of misappropriating the wealth of minority shareholders.The present study may, therefore, be extended further to judge the social welfare consequences of the family business groups in emerging economies, like India.

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