Medium Sized Firms in India and Their Dynamic Adjustment Towards Their Target Debt Equity Structure

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Abstract: There have been very few studies done over the world to determine the profitability of firms given the firms expected financial leverage or debt equity structure. Studies from all over the world have identified various factors that are vital in influencing the target debt equity structure of firms. However, different factors vary in terms of their influence on determining the optimal debt equity structure of firms for different countries. This paper researches into various firm specific factors for medium sized companies in India and makes an in-depth analysis to establish the relationship of their impact on medium sized firms which move towards the target debt equity structure through a dynamic process. The medium sized companies have been sampled keeping in mind the market capitalization of these firms in India. This research work tries to explain those factors which have an influence on achieving the optimum debt equity structure for medium sized firms and tries to study how these firms could use their resources in consolidating upon these firm specific factors for the overall profitability of the firms. This line of research has been rarely tried in the Indian context and it promises an innovative insight into scientific research on determining a firm's profitability. This research work is based on a very unique analytical tool namely the General Method of Moments (GMM) which is a Nobel award winning analytical tool first proposed by its founder Lars Peter Hansen in 1982.This research work is purely quantitative and empirical in nature and is academically relevant for academicians and industry equally.

Keywords: Capital structure, Speed of adjustment, General Methods of Moments (GMM), Instruments, error term, Endogeneity

I. INTRODUCTION

Determining the optimum capital structure of firms has been a challenge for financial researchers all over the world. The importance of debt equity ratio and its influence on the profitability of firms was initially highlighted in the studies of Modigliani Miller approach, 1958. This was followed by other theories to determine the optimum debt equity structure. Some of the studies worth mentioning are that of Aydin Ozkan (2001), Wolfgang Drobetz and Gabrielle Wanzanreid (2006), Julan Du & Yi Dai (2005), Hyesung Kim, Almas Heshmati & Dany Aoun, (2006). Most of these studies identified that certain factors like, profitability, size, growth, tangibility, Non Debt Tax shield and others have an effect on the decision of capital structure of firms.

Though many research on capital structure has been done over the years, there is a lot of scope in research of optimal capital structure of firms in the Indian context.

With the Industrialization in the private sector picking up momentum towards the 1990's decade, the Indian state has seen rapid development of firms through such activity in all sectors of the economy.

Though Public sector units are primarily funded by the government, the issue of optimum capital structure is even more noteworthy for private firms which rely hugely on external debt.

Thus right leverage of equity and debt determines the success for most firms. Hence a firm must strive to achieve optimum leverage to ensure success of the firms. Too high equity could block ones internal sources of funds and too high dependence on external debt could make firms insolvent. At a time when India is on path of growth and development ensuring the proper management of firms at the micro level is essential to ensure that Indian can sustain this growth. Again firms can succeed if they are fundamentally strong which also includes that they have a right balance of capital structure. Thus this study is significant and relevant for a country like India as it is on a transition phase from being a developing economy to becoming a developed economy given the various challenges in the macro and micro level.

In this paper the researcher's primary objective is to study the various firm and industry specific factors that could influence a firm to adapt to its target capital structure.

This paper has been divided into five sections. The first section comprises of the Introduction and the need for identification of this research. The second section comprises of the Literature Review. The third section comprises of Research Methodology. This section covers the topics on research objectives, need and background for study, research hypotheses, computational procedure, scope and relevance of study for industry. The fourth section comprises of analysis and findings of medium sized firm data using four different models and analyses of the hypotheses formed. The last and fifth section comprises of the conclusion and major findings of this research work.

II. LITERATURE REVIEW

The researcher has based his research on the scope of further research already done by various researchers all over the world. Some of the research work reviewed includes.

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Determinants of Capital Structure and Adjustment to Long Run Target (Aydin Ozkan, 2001): The paper examines UK based firms and their partial adjustment to a long term debt ratio. The use of General Methods of Moments is used to overcome the problem of endogeneity explained in the methodology part of this paper.

Determinants of capital Structure choice: A study of the Indian Corporate Sector (Sumitra N. Bhaduri, 2002): The paper studies optimal capital structure of firms in India to understand the magnitude of restructuring costs necessary to obtain the optimal capital structure. The speed of adjustment as found is slower for long term loans and faster for short term loans.

What determines the speed of adjustment to the target capital structure? (Wolfgang Drobetz and Gabrielle Wanzanreid, 2006): This paper features a model based on the BHW model (1999) and works out the GMM estimation to determine the correct estimates of capital structure determinants and their speed of adjustment. The empirical results reveal that firms actually seek a target debt equity ratio. Fast growth firms and those which are away from their target leverage are seen to adjust faster. Moreover, speed of adjustment is faster when the term spread is higher and the economic conditions are favorable.

The dynamic adjustment towards target capital structure of firms in transition economies (Ralph de Haas & Marga Peeters, 2006): The paper studies a dynamic model which endogenizes the target leverage and speed of adjustment after taking into consideration microeconomic data of European firms. The results indicate gradual development of financial institutions in the region have led to increase in the capital structure of firms and has helped these firms come closer to their target.

A dynamic model of optimal capital structure (Sheridan Titman & Sergey Tsyplakov, 2006): This paper studies how firms can dynamically adjust both capital structure and its investment choices together. It is the choice between increasing firm's value or equity value which helps firms to move towards their target leverage.

Determinants of Adjustment Speed to Target Capital Structure: Evidence from Indian Manufacturing Firms (Jitendra Mahakud and Sulagna Mukherjee, 2011): The paper studies factors that determine the speed of adjustment of Indian manufacturing firms towards their target leverage. The results shows that variables like size of the firm, profitability, opportunity to grow, tangibility and research and development are significant in determination of target leverage ratio of Indian manufacturing companies.

Factors affecting Capital Structure Decisions: Empirical evidence from selected Indian firms (Anurag Pahuja & Ms. Anu Sahi, 2012): This paper studies factors which determine the capital structure of Indian firms. Two major determinants of capital structure identified are growth and liquidity. Both the variables are seen to have positive relationship with debt-equity ratio. Other factors such as profitability, size, and tangibility were seen not to have significant affect on determining the capital structure. Hence the study doesn't consider those factors as significant.

III. RESEARCH METHODOLOGY

A. Objectives of the research

1. To identify firm specific and macro-economic specific characteristics that contribute in determining the capital structure of medium sized Indian firms.
2. To find the relationship of these identified characteristics and the capital structure of medium sized Indian firms.
3. To identify certain key factor that influences the speed of adjustment of medium sized Indian firms to their optimal capital structure.
4. To establish the relationship of the factors identified with the speed of adjustment of medium sized Indian firms

B. Background and need of the study

All of the research done on this topic of research till date reveals important insights into the research of capital structure decisions and its speed of adjustment. This research paper establishes models which go beyond the scope of already researched papers:

In this research paper, the researcher has gone ahead of all previous research on this area. The models used in this paper has used the identified explanatory variables related to speed of adjustment, all the identified explanatory variables related to optimal structure and the interaction of all these variables simultaneously with each other to determine the optimal capital structure and speed of adjustment simultaneously. Moreover studying the nature and behavior of firms throughout the various business cycles is of importance in any economy. This research is based keeping in mind three business cycles viz. a) Pre-recession phase b) Recession phase and c) Post-recession growth phase.

In India and all-throughout the globe a major recession occurred during the period 2008 to 2010. Hence the time period of research is taken from 2005 to 2014 and divided into three phases viz. i) Pre-recession phase (2005-2007), ii) Recession phase (2008-2010) iii) Post-recession or growth phase (2011-2014).

C. Research Hypotheses

A few research hypotheses framed for this research study are as follows:

H1A : Medium sized firms which are furthest away from their target are more eager to close the gap.

H1B: Bigger medium sized firms do have some little tendency to adjust to their capital structure during the recession period in India.

H1C: Medium sized firms have an incentive to speed up their adjustment as they slowly come out of a period of recession.

D. Type of research

Quantitative and exploratory research.

E. Type of data

Panel data from secondary source has been used for this research.

F. Data Source

Capitaline database

G. Sampling frame

The sampling frame includes both listed and unlisted medium sized firms in India.

H. Sampling procedure and size

The sampling procedure consists of judgmental sampling plan and convenience sampling plan.

Table- I: Segregation of firms on the basis of market capitalization

Category	Market Capitalization (Rs. Crores)	No. of firms
Medium sized Companies	>= 500 & < 7000	342

Market capitalization is calculated as the product of current market price of share of a firm multiplied by the number of shares outstanding of the firm.

I. Analytical tools used

1. OLS regression
2. Regression using GMM
3. Correlation
4. Walds test for heteroskedasticty
5. Autocorrelation test
6. Sargan test for validity of instruments

J. Statistical software / packages

1. STATA
2. SPSS
3. MS-Excel
4. MS-Word

K. Computational Procedure

The researcher has used the BHW model as the base. This model was the pioneering works of Saugata Banerjee, Almas Heshmati and Clas Wihlborg (1999) with a definitive purpose of determining the speed of adjustment of firms to their target capital structure.

The problem of endogeneity and the use of Generalized Methods of Moments

In econometrics, the problem of **Endogeneity** *arises when the error term is correlated with the independent variables*. Whenever, there is endogeneity the OLS estimates are biased and inconsistent.

Hence, to overcome the problem of endogeneity, we need "**instruments**". Instruments are certain exogenous variables that are correlated to the endogenous variable but are uncorrelated to the error term. In financial econometrics, there are only two types of estimators which can provide instruments to overcome the problem of endogeneity:

A) Instrument Variables (IV) Estimator and

B) Arellano Bond estimator for Generalized Methods of Moments (GMM)

The choice between using GMM over IV estimator depends on a number of factors:

1) GMM is a better estimator even in the presence of unobservable heteroskedasticity, Baum, Schaffer, Stillman (2003).

2) GMM uses the same set of instruments for all the time periods of observed sample by using a system of weighted average, hence handling of instruments is easier.

3) GMM is most useful for small time periods and large number of individual units, Baum (2013).

4) It is most effective when the dependent variable is dynamic and keeps changing values depending on the past existing conditions, Baum (2013).

5) It is efficient when independent variables in an equation are not always strictly exogenous, Baum (2013).

6) It is most consistent when autocorrelation and heteroskedasticity exists within individual errors, Baum (2013).

L. Selection of dependent and independent variables used in the research

Dependent variable

The data for the dependant variable i.e. the debt equity ratio of 342 medium sized firms has been taken. Leverage is the ratio of total debt to capital, where capital is equal to total debt plus equity.

Independent variables

Whilst most researchers have taken six to seven variables as determinants of capital structure and around three to five variables as the determinants of the speed of adjustment, in this research paper after careful consideration, nine independent variables were considered for this research as described below:

Firm specific variables selected as determinants of capital structure

i. Firm Size – Log of Total assets
ii. Non Debt Tax shields (NDTS) – Ratio of depreciation / total assets
iii. Growth – % change in total assets, previous to current year
iv. Profitability – Pre tax operating profit to total assets
v. Trade credit – Total credit by creditors / total assets
vi. Net profitability ratio – Net Profit to Net Sales
vii. Firm specific interest rate (FSIR) – 100 * (tot interest paid / Long Term Debt)
viii. Age of firm – No. of years since incorporation
ix. Uniqueness – R&D costs / Sales

The following symbols have been assigned to the variables and used for analysis of data.

Let,
X1 = SIZE
X2 = NDTS
X3 = GROWTH
X4 = PROFITABILTY

X5 = TRADE CREDIT
X6 = PROFITABILTY
X7 = FSIR
X8 = AGE
X9 = UNIQUENESS

Firm specific variables used for determining the speed of adjustment

The following firm specific variables have been used.

  i. Distance from target (Absolute difference between actual and optimal capital structure)
  ii. Size of firm
  iii. Growth

Macro-economic variables used for determining the speed of adjustment

Macro economic factors which have been tested in other countries and which have been used for determining the speed in the current research are as follows:

  iv. GDP growth rate
  v. Average yearly Inflation rate
  vi. 6 month money market interest rates
  vii. 3 month money market interest rates

The following symbols used for the above variables are,

  Z1 = Distance from target
  Z2 = Size of firm
  Z3 = Growth
  Z4 = GDP growth rate
  Z5 = Average yearly inflation rate
  Z6 = 6 month MM Interest Rate
  Z7 = 3 month MM interest Rate

The analysis for this research has been carried out in STATA by developing a model with the sample data set.

M. Scope of research

Scope of the research

  i. The scope of this research is limited to only Indian medium sized companies.
  ii. The research aims to find the relation of firm specific variables with the leverage ratio of the firms.
  iii. The research also identifies few variables which influence the speed of adjustment of firms towards their optimal capital structure.

IV. ANALYSIS AND FINDINGS

The data from the excel sheets were transferred into STATA software and after coding the commands for GMM estimation, the results from the four models have been presented along with the explanation of the results.

A. Analysis of all 342 medium sized firms for all ten periods of observation (2005 to 2014)

In this model, all nine determinants of capital structure and all seven determinants of the speed of adjustment have been included.

Table- II: Output of regression between the determinants and the observed capital structure

```
System dynamic panel-data estimation       Number of obs    =      421
Group variable: nc                          Number of groups =       93
Time variable: year
                                            Obs per group:
                                                      min =        1
                                                      avg = 4.526882
                                                      max =        9
Number of instruments =     54              Wald chi2(10)    = 32841.79
                                            Prob > chi2      =   0.0000
Two-step results
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y	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]
y L1.	.7407094	.0217934	33.99	0.000	.6979951 .7834238
x1	.1048425	.024467	4.29	0.000	.056888 .152797
x2	-.3216324	.0194428	-16.54	0.000	-.3597395 -.2835253
x3	.1107582	.0208747	5.31	0.000	.0698444 .1516719
x4	-1.045914	.1201046	-8.71	0.000	-1.281314 -.8105131
x5	.0000754	5.39e-06	13.99	0.000	.0000648 .0000859
x6	-.4705764	.1760006	-2.67	0.008	-.8155312 -.1256217
x7	-.1271526	.0095643	-13.29	0.000	-.1458983 -.1084068
x8	.0217123	.0049138	4.42	0.000	.0120814 .0313432
x9	-4.285626	1.2021	-3.57	0.000	-6.641698 -1.929554
_cons	-1.330722	.1802691	-7.38	0.000	-1.684043 -.9774007

From the Table- II it is observed that it is a highly significant model as all the 'p' values of the independent variables are highly significant in the range of below 1% range. It is seen that profitable firms with substantial assets have less requirement for external debt.

Table- III: Output of the GMM estimation

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Dynamic panel-data estimation               Number of obs    =      421
Group variable: nc                          Number of groups =       93
Time variable: year
                                            Obs per group:
                                                      min =        1
                                                      avg = 4.526882
                                                      max =        9
Number of instruments =    217              Wald chi2(71)    =  8072.99
                                            Prob > chi2      =   0.0000
One-step results
```

Observations & Interpretations of GMM estimation output in Table- III

1) Only trade credit and FSIR are significant at below 5% and bear a negative sign indicating that firms rely more on creditors for finance than on external debt. However, at the same time mid sized firms are not averse to bank debt.

2) Amongst the determinants of speed it observed that firms which are furthest away from their target are more eager to close the gap. This is evident because these firms can justify using their resources for a greater gain in the future.

3) Also given a regime of increasing inflation, firms take incremental steps to close down the gap instead of closing the gap at once. This is evident from the fact that firms do feel comfortable taking credit at short term from money market.

4) Amongst the determinants of the speed of adjustment, size and distance have a negative relationship with the speed indicating big firms further away from their target are less motivated to adjust to their target.

5) Inflation and six month money market interest rate has a positive relationship with speed indicating that six month money market interest rate motivates firms to incrementally adjust to their target ratio.

6) A lot of interaction terms are highly significant and positive in their relationship with the speed of adjustment. For e.g. interaction of X1 and Z4 i.e. size and GDP is very highly significant giving a clear indication that bigger medium sized firms feel motivated to close their gap in a period of positive growth in India.

7) NDTS and distance is also significant indicating firms with significant assets and further away from the target adjust faster. So is the case with NDTS and high growth firms. Higher growth firms derive higher tax benefits and are able to fund their requirement for achieving the target capital structure.

8) Profitable firms also adjust to their targets incrementally as evident from the highly significant interaction term of profitability and 3 month money market interest rate. This is evident from the fact that they have sufficient borrowing power in the short term to meet their targets.

9) Older firms with good growth rate are also amongst the first to adjust to their capital structure fast as evident from the interaction term X8 & Z3.

10) The 'P' values for a lot of factors and interactive factors are significant, which is statistically significant.

11) The above model is the best fit model amongst the four models discussed in this paper.

B. Analysis of all the 342 medium sized firms for the period before recession in India (2005 to 2007)

In this model, age and uniqueness variables have not been included mainly due to the fact that the period of analysis is very less and it also helps improving the predictive power of the model.

Table- IV: Output of regression between the determinants and the observed capital structure

Source	SS	df	MS			
Model	824.529226	7	117.789889	Number of obs	=	623
Residual	1321.10199	615	2.14813331	F(7, 615)	=	54.83
				Prob > F	=	0.0000
				R-squared	=	0.3843
Total	2145.63121	622	3.44956787	Adj R-squared	=	0.3773
				Root MSE	=	1.4657

y	Coef.	Std. Err.	t	P>|t|	Beta
x1	.4540756	.0733288	6.19	0.000	.3098602
x2	-.3185454	.0591363	-5.39	0.000	-.1893416
x3	.9419798	.1990176	4.73	0.000	.1594819
x4	-.3051627	.091872	-3.32	0.001	-.1403597
x5	-.252576	.069523	-3.63	0.000	-.1689854
x6	-.7195455	.1032387	-6.97	0.000	-.3298625
x7	-.5391701	.0592545	-9.10	0.000	-.4274528
_cons	-4.117192	.4094668	-10.06	0.000	.

The above regression attained is highly significant and hence the distance variable calculated from the coefficients is valid. Profitability, high depreciation, trade credit and FSIR are little internal strength which could give medium sized firms the motivation not to depend too much on external debt.

Table- V: Output of the GMM estimation

Dynamic panel-data estimation

Group variable: nc

Time variable: year

Number of obs = 441
Number of groups = 245

Obs per group:
min = 1
avg = 1.8
max = 2

Number of instruments = 28

Wald chi2(28) = 5495.81
Prob > chi2 = 0.0000

One-step results

y	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
xi1_1	.0093482	.0183686	0.51	0.611	-.0266535	.04535
xi1_2	.0094076	.0260245	0.36	0.718	-.0415995	.0604147
xi1_3	.1680225	.1074375	1.56	0.118	-.0425512	.3785961
xi1_4	-.0846444	.1086038	-0.78	0.435	-.2973079	.1280191
xi1_6	.0460596	.0731766	0.63	0.529	-.097362	.1894812
xi2_1	-.077398	.0361092	-2.14	0.032	-.1481708	-.0066253
xi2_2	-.032926	.0194019	-1.70	0.090	-.0709631	.0051011
xi2_3	.2898612	.0766914	3.78	0.000	.1395489	.4401736
xi2_4	-.0474626	.0692813	-0.75	0.453	-.1714917	.0765665
xi2_6	0	(omitted)				
xi3_1	-.3062337	.2139873	-1.43	0.154	-.724641	.1141737
xi3_3	0	(omitted)				
xi3_4	0	(omitted)				
xi3_6	0	(omitted)				
xi4_1	-.0177763	.0948602	-0.19	0.851	-.2036989	.1681464
xi4_2	.1082743	.0261386	4.14	0.000	.0570434	.1595051
xi4_3	-.108265	.1601855	-0.68	0.499	-.4222235	.2056936
xi4_4	-.294623	.081334	-3.62	0.000	-.4540347	-.1352112
xi4_6	0	(omitted)				
xi5_1	.05519	.0193793	2.85	0.004	.0172073	.0931727
xi5_2	.0182786	.0266686	2.36	0.018	.0099291	.1066282
xi5_3	.0524684	.1234844	0.42	0.671	-.1895565	.2944934
xi5_4	-.1176227	.1097234	-1.44	0.151	-.1726767	.3674313
xi5_6	0	(omitted)				
xi6_1	.1058414	.0365363	2.90	0.004	.0342316	.1774511
xi6_2	-.0100606	.024649	-3.25	0.001	-.1283618	-.3317395
xi6_3	0	(omitted)				
xi6_4	.1462373	.0717875	2.32	0.021	.0255560	.3069383
xi6_6	0	(omitted)				
xi7_1	.0155382	.0383472	0.93	0.354	-.039621	.1106974
xi7_2	-.0064331	.0173388	-0.31	0.754	-.0394165	.2285504
xi7_3	-.1064568	.0798968	-1.33	0.183	-.263051	.3601381
xi7_4	-.0807492	.0493852	-1.09	0.304	-.1474445	.3459489
xi7_6	0	(omitted)				
y_i_1	.0109287	.2156665	0.05	0.960	-.417653	.439311
y_i_2	.1384975	.0272625	5.08	0.000	.0850639	.1919311
y_i_3	-.1271611	.1259962	-1.01	0.313	-.1741072	.1197849
y_i_4	0	(omitted)				
y_i_6	0	(omitted)				
_cons	0	(omitted)				

Observations & Interpretations of GMM estimation output from Table- V.

1) STATA has dropped all the determinants of capital structure from the analysis due to collinearity.
2) STATA has also dropped most of the determinants of speed of adjustment except for distance, size and growth.
3) Out of these three, only size is significant at below 5% and positive which indicates that more the size of firms more is the tendency to adjust to its target capital structure.
4) Amongst the significant terms interaction between NDTS and growth is substantial and positive indicating that high growth firms also have some incentive for closing the gap.
5) Next profitability and size is highly significant and positive indicating that big sized firms with high profitability will be amongst the first to adjust to their target capital structure.
6) Trade credit and distance and trade credit and size are also significant and positive indicating that big firms with good credibility and further away from the target also attempts to close the gap.
7) Lastly profitability in interaction term between distance and GDP is also significant from which it can be concluded that profitable firms further away from their distance adjust faster in the period of boom.

C. Analysis of all the 342 medium sized firms for the period of recession in India (2008 to 2010)

In this model, three variables viz. growth, profitability and trade credit have been dropped to increase the predictive power of the model.

Table- VI: Output of regression between the determinants and the observed capital structure

Source	SS	df	MS		Number of obs	=	173
					F(6, 166)	=	28.59
Model	37.1888483	6	6.19814138		Prob > F	=	0.0000
Residual	35.9940801	166	.216831808		R-squared	=	0.5082
					Adj R-squared	=	0.4904
Total	73.1829284	172	.425482142		Root MSE	=	.46565

y	Coef.	Std. Err.	t	P>|t|	Beta
x1	.4316161	.0815757	5.29	0.000	.743825
x2	48.64859	22.9874	2.12	0.036	.2815894
x3	-.463706	.0604425	-7.67	0.000	-.4396187
x4	-.2410757	.0337515	-7.14	0.000	-.5089535
x5	-.2014801	.0582639	-3.46	0.001	-.1925363
x6	-.088639	.021461	-4.13	0.000	-.2639156
_cons	-2.069648	.6039475	-3.43	0.001	.

The regression attained above is significant and hence the distance variable calculated from the coefficients is valid. From above one thing is clear that older firms with profitability have some reliability on their internal sources of finance during a period of recession.

Since reserves and surplus of old firms are quite well accumulated due to years of operations, they have enough resources in hand to try and bail themselves out during a phase of recession. Hence we observe that firms with substantial years of existence are better equipped than new firms during a phase of recession.

Table- VII: Output of the GMM estimation

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Dynamic panel-data estimation        Number of obs    =      109
Group variable: nc                   Number of groups =       64
Time variable: year
                                     Obs per group:
                                              min =        1
                                              avg = 1.703125
                                              max =        2

Number of instruments =    19        Wald chi2(19)    =   978.21
                                     Prob > chi2      =   0.0000
One-step results
```

y	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]
xi1_1	-.0081197	.0341303	-0.24	0.812	-.0750139 .0587746
xi1_2	.0340009	.0442273	0.77	0.442	-.052683 .1206847
xi1_3	.0606158	.0602831	1.01	0.315	-.0575369 .1787684
xi1_5	-.1500152	.1323498	-1.13	0.257	-.4094159 .1093856
xi1_6	0	(omitted)			
xi2_1	0	(omitted)			
xi2_2	0	(omitted)			
xi2_3	0	(omitted)			
xi2_5	0	(omitted)			
xi2_6	0	(omitted)			
xi3_1	.031764	.0400354	0.79	0.428	-.0467138 .1102219
xi3_2	.0550359	.0503828	1.09	0.275	-.0437126 .1537843
xi3_3	0	(omitted)			
xi3_5	-.17316	.1487572	-1.16	0.244	-.4647187 .1183987
xi3_6	0	(omitted)			
xi4_1	-.0069168	.0240005	-0.29	0.773	-.0539569 .0401232
xi4_2	-.0122052	.0373478	-0.33	0.744	-.0854056 .0609952
xi4_3	0	(omitted)			
xi4_5	.0323942	.1108093	0.29	0.770	-.1847879 .2495763
xi4_6	0	(omitted)			
xi5_1	.0274074	.0244677	1.12	0.263	-.0205484 .0753632
xi5_2	.0615266	.0469691	1.31	0.190	-.0305312 .1535844
xi5_3	0	(omitted)			
xi5_5	-.0897577	.1068907	-0.84	0.401	-.2992596 .1197442
xi5_6	0	(omitted)			
xi6_1	-.0031328	.0159443	-0.20	0.844	-.0343831 .0281175
xi6_2	.043213	.0294318	1.47	0.142	-.0144722 .1008983
xi6_3	-.0658521	.062661	-1.05	0.293	-.1886664 .0569601
xi6_5	-.1028502	.0741776	-1.39	0.166	-.2482356 .0425352
xi6_6	.0125555	.0336771	0.37	0.709	-.0534605 .0785614
yli_1	0	(omitted)			
yli_2	.183522	.0356429	5.16	0.000	.1138592 .2531849
yli_3	0	(omitted)			
yli_5	0	(omitted)			
yli_6	0	(omitted)			
_cons	0	(omitted)			

Observations Interpretations of GMM estimation output from Table- VII

1) STATA has dropped all the determinants of capital structure and most of the determinants of speed of adjustment from the analysis due to collinearity.
2) Only size is significant and positive indicating that bigger sized medium sized firms do have some little tendency to adjust to their capital structure during the recession period in India.

D. Analysis of all 342 medium sized firms for the period of post recession in India (2011 to 2014)

In the last model analyzed in this paper age and uniqueness of firm have been dropped to get a robust and significant model. Many of the interaction terms are also significant and inferences about the behavior of medium sized firms in the post recession period have been made in details.

Table- VIII: Output of regression between the determinants and the observed capital structure

Source	SS	df	MS		Number of obs	=	703
					F(7, 695)	=	45.10
Model	549.944142	7	78.5634489		Prob > F	=	0.0000
Residual	1210.60867	695	1.74188299		R-squared	=	0.3124
					Adj R-squared	=	0.3054
Total	1760.55282	702	2.50791		Root MSE	=	1.3198

y	Coef.	Std. Err.	t	P>|t|	Beta
x1	.917279	.0723442	12.68	0.000	.6996938
x2	-.9383902	.3520091	-2.67	0.008	-.1083034
x3	.1487997	.0475441	3.13	0.002	.100274
x4	62.83629	11.53106	5.45	0.000	.289974
x5	-2.11824	.329778	-6.42	0.000	-.2427569
x6	-2.548761	.4127493	-6.18	0.000	-.2461844
x7	-.0001316	.0000524	-2.51	0.012	-.0837111
_cons	-1.710478	.5757467	-2.97	0.003	.

The regression attained in Table- VIII is significant and hence the distance variable calculated from the coefficients is valid.

Table- IX: Output of the GMM estimation

```
Dynamic panel-data estimation          Number of obs     =        498
Group variable: nc                     Number of groups  =        211
Time variable: year
                                       Obs per group:
                                                    min =          1
                                                    avg =    2.36019
                                                    max =          3

Number of instruments =      50        Wald chi2(42)     =    3719.46
                                       Prob > chi2       =     0.0000
One-step results
```

y	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
x7	.0000119	.0000229	0.52	0.601	-.0000329	.0000568
xi1_1	.3907367	.0679704	5.75	0.000	.2575172	.5239563
xi1_2	.469327	.0715559	6.56	0.000	.32908	.609574
xi1_3	.1338692	.0560519	2.39	0.017	.0240094	.2437289
xi1_4	-2.368338	.3656808	-6.48	0.000	-3.085059	-1.651617
xi1_5	-.2195548	.1203533	-1.82	0.068	-.4554429	.0163332
xi1_6	.8715447	.1577275	5.53	0.000	.5624044	1.180685
xi2_1	-2.00095	.3190505	-6.27	0.000	-2.626277	-1.375622
xi2_2	-.9399974	.1580545	-5.95	0.000	-1.249778	-.6302163
xi2_3	-.1823256	.2011136	-0.91	0.365	-.576501	.2118497
xi2_4	3.221977	.9341797	3.45	0.001	1.391019	5.052936
xi2_5	-.9004188	.6436145	-1.40	0.162	-2.16188	.3610424
xi2_6	-1.672767	.4011479	-4.17	0.000	-2.459003	-.8865318
xi3_1	.0837864	.0305543	2.74	0.006	.0239011	.1436716
xi3_3	.0069433	.0099056	0.70	0.483	-.0124714	.026358
xi3_4	-.0515644	.1672948	-0.31	0.758	-.3794562	.2763273
xi3_5	-.0070933	.0799895	-0.09	0.929	-.1638698	.1496833
xi3_6	.0664664	.0702751	0.95	0.344	-.0712703	.2042031
xi4_1	3.197933	6.511926	0.49	0.623	-9.565209	15.96107
xi4_2	-15.44609	10.84226	-1.42	0.154	-36.69653	5.804349
xi4_3	12.38104	7.792217	1.59	0.112	-2.891424	27.65351
xi4_4	-2.289775	31.56899	-0.07	0.942	-64.16385	59.5843
xi4_5	-7.731307	19.57606	-0.39	0.693	-46.09968	30.63706
xi4_6	-16.81325	13.938	-1.13	0.257	-43.13123	11.50473
xi5_1	-1.834821	.2637918	-6.96	0.000	-2.351844	-1.317799
xi5_2	-.850579	.1575813	-5.40	0.000	-1.159433	-.5417254
xi5_3	-.1555261	.2413771	-0.64	0.519	-.6286166	.3175643
xi5_4	1.929845	.8341419	2.31	0.021	.2949567	3.564733
xi5_5	1.074175	.5122137	2.10	0.036	.0702543	2.078095
xi5_6	-.0591288	.4036565	-0.15	0.884	-.8502809	.7320233
xi6_1	.2268647	.246662	0.92	0.357	-.2556122	.7093415
xi6_2	.0840542	.1732786	0.49	0.628	-.2555656	.4236741
xi6_3	-.6971674	.4390067	-1.59	0.113	-1.558781	.1644459
xi6_4	.850512	1.054118	0.81	0.420	-1.215521	2.916545
xi6_5	-.538977	.9772298	-0.55	0.581	-2.454312	1.376358
xi6_6	.004173	.4694734	0.01	0.993	-.9159778	.9243239
y1i_1	-.4669195	.0972018	-4.80	0.000	-.6574316	-.2764075
y1i_2	-.4802058	.0822295	-5.84	0.000	-.6413727	-.3190389
y1i_3	-.0058737	.14169	-0.04	0.967	-.283581	.2718336
y1i_4	2.249626	.4423807	5.09	0.000	1.382576	3.116677
y1i_5	.0316529	.1060546	0.30	0.765	-.1762104	.2395162
y1i_6	-.9501821	.2182879	-4.35	0.000	-1.378019	-.5223456
_cons	15.31727	1.935297	7.91	0.000	11.52416	19.11038

Observations Interpretations of GMM estimation output from Table- IX

1) All the determinants of capital structure except FSIR have been dropped by STATA.
2) Amongst the determinants of speed, growth and inflation are not significant. 6 month money market interest rate has been dropped by STATA due to collinearity.
2) Only GDP is positive indicating that, firms have an incentive to speed up their adjustment as they slowly come out of a period of recession.
3) Interaction of X1 with all the determinants of speed are very significant, leading to the inference that the bigger sized firms shall be amongst the first to resume their speed of adjustment whenever it encounters favorable determinants of speed such as size, growth, GDP and distance.
4) Bigger sized firms furthest away from the target capital structure shall increase their speed of adjustment the most.
5) In a similar way firms with reliable assets will also adjust to their target on the same ground as that of size of firm above.
6) Interaction term X3 & Z1 which indicate growth and distance, makes it very clear that high growth firms furthest away from their target leverage are the ones that will be amongst the first to adjust their target capital structure.
7) The rest of the interaction terms are either having a negative relationship or are insignificant statistically.

E. Testing of research hypotheses

H1A : Medium sized firms which are furthest away from their target are more eager to close the gap.

Conclusion: From the outcome of the first model it is seen that medium sized firms which are furthest away from their target are more eager to close the gap. Hence we accept the alternate hypothesis HIA.

H1B: Bigger medium sized firms do have some tendency to adjust to their capital structure during the recession period in India.

Conclusion: From the outcome of the third model it is seen that bigger medium sized firms do have some tendency to adjust to their capital structure during the recession period in India. Hence we accept the alternate hypothesis HIB.

H1C: Medium sized firms have an incentive to speed up their adjustment as they slowly come out of a period of recession.

Conclusion: From the outcome of the fourth model it is observed that medium sized firms do have an incentive to speed up their adjustment as they slowly come out of a period of recession. Hence we accept the alternate hypothesis HIC

V. CONCLUSION AND MAJOR FINDINGS

1. The behavior of medium sized firms bears a lot of similarity in behavior to large sized firms, maybe due to the fact that some medium sized firms are having the same financial power as large firms but categorized as medium sized firms for the sake of their market capitalization.
2. One good thing to notice is that firms which are furthest away from their target capital structure are more eager to adjust mainly due to two reasons, one that the cost of adjustment is not very high and second is that the firms adjust incrementally rather than at one time.
3. Firms which are older or profitable or having significant assets or having good growth potential all have an incentive for adjusting to their target leverage during a period of economic boom.
4. Firms with good credibility and further away from their target also speed up their adjustment to the target capital structure.
5. Profitable firms further away from their target adjust faster.
6. During the period of recession although there is not much activity in firms, some faint traces of effort to move towards the optimal capital structure is observed in big sized firms.
7. In the post recession scenario medium sized firms resumes their activity to adjust to their target capital structure and bigger medium sized firms which are furthest from their target will be the first ones to speed up the adjustment.
8. Similar is the situation with those firms who are able to achieve high growth once the economy bounces back to normalcy. These firms shall also actively resume their initiative to close the gap with the target capital structure.

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