Impact of Financial Crisis on Determinants of Capital Structure of Indian Non-financial Firms : Estimating Dynamic Panel Data Model using Two-Step System GMM

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Abstract

This study is an attempt to identify and uncover the changes in firm and institutional determinants of Debt Financing Ratio in India, before and after the crisis.Pre and post-crisis analysis are undertaken by employing firm-specific factors represented by Non-debt tax shields, Asset Composition (tangibility), Size, Profitability, Growth Opportunity (Market to Book), and Liquidity in the firms and institutional factors represented by Economic Growth Rate and Inflation. Two models, with different measures of leverage as dependent variables, have been constructed to analyse theimpact of the crisis. The results favoured that the Indian firms tend to adjust their capital structure to reach an optimum level of debt (Target Leverage). The study confirms that profitability, and size of the firm are robust determinants of leverage in both pre and post-crisis periods; tangibility is found to be insignificantin the pre-crisis period and statistically significant in the post-crisis period for both measures of leverage.

I. Introduction

THE RECENT FINANCIAL turmoil of 2008, caused by lending to the subprime borrowers in the USA, has shaken the world and confirmed the phrase "When US sneezes the whole world catches cold."

The crisis bankrupted major financial and insurance companies in the US. Since the globalization has converted the world economy into a unit, other economies in the world could not remain unaffected leading to rejection of "Decoupling theory" (Subbarao, 2009). During the turmoil, firms faced problems of paying fixed financial obligation as the major part of the financial

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Profitability and size are robust determinants of leverage in both pre and post-crisis periods. Profitability is found negativelyrelatedwhereas the size is positively related to leverage. Tangibility is found not relevant in the pre-crisis period whereas it is found statistically significant in the post-crisis period for both measures of leverage. Other factors show inconsistent results for both the measures in full and sub sample periods.

The study has an important finding based on the analysis of Book measure-based model of leverage. The factors tangibility and liquidity show different behavior in pre and post-crisis period. They are not found to be significant during the pre-crisis period but after the crisis, they show significance in the determination of leverage. These findings throw light on the process of financial institutions in lending funds to firms. In line with the theoretical explanations, high tangibility increases prospects for firms for taking higher debt as it can be kept as collateral with lenders and liquidity ensures timely payment of interest and principal amount to lending authorities. These factors can be categorized as influencing the institution's decision towards lending to firms. It further implies that the crisis may have caused a learning for lenders and their improved processes by implementing laid down policies after the crisis. Tangibility and liquidity seem to influence lending decisions in the post crisis period; leading to higher leverage for firms with high tangibility and liquidity. The results also indicate that it is more appropriate to model liquidity and tangibility as institutional factors rather than firm specific factors affecting capital structure of Indian firms. The results suggest to investigate further the role of tangibility and liquidity on non-performing assets of financial institutions in India.

Notes

1. Abbreviations: BDFR: Book Debt Financing Ratio, MDFR: Market Debt Financing Ratio, NDTS: Non-Debt Tax Shield, Tangb: Tangibility of assets, MTB Ration: Market Value to Book Value Ratio,LIQ: Liquidity, GDP: Gross domestic product, Std. Dev.: standard Deviation and rest of the words used are self-explanatory. ** Stationary after removing time trend.
2. The results are given in Annexure II.
3. ResultsThe results of Arellano Bond Autocorrelation for lag (1) and lag (2) given in Annexure III
4. Results are provided in Annexure IV

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Annexure I
Definitions of variables and their Proxies

Dependent Variable:	This study has used two measures of leverage one is book and second is the market-based definition. Book Debt Financing Ratio (BDFR) is the ratio of total debt and sum of Total Long-Term Debt and Book Value of Equity. Market Debt Financing Ratio (MDFR) is the ratio of Total Long-Term Debt and the sum of total debt and market value of equity. Long-Term Debt excludes the short term liabilities of the firms.
Immediate past leverage:	The proxy for lagged leverage is the leverage at the time (t-1).
Non-Debt Tax Shield (NDTS):	The study has taken the ratio of Depreciation to Total Assets.
Tangibility (TANGB):	The ratio of Fixed Assets with respect to fixed and non-fixed assets available in the firm, as an attribute for tangibility.
Profitability (PROFIT):	The ratio of Earning Before Interest, Tax, Dividend and Amortization of capital expenditure and Total Assets. It is the overall measure of returns on Assets (EBITDA / Total Assets).
Size:	Study has used the proxy for Size as a natural logarithmic value of sales after-sales returns.
Market to Book Value (MTB Ratio):	In this study market-to-book asset ratio has been used as a proxy for future growth prospect of the firm and it is computed using formula MTB Ratio=(No. of Outstanding shares × closing price of share) / Book Value of Assets.
Liquidity (LIQ):	Liquidity refers to the convertibility of assets into cash without losing value and delaying in time. The standard measurement of liquidity as the ratio of Current Asset to Current Liabilities, hence, this study considered the standard measure of liquidity for this attribute.
Inflation:	Study has taken the change in consumer price index as a proxy for inflation.
Domestic GDP growth rate (GDP):	This study has considered this factor to account the business cycle and included GDP as a proxy for the state of the business cycle in the economy.

Annexure II
Unit root test for stationarity

Null Hypothesis: The series contains unit root
Alternate Hypothesis: Series does not contain unit root

Variables	Method	T-Stat.	P-Value	Description
BDFR	Levin, Lin & Chu	-640.97200	0.00	At Level with intercept
	PP - Fisher Chi-square	746.52400	0.00	
MDFR	Levin, Lin & Chu	-1936.01000	0.00	At Level with intercept
	PP - Fisher Chi-square	966.73600	0.00	
NDTS	Levin, Lin & Chu	-18.38530	0.00	At Level with intercept
	PP - Fisher Chi-square	983.89800	0.00	
TANGB	Levin, Lin & Chu	-23.86690	0.00	At Level with intercept
	PP - Fisher Chi-square	903.54200	0.00	
Profit	Levin, Lin & Chu	-6.36784	0.00	At Level with intercept
	PP - Fisher Chi-square	1047.75000	0.00	
Size	Levin, Lin & Chu	-17.52250	0.00	At Level with intercept
	PP - Fisher Chi-square	935.15300	0.00	
MTB	Levin, Lin & Chu	-67.36820	0.00	At Level with intercept
	PP - Fisher Chi-square	976.01700	0.00	
GDP	Levin, Lin & Chu	-41.11770	0.00	At Level with intercept
	PP - Fisher Chi-square	3356.94000	0.00	
Inflation	Levin, Lin & Chu	-8.60108	0.00	At Level with no intercept and trend
	PP - Fisher Chi-square	451.14000	0.00	

Source: Self Computed

Annexure III
The results of Arellano Bond Autocorrelation for lag (1) and lag (2)
Hypothesis H0: *No autocorrelation in first or second differenced errors.*
Hypothesis HA: *Autocorrelation in first or second differenced errors.*

Annexure IV
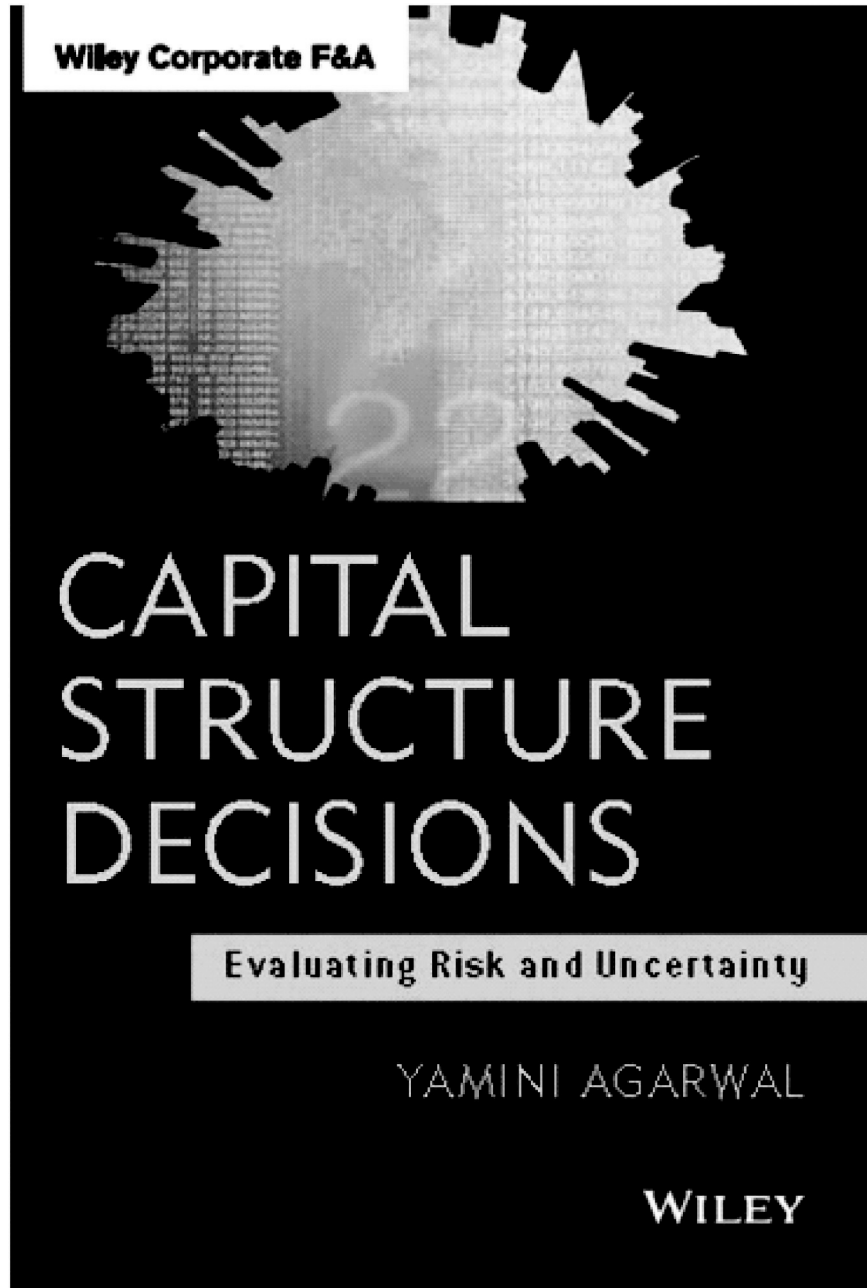**Table A 4-1**
Standard Errors with Pooled, GMM and Two-Step System GMM

Variables	Fixed Effect	Random Effect	Differenced GMM	One Step GMM	Two-Step System GMM
Intercept	0.043	0.037	0.069	0.058	0.036
NDTS	0.233	0.215	0.270	0.277	0.171
TANGB	0.030	0.026	0.038	0.038	0.024
Profit	0.045	0.043	0.050	0.049	0.031
Size	0.004	0.003	0.006	0.005	0.003
MB Ratio	0.001	0.001	0.001	0.001	0.001
LIQ	0.002	0.002	0.003	0.003	0.002
Inflation	0.095	0.095	0.079	0.080	0.039
GDP	0.156	0.158	0.131	0.135	0.061

Source: Self Computed
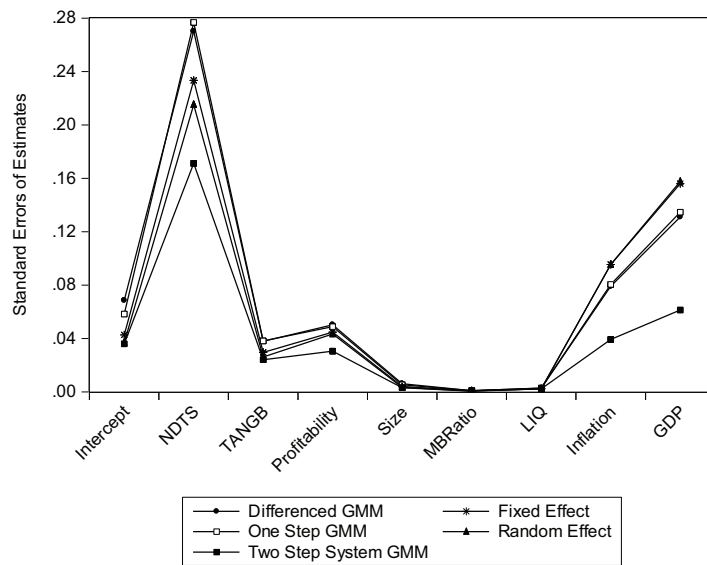
Source: Self Computed

Figure A 4-1
Comparisons of Standard Errors

ISBN No. 978-1-118-20313-2

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