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AN ANALYSIS OF FINANCIAL RISK IN CAPITAL STRUCTURE

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ABSTRACT

Mix of debt and equity in capital structure impacts value of the firm. Use of debt increases the risk of the firm. This study analyses the impact of financial risk on debt – equity mix and also analyses the impact of financial risk on debt equity mix decisions of selected industries. The study covers a period of 7 years (2010-2017) drawing data from financial statements of 25 companies – five each from Chemical, Engineering, Food, Media and Entertainment sector. Analysis is carried out using regression model. From the estimated results, it is concluded that financial risk variables, particularly interest risk followed by volatility in ROE has significant effect on determining the additional variation in use of debt financing in business through long-term sources among firms under all selected sectors.

KEYWORDS

financial risk, debt-equity mix, long term debt, short term debt.

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INTRODUCTION

An optimum mix of debt and equity in the capital structure of the firm would lead to maximize the wealth of shareholders by minimising aggregate cost of capital. Determining optimum capital structure is one of the basic criteria of policy decision making by finance managers, with respect to the components of capital. Due to the relevance of capital structure policy has gained momentum among the academicians, researchers, and financial practitioners.

The choice of appropriate capital structure depends on number of factors such as nature of business, purpose of financing, period of financing, market sentiments, control aspect, attitude of the investors, and so on. A firm is said to be trading on equity when the firm has the ability to maximize the return to the shareholders by way of employing the adequate debt in the capital structure.

The formation of an appropriate capital structure is not an easy task as the presence of higher leverage in capital structure can lead to bankruptcy. The capital structure is an indicator of the risks that a company may be facing (operating risk, financial risk). For every company there is a necessity for attaining an optimal balance of debt and equity sources in its capital structure. Otherwise, it may face difficulties in raising funds favourably in the long run to finance its developmental projects. Leverage ratio affects the cost of capital. Firms can choose alternative forms of capital structure to maximize overall market value. In this scenario, here an attempt is made to evaluate the capital structure that is share of debt and equity by groups of firm with different levels of financial risk under different sectors.

REVIEW OF LITERATURE

The literature on capital structure marked the beginning when seminal work of Modigliani and Miller (1958;1963) postulating the irrelevance of capital structure in the valuation of a firm without tax effect and with tax advantage was proposed. This was followed by the trade-off theory (Miller 1977), pecking order theory or asymmetric information theory (Myers, 1984) and agency theory (Haris and Raviv, 1990). Phenomenal empirical research has been conducted on the determinants of capital structure in both developed and developing countries. Prominent studies are by Rajan and Zingales (1995).

Even in the last two decades the studies continue to focus on capital structure. Keshar J. Baral (2004) studied determinants of capital structure: and found that size, growth rate and earning rate are statistically significance influence on capital structure decisions.

Kinga Mazur (2007) focused on determinants of Capital Structure Choice and tried to examine the fact whether the financing decision of polish firms are influenced by pecking order theory or Trade off Theory. It was observed that pecking order hypothesis best explains the financing choice of polish firms. In a similar study Nadeem et.al (2011) tried to investigate the factors determining the capital structure and concluded that profitability, tangibility, earning volatility, liquidity are negatively related to leverage while firm size is positively related to leverage. Jothi (2012) focused on economic analysis of financial risk of debt-equity mix, among firms with low, medium and high financial risk using three regression models. It was found that financial risk variables, particularly interest risk followed by volatility in ROE has significant effect on determining the additional variation in use of debt financing in business through long-term sources among firms under all selected sectors.

Ashok (2012), studied the existing capital structure maintained by SAIL to find the relation between capital structure and value of firm. They found that decisions taken by the management was very fast and hasty. Financial acumen was very poor. The management could not foresee the risk that might arise in future. Alayemi et.al (2013) found that the choice of leverage must be seriously considered by management as the capital strength is crucial to profitability of a company. Prerna et.al (2014) tried to examine the debt equity mix of the three media companies to check the solvency position of these companies. Financial leverage stated as a double edged sword describes the limit of financial risk of the companies.

Narayan et al, analyzed capital structure decisions of Infrastructure Companies in India with the help of leverage and profitability ratios. They found that the sources of funds for these segments broadly comprise 30% to 40% of Debt and rest of equity shares.

IMPORTANCE OF THE STUDY

Considering the fact that debt is an inevitable component in capital structure which can accelerate value of the firm through leverage, debt-equity mix has been the focus of academicians, researchers and practitioners. Many studies have focused on different dimensions of capital structure. Present study focuses on financial risk of using debt in the capital structure considering both long and short term debt. The study finding would help in understanding the financial risk and its determinants.

STATEMENT OF THE PROBLEM

In this study, an attempt is made to identify the impact of financial risk on debt financing in capital structure through long-term debt by firms under Chemical, Engineering, Food, Media and Entertainment sector across in India. For analysing the impact, multiple regression statistical technique was used. Three measures were used as proxy for capital structure. Three measures are long-term debt (LTDTA), short-term debt (STDTA) and total debt (TDTA) relative to total assets.

OBJECTIVES

The objective of the study is to analyse the impact of financial risk on debt – equity mix and also to analyse the impact of financial risk on debt equity mix decisions of selected industries.

RESEARCH METHODOLOGY

The study covers a period of 7 years (2010-2017) drawing data from financial statements of 25 companies – five each from Chemical, Engineering, Food, Media and Entertainment sector. The statistical tools used for analysing them varies from general descriptive analysis such as Mean, Standard Deviation, Coefficient of Variation and Compound Growth Rate to Linear Growth Rate. Also, Parametric t-test for ascertaining the level of significance and one-way analysis of variance, simply called F-test for comparing.

Significance of the difference in debt level across groups is tested with one ANOVA (F test). Financial leverage; interest rate risk and coefficient of variation in return on equity were used as measures of financial risk. Financial leverage (FL) and coefficient of variation in return on equity (CVROE) reflects the financial risk of a firm in the preceding years (FL is percent change in EPS relative to percent change in EBIT and CVROE is calculated as standard deviation divided by mean based on three years data). So, any decision selection of capital between debt and equity would obviously be based on these measures.

REDUCED MODEL 1

$$Y = \alpha + \beta_1 \text{Prof} + \beta_2 \text{size} + \beta_3 \text{Tang} + \beta_4 \text{NDTS} + \beta_5 \text{Growopp} + \beta_6 \text{Agcost} + \beta_7 \text{Incvr} + \epsilon \tag{1}$$

Y = Dependent Debt variables (Long-Term Debt to Total Assets, Short-Term Debt to Total Assets, Total Debt to Total Assets)

Prof = Profitability (measured as natural logarithm of profit before tax scaled by net sales)

Size = Size of the firm (measured as Natural logarithm of Total assets)

Tang = Tangibility (ratio of fixed assets to total assets)

NDTS = Non-debt tax shield (depreciation to total assets)

GrowOpp = Growth opportunity (ratio of market value of assets to book value of assets)

AgCost = Agency Cost (asset turnover ratio, measured as net sales to total assets, is used as proxy for agency cost)

IncVar = Income variability (an indicator of operating risk, measured as standard deviation of EBIT – Earning before interest and tax)

ε = Error term

REDUCED MODEL 2

$$Y = \alpha + \beta_1 \text{MFR} + \beta_2 \text{HFR} + \beta_3 \text{FINLVR} + \beta_4 \text{IR} + \beta_5 \text{CVROE} + \beta_6 \text{MFR} * \text{FINLVR} + \beta_7 \text{MFR} * \text{IR} + \beta_8 \text{MFR} * \text{CVROE} + \beta_9 \text{HFR} * \text{FINLVR} + \beta_{10} \text{HFR} * \text{IR} + \beta_{11} \text{HFR} * \text{IR} + \beta_{12} \text{HFR} * \text{CVROE} + \epsilon \tag{2}$$

Y = As above

MFR = Dummy variable for Medium Financial Risk (1 for Medium Risk and 0 for others)

HFR = Dummy variable for High Financial Risk (1 for High Risk and 0 for others)

FINLVR = Percentage change in EPS / percentage change in EBIT

IR = Interest risk – [EBIT / (EBIT – I)]

CVROE = Coefficient of Variation in Return on Equity

MFR x FINLVR = Interaction between M F R a n d FINLVR

MFR x IR = Interaction between MFR and IR

MFR x CVROE = = Interaction between M F R a n d CVROE

HFR x FINLVR = Interaction between H F R and FINLVR

HFR x IR = Interaction between HFR and IR

HFR x CVROE = Interaction between HFR and CVROE

ε = Error term.

FULL MODEL

$$Y = \alpha + \beta_1 \text{Prof} + \beta_2 \text{size} + \beta_3 \text{Tang} + \beta_4 \text{NDTS} + \beta_5 \text{Growopp} + \beta_6 \text{Agcost} + \beta_7 \text{Incvr} + \beta_1 \text{MFR} + \beta_2 \text{HFR} + \beta_3 \text{FINLVR} + \beta_4 \text{IR} + \beta_5 \text{CVROE} + \beta_6 \text{MFR} * \text{FINLVR} + \beta_7 \text{MFR} * \text{IR} + \beta_8 \text{MFR} * \text{CVROE} + \beta_9 \text{HFR} * \text{FINLVR} + \beta_{10} \text{HFR} * \text{IR} + \beta_{11} \text{HFR} * \text{IR} + \beta_{12} \text{HFR} * \text{CVROE} + \epsilon \tag{3}$$

RESULTS & DISCUSSION

To begin with, selected companies under each sector are segmented into three mutually exclusive groups based on low, moderate and high financial leverage. Companies were segmented according to the ratings given by the Standard and Poor’s Rating services.

TABLE 1: BASIS OF CLASSIFICATION

	FFO/Debt	Debt/EBITDA	Debt/Capital
Low financial risk	Above 45	Below 2	Below 35
Medium financial risk	20-45	02-04	35-50
High financial risk	Below 20	Above 4	Above 50

Secondly all the variables were computed considering all dependant and independent variables and then the results of the regression analysis of restricted models and full model are presented below. By using reduced model 1, in which the effect of financial risk is set to zero, the regression coefficients of the control variables on LTD, STD and TD were estimated. Using reduced model 2, the regression of debt financing relative to total assets on financial risk variables after setting effect of control variables to zero was estimated. By using full model, the effect of financial risk variables on debt financing in the presence of control variables were examined.

TABLE 2: EFFECT OF FINANCIAL RISK ON LTDTA- CHEMICAL

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	B	t	sig
Size	-.553	-1.416	.167				-.476	-1.328	.198
Incomevariability	-.554	-1.492	.146				-.376	-.992	.333
Growthhopp	-.090	-.480	.635				.131	.667	.512
Agencycost	.197	1.290	.206				.332	2.154	.043
NondebtTaxShield	.042	.274	.786				-.090	-.626	.538
Profitability	-.150	-.729	.471				-.084	-.492	.628
Tangibility	.578	3.795	.001				.648	4.102	.001
FL				.160	.604	.551	.235	1.348	.192
IR				-.211	-.686	.498	-.368	-1.422	.170
CVROE				-1.683	-.595	.557	-1.806	-.785	.441
MFR				.309	.849	.403	.258	1.064	.299
HFR				-.193	-.509	.615	.274	1.052	.305
MFRFINLIV				-.468	-1.863	.073	-.310	-1.868	.076
MFRIR				.051	.162	.873	.369	1.387	.180
MFRCVROE				.061	.164	.871	.145	.601	.554
HFRFINLIV				-.078	-.380	.707	-.095	-.655	.520
HFRIR				.325	.964	.343	.208	1.004	.327
HFRCVROE				1.540	.536	.596	1.578	.674	.508
R Square	.546			.334			.820		
Adjusted R Square	.447			.072			.666		
F	5.503			1.275			5.324		

Table 2 reports the results of three regression models for long term debt on total assets under chemical sector. It can be observed that R square is 0.546 i.e. 54.6% of the dependent variable (LTDTA) is explained by Independent variables (profitability, size of the business, tangibility, non-debt tax shields, growth opportunity, agency cost, income variability) in model-1 and in model-2 it is 0.334, in full model 0.82. It can be observed that in Model-1 only tangibility (p<0.05) i.e., 0.001 and t=3.795 is significant factors of LTDTA and in model 2 none of the factors are significant. In full model agency cost and tangibility are significant. MFR is positively correlated in the absence of control variables but it is not significant (β=-.309 & sig=0.403).

TABLE 3: EFFECT OF FINANCIAL RISK ON STDTA

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	B	t	sig
Size	.598	1.688	.101				.029	.172	.865
Income variability	.525	1.559	.129				-.239	-.962	.347
Growth Opp	-.098	-.580	.566				-1.132	-.512	.614
Agency cost	-.375	-2.705	.011				.134	.577	.570
Non debt Tax Shield	-.006	-.046	.964				.225	.899	.379
Profitability	-.082	-.440	.663				.078	.493	.627
Tangibility	-.489	-3.544	.001				-.009	-.035	.973
FL				.004	.016	.987	-.032	-.137	.893
IR				-.099	-.349	.730	-.117	-.838	.411
CVROE				1.389	.531	.600	-.156	-.788	.439
MFR				.263	.782	.441	1.554	.692	.497
HFR				.740	2.109	.044	.181	.526	.604
MFRFINLIV				.255	1.100	.281	-.063	-.173	.865
MFRIR				.096	.328	.745	.091	.486	.632
MFRCVROE				-.100	-.290	.774	-.287	-1.935	.067
HFRFINLIV				-.019	-.098	.922	-.160	-1.152	.262
HFRIR				-.234	-.751	.459	-.086	-.521	.608
HFRCVROE				-1.116	-.420	.677	-.304	-2.006	.058
R Square	.626			.430			.834		
Adjusted R Square	.545			.207			.693		
F	7.661			1.923			5.882		

Table 3 shows R² value of 0.626 (Model-1) 0.43 (Model-2) and 0.834 (Full-model) indicating that dependent variable (STDTA) is explained by Independent variables. It has been decreased in the absence of control variables. It can also be observed that in Model-1 only tangibility ((p<0.05) i.e., 0.001 and t=3.795, sig=-.489 and agency cost (p=0.11 and t=-2.07 and sig=-.375) is significant factors of STDTA. As these are negatively correlated it refers these two factors do not have any effect on STDTA and in model-2 high financial risk is significant. Portion of short term fund for firms under chemical sector, is significantly higher for high risk firms compared to low and medium risk firms.

TABLE 4: EFFECT OF FINANCIAL RISK ON TDTA

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	T	sig	β	T	sig	B	t	sig
Size	-.138	-.262	.795				.331	1.522	.143
Income variability	-.210	-.419	.678				-.708	-2.183	.041
Growth opp	-.211	-.838	.408				-3.428	-1.190	.247
Agency cost	-.107	-.519	.607				.464	1.528	.141
Non debt Tax Shield	.048	.232	.818				.572	1.754	.094
Profitability	-.274	-.986	.332				-.325	-1.567	.132
Tangibility	.275	1.340	.190				.469	1.409	.174
FL				.211	.986	.333	.157	.520	.609
IR				-.369	-1.485	.149	-.236	-1.298	.209
CVROE				-.835	-3.66	.717	.118	.455	.654
MFR				.653	2.226	.034	3.541	1.209	.240
HFR				.464	1.516	.141	-.442	-.985	.336
MFRFINLIV				-.359	-1.771	.088	-.548	-1.154	.262
MFRIR				.160	.622	.539	.257	1.049	.306
MFRCVROE				-.018	-.059	.954	.153	.795	.436
HFRFINLIV				-.119	-.719	.478	-.271	-1.501	.148
HFRIR				.195	.716	.480	-.192	-.895	.381
HFRCVROE				.915	.395	.696	.545	2.758	.012
R Square	.175			.566			.719		
Adjusted R Square	-.050			.395			.477		
F	9.700			3.318			2.980		

For total debt, it is clear that, all control variables have explanatory power and together explaining 17.5, 56.6% and 71.9% of the variation in total debt. In model-1 None of the factors are significant factors of TDTA and of the model-2 MFR is significant as positive total debt influences more on medium risk firms. In the full model Income variability and HFR*CVROE are significant and has positive coefficient for total debt. This evidences that, increase in volatility in ROE decrease the debt fund for firms with low financial risk.

TABLE 5: EFFECT OF FINANCIAL RISK ON LTDTA - ENGINEERING

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	B	t	sig
Tangibility	-.114	-.842	.406				.127	.635	.532
Non debt tax shield	-.224	-2.178	.037				-.010	-.061	.952
Agency cost	.538	3.835	.001				.568	3.058	.006
Growth opp	.350	3.438	.002				.359	3.287	.004
Income variability	-.220	-1.118	.272				-.350	-.972	.342
Prof	-.402	-1.938	.062				-.007	-.021	.984
Size	.590	4.236	.000				-.176	-.433	.669
FL				.326	.204	.840	.511	.393	.699
IR				.767	1.856	.074	.634	1.716	.101
CVROE				1.653	1.043	.306	.135	.105	.917
MFR				-.954	-.824	.417	-1.754	-2.046	.054
HFR				.318	1.165	.254	.140	.679	.505
MFRFINLIV				-.302	-.188	.852	-.474	-.365	.719
MFRIR				-.068	-.186	.854	.074	.197	.845
MFRCVROE				-1.691	-1.076	.291	-.266	-.211	.835
HFRFINLIV				1.184	1.232	.228	1.237	1.783	.089
HFRIR				-.130	-.252	.803	.850	1.780	.090
HFRCVROE				.113	.436	.666	-.291	-1.465	.158
R Square	.755			.605			.873		
Adjusted R Square	.701			.450			.730		
F	14.069			3.900			7.992		

Table 5 presents LTD to total assets for firms under engineering sector are presented. Control variables is significantly fitted with 75.5%, 60.5% and 87.3% of the explained variance.

It can also be observed that in Model-1 Non debt tax shield, growth opportunity, agency cost and size are significant factors of LTDTA but Non debt tax shield is negatively correlated. In model-2 none of the factors are significant. In full model agency cost and Growth opportunity are significant and MFR is also significant and positive hence long term funds in capital structure for firms under food sector is significant to medium risk firms.

TABLE 6: EFFECT OF FINANCIAL RISK ON STDTA

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	T	sig	β	T	sig	B	t	sig
Tangibility	-.008	-.032	.975	.269	.527	.604	.269	.527	.604
Non debt tax shield	.143	.721	.476	.336	.809	.427	.336	.809	.427
Agency cost	-.073	-.271	.788	-.108	-.227	.822	-.108	-.227	.822
Growth opp	-.201	-1.024	.313	-.138	-.496	.625	-.138	-.496	.625
Income variability	.033	.088	.931	.189	.205	.840	.189	.205	.840
Prof	-.027	-.067	.947	.421	.520	.608	.421	.520	.608
Size	-.102	-.382	.705	-.470	-.454	.654	-.470	-.454	.654
FL				-1.851	-.754	.457	-3.586	-1.079	.293
IR				-.601	-.949	.351	-.508	-.539	.595
CVROE				.321	.132	.896	2.341	.713	.484
MFR				-.315	-.178	.860	-.565	-.258	.799
HFR				-.300	-.717	.480	-.408	-.777	.446
MFRFINLIV				1.840	.747	.462	3.561	1.072	.296
MFRIR				.365	.649	.522	.753	.792	.437
MFRCVROE				-.204	-.085	.933	-2.142	-.663	.514
HFRFINLIV				.064	.044	.966	.344	.194	.848
HFRIR				.302	.382	.705	.498	.408	.687
HFRCVROE				.011	.029	.977	.117	.231	.819
R Square	.093			.074			.169		
Adjusted R Square	-1.050			-2.900			.553		
F	4.700			0.203			0.238		

Table-6 presents, R square is 9.3%, 7.4% and 16.9% indicating low predictability, dependent variable (STDTA) by Independent variables. It can also be observed that in model-1 model-2 and in the full model None of the factors are significant.

TABLE 7: EFFECT OF FINANCIAL RISK ON TDTA

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	Sig	B	T	sig	B	t	sig
Tangibility	-.180	-1.332	.192				.165	1.034	.313
Non debt tax shield	-.222	-2.149	.039				.101	.780	.444
Agency cost	.610	4.340	.000				.616	4.154	.000
Growth opp	.233	2.285	.029				.261	2.996	.007
Income variability	.037	.189	.851				-.006	-.020	.985
Prof	-.456	-2.191	.036				.165	.651	.522
Size	.839	6.004	.000				-.242	-.749	.462
FL				.323	.236	.815	-.463	-.446	.660
IR				.719	2.037	.051	.702	2.383	.027
CVROE				1.058	.781	.441	.855	.834	.414
MFR				-.727	-.735	.469	-1.441	-2.106	.047
HFR				.222	.951	.350	-.008	-.050	.960
MFRFINLIV				-.229	-.167	.869	.571	.551	.588
MFRIR				.131	.417	.680	.310	1.043	.309
MFRCVROE				-1.074	-.800	.430	-.911	-.903	.377
HFRFINLIV				.918	1.118	.273	.911	1.646	.115
HFRIR				-.148	-.335	.740	.797	2.092	.049
HFRCVROE				.168	.758	.455	-.183	-1.155	.261
R Square	.793			.712			.919		
Adjusted R Square	.699			.599			.849		
F	13.961			6.291			13.227		

Table-7 presents R square is 79.3%, 71.2% and 91.9% indicating higher predictability of the dependent variable (TDTA) by Independent variables. In model-1 Non debt tax shield, growth opportunity, agency cost, profitability and size are significant factors and model-2, IR is significant. In full model Growth opportunity and agency cost, IR, MFR and MFRIR are significant. The significant coefficients of IR and its cross terms with medium and low financial risk has evidenced that, debt fund has increased for low financial risk firms and there has been significant difference in slope coefficients of interest risk on total debt across firms with different level of financial risk.

TABLE 8: EFFECT OF FINANCIAL RISK ON LTDTA-FOOD SECTOR

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	β	t	sig
Tangibility	-.141	-.627	.535				-.290	-1.364	.187
Nondebttaxshield	-.537	-1.874	.070				-.299	-.979	.339
Agencycost	.619	3.462	.002				.312	1.439	.165
Growthopp	-.129	-1.079	.289				-.353	-3.007	.007
Incomevariabilty	-.411	-2.372	.024				-.462	-2.840	.010
Prof	-1.499	-4.985	.000				-.615	-1.413	.172
Size	.496	2.127	.041				-.369	-.942	.357
FL				.308	.396	.695	.272	.450	.657
IR				-.255	-.371	.713	-.701	-1.263	.221
CVROE				1.654	2.263	.032	.326	.477	.638
MFR				1.146	4.340	.000	.208	.786	.441
HFR				.776	3.026	.005	.413	1.918	.069
MFRFINLIV				-.237	-.743	.464	-.221	-.950	.353
MFRIR				.004	.008	.994	.605	1.475	.155
MFRCVROE				-.431	-.885	.383	-.113	-.345	.734
HFRFINLIV				-.573	-.681	.501	-.102	-.153	.880
HFRIR				.368	.551	.586	1.125	2.205	.039
HFRCVROE				-1.612	-2.207	.036	-.429	-.632	.534
R Square	.742			.706			.905		
Adjusted R Square	.699			.599			.549		
F	13.961			6.291			13.227		

Table-8 shows test results with respect to effect of financial risk of long term debt financing in capital structure. R² is 74.2%, 70.6% and 90.5% indicating explanatory power of independent variables on dependent variable (LTDTA).

In model-1 Non debt tax shield, Income variability, profitability and size are significant factors of LTDTA and in model-2 CVROE, MFR, HFR and HFR *CVROE are significant and is positively correlated. In full model income variability and Growth opportunity are significant but it is negatively correlated and in case of financial risk variables HFRIR is significant and positively correlated (β=1.125 and sig =.039) The significant coefficients of IR and its cross terms with medium and high financial risk has evidenced that, debt fund has increased for low financial risk firms and there has been significant difference in slope coefficients of interest risk on total debt across firms with different level of financial risk.

TABLE 9: EFFECT OF FINANCIAL RISK ON STDTA

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	B	t	sig
Tangibility	.548	1.436	.161				.583	1.027	.316
Nondebttaxshield	-.464	-.953	.348				-.490	-.600	.555
Agencycost	.667	2.196	.035				.656	1.133	.270
Growthopp	.328	1.614	.116				.201	.642	.528
Incomevariabilty	-.176	-.598	.554				-.222	-.511	.615
Prof	-.477	-.934	.357				-.304	-.262	.796
Size	.500	1.262	.216				.317	.303	.765
FL				-.140	-.104	.918	-.659	-.408	.687
IR				-.198	-.166	.869	.004	.002	.998
CVROE				-.212	-.167	.868	.756	.414	.683
MFR				-.398	-.872	.391	-.152	-.216	.831
HFR				.067	.150	.882	.306	.533	.599
MFRFINLIV				-.281	-.507	.616	-.130	-.210	.836
MFRIR				-.117	-.120	.905	-.424	-.387	.703
MFRCVROE				.342	.407	.687	.213	.244	.810
HFRFINLIV				.441	.303	.764	.888	.498	.624
HFRIR				.449	.387	.702	.194	.142	.888
HFRCVROE				.188	.149	.883	-.723	-.400	.694
R Square	.254			.119			.327		
Adjusted R Square	.091			.227			.250		
F	1.555			0.343			0.566		

Results with respect to Short Term Debt financing in capital structure relative to total assets for firms under food sector are significantly fitted with 25.4%, 11.9% and 32.7%. It can also be observed that in Reduced Model 1 only agency cost influences on short term funds.

TABLE 10: EFFECT OF FINANCIAL RISK ON TDTA

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	β	T	sig
Tangibility	.332	1.713	.096				.283	1.250	.225
Nondebttaxshield	-.878	-3.547	.001				-.748	-2.297	.032
Agencycost	.690	4.471	.000				.476	2.061	.052
Growthopp	.169	1.639	.111				-.052	-.415	.682
Incomevariability	-.349	-2.332	.026				-.345	-1.991	.060
Prof	-1.702	-6.556	.000				-.961	-2.076	.050
Size	1.014	5.038	.000				.352	.843	.409
FL				-.273	-.450	.656	.017	.026	.979
IR				.659	1.227	.230	-.233	-.394	.697
CVROE				1.362	2.385	.024	.892	1.226	.234
MFR				.848	4.111	.000	.186	.662	.515
HFR				.689	3.441	.002	.408	1.780	.090
MFRFINLIV				-.153	-.611	.546	-.197	-.795	.435
MFRIR				-.604	-1.378	.179	-.014	-.032	.975
MFRCVROE				-.105	-.277	.784	.016	.045	.964
HFRFINLIV				.479	.730	.471	.225	.317	.754
HFRIR				-.333	-.637	.529	.561	1.034	.313
HFRCVROE				-1.325	-2.324	.028	-.927	-1.283	.213
R Square	.808			.821			.893		
Adjusted R Square	.765			.750			.801		
F	19.180			11.655			9.726		

In the table it can be observed that in the reduced model except growth opportunity and non-debt tax shield others are significant. TDTA is explained by Independent variables, reflected in higher R values. In model-2 both the MFR and HFR are significant to TDTA. Non debt tax shield, Growthopp, Income variability and profitability are significant factors. But the NDTs and profitability are negatively correlated ($\beta=-.878$ and $\beta=-1.702$) respectively. In model-2 MFR, HFR and CVROE are significant and are positively correlated. This shows that increase in volatility of net income relative to equity increases the portion of long-term debt in capital structure of firms with low and high financial risk.

TABLE 11: EFFECT OF FINANCIAL RISK ON STDTA- MEDIA

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	β	t	sig
Tangibility	.132	.835	.410				-.081	-.745	.465
Nondebttaxshield	.531	4.157	.000				.411	4.239	.000
Agencycost	-.343	-2.347	.025				.352	2.339	.029
Growthopp	-.098	-.414	.682				-.040	-.247	.807
Incomevariability	.400	1.600	.119				.332	1.832	.081
Prof	.147	.717	.478				-.431	-2.091	.049
Size	-.112	-.504	.618				-.303	-2.054	.053
FL				-.018	-.147	.884	-.036	-.540	.595
IR				.264	1.473	.152	-.055	-.509	.616
CVROE				.118	.200	.843	.878	2.528	.020
MFR				-.087	-.309	.760	-1.016	-3.230	.004
HFR				-.036	-.132	.896	-.471	-2.257	.035
MFRFINLIV				-.102	-.663	.513	-.219	-2.509	.020
MFRIR				.473	2.059	.049	.554	3.833	.001
MFRCVROE				-.018	-.072	.943	-.193	-1.106	.281
HFRFINLIV				.096	.545	.590	.074	.684	.501
HFRIR				.436	1.223	.231	1.169	3.885	.001
HFRCVROE				-.042	-.072	.943	-1.053	-3.062	.006
R Square	.608			.595			.924		
Adjusted R Square	.522			.435			.085		
F	7.084			3.735			14.084		

STDTA is explained by independent variables with higher R² Value. In model-1, agency cost and non debt tax shield are significant to STDTA. In model-2, only MFRIR is significant to STDTA. This shows that short-term debt is significantly lower for medium and high financial risk firms when compared to that of high risk firms, In full model, debt tax shield, income variability, profitability, size, CVROE, MFR (dummy), HFR (dummy), MFRV are significant but negatively correlated. MFRIR, HFRIR and HFRCVROE are significant to STDTA and positively correlated.

TABLE 12: EFFECT OF FINANCIAL RISK ON LTDTA

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	B	t	sig
Tangibility	.022	.168	.868				.037	.266	.793
Nondebttaxshield	.075	.716	.479				.212	1.697	.105
Agencycost	-.112	-.938	.355				-.390	-2.007	.058
Growthopp	-.236	-1.231	.227				-.293	-1.390	.179
Incomevariability	-.618	-3.030	.005				-.684	-2.928	.008
Prof	-1.328	-7.942	.000				-1.171	-4.409	.000
Size	.298	1.643	.110				.250	1.315	.203
FL				.138	1.019	.317	.092	1.082	.292
IR				.090	.457	.651	.024	.171	.866
CVROE				-.003	-.004	.997	-.120	-.269	.791
MFR				1.101	3.563	.001	.323	.797	.434
HFR				.984	3.316	.003	.680	2.529	.020
MFRFINLIV				-.197	-1.168	.253	.032	.282	.781
MFRIR				-.658	-2.604	.015	-.458	-2.463	.023
MFRCVROE				-.490	-1.741	.093	-.288	-1.284	.213
HFRFINLIV				.330	1.696	.101	.042	.298	.768
HFRIR				-1.298	-3.309	.003	-.406	-1.048	.307
HFRCVROE				.347	.537	.596	.138	.311	.759
R Square	.739			.510			.873		
Adjusted R Square	.682			.170			.764.000		
F	12.953			2.468			8.018		

In the above table 4.2, income variability and profitability are significant factors of LTDTA in the reduced model 1. In the reduced model 2 MFR (dummy) and HFR both are significant to LTDTA and MFR. In the full model growth opportunity, income variability and profitability and MFR*IR is also significant it means that the short term debt has increased with increase in interest risk. It can be observed here that the variation with the R² has been decreased in reduced model 2 i.e, 51% with the absence of control variables.

TABLE 13: EFFECT OF FINANCIAL RISK ON TDTA

	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	β	t	sig
Tangibility	-.026	-.182	.856				-.186	-.980	.338
Nondebttaxshield	-.083	-.707	.485				.079	.465	.647
Agencycost	.574	4.288	.000				.785	2.991	.007
Growthopp	.234	1.085	.286				.374	1.314	.203
Incomevariability	.327	1.427	.163				.238	.754	.459
Prof	-.255	-1.356	.184				-.560	-1.560	.134
Size	-.091	-.445	.659				-.069	-.267	.792
FL				-.121	-.964	.343	-.075	-.654	.520
IR				-.161	-.880	.387	-.245	-1.297	.209
CVROE				.882	1.470	.153	1.180	1.952	.064
MFR				.888	3.101	.004	-.442	-.806	.429
HFR				.818	2.977	.006	.073	.202	.842
MFRFINLIV				.243	1.553	.132	.079	.518	.610
MFRIR				-.362	-1.549	.133	-.109	-.435	.668
MFRCVROE				-.428	-1.640	.112	-.424	-1.397	.177
HFRFINLIV				-.096	-.532	.599	-.279	-1.479	.154
HFRIR				-.194	-.535	.597	.935	1.785	.089
HFRCVROE				-.837	-1.397	.173	-1.448	-2.417	.025
R Square	.671			.580			.768		
Adjusted R Square	.599			.414			.569		
F	9.335			3.509			3.833		

In table-13 it can be observed that the dependent variable is explained with higher R value in all three models. In model-1, income variability and profit is significant but it is negatively correlated. TDTA is explained by Independent variables (profitability, size of the business, tangibility, non-debt tax shields, agency cost, income variability). In model 2 both the MFR and HFR are significant to TDTA In the full model HFR *CVROE and agency cost are significant but it is negatively correlated.

TABLE 14: EFFECT OF FINANCIAL RISK- LTDTA – HOSPITALS

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	β	t	sig
Tangibility	1.596	4.655	.000				1.620	3.124	.005
Nondebttaxshield	.571	1.144	.261				.396	.554	.586
Agencycost	-2.388	-3.223	.003				-2.066	-1.897	.072
Growthopp	-.088	-.914	.367				-.108	-.656	.519
Incomevariability	.699	3.979	.000				.742	2.364	.028
Prof	.705	3.726	.001				.729	3.174	.005
Size	-1.098	-3.576	.001				-.866	-1.150	.263
FL				4.131	1.783	.085	.569	.409	.687
IR				-.193	-.734	.469	-.254	-1.097	.285
CVROE				.686	2.235	.034	-.004	-.023	.982
MFR				-.205	-.633	.532	-.271	-1.030	.315
HFR				-.623	-1.972	.059	-.540	-2.784	.011
MFRFINLIV				-3.110	-1.673	.106	-.407	-.367	.717
MFRIR				.096	.412	.683	.332	1.653	.113
MFRCVROE				.178	.873	.390	.127	.876	.391
HFRFINLIV				-2.185	-1.632	.114	-.290	-.365	.718
HFRIR				.056	.234	.817	.099	.303	.765
HFRCVROE				-.314	-1.067	.295	-.083	-.430	.672
R Square	.820			.464			.882		
Adjusted R Square	.780			.253			.781		
F	20.807			2.202			8.728		

In model-1 tangibility, income variability, profitability and size are significant with positively correlated. In the reduced model 2 CVROE is significant and is positively correlated. In full model HFR is significant. Long term debt influences on high risk firms.

TABLE 15: EFFECT OF FINANCIAL RISK- STDTA

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	β	t	Sig
Tangibility	1.315	3.013	.005				2.070	3.364	.003
Nondebttaxshield	.053	.084	.934				.587	.691	.497
Agencycost	-2.348	-2.487	.018				-3.131	-2.422	.025
Growthopp	-.068	-.553	.584				.056	.287	.777
Incomevariability	.390	1.744	.091				.390	1.047	.307
Prof	.388	1.608	.118				.752	2.760	.012
Size	-1.521	-3.887	.000				-1.286	-1.439	.165
FL				.838	.359	.722	-2.617	-1.584	.128
IR				-.054	-.205	.839	.113	.412	.685
CVROE				.128	.414	.682	-.538	-2.386	.027
MFR				.347	1.061	.298	.365	1.170	.255
HFR				-.289	-.908	.372	-.303	-1.317	.202
MFRFINLIV				-.714	-.381	.706	1.909	1.453	.161
MFRIR				.032	.138	.892	.434	1.819	.083
MFRCVROE				.153	.748	.461	.215	1.248	.226
HFRFINLIV				-.372	-.276	.785	1.437	1.525	.142
HFRIR				-.248	-1.030	.312	.033	.084	.934
HFRCVROE				.202	.680	.502	.510	2.233	.037
R Square	.708			.455			.834		
Adjusted R Square	.644			.241			.692		
F	11.067			2.123			5.861		

In all three models R² is high indicating the explanatory power of independent variables. In model-1 only tangibility is significant and is positively correlated (β=1.315 and sig=.005). In the model-2 none of the factors are significant. In model-1 size, tangibility and NDTs are significant. In the full model only HFRCVROE is significant and is negatively correlated.

TABLE 16: EFFECT OF FINANCIAL RISK TDTA

Exploratory variables	Reduced model 1			Reduced model 2			Full Model		
	β	t	sig	β	T	sig	β	t	sig
Tangibility	-.763	-2.306	.028				-.776	-1.643	.115
Nondebt tax shield	-1.034	-2.144	.040				-.746	-1.145	.265
Agency cost	1.663	2.324	.027				1.596	1.609	.123
Growth opp	.248	2.666	.012				.339	2.270	.034
Income variability	-.814	-4.800	.000				-1.041	-3.642	.002
Prof	-1.010	-5.524	.000				-.965	-4.613	.000
Size	-.384	-1.296	.204				-.408	-.595	.558
FL				1.512	.740	.466	1.987	1.568	.132
IR				-.388	-1.671	.106	.128	.605	.551
CVROE				-.162	-.599	.554	.124	.715	.483
MFR				-.062	-.215	.831	.057	.236	.816
HFR				-.287	-1.028	.313	-.230	-1.302	.207
MFRFINLIV				-1.220	-.744	.463	-1.803	-1.790	.088
MFRIR				.692	3.376	.002	-.025	-.135	.894
MFRCVROE				.154	.860	.397	.180	1.364	.187
HFRFINLIV				-1.003	-.849	.403	-1.077	-1.490	.151
HFRIR				.713	3.388	.002	-.193	-.646	.525
HFRCVROE				.342	1.315	.199	-.101	-.577	.570
R Square	.832			.582			.902		
Adjusted R Square	.795			.418			.819		
F	22.646			3.550			10.774		

For all models R^2 is high. In model-1 all are significant except size. In model-2 HFRIR and MFRIR is significant and are positively correlated. In full model income variability and profitability are significant and negatively correlated.

FINDINGS

The use of Debt in capital structure is determined by the profitability, size of the business, tangibility, non-debt tax shields, growth opportunity, agency cost, income variability in all the sectors considered.

High risk firms across sectors use higher debt and their profitability is low. Medium risk and low risk firms use lower debt. It has emerged that degree of financial leverage, interest risk and volatility in ROE has collective impact on determining the level of debt financing in capital structure. But negative relation is found in food and media sector.

CONCLUSION

The relationship between financial risk factors and debt financing in capital structure among firms with low, medium and high financial risk using three regression models, first one with only control variables, second one with only financial risk variables as well as dummy and interaction variables for risk level, and third one with full model by including both control and financial risk variable were evaluated. From the estimated results, it is concluded that financial risk variables, particularly interest risk followed by volatility in ROE has significant effect on determining the additional variation in use of debt financing in business through long-term sources among firms under all selected sectors. This study is limited only to few sectors and selected companies in those sectors. Further study can be carried out considering both operating and financial risk and its combined effect on the value of the firm.

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