DETERMINANTS OF CAPITAL STRUCTURE OF SELECTED MANUFACTURING INDUSTRIES IN INDIA – AN EMPIRICAL STUDY

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"Capital as such is not evil; it is its wrong use that is evil. Capital in some form or other will always be needed".
- Mahatma Gandhi

Abstract
This study investigates seven determinants of capital structure in ten different manufacturing industries in India. Based on the available information and literature review, the determinants considered are size of the firm measured by the natural logarithm of total assets, tangibility measured by fixed assets to total assets ratio, rate of growth measured by percentage of total assets, profitability measured by PBDITA/Total assets, Earnings risk measured by ROCE, Non-debt shield measured by PBIT/Average total asset and Business risk measured by the standard deviation of return on assets, The capital structure or leverage is measured by total debt ratio. Size of the firm, Profitability and Business Risk are the main determinants which influence the capital structure of different industries. In this paper the result of the study conducted to investigate the determinants of capital structure and the differences in capital structure across industry groups.

Keywords: Capital Structure, Leverage, Size, Return on Assets, PBDITA/Total assets and Risk.

Introduction

The financial success of a firm depends mainly on its capital structure. The choice of debt and equity in the capital structure of corporate firms is an important financial decision because it influences both the return and risk of shareholders. The excessive use of debt may endanger the survival of the corporate firm. At the same time, non-use of debt prevents the firm from an opportunity to enhance the rate of return to its equity holders. Capital structure refers to the proportionate relationship between different components of financing mix or long term sources of funds such as debentures, long term debt, preference capital and equity share capital including reserves and surplus. A firm may decide to finance its investment requirements either through equity only or through debt only or a mixture of both.

It is generally understood that the optimal capital structure of a firm is the composition of debt and equity which results in the minimum cost of capital and the determination of an optimal capital structure is not an exact science. The firms have to analyze a number of factors such as the firm's business risk, its financial flexibility, shareholders' wealth maximization, survival against competitors, assurance of a steady source of funds, acquisition and maintenance of a good rating in the market, profitability and growth rate before deciding upon an appropriate capital structure. All these factors are a pointer to one important fact, that, companies will have to search for the right capital structure which enhance its value while minimizing costs.

A rapid development of capital markets creates new possibilities of capital rising for companies. Rational financing solutions may be an especially important determinant to create value. According to the original idea of Modigliani and Miller in the of absence of taxes, the corporate market value does not depend on the structure of capital and therefore financing solutions are not important in striving for the key aim - corporate value maximization. But in literary sources one can find many arguments against this theory. According to the authors of the trade-off theory companies can benefit from the advantages of the loan capital before the benefit received becomes smaller than additional charges covering the costs of financial distress and the costs of agency.

Neither theory nor research has been able to provide satisfactory agreement as to what factors affect the capital structure decision. The theories suggest that firms select capital structures depending on characteristics that determine the various costs and benefits associated with debt and equity financing, Empirical work in this area has lagged behind the theoretical work, as the relevant firm characteristics are expressed in abstract concepts and are rarely directly observable.

In a study conducted by the Reserve Bank of India on the basis of sample of about 1950 non-government companies covering the period from 1984-85 to 1997-98, it was disclosed that relevant share of internal sources tended to decline, while that of external sources tended to move up in the total capital structure of the companies. The internal sources include bonus shares, reserves and surplus and provisions. The external sources of funds, on the other hand comprise increase in paid up capital,

borrowings and trade dues. Among the external sources, corporate reliance on debt financing has been much more than the equity financing, even as the share of latter has gone up over the years.

Statement of the Problem
Financial management determines how funds are procured and used and they relate to a firm's financing and investment policies. It involves the solution for three decisions namely investment decisions, financing decisions and dividend decisions which determine the value of the firm to its shareholders. A firm should strive for an optimal combination of the three interrelated decisions, in order to maximize its value. The decision to invest in a new capital project necessitates financing the investment. The financing decision, in turn, influences, and is influenced by the dividend decision, for retained earnings used in internal financing represent dividends foregone by stockholders. Thus, these three financial decisions are inseparable and therefore whenever a decision has to be taken, the financial manager should give due weightage to all of them as the situation demands. Hence a study is required to investigate it.

Objectives of the Study
The primary objective of the present study is to analyze the determinants which influence the capital structure of various manufacturing industries selected for the study. In consonance with the above idea, the following objectives have been framed.
- To investigate the determinants that influences the capital structure of selected industries.
- To study the differences in capital structure across industry groups

Methodology
Sources of Data
This study is based on the secondary data collected from PROWESS data base of Centre for Monitoring Indian Economy Pvt. Ltd. (CMIE). This data for the sample companies is supplemented with information from various financial dailies, magazine reports, industry reports and annual reports of companies to enable proper analysis and to facilitate the attainment of study objectives listed earlier.

Sample Selection and Period of Study
The data used in the study relates to the manufacturing companies listed in the Bombay Stock Exchange (BSE) for which the data is available in the Prowess database of CMIE. The analysis is confined to BSE listed companies only because all the listed companies are required to follow the norms set by SEBI for financial reporting. Another reason for the selection is the fact that, after New York Stock Exchange (NYSE), BSE has the second-largest number of domestic quoted companies on any stock exchange in the world. The period of the study is from 1998 to 2008 (i.e., financial year 1997-98 to financial year 2007-08). Henceforth financial year 1997-98 (i.e., 1997 April to 1998 March) will be referred as 1998 and accordingly financial year 2007-08 as 2008.

There are 11,064 manufacturing companies available in Prowess data base of CMIE. This study is focused only on 10 industries such as Automobile and Auto ancillaries, Cement, Drugs and Pharmaceuticals, Dyes and Pigments, fertilizer, Leather, Paper, Steel, Sugar and Textiles (Cotton). These 10 industries comprising of 2991 companies are listed in the Bombay Stock Exchange (BSE) of which 955 companies are selected based on market capital. Out of 955 companies the sample of 30% from each industry has been selected for a total of 290 companies. The details are provided in Table 1.

Table 1: Sample size and number of manufacturing companies data collected–Industry wise

S. No	Industries	Total number of BSE Listed companies	Companies selected based on Market Capital	30% of Selected companies – Sample
1	Automobiles and Auto ancillaries	421	139	42
2	Cement	156	59	18
3	Drugs and Pharmaceuticals	619	218	66
4	Dyes and Pigments	92	38	12
5	Fertilizers	79	33	10
6	Leather	134	21	7

7	Paper	206	70	21
8	Steel	476	124	38
9	Sugar	146	50	15
10	Textile (Cotton)	662	203	61
	Total	**2991**	**955**	**290**

Frame Work of Analysis
The following statistical tools are also used to analyse the data in tune with the objective of the study.
- Summary statistics
- Analysis of variance
- Correlation analysis
- Multiple Regression analysis

Suitable statistical hypothesis have been framed to supplement the results of the study and all the tests were tested at 5% level of significance.

Meaning of Variables and Acronyms Used

Table 2: Definition of the Variables

Variables	Measures
Size of the firm	Natural log of total asset
Tangibility	Fixed asset / Total asset
Growth	Percentage of total asset
Profitability	Profit before depreciation, interest and tax (PBDITA) / Total asset
Earnings Risk	Co-efficient of variation of Return on Capital Employed (ROCE)
Non-debt tax shield	Profit before interest and tax (PBIT) / Average total asset
Business Risk	Standard deviation of profit before tax

Findings
The study on determinants of capital structure has been undertaken with a sample of 290 companies comprising of 10 different industries. The financial data has been taken from the prowess database of the Centre for Monitoring Indian Economy (CMIE). The study covers a period of 11 years 1997-2008. Seven variables have been chosen as determinants of capital structure and suitable statistical tools were applied. The findings of the study are presented objective wise in this paper.

Objective: 1 To investigate the determinants that influences the capital structure of selected industries.
The following are the results of summary statistics
- The average size of the firm is high for Fertilizers (3.33) followed by Cement. The co-efficient of variation for Fertilizers (6.81) is least indicating the size of the firm is more consistent in Fertilizers industry. (Table 3)
- The average profitability is uniform in case of Cement (0.18) followed by Automobile and Auto ancillaries (0.17). The co-efficient of variation is less in case of Sugar and Fertilizers which indicates that the profitability is more uniform in these industries than the others. (Table 4)
- Average business risk is high in case of Steel, Cement and Fertilizers industry. (Table 5)
- Size of the firm, Profitability and business risk are the determinants which influence more on the capital structure of various industries considered for the study.

The following are the result of Correlation analysis
- The profitability has significant correlation with earnings risk, non-debt tax shield and business risk in Automobile and Auto Ancillaries. (Table 6)
- The profitability and growth rate has significant correlation with earnings risk and non-debt tax shield in Fertilizers industry. (Table 7)
- The profitability has significant correlation with non-debt tax shield and business risk in Steel industry. (Table 8)
- Profitability, Earnings risk and non-debt tax shield are the three important determinants which plays an important role on the dependent variable in determining the capital structure of various industries considered for the study.

The following are the result of multiple regression analysis

- Business Risk contributes a maximum of 63.7% on the debt equity ratio in Automobile and Auto ancillaries industry. (Table 9)
- Size of the firm contributes a maximum of 36.8% on the debt equity ratio in Sugar industry. (Table 10)
- Size of the firm contributes a maximum of 30.4% on the debt equity ratio in Textile (Cotton) industry. (Table 11)
- Mainly size of the firm and Business Risk plays the vital role in determining the capital structure of various industries considered for the study.

Objective: 2 To study differences in capital structure across industry groups.

To achieve the above mentioned objective the ratio of debt to total assets is considered to study the leverage effect across industries. The descriptive statistics, trend in debt ratio, co-efficient, F-ratio and analysis of variance are applied for analyzing the objective.

- It is concluded that in 1998 the Cement industry is having high leverage (0.519) and in 2001 the Sugar industry has a high leverage (0.548) and in 2002 the Steel industry having a high leverage of (0.518). It further deduced that Sugar, Steel and Cement industries are equally high levered industries among the industries considered for the study in determining the capital structure. (Table 12)
- It is concluded that except Leather industry all the industries show a significant positive growth in debt ratio. (Table 13)
- The difference in the debt ratio between the selected industries is significant in all the years considered for the study. (Table 14)

Table 3: Results of Summary Statistics – Size of the firm

Industry	Mean	Standard Deviation	Co-efficient of Variation	Co-efficient of Skewness	Co-efficient of Kurtosis
Automobiles and Auto ancillaries	2.72	0.59	21.61	0.63	3.64
Cement	3.10	0.57	18.24	-0.07	2.64
Drugs and Pharmaceuticals	2.54	0.64	25.19	-0.16	2.62
Dyes and Pigments	2.25	0.56	24.72	-0.26	2.42
Fertilizers	3.33	0.23	6.81	-0.92	3.00
Leather	1.94	0.49	25.49	-0.19	3.40
Paper	2.25	0.63	28.16	-0.13	2.31
Steel	2.65	0.69	25.99	0.56	3.55
Sugar	2.74	0.38	14.01	-0.06	3.39
Textile (Cotton)	2.14	0.50	23.23	0.21	3.85

Source: Computed

Table 4: Results of Summary Statistics – Profitability

Industry	Mean	Standard Deviation	Co-efficient of Variation	Co-efficient of Skewness	Co-efficient of Kurtosis
Automobiles and Auto ancillaries	0.17	0.06	36.48	0.25	3.47
Cement	0.18	0.11	63.11	-0.15	4.76
Drugs and Pharmaceuticals	0.16	0.10	63.19	0.21	4.16
Dyes and Pigments	0.14	0.07	48.10	-0.07	5.11
Fertilizers	0.13	0.04	28.47	-0.63	3.10
Leather	0.11	0.04	35.53	0.85	2.40
Paper	0.10	0.07	65.46	-3.27	15.58
Steel	0.10	0.06	59.93	0.23	4.81
Sugar	0.14	0.03	22.60	1.21	5.96
Textile (Cotton)	0.13	0.04	29.72	-0.08	3.69

Source: Computed

Table 5: Results of Summary Statistics - Business Risk

Industry	Mean	Standard Deviation	Co-efficient of Variation	Co-efficient of Skewness	Co-efficient of Kurtosis

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Automobiles and Auto ancillaries	105.96	224.29	211.68	3.12	9.84
Cement	225.65	274.14	121.49	1.82	2.21
Drugs and Pharmaceuticals	54.79	82.02	149.70	2.35	5.28
Dyes and Pigments	11.89	13.47	113.24	1.64	2.50
Fertilizers	142.13	72.60	51.08	1.04	0.07
Leather	7.80	11.42	146.43	2.27	5.35
Paper	17.55	23.64	134.74	2.73	8.64
Steel	283.01	892.92	315.51	4.51	21.34
Sugar	41.18	30.19	73.31	0.85	-0.09
Textile (Cotton)	21.93	30.26	137.97	2.01	3.30

Source: Computed

Table 6: Results of Correlation Matrix - Automobile and Auto ancillaries

Determinants	Size of the firm	Tangibility	Growth Rate	Profitability	Earnings Risk	Non-debt Tax Shield	Business Risk
Size of the firm	1						
Tangibility	-0.063	1					
Growth Rate	-0.149	0.058	1				
Profitability	0.196	0.197	-0.220	1			
Earnings Risk	0.170	-0.429*	-0.034	0.774*	1		
Non-debt Tax Shield	0.154	-0.356*	0.074	0.906*	0.872*	1	
Business Risk	0.053	0.171	-0.115	0.322*	0.081	0.173	1

Source: Computed   *Significant at 5% level

Table 7: Results of Correlation Matrix – Fertilizers

Determinants	Size of the firm	Tangibility	Growth Rate	Profitability	Earnings Risk	Non-debt Tax Shield	Business Risk
Size of the firm	1						
Tangibility	0.468	1					
Growth Rate	-0.544	0.473	1				
Profitability	0.130	0.092	0.608	1			
Earnings Risk	-0.069	-0.351	0.717*	0.877*	1		
Non-debt Tax Shield	-0.013	-0.168	0.779*	0.957*	0.943*	1	
Business Risk	-0.060	-0.435	0.245	-0.219	-0.095	-0.018	1

Source: Computed   *Significant at 5% level

Table 8: Results of Correlation Matrix – Steel

Determinants	Size of the firm	Tangibility	Growth Rate	Profitability	Earnings Risk	Non-debt Tax Shield	Business Risk
Size of the firm	1						
Tangibility	0.338*	1					
Growth Rate	0.182	0.396*	1				
Profitability	-0.093	-0.130	0.184	1			
Earnings Risk	0.175	-0.120	0.213	0.003	1		

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Non-debt Tax Shield	-0.041	-0.128	0.369*	0.952*	0.126	1	
Business Risk	0.056	0.067	0.128	0.520*	0.345*	0.537*	1

Source: Computed *Significant at 5% level

Table 9: Results of multiple Regression Analysis – Automobiles and Auto ancillaries

Determinants	R	R^2	Incremental Value of R^2
Size of the firm	0.190	0.036	0.036
Tangibility	0.232	0.054	0.018
Growth Rate	0.263	0.069	0.015
Profitability	0.468	0.219	0.150
Earnings Risk	0.523	0.274	0.055
Non-debt Tax Shield	0.540	0.291	0.017
Business Risk	0.963	0.928	0.637

Source : Computed

Table 10: Results of multiple Regression Analysis – Sugar

Determinants	R	R^2	Incremental Value of R^2
Size of the firm	0.606	0.368	0.368
Tangibility	0.606	0.368	0.000
Growth Rate	0.804	0.647	0.279
Profitability	0.884	0.782	0.135
Earnings Risk	0.910	0.828	0.046
Non-debt Tax Shield	0.920	0.847	0.019
Business Risk	1.000	1.000	0.153

Source: Computed

Table 11: Results of multiple Regression Analysis – Textile (Cotton)

Determinants	R	R^2	Incremental Value of R^2
Size of the firm	0.551	0.304	0.304
Tangibility	0.551	0.304	0.000
Growth Rate	0.551	0.304	0.000
Profitability	0.565	0.319	0.015
Earnings Risk	0.573	0.328	0.009
Non-debt Tax Shield	0.574	0.329	0.001
Business Risk	0.747	0.558	0.229

Source: Computed

Table 12: Results of Descriptive Statistics - Mean Debt Ratio

Year	Automobiles and auto ancillaries	Cement	Drugs and Pharmaceuticals	Dyes and Pigments	Fertilizers	Leather	Paper	Steel	Sugar	Textiles (Cotton)
1998	0.365	0.519	0.311	0.360	0.390	0.392	0.188	0.464	0.511	0.454
1999	0.366	0.517	0.303	0.354	0.399	0.423	0.173	0.497	0.507	0.476
2000	0.346	0.517	0.278	0.332	0.408	0.426	0.176	0.494	0.524	0.479
2001	0.359	0.509	0.285	0.331	0.398	0.451	0.184	0.485	0.548	0.500
2002	0.334	0.500	0.278	0.304	0.377	0.469	0.193	0.518	0.516	0.470
2003	0.294	0.498	0.277	0.280	0.395	0.455	0.212	0.568	0.485	0.477
2004	0.282	0.452	0.267	0.245	0.366	0.414	0.240	0.476	0.484	0.483
2005	0.265	0.445	0.294	0.204	0.332	0.410	0.259	0.440	0.439	0.468
2006	0.283	0.423	0.268	0.181	0.276	0.410	0.272	0.440	0.376	0.480
2007	0.301	0.314	0.271	0.192	0.311	0.397	0.286	0.417	0.389	0.527
2008	0.295	0.298	0.248	0.174	0.314	0.422	0.316	0.378	0.486	0.573
Total	0.317	0.453	0.280	0.269	0.361	0.424	0.226	0.470	0.479	0.490

Source : Computed

Table 13: Results of Trend in Debt Ratio

Industry	Co-efficient	F-Ratio
Automobiles and auto ancillaries	0.374	21.487*
Cement	0.584	36.021*
Drugs and Pharmaceuticals	0.306	14.608*
Dyes and Pigments	0.397	200.166*
Fertilizers	0.43	24.327*
Leather	0.432	0.276 NS
Paper	0.141	88.632*
Steel	0.528	5.354*
Sugar	0.549	8.883*
Textiles	0.449	7.634*

Source : Computed   *Significant at 5% level

Table 14: Results of ANOVA

Year	Debt to total Assets	Degrees of Freedom
1998	4.743*	9
1999	6.853*	9
2000	8.132*	9
2001	7.814*	9
2002	6.596*	9
2003	5.934*	9
2004	5.197*	9
2005	3.161*	9
2006	5.466*	9
2007	7.049*	9
2008	12.881*	9

Source : Computed *Significant at 5% level

Conclusion

The study has examined the determinants of capital structure in ten different manufacturing industries in India. Size of the firm, Profitability and Business Risk are the main determinants which influence the capital structure of different industries. There exists a significant difference in capital structure among the selected industries. The analysis also reveals that in most of the industries the dividend policy has significant relationship with the market price of the shares.

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