FINANCING PATTERN AND DETERMINANTS OF FINANCING PATTERN OF PHARMACEUTICAL INDUSTRY: AN EMPIRICAL ANALYSIS IN INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The paper ascertains the financing patterns and determinants of pharmaceutical industry. We use the financial data of one hundred and forty-one pharmaceutical companies. Financing pattern of sample companies has been studied by using twenty different ratios. The results of the financing pattern ratios of the pharmaceutical industry show that they have not used more debt for financing fixed assets. The earning capacity of the companies is good as indicated by the overall positive values of shareholders equity. Further, we use regression model to study the determinants of financing patterns for the industry, we found that, of the sixty-one independent variables analysed, five independent variables viz, current liabilities to net worth, leverage ratio, short term debt to total debt (including current liabilities), logarithm of PBIT by total assets and logarithm of cash profit by sales as independent variables emerge as determinant for two dependent variables viz. long-term debt to equity and total debt-equity ratio. Further, we found that, forty-eight independent variables are not the determinants of financing pattern for the industry. The results of the study may be used researchers to compare with other foreign Pharmaceutical companies. Further studies can be undertaken for companies in pharmaceutical industry.

Keywords: Financing patterns; long term debt to equity; total debt to equity; liquidity ratios; turnover ratios; profitability ratios; pharmaceutical industry.

1. INTRODUCTION

Indian Pharmaceutical industry supplies more than fifty percent of the global demand for various vaccines. In the global pharmaceuticals sector, India is a significant and rising player. India is the world's largest supplier of generic medications. The companies in Indian pharmaceutical industry are having good profitability, hence investors need to analyse the financing pattern and determinants of financing pattern of pharmaceutical companies. Studies by Frederick et al. [1] analysed the risk-return characteristics of the portfolios and found that rankings are correlated with variability of returns.

Raghuram and Zingales [2] analysed determinants of capital structure by using the financing decisions of public firms. Manoharan [3] studied the performance of cement companies in India using age, size, and location. The study found that leverage and earnings are related. Lermack [4] argues that financial ratios analysis is of immense use in assessing the performance of companies. Ali et al. [5] studied BOT model in Turkey and found that there were problems related to coordination, land acquisition and use, water, operation time period, financing mix of the project, return on equity. Bardia [6] applied Spearman's rank correlation between liquidity and profitability and found a positive association between the two. Chen and Messner [7] analysed BOT in water projects in China and found that a number of factors influence the success of these water projects. Karadeniz et al. [8] investigated the factors influencing capital structure decisions of the Istanbul Stock Exchange firms and found that a number of variables influence capital structure choice. Edward and Elizabeth [9] observed corporate social responsibility and financial performance are positively related. Cinca et al. [10] argue that size of a firm and the location of the firm impact the financial ratio structure. Rakesh [11] studied the determinants of capital structure and reported that profitability, size, age, debt service capacity growth and tax shield variables are the significant firm-level determinants of capital structure. Manjunatha and Gujjar [12,13] analyzed and found that net income of the organization is not enough to determine its efficiency unless profit margin, asset turnover, financial leverage is taken into consideration. In most of the developing countries there has been a debate on the level of efficiency of the state, public sector, and listed companies. Kavitha and Mohanraj [14] found that capital structure is negatively related with liquidity while it is positively related with cost of debt, size of the business, liquidity, profitability and collateral value of asset. Manjunatha et al [15] found that return on equity is better in creating positive shareholders value and also found that return on sales, return on assets and asset turn over are positively correlated with return on equity. Manjunatha et al [15] found that return on equity better in creating positive shareholders value and also found that return on sales, return on assets and assets turn over are positively correlated with return on equity. Praveen and Manjunatha [16] calculated return on equity for software and training services companies in India using three factors DuPont model and five factors DuPont model and found that there is a significant relationship between return on equity, asset tun over and profit margin. Manjunatha and Vikas [16] found that there is a significant difference in the financing pattern and independent variables have inverse relationship with the financing pattern of selected infrastructure sectors in India. Rajesh kumar and Manjunatha [17] found that profitability by total assets, working capital to total assets, total assets turnover ratio, current assets turnover ratio and current ratio as independent variables emerge as determinants of the financial performance of construction industry of the study.

While many studies have been conducted on determinants of financing pattern of companies in the western countries, there are a few studies in the Indian context. Studies and Rakesh [11] have generally supported the determinants of financing pattern in India. There is no robust conclusive evidence that whether we can use particular variables to know the determinants of financing pattern in India and further Kavitha and Mohanraj [14] suggested to use large sample for longer span of time to ascertain the relationship between financing patterns of firms and liquidity, leverage, profitability and efficiency ratios. To understand how important financing patterns for pharmaceutical companies are influenced by financial ratios, we use regression analysis by taking one independent variable and one dependent variable at a time and present the results of the regression co-efficients and their corresponding probability values for infrastructure sectors in India.

2. METHODOLOGY

2.1 Research Design

- We have set following objective based on the evidence of review of literature
- To find out the determinants of the financing pattern of infrastructure sectors in India

2.2 Data and Sample

We use the financial data of one hundred and forty-one pharmaceutical companies which are listed in the Indian stock exchanges. The companies are selected based on two criteria: a) the companies selected should have been listed and traded in Indian stock exchanges and b) annual reports and financial statements should be available for the years 1999-2000 to 2017-2018. The total number of companies included in this study, using the above criteria is one hundred and forty-one. The financing pattern is measured using two dependent variables: a) long term debt to equity and (b) total debt to equity ratio. We have computed sixty-one independent variables from financial statements of sample infrastructure companies for the years 2000 to 2018 for each

company and aggregating the results for pharmaceutical industry.

2.3 Tools of Analysis

2.3.1 Financing pattern evaluation

We use twenty different ratios to understand the dimensions of financing patterns. The analysis of financing pattern is presented by pooling the data of all the companies. Therefore, the analysis presented is for the industry as a whole. We present the results of financing pattern in Table 1. The aggregated results are presented to avoid too many tables if the data of each company is presented and analysed. One of the limitations of this type of analysis is that the individual companies lose their identity in the analysis. An enterprise financing pattern that maximises the value of firm is an optimal capital structure. It is also referred to as the appropriate composition of the debt and equity.

2.3.2 Determinants of financing pattern

There are numerous factors both qualitative and quantitative. The main determinants of the financial performance are many. In this study we use sixty-one different financial ratios to ascertain how these ratios influence the financial pattern of the pharmaceutical industry. We use financial statement analysis tools and regression model for the paper. Two ratios representing financial performance are dependent variables and sixty-one ratios are taken as independent variables. The following regression equations are designed to test the relationship and significance.

Long term Debt to Equity = $\alpha_i + \beta_{1*}$ variable$_i$ +e$_i$
    …1

Total Debt to Equity = $\alpha_i + \beta_{1*}$ variable$_i$ +e$_i$
    …2

We use regression analysis by taking one independent variable and one dependent variable at a time and present results of the regression co-efficients and their corresponding probability values (p-values). We use sixty-one independent variables, two dependent variables which results in one hundred and twenty-two regression lines and presented in Table 2.

Table 1. Financing patterns of companies in pharmaceutical industry

N	Financing Pattern Ratios	Mean	Med	CV	Q1	Q3	Max	Min
1	Long Term Debt to Equity	0.06	0	3.61	0	0	1.78	0
2	Total debt-Equity ratio	0.64	0.42	1.3	0.22	0.74	6.42	-0.12
3	Total Debt (Ex CL) to Debt Equity	-2.15	-0.26	-13.99	-0.63	-0.01	72.12	-358.08
4	Total Debt (Ex CL) to Total Assets	-0.15	-0.15	-16.17	-0.38	-0.06	26.6	-6.12
5	Capital Gearing Ratio	304.85	0.34	3.44	0.04	13.94	6775	-0.08
6	Proprietary ratio	3.66	2.82	0.97	1.5	4.63	24.12	-0.58
7	Funded Debt to NWC	-2.31	0	-10.89	-0.12	0	3.84	-304.59
8	Leverage ratio	0.06	0.02	1.71	0	0.07	0.64	0
9	Long Term Debt to Total Capitalisation (Book Value)	0.16	0.18	13.29	0	0.78	3.77	-23.15
10	Long term debt to Total Asset	0.01	0.01	36.38	0	0.06	0.33	-4.3
11	Total Assets to Equity Share Holders Equity	2957.91	3.3	3.44	1.75	42.43	53725	-288.4
12	Short Term Debt to Total Debt	0.98	1	0.35	0.84	1.11	2.21	0
13	Current Liabilities to Total Assets	0.2	0.25	12.04	0.07	0.43	6.13	-26.6
14	Current Liabilities to Equity	0.55	0.35	1.44	0.2	0.62	6.41	-0.07
15	Quick Assets to Total Assets	-13.64	1.08	-13.83	0.21	2.2	50.31	-2308
16	Current Assets to Total Assets	-0.5	0.02	-15.32	0	0.2	0.9	-93.75
17	Net fixed Assets to Total Assets	-7.07	1.76	-16.68	0.4	3.03	36.69	-1441.2
18	Working Capital to Total Assets	-0.7	-0.11	-7.92	-0.37	0.01	2.63	-67.15
19	Retained Earnings to Total Assets	0.12	0	2.04	0	0.17	0.74	-0.98
20	Sales to Total Assets	0.87	0.81	0.43	0.67	1.01	1.97	0

Notes: Med = Median, CV= coefficient of variation, Q1= first quartile, Q3= third quartile, Max= Maximum value, Min = Minimum value, N = number of companies/ratios considered for analysis.

3. ANALYSIS OF RESULTS

3.1 Evaluation of Financing Pattern

To assess the financing pattern of pharmaceutical industry, we compute the ratios based on the annual financial statements of companies and interpret these ratios to understand how the companies choose their finances. Table1 presents the financing patterns of pharmaceutical industry. The mean value is 0.06 and the maximum value is 1.78. The median, Q1, Q3 and minimum values of long-term debt to equity ratio is 0.00 which show that most of the companies in this industry have not resorted to debt capital to finance their assets as well as their operations. The mean and median of debt-equity ratio is negative and the maximum value is 72.12 and the minimum value is -358.08. This shows that there are companies which have used high doses of debt and some of the company's equity is negative. However, the overall for the industry as a whole is not very high as indicated by the low total debt to equity ratio. When we compare the long-term debt to equity and total debt to equity ratios, the latter has very high values which indicate that the short-term debt is substantially more in the overall total debt. However, this ratio is within the limits as the current liabilities to total assets and current liabilities to equity are relatively low. Further, the short-term debt is not used for financing the assets of companies. The retained earnings are low compared to the total assets but the companies have been able to generate enough sales by utilizing the total assets of the companies. The minimum value of this ration is zero in this sector which shows that there are companies which have not been able to generate the sales by using the fixed assets. It should be noted that zero values do not necessarily indicate absolute zero, but when the values are approximated to the second decimal, the numbers are zero. These indicate very low values for the rations. The leverage ratio for the companies in this sector is very low and companies have been able to generate enough cash flows to finance the operations of the companies. Net fixed assets to total assets and quick assets to total assets ratio are negative which indicate that there are companies which have incurred losses and therefore, their total assets value is negative (the difference between fixed and current assets and fictitious assets). The contribution of equity shareholders to finance the total assets is low indicating that the companies' assets as well as operations are financed by the debt. Working capital to total capital is negative which is a clear indication that the current liabilities have exceed the current assets substantiating the fact that the current liabilities are used to finance fixed assets. However, this is the average position but as indicated

by the long-term debt to equity ratio, these ratios for some companies are very but not for the industry as a whole. As the averages are influenced by the extreme values the mean values show negative values. Total assets to equity shareholders equity ratio is very high indicating that the contribution of equity shareholders is not substantial. Current liabilities to total assets ratios are in reasonable range as indicated by the low mean and median values. However, the maximum and minimum values indicate that there are companies which have used current liabilities to finance the fixed assets. This position is not good for these companies. The mean and median values of working capital to total assets ratio are negative which shows that the current liabilities are used for financing the long-term assets like the fixed assets. However, this may not be bad indicator as the earning capacity of the companies could generate income to service the short-term debt.

3.2 Analysis on determinants of Financing Pattern

The regression result reported in the Table 2 shows the determinants of long-term debt to equity. Of the sixty-one independent variables analysed, thirteen exhibit a statistically significant association with long term debt to equity and forty-eight exhibit statistically insignificant association. The coefficients of the thirteen independent variables viz liquid ratio, inventory to working capital, current liabilities to net worth, return on investment ratio, fixed assets turnover ratio, working capital turnover ratio, proprietary ratio, leverage ratio, long-term debt to total assets, short term debt to total debt(including current liabilities), retained earnings to total assets, logarithm of PBIT by total assets and logarithm of cash profit by sales have positive and statistically significant relationship with the long term debt to equity and therefore, we conclude that these variables are the determinants of the long-term debt to equity in the pharma sector. Further, the regression result reported in the Table 2 shows the determinants of total debt-equity ratio. Of the sixty-one independent variables analysed, seven exhibit a statistically significant association with total debt-equity ratio and fifty-four exhibit statistically insignificant association. The coefficients of the seven independent variables viz current liabilities to net worth, working capital to operating expenditure, intangible assets to total assets, leverage ratio, short term debt to total debt(including current liabilities), logarithm of PBIT by total assets, logarithm of cash profit by sales have positive and statistically significant relationship with the total debt to equity and therefore, we conclude that these variables are the determinants of the total debt to equity in the pharma sector.

Table 2. Determinants of financial pattern for pharmaceutical industry in India

	Dependent variables	a		b	
	Independent variables	i	ii	i	ii
1	Current Ratio (LIQ)	0.00	0.54	0.87	0.87
2	Liquid Ratio/Quick Ratio	0.13	0.00*	0.13	0.13
3	Inventory to Working Capital	0.00	0.00*	0.32	0.32
4	Current Liabilities to Net Worth	0.09	0.00*	0.00*	0.00*
5	Current Liabilities to Total Assets	0.00	0.79	0.36	0.36
6	Working Capital to Net Sales	0.00	0.70	0.85	0.85
7	Working Capital to Operating Expenditure	0.06	0.12	0.00*	0.00*
8	Cash Flow to Current Liabilities	0.00	0.61	0.78	0.78
9	Gross profit Ratio	-0.01	0.09	0.92	0.92
10	Net Profit Ratio	0.00	0.73	0.72	0.72
11	Net Profit to NFA	0.00	0.86	0.97	0.97
12	Net Profit to Total Assets	0.00	0.82	0.48	0.48
13	Operating Profit Ratio	-0.01	0.10	0.88	0.88
14	Return On Investment (LT) Ratio	0.00	0.03*	0.36	0.36
15	Return On Investment (Total) Ratio	0.00	0.15	0.18	0.18
16	Return on shareholders' equity	0.00	0.05	0.82	0.82
17	PBIT to Total Assets /Return On Total Assets	0.00	0.74	0.93	0.93
18	Return On Fixed Assets	0.00	0.86	0.97	0.97
19	Earning Power (PAT/(NFA + Inventory))	0.00	0.41	0.75	0.75
20	EBDIT to Total Interest (DSC)	0.00	0.25	0.61	0.61
21	Cash Flow to Sales	-0.95	0.19	0.18	0.18
22	Cash Flow to (Shareholders Equity +Financial Debt)	0.00	0.07	0.30	0.30
23	EBIT to Total Assets (PROF)	0.00	0.76	0.94	0.94
24	(Depreciation + Amortisation)/Total Assets (NDTS)	0.00	0.90	1.00	1.00
25	Intangible Assets to Total Assets (UNIQ)	0.39	0.13	0.00*	0.00*
26	WACC	0.00	0.69	0.41	0.41
27	Capital Expenditure to GFA	-0.07	0.68	0.44	0.44
28	EBIT growth rate	0.00	0.69	0.90	0.90
29	growth rate of total assets (GROW)	0.00	0.95	0.77	0.77
30	growth rate of sales	0.00	0.33	0.14	0.14
31	Tobin's Q	0.00	0.59	0.53	0.53
32	Investment demand	0.00	0.39	0.83	0.83
33	Inventory Turnover ratio	0.00	0.48	0.98	0.98
34	Receivables Turnover ratio	0.00	0.88	0.93	0.93
35	Creditors turnover ratio	0.00	0.05	0.34	0.34
36	Total Assets Turnover Ratio	0.00	0.80	0.48	0.48
37	Fixed assets turnover ratio	0.04	0.00*	0.07	0.07
38	Working Capital turnover ratio	0.00	0.04*	0.10	0.10
39	Current assets turnover ratio	0.00	0.32	0.21	0.21
40	Capital Gearing Ratio	0.00	0.30	0.30	0.30
41	Proprietary ratio (FA/Shareholders Equity)	-0.01	0.02*	0.13	0.13
42	Leverage ratio	1.72	0.00*	0.00*	0.00*
43	Long Term Debt to Total Capitalisation (Book Value)	0.01	0.23	0.49	0.49
44	Long term debt to Total Asset	0.10	0.04*	0.21	0.21
45	Short Term Debt to Total Debt (including CL)	0.38	0.00*	0.01*	0.01*
46	EPS	0.00	0.78	0.32	0.32
47	Pay-out ratio	0.12	0.44	0.42	0.42

	Dependent variables	a		b	
	Independent variables	i	ii	i	ii
48	Price to earnings ratio	0.00	0.78	0.38	0.38
49	Book value per share	0.00	0.90	0.82	0.82
50	Price to book value ratio	0.00	0.62	0.32	0.32
51	Net fixed Assets to Total Assets (COVA)	0.00	0.83	0.50	0.50
52	Working Capital to Total Assets	0.00	0.64	0.48	0.48
53	Retained Earnings to Total Assets	0.19	0.01*	0.25	0.25
54	Market value of Equity to Book Value of Debt	0.00	0.71	0.39	0.39
55	Market equity or market capitalisation	0.00	0.75	0.66	0.66
56	Market Value of Firm	0.00	0.75	0.66	0.66
57	Logarithm of sales (SIZ)	-0.01	0.73	0.97	0.97
58	Logarithm of total assets (SIZ-Not used in Cap Structure)	0.02	0.11	0.37	0.37
59	Logarithm of dividend to paid up capital	-0.11	0.07	0.12	0.12
60	Logarithm of PBIT by total assets	-0.08	0.04*	0.04*	0.04*
61	Logarithm of cash profits by sales	-0.02	0.00*	0.00*	0.00*
62	N +ve / P>0.05	27	48	32	54
63	N -ve / P<0.05	34	13	29	7
64	N +ve, P>0.05		19		28
65	N -ve, P>0.05		29		26
66	N +ve, P<0.05		8		4
67	N -ve, P<0.05		5		3

Source: Financing pattern ratios are computed by the researchers using the financial statements data. Using the ratios of different companies for the industry a regression line is fit by taking one independent variable and dependent variable at a time. detailed regression output is not presented in the tables. Only the value of the co-efficient of the independent variable and their corresponding probability values are presented.
Note 1: First row of the table "a" and "b" represents dependent variables as explained in in sample data.
Note 3: Third and fourth column of the table "I" and "ii" indicates regression co-efficient and p values respectively. Same explanation holds good for column fifth and sixth.
Note 4: Sixty second row: N +ve indicates the number of positive coefficients.
Sixty third row: N –ve indicate the number of negative coefficients.
Sixty fourth row: N +ve/ P> 0.05 indicate the number of coefficients that are positive and not statistically significant.
Sixty fifth row: N +ve/ P< 0.05 indicate the number of coefficients that are positive and statistically significant.
Sixty sixth row: N -ve/ P> 0.05 indicate the number of coefficients that are negative and not statistically significant.
Sixty seventh row: N -ve/ P< 0.05 indicate the number of coefficients that are negative and statistically significant.
*Note 5: The mark * in the p-value column denotes that the corresponding coefficients of the independent variables. are statistically significant at 5 percent level of significance.*

4. DISCUSSION AND CONCLUSION

This paper has attempted to test the financing pattern and determinants of financing patterns of pharmaceutical industry in India.

The financing pattern ratios of the pharmaceutical companies show that they have not used more debt for financing fixed assets. The earning capacity of the companies is good as indicated by the overall positive values of shareholders equity. The maximum and minimum values in this sector are extreme indicating that there are companies which have exceeded the normal doses of debt which can potentially cause financial problems to the companies. The presence of the extreme values seems to have affected the overall mean and median values of the different ratios in this industry.

We found that the determinants of financing patterns, of the sixty-one independent variables analysed, five independent variables viz, current liabilities to net worth, leverage ratio, short term debt to total debt (including current liabilities), logarithm of PBIT by total assets and logarithm of cash profit by sales as independent variables emerge as determinant for two dependent variables viz. long-term debt to equity and total debt-equity ratio. Further, we found that, forty-eight independent variables viz current ratio, current

liabilities to total assets, working capital to net sales, cash flow to current liabilities, gross profit ratio, net profit ratio, net profit to NFA, net profit to total assets, operating profit ratio, return on investment (total) ratio, return on shareholders' equity, PBIT to total assets, return on fixed assets, earning power (PAT/(NFA + Inventory)), EBDIT to total interest, cash flow to sales, cash flow to (Shareholders Equity +Financial Debt), EBIT to total assets, (depreciation + amortisation)/total assets, WACC, capital expenditure to GFA, EBIT growth rate, growth rate of total assets, growth rate of sales, Tobin's Q, investment demand, inventory turnover ratio, receivables turnover ratio, creditors turnover ratio, total assets turnover ratio, current assets turnover ratio, capital gearing ratio, long-term debt to total capitalisation, EPS, pay-out ratio, price to earnings ratio, book value per share, price to book value ratio, net fixed assets to total assets, working capital to total assets, market value of equity to book value of debt, market equity or market capitalisation, market value of firm, logarithm of sales, logarithm of total assets, logarithm of dividend to paid up capital are not the determinants of financing pattern for pharmaceutical industry of the study [18-20].

IMPLICATIONS AND SCOPE FOR FURTHER RESEARCH

The results of the study may be used researchers to compare with other foreign pharmaceutical companies to understand the financing pattern and the determinants of financing patterns of foreign pharmaceutical industry. We have analysed only the listed companies and further studies can include unlisted companies. This study has not made the company wise analysis. This can also be done. The results for the industry may not agree with the results of the company wise results of different sectors. Studies can be undertaken for companies in pharmaceutical industry.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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