
Determinants of Financial leverage in Indian Pharmaceutical Industry

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ABSTRACT

This paper attempts to explain the variables that influence the use of debt funds in the Indian Pharmaceutical industry. The results are broadly consistent with the previous research findings. Variables like interest, asset structure, retained earnings and intrinsic value of share are positively associated with leverage while cash flow and interest coverage bear negative association with leverage. Indian pharmaceutical Companies employ substantial amount of debt as is evident from debt-equity ratio as well as total debt to total assets ratio. The Indian pharmaceutical industry is growing at an annual growth rate of 20 per cent is evolving as one of the major industries in the world with its huge market and a great availability of skilled labour and improved laboratories.

Keywords: Leverage, Intrinsic value of share.

1. Introduction

A firm requires capital for meeting out its short-term and long-term financial needs. Equity, debt and hybrid securities constitute the broad sources of funds available to a business house. A successful blending of different sources of funds is desirable from the point of view of investor's, the creditors and the concern itself. A firm can finance its investment project either through debt or equity. The prime objective of a firm is to maximize shareholders wealth and banking upon debt funds enables a firm to maximize the objective. Wealth maximisation implies the maximisation of market price of shares which depends on economic value added (EVA) and focus on stake holders. A positive EVA would increase owner's wealth therefore only investment with positive EVA would be desirable for maximising shareholders wealth choosing debt form of financing results in increased Earnings Per Share leading to enhanced shareholder's wealth. The use of borrowed funds along with preferred and equity capital is known as leverage. The financial leverage is a pre-requisite for achieving optimal capital structure. An optimal capital structure can influence the value of firm and wealth of shareholder's through reduced cost of capital. Hence, determination of optimal debt level and its impact on the firm's over all capital structure is regarded as an integral part of a firm's financial decision. The aim of this paper is to investigate the relationship between a firm's financial leverage and its sales, interest, cash flow, asset structure, interest coverage, firm's size, retained earnings, Earnings Before Interest and Tax, intrinsic value of a share and return on asset in Indian pharmaceutical industry. Highly organized sector in Indian economy, it plays an important role in promoting and sustaining development of health care in India. Presence of low cost manufacturing facilities, educated

and skilled manpower, cheap labour force among others make pharmaceutical industry the prime sector of the Indian economy. Globally, Indian pharmaceutical industry ranks third in terms of manufacturing pharmacy production by volume and it is expected to grow by 10 per cent in the year 2010. Rapid growth in emerging market is a beacon of hope for the pharm industry . The Indian drug market is expected to reach \$ 20 Billion by 2015.It can be seen that most of the pharmaceutical industry trends are on positive node and it is expected to be there with the growing health consciousness among the people all over the world. This industry caters to the needs of Indian as well as world citizens for healthy living and promotes economic development of the nation.

2. Review of Previous Studies

Modigliani- Miller (1958) found that the market value of a firm is affected by the structure of its debts. I MM (1969) found that in the presence of corporate income tax but in the absence of bankruptcy risk, there is a linear relationship between the value of levered firm and of its debt. This implies that a firm should maximize its use of debt in order to capture the benefit of tax subsidy on interest payment. Gordon (1962) found that gearing increased with size and return on investment was negatively related to debt ratio. Baxter (1967) reported that leverage would depend on the variance of net operating earnings since firms with relatively stable income streams were less subject to the possibility of ruin. They would be desirable to rely relatively heavily on debt financing. On the other hand, firms with risky income streams are less able to assume fixed charge sources of finance. He found a negative association between net operating earnings and leverage. Scott and Martin (1976) support the view that size might shape a firm's debt-equity mix. Scott and Martin (1976) supported the view that size might shape a firm's debt-equity mix. Myers (1977) explained how highly levered firms were less likely to exploit valuable growth opportunities as compared to firms with low leverage levels.

De angelo and Mansuil (1980) demonstrated that with the presence of corporate tax shield substitutes for debt (e.g depreciation, depletion, amortization and investment tax credits) each firm can have an unique interior optimum leverage decision with or without leverage- related costs. Myers (1984) found a negative relationship between profitability and debt-equity ratio using what he calls the 'pecking order theory'. This is based on the assumption that firms have a preference to internal finance. If internal finance is not sufficient, then they first issue debt, followed by hybrid securities as a last resort. Further, he states that a firm's optimal debt ratio is viewed as determined by a trade-off between the costs and benefits of borrowing, holding the firm's assets and investment plans constant. The pecking order theory also implies that companies with high growth rates should have a higher debt ratio since the need for external funds would be higher. Stulz and Johnson(1985) demonstrated theoretically that secured debt reduce a firm's opportunities to engage in asset substitution. Firms with proportionately more tangible assets , which can serve more easily as collateral find it difficult to shift to riskier projects when specific assets secure their debt. Malabika Deo and Jackline(2009), found that the ratio of total debt in the firm's overall capital structure depends mainly on the major determinants such as collateral value, that is, the tangibility of firm, its profitability and the bankruptcy costs associated with the debt capital.

This paper is structured as follows we survey previous studies on the leverage and its determinants in section 2 and explain our study variables and method of empirical analysis in section 3.we attempt an interpretation of the estimation results in section 4, followed by conclusions in section 5

3. Methodology

Data have been collected from Prowess Database maintained by Centre for Monitoring Indian Economy (CMIE). Top 25 pharmaceutical companies in India are selected as sample of the study based on sales value for the period from 1998 to 2009. Independent variables like sales, interest, interest coverage, cash flow, size, asset structure, retained earnings, EBIT, intrinsic value of share and ROA are examined for their influence on leverage. Multiple regression analysis is used to identify the variables that influence debt financing pattern. In addition to this, correlation analysis has been used to ascertain variables associated with leverage. Path analysis is also used to know the direct and indirect effects of selected variables on leverage. The rationale of the selection of the independent variables is given in the following paragraphs.

Sales(SPSt)

Operating leverage may be defined as the relative change in sales on its earnings before interest and taxes. High degree of leverage implies that a large change in profits occurs due to a relatively small change in sales, which increases the EBIT resulting in increased earnings per share. Sales may be positively associated with leverage.

Interest(INTt)

Interest is charged to profit and loss account. This would result in reduced tax liability of the firm and it maximizes the shareholders wealth. Hence, firms are likely to engage more amount of debt.

Interest Coverage (INTCt)

This ratio can be used to judge the adequacy of EBIT to meet a firm's obligation to pay fixed interest charges and principal. It is determined by dividing the operating profits by the fixed interest charges on borrowed funds. A higher ratio implies that a firm can go for larger proportion of debt in its capital structure. Interest coverage ratio may be positively associated with leverage.

Cash Flow (CFt)

Cash flow is one of the indicators of a firm's ability to meet fixed interest obligation. High cash flow can be expected to lead to an increased reliance on debt.

Retained Earnings (RETPSt)

Retained earnings represent the amount of business savings meant for ploughing back. An increased amount of retained earnings indicates that the equity of firm is increased resulting in reduced leverage.

Asset Structure (ASt)

Asset structure refers to the proportion of fixed assets to total assets. Higher the proportion, higher will be the debt. Thus, these variables have a positive relationship. The

relationship between leverage and asset structure in the developed and developing countries is positive because tangible assets are easy to collateralize for debt. From the view point of transaction cost economics, tangible assets usually have less asset specificity thus increasing their use as collateralization for debt to reduce lenders risk (Williamson 1975,1988,). Agency theory also predicts some relationship (Jensen and Meckling 1976). The agency cost of equity lead to under investment problem's further the information asymmetry result in new equity being under priced issuing debt secured by tangible assets reduces these agency cost. This study confirms this positive relationship between firms and leverage.

Size(St)

Size is measured by calculating the proportion of sales to total asset. It is the most crucial variable that determines the use of debt by a firm. Small- sized firms tend to rely on debt because of high cost of outside equity. Size is positively associated with leverage. Kerter (1986), Titman and Wessels (1988) found evidence to support the negative hypothesis between size and leverage.

Earnings Before Interest and Tax(EBITt)

Higher volume of earnings before interest and tax enables the firm to enhance the level of equity base, so that the dependence on debt capital can be reduced. According to Gestenberg "The greater the stability of earnings , higher may be ratio of bond to stock in the capital structure. The capital structure should be balanced with a sufficient equity cushion to absorb the shocks of the business cycle and to offer flexibility".

Intrinsic Value of Shares(INTVt)

Intrinsic value of shares is defined as the proportion of net asset to the equity shares of a company. High intrinsic value of share increases the credit standing and the firm's value in the market place and it can find ample profitable investment opportunities and thus require large amount of capital, which can be raised through debt. It is positively associated with leverage.

Return on Asset (ROAt)

Profitability is yet another important variable taken into consideration for determining the level of debt. This ratio is measured in terms of the relationship between net profits and assets. The rate of return on investment is a better measure to test the profitability of a firm. Higher the profitability, lower will be the leverage. According to Mohanty (2002), leverage is negatively related with profitability and value of the firm.

4. Research findings

1. Variables associated with leverage

Table 1: Variables Associated with leverage

Variable	LEV	SPSt	INTt	CFt	ASt	INTCt	St	RETPSt	EBITt	INTVt	ROAt
LEV	1										
SPSt	0.320**	1									
INTt	0.463**	0.663**	1								
CFt	0.021	0.609**	0.164**	1							
ASt	0.883**	0.174**	0.296**	-0.037	1						
INTCt	0.015	-0.089	-0.304**	0.227*	0.124*	1					
St	-0.047	-0.110	-0.044	0.056	-0.056	-0.004	1				
RETPSt	-0.109	0.600**	0.128*	0.685*	-0.229**	0.096	0.192**	1			
EBITt	0.128*	0.658**	0.318**	0.930*	0.013	0.122*	0.037	0.626*	1		
INTVt	0.464**	0.275**	0.102	0.351*	0.314**	0.177**	-0.049	0.028	0.445**	1	
ROAt	0.079	-0.120*	-0.126*	0.179*	0.087	0.221**	-0.048	-0.217*	0.201**	0.349**	1

** = significant at one per cent * = significant at five per cent

Correlation analysis has been used to find out the variables that are associated with leverage .Table 1 presents the correlation matrix of the variables. An examination of the table shows that sales, interest, asset structure, EBIT, and Intrinsic value of share are positively associated with leverage both at one per cent as well as five per cent level of significance.

ii. Determinates of Financial Leverage

The determinates of leverage is found out by using multiple regression analysis. The basic regression model used can be specified as follows:

$$y = a + \sum_{i=1}^n \beta_i x_i + e$$

where, a= constant, β_i = Coefficient of independent variable, x_i = Independent variable and e =Residual Error Term. Stepwise regression has also been performed. The results of these two analyses are presented in Tables 2 and 3.

Table 2: Determinates of Financial Leverage

Variables	Coefficient	Std.Error	t-Value
Sales	-8.060	0.015	-1.321
Interest	0.006	0.001	6.138**
Cash flow	-0.001	0.001	-2.928**
Assets	1.290	0.001	30.356**
Interest coverage	-0.001	0.042	-1.834*
Size	0.001	0.001	-0.622
Retain Earnings	0.001	0.001	4.926**
EBIT	0.001	0.001	0.544
Intrinsic value of share	0.001	0.001	9.227**
ROA	0.004	0.005	0.3924

** significant at one per cent * significant at five per cent

R=0.938

R²=0.88

Adjusted R² = 0.876

F value =194.26 **

Interest

Interest since it reduces taxable profit, firm's prefer to engage more amount of debt. Interest and leverage are positively associated in the Indian pharmaceutical industry. The value is significant at one per cent level and regression co-efficient amounts to 0.006. This shows that for an increase of one rupee in interest, there will be an increase of Rs.0.006 in the amount of debt.

Cash Flow

Whenever cash flow increases, it increases the contractual ability of the firm to make the payment of interest. Hence, with increased level of funds the amount of borrowed capital used is likely to be more. The regression analysis indicates that cash flow is negatively associated with leverage. The value of co-efficient amounts to -0.001. This indicates that increase of one rupee in cash flow reduces debt by Rs.0.001.

Asset Structure

Increase in asset structure represents an increasing investment needs requiring long-term funds. Hence, whenever there is an increase in asset structure, it is likely to be accompanied by an increase in borrowed capital. The relationship between asset structure and leverage is found to be positive and the coefficients value amounts to 1.290. This shows that for an increase of one rupee in asset structure there will be an increase of Rs.1.290 in the amount of debt.

Interest Coverage

Interest coverage ratio indicates the number of times interest is covered by profits available to pay interest. The larger the coverage, the greater is the ability of the firm's to use increased amount of debt funds and more assured is the payment interest to them. The relationship between interest coverage and debt capital is found to be positive and the coefficients value amounts to -0.001. This shows that for an increase of one rupee in the interest coverage ratio, the debt get reduced by Rs.0.001 in debt.

Retained Earnings

Retained earnings are the most favoured source finance. There is a significant difference in the use of internally generated funds by the highly profitable firms as opposed to low profitable firms. Increased amount of retained earnings indicate that the equity of firms is increased resulting in reduced leverage. A Retained earnings is negatively associated with leverage and the value of coefficient is 0.001. This shows that for an increase of one rupee in retained earnings there is an increase of 0.001 units in debt.

Intrinsic Value of Share

Increase of intrinsic value in share results in increase of debt funds. Higher intrinsic value of share increases the credit standing and the firm's value in the market place and it can find ample profitable investment opportunities and thus requires large amount of capital. Intrinsic value of share is positively associated with leverage and the value of coefficient is 0.001. This shows that for an increase of one rupee in intrinsic value of share there will be an increase of 0.001 units in debt.

iii. Closely Associated Variables With Leverage

Multiple regression analysis reveals that five of the variables namely, asset structure, interest, intrinsic value of share, cash flow, interest coverage and retained earnings are associated with leverage. In order to find out the variables that are more closely associated with leverage, stepwise regression analysis has been applied. In the first step, asset structure has been introduced. The contribution of this variable is found to be 77.90 per cent. Interest has been introduced as a second variable along with asset structure. It contributes 82.4 per cent. The contribution has increased from 77.90 per cent to 82.40 per cent. Intrinsic value of share has been introduced as a third variable along with asset structure and interest. The contribution of this variable is found to be 86.20 per cent. The contribution has increased from 82.40 per cent to 86.20 per cent. Cash flow has been introduced as a fourth variable and along with asset structure, interest and Intrinsic value of share, it contributes 86.60 per cent. The contribution has increased from 86.20 per cent to 86.60 per cent. Retained earnings has been introduced as a fifth variable and along with asset structure, interest, Intrinsic value of share and cash flow, it contributes 87.80 per cent. The contribution has been increased from 86.60 per cent to 87.80 per cent.

Table 3: Variables Prominently Associated with Leverage

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	0.059	0.031	-0.026	-0.009	-0.037
	(6.004)	(3.321)	(-2.409)	(-0.776)	(-2.933)
ASt	1.452	1.344	1.239	1.213	1.257
	(31.025)	(30.652)	(30.402)	(29.486)	(31.148)
INTt		0.006	0.006	0.006	0.006
		(8.291)	(9.264)	(9.784)	(9.625)
INTVt			0.000	0.000	0.000
			(8.648)	(9.222)	(10.531)
CFt				-0.001	-0.001
				(-2.935)	(-5.712)
RETPSt					0.000

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					(5.035)
R ²	0.779	0.824	0.862	0.866	0.878

Multiple Regressions further reveals that 88 per cent of variation in leverage ratio is due to the nine selected variables. On the other hand, step wise regression reveals that 87.80 per cent of variation in leverage is explained by five variables. The difference of 0.20per cent contribution is due to the variables not included in the step wise regression.

iv. Direct and Indirect effects of variables on Leverage

Table 4: Direct and Indirect effect of variables on Leverage

VARIABLE	DIRECT EFFECT	SUBSTANTIAL INDIRECT EFFECTS		
		POSITIVE	POSITIVE	NEGATIVE
Asset structure	-1.36723	1.51754(INTCt)	0.00992(SPSt)	-.04295(EBITt)
Interest	0.16250	0.48314(INTCt)	0.03767(SPSt)	-0.13538(INTVt)
Intrinsic value of share	-0.42615	0.30669(CFt)	0.01563(SPSt)	-0.06780(EBITt)
Cash flow	0.45663	0.15873 (RETPST)	0.01955(INTt)	-0.28622(INTVt)
Retained earnings	0.69851	0.27525(ASt)	0.01200 (INTCt)	-0.09433(INTVt)

Of the selected variables, asset structure is found to contribute the maximum to variation in leverage, interest coverage has substantial positive indirect effect along with sales and it has substantial negative indirect effects along with EBIT.

Interest has the highest positive direct effect on leverage, it has substantial positive indirect effect along with interest coverage and sales, while it has substantial negative in direct effect along with Intrinsic value of share. Intrinsic value of share has the highest negative direct effect on leverage it has substantial positive indirect effect along with cash flow and sales, while it has substantial negative in direct effect along with EBIT. Cash flow has the highest positive direct effect on leverage, it has substantial positive indirect effect along with retained earnings and interest, while it has substantial negative in direct effect along with Intrinsic value of share. Retained earnings has the highest positive direct effect on leverage, it has substantial positive indirect effect along with asset structure and Interest coverage, while it has substantial negative in direct effect along with Intrinsic value of share.

5. Conclusion

The present study was undertaken for determining the variables that influence the financial leverage. It has revealed that the variables sales, interest, cash flow, asset structure, interest coverage, firm's size, retained earnings, earnings before interest and tax and intrinsic value of shares influence financial leverage. Jain and Surendra Yadav (2000) found that the Indian firms seemed to prefer debt capital for financing their projects. As a result, debt dominating capital structure is exposing to a very high degree of total risk as reflected in high degree of operating and financial leverage, consequently are subject to high cost of financial distress which includes a broad spectrum of problems ranging from relatively minor liquidity shortages to extreme cases of bankruptcy. The dependence of Indian firms on debt as a source of finance has over the years declined particularly since the mid-nineties. Results outlined in this study confirm the findings of Williamson (1975, 1988) and Jensen and Meckling (1976) that asset structure has positive relationship with leverage. Pharmaceutical industry in India is

found to engage relatively more amount debt capital so that the value of firm's could be increased. The study also indicates that the cash flow and interest coverage are negatively associated with leverage.

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