Impact of WTO Agreement On Capital Structure Of Pharmaceutical Industry In India

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BACKGROUND

When the International norms recognized the product patent, the Government of India enacted the Indian Patent Act in 1970(process patent) with the objectives of allowing the domestic companies to grow. The Indian Patent Act recognized the "process" to manufacture a product and not the end product. Indian companies took advantage of the Patent Act and succeeded in producing molecules, which were under patent protection elsewhere, at a cost that was lower than the original research cost. By taking the cost advantage, the Indian Pharmaceutical manufacturing companies fixed their prices lower than the prices fixed by the MNCs manufacturing the drugs. Today, Indian pharma has been ranked number three in terms of volume and thirteen in terms of value.

The New Industrial Policy (NIP) 1991 and the Government's commitment under the World Trade Organization (WTO) agreement led to policy changes, which posed challenges to Indian industries in general and the Pharmaceutical industry in particular. India is one of the 150 countries which are signatory to the WTO and hence is subject to the TRIPS which is an integral part of WTO. The TRIPS accord specifies that pharmaceutical companies should implement the requirements of the agreement in accordance with the level of development of the member nations. The developed countries were provided one year (that is till January 1, 1996) to bring their national legislation in tune with the trips accord. Developing Nations were given another four years (that is till January1, 2000) to incorporate all the TRIPS clauses in their national legislation. An additional five years were provided to those developing nations that did not recognize product patent for food products, pharmaceutical and agro-chemicals. The above 10 years period was given to developing countries in order to equip them to adopt the product patent. As a result, the pharmaceutical companies realized the need for basic research. The survival of the pharmaceutical companies after signing the TRIPS is dependent on Research and Development (R&D). Both Indian companies and MNCs are gearing themselves, towards contributing to investments in the R&D since 1995 after the Government of India signed the WTO. It will be further accelerated after 1st Jan 2005, once India starts implementing the product patent. Thus all pharmaceutical companies in India have been undergoing structural reforms in the form of merger, acquisition, amalgamation, changes in the capital structure, investments, marketing, etc,. Now India has completed nearly sixteen years after the signing of the TRIPS agreement. Hence an attempt has been made to assess whether there are any changes in the capital structure of the pharmaceutical industry between the two periods in view of the TRIPS agreement.

DATA AND METHODS

The Indian pharmaceutical industry is a highly fragmented one. It is divided into two namely, Organized and Unorganized sectors. Of the total 250 units in the organized sector, there are 5 in the public sector, 7 in the joint sector and 238 in the private sector and MNCs. Again in the organized sector, there are about 100 manufacturing units controlling more than the 90% of the market share. The unorganized sector consists of a total of 19,803 units of which 5000 units are in the small-scale sector and 14,803 in the tiny sector. Under the organized sector, the performance of public sector pharmaceutical companies are on a declining trend which is evidenced from the market share of 10 percent in 1970 to 2 percent in 1982, 1 percent in 1995 and almost nil today. The joint sector enterprises are also not in a comparable position with the private sector enterprise. Ultimately this leaves the researcher with only 238 companies. To select the sample from the 238, the criteria used were:

1. Pharmaceutical companies which are manufacturing more than 75 percent of production capacity of bulk drugs and formulations.
2. The companies where quantifiable changes have taken place in terms of growth rate, exports and market capitalization, investments etc.

In this process, out of the 238 companies, 44 were selected from the pharmaceutical companies. Out of the 44 companies, 30 have been operated by the Indian players and 14 are operated by the MNCs. Of the 30 Indian units, 21 were manufacturing both bulk drugs & formulations. Five units were producing only bulk drugs and four were concentrating only on formulations.

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All 14 MNCs were manufacturing both bulk drugs and formulations. On the basis of having existence during the process patent from 1989-90 (period-1) to transition cum product patent from 1995-96 to 2006-07 (period-2), six Indian companies and four MNCs were selected for the detailed analysis which produces 30 percent of the total market share. In this process, the companies shown in table 3 became the sample units for detailed analysis.

Table – 1: Selected Sample Units

Indian Companies	Multinational Corporations
CIPLA, Ltd. Dr. Reddy's Laboratories, Ltd. Ranbaxy Laboratories, Ltd. J.B. Chemical and Pharmaceutical, Ltd. Unichem Laboratories, Ltd. Alembic Chemicals, Ltd.	Glaxo (India) Ltd. Pfizer (India) Ltd. E. Merck (India) Ltd. Abbott Laboratories (India) Ltd.

TOOLS OF ANALYSIS

The data collected from various sources were subjected to statistical analysis consistent with the objectives of the study. Ratios are used to see the mean value difference between the two periods. Paired t-test is used to study the difference between the two periods for the same group. Multiple regressions are used to study the relationship between the variables. The impact of TRIPs agreement on the Indian industry has been studied through its capital structure. CHOW test has been used to study the shift in the capital structure.

The present study covers a period of 18 years starting from 1989-90 to 2006-07. Two sub-periods are identified as prior to TRIPs agreement (Period –1) from 1989-90 to 1994-95 and after TRIPS agreement (Period – 2) from 1995-96 to 2006-07 and combined period from 1989-90 to 2006-07. More specially, the first six years starting from 1989-90 was the period process patent was used. The next 12 years commencing from 1995-96 was the period where the industrial scenario was totally different because of the TRIPS agreement signed by India in December 1994. For company analysis, the study has been identified as 1) Indian Pharmaceutical, 2) Multinational Corporations and 3) Indian and MNCs combined together. Data for Indian firms are not available before 1989 since Indian firms had undergone rigorous structural changes after introduction of New Industrial Policy. Hence data of six years starting from 1989-90 to 1994-95 are used. However MNC's data are available for nine years for period-1.

Pharma industry operating in India shifted from process patent to product patent in January 2005 after allowing the transition period of ten years from January 1995. With the introduction of product patent regime as a consequence of India signing in the WTO agreements, development of a new product and launching it will become absolutely vital for survival in the domestic market. This was creating pressure on the pharmaceutical companies, particularly on Indian pharma companies concentrating on the research and development.

The investment in the R&D is mandatory to Indian pharmaceutical companies whereas it is optional for the MNCs because they are already in product patent. Under this situation, a study has been attempted to see whether pharmaceutical companies operating in India made any change in the capital structure in order to protect themselves and compete with MNCs in India and the international market.

EMPIRICAL ANALYSIS

I. Ratio

From Table-1, we can see that the FA/LTF has drastically reduced in all the Indian pharmaceutical companies except Alembic. The lower value may be due to two reasons: 1) Fixed assets might have decreased while long term funds remained the same. 2) Fixed assets remaining the same when the LTF increased. As far as the pharmaceutical company is concerned, the latter is a true factor because the pharmaceutical companies do not need much of fixed assets. The NW/TA has increased in all the companies except Alembic. This can be seen from the table-1, the mean of all companies has increased from 0.3114 in period-1 to 0.5196 in period-2. To reciprocate this DEBT/ TA has decreased from 0.6881 in period-1 to 0.4541 in period-2. From the above, it is very clear that the shareholders funds have increased from period-1 to period-2. In period-2, the debt fund is replaced by shareholders funds. As a result, the value of debt to NW has drastically decreased in all the Indian pharmaceutical companies, except Alembic. By taking all the four ratios, we can arrive at the following findings. Except Alembic, all the Indian pharmaceutical companies have increased the long term funds. The increased long term funds are made in the form of raising the shareholders funds and not in the form of debt funds.

Table-2: Indian Companies

Name of the Company	Fixed assets/ Long term Funds			Shareholders Funds/ Total Assets			Debt/ Shareholders Fund			Debt/ Total Assets		
	Period 1	Period 2	Combined	Period 1	Period 2	Combined	Period 1	Period 2	Combined	Period 1	Period 2	Combined
CIPLA	0.8541 (0.14)	0.4734 (0.22)	0.6003 (0.26)	0.3626 (0.05)	0.5467 (0.15)	0.4854 (0.15)	0.5344 (0.22)	0.1087 (0.13)	0.2506 (0.26)	0.6360 (0.05)	0.4532 (0.15)	0.5142 (0.15)
DR.REDDY	1.0524 (0.36)	0.4183 (0.18)	0.6296 (0.39)	0.2028 (0.06)	0.6502 (0.17)	0.5010 (0.26)	1.4574 (0.89)	0.0942 (0.12)	0.5486 (0.82)	0.7972 (0.06)	0.3498 (0.17)	0.4990 (0.26)
RANBAXY	0.9222 (0.27)	0.5412 (0.34)	0.6682 (0.36)	0.2437 (0.05)	0.5411 (0.15)	0.4420 (0.19)	1.1296 (0.47)	0.3135 (0.37)	0.5856 (0.56)	0.7551 (0.05)	0.4589 (0.15)	0.5576 (0.19)
J B CHEMICAL	0.7764 (0.26)	0.4626 (0.06)	0.5672 (0.21)	0.3666 (0.10)	0.6436 (0.11)	0.5513 (0.17)	0.5527 (0.59)	0.0940 (0.07)	0.2469 (0.39)	0.6334 (0.10)	0.3564 (0.11)	0.4487 (0.17)
UNICHEM	0.9854 (0.16)	0.7224 (0.15)	0.8101 (0.20)	0.3865 (0.08)	0.4515 (0.09)	0.4299 (0.09)	0.2944 (0.26)	0.2531 (0.15)	0.2669 (0.19)	0.6135 (0.08)	0.5485 (0.09)	0.5701 (0.09)
ALEMBIC	0.8663 (0.11)	1.1173 (0.29)	1.0336 (0.27)	0.3062 (0.04)	0.2844 (0.07)	0.2917 (0.06)	0.2833 (0.03)	0.5025 (0.18)	0.4294 (0.18)	0.6937 (0.04)	0.7067 (0.08)	0.7024 (0.07)
ALL COMPANIES	0.9095 (0.23)	0.6225 (0.33)	0.7182 (0.33)	0.3114 (0.09)	0.5196 (0.18)	0.4502 (0.18)	0.7086 (0.64)	0.2277 (0.24)	0.3880 (0.47)	0.6881 (0.09)	0.4789 (0.17)	0.5487 (0.18)
Correlation		-0.099			-0.222			-0.383			-0.227	
Paired t-test	Sig.	0.062			0.030			0.900			0.028	
	t-value	2.392			-3.006			2.097			3.065	

Figures in the Brackets indicates Standard Deviation

The increased shareholders funds were used for the purpose of repayment of debt funds and investment in the R&D in period-2. This is because all the Indian pharmaceutical companies were shifting from process patent to product patent with effect from 1/1/2005 after allowing a transition period from 1/4/1995 to 31/12/2004. The product patent is highly risk oriented. Hence all the Indian pharmaceutical companies shifted from financial risk to product risk.

A paired sample t-test (n=6) was conducted to evaluate the FA/LTF, NW/TA, D/NW and D/TA between the two periods for the same group. The mean scores of NW/TA and D/TA between the two periods differed significantly (t=2.35, df=5, p=0.03), (t=3.065, df=5, p=0.028) respectively. The mean scores of FA/LTF between the two periods differed significantly at 6% level. The other ratio namely D/NW did not show any significant change. These clearly indicate that there is a shift from debt to shareholders funds in Indian pharmaceutical companies.

Table – 3: Multi-National Corporations

Name of the Company	Fixed assets/ Long term Funds			Shareholders fund/ Total Assets			Total Debt/ Shareholders Fund			Total debt/ Total Asset		
	Period 1	Period 2	Combined	Period 1	Period 2	Combined	Period1	Period2	combined	Period 1	Period2	Combined
GLAXO	0.8810 (0.10)	0.4204 (0.32)	0.6178 (0.34)	0.4430 (0.06)	0.5358 (0.14)	0.4960 (0.12)	0.2447 (0.10)	0.0636 (0.10)	0.1412 (0.14)	0.5570 (0.06)	0.4642 (0.14)	0.5040 (0.12)
Pfizer	0.4281 (0.07)	0.4375 (0.15)	0.4335 (0.12)	0.5953 (0.10)	0.4993 (0.10)	0.5404 (0.11)	0.0179 (0.04)	0.0689 (0.09)	0.0470 (0.08)	0.4047 (0.10)	0.5007 (0.10)	0.4596 (0.11)
E-Merck	0.9581 (0.25)	0.9505 (0.61)	0.9538 (0.48)	0.2807 (0.05)	0.4773 (0.20)	0.3930 (0.18)	0.5978 (0.40)	0.4938 (0.83)	0.5383 (0.67)	0.7193 (0.05)	0.5227 (0.20)	0.6070 (0.18)
Abbott Ltd.Ltd	0.6643 (0.25)	0.4681 (0.20)	0.5522 (0.24)	0.3978 (0.11)	0.4647 (0.08)	0.4360 (0.10)	0.1304 (0.07)	0.0744 (0.05)	0.0984 (0.06)	0.6022 (0.11)	0.5353 (0.08)	0.5640 (0.10)
All Companies	0.7329 (0.28)	0.5691 (0.42)	0.6393 (0.37)	0.4292 (0.14)	0.4943 (0.14)	0.4664 (0.14)	0.2477 (0.30)	0.1752 (0.45)	0.2062 (0.39)	0.5708 (0.14)	0.5057 (0.14)	0.5336 (0.14)
Correlation		0.69			0.399			0.926			0.399	
Paired t-test	Sig.	0.231			0.231			0.232			0.361	
	t-value	1.497			-1.074			1.493			1.074	

Figures in the Brackets indicates Standard Deviation

Table 3 shows the position of MNCs with respect to the 4 ratios as seen in the Indian cos. The FA/TA has increased by 29% from period-1 to period-2. The correlation of Debt /TA and NW/TA are exactly same between the two periods. The Debt/ NW has decreased from 0.24 in period-1 to 0.17 in period-2. In all the four cases, the correlation coefficient is positive. It is just opposite to the trend of Indian pharmaceutical companies. This is because, the MNCs were already in product patent and hence the WTO agreement concerned with TRIPs did not make any major changes in the capital structure. A paired

sample t-test (n=4) was conducted for MNCs to evaluate FA/LTF, NW/TA, D/NW, and D/TA for the two periods for the same group. The mean scores between the two periods did not differ in any of the cases. This clearly indicates that there is no change in the capital structure from period-1 to period-2 when MNCs are concerned.

Table – 4: Indian companies and MNCs together

Companies	Fixed Assets/ Long Term Funds			Shareholders Funds/ Total Assets			Debt / Net worth			Debt/ Total Assets		
	Period 1	Period 2	Combined	Period 1	Period 2	Combined	Period 1	Period 2	Combined	Period 1	Period 2	Combined
Indian &	0.8459	0.6012	0.6827	0.3493	0.5094	0.4561	0.5444	0.2067	0.3193	0.6504	0.4897	0.5433
MNC's	(0.27)	(0.37)	(0.35)	(0.12)	(0.16)	(0.17)	(0.57)	(0.34)	(0.46)	(0.12)	(0.16)	(0.17)

(Figures in the Brackets indicates Standard Deviation)

II. REGRESSION ANALYSIS

Apart from analyzing the impact of capital structure between the two periods with the help of ratio analysis and paired t-test, the study also attempts to analyse the capital structure effect with the help of multiple regression analysis taking some of the variables related to capital structure like investment, financial leverage, dividend, growth, profit and size of the firm. The study is carried out by dividing the periods into period-1, periods-2 and combined periods without dummy and also with dummy. The following formula is used for analysis.

$$FL = \alpha + \beta 1 DEFTAX + \beta 2 DIV + \beta 3 INV + \beta 4 PROFIT + \beta 5 SIZE + \beta 6 VAR + \beta 7 GLOBDUMMY + e$$

where, FL = Financial Leverage, measured earning before interest and tax / earning before tax (less interest);

DEFTAX = tax provision / total assets;

DIV = Dividend payout ratio, measured by dividends / distributable earnings;

INV = Investment, change in total assets, i.e., (total assets in current year – total assets in previous year) / total assets in previous year;

PROFIT = Profitability ratio, measured by profit before interest and tax / total assets;

SIZE = Firm size, natural logarithm of total assets;

VAR = Variability, annual change in profit before interest, tax and depreciation;

GLOBDUMMY = Dummy variable (value "0" for period 1 and "1" for period 2); and α is Intercept term, $\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$, $\beta 5$, $\beta 6$, $\beta 7$ are regression coefficients and 'e' is error terms.

The regression results of the above functional forms as well as the results of the Chow test for structural shifts between period-1 and period-2 are presented in Tables 5 and 6.

The regression results of financial leverage function for the selected Indian pharmaceutical companies in India are presented in the Table 5. It shows that all the four regressions for the different time periods are significantly fitted irrespective of globalization. (The results of the regression model for the pooled period with dummy shows an insignificant coefficient for dummy meaning lack of significant intercept shift during the period -2. That is, there is no significant change in financial performance in the period-2 in the financial leverage function in the absence of exogenous variables).

Table – 5: Estimated coefficients from the leverage equation for Indian pharmaceutical companies for different periods

Independent Variables	Pooled Period		Period-1	Period-2
	Without Dummy	With Dummy		
Intercept	0.2233** (-9.96)	-0.2279** (-9.36)	-0.0450 (-1.07)	-0.2756** (-0.28)
Deferred Tax	1.3025** (3.73)	1.2810** (3.63)	3.0738** (5.91)	1.0046* (2.36)
Dividend Payout	-0.0006 (-0.06)	-0.0006 (-0.06)	0.0028 (0.45)	0.0180 (0.28)
Investments	0.0954* (2.36)	0.0952* (2.34)	0.0283 (0.55)	0.0972 (1.75)
Profitability	0.9000** (6.97)	0.9226** (6.71)	0.0043 (0.02)	10.0883** (6.60)

Independent Variables	Pooled Period		Period-I	Period-2
	Without Dummy	With Dummy		
Firm Size	0.0171** (5.00)	0.0185** (4.21)	-0.0056 (-0.73)	0.0211** (4.01)
Variability	-0.0778** (-3.03)	-0.0809** (-3.05)	0.0099 (0.24)	-0.0926** (-2.95)
Globalization Dummy		-0.0072 (-0.49)		
R-square	0.7675	0.7681	0.8635	0.7313
Adjusted R-square	0.7528	0.7508	0.8279	0.7065
F-value	52.26**	44.47**	24.26**	29.49**
Degrees of Freedom	6,95	7,94	6,23	6,65
N	102	102	30	72

*Significant at 5 per cent level; **Significant at 1 per cent level.

Figures in parenthesis indicate't' values.

Deferred tax, which is supposed to have a negative relationship with financial leverage with the concept that more earnings would lead to less external borrowings, is found to have a positive significant relationship with financial leverage for the period 1, period 2 and combined periods however, its coefficient has gone down from 3.0738 in the period 1 to 1.0046 in the period 2. This leads to the inference that the firms might have reduced the debt burdens and started depending on their own internal sources of funds by way of retained profits or equity funds during the period 2. The significant positive relationship of profitability and firm size indicate the increase in earnings of Indian companies, which in turn reveals an increase in retained profits.

Table-5 further shows that the increase in variability in earnings before interest and tax has significantly decreased debt capital structure of Indian companies. That is, one unit increase in earning variability has significantly led to 0.09 unit decrease in borrowings. Further the explaining capacity of financial leverage by all exogenous variables together has declined to 73.13 percent (R-square = 0.7313; F-value = 29.49) in the period 2 from 86.35 percent (R-square = 0.8635; F-value = 24.26) in the period 1.

Chow Test

In the foregoing analysis, an attempt was made to find out whether there were any differences in the performance of the pharmaceutical industry between the two periods, employing the chow test. In this process, the mean values in the respective sub-periods were taken into consideration. Now an attempt is made to see whether there are any changes in performance in the two sub-periods by considering all the annual values in both the sub-periods.

Application of Chow test

The impact on the Indian industries can be seen especially through the pharmaceutical industry in this study. For this purpose, the total period of study namely 1989-2007 has been divided into two. Period 1 is concerned with process patent from 1989-90 to 1994-95 while period 2 from 1995-96 to 2006-07 is concerned with product patent. For the purpose of analyzing the impact of structural changes as part of TRIPS agreement With WTO, the most useful tool is the chow test.

Procedure

For considering a time series data, a regression equation is arrived at using the formula $y = a + bt$

where't' indicates time

The time interval is divided into two parts namely period 1and period 2. The number of observations in the two sub periods is taken as n_1 and n_2, respectively. For the two sub- periods, three individual regression equations have been fitted as follows.

$y_1 = a_1 + b_1 t$

$y_2 = a_2 + b_2 t$

$y_3 = a_3 + b_3 t$

The following notations are used:

SSE_w = Sum of square error for the whole period.

SSE_1 = Sum of square error for the period-1.

SSE_{II} = Sum of square error for the period-2.

The chow test statistic is provided as follows

Chow statistic = $(SSE_w - SSE_I - SSE_{II}/2) / ((SSE_I + SSE_{II})/(n_1 + n_2 - 4))$

Using this formula, the regression equation for finding out the impact of leverage has been calculated between the two periods.

Table – 6: Chow test for structural shifts between period 1 and period 2 for Indian pharmaceutical companies

Sum Square Residuals			Number of Parameters Estimated	Number of observations	F –value
Combined Period	Period-1	Period-2			
0.2081	0.0209	0.1629	6	102	2.25* (6, 90)

*Significant at 1 per cent level. Figures in parenthesis indicate degrees of freedom.

F-Table value for degrees of freedom 6, 90 at 5% level is 2.201 and at 1% level is 3.00.

The results of chow test presented in Table-6 reveal that there has been significant structural shift from period-1 to period-2. The calculated F-value 2.25 is greater than the table value of 2.20 for 6.90 degrees of freedom at 5 percent level. The results of the foregoing analysis have revealed that there is significant structural shift in financial leverage of the selected Indian pharmaceutical companies in the period - 2.

Table – 7: Estimated coefficients from leverage equation for MNCs for different periods

Independent Variables	Combined Period		Period-1	Period-2
	Without Dummy	With Dummy		
Intercept	-0.1075m** (-2.93)	-0.1064** (-2.60)	-0.1039** (-3.46)	-0.1273 (-1.41)
Deferred Tax	1.4048** (4.18)	1.4073** (4.13)	2.2205** (5.81)	0.9794 (1.94)
Dividend Payout	0.0062 (0.38)	0.0066 (0.38)	0.0165 (1.71)	-0.0788 (-1.28)
Investments	0.0160 (0.26)	0.0168 (0.26)	0.0590 (1.26)	0.0094 (0.08)
Profitability	0.3136* (2.35)	0.3103* (2.16)	0.1286 (0.50)	0.4501* (2.35)
Firm Size	0.0081 (0.98)	0.0077 (0.76)	0.0021 (0.29)	0.0169 (0.93)
Variability	-0.0233 (-1.09)	-0.0232 (-1.08)	0.0038 (0.24)	-0.0524 (-1.47)
Globalization Dummy		0.0016 (0.06)		
R-square	0.5848	0.5848	0.8604	0.4435
Adjusted R-square	0.5507	0.5444	0.8269	0.3621
F-value	17.14**	14.49**	25.67**	5.45**
Degrees of Freedom	6,73	7,72	6,25	6,41
N	80	80	32	48

*Significant at 5 per cent level; **Significant at 1 per cent level.

Figures in parenthesis show't' values.

The observation of Table-6 portraying the results of leverage function for the selected MNCs in India indicates that all the functional models are significantly fitted. The R-square values of regression models for pooled period of study, (both with and without dummy period are the same).

The R square value 0.58 tells us the variability in capital structure can be explained by regression on predictors. This value is exactly the same for both the period using with or without dummy variables.

With regard to the regression results for the period-1, the coefficient of deferred tax, has shown positive significant relationship with financial leverage. However the coefficient of deferred tax in the period- 2 has become insignificant. Further, the variable profitability, which had insignificant interaction with financial leverage in the period-1, has improved to the level of significant relationship in the period-2. Its beta coefficient has increased from 0.1286 with t-value of 0.50 in the period 1 to 0.4501 with t-value of 2.35 (significant at 5% level) in the period -2. The above results show the improvement in earnings by way of increasing their debt capital during the period 2. Also, one interesting thing is that the R-square value (0.8604) of regression for the period-1 is much more than the R-square value (0.4435) for the period- 2.

Table- 8: Chow test for structural shifts between period 1 and period 2 for MNCs in India

Sum Square Residuals			Number of Parameters Estimated	Number of observations	F –value
Whole Period	Period-1	Period-2			
0.3119	0.0209	0.2561	6	80	1.68 (6, 68)

Figures in parenthesis indicate degrees of freedom.

F-Table value for degrees of freedom 6, 68 at 5% level is 2.23 and at 1% level is 3.07

The downward change in explaining capacity in financial leverage by the exogenous variables in period 2 may be attributed to change in capital structure. That is, MNCs might have started venturing equity capital rather than going for debt funds for expansion and modernisation. The results of chow test presented in Table-6 show an insignificant F-value. The F-value is (just 1.68), much lower than the table value of 2.23 at 5 percent level of significance for 6,68 degrees of freedom. So, from the results of the above analysis, it can be concluded that there is no significant structural shift in the financial leverage of the selected MNCs in India between the two periods.

Table – 9: Estimated coefficients from the leverage equation for Indian companies and MNCs Together for different periods

Independent Variables	Combined Period		Period-1	Period-2
	Without Dummy	With Dummy		
Intercept	-0.1763** (-8.05)	-0.1747** (-7.35)	-0.0836** (-3.11)	-0.1821** (-4.73)
Deferred Tax	0.8885** (3.80)	0.8929** (3.78)	2.2508** (8.03)	0.6871* (2.39)
Dividend Payout	0.0028 (0.31)	0.0030 (0.33)	0.0047 (0.93)	-0.1068** (-2.73)
Investments	0.0945* (2.39)	0.0953* (2.39)	0.0290 (0.79)	0.0728 (1.31)
Profitability	0.5969** (6.08)	0.5909** (5.66)	0.2355 (1.75)	0.7029** (5.70)
Firm Size	0.0163** (4.29)	0.0158** (3.27)	-0.0021 (-0.38)	0.0212** (3.50)
Variability	-0.0377* (-2.22)	-0.0373* (-2.17)	0.0018 (0.12)	-0.0633** (-2.71)
Globalization Dummy		0.0025 (0.17)		
R-square	0.6248	0.6249	0.8349	0.5595
Adjusted R-square	0.61	0.61	0.81	0.54
F-value	46.36**	39.51**	39.62**	23.92**
Degrees of Freedom	6,167	7, 166	6,47	6,113
N	174	174	54	120

*Significant at 5 per cent level; **Significant at 1 per cent level.

Figures in parenthesis shows't' values.

Table-9 which presents the regression results of leverage function with respect to dividend payout, investments, deferred tax, liquidity, profitability, firm size and variability among selected Indian and foreign Pharmaceutical companies combined together in India. The table clearly shows that the leverage function models significantly fit the pooled period, period -1and period-2.

In the period -1, the deferred tax had shown positive significant influence on financial leverage, It is found to be a more important determining factor of financial leverage individually when all the other predictors are constant. It seemed that deferred tax has significant interaction with financial leverage through profitability of the firms because there has been an increase in tax payables on profits which the firms have made by way of investing more on the assets which in turn might have led to the more long-term borrowings. That is, the increase in earning powers of pharmaceutical companies through debt funds might have led them to pay more tax in the period-1.

In the period 2- (1996-2007), the financial leverage has been found to be influenced significantly by deferred tax, profitability and firm size with a positive sign, and by dividend payout and variability with a negative sign. In the period-1, the variation in financial leverage has been significantly explained by all the exogenous variables to the extent of 83.49 percent (R^2 = 0.8349; F-value = 39.62 – significant at 1% level) and in the period -2, it has been just 55.95 percent. That is, explanatory power of independent variables on financial leverage has gone down in the period-2. But, as far as the individual independent variables are concerned, only the strength of relationship of 'deferred tax' has gone down, and the exogenous variables other than 'deferred tax' have shown improvement, particularly, there has been remarkable improvement to a significant level in the case of dividend payout, profitability, firm size and variability.

Table – 10: Chow test for structural shifts between period 1 and period 2 of Indian companies and MNCs together for different periods

Sum Square Residuals			Number of Parameters Estimated	Number of observations	F –value
Whole Period	Period-1	Period-2			
0.6175	0.0453	0.4866	6	174	4.67**(6, 162)

**Significant at 1 per cent level. Figures in parenthesis indicate degrees of freedom.

F-Table value for degrees of freedom 6, 162 at 5% level is 2.154 and at 1% level is 2.915.

The results for the period- 2 indicate that the increase in debt funds have made the firms to abstain from declaring the dividend and also have reduced the variability in the earnings before interest and tax. It is much clear from the relationship of assets and profitability that investments in assets have been made from debt funds leading to higher earnings. The F-value of 4.67 (significant at 1 percent level) calculated using chow test (Table -10) clearly brings out the existence of significant structural shift between the two periods.

CONCLUSION:

After the WTO TRIPS agreement, all the Indian companies are treated at par with MNCs. Necessarily they had to develop their own R&D which needed more funds in order to shift from process to product patent. These long term sources were raised particularly through issue of shares (table-1). These funds were mainly used to invest in the R&D and repayment of dept funds. The repayment of debt funds reduced the financial risk in order to face the product risk. This was mainly because Indian pharmaceutical companies which have been manufacturing products with no risk started manufacturing high risk products during the period-2. Above all, the chow test for Indian pharmaceutical companies also shows that there has been significant shift in the capital structure (i.e. from debt funds to shareholders funds). But if we look at the MNCs, there is no change in the ratios or a significant change in the t value and the chow test for MNCs to test the structural shift has shown no significant change in the capital structure between the two periods. This is because the MNCs were in the product patent even before the WTO TRIPs agreement December, 1994 and hence there was no need of change in the capital structure.

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