

Use of Dupont Five Point Analysis to study CNX Pharma Index

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Abstract

Pharmaceuticals sector is one of the key sectors where Indian companies have created a global brand for themselves besides software. Indian companies have taken advantage of the opportunities in the regulated generics market in the western countries and made deep inroads especially in providing low cost equivalents of expensive drugs. Pharma outsourcing into India and low cost Healthcare services are expected to be the key areas of growth in the near future. This paper looks at the performance of the CNF Pharma Index, which represents about 4.54% of the free float market capitalization of the stocks listed on NSE and 76.97% of that of Pharmaceutical sector in India. Considering period of 2005-2014, pre and post-recession performance of the Index have been analysed using Ratio and Du-Pont five point analysis. To get a fair idea about the financial aspects, ROE and it's the factors affecting it have been studied. Regression tools were used to develop a model for calculating the ROE of the index. Through the study we concluded that the growth of the industry has been steady over the past decade. The only hiccup it encountered was during the recession, it was a very short period but pharmaceuticals got over it in a year.

Keywords: Pharmaceutical, Du Pont Five Point Analysis, Regression tools, Pre and Post recession

1. Introduction

Pharmaceuticals sector is one of the key sectors where Indian companies have created a global brand for themselves besides software. Indian companies have taken advantage of the opportunities in the regulated generics market in the western countries and made deep inroads especially in providing low cost equivalents of expensive drugs. Pharma outsourcing into India and low cost Healthcare services are expected to be the key areas of growth in the near future. In addition, the inherent potential of biotechnology has also attracted many new companies and this is also a key growth area for Indian companies. IISL (Indian Index Services & Products Limited) developed CNX Pharma Index to capture the performance of the companies in this sector.

An Index is a statistical measure of change in an economy or a securities market. In the case of financial markets, an index is an imaginary portfolio of securities representing a particular market or a portion of it.

CNX Pharma Index, launched in July, 2005 captures the performance of the pharmaceutical sector in India. CNX Pharma Index is computed using free float market capitalization method, wherein the level of the index reflects the total free float market value of all the stocks in the index relative to particular base market capitalization value. CNX Pharma Index is used for a variety of purposes such as benchmarking fund portfolios, launching of index funds, ETF's and structured products.

The CNX Pharma consists of 10 companies listed on the NSE. It represents about 4.54% of the free float market capitalization of the stocks listed on NSE and 76.97% of the free float market capitalization of the stocks forming part of the Pharmaceutical sector in India. All companies do not have the same weightage in the index, every company is assigned a weightage and then the portfolio is formed. The average returns of the CNX Pharma index is around 40%.

The table below shows the weightage of the companies forming the Index:

Table 1: Various Constituents of the CNX Pharma Index

Company Name	Weight (%)
Sun Pharmaceuticals Industries Ltd.	27.27
Dr. Reddy Laboratories Ltd.	18.06
Lupin Ltd.	14.98
Cipla Ltd.	13.93
Aurobindo Pharma Ltd.	6.66
Divi's Laboratories Ltd.	4.80
glenmark Pharmaceuticals Ltd.	4.73
Cadila Healthcare Ltd.	3.62
Piramal Enterprise Ltd.	2.98
glaxosmithkline Pharmaceuticals Ltd.	2.97



Figure 1: Index Performance through the years (www.nseindia.com)

From the above graph we can see that the performance of the Index took a dip around the FY 2009, but soon enough the industry recovered and from then there is a steady growth in the industry as indicated by the graph. We would later in the paper try to analyze this behavior.

2. Literature Review

Financial evaluation of a firm can be done by various methods. Ratios is one of the method for the same. Mainly two financial statements called balance sheet and Profit and loss statement are used to calculate ratios (Shrabanti Pal and Mahua Bhattacharya, 2013, pp.47-48). One of the most advanced and unexplored approach is Du Pont Five Point analysis. DuPont Five Point breaks return on equity into five further ratios to better explore and understand the different financial aspects of a firm.

Analyzing ROE only, cannot give a clear picture. For instance, a very highly positive value of ROE might sound too robust, but it might happen that the company is running into heavy losses and both EAT (earning after taxes) and Total Equity funds are highly negative, ultimately reflecting a highly positive ROE. Thus, dissociation of ROE into these ratios help to assess the strong parts of the firm and also where it is lagging, citing a more clear picture.

Regression analysis is one of the many statistical tool used to develop the relationship between metrically measured independent and dependent variables (Cohen & Cohen, 1983). Regression tools are used to relate a dependent variable with one or multiple independent variables. It can

be in a linear or a non-linear fashion. Multiple regression's popularity is fostered by its applicability to varied types of data and problems, ease of interpretation, robustness to violations of the underlying assumptions, and widespread availability (Mason & Perreault, 1991). The most widely used approach to conducting a multiple regression analysis is ordinary least squares (Wang & Jain, 2003). Ordinary least squares estimates the parameters in a linear model by minimizing the vertical distances between responses that are observed and the responses that are predicted by the linear estimate (Dismuke & Lindrooth, 2006). As can be understood, the smaller is the value of the squares of errors, the better the regression model will be. The coefficient of determination, R^2 , measures how well the variation in the dependent variable (DV) is explained by the variations in the independent variables (IVs). If the value of R^2 is 1 then the IVs perfectly predicts the value of the DV. Hence a higher value of R^2 is desired. Similarly the R^2 value of 0 suggests that the IVs chosen does not represent the DV in any sense.

One way to increase the coefficient of determination is to include additional independent variables. While adding additional independent variables will increase the R^2 , when evaluating regression models researchers must also ensure that the added independent variables are meaningful (Hair, Black, Babin, & Anderson, 2010). Researchers should be careful when adding additional independent variables, as too many independent variables may cause an issue with the modelling of random noise and reduction in the ability to make valid predictions (Hopkins & Ferguson, 2014). Adjusted R^2 value from the regression analysis can help reduce this issue as it increases only if the new IVs introduced improves the R^2 value. A popular term, while using multiple regression, is the F-score. It is calculated by dividing the explained variance by unexplained variance. It can be understood that a high value of F-score is desired. Also, many researchers, such as (Pal & Bhattacharya), considers the p-value while evaluating their regression model.

One of the key challenges for regression analysis is to identify the correct IVs. Including too many IVs can reduce the strength and uniqueness of each IV due to the effect of multicollinearity. Multicollinearity is the presence of correlation amongst the independent variables. Overall prediction is not affected, but interpretation of and conclusions based on the size of the regression coefficients, their standard errors, or the associated t -tests may be misleading because of the potentially confounding effects of collinearity (Mason & Perreault, 1991).

To tackle this issue researchers can calculate variance inflation factor (VIF) to test independent variables. While VIF values below 10 suggest that multicollinearity is not likely to be an issue, values over 5 can result in problems interpreting regression results (Hair et al., 2011). The use of VIF analysis as the only mean to rule out a potential danger of multicollinearity is questionable, primarily because the VIF criteria are quite liberal and independent variables that result in multicollinearity problems may still be included (Hair et al., 2011). In addition to VIF assessment, the researcher should inspect the bi-variate correlations between all IVs.

The rule of thumb is that correlations between IVs equal to or greater than 0.5 indicate a potential problem with multicollinearity (Hopkins & Ferguson, 2014). To overcome problems with multicollinearity, the researcher can run exploratory factor analysis to create factor scores or transform the several related variables into an average summated score (Hair et al., 2010). Another method is to run Principal component analysis for the raw data given and convert all the variables to relevant, independent factors which can later be used for regression analysis. This method of data reduction is highly popular and used by many scholars but since the regressors are not in their original form, the final outcome of regression analysis might not be useful for research and analytical purpose.

The traditional regression model enters the IVs simultaneously. More sophisticated models allows the IVs to be entered in a step wise or hierarchical fashion. In this way the effect of each variable can be studied of the regression equation and promotes better quality control. By using hierarchical regression analysis and entering these variables into the regression equation first and one at a time, the researcher can determine the predictive power of each variable (Hopkins & Ferguson, 2014). Stepwise regression, on the other hand, decides the order based on which IV contributes the most toward predicting the variance in the DV, with the highest contributing IVs being entered first (Wang & Jain, 2003). Another way of stepwise regression is to include all the IVs initially and remove them one by one. If traditional regression approach is followed then the coefficients in the equation can be studied to understand the relation between the IV and the DV. The effect on dependent variable can also be understood by changing the independent variable by 1 unit and analyzing its impact on the DV.

Nonlinear regression analysis is used when the relationship between the independent and dependent variables is non-linear (Bates & Watts, 1988). Nonlinear regression should be opted for if the linear assumption is giving an ill fit and the noise is high in the model.

3. Ratio Analysis

The companies present in the CNX Pharma Index capture around 77 % of the market. Du Pont Five Point plays a vital part in analyzing financial condition of a firm when it is intended to know the actual breakdown of financial aspects and the strong and weak areas of a company. Here we would analyze the pre and post-recession ratios of the first five companies forming the CNX Pharma Index. These companies form represent more than 80% of the whole Index.

3.1 Sun Pharmaceuticals

Sun Pharmaceuticals has a percentage share of 27.27 in the Index. Table 1 and table 2 shows the pre-recession data and ratios respectively, while table 3 and 4 show the post-recession data and ratios respectively.

Pre-recession:

Table 2: Pre-recession data for Sun Pharmaceuticals

	2005	2006	2007	2008
Net Sales	1,191.07	1,636.82	2,132.05	3,360.32
E_{BT}	420.9	596.9	833.47	1,599.39
E_{BIT}	433.84	612.46	846.15	1,608.20
Interest Expense	12.94	15.56	12.68	8.81
Income Tax	4.93	7.38	7.96	127.26
EAT	400.42	572.97	840.15	1,550.91
Total Assets	2,969.88	3,498.01	3,930.98	5,323.66
Shareholders' Equity	1,130.74	1,590.16	2,772.79	4,991.46

Table 3: Pre-recession ratios for Sun Pharmaceuticals

Five Step Du Pont Model:	2005	2006	2007	2008
Tax Burden (EAT ÷ E_{BT})	0.95	0.96	1.01	0.97
Interest Burden (E_{BT} ÷ E_{BIT})	0.97	0.97	0.99	0.99
Operating Income Margin (E_{BIT} ÷ Net Sales)	0.36	0.37	0.40	0.48
Asset Turnover (Net Sales ÷ Total Assets)	0.40	0.47	0.54	0.63
Equity Multiplier (Total Assets ÷ Shareholders Equity)	2.63	2.20	1.42	1.07
Return on Equity (%)	35.4	36.0	30.3	31.1

Tax burden and interest burden close to unity indicates no tax and interest commitments of the company.

A decreasing trend in equity multiplier with the increase in both total assets and Shareholders' equity reflects that increase in shareholders' equity has been much more as compared to increase in total assets. Higher

equity multiplier shows that a company is highly leveraged (i.e. having more loans). This decreasing equity multiplier in turn reflects less portion of assets being financed by loans i.e. having continuous decreasing interest burden, as shown by interest expenses. The ROE decreases due to the decreasing Equity Multiplier, this in turn shows that the company has unused debt capacity.

Post-recession:

Table 4: Post recession data for Sun Pharmaceuticals

	2009	2010	2011	2012	2013	2014
Net Sales	4272	4007	5728	8020	11300	16080
E_{BT}	1949	1415	2036	3355	4315	4581
E_{BIT}	1955	1421	2110	3384	4358	4625
Interest Expense	5.85	6.15	73.88	28.2	43.16	44.19
Income Tax	118	111	87	405	813	808
EAT	1878	1347	1908	3042	3469	3879
Total Assets	7421	8193	10776	13866	17681	2561
Shareholders' Equity	7045	7829	9483	12236	14990	18525

Table 5: Post-recession data for Sun Pharmaceuticals

Five-Step DuPont Model:	2009	2010	2011	2012	2013	2014
Tax burden (EAT ÷ E_{BT})	0.96	0.95	0.94	0.91	0.80	0.85
Interest burden (E_{BT} ÷ E_{BIT})	1.00	1.00	0.96	0.99	0.99	0.99
Operating Income Margin (E_{BIT} ÷ Net Sales)	0.46	0.35	0.37	0.42	0.39	0.29
Asset Turnover (Net Sales ÷ Total Assets)	0.58	0.49	0.53	0.58	0.64	0.63
Equity Multiplier (Total Assets ÷ Shareholders Equity)	1.05	1.05	1.14	1.13	1.18	1.38
Return on Equity(%)	26.7	17.2	20.1	24.9	23.1	20.9

As the years go by, we see that the tax burden on the company increases, but the interest burden is more or less close to unity. The return on equity falls from 4.4 after the onset of recession in 2008, the ROE keeps on falling in the next year as well. Although the company still manages to increase its Profits and assets base to a great extent. The company started to use its unused debt capacity as seen from increasing equity multiplier. The interest burden does not increase due to the same increase in E_{BIT}. Hence Sun Pharmaceuticals continues to grow unaffected by the perils of recession.

3.2 Dr. Reddy's Laboratories

Dr. Reddy's Labs has second largest share in the CNX Pharma, amounting to 18.06. Below are the pre and postrecession data for the company.

Pre-recession:

Table 6: Pre-recession data for Dr. Reddy's

	2005	2006	2007	2008
Net Sales	1,832.68	2,355.02	6,513.88	4,963.10
E_{BT}	13.86	201.33	1,239.90	545.00
E_{BIT}	28.13	269.69	1,398.67	647.20
Interest Expense	14.27	68.36	158.77	102.2
Income Tax	0.13	17.25	243.53	105.8
EAT	31.95	146.74	965.53	437.3
Total Assets	2,222.20	5,185.79	6,488.97	6,465.30
Shareholders' Equity	1,941.78	2,068.88	3,997.26	4,496.90

Table 7: Pre-recession ratios for Dr. Reddy's

Five-Step DuPont Model:	2005	2006	2007	2008
Tax burden (EAT ÷ E_{BT})	2.31	0.73	0.78	0.80
Interest burden (E_{BT} ÷ E_{BIT})	0.49	0.75	0.89	0.84
Operating Income Margin (E_{BIT} ÷ Net Sales)	0.02	0.11	0.21	0.13
Asset Turnover (Net Sales ÷ Total Assets)	0.82	0.45	1.00	0.77
Equity Multiplier (Total Assets ÷ Shareholders Equity)	1.14	2.51	1.62	1.44
Return on Equity	1.6%	7.1%	24.2%	9.7%

The company shows great growth from the FY 2005-2007, but in the FY 2008, the sales and profit margins take a huge dip. The ROE also falls from 24.2 to 9.7. The ratios more or same remain the same between

the FY's 2007 & 2008.

Post-Recession:

Table 8: Post-recession data for Dr. Reddy's

	2009	2010	2011	2012	2013	2014
Net Sales	6,861.90	7,031.00	7,435.20	9,814.50	11,832.60	13,359.10
E₁T	-656.40	618.30	1,182.80	1,804.40	2,164.70	2,646.30
E₂IT	-548.20	656.80	1,215.10	1,918.50	2,265.00	2,773.00
Interest Expense	108.2	38.5	32.3	114.1	100.3	126.7
Income Tax	272.4	325.2	210.6	524.8	657	656.8
EAT	-917.2	351.5	998.9	1,300.90	1,526.80	1,963.20
Total Assets	5,523.70	5,260.80	6,488.20	8,305.70	10,137.70	12,516.60
Shareholders' Equity	3,526.10	3,776.80	4,031.90	4,989.00	6,369.10	7,865.20

Table 9: Post-recession ratios for Dr. Reddy's

Five-Step DuPont Model:	2009	2010	2011	2012	2013	2014
Tax Burden (EAT ÷ E₁T)	1.40	0.57	0.84	0.72	0.71	0.74
Interest Burden (E₁T ÷ E₂IT)	1.20	0.94	0.97	0.94	0.96	0.95
Operating Income Margin (E₂IT ÷ Net Sales)	-0.08	0.09	0.16	0.20	0.19	0.21
Asset Turnover (Net Sales ÷ Total Assets)	1.24	1.34	1.15	1.18	1.17	1.07
Equity Multiplier (Total Assets ÷ Shareholders Equity)	1.57	1.39	1.61	1.66	1.59	1.59
Return on Equity	-26.0%	9.3%	24.8%	26.1%	24.0%	25.0%

During the FY of 2009, just after the worldwide recession, Dr. Reddy suffered huge losses. Hence the negative ROE. An increasing interest burden, with interest commitment nearly same as the previous year also indicates a decreasing E₂IT. After 2009, the company recovered and the sales, total asset base and profit margin keeps increasing steadily, indicating a healthy growth.

3.3 Lupin Ltd.

Lupin has 14.98% weightage in the CNX Pharma Index. Below are the pre & post-recession data for the company:

Pre-recession:

Table 10: Pre-recession data for Lupin

	2005	2006	2007	2008
Net Sales	1,255.77	1,685.84	2,005.74	2,686.24
E₁T	94.96	225.5	407.45	540.21
E₂IT	123.21	256.78	444.67	577.56
Interest Expense	28.25	31.28	37.22	37.35
Income Tax	3.46	40.26	77.96	102.26
EAT	92.22	173.37	308.64	408.41
Total Assets	947.79	1,549.76	1,738.07	2,492.01
Shareholders' Equity	489.38	623.28	873.31	1,279.68

Table 11: Pre-recession ratios for Lupin

Five-Step DuPont Model:	2005	2006	2007	2008
Tax Burden (EAT ÷ E₁T)	0.97	0.77	0.76	0.76
Interest Burden (E₁T ÷ E₂IT)	0.77	0.88	0.92	0.94
Operating Income Margin (E₂IT ÷ Net Sales)	0.10	0.15	0.22	0.22
Asset Turnover (Net Sales ÷ Total Assets)	1.32	1.09	1.15	1.08
Equity Multiplier (Total Assets ÷ Shareholders Equity)	1.94	2.49	1.99	1.95
Return on Equity	18.8%	27.8%	35.3%	31.9%

The company shows steady growth in sales, profits and its assets base during the pre-recession period. The ROE hence also grows steadily over the years. During the FY 2007-2008, a slight dip in ROE is seen, which is due to the decrease in Asset turnover.

Post-recession:

Table 12: Post-recession data for Lupin

	2009	2010	2011	2012	2013	2014
Net Sales	3,776.10	4,773.63	5,818.97	7,082.91	9,641.30	11,286.57
EbT	606.04	835.69	994.37	1,196.07	1,924.60	2,831.65
EbIT	655.9	874.18	1028.85	1,231.54	1,965.55	2,858.30
Interest Expense	49.86	38.49	34.48	35.47	40.95	26.65
Income Tax	72.7	110.98	117.63	275.62	582.9	953.6
EAT	507.74	699.67	879.39	887.51	1,340.44	1,869.50
Total Assets	2,662.34	3,733.17	4,588.28	5,877.05	6,590.69	7,830.60
Shareholders' Equity	1,424.82	2,567.83	3,281.08	4,012.89	5,204.18	6,931.57

Table 13: Post-recession data for Lupin

Five-Step DuPont Model:	2009	2010	2011	2012	2013	2014
Tax burden (EAT ÷ EbT)	0.84	0.84	0.88	0.74	0.70	0.66
Interest burden (EbT ÷ EbIT)	0.92	0.96	0.97	0.97	0.98	0.99
Operating Income Margin (EbIT ÷ Net Sales)	0.17	0.18	0.18	0.17	0.20	0.25
Asset Turnover (Net Sales ÷ Total Assets)	1.42	1.28	1.27	1.21	1.46	1.44
Equity Multiplier (Total Assets ÷ Shareholders Equity)	1.87	1.45	1.40	1.46	1.27	1.13
Return on Equity	35.6%	27.2%	26.8%	22.1%	25.8%	27.0%

During the recession, Lupin Ltd. suffers no decrease in sales and its profits. Although in the FY 2010, the company records a decrease in its ROE. This is recorded due to a decrease in Asset turnover & in Equity Multiplier. This shows a decrease in the share of equity holdings and hence other forms of capital were employed. During the post-recession period, a steady increase in Operating Income margin can be seen, indicating the efficiency in the operations of the company.

3.4 Cipla Ltd.

Pre-recession:

Table 14: Pre-recession data for Cipla

	2005	2006	2007	2008
Net Sales	2,181.26	2,891.36	3,438.24	3,997.90
EbT	514.61	709.84	807.98	838.36
EbIT	526.27	725.91	819.14	855.87
Interest Expense	11.66	16.07	11.16	17.51
Income Tax	82	89	121.75	94
EAT	409.61	607.64	668.03	701.43
Total Assets	1,744.83	2,452.18	3,359.83	4,296.27
Shareholders' equity	1,553.63	1,983.27	3,236.27	3,755.82

Table 15: Pre-recession data for Cipla

Five-Step DuPont Model:	2005	2006	2007	2008
Tax burden (EAT ÷ EbT)	0.80	0.86	0.83	0.84
Interest burden (EbT ÷ EbIT)	0.98	0.98	0.99	0.98
Operating Income Margin (EbIT ÷ Net Sales)	0.24	0.25	0.24	0.21
Asset Turnover (Net Sales ÷ Total Assets)	1.25	1.18	1.02	0.93
Equity Multiplier (Total Assets ÷ Shareholders Equity)	1.12	1.24	1.04	1.14
Return on Equity	26.4%	30.6%	20.6%	18.7%

The ROE of Cipla is low as compared to other companies in the CNX Pharma index. A decreasing Asset turnover is the reason of a low ROE. This shows the inefficiency of the company. Overall a steady increase in sales, asset base and profits was observed.

Post-recession:

Table 16: Post-recession data for Cipla

	2009	2010	2011	2012	2013	2014
Net Sales	4,960.60	5,359.52	6,331.09	6,977.50	8,202.42	9,380.29
E_bT	901.31	1,324.99	1,151.39	1,421.46	2,011.86	1,818.34
E_bIT	953.54	1,353.29	1,164.31	1,448.09	2,045.24	1,946.20
Interest Expense	52.23	28.3	12.92	26.63	33.38	127.86
Income Tax	101	228.5	157.7	277.5	456	400
EAT	776.81	1,081.49	960.39	1,123.96	1,507.11	1,388.34
Total Assets	5,290.99	5,919.16	7,075.34	7,622.32	9,912.81	11,073.03
Shareholders' equity	4,350.75	5,914.09	6,612.95	7,550.28	8,869.52	10,091.64

Table 17: Post-recession ratios for Cipla

Five-Step DuPont Model:	2009	2010	2011	2012	2013	2014
Tax Burden (EAT ÷ E_bT)	0.86	0.82	0.83	0.79	0.75	0.76
Interest Burden (E_bT ÷ E_bIT)	0.95	0.98	0.99	0.98	0.98	0.93
Operating Income Margin (E_bIT ÷ Net Sales)	0.19	0.25	0.18	0.21	0.25	0.21
Asset Turnover (Net Sales ÷ Total Assets)	0.94	0.91	0.89	0.92	0.83	0.85
Equity Multiplier (Total Assets ÷ Shareholders Equity)	1.22	1.00	1.07	1.01	1.12	1.10
Return on Equity	17.9%	18.3%	14.5%	14.9%	17.0%	13.8%

A decrease in the ROE over the years was observed. Overall the sales, total asset base and profits of the company grew steadily.

3.5 Aurobindo Pharmaceuticals Ltd.

Pre-Recession:

Table 18: Pre-Recession data for Aurobindo

	2005	2006	2007	2008
Net Sales	1,315.13	1,561.21	2,104.45	2,426.12
E_bT	16.71	98.5	206.42	291.75
E_bIT	66.63	167.6	292.87	361.17
Interest Expense	49.92	69.1	86.45	69.42
Income Tax	8.08	11.21	8.02	47.92
EAT	3.68	71.11	202.06	238.15
Total Assets	1,713.51	2,190.33	2,967.67	3,035.62
Shareholders' Equity	678.24	814.83	885.99	1,124.02

Table 19: Pre-recession data for Aurobindo

Five-Step DuPont Model:	2005	2006	2007	2008
Tax Burden (EAT ÷ E_bT)	0.22	0.72	0.98	0.82
Interest Burden (E_bT ÷ E_bIT)	0.25	0.59	0.70	0.81
Operating Income Margin (E_bIT ÷ Net Sales)	0.05	0.11	0.14	0.15
Asset Turnover (Net Sales ÷ Total Assets)	0.77	0.71	0.71	0.80
Equity Multiplier (Total Assets ÷ Shareholders Equity)	2.53	2.69	3.35	2.70
Return on Equity	0.5%	8.7%	22.8%	21.2%

Continuous growth in the company was observed during the FY 2005-2008. A high Equity multiplier and a low interest burden shows that the company is heavily leveraged. A steady increase in ROE was observed over the years with a slight dip in 2008.

Post-recession

Table 20: Post recession data for Aurobindo

	2009	2010	2011	2012	2013	2014
Net Sales	3,037.98	3,523.87	4,381.48	4,627.40	5,855.32	8,099.79
EbT	121.57	754.44	788.18	-212.95	374.11	1,532.52
EbIT	214.79	827.53	852.83	64.29	640.75	1,842.68
Interest Expense	93.22	73.09	64.65	277.24	266.64	310.16
Income Tax	17.09	176.75	198.4	32.74	13.2	226.08
EAT	100.21	563.08	563.06	-124.14	291.4	1,169.07
Total Assets	3,577.38	3,987.97	4,871.29	5,450.04	6,061.22	7,554.14
Shareholders' Equity	1,241.26	1,829.08	2,444.83	2,339.65	2,605.76	3,750.15

Table 21: Post recession ratios for Aurobindo

Five-Step DuPont Model:	2009	2010	2011	2012	2013	2014
Tax burden (EAT ÷ EbT)	0.82	0.75	0.71	0.58	0.78	0.76
Interest burden (EbT ÷ EbIT)	0.57	0.91	0.92	-3.31	0.58	0.83
Operating Income Margin (EbIT ÷ Net Sales)	0.07	0.23	0.19	0.01	0.11	0.23
Asset Turnover (Net Sales ÷ Total Assets)	0.85	0.88	0.90	0.85	0.97	1.07
Equity Multiplier (Total Assets ÷ Shareholders Equity)	2.88	2.18	1.99	2.33	2.33	2.01
Return on Equity	8.1%	30.8%	23.0%	-5.3%	11.2%	31.2%

Onset of FY 2009 shows a decrease in the profitability of the company, this is backed by the decreased operating income ratio which is also the reason of a decreased ROE. During the FY of 2012, Aurobindo Pharmaceuticals suffers huge losses, which drags its ROE to negative side.

Although the company soon recovers in 2013 and continues with a steady growth ahead.

4. Regression Model

Regression tools have been applied and Model is developed for the CNX Index as a whole. Calculations below shown only for Sun Pharmaceuticals.

Table 22: Normalized Ratios

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Tax burden	0.72	0.76	1.00	0.81	0.78	0.73	0.65	0.50	0.00	0.21
Interest burden	0.16	0.30	0.63	0.92	1.00	0.96	0.00	0.83	0.78	0.80
Operating Income Margin	0.40	0.45	0.57	1.00	0.89	0.35	0.42	0.70	0.51	0.00
Asset Turnover	0.00	0.28	0.59	0.97	0.73	0.37	0.55	0.74	1.00	0.95
Equity Multiplier	1.00	0.73	0.23	0.01	0.00	0.00	0.06	0.05	0.08	0.21
ROE	0.97	1.00	0.70	0.74	0.50	0.00	0.15	0.41	0.32	0.20

Table 23: Correlations between the different constituents of the ROE equation

	Tax burden	Interest burden	Operating Income Margin	Asset Turnover	Equity Multiplier
Tax burden	1				
Interest burden	-0.15794655	1			
Operating Income Margin	0.421758486	0.338804719	1		
Asset Turnover	-0.507832399	0.613663704	0.238318428	1	
Equity Multiplier	0.173742102	-0.630707896	-0.315911919	-0.744659272	1

Hence from the regression result of Sun Pharmaceuticals, the model developed for the FY 20052014 is:

$$ROE = a*TB + b*IB + c*OI + d*AT + e*EM$$

In the above formula,

Tb = Tax burden

Ib = Interest burden

OI = Operating Income Margin

AT = Asset Turnover

EM = Equity Multiplier

The Table below gives the values of the coefficients for Sun Pharmaceuticals:

a	b	c	d	e
0.420297065	0.010401754	0.51908608	0.643018379	1.260628537

Now performing regression analysis on whole of the CNX Pharma Index, we get the values of the coefficients as in Table 25.

Table 24: Regression

<i>Regression Statistics</i>					
Multiple R	0.991814115				
R Square	0.983695239				
Adjusted R Square	0.963314288				
Standard Error	0.065900161				
Observations	10				
<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	1.048042929	0.209608586	48.26542301	0.001144167
Residual	4	0.017371325	0.004342831		
Total	9	1.065414254			
<i>Coefficients</i>					
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	
Intercept	-0.743150622	0.142888012	-5.200930507	0.006511987	
Tax Burden	0.420297065	0.1162459	3.615586136	0.022444955	
Interest Burden	0.010401754	0.08419575	0.123542504	0.907636571	
Operating Income Margin	0.51908608	0.105664436	4.912590276	0.007971619	
Asset Turnover	0.643018379	0.138523984	4.641928121	0.009719965	
Equity Multiplier	1.260628537	0.10614846	11.8760888	0.000287875	

Table 25: Regression analysis on whole of the CNX Pharma Index

Company	Weightage in CNX Index	Tax Burden	Interest Burden	Operating Income Margin	Asset Turnover	Equity Multiplier
Sun Pharma	27.27	0.420297065	0.010401754	0.51908608	0.643018379	1.260628537
Reddy	18.06	0.098791912	-0.326224691	0.982369895	0.313654845	0.112308533
Lupin	14.98	0.934600047	0.89952717	1.38901032	0.495898604	1.554362253
Cipla	13.93	0.142434984	0.057751886	0.342627915	0.552783894	0.269364271
Aurobindo	6.66	-0.046590655	-0.081528002	1.124507264	0.19190853	0.415793889
Divi	4.8	0.539056496	0.416842514	0.504262367	0.967853834	0.911211683
glenmark	4.73	0.223971794	-0.002248622	1.064257144	0.449859552	0.599572269
Cadila	3.62	0.150504268	0.291457926	0.716446812	0.554085737	0.56152076
Piramal	2.98	0.084133659	0.298962503	0.904889594	0.115177728	0.128824377
gSK	2.97	0.864856454	0.868206108	1.243767223	1.311504897	1.403778063
Weighted Average		0.359308423	0.146432284	0.814049703	0.526243929	0.80007026

Hence after accounting the weightage of the different companies present in the CNX Pharma Index, we can generate the equation governing ROE.

Hence:

$$ROE = a*TB + b*IB + c*OI + d*AT + e*EM$$

The values of the the coefficients:

a	b	c	d	e
0.420297065	0.010401754	0.51908608	0.643018379	1.260628537

5. Conclusion

In this paper, we saw that the performance of the CNX Pharma Index and in general the pharmaceutical industry was good. The performance of the index was measured by the Du-pont, five point analysis, it measures ROE and the factors that affect it. The industry easily fared its way past the recession. The growth of the industry has been steady over the past decade. The only hiccup it encountered was during the recession, it was a very short period but pharmaceuticals got over it in a year.

Also a model for calculating the ROE of the index was developed, it was developed keeping in mind the past decade.

6. References

The financial statements were taken from Capitaline.

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