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Financial Performance of Pharmaceutical Industry in India using DuPont Analysis

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Abstract
This study attempts basically to measure the financial performance of the Pharmaceutical Industry taking top three companies like Cipla, Dr. Reddy's Laboratories, Ranbaxy for the period 2003-2012. In order to achieve our goals in this paper we have measured the ratios of ROE, ROA applying the DuPont analyses, which have been demonstrated with the aim of tables to show the change periodically. DuPont analysis (ROI and ROE)) is an important tool for judging the operating financial performance. It is an indication of the earning power of the firm.
DuPont Model which is based on analysis of Return on Equity (ROE) & Return on Investment (ROI). The return on equity disaggregates performance into three components: Net Profit Margin, Total Asset Turnover, and the Equity Multiplier. Return on Investment consists of Assets Turnover and Profit Margin. The return on investment consists of Assets Turnover (Operating Income X Total Assets) and Profit Margin (EBIT X Operating Income).
From the study it if found that Cipla pharmaceutical Financial performance is high followed by Dr.Reddy's Laboratories and then Ranbaxy Pharmaceutical. The three companies are significant at their level. In conclusion, ROE & ROI is the most comprehensive measure of profitability of a firm. It considers the operating and investing decisions made as well as the financing and tax-related decisions
Keywords: DuPont Analysis, Return on equity, Return on Investment, Financial Performance, Pharmaceutical Industry.

1. Introduction

For any business in the private sector there are numerous of models to describe how well the business is running. Among these the DuPont model was created in the early 1900s but is still a model valid to use for assessment of the profitability. Using the DuPont model for risk analysis is not very common but if you as a risk analysis specialist want to talk the language of the business, it can be valuable to you.

The model was created by F. Donaldson Brown who came up with the model when he was assigned to clean up the finances in General Motors and has ever since been an important model for financial analysis. Remarkably it has not been used in the security community for risk prioritization or impact analysis. The original DuPont method of financial ratio analysis was developed in 1918 by an engineer at DuPont who was charged with understanding the finances of a company that DuPont was acquiring. He noticed that the product of two often-computed ratios, net profit margin and total asset turnover, equals return on assets (ROA). The elegance of ROA being affected by a profitability measure and an efficiency measure led to the DuPont method becoming a widely-used tool of financial analysis Liesz, (2002). In the 1970's, emphasis in financial analysis shifted from ROA to return on equity (ROE), and the DuPont model was modified to include the ratio of total assets to equity. Three distinct versions of Du Pont have been created and used to help unravel the underlying drivers of profitability and return over time, beginning nearly 90 years ago.

The DuPont Model is a useful tool in providing both an overview and a focus for such analysis. It can be used as a compass in the process by directing the analyst toward significant areas of strength and weakness evident in the financial statements. This study attempts basically to measure the financial performance of the Pharmaceutical Industry in India. The main objective is to find out the ratios of ROE and ROI for top three pharmaceutical industries namely Cipla Pharmaceutical, Dr. Reddy's Laboritories, Ranbaxy Pharmaceutical for a period 10 years from 2003-2012. The aim of the study to rank the pharmaceutical industry and evaluate its financial performance based on DuPont analysis which includes ROE and ROI.

Currently the Indian Pharmaceutical industry is valued at approximately 90,000 Crores or US $ 20 billion (1 US $ = 45), constituting 1.8% of the GDP and expected to grow more than 11% going forward. The country now ranks 3rd worldwide by volume of production and 14th by value thereby accounting for around 10% of world's production by volume and 1.5% by value. Globally, it ranks 4th in terms of generics production and 17th in terms of export value of bulk actives and dosage forms. Through to 2015 and 2020, India's pharmaceutical market will post local currency CAGRs of 14.6% and 13.5% respectively. It increases the value of shareholders

in the market and makes them to earn more. This is the reason the researcher attempts to evaluate the financial performance of pharmaceutical industry in India using DuPont Analysis.

2.Concept of DuPont Model

For any business in the private sector there are numerous of models to describe how well the business is running. Among these the DuPont model was created in the early 1900s but is still a model valid to use for assessment of the profitability. Using the DuPont model for risk analysis is not very common but if you as a risk analysis specialist want to talk the language of the business, it can be valuable to you.

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Before discussing the mechanics and usefulness of Du Pont, it may be of some interest to learn about its development. The maturation of the Du Pont model parallels the progress made in the field of financial analysis itself. Three distinct versions of Du Pont have been created and used to help unravel the underlying drivers of profitability and return over time, beginning nearly 90 years ago.

In 1918, four years after he was hired by the E. I. du Pont Corporation of Wilmington,

Delaware, to work in its treasury department, electrical engineer F. Donaldson Brown was given the task of untangling the finances of a company of which Du Pont had just purchased 23 percent of its stock. (This company was General Motors!) Brown recognized a mathematical relationship that existed between two commonly computed ratios, namely net profit margin (obviously a profitability measure) and total asset turnover (an efficiency measure), and ROA.

3. Review Literature

For an investment to be acceptable to a firm's financial management it must provide a positive answer to the question "Will the acquisition of this asset increase the value of the owner's equity?" **(F. Arditti, 1967)**

The financial objectives of a for-profit business primarily concern the needs of the external suppliers of debt and equity capital. The economic returns to shareholders comprise dividends and capital gains on the market value of their shares. As earning determine what can be paid out as dividend in the long run, shareholders are primarily concerned with financial measures like earnings, ROS, ROA, ROE, ROI. (**R. Thorpe, J. Holloway, 2008)**

Du Pont analysis, a common form of financial statement analysis, decomposes return on net operating assets into two multiplicative components: profit margin and asset turnover **(B. McClure).** These two accounting ratios measure different constructs and, accordingly, have different properties. Prior research has found that a change in asset turnover is positively related to future changes in earnings **(M. Soliman)**

Du Pont analysis takes into account three indicators to measure firm profitability: ROA, ROE and ROI.

Return on assets – **ROA** offers a different take on management effectiveness and reveals how much profit a company earns for every dollar of its assets (**[S. Ross, R. Westerfield, J. Jaffe, B. Jordan).** Assets include things like cash in the bank, accounts receivable, property, equipment, inventory and furniture. Only a few professional money managers will consider stocks with a ROA of less than 5%.

ROA = *Total Assets / Net income*

Return on equity – **ROE** It is a basic test of how effectively a company's management uses investors' money – ROE shows whether management is growing the company's value at an acceptable rate. Also, it measures the rate of return that the firm earns on stockholder's equity. Because only the stockholder's equity appears in the denominator, the ratio is influenced directly by the amount of debt a firm is using to finance assets **(B. McClure).** Practically, ROE reflects the profitability of the firm by measuring the investors` return **(J. J. Griffin, J.F. Mahon).**

ROE = Stockholder's equity/Total Assets X Total Assets/ Net income X Stockholder s equity / Total Assets

ROE is calculated by taking the profit after tax and preference dividends of a given year and dividing it by the book value of equity (ordinary shares) at the beginning of the year. Average equity can also be used. Equity would consist of issued ordinary share capital plus the share premium and reserves **[J.H.V.H. de Wet, E. du Toit].**

Return on Investment – ROI The return on investment is the return earned from the investment made by the firm. This gives the actual position of the firm. ROI shows whether the management is in profitable position or not. It measures the earnings of the firm. It multiplies profit margin and Asset Turnover**. (B. McClure)**

ROI = Assets Turnover (Operating Income X Total Assets) X Profit Margin (EBIT X Operating Income)

Hawawini and Viallet (1999) offered yet another modification to the DuPont model. This modification resulted in five different ratios that combine to form ROE and ROI. In their modification they acknowledge that the financial statements firms prepare for their annual reports (which are of most importance to creditors and tax collectors) are not always useful to managers making operating and financial decisions.

In order to more effectively evaluate operational managers, **Nissim & Penman (2001)** suggest using a modified version of the traditional DuPont model in order to eliminate the effects of financial leverage and other factors not under the control of those managers. Using operating income to sales and asset turnover based on operating assets limits the performance measure of management to those factors over which management has the most control. The modified DuPont model has become widely recognized in the financial analysis literature. See, for example, **Pratt & Hirst (2008), Palepu & Healy (2008), and Soliman (2008).**

In addition, **Soliman (2004)** found that industry-specific DuPont multiplicative components provide more useful valuation than do economy-wide components, suggesting that industry-specific ratios have increased validity.

Prendergast (2006) and Milbourn & Haight (2005) present examples of using DuPont analysis in both a business and classroom setting. Prendergast illustrates how a "modified DuPont approach to ratio analysis can be used to drill down to the true cause of financial performance problems" in a small manufacturing business **(p. 48). Milbourn & Haight** show the use of "Du Pont Analysis as a teaching aid to equip students with an understanding of how management decisions influence the bottom line" **(p. 46).** Unfortunately, the **Milbourn & Haight** paper is concerned exclusively with only the original Du Pont model, i.e. it shows the drivers of no more than Return on Assets. We will show the impact and value of the Du Pont model drivers on Return on Equity.

Saunders (2000) provides a model of financial analysis for financial institutions based on the DuPont system of financial analysis return on equity model and return on investment model. The return on equity model disaggregates performance into three components: net profit margin, total asset turnover, and the equity multiplier. The profit margin allows the financial analyst to evaluate the income statement and the components of the income statement. Total asset turnover allows the financial analyst to evaluate the left-hand side of the balance sheet: assets. The equity multiplier allows the financial analyst to evaluate the right-hand side of the balance sheet: liabilities and owners equity

Brigham and Houston, (2001) The modified model was a powerful tool to illustrate the interconnectedness of a firm's income statement and its balance sheet, and to develop straight-forward strategies for improving the firm's ROE.

Sundararajan, et al (2002) Various measures of rates of return are used mainly for that purpose. We fully agree with the opinion that "Relaying too heavily on just a few indicators of bank profitability can be misleading. While ROI, ROE, and interest margin (and non interest expenses) to gross income remain the key measures, they should ideally be supplemented by the analysis of other operating ratios"

Debasish Sur and kaushik Chakraborty (2006) in his study financial performance of Indian Pharmaceutical Industry: The Indian Pharmaceutical Industry has been playing a very significant role in increasing the life expectancy and in decreasing the mortality rate. It is the 5th largest in terms of volume and 14th largest in value terms I the world. The comparative analysis the financial performance of Indian pharmaceutical industry for the period 1993 to 2002 by selecting six notable companies of the industry. The comparison has been made from almost all points of view regarding financial performance using relevant statistical tools.

T. Vanniarajan and C. Samuel Joseph (2007) in his study An Application of DuPont Control chart in Analyzing the financial performance of Banks. The liberlization of the finance sector in India is exposing Indian banks to a new economic environment it is characterized by increased competition and new regulatory requirements. Indian and foreign banks are exploring growth opportunities in India by introducing new products for different customer segments, many of which were not conventionally viewed as customer for the Banks have, in the last ten years, witnessed new shareholders. All banks are in a position to evaluate its performance compared to others. In general, the performance of the banks may be viewed on three dimensions namely structural, operational and efficiency factors are suggested by India Bank Association.

Mihaela Herciu, Claudia Ogrean & Lucian Belascu(2011) The present paper aims to demonstrate that in most cases the most profitable companies are not the most attractive for investors – through Du Pont Analysis method. In order to do this, we take into account the top 20 most profitable companies in the world in 2009 (according to Fortune). By using Du Pont analysis we came to the results that the ranking is not preserved when indicators (ratios) such as ROA (return on assets) or ROI (return on Investment), ROE (return on equity) or ROS (return on sales) are taken into consideration.

Dr Ahmed Arif Almazari (2012) This study attempts basically to measure the financial performance of the Jordanian Arab commercial bank for the period 2000-2009 by using the DuPont system of financial analysis which is based on analysis of return on equity model and return on investment model. The return on equity model disaggregates performance into three components: net profit margin, total asset turnover, and the equity multiplier. It was found that the financial performance of Arab Bank is relatively steady and reflects minimal volatility in

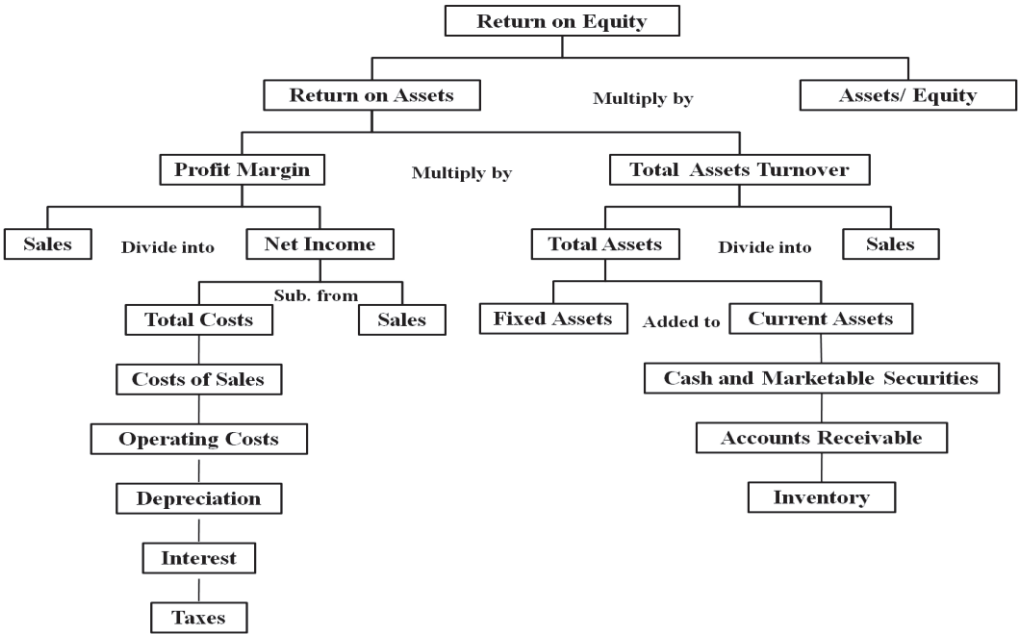
the return on equity. Net profit margin and total asset turnover exhibit relative stability for the period from 2001 to 2009.The equity multiplier also show almost stable indicators for the period from2001-2005 and the ratios declined from 2006-2009 which indicates that the Arab bank had less financial leverage in the recent years, which means the bank is relying less on debt to finance its assets.

4. DuPont Analysis Computation

The DuPont analysis computes variables from the income statement and balance sheet to determine a firm's return on equity (ROE) & return on Investment (ROI). The formula is as follows:

ROE = Profit Margin (Net Profit/Sales) X Asset Turnover (Sales/Total Assets) X Equity Mulitplier (Total Assets/Total Equity)

Figure 1: Return On Equity



ROI = Assets Turnover (Operating Income X Total Assets) X Profit Margin (EBIT X Operating Income)

Figure 2: Return on Investment

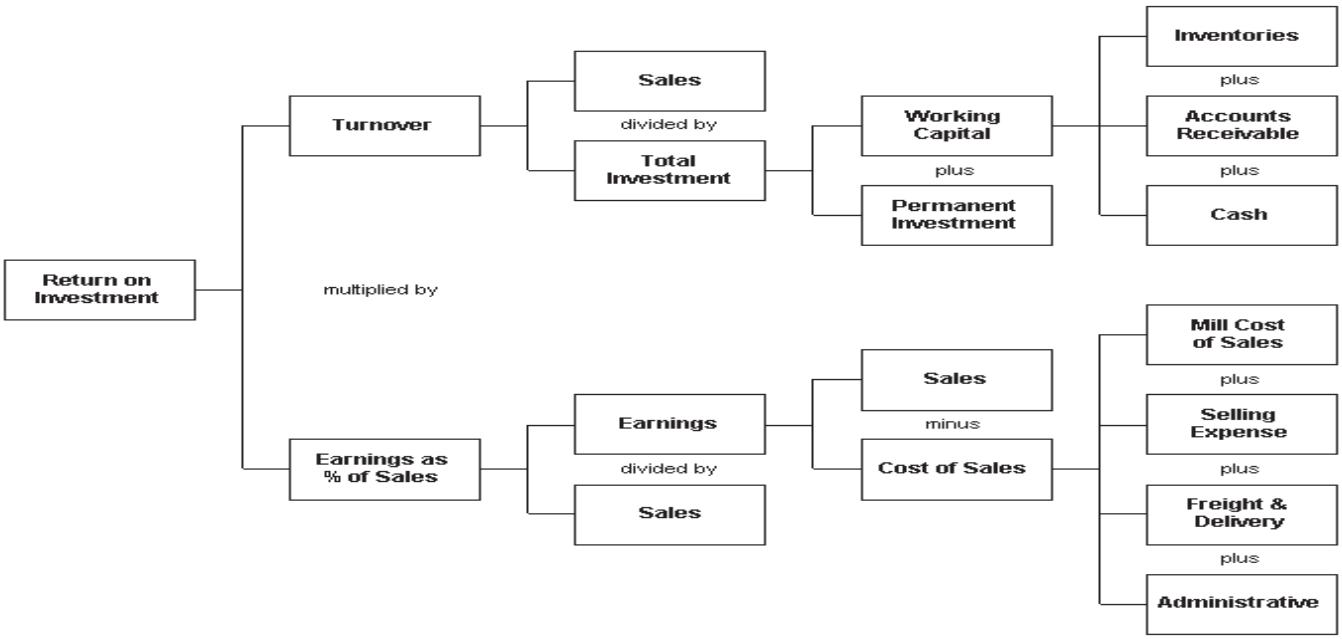


Table 1: Showing ROE & ROI for Cipla Pharmaceutical

1.A. Return on Equity

Year	Total Assets (a)	Common stock Equity (b)	Financial Leverage C=(a x b)	NPM (d)	TAT (e)	ROA (d/e)	ROE = FL*ROA
2002-2003	1044.31	724.66	1.44	18.22	0.94	17.15	24.71
2003-2004	1411.54	890.14	1.59	18.24	0.91	16.66	26.41
2004-2005	1817.68	1070.08	1.70	16.97	0.80	13.63	23.15
2005-2006	2220.08	1264.05	1.76	15.95	0.87	13.81	24.27
2006-2007	2616.06	1553.63	1.68	18.17	0.86	15.66	26.36
2007-2008	3458.33	1983.27	1.74	20.38	0.86	17.57	30.64
2008-2009	4413.74	3236.27	1.36	18.75	0.82	15.14	20.64
2009-2010	5733.21	3755.82	1.53	16.69	0.73	12.23	18.68
2010-2011	6859.7	4350.75	1.58	14.84	0.76	11.32	17.85
2011-2012	8443.93	5914.09	1.43	19.29	0.66	12.81	18.29
MEAN	**3801.86**	**2474.28**	**1.58**	**17.75**	**0.82**	**14.60**	**23.10**
STD.DEV	**2500.77**	**1753.48**	**0.14**	**1.65**	**0.09**	**2.16**	**4.20**
t value	**4.808**	**4.462**	**35.804**	**34.114**	**30.343**	**21.337**	**17.397**
Sig. (2-tailed)	**(0.001)**	**(0.001)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**

1.B. Return on Investment

Year	Operating Income (a)	Total assets (b)	Assets Turnover C=(a/b)	EBIT (d)	Operating Income (e)	Profit Margin F=(d/e)	ROI (C*F)
2002-2003	233.45	1044.31	0.22	255.91	233.45	1.10	0.25
2003-2004	306.48	1411.54	0.22	334.65	306.48	1.10	0.24
2004-2005	319.42	1817.68	0.18	345.41	319.42	1.90	0.19
2005-2006	422.38	2220.08	0.19	448.3	422.38	1.70	0.20
2006-2007	505.29	2616.06	0.19	581.32	505.29	1.15	0.22
2007-2008	693.89	3458.33	0.20	806.09	693.89	1.16	0.23
2008-2009	821.83	4413.74	0.19	922.51	821.83	1.12	0.21
2009-2010	852.17	5733.21	0.15	987.09	852.17	1.16	0.17
2010-2011	1244.84	6859.70	0.18	1105.33	1244.84	0.89	0.16
2011-2012	1380.93	8443.93	0.16	1506.64	1380.93	1.09	0.18
MEAN	**678.06**	**3801.86**	**0.19**	**729.33**	**678.07**	**1.24**	**0.21**
STD.DEV	**398.06**	**2500.77**	**0.02**	**405.99**	**398.06**	**0.310**	**0.03**
t value	**5.39**	**4.81**	**26.41**	**5.68**	**5.39**	**12.61**	**21.41**
Sig. (2-tailed)	**(0.000)**	**(0.001)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**

Inference:

From the above table 1.A. ROE it is clear that mean value is 23.10, Std.dev is 4.20, the t-value is 17.397 and it is significant at 1% level of significance (.000). In table 1.B. ROI it shows that the mean value is 0.21, std.dev is 0.03, the t-value is 21.41 and it is significant at 1% level of significance (0.000)

Table 2: Showing ROE & ROI for Dr. Reddy's Laboratories

2.A. Return on Equity

Year	Total Assets (a)	Common stock Equity (b)	Financial Leverage C=(axb)	NPM (d)	TAT (e)	ROA (d/e)	ROE = FL*ROA
2002-2003	1063.06	553.26	1.92	15.71	0.87	13.59	26.11
2003-2004	1719.09	1457.99	1.18	30.77	0.87	26.74	31.53
2004-2005	2166.06	1806.92	1.20	25.56	0.71	18.10	21.70
2005-2006	2519.09	2047.02	1.23	17.05	0.66	11.24	13.83
2006-2007	2982.01	2074.08	1.44	4.23	0.51	2.20	3.16
2007-2008	3984.97	2262.14	1.76	10.54	0.50	5.30	9.33
2008-2009	5958.19	4373.36	1.36	31.11	0.63	19.75	26.91
2009-2010	6661.83	4811.81	1.39	14.21	0.50	7.13	9.88
2010-2011	7357.50	5259.10	1.40	14.02	0.54	7.62	10.67
2011-2012	8361.00	5914.60	1.41	19.25	0.53	10.12	14.31
MEAN	**4277.28**	**3056.03**	**1.43**	**18.24**	**0.63**	**12.18**	**17.00**
STD.DEV	**2600.50**	**1850.93**	**0.24**	**8.66**	**0.14**	**7.49**	**9.26**
t value	**5.201**	**5.221**	**18.878**	**6.664**	**14.053**	**5.143**	**5.715**
Sig. (2-tailed)	**(0.001)**	**(0.001)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.001)**	**(0.000)**

2.B. Return on Investment

Year	Operating Income (a)	Total assets (b)	Assets Turnover C=(a/b)	EBIT (d)	Operating Income (e)	Profit Margin F=(d/e)	ROI (C/F)
2002-2003	261.28	1063.06	0.25	257.80	261.28	0.99	0.24
2003-2004	572.49	1719.09	0.33	626.64	572.49	1.09	0.36
2004-2005	460.65	2166.06	0.21	498.04	460.65	1.08	0.23
2005-2006	346.79	2519.09	0.14	379.31	346.79	1.09	0.15
2006-2007	163.21	2982.01	0.05	154.8	163.21	0.95	0.05
2007-2008	317.07	3984.97	0.08	413.05	317.07	1.30	0.10
2008-2009	1327.35	5958.19	0.22	1561.3	1327.35	1.18	0.26
2009-2010	582.70	6661.83	0.09	779.99	582.70	1.34	0.13
2010-2011	758.00	7357.5	0.10	970.20	758.00	1.28	0.13
2011-2012	1088.5	8361	0.13	1342.5	1088.50	1.23	0.16
MEAN	**587.80**	**4277.28**	**0.16**	**698.36**	**587.80**	**1.15**	**0.18**
STD.DEV	**374.36**	**2600.50**	**0.09**	**466.45**	**374.36**	**0.13**	**0.09**
t value	**4.965**	**5.201**	**5.681**	**4.735**	**4.965**	**27.311**	**6.291**
Sig. (2-tailed)	**(0.001)**	**(0.001)**	**(0.000)**	**(0.001)**	**(0.001)**	**(0.000)**	**(0.000)**

Inference:

From the above table 2.A. ROE it is clear that mean value is 17.00, Std.dev is 9.26, the t-value is 5.715 and it is significant at 1% level of significance (0.000). In table 2.B. ROI it shows that the mean value is 0.18, std.dev is 0.09, the t-value is 6.291 and it is significant at 1% level of significance (0.000)

Table 3: Showing ROE & ROI for Ranbaxy Pharmaceutical

3. A. Return on Equity

Year	Total Assets (a)	Common stock Eq-uity (b)	Financial Leverage C=(axb)	NPM (d)	TAT (e)	ROA (d/e)	ROE = FL*ROA
2002-2003	2452.86	1606.98	1.53	12.14	0.85	10.27	15.68
2003-2004	2823.13	1882.81	1.50	20.49	1.08	22.09	33.12
2004-2005	3599.72	2321.77	1.55	20.83	1.06	22.08	34.23
2005-2006	4187.72	2509.51	1.67	13.91	0.91	12.60	21.02
2006-2007	4804.67	2377.3	2.02	5.83	0.76	4.41	8.92
2007-2008	7036.85	2350.01	2.99	9.12	0.59	5.41	16.19
2008-2009	7956.91	2538.4	3.13	14.38	0.54	7.76	24.34
2009-2010	12013.46	3716.77	3.23	-22.46	0.39	-8.70	-28.11
2010-2011	11328.91	4134.60	2.74	11.96	0.42	5.05	13.83
2011-2012	12782.01	5132.40	2.49	20.35	0.44	8.99	22.38
MEAN	**6898.62**	**2857.06**	**2.29**	**10.66**	**0.70**	**9.00**	**16.16**
STD.DEV	**3951.56**	**1108.37**	**0.71**	**12.67**	**0.26**	**8.95**	**17.52**
t value	**5.52**	**8.15**	**10.19**	**2.66**	**8.46**	**3.18**	**2.91**
Sig. (2-tailed)	**(.000)**	**(.000)**	**(.000)**	**(.026)**	**(.000)**	**(.011)**	**(.017)**

3. B. Return on Investment

Year	Operating Income (a)	Total assets (b)	Assets Turnover C=(a/b)	EBIT (d)	Operating Income (e)	Profit Margin F=(d/e)	ROI (C/F)
2002-2003	297.95	2452.86	0.12	393.36	297.95	1.32	0.16
2003-2004	723.96	2823.13	0.26	801.62	723.96	1.11	0.28
2004-2005	915.65	3599.72	0.25	1031.94	915.65	1.13	0.29
2005-2006	632.65	4187.72	0.15	697.43	632.65	1.10	0.17
2006-2007	185.44	4804.67	0.04	307.69	185.44	1.66	0.06
2007-2008	632.27	7036.85	0.09	603.62	632.27	0.96	0.09
2008-2009	414.59	7956.91	0.05	965.72	414.59	2.33	0.12
2009-2010	256.17	12013.46	0.02	-1331.47	256.17	-5.20	-0.11
2010-2011	652.64	11328.91	0.06	1138.3	652.64	1.74	0.10
2011-2012	1271.03	12782.01	0.10	1833.48	1271.03	1.44	0.14
MEAN	**598.24**	**6898.62**	**0.11**	**644.17**	**598.24**	**0.76**	**0.13**
STD.DEV	**330.96**	**3951.56**	**0.08**	**817.92**	**330.96**	**2.13**	**0.11**
t value	**5.716**	**5.521**	**4.301**	**2.491**	**5.716**	**1.125**	**3.624**
Sig. (2-tailed)	**(0.000)**	**(0.000)**	**(0.002)**	**(0.034)**	**(0.000)**	**(0.290)**	**(0.006)**

Inference:

From the above table 3.A. ROE it is clear that mean value is 16.16, Std.dev is 17.52, the t-value is 2.91 and it is significant at 5% level of significance (0.017). In table 3.B. ROI it shows that the mean value is 0.13, std.dev is 0.11, the t-value is 3.624 and it is significant at 5% level of significance (0.006).

5. Conclusion

The company profitability for most investors is a landmark in terms of earnings they could obtain by placing

capital. Profits earned by a company, taken the absolute amount, provides an overview of a company's activity without giving details about the extent to which the company manages dividends, debts, liabilities or other indicators.

In this paper it is tried to demonstrate with the help of profitability ratios like ROI and ROE that the comparison of performance and condition of a company against its competitors, analyzing trends in the returns of a company in the context of trends of the components and forecasting the returns of a company based on forecasts of the components.

From the above analysis it is found that Cipla pharmaceutical ROE and ROI has highest returns on equity and Investment by 23.10 and 0.21 followed by Dr. Reddy's Laboratories ROE is 17.00 and ROI is 0.18. The third position secured by Ranbaxy Laboratories ROE is 16.16 and ROI by 0.13. This shows Cipla is concentrating on its financial performance by reducing its expenses and cost.

As a conclusion, the Du Pont analysis that we made (by calculating ROI and ROE) for the top 3 most profitable pharmaceutical companies in India emphasize that absolute measurements are not relevant every time. Therefore to have a common basis of comparison between several companies and to compose ranks the relative sizes for measuring efficiency are necessary when calculating the ratio.

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