



## MAXIMIZATION OF SHAREHOLDERS WEALTH: A STUDY ON INDIAN PHARMA COMPANIES

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### **Abstract**

*Value Based Analysis is a continuing process which focuses in maximising Shareholders' Wealth. It is applied to evaluate the financial performance as well as the shareholders' value generated by a Company. Traditional analysis do not take into consideration a firm's cost of capital, and are therefore considered inappropriate in evaluating value creation. Moreover, Traditional measures are based almost exclusively on information obtained from financial statements, and so are exposed to accounting distortions. Despite these limitations analysts and investors still widely apply the traditional measures. On the other hand, as a result of the perceived limitations of traditional measures, value based financial performance measures were developed.*

*In compare to traditional methods value based measures report high levels of correlation between the Profitability and Market Return. In those cases where these measures yield positive values, economic profits are generated, and consequently shareholder value is expected to increase. Negative values indicate the destruction of shareholder wealth.*

*Economic Value Added (EVA), Market Value Added (MVA), Enterprise Value (EV) are considered as important criterion for evaluation of internal performance and total return of Shareholders. On the other hand, stock return is another key factor in decisions of the stock. It provides some information which has been used by many potential and actual investors for financial analysis and prediction. Value Added Analysis is a measure of true economic performance of a company and a strategy for creating shareholder wealth. Investing in projects where the return exceeds the cost of capital results in value creation, while investing in projects with returns below the cost of capital destroys value.*

*EVA is the difference between Net Operating Profit after Tax and Cost of Equity multiplied by Capital Employed. MVA is the difference between Market Value of Equity and Shareholders Fund while EV is the difference between Market Cap plus Market Value of Debt and Cash & Cash Equivalentents.*

*The study aims at evaluating the relationship between EVA, MVA, EV, PAT, NOPAT & EPS, MPS, ROCE, ROE, ROA as well as impact of EPS MPS ROCE ROE ROA EVA / CE of Leading Indian Pharma companies.*

**Keywords:** *NOPAT, EVA, Market Cap, MPS, EPS, MVA, EV, CFROI, ROCE and ROE.*

### **I. Objectives of the Study**

1. To analysis the profitability, Liquidity, Operating Efficiency & Valuation Ratios of leading Indian Pharma Companies as well as calculate the market values like EVA, EV, MVA etc.
2. To analyse the performance in terms of Economic Profit of the selected companies using Value Based Analysis.
3. To highlight the impact of Profitability & Rate of Return ratios on EVA/ Capital Employed.

### **Review of Literature**

The researcher and economists have recognized that the measurement of profitability is necessary to analyse and improve the financial performance of the sector. A large number of studies have been conducted in the field of Value based Management. A brief review of some of these studies has been presented.

1. In 1990, Joel Stern, managing partner of M/s Stern Stewart & Co. introduced the modified concept of economic profit named Economic Value Added (EVA) as measure of business performance in order to overcome the limitations of accounting based measures. EVA-based financial management and incentive compensation scheme gives manager better quality information and helps to analyse the Shareholders' wealth. EVA is a performance

measure which is most closely linked to the creation of shareholders' wealth over a period of time. EVA should be made the focal point for financial reporting, planning, and decision-making. The executives of an organization should look out for appropriate techniques that will guard them against any future attacks by corporate marauders. The best way of maximizing shareholder return is to offer incentives to managers for making decisions that boost long-term value. The objective is to motivate the managers to look beyond short-term measures of economic performance by essentially turning managers into owners. The managers may be guided by EVA and pursue such objectives that improve operating profits investing more capital. Managers can be remunerated a proportion of both the total EVA and the positive change in EVA.

**2. Stewart (1994)** has expended that EVA is a powerful new management tool that has gained worldwide recognition as the standard tool of corporate performance. EVA presents an integrated framework of financial management and incentive compensation. The adoption of EVA system by more and more companies throughout the world clearly depicts that it provides an integrated decision-making framework, can reforms energies and redirect resources to create sustainable value for companies, customers, employees, shareholders and for managements.

**3. Huang and Liu (2010)** represented that the traditional accounting performance measures (Return on Equity, Earnings per Share) only reflected short-term performance, and were unable to express an enterprise's long-term value. The sample of their study included a list of high-technology firms in Taiwan and China from 1998 - 2008. They used the ordinary least squares method to test their hypothesis. Empirical results of their study showed that the account receivables and account payables from related-party transactions of high-technology firms in Taiwan exhibited a significant (positive) relationship with performance. They used Market value added (MVA), which was a powerful method for explaining market value.

**4. Rice (1996)** believes that there is a direct relationship between EVA improvement and a higher share price. EVA has been made a part of Varsity's mantra company for building corporate culture and creating wealth for shareholders.

Specific ways that EVA has been applied at Varsity Company include:

1. EVA caused the company to take a closer look at its capital structure.
2. EVA identifies operations and projects that return more than the cost of capital.
3. EVA is used to evaluate potential joint ventures and
4. EVA provides a means of determining whether the sale of businesses or assets is in the best interest of shareholders

**5. Rajeshwar (1997)** offered in his study that EVA can also be used as a device for shareholders' communication and manager incentive system, apart from measuring the financial performance of organization. Demand for EVA among the corporate world has spurred competition among financial consultants, who help in computing EVA of business organizations.

**6. Banerjee (1997)** has conducted an empirical research to find the superiority of EVA over other traditional financial performance measure. Ten industries were chosen and each industry was represented by four/five companies. ROI and EVA have been calculated for sample companies and a comparison of both has been undertaken, showing the superiority of EVA over ROI. Indian companies are gradually recognizing the importance of EVA.

## II. Scope of Study

The financial statement is a mirror, which reflects the financial position and operational strength and weakness of concern. But a mere look at the financial statement will not reveal some crucial information. To bring out the hidden information, financial statements over a period are to be studied.



The study is concerned with the analysis of NOPAT, EVA, Market Cap, MPS, EPS, MVA, EV, CFROI of Leading Indian Pharma Companies as well as impact of Rate of Return ratios on Economic Profit (EVA/CE).

**Period of Study:** The study covers a period of 6 years from 2011-12 to 2016-17.

### Methodology

#### Sources of Data

The study is based on secondary data. Information required for the study has been collected from the Annual Reports of Sun Pharma, Lupin, Cipla, Dr Reddy's, Biocon, Aurobindo Pharma & Cadila and different books, journal, magazines, and data collected from various websites.

### III. Tools Applied

In this study various tools: Financial Tools – Ratio Analysis and Statistical Tools (i.e.) Mean and ANOVA, t-test has been used for data analysis.

**MEAN = Sum of variable/N**

**Standard Deviation** is used to see how measurements for a group are spread out from Mean. A low Standard Deviation means that most of the numbers are very close to the average and vice-versa.

**(SD) =  $\sqrt{\frac{\sum X^2}{N} - (\frac{\sum X}{N})^2}$**

**Coefficient of Variation** is a standardized measure of dispersion of a probability distribution or frequency distribution. It is the ratio of standard deviation to mean. Higher the coefficient of variation, the greater the level of dispersion around mean and vice-versa. **Coefficient of Variation (COV) = SD/MEAN\* 100.**

**t-Test (Two-Sample Assuming Unequal Variances):** t-test assesses whether the means of two groups are statistically different from each other.

### Hypothesis

An ANOVA is statistical hypothesis in which the sampling distribution of test statistic when null hypotheses is true. Null hypotheses have been set and adopted for the analysis of data. The null hypotheses are represented by  $H_0$ . It is a negative statement which avoids personal bias of investigator during data collection as well as the time of drawing conclusion.

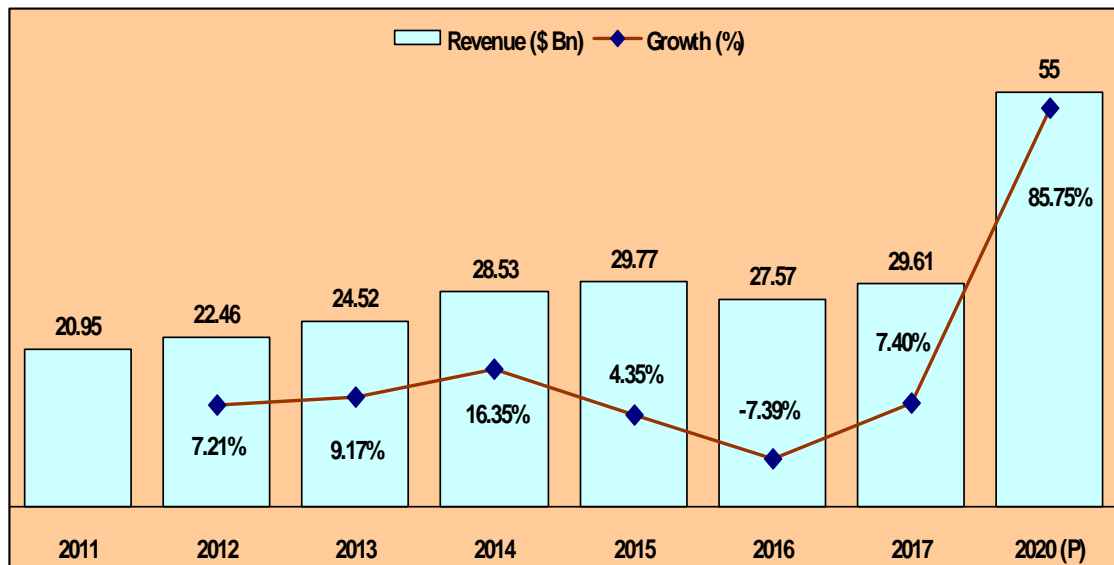
### IV. Limitation of The Study

1. The study is related to a period of 6 years.
2. Data is secondary i.e. they are collected from the published Annual Reports
3. Profitability, Structural and Valuation ratios have been taken for the study.

### I. Indian Pharma Sector & Its Leading Players

Indian pharma industry enjoys an important position in the global pharmaceuticals industry. The Indian pharmaceuticals market is the third-largest in terms of volume and thirteenth-largest in terms of value. Indian pharma industry is mainly operated as well as controlled by dominant foreign companies having subsidiaries in India due to availability of cheap labor in India at low cost. Revenue of the Indian Pharma Sector increased from \$ 29.61 billion to \$ 27.57 billion between 2011 & 2017 and is expected to reach \$ 55 billion by the end of 2020.

**Exhibit – 1: Revenue Indian Pharma Sector (\$ Billions)**



**Sun Pharma:** It is an international specialty pharma company manufacturing & marketing pharmaceutical formulations as branded generics throughout globe. Its business is divided into four segments: Indian Branded Generics, US Generics, International Branded Generics and Active Pharmaceutical Ingredients (API). Its brands are prescribed in chronic therapy areas like cardiology, psychiatry, neurology, gastroenterology, diabetology, respiratory.

**Lupin:** Headquartered in Mumbai, Lupin is an innovation led transnational pharma company producing a wide range of quality, affordable generic and branded Pharmaceutical Ingredients in Cardiovascular, Diabetology, Asthma, Pediatrics, Anti-Infectives, NSAIDs therapy segments, Anti-TB etc.

**Cipla:** Headquartered in Mumbai, it is a leading global pharmaceutical company, dedicated to high-quality, branded and generic medicines. Cipla develops medicines to treat respiratory, cardiovascular disease, arthritis, diabetes, weight control, depression etc.

**Dr Reddy's:** Headquartered in Hyderabad, it is an Indian multinational pharmaceutical company. It offers portfolio of products and services including APIs, custom pharmaceutical services, generics, biosimilars etc.

**Biocon:** Biocon is an Indian biopharma company based in Bangalore. It is committed to reduce therapy costs of chronic diseases like diabetes, cancer and autoimmune disease etc. It manufactures generic active pharmaceutical ingredients which are sold across the globe, including developed markets of the US and Europe.

**Aurobindo Pharma:** Headquartered in Hyderabad, Aurobindo Pharma manufactures generic pharmaceuticals and active pharmaceutical ingredients. It manufactures generic active pharmaceutical ingredients in antibiotics, anti-retrovirals, cardiovascular products, central nervous system products etc.

**Cadila:** Headquartered in Ahmedabad, it is of India's leading pharma company which has been developing and manufacturing pharmaceutical products in India as well as overseas. It specialization area includes cardiovascular, gastrointestinal, analgesics, haematinics, anti-infectives, respiratory agents, antidiabetics and immunologicals.

### Preface

The important goal of financial management is to create highest capital employees (owners & lenders) wealth and consequently enhancing the value of the firm. The question arises about the method to evaluate a firm's value. In

answer to this question, it can be said, various accounting based measures like Earning Per Share (EPS), Return on Equity (ROI); Return on Capital Employed (ROCE) and growth in sales have been used to evaluate the performance of the business. But the problem with these performance measures is that they lack a proper benchmark for comparison. The shareholders require at least a minimum rate of return that the above mentioned performance measures ignore. EVA is an estimation of firm's economic profit or value generated over the generated over the required rate of return.

Profit is the prime motive of every business. It plays a pivotal role behind the success and growth of an enterprise. Profitability is the main base for liquidity as well as solvency. Analysing a company's profitability is an important part of financial statement analysis. Profitability of a company measures the ability to generate earnings.

### EVA & its Constituents

EVA is a measure based on the Residual Income technique that serves as an indicator of the profitability of projects undertaken. Its underlying premise consists of the idea that real profitability occurs when additional wealth is created for shareholders and that projects should create returns above their cost of capital.

### EVA = NOPAT – (WACC \* Capital Employed)

To understand and calculate EVA we have to calculate NOPAT, Capital Employed, Debt Equity Ratio and Weighted Average Cost of Capital.

**Net Operating Profit after Tax (NOPAT)** is a measure of profit that excludes the costs and tax benefits of debt financing. It is used by analysts and investors as a precise and accurate measurement of profitability to compare a company's financial results across its over years as well as peer group.

**Exhibit – 2: Net Operating Profit After Tax**

Inr Mn	Sun Pharma	Lupin	Cipla	Dr. Reddy's	Biocon	Aurobindo Pharm	Cadila
2011-12	30,715	9,889	11,796	15,418	8,326	5,711	8,639
2012-13	30,263	13,839	49,308	16,813	8,876	8,247	8,586
2013-14	39,232	19,133	56,464	26,107	9,687	17,911	9,436
2014-15	63,050	24,542	14,225	30,963	10,278	18,910	12,644
2015-16	64,869	23,241	16,021	21,903	3,241	51,808	19,766
2016-17	82,460	27,089	12,018	13,206	5,695	56,361	15,283
Mean	51765	19622	26639	20735	7684	26491	12392
SD	21465	6656	20515	6858	2693	22040	4475
COV	0.41	0.34	0.77	0.33	0.35	0.83	0.36
CAGR (%)	21.8	22.3	0.4	-3.0	-7.3	58.1	12.1

Above Exhibit depicts that mean value of Sun Pharma is maximum in terms of NOPAT followed by Cipla, Aurobindo Pharma, Dr Reddy's & Lupin. Aurobindo Pharma reported the highest CAGR of 58% followed by Lupin.

### Hypothesis

**H<sub>0</sub>:**  $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7$  (NOPAT of Pharma Companies doesn't differ over years).

**H<sub>1</sub>:**  $\mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6 \neq \mu_7$  (NOPAT of Pharma Companies differ over years).

**Exhibit – 3: Net Operating Profit After Tax: Anova**  
**Anova: Single Factor**

Groups	Count	Sum	Average	Variance
SUN PHARMA	6	310587.3	51764.55	460753479.5
LUPIN	6	117732.4	19622.06667	44296705.29
CIPLA	6	159831.9	26638.65	420868105.7
DR. REDDY'S	6	124410	20735	47034601.2
BIOCON	6	46103	7683.833333	7254048.567
AUROBINDO PHARM	6	158947	26491.16667	485780909
CADILA	6	74354	12392.33333	20021168.27

**Anova: Variation**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	7282800728	6	1213800121	5.7177	0.000317	2.3718
Within Groups	7430045087	35	212287002			
<b>Total</b>	14712845815	41				

Above analysis shows that the F value (5.7177) is more than the table value (2.3718) so, null hypothesis is rejected. Therefore it is concluded that NOPAT of Pharma Companies differ over the years.

**Capital Employed:** Capital employed is the total amount of capital that a company has utilized in order to generate profits. It is the sum of shareholders' equity and debt. It can also be simplified as total assets minus current liabilities.

**Exhibit – 4: Capital Employed (In Millions)**

Inr Mln	Sun Pharma	Lupin	Cipla	Dr. Reddy's	Biocon	Aurobindo Pharm	Cadila
2011-12	135,527	44,459	76,422	66,309	23,422	33,145	39,986
2012-13	167,401	54,512	90,192	76,350	28,586	37,650	44,898
2013-14	204,948	70,825	103,682	99,407	36,329	50,552	49,455
2014-15	322,524	92,751	112,862	122,641	41,414	67,066	58,479
2015-16	401,780	165,373	120,882	136,383	63,720	80,327	67,314
2016-17	418,666	191,454	166,090	128,070	73,220	95,554	95,845
Mean	275141	103229	111688	104860	44449	60716	59330
SD	122400	61045	31033	28904	19840	24634	20385
COV	0.44	0.59	0.28	0.28	0.45	0.41	0.34
CAGR (%)	25.3	33.9	16.8	14.1	25.6	23.6	19.1

Above Exhibit depicts that mean value of Sun Pharma is maximum in terms of Capital Employed followed by Cipla, Dr Reddy's & Lupin. Lupin reported the highest CAGR of 33.9% followed by Biocon & Sun Pharma.

**Hypothesis**

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7$  (Capital Employed of Pharma Companies doesn't differ over years)

$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6 \neq \mu_7$  (Capital Employed of Pharma Companies differ over years)

**Exhibit – 5: Capital Employed (In Millions): Anova**  
**Anova: Single Factor**

Groups	Count	Sum	Average	Variance
SUN PHARMA	6	1650846	275140.95	14981872580.7
LUPIN	6	619373	103228.83	3726495455.2
CIPLA	6	670130.3	111688.38	963071474.3
DR. REDDY'S	6	629160	104860	835460500.0
BIOCON	6	266691	44448.5	393611400.7
AUROBINDO PHARM	6	364293.6	60715.6	606817518.9
CADILA	6	355977	59329.5	415560453.1

**Anova: Variation**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	219744523781	6	36624087297	11.6941	3.68572E-07	2.3718
Within Groups	109614446914	35	3131841340			
<b>Total</b>	<b>329358970695</b>	<b>41</b>				

Above analysis shows that the F value (11.6941) is more than the table value (2.3718) so, null hypothesis is rejected. Therefore it is concluded that Capital Employed of Pharma Companies differ over the years.

**Debt Equity Ratio:** It measures the total Debt of a company as a percentage of Equity share holders fund. A high Debt Equity ratio indicates high amount of Interest expenses which has to be paid irrespective of the profit volume. **Debt Equity Ratio = Borrowings / Equity Share Holders Fund.**

**Exhibit – 6: Debt Equity Ratio (D/E)**

Year	Sun Pharma	Lupin	Cipla	Dr. Reddy's	Biocon	Aurobindo Pharm	Cadila
2011-12	0.012	0.108	0.0004	0.329	0.031	0.411	0.494
2012-13	0.007	0.047	0.0001	0.199	0.061	0.439	0.465
2013-14	0.002	0.022	0.032	0.264	0.200	0.339	0.380
2014-15	0.044	0.011	0.028	0.132	0.227	0.243	0.245
2015-16	0.084	0.481	0.019	0.085	0.482	0.102	0.154
2016-17	0.036	0.418	0.281	0.044	0.404	0.019	0.347
Mean	0.031	0.181	0.060	0.176	0.234	0.259	0.348
SD	0.031	0.212	0.109	0.109	0.181	0.170	0.130
COV	1.00	1.17	1.82	0.62	0.77	0.66	0.37
Cagr (%)	25.1	31.1	266.5	-33.0	67.4	-45.7	-6.8

Above Exhibit depicts that mean value of Sun Pharma is minimum in terms of D/E ratio which indicates minimum risk in terms of Bankruptcy cost. Cadila reported the maximum in terms of D/E ratio indicating high amount of Interest cost & default risk.

**Hypothesis**

**H<sub>0</sub>:**  $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7$  (D/E ratio of Pharma Companies doesn't differ over years).

**H<sub>1</sub>:**  $\mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6 \neq \mu_7$  (D/E ratio of Pharma Companies differ over years).

**Exhibit – 7: Debt Equity Ratio: Anova**  
**Anova: Single Factor**

Groups	Count	Sum	Average	Variance
SUN PHARMA	6	0.184359	0.030726427	0.000952667
LUPIN	6	1.088061	0.181343562	0.044799116
CIPLA	6	0.360187	0.060031095	0.011918847
DR. REDDY'S	6	1.053251	0.17554189	0.011840016
BIOCON	6	1.405547	0.234257898	0.032600775
AUROBINDO PHARM	6	1.552395	0.258732539	0.028805333
CADILA	6	2.085061	0.347510232	0.016915086

**Anova: Variation**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.4427165	6	0.07379	3.4939	0.008201743	2.3718
Within Groups	0.7391592	35	0.02112			
<b>Total</b>	<b>1.1818757</b>	<b>41</b>				

Above analysis shows that the F value (3.4939) is more than the table value (2.3718) so, null hypothesis is rejected. Therefore it is concluded that Debt Equity ratio of Pharma Companies differ over the years.

**Weighted Average Cost of Capital (WACC)**

It is the average of the costs of various long term sources of financing. It is also known as composite or average cost of capital. After computing the cost of individual sources of finance, the weighted average cost of capital is calculated by putting weights in the proportion of the various sources of funds to the total funds.

$$\text{WACC} = \text{Proportion of Equity} * K_E + \text{Proportion of Debt} * K_D * (1-t),$$

$K_E$  = Cost of Equity,  $K_D * (1-t)$  = Post Tax Cost of Debt.

**Exhibit – 8: Weighted Average Cost of Capital (Wacc %)**

Year	Sun Pharma	Lupin	Cipla	Dr. Reddy's	Biocon	Aurobindo Pharm	Cadila
2011-12	11.15	9.54	11.04	9.59	16.85	14.02	9.11
2012-13	10.82	8.79	11.47	8.31	20.24	14.01	7.64
2013-14	13.36	10.36	14.02	13.89	21.60	10.98	7.05
2014-15	10.47	11.07	12.92	14.27	22.41	10.33	9.36
2015-16	13.83	9.13	14.90	12.90	9.95	16.93	10.93
2016-17	12.82	10.27	9.50	11.04	9.69	16.42	10.04
Mean	12.08	9.86	12.31	11.67	16.79	13.78	9.02
SD	1.434	0.857	2.011	2.417	5.726	2.710	1.458
COV	0.12	0.09	0.16	0.21	0.34	0.20	0.16
CAGR (%)	2.8	1.5	-2.9	2.9	-10.5	3.2	2.0

Above Exhibit depicts that mean value of Cadila is minimum in terms of WACC which indicating minimum risk. Biocon reported the maximum in terms of WACC ratio indicating high amount of risk.

**Hypothesis**

$H_0$ :  $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7$  (WACC of Pharma Companies doesn't differ over years).

$H_1$ :  $\mu_1 \mu_2 \mu_3 \mu_4 \mu_5 \mu_6 \mu_7$  (WACC of Pharma Companies differ over years).



**Exhibit – 9: Weighted Average Cost Of Capital (%): Anova**  
**Anova: Single Factor**

Groups	Count	Sum	Average	Variance
SUN PHARMA	6	72.45177	12.07529485	2.05732731
LUPIN	6	59.15282	9.858802976	0.733774433
CIPLA	6	73.85488	12.30914748	4.043949704
DR. REDDY'S	6	69.99558	11.66592968	5.843048607
BIOCON	6	100.7517	16.79194538	32.78529457
AUROBINDO PHARM	6	82.7028	13.78379948	7.34592464
CADILA	6	54.14403	9.024004941	2.124950433

**Anova: Variation**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	236.8411919	6	39.47353	5.0299	0.000823745	2.3718
Within Groups	274.6713485	35	7.84775			
<b>Total</b>	<b>511.5125404</b>	<b>41</b>				

Above analysis shows that the F value (5.0299) is more than the table value (2.3718) so, null hypothesis is rejected. Therefore it is concluded that WACC of Pharma Companies differ over the years.

**Economic Value Added (EVA)**

EVA concept developed by Stern Stewart in 1990's has been considered to be the best tool to assess the Economic Profit earned by a firm replacing the traditional concept of Accounting Profit. It is directly linked to the creation of shareholders wealth over time & is used to analyse the financial performance & Economic Profit of an entity. It provides a unique insight into value creation and unites the finance theory with competitive strategy framework. Cost of Equity is the return expected by the Shareholders for their investments and risks undertaken. Cost of Debt is the cost involved in procuring fund from any fixed income bearing securities. These costs were not considered by the financial managers while computing the profit of the company earlier, hence a proper justification could not be found between Accounting and Economic Profit.

EVA does not take into account if a company is making profit or loss. It considers the earnings that remain after all costs from all resources are taken into account including opportunity cost of capital. Opportunity cost for equity capital means the cost that is incurred to compensate the equity shareholders at a market determined rate of return.

**Exhibit – 10: Economic Value Added (Eva)**

Inr Mln	Sun Pharma	Lupin	Cipla	Dr. Reddy's	Biocon	Aurobindo Pharm	Cadila
2011-12	15,604	5,647	3,363	9,062	4,380	1,062	4,995
2012-13	12,154	9,048	38,958	10,468	3,089	2,970	5,155
2013-14	11,859	11,798	41,925	12,299	1,839	12,360	5,950
2014-15	29,271	14,272	-359	13,466	995	11,979	7,168
2015-16	9,302	8,145	-1,989	4,308	-3,101	38,207	12,405
2016-17	28,766	7,431	-3,763	-933	-1,399	40,672	5,659
Mean	17826	9390	13023	8111	967	17875	6889
SD	8900	3135	21389	5458	2795	17338	2811
COV	0.50	0.33	1.64	0.67	2.89	0.97	0.41
CAGR (%)	13.0	5.6	-202.3	-163.5	-179.6	107.3	2.5

Above Exhibit depicts that mean value of Aurobindo Pharma is maximum in terms of EVA followed by Sun Pharma & Cipla & Lupin. Aurobindo Pharma also reported the highest CAGR of 107.3% due to growth in EVA.

Cipla, Dr Reddy's & Biocon reported Negative EVA in terms of absolute value as a result of which it had Negative CAGR.

### Hypothesis

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7$  (EVA of Pharma Companies doesn't differ over years).

$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6 \neq \mu_7$  (EVA of Pharma Companies differ over years).

**Exhibit – 11: Economic Value Added: Anova**  
**ANOVA: Single Factor**

Groups	Count	Sum	Average	Variance
SUN PHARMA	6	106955.5	17825.92	79209747.89
LUPIN	6	56342	9390.333	9829011.41
CIPLA	6	78135.54	13022.59	457498658.6
DR. REDDY'S	6	48668.79	8111.465	29786902.79
BIOCON	6	5803.242	967.207	7810241.965
AUROBINDO PHARM	6	107251.8	17875.3	300615650.9
CADILA	6	41332.02	6888.67	7899096.202

**Anova: Variation**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1351390115.81	6	225231685.97	1.7662	0.134886	2.3718
Within Groups	4463246548.74	35	127521329.96			
<b>Total</b>	<b>5814636664.55</b>	<b>41</b>				

Above analysis shows that the F value (1.7662) is less than the table value (2.3718) so, null hypothesis is accepted. Therefore it is concluded that the trend of EVA of Pharma Companies does not differ over the years.

### Market Value Added (MVA)

MVA focuses on how well a firm has maximized shareholder value since its inception. It offers a judgment on the company's past, present and future use of investment capital. A higher number is better because it shows that shareholder value has increased over the life of the company. It is an aggregate figure because it provides information on the company as a whole. Companies with high MVA are attractive to investors because it indicates about positive returns as well as strong leadership, sound governance. MVA can be interpreted as the amount of wealth that management has created for investors over and above their investment. Companies that are able to sustain or increase MVA over time typically attract more investment, which enhances MVA.

**MVA = Market Cap – BV of Equity.**

**Exhibit – 12: Market Value Added (Mva)**

Inr Mln	Sun Pharma	Lupin	Cipla	Dr. Reddy's	Biocon	Aurobindo Pharm	Cadila
2011-12	456,268	432,873	168,591	250,702	25,076	11,145	128,539
2012-13	681,857	510,573	214,733	237,704	27,784	16,349	121,439
2013-14	985,961	767,533	206,866	358,188	54,613	111,322	174,024
2014-15	1,811,775	1,713,819	462,293	486,083	60,117	302,730	1,736,180
2015-16	1,602,735	1,221,466	292,407	391,442	53,674	363,538	266,074
2016-17	1,246,773	1,170,329	346,473	325,881	174,322	301,860	381,333
Mean	1130895	969432	281894	341667	65931	184491	467931
SD	524866	489327	109364	92670	55109	157155	629019
COV	0.46	0.50	0.39	0.27	0.84	0.85	1.34
CAGR (%)	22.3	22.0	15.5	5.4	47.4	93.4	24.3

Above Exhibit depicts that mean value of Sun Pharma is maximum in terms of MVA followed by Lupin, Cadila, Dr Reddy's & Cipla. Aurobindo Pharma reported the highest CAGR of 93.4% due to growth in MVA.

### Hypothesis

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7$  (MVA of Pharma Companies doesn't differ over years).

$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6 \neq \mu_7$  (MVA of Pharma Companies differ over years).

### Exhibit – 13: Market Value Added: Anova

#### Anova: Single Factor

Groups	Count	Sum	Average	Variance
SUN PHARMA	6	6785368	1130894.719	2.7548430E+11
LUPIN	6	5816595	969432.4358	2.3944057E+11
CIPLA	6	1691362	281893.725	1.1960393E+10
DR. REDDY'S	6	2050000	341666.6598	8.5877261E+09
BIOCON	6	395586	65931	3.0370135E+09
AUROBINDO PHARM	6	1106944	184490.7494	2.4697634E+10
CADILA	6	2807589	467931.4718	3.9566515E+11

#### Anova: Variation

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	5877291221007.75	6	979548536834.6	7.1509	4.95E-05	2.3718
Within Groups	4794363954597.06	35	136981827274.2			
<b>Total</b>	<b>10671655175604.80</b>	<b>41</b>				

Above analysis shows that the F value (7.1509) is more than the table value (2.3718) so, null hypothesis is rejected. Therefore it is concluded that MVA of Pharma Companies differ over the years.

### Enterprise Value (EV)

EV is a measure of a company's total value. It looks at the entire market value rather than just the equity value, so all ownership interests and assets claims from both debt and equity are included. Acquisition of assets through cash or issue of shares increases EV, irrespective of its productivity. On the other hand, a reduction in capital intensity, like reduction in the working capital, reduces the EV. EV could also be negative if the company have abnormally high amounts of cash that may not be reflected in the market value of the stock as well as the market capitalization.

**EV = Market Cap + BV of Debt.**

### Exhibit – 14: Enterprise Value (Ev)

Inr Mln	Sun Pharma	Lupin	Cipla	Dr. Reddy's	Biocon	Aurobindo Pharm	Cadila
2011-12	547,696	470,246	238,426	300,950	43,265	43,581	163,859
2012-13	797,874	557,340	303,496	293,883	49,641	51,915	160,499
2013-14	1,102,562	805,743	308,790	434,589	82,898	160,088	217,991
2014-15	2,024,529	1,775,682	569,512	603,329	92,327	365,306	1,788,481
2015-16	1,872,699	1,333,425	404,575	522,904	102,008	435,862	327,001
2016-17	1,514,031	1,311,891	506,321	450,086	237,099	392,279	461,743
Mean	1309898	1042388	388520	434290	101206	241505	519929
SD	592490	512576	128846	121795	70566	177528	631977
COV	0.45	0.49	0.33	0.28	0.70	0.74	1.22
CAGR (%)	22.6	22.8	16.3	8.38	40.5	55.2	23.02

Above Exhibit depicts that mean value of Sun Pharma is maximum in terms of EV followed by Lupin, Cadila, Dr Reddy's & Cipla. Aurobindo Pharma reported the highest CAGR of 55.2% due to growth in EV.

### Hypothesis

$H_0: \mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6=\mu_7$  (EV of Pharma Companies doesn't differ over years).

$H_1: \mu_1 \mu_2 \mu_3 \mu_4 \mu_5 \mu_6 \mu_7$  (EV of Pharma Companies differ over years).

### Exhibit – 15: Enterprise Value: Anova

#### Anova: Single Factor

Groups	Count	Sum	Average	Variance
SUN PHARMA	6	7859390	1309898.286	3.51044E+11
LUPIN	6	6254326	1042387.686	2.62735E+11
CIPLA	6	2331120	388519.9583	16601399366
DR. REDDY'S	6	2605741	434290.1598	14834003164
BIOCON	6	607238	101206.3333	4979535773
AUROBINDO PHARM	6	1449031	241505.1494	31516222481
CADILA	6	3119574	519928.9718	3.99395E+11

#### Anova: Variation

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	6910858214092.78	6	1151809702348.8	7.4578	3.40478E-05	2.3718
Within Groups	5405522099858.60	35	154443488567.4			
<b>Total</b>	<b>12316380313951.40</b>	<b>41</b>				

Above analysis shows that the F value (7.4578) is more than the table value (2.3718) so, null hypothesis is rejected. Therefore it is concluded that EV of Pharma Companies differ over the years.

### Cash Flow Return on Investment (CFROI)

CFROI is a metric that analyses a company's cash flow in relation to its capital employed. This ratio is used by investors who believe that cash flow is the underlying driver of value in a company, as opposed to earnings or sales. It is most informative when compared to WAAC, as it allows investors to see the discrepancy between the amount a company paid to raise funds and the amount of return a company receives from those funds.

**CFROI = Cash Flow from Operating Activities / Capital Employed.**

### Exhibit – 16: Cash Flow Return On Investment (CFROI)

Year	Sun Pharma	Lupin	Cipla	Dr. Reddy's	Biocon	Aurobindo Pharm	Cadila
2011-12	0.16	0.13	0.22	0.24	0.24	0.10	0.13
2012-13	0.20	0.23	0.15	0.18	0.16	0.07	0.13
2013-14	0.19	0.28	0.15	0.20	0.15	0.13	0.18
2014-15	0.17	0.29	0.10	0.21	0.05	0.18	0.17
2015-16	0.17	-0.02	0.14	0.24	0.06	0.18	0.28
2016-17	0.17	0.21	0.14	0.17	0.09	0.34	0.14
Mean	0.178	0.187	0.154	0.206	0.126	0.167	0.173
SD	0.015	0.119	0.039	0.031	0.074	0.096	0.057
COV	0.08	0.64	0.25	0.15	0.59	0.58	0.33
CAGR (%)	0.51	11.3	-8.5	-7.2	-18.3	28.4	2.0

Above Exhibit depicts that mean value of Dr Reddy's is maximum in terms of CFROI followed by Lupin, Sun Pharma, Cadila & Aurobindo Pharma. Aurobindo Pharma reported the highest CAGR of 28.4%.

### Hypothesis

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7$  (CFROI of Pharma Companies doesn't differ over years)

$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6 \neq \mu_7$  (CFROI of Pharma Companies differ over years).

**Exhibit – 17: Cash Flow Return On Investment: Anova**  
**Anova: Single Factor**

Groups	Count	Sum	Average	Variance
SUN PHARMA	6	1.068251	0.178041766	0.000227433
LUPIN	6	1.124856	0.187476004	0.014251181
CIPLA	6	0.921282	0.153546961	0.001528225
DR. REDDY'S	6	1.234237	0.205706243	0.000937416
BIOCON	6	0.756462	0.126077069	0.005447012
AUROBINDO PHARM	6	1.003549	0.167258098	0.009297007
CADILA	6	1.036764	0.172794013	0.003279313

**Anova: Variation**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.02	6	0.003860	0.7727	0.596595927	2.3718
Within Groups	0.17	35	0.004995			
<b>Total</b>	<b>0.20</b>	<b>41</b>				

Above analysis shows that the F value (0.7727) is less than the table value (2.3718) so, null hypothesis is accepted. Therefore it is concluded that the trend of CFROI of Pharma Companies does not differ over the years.

**T-Test:** It is used to test the null hypothesis that the variances of two populations are not equal. If t Stat value lies between - t Critical two tail and + t Critical two test we don't reject Null Hypothesis.

**EVA** is an attempt to figure out the actual economic value created by the company. After meeting the obligations if the company is left with earnings then it creates a Positive EVA and vice versa. From EVA stand point, if a company is making profits it does not necessarily mean that it is creating positive EVA likewise if a company is making losses it neither means, creation of negative EVA.

**Exhibit – 18: T-Test: Two-Sample Assuming Unequal Variances: Sun Pharma**

	Eps	Mps	Roce	Roe	Roa	Eva / Ce
Mean	27.00805269	749.2833333	25.5049449	18.9435459	13.51749	0.07137
Variance	23.04689118	30325.64367	31.04511484	4.752623148	7.658684	0.000961
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	5	5	5	5	5	
<b>t Stat</b>	<b>13.7437</b>	<b>10.5384</b>	<b>11.1810</b>	<b>21.2025</b>	<b>11.9006</b>	
P(T<=t) one-tail	1.8299E-05	6.64333E-05	4.99294E-05	2.16293E-06	3.69E-05	
t Critical one-tail	2.015048372	2.015048372	2.015048372	2.015048372	2.015048	
P(T<=t) two-tail	3.6598E-05	0.000132867	9.98589E-05	4.32587E-06	7.38E-05	
<b>t Critical two-tail</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	

### EPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between EPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between EPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### MPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between MPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between MPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROCE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROCE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROCE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROA & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROA & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROA & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

**Exhibit –19: T-Test: Two-Sample Assuming Unequal Variances: Lupin**

	Eps	Mps	Roce	Roe	Roa	Eva / Ce
Mean	41.505	1170.675	30.1262350 1	23.7756790 5	13.9242 5	0.11692 3
Variance	214.55287	326757.740 8	80.6888377 4	11.9558403 4	16.0632 7	0.00340 4
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	5	5	5	5	5	
t Stat	6.9212	5.0160	8.1831	16.7577	8.4377	
P(T<=t) one-tail	0.000482871	0.0020245	0.00022161 6	6.9146E-06	0.00019	
t Critical one-tail	2.015048372	2.01504837 2	2.02E+00	2.02E+00	2.01504 8	
P(T<=t) two-tail	0.000965741	0.004049	0.00044323 2	1.38292E-05	0.00038 4	
t Critical two-tail	2.570582	2.570582	2.570582	2.570582	2.57058 2	

**EPS & EVA/Capital Employed**

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between EPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between EPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

**MPS & EVA/Capital Employed**

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between MPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between MPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

**ROCE & EVA/Capital Employed**

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROCE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROCE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

**ROE & EVA/Capital Employed**

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

**ROA & EVA/Capital Employed**

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROA & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROA & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

**Exhibit –20: T-Test: Two-Sample Assuming Unequal Variances: Cipla**

	Eps	Mps	Roce	Roe	Roa	Eva / Ce
Mean	15.80166667	480.8333333	29.9236622	21.69692182	15.97058	0.13967
Variance	5.954936667	23579.05067	549.8026295	252.8317749	160.9082	0.047154
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	5	5	5	5	5	
<b>t Stat</b>	<b>15.6593</b>	<b>7.6680</b>	<b>3.1113</b>	<b>3.3206</b>	<b>3.0565</b>	
P(T<=t) one-tail	9.65218E-06	0.000300483	0.013256464	0.010497555	0.014107	
t Critical one-tail	2.015048	2.015048	2.015048	2.015048	2.015048	
P(T<=t) two-tail	1.93044E-05	0.000600966	0.026512928	0.02099511	0.028213	
<b>t Critical two-tail</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	

**EPS & EVA/Capital Employed**

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between EPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between EPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### MPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between MPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between MPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROCE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROCE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROCE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROA & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROA & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROA & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

**Exhibit –21: T-Test: Two-Sample Assuming Unequal Variances: Dr Reddy's**

	EPS	MPS	ROCE	ROE	ROA	EVA / CE
Mean	104.4711042	2541.908333	26.39806465	21.19303759	10.83493	0.088597
Variance	607.815903	470748.4594	61.16131185	44.89106297	6.837162	0.003758
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	5	5	5	5	5	
<b>t Stat</b>	<b>10.3708888</b>	<b>9.0745671</b>	<b>8.24016576</b>	<b>7.7152739</b>	<b>10.0642</b>	
P(T<=t) one-tail	7.17589E-05	0.000135905	0.000214484	0.000291984	8.289E-05	
t Critical one-tail	2.015048	2.015048	2.015048	2.015048	2.015048	
P(T<=t) two-tail	0.000143518	0.00027181	0.000428969	0.000583969	0.000166	
<b>t Critical two-tail</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	

### EPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between EPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between EPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### MPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between MPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between MPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.



### ROCE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROCE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROCE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROA & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROA & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROA & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

**Exhibit –22: T-Test: Two-Sample Assuming Unequal Variances: Biocon**

	EPS	MPS	ROCE	ROE	ROA	EVA / CE
Mean	20.12167	503.66667	24.39286	12.69263	7.168929	0.050321
Variance	43.9005	105202.6037	163.2954	42.8018	16.70482	0.007464
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	5	5	5	5	5	
<b>t Stat</b>	<b>7.4195971</b>	<b>3.8033140</b>	<b>4.6659976</b>	<b>4.7329619</b>	<b>4.26533</b>	
P(T<=t) one-tail	0.000350232	0.006292878	0.002751168	0.002591214	0.003987	
t Critical one-tail	2.015048	2.015048	2.015048	2.015048	2.015048	
P(T<=t) two-tail	0.000700464	0.012585756	0.005502335	0.005182428	0.007974	
<b>t Critical two-tail</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	

### EPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between EPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between EPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### MPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between MPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between MPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROCE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROCE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROCE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROA & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROA & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROA & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

**Exhibit –23: T-Test: Two-Sample Assuming Unequal Variances: Aurobindo Pharma**

	EPS	MPS	ROCE	ROE	ROA	EVA / CE
Mean	53.0746	569.6917	40.0334	38.4159	17.7774	0.23923
Variance	1152.6029	170576.1384	641.1727	567.5754	173.3697	0.03260
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	5	5	5	5	5	
<b>t Stat</b>	<b>3.812013</b>	<b>3.377333</b>	<b>3.849431</b>	<b>3.925090</b>	<b>3.262360</b>	
P(T<=t) one-tail	0.0062372	0.0098657	0.0060040	0.0055625	0.0111935	
t Critical one-tail	2.0150484	2.0150484	2.0150484	2.0150484	2.0150484	
P(T<=t) two-tail	0.0124744	0.0197314	0.0120081	0.0111250	0.0223871	
<b>t Critical two-tail</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	

### EPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between EPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between EPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### MPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between MPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between MPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROCE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROCE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROCE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROA & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROA & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROA & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

**Exhibit –24: T-Test: Two-Sample Assuming Unequal Variances: Cadila**

	Eps	Mps	Roce	Roe	Roa	Eva / Ce
Mean	25.6023	837.8167	23.7951	25.1787	11.9542	0.120992
Variance	149.2603	259111.713	25.1718	17.7179	11.1615	0.00158
Observations	6	6	6	6	6	6
Hypothesized Mean Difference	0	0	0	0	0	
df	5	5	5	5	5	
<b>t Stat</b>	<b>5.10885</b>	<b>4.03105</b>	<b>11.55790</b>	<b>14.58112</b>	<b>8.67534</b>	
P(T<=t) one-tail	0.00187106	0.00500539	4.25268E-05	1.36987E-05	0.0001682	
t Critical one-tail	2.015048	2.015048	2.015048	2.015048	2.015048	
P(T<=t) two-tail	0.003742123	0.010010786	8.50536E-05	2.73974E-05	0.0003365	
<b>t Critical two-tail</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	<b>2.570582</b>	

### EPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between EPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between EPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### MPS & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between MPS & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between MPS & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROCE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROCE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROCE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROE & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROE & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROE & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

### ROA & EVA/Capital Employed

$H_0: \mu_1^2 = \mu_2^2$  (There is significant relationship between ROA & EVA/CE, Variance is not Equal).

$H_1: \mu_1^2 \neq \mu_2^2$  (There is significant no relationship between ROA & EVA/CE, Variance is Equal).

Here the t Stat value do not lie between - 2.570582 & + 2.570582. Therefore, we accept Null Hypothesis stating that the variances are not equal.

## Conclusion

Value based Analysis has proved to be more effective in analysing the Financial performance and Shareholders value and hence it is preferred over the traditional analytical tools. EVA, MVA and EV are considered as the yardstick for calculating the value generated by a firm as it takes into account the Cost of Capital.

## Anova Findings

The study reveals that:

1. Sun Pharma reported the maximum value in terms of NOPAT followed by Cipla, Aurobindo Pharma.
2. Sun Pharma reported the maximum value in terms of Capital Employed followed by Cipla, Dr Reddy's.
3. Sun Pharma has the minimum D/E ratio indicating minimum risk in terms of Bankruptcy cost.
4. Cadila has the minimum WACC indicating minimum risk.
5. Aurobindo Pharma reported the maximum EVA followed by Sun Pharma & Cipla & Lupin. Aurobindo Pharma also reported the highest CAGR of 107.3% due to growth in EVA.
6. Sun Pharma reported the maximum MVA followed by Lupin, Cadila, Dr Reddy's & Cipla.
7. Sun Pharma reported the maximum EV followed by Lupin, Cadila, Dr Reddy's & Cipla.
8. Dr Reddy's reported the maximum CFROI followed by Lupin, Sun Pharma, Cadila & Aurobindo Pharma.

Sun Pharma reported the highest mean value in terms of NOPAT, MVA, EV and second position in terms of EVA. Moreover, its D/E ratio is minimum indicating minimum risk. So, it can be inferred that Sun Pharms's position in terms of Value generation is better in comparison to other Pharma companies.

## T-Test Conducted with selected Pharma Companies revealed that

1. There is significant relationship between EPS & EVA/Capital Employed.
2. There is significant relationship between MPS & EVA/Capital Employed.
3. There is significant relationship between ROCE & EVA/Capital Employed.
4. There is significant relationship between ROE & EVA/Capital Employed.
5. There is significant relationship between ROA & EVA/Capital Employed.

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