



VALUE BASED ANALYSIS: A STUDY ON LEADING INDIAN CEMENT FIRMS

Sri Ayan Chakraborty

Faculty of Management, University Program, Institute of Computer Accountants.

Abstract

Value Based Analysis or Management is a continuing process which focuses in maximising Shareholders' Wealth. It is applied to evaluate the financial performance as well as the shareholders' value created. Traditional based measures do not take into consideration a firm's cost of capital, and are therefore considered inappropriate in evaluating value creation. Moreover, these 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 value.

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 Equivalents.

The study aims at evaluating the relationship between EVA, MVA, EV, PAT, NOPAT & EPS, MPS, ROCE, ROE, ROA to Capital Employed as well as the variance analysis between EPS, ROCE, ROE and EVA, of Leading Indian Cement players.

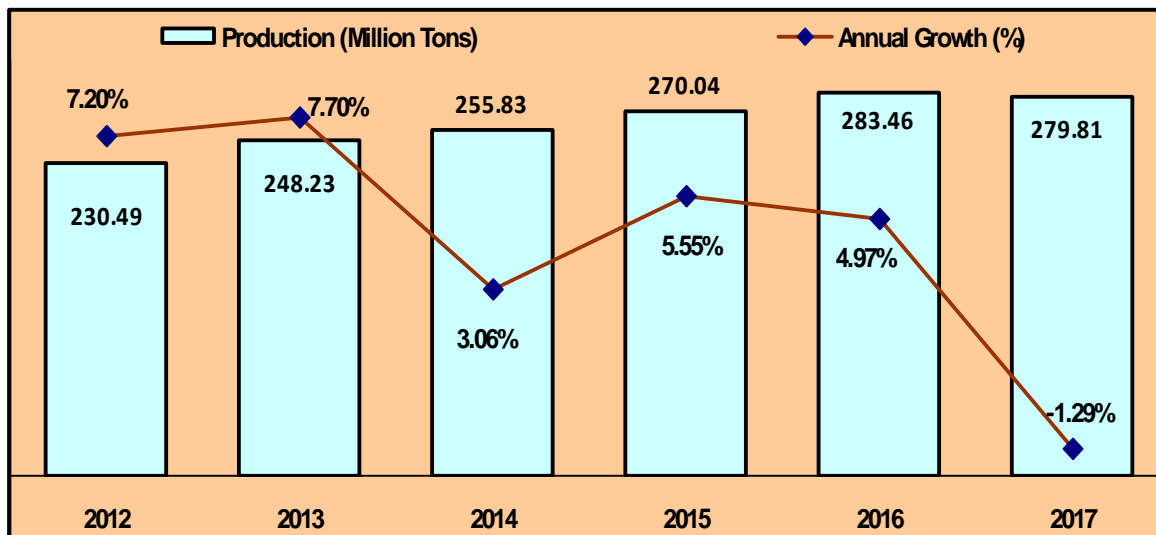
Keywords: *NOPAT, EVA, Market Cap, MPS, EPS, MVA, EV, CFROI, ROCE and ROE.*

Indian Cement Sector & the Market Leaders

Indian Cement Industry has the second largest market in the world after China with production of 279.81 million tons per annum. The Cement Industry comprises of 210 large and 365 mini cement plants. Cement is a cyclical commodity with a high correlation with GDP. The demand for cement in real estate sector is spread across rural housing (40%), urban housing (25%) and construction/infrastructure/industrial activities (25%). While the rest 10% demand is contributed by commercial real estate sector. The growth in the Real Estate sector has played a positive role behind the

development in the Cement Sector. Cement demand is expected to reach 550 to 600 Million Tonnes Per Annum (MTPA) by 2025.

Exhibit – 1: Annual Production (Million Tons)



Ultratech Cement

Headquartered in Mumbai, Ultra-Tech Cement Ltd was founded in 1983. It has a production capacity of 93 million tonnes per annum (MTPA) of grey cement. It operates across India, Bangladesh, Bahrain, UAE, and Sri Lanka. For white cement segment, it adopts the brand name of Birla White.

ACC

Headquartered in Mumbai, Associated Cement Companies Limited was founded in 1936. It is the second largest Indian cement company with annual production capacity of 33.42 million tonnes. It operates with more than 40 ready mix concrete plants, 21 sales offices, and several zonal offices.

Ambuja Cement

Headquartered in Mumbai, Ambuja Cements Ltd was founded in 1983 and stated its production in 1986. It is the third largest Indian cement company with annual production capacity of 29.65 million tonnes. It has 5 integrated cement manufacturing plants and 8 cement grinding units.

Shree Cements

Headquartered in Kolkata, Shree Cements Limited was founded in 1979 in Bewar in the Ajmer district of Rajasthan. It is the fourth largest Indian cement company with annual production capacity of 13.5 million tonnes. It has 6 cement manufacturing plants located at Beawar, Ras, Khushkhera, Jobner (Jaipur) and Suratgarh in Rajasthan and Laksar (Roorkee) in Uttarakhand.

Ramco Cement

Headquartered in Chennai Ramco was founded in 1984. It is the fifth largest Indian cement company with annual production capacity of 16.45 million tonnes. It has 8 manufacturing plants including grinding unit. It also produces Ready Mix Concrete and Dry Mortar products.



India Cements

Headquartered in Tirunelveli, The India Cements Limited was founded in 1946. It is the sixth largest Indian cement company with annual production capacity of 15.5 million tonnes. It manufactures cement for various applications, including, precast concrete items, concrete components, and multi-storey buildings, as well as runways, concrete roads, bridges and for general-purpose use. It has 8 integrated cement plants and 2 grinding units.

Prism Cement

Prism Cement Limited is India's 8th leading integrated Building Materials Company, with a wide range of products from cement, ready-mixed concrete, tiles, and bath products to kitchens. The company has three Divisions Prism Cement, H & R Johnson (India), and RMC Readymix (India).

Binani Cement

Headquartered in Mumbai, Binani was founded in the year 1872. It is the seventh largest Indian cement company with annual production capacity of 11.25 million tonnes. It has 2 integrated plants, one in India and another in China, and grinding units in Dubai.

Birla Corp

M.P Birla is one of the top Industrial groups in India. It offers wide range of products including auto interiors, cables, jute, cement etc. The group include companies like Vindhya Telelinks Ltd, Universal-ABB Power Cables Ltd, Universal Cables Ltd, Hindustan Gum & Chemicals Ltd etc.

Jk Cement

Headquartered in Mumbai, J.K Cement Ltd was founded by Lala Kamlapat Singhanian. It is one of the top manufacturers of white cement in India. It has 3 cement production plants located in Karnataka, Andhra Pradesh, and Maharashtra. It produces 2 types of cements namely Portland Slag Cement, Ordinary Portland Cement and Ground Granulated Blast Furnace Slag.

Objectives of The Study

1. To analysis the profitability position of some selected Cement Companies like Ultratech Cement, ACC, Ambuja Cement, Shree Cement, India Cement, Prism Cement, Binani Cement, Ramco Cement, Birla Corp, JK Cement.
2. To know the overall efficiency and performance of the firm through financial analysis.
3. To highlight the financial performance and return of the selected companies using Value Based Analysis.

Review of Literature

The researcher and economists have recognized that the measurement of profitability in Cement Sector 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.

In order to overcome the limitations of accounting based measures of financial performance, Joel Stern, managing partner of M/s Stern Stewart & Co. introduced a modified concept of economic profit in 1990 in the name of Economic Value Added (EVA) as measure of business performance. Stern (1990) observed that EVA as a performance measure captures the true economic profit of an organization.

EVA-based financial management and incentive compensation scheme gives manager better quality information and superior motivation to make decisions that will create the maximum shareholders' wealth in an organization. EVA is a performance measure which is most closely linked to the creation of shareholders' wealth over a period of time. The financial management and the incentive compensation system based on EVA give the manager superior information and higher motivation. Accordingly 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. A major step is to provide cash bonus or stock option arrangements with incentives to that create built-in share 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.

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.

Huang and Liu (2010) represented that the traditional accounting performance measures (Return of 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. However, the sales or purchases of goods from related party transactions of high-technology firms in China had a significant (negative) relationship with performance. They used Market value added (MVA), which was a powerful method for explaining market value.

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

Specific ways that EVA has been applied at Varity 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.

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.



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.

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 10 Leading Indian Cement Companies.

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 Ultratech Cement, ACC, Ambuja Cement, Shree Cement, India Cement, Prism Cement, Binani Cement, Ramco Cement, Birla Corp, JK Cement and different books, journal, magazines, and data collected from various websites.

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.

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

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.

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.

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 evaluated 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 it's over years as well as peer group.

Exhibit – 2: Net Operating Profit After Tax

| Year | Ultratech | ACC | Ambuja | Shree | India | Prism | Binani | Ramco | Birla Corp | JK Cement |
|----------|-----------|--------|--------|--------|-------|-------|--------|-------|------------|-----------|
| 2011-12 | 23,526 | 13,737 | 12,668 | 8,362 | 5,497 | 1,802 | 1,371 | 5,054 | 2,780 | 2,823 |
| 2012-13 | 26,697 | 11,357 | 13,477 | 11,801 | 4,964 | 2,060 | 1,967 | 5,392 | 3,225 | 3,389 |
| 2013-14 | 26,647 | 11,840 | 13,358 | 9,126 | 1,653 | 2,840 | - | 2,930 | 2,073 | 2,051 |
| 2014-15 | 25,151 | 12,356 | 15,418 | 5,528 | 4,714 | 3,091 | -3,131 | 4,017 | 2,435 | 3,697 |
| 2015-16 | 27,826 | 6,254 | 8,737 | 12,169 | 5,213 | 3,066 | 11,533 | 7,036 | 2,403 | 3,301 |
| 2016-17 | 27,822 | 6,481 | 15,216 | 14,536 | 4,810 | 2,093 | 5,302 | 7,478 | 4,903 | 4,832 |
| Mean | 26,278 | 10,338 | 13,146 | 10,254 | 4,475 | 2,492 | 281 | 5,318 | 2,970 | 3,349 |
| SD | 1,670 | 3,177 | 2,420 | 3,212 | 1,411 | 571 | 9,077 | 1,737 | 1,025 | 926 |
| COV | 0.06 | 0.31 | 0.18 | 0.31 | 0.32 | 0.23 | 32.27 | 0.33 | 0.35 | 0.28 |
| CAGR (%) | 3.4 | -14.0 | 3.7 | 11.7 | -2.6 | 3.0 | 31.1 | 8.2 | 12.0 | 11.4 |

Exhibit-2 depicts that Ultratech reported the highest mean value and COV in terms of NOPAT followed by Ambuja, ACC, Shree Cement etc. Binani reported the highest CAGR of 31.1%. ACC & India Cement reported a negative CAGR.

Hypothesis:

H₀: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6=\mu_7=\mu_8=\mu_9=\mu_{10}$ (NOPAT of Cement Companies doesn't differ over years)

$H_1: \mu_1 \mu_2 \mu_3 \mu_4 \mu_5 \mu_6 \mu_7 \mu_8 \mu_9 \mu_{10}$ (NOPAT of Cement Companies differ over years)

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

| Groups | Count | Sum | Average | Variance |
|------------------|-------|------------|----------|---------------|
| Ultratech Cement | 6 | 1,57,669.1 | 26,278.2 | 27,87,281.2 |
| Acc | 6 | 62,025.3 | 10,337.5 | 1,00,95,136.8 |
| Ambuja Cement | 6 | 78,874.1 | 13,145.7 | 58,55,207.9 |
| Shree Cement | 6 | 61,521.3 | 10,253.5 | 1,03,15,049.1 |
| India Cement | 6 | 26,851.4 | 4,475.2 | 19,91,902.6 |
| Prism Cement | 6 | 14,952.5 | 2,492.1 | 3,26,164.2 |
| Binani Cement | 6 | 1,687.7 | 281.3 | 8,23,90,454.1 |
| Ramco Cement | 6 | 31,906.5 | 5,317.7 | 30,17,674.8 |
| Birla Corp | 6 | 17,819.8 | 2,970.0 | 10,50,265.7 |
| JK Cement | 6 | 20,092.1 | 3,348.7 | 8,57,037.9 |

Anova: Variation

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|-------------------------|-----------|----------------|----------|----------------------|----------|
| Between Groups | 3,16,47,69,889.2 | 9 | 35,16,41,098.8 | 29.62781 | 0.000000000000000046 | 2.073351 |
| Within Groups | 59,34,30,871.6 | 50 | 1,18,68,617.4 | | | |
| Total | 3,75,82,00,760.7 | 59 | | | | |

Above analysis shows that the F value (29.62781) is more than the table value (2.073351) therefore null hypothesis is rejected. Therefore it is concluded that Net Operating Profit after Tax (NOPAT) of the Cement Companies differs 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)

| Year | Ultratech | ACC | Ambuja | Shree | India | Prism | Binani | Ramco | Birla Corp | JK Cement |
|----------|-----------|--------|----------|--------|--------|--------|--------|--------|------------|-----------|
| 2011-12 | 1,76,677 | 74,851 | 81,154 | 35,517 | 56,898 | 23,250 | 38,431 | 35,511 | 29,981 | 25,188 |
| 2012-13 | 2,03,987 | 74,575 | 88,367 | 42,867 | 61,232 | 24,500 | 35,789 | 37,638 | 33,504 | 27,548 |
| 2013-14 | 2,32,027 | 78,134 | 94,953 | 51,575 | 56,476 | 25,611 | 35,300 | 39,793 | 34,454 | 42,022 |
| 2014-15 | 2,50,993 | 82,177 | 1,01,016 | 62,706 | 74,688 | 27,918 | 46,916 | 44,465 | 39,304 | 43,182 |
| 2015-16 | 2,68,422 | 84,211 | 1,02,950 | 73,762 | 72,033 | 27,240 | 44,631 | 41,933 | 37,150 | 44,678 |
| 2016-17 | 3,07,625 | 86,415 | 1,95,690 | 82,167 | 76,620 | 24,544 | 39,222 | 43,084 | 73,541 | 46,697 |
| Mean | 2,39,955 | 80,061 | 1,10,688 | 58,099 | 66,324 | 25,510 | 40,048 | 40,404 | 41,322 | 38,219 |
| SD | 46,631 | 4,961 | 42,419 | 18,058 | 9,169 | 1,781 | 4,736 | 3,405 | 16,103 | 9,342 |
| COV | 0.19 | 0.06 | 0.38 | 0.31 | 0.14 | 0.07 | 0.12 | 0.08 | 0.39 | 0.24 |
| CAGR (%) | 11.7 | 2.9 | 19.2 | 18.3 | 6.1 | 1.1 | 0.4 | 3.9 | 19.7 | 13.1 |

Exhibit-4 depicts that in terms of Mean Value, Ultratech Cement have the maximum amount of Capital of Rs 2,39,955 Millions. ACC reorted minimum COV followed by Prism, Ramco Cements etc. Birla Corp reported the highest CAGR of 19.7%, followed by Ambuja Cement of 19.2%

Hypothesis

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7 = \mu_8 = \mu_9 = \mu_{10}$ (D/E Ratio of Cement Companies doesn't differ over years)

$H_1: \mu_1 \mu_2 \mu_3 \mu_4 \mu_5 \mu_6 \mu_7 \mu_8 \mu_9 \mu_{10}$ (D/E Ratio of Cement Companies differ over years)

Exhibit – 5: Capital Employed (In Millions): Anova

ANOVA: Single Factor

| Groups | Count | Sum | Average | Variance |
|------------------|-------|-------------|------------|----------------|
| Ultratech Cement | 6 | 14,39,729.8 | 2,39,955 | 2,17,44,08,938 |
| Acc | 6 | 4,80,363.1 | 80,060.5 | 2,46,06,789 |
| Ambuja Cement | 6 | 6,64,130.1 | 1,10,688.4 | 1,79,93,76,315 |
| Shree Cement | 6 | 3,48,594 | 58,099 | 32,60,74,206 |
| India Cement | 6 | 3,97,947 | 66,324.5 | 8,40,64,345 |
| Prism Cement | 6 | 1,53,062 | 25,510.3 | 31,72,598.2 |
| Binani Cement | 6 | 2,40,287.8 | 40,048 | 2,24,32,174.1 |
| Ramco Cement | 6 | 2,42,424.7 | 40,404.1 | 1,15,95,166.9 |
| Birla Corp | 6 | 2,47,933.7 | 41,322.3 | 25,92,90,593.2 |
| Jk Cement | 6 | 2,29,315.7 | 38,219.3 | 8,72,71,184.1 |

ANOVA: VARIATION

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|--------------------------|-----------|-----------------|----------|----------|----------|
| Between Groups | 2,17,29,77,73,726 | 9 | 24,14,41,97,081 | 50.38131 | 5.37E-22 | 2.073351 |
| Within Groups | 23,96,14,61,547 | 50 | 47,92,29,231 | | | |
| Total | 2,41,25,92,35,273 | 59 | | | | |

Above analysis shows that the F value (50.38131) is more than the table value (2.073351) therefore null hypothesis is rejected. Therefore it is concluded that Capital Employed of Cement Companies differs over 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 = Total Debt / Equity Share Holders Fund**

Exhibit – 6: Debt Equity Ratio (D/E)

| Year | Ultratech | ACC | Ambuja | Shree | India | Prism | Binani | Ramco | Birla Corp | JK Cement |
|----------|-----------|-------|--------|-------|-------|-------|--------|-------|------------|-----------|
| 2011-12 | 0.38 | 0.07 | 0.01 | 0.30 | 0.44 | 0.84 | 8.66 | 0.73 | 0.33 | 0.65 |
| 2012-13 | 0.34 | 0.01 | 0.0045 | 0.12 | 0.53 | 1.04 | 18.39 | 0.59 | 0.37 | 0.62 |
| 2013-14 | 0.35 | 0 | 0.0035 | 0.09 | 0.66 | 1.30 | -13.20 | 0.62 | 0.36 | 1.39 |
| 2014-15 | 0.27 | 0 | 0.0031 | 0.07 | 0.51 | 1.41 | -27.79 | 0.63 | 0.39 | 1.71 |
| 2015-16 | 0.22 | 0 | 0.0023 | 0.08 | 0.42 | 1.18 | -7.74 | 0.34 | 0.27 | 1.80 |
| 2016-17 | 0.26 | 0 | 0.0012 | 0.07 | 0.47 | 0.94 | -3.57 | 0.13 | 1.23 | 1.65 |
| Mean | 0.30 | 0.014 | 0.0035 | 0.12 | 0.51 | 1.12 | -4.21 | 0.51 | 0.49 | 1.30 |
| SD | 0.06 | 0.03 | 0.0018 | 0.09 | 0.09 | 0.22 | 16.29 | 0.22 | 0.36 | 0.53 |
| COV | 0.20 | 2.07 | 0.51 | 0.74 | 0.17 | 0.19 | -3.87 | 0.44 | 0.74 | 0.41 |
| CAGR (%) | -7.1 | -100 | -28.1 | -25.8 | 1.1 | 2.2 | -183.8 | -28.7 | 29.6 | 20.3 |

Exhibit-6 depicts that in terms of Mean Value, both Ramco & India Cement have the maximum Debt Equity ratio of 0.51, followed by Birla Corp (0.49). Binani have negative D/E ratio since FY 2013-14. Birla Corp reported the highest CAGR of 29.6%. Ultratech, ACC, Ambuja, Shree Binani & Ramco Cement reported a negative CAGR.

Hypothesis

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7 = \mu_8 = \mu_9 = \mu_{10}$ (D/E Ratio of Cement Companies doesn't differ over years)

$H_1: \mu_1 \mu_2 \mu_3 \mu_4 \mu_5 \mu_6 \mu_7 \mu_8 \mu_9 \mu_{10}$ (D/E Ratio of Cement Companies differ over years)

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

| Groups | Count | Sum | Average | Variance |
|------------------|-------|--------|---------|----------|
| Ultratech Cement | 6 | 1.82 | 0.3041 | 0.00364 |
| Acc | 6 | 0.08 | 0.0140 | 0.00084 |
| Ambuja Cement | 6 | 0.021 | 0.0035 | 0.000003 |
| Shree Cement | 6 | 0.72 | 0.1206 | 0.00797 |
| India Cement | 6 | 3.03 | 0.5052 | 0.00728 |
| Prism Cement | 6 | 6.72 | 1.1197 | 0.04745 |
| Binani Cement | 6 | -25.25 | -4.2080 | 265.21 |
| Ramco Cement | 6 | 3.04 | 0.5075 | 0.0506 |
| Birla Corp | 6 | 2.94 | 0.4906 | 0.1311 |
| Jk Cement | 6 | 7.82 | 1.3034 | 0.2830 |

Anova: Variation

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|--------------|-----------|----|---------|-------------|----------|
| Between Groups | 129 | 9 | 14 | 0.53981 | 0.838385461 | 2.073351 |
| Within Groups | 1,329 | 50 | 27 | | | |
| Total | 1,458 | 59 | | | | |

Above analysis shows that the F value (0.53981) is less than the table value (2.073351) therefore null hypothesis is accepted. Therefore it is concluded that Debt Equity Ratio (D/E) of the Cement Companies doesn't differ over the years

Weighted Average Cost of Capital (WACC)

It is the average of the costs of various sources of financing. It is also known as composite or overall 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. **WACC = Proportion of Equity * K_E + 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 | Ultratech | ACC | Ambuja | Shree | India | Prism | Binani | Ramco | Birla Corp | JK Cement |
|----------|-----------|-------|--------|-------|-------|-------|--------|-------|------------|-----------|
| 2011-12 | 10.26 | 13.67 | 13.61 | 27.86 | 16.72 | 12.67 | 7.31 | 10.85 | 8.37 | 11.34 |
| 2012-13 | 7.95 | 13.51 | 14.82 | 41.65 | 14.80 | 12.33 | 9.85 | 10.76 | 10.57 | 12.50 |
| 2013-14 | 13.16 | 14.74 | 14.97 | 31.30 | 14.54 | 14.17 | 11.20 | 11.13 | 9.78 | 7.55 |
| 2014-15 | 15.76 | 16.26 | 18.16 | 31.57 | 21.29 | 13.87 | 8.27 | 12.20 | 13.76 | 9.58 |
| 2015-16 | 14.09 | 14.36 | 16.01 | 23.60 | 21.22 | 16.25 | 7.31 | 12.90 | 12.34 | 10.16 |
| 2016-17 | 13.39 | 15.61 | 17.70 | 31.07 | 20.57 | 16.13 | 3.33 | 16.31 | 8.39 | 9.88 |
| Mean | 12.43 | 14.69 | 15.88 | 31.17 | 18.19 | 14.23 | 7.88 | 12.36 | 10.54 | 10.17 |
| SD | 2.83 | 1.08 | 1.77 | 5.97 | 3.21 | 1.66 | 2.70 | 2.11 | 2.17 | 1.68 |
| COV | 0.23 | 0.07 | 0.11 | 0.19 | 0.18 | 0.12 | 0.34 | 0.17 | 0.21 | 0.17 |
| CAGR (%) | 5.5 | 2.7 | 5.4 | 2.2 | 4.2 | 4.9 | -14.6 | 8.5 | 0.03 | -2.7 |

Exhibit-8 depicts that in terms of Mean Value, Shree Cement have the maximum WACC of 31.17%. In terms of COV ACC reported the minimum value of 7%, followed by Ambuja, Prism etc. Ramco Cement reported the highest CAGR of 8.5%, while Binani Cement reported a negative CAGR.

Hypothesis

H₀: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6=\mu_7=\mu_8=\mu_9=\mu_{10}$ (WACC of Cement Companies doesn't differ over years)

H₁: $\mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6 \neq \mu_7 \neq \mu_8 \neq \mu_9 \neq \mu_{10}$ (WACC of Cement Companies differ over years)

Exhibit – 9: Weighted Average Cost of Capital (%): Anova

ANOVA: Single Factor

| Groups | Count | Sum | Average | Variance |
|------------------|-------|--------|---------|----------|
| ULTRATECH CEMENT | 6 | 74.60 | 12.43 | 8.02 |
| ACC | 6 | 88.13 | 14.69 | 1.17 |
| AMBUJA CEMENT | 6 | 95.27 | 15.88 | 3.13 |
| SHREE CEMENT | 6 | 187.05 | 31.17 | 35.65 |
| INDIA CEMENT | 6 | 109.14 | 18.19 | 10.29 |
| PRISM CEMENT | 6 | 85.40 | 14.23 | 2.77 |
| BINANI CEMENT | 6 | 47.27 | 7.88 | 7.29 |
| RAMCO CEMENT | 6 | 74.15 | 12.36 | 4.46 |
| BIRLA CORP | 6 | 63.22 | 10.54 | 4.71 |
| JK CEMENT | 6 | 61.03 | 10.17 | 2.82 |

Anova: Variation

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|--------------|-----------|-----|----------|----------|----------|
| Between Groups | 2,281 | 9 | 253 | 31.55807 | 1.26E-17 | 2.073351 |
| Within Groups | 402 | 50 | 8 | | | |
| Total | 2,683 | 59 | | | | |

Above analysis shows that the F value (31.55807) is more than the table value (2.073351) therefore null hypothesis is rejected. Therefore it is concluded that WACC of Cement Companies differs over years.

Economic Value Added (EVA)

Economic Value Added (EVA) concept, developed by Stern Stewart in 1990's has been considered as a financial measure and referred as economic profit or residual income by economists. It is directly linked to the creation of shareholders wealth over time and is used to analyse the financial performance and to capture the Economic Profit of an entity. It provides a unique insight into value creation and unites the finance theory with competitive strategy framework. EVA focuses the economic profit as against accounting profit. Cost of equity share capital is the return expected by the Equity Share holders for their investments and the risks undertaken by them. 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. Economists do take all such costs including opportunity costs in order to compute a firm's earnings. Thus profits of a business differ in financial manager's view point and that of an economist's view point.

EVA, in general 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)

| Year | Ultratech | ACC | Ambuja | Shree | India | Prism | Binani | Ramco | Birla Corp | JK Cement |
|----------|-----------|-------|---------|---------|---------|--------|---------|--------|------------|-----------|
| 2011-12 | 5,396 | 3,508 | 1,620 | -1,533 | -4,018 | -1,143 | -1,437 | 1,202 | 269 | -35 |
| 2012-13 | 10,489 | 1,285 | 384 | -6,051 | -4,097 | -960 | -1,560 | 1,342 | -317 | -55 |
| 2013-14 | -3,886 | 325 | -853 | -7,018 | -6,556 | -788 | -19,306 | -1,497 | -1,297 | -1,123 |
| 2014-15 | -14,397 | - | -2,929 | -14,269 | -11,185 | -781 | -7,013 | -1,410 | -2,973 | -442 |
| 2015-16 | -9,987 | - | -7,751 | -5,236 | -10,072 | -1,359 | 8,269 | 1,627 | -2,182 | -1,240 |
| 2016-17 | -13,383 | - | -19,419 | -10,994 | -10,954 | -1,864 | 3,998 | 449 | -1,264 | 218 |
| Mean | -4,295 | - | -4,824 | -7,517 | -7,814 | -1,149 | -2,841 | 285 | -1,294 | -446 |
| SD | 10,293 | 1,455 | 7,869 | 4,496 | 3,350 | 414 | 9,616 | 1,402 | 1,184 | 609 |
| COV | -2.40 | 4,136 | -1.63 | -0.60 | -0.43 | -0.36 | -3.38 | 4.91 | -0.91 | -1.36 |
| CAGR (%) | -219.9 | -2.84 | -264.3 | 48.3 | 22.2 | 10.3 | -222.7 | -17.9 | -236.2 | -244.5 |
| | | 214.8 | | | | | | | | |

Exhibit-10 depicts that Ramco Cement reported the highest mean value in terms of EVA. All others companies reported negative EVA. Shree Cement reported a CAGR of 48.3%, followed by India, Prism Cement, while others reported a negative CAGR.

Hypothesis

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7 = \mu_8 = \mu_9 = \mu_{10}$ (EVA of Cement Companies doesn't differ over years)

$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6 \neq \mu_7 \neq \mu_8 \neq \mu_9 \neq \mu_{10}$ (EVA of Cement Companies differ over years)

Exhibit – 11: Eva: Anova

ANOVA: Single Factor

| Groups | Count | Sum | Average | Variance |
|------------------|-------|-----------|----------|----------------|
| Ultratech Cement | 6 | -25,767.8 | -4,294.6 | 10,59,40,191.1 |
| Acc | 6 | -8,731.0 | -1,455.2 | 1,71,07,305.0 |
| Ambuja Cement | 6 | -28,946.7 | -4,824.5 | 6,19,20,691.3 |
| Shree Cement | 6 | -45,101.3 | -7,516.9 | 2,02,16,353.8 |
| India Cement | 6 | -46,883.2 | -7,813.9 | 1,12,25,527.2 |
| Prism Cement | 6 | -6,896.6 | -1,149.4 | 1,71,421.9 |
| Binani Cement | 6 | -17,048.7 | -2,841.5 | 9,24,65,916.5 |
| Ramco Cement | 6 | 1,712.9 | 285.5 | 19,66,921.7 |
| Birla Corp | 6 | -7,764.3 | -1,294.0 | 14,01,832.6 |
| Jk Cement | 6 | -2,676.5 | -446.1 | 3,70,333.1 |

ANOVA: Variation

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|-------------------------|-----------|---------------|---------|----------------|----------|
| Between Groups | 44,67,67,328.4 | 9 | 4,96,40,814.3 | 1.58705 | 0.144916436782 | 2.073351 |
| Within Groups | 1,56,39,32,471.0 | 50 | 3,12,78,649.4 | | | |
| Total | 2,01,06,99,799.4 | 59 | | | | |

Above analysis shows that the F value (3.03994) is more than the table value (2.073351) therefore null hypothesis is rejected. Therefore it is concluded that Economic Value Added (EVA) of the Cement Companies differs 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.

Exhibit – 12: Market Value Added (MVA)

| Year | Ultratech | ACC | Ambuja | Shree | India | Prism | Binani | Ramco | Birla Corp | JK Cement |
|----------|-----------|----------|-----------|-----------|---------|--------|--------|---------|------------|-----------|
| 2011-12 | 2,84,660 | 1,86,864 | -54,042 | 10,94,210 | -5,163 | 12,951 | 31,203 | -16,843 | -525 | 97,537 |
| 2012-13 | 3,59,536 | 1,45,125 | -61,060 | 13,70,172 | -14,230 | 9,147 | 27,400 | -17,660 | -5,703 | 1,68,704 |
| 2013-14 | 4,27,940 | 1,86,092 | -63,379 | 19,28,494 | -15,388 | 8,196 | 25,120 | -19,463 | -2,924 | 1,50,219 |
| 2014-15 | 6,08,092 | 2,16,617 | -60,978 | 36,87,211 | -22,236 | 38,381 | 30,359 | -20,209 | 2,649 | 4,51,726 |
| 2015-16 | 6,64,742 | 1,76,682 | -66,785 | 42,58,503 | -24,289 | 28,050 | 26,160 | -21,818 | -749 | 4,56,390 |
| 2016-17 | 8,49,330 | 1,86,589 | -1,48,479 | 58,74,333 | -2,233 | 36,635 | 38,277 | -21,958 | 23,917 | 6,36,150 |
| Mean | 5,32,383 | 1,82,995 | -75,787 | 30,35,487 | -13,923 | 22,227 | 29,753 | -19,659 | 2,778 | 3,26,788 |
| SD | 2,12,536 | 22,987 | 35,856 | 18,83,976 | 8,857 | 13,831 | 4,797 | 2,108 | 10,721 | 2,17,639 |
| COV | 0.40 | 0.13 | -0.47 | 0.62 | -0.64 | 0.62 | 0.16 | -0.11 | 3.86 | 0.67 |
| CAGR (%) | 24.4 | 0.0 | 22.4 | 39.9 | -15.4 | 23.1 | 4.2 | 5.4 | -314.6 | 45.5 |

Exhibit-12 depicts that Shree Cement reported the highest mean value in terms of MVA followed by Ultratech, JK Cement, ACC etc. JK Cement reported a CAGR of 45.5%. India Cement & Birla Corp reported a negative CAGR.

Hypothesis

H₀: $\mu_1=\mu_2=\mu_3=\mu_4=\mu_5=\mu_6=\mu_7=\mu_8=\mu_9=\mu_{10}$ (MVA of Cement Companies doesn't differ over years)

H₁: $\mu_1 \mu_2 \mu_3 \mu_4 \mu_5 \mu_6 \mu_7 \mu_8 \mu_9 \mu_{10}$ (MVA of Cement Companies differ over years)

Exhibit – 13: Mva: Anova

ANOVA: Single Factor

| Groups | Count | Sum | Average | Variance |
|------------------|-------|----------------|--------------|--------------------|
| Ultratech Cement | 6 | 31,94,299.30 | 5,32,383.22 | 45,17,14,41,349 |
| Acc | 6 | 10,97,969.16 | 1,82,994.86 | 52,83,82,605 |
| Ambuja Cement | 6 | -4,54,723.25 | -75,787.21 | 1,28,56,47,237 |
| Shree Cement | 6 | 1,82,12,923.62 | 30,35,487.27 | 35,49,36,45,19,770 |
| India Cement | 6 | -83,539.69 | -13,923.28 | 7,84,39,573 |
| Prism Cement | 6 | 1,33,360.10 | 22,226.68 | 19,12,90,231 |
| Binani Cement | 6 | 1,78,519.06 | 29,753.18 | 2,30,08,979 |
| Ramco Cement | 6 | -1,17,951.39 | -19,658.56 | 44,43,024 |
| Birla Corp | 6 | 16,665.44 | 2,777.57 | 11,49,34,067 |
| Jk Cement | 6 | 19,60,725.16 | 3,26,787.53 | 47,36,68,94,155 |

ANOVA: Variation

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|-----------------------------|-----------|--------------------|----------|----------------|----------|
| Between Groups | 4,81,62,70,18,85,202 | 9 | 53,51,41,13,20,578 | 14.68502 | 0.000000000028 | 2.073351 |
| Within Groups | 1,82,20,64,50,04,951 | 50 | 3,64,41,29,00,099 | | | |
| Total | 6,63,83,34,68,90,153 | 59 | | | | |

Above analysis shows that the F value (14.68502) is more than the table value (2.073351) therefore null hypothesis is rejected. Therefore it is concluded that Market Value Added (MVA) of the Cement Companies differs 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.

Exhibit – 14: Enterprise Value (Ev)

| Year | Ultratech | ACC | Ambuja | Shree | India | Prism | Binani | Ramco | Birla Corp | JK Cement |
|----------|-----------|----------|--------|-----------|--------|--------|--------|--------|------------|-----------|
| 2011-12 | 4,59,195 | 2,60,056 | 6,380 | 11,24,740 | 51,613 | 35,275 | 64,799 | 18,193 | 25,171 | 1,18,393 |
| 2012-13 | 5,61,675 | 2,12,892 | 4,705 | 14,08,449 | 46,900 | 32,658 | 60,939 | 19,439 | 24,980 | 1,92,499 |
| 2013-14 | 6,56,481 | 2,59,168 | 8,124 | 19,76,275 | 41,016 | 32,700 | 59,003 | 19,876 | 26,507 | 1,88,154 |
| 2014-15 | 8,55,451 | 2,95,696 | 15,415 | 37,48,932 | 51,960 | 65,291 | 74,552 | 23,368 | 37,273 | 4,90,968 |
| 2015-16 | 9,10,494 | 2,59,953 | 7,631 | 43,31,434 | 47,387 | 53,979 | 69,389 | 19,204 | 32,768 | 4,97,338 |
| 2016-17 | 11,34,467 | 2,70,220 | 30,249 | 59,55,389 | 74,007 | 60,370 | 76,506 | 19,928 | 94,333 | 6,78,574 |
| Mean | 7,62,960 | 2,59,664 | 12,084 | 30,90,870 | 52,147 | 46,712 | 67,532 | 20,001 | 40,172 | 3,60,988 |
| SD | 2,49,986 | 26,825 | 9,628 | 19,03,473 | 11,422 | 14,894 | 7,168 | 1,765 | 26,979 | 2,25,149 |
| COV | 0.33 | 0.10 | 0.80 | 0.62 | 0.22 | 0.32 | 0.11 | 0.09 | 0.67 | 0.62 |
| CAGR (%) | 19.8 | 0.77 | 36.5 | 39.6 | 7.47 | 11.3 | 3.4 | 1.8 | 30.2 | 41.8 |

Exhibit-14 depicts that Shree Cement reported the highest mean value in terms of EV. All others companies reported negative EV. Birla Corp reported a CAGR of 124.1% followed by JK Cement, India and Prism Cement. All other firms had a negative CAGR.

Hypothesis

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7 = \mu_8 = \mu_9 = \mu_{10}$ (EV of Cement Companies doesn't differ over years)

$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6 \neq \mu_7 \neq \mu_8 \neq \mu_9 \neq \mu_{10}$ (EV of Cement Companies differ over years)

Exhibit – 15: Ev: ANOVA

ANOVA: Single Factor

| Groups | Count | Sum | Average | Variance |
|------------------|-------|----------------|--------------|-----------------------|
| Ultratech Cement | 6 | 45,77,762.90 | 7,62,960.48 | 62,49,30,55,447.41 |
| Acc | 6 | 15,57,986.04 | 2,59,664.34 | 71,95,58,858.76 |
| Ambuja Cement | 6 | 72,505.45 | 12,084.24 | 9,27,06,888.71 |
| Shree Cement | 6 | 1,85,45,219.82 | 30,90,869.97 | 36,23,20,93,93,690.65 |
| India Cement | 6 | 3,12,882.56 | 52,147.09 | 13,04,56,242.51 |
| Prism Cement | 6 | 2,80,271.30 | 46,711.88 | 22,18,33,717.66 |
| Binani Cement | 6 | 4,05,189.37 | 67,531.56 | 5,13,85,918.13 |
| Ramco Cement | 6 | 1,20,008.61 | 20,001.44 | 31,16,003.52 |
| Birla Corp | 6 | 2,41,032.31 | 40,172.05 | 72,78,46,347.63 |
| Jk Cement | 6 | 21,65,925.45 | 3,60,987.58 | 50,69,19,66,774.37 |

ANOVA: Variation

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|----------------------|----|--------------------|----------|----------------|----------|
| Between Groups | 4,87,41,51,08,56,671 | 9 | 54,15,72,34,28,519 | 14.48697 | 0.000000000036 | 2.073351 |
| Within Groups | 1,86,91,70,65,99,447 | 50 | 3,73,83,41,31,989 | | | |
| Total | 6,74,33,21,74,56,118 | 59 | | | | |

Above analysis shows that the F value (14.48697) is more than the table value (2.073351) therefore null hypothesis is rejected. Therefore it is concluded that Enterprise Value (EV) of the Cement Companies differs 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.

Exhibit – 16: Cash Flow Return On Investment (Cfroi)

| Year | Ultratech | ACC | Ambuja | Shree | India | Prism | Binani | Ramco | Birla Corp | JK Cement |
|----------|-----------|--------|--------|--------|--------|--------|---------|--------|------------|-----------|
| 2011-12 | 0.1915 | 0.2105 | 0.1887 | 0.5424 | 0.1655 | 0.1147 | 0.1356 | 0.2432 | 0.0817 | 0.2064 |
| 2012-13 | 0.1783 | 0.2114 | 0.2105 | 0.2939 | 0.1195 | 0.1061 | 0.1633 | 0.1864 | 0.0586 | 0.1387 |
| 2013-14 | 0.1489 | 0.1361 | 0.1335 | 0.2716 | 0.0914 | 0.0221 | 0.0607 | 0.1278 | 0.1041 | 0.0867 |
| 2014-15 | 0.1669 | 0.1645 | 0.1659 | 0.1975 | 0.0864 | 0.0711 | -0.0090 | 0.2095 | 0.0717 | 0.0593 |
| 2015-16 | 0.1686 | 0.1730 | 0.1512 | 0.2123 | 0.1338 | 0.1697 | 0.0762 | 0.2596 | 0.0670 | 0.1298 |
| 2016-17 | 0.1623 | 0.1609 | 0.1439 | 0.2679 | 0.0987 | 0.2753 | 0.0917 | 0.2594 | 0.0921 | 0.1626 |
| Mean | 0.169 | 0.176 | 0.166 | 0.298 | 0.116 | 0.126 | 0.086 | 0.214 | 0.079 | 0.131 |
| SD | 0.014 | 0.030 | 0.029 | 0.126 | 0.030 | 0.088 | 0.060 | 0.051 | 0.017 | 0.053 |
| COV | 0.09 | 0.17 | 0.18 | 0.42 | 0.26 | 0.69 | 0.70 | 0.24 | 0.21 | 0.40 |
| CAGR (%) | -3.3 | -5.2 | -5.3 | -13.2 | -9.8 | 19.1 | -7.5 | 1.3 | 2.4 | -4.7 |

Exhibit-16 depicts that Shree Cement reported the highest mean value in terms of CFROI followed by Ramco, ACC, Ultratech, Ambuja, JK Cement etc. In terms of CAGR Prism Cement reported the highest followed by Birla Corp, Ramco Cements, others reported a negative CAGR.

Hypothesis

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7 = \mu_8 = \mu_9 = \mu_{10}$ (CFROI of Cement Companies doesn't differ over years)

$H_1: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6 \neq \mu_7 \neq \mu_8 \neq \mu_9 \neq \mu_{10}$ (CFROI of Cement Companies differ over years)

Exhibit – 17: CFROI: ANOVA
ANOVA: Single Factor

| Groups | Count | Sum | Average | Variance |
|------------------|-------|--------|---------|----------|
| Ultratech Cement | 6 | 1.0166 | 0.1694 | 0.000209 |
| Acc | 6 | 1.0565 | 0.1761 | 0.000882 |
| Ambuja Cement | 6 | 0.9936 | 0.1656 | 0.000852 |
| Shree Cement | 6 | 1.7856 | 0.2976 | 0.015754 |
| India Cement | 6 | 0.6953 | 0.1159 | 0.000913 |
| Prism Cement | 6 | 0.7590 | 0.1265 | 0.007702 |
| Binani Cement | 6 | 0.5185 | 0.0864 | 0.003648 |
| Ramco Cement | 6 | 1.2859 | 0.2143 | 0.002642 |
| Birla Corp | 6 | 0.4752 | 0.0792 | 0.000285 |
| Jk Cement | 6 | 0.7835 | 0.1306 | 0.002768 |

ANOVA: Variation

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---------------------|---------------|-----------|---------|---------|----------------|----------|
| Between Groups | 0.2280 | 9 | 0.02533 | 7.10354 | 0.000001526273 | 2.073351 |
| Within Groups | 0.1783 | 50 | 0.00357 | | | |
| Total | 0.4062 | 59 | | | | |

Above analysis shows that the F value (7.10354) is more than the table value (2.073351) therefore null hypothesis is rejected. Therefore it is concluded that Cash Flow Return on Investment (CFROI) of the Cement Companies differs 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 not just figure out the accounting profit of an organization, but to put an amount on 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: Ultratech Cement

| | EPS | MPS | ROCE | ROE | ROA | EVA / CE |
|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------|
| Mean | 88.76734 | 2619.9667 | 0.155599 | 0.137176 | 0.07251 | -0.01 |
| Variance | 81.29862 | 867440.9 | 0.000629 | 0.001257 | 0.00029 | 0.0 |
| Observations | 6 | 6 | 6 | 6 | 6 | 6 |
| Pearson Correlation | 0.383608 | -0.815714 | 0.955195 | 0.963969 | 0.95911 | |
| Hypothesized Mean Difference | 0 | 0 | 0 | 0 | 0 | |
| df | 5 | 5 | 5 | 5 | 5 | |
| t Stat | 24.16296 | 6.890280 | 19.502 | 27.31565 | 7.465317 | |
| P(T<=t) one-tail | 1.13E-06 | 0.000493 | 3.27E-06 | 6.15E-07 | 0.000340 | |
| t Critical one-tail | 2.015048 | 2.015048 | 2.015048 | 2.015048 | 2.015048 | |
| P(T<=t) two-tail | 2.26E-06 | 0.000986 | 6.54E-06 | 1.23E-06 | 0.000681 | |
| t Critical two-tail | 2.570582 | 2.570582 | 2.570582 | 2.570582 | 2.570582 | |

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: Acc

| | EPS | MPS | ROCE | ROE | ROA | EVA / CE |
|------------------------------|-----------------|-----------------|-----------------|------------------|-----------------|----------|
| Mean | 51.43667 | 1388.133 | 0.156428 | 0.123830 | 0.077635 | -0.0157 |
| Variance | 253.8953 | 18918.69 | 0.002545 | 0.002126 | 0.000703 | 0.0025 |
| Observations | 6 | 6 | 6 | 6.000000 | 6.000000 | 6.0000 |
| Pearson Correlation | 0.947513 | -0.34493 | 0.970716 | 0.981313 | 0.970813 | |
| Hypothesized Mean Difference | 0 | 0 | 0 | 0.000000 | 0.000000 | |
| df | 5 | 5 | 5 | 5.000000 | 5.000000 | |
| t Stat | 7.93322 | 24.7179 | 34.6426 | 33.792048 | 9.082581 | |
| P(T<=t) one-tail | 0.000256 | 1.01E-06 | 1.89E-07 | 0.000000 | 0.000135 | |
| t Critical one-tail | 2.015048 | 2.015048 | 2.015048 | 2.015048 | 2.015048 | |
| P(T<=t) two-tail | 0.000513 | 2.02E-06 | 3.77E-07 | 0.000000 | 0.000271 | |
| t Critical two-tail | 2.570582 | 2.570582 | 2.570582 | 2.570582 | 2.570582 | |

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: Ambuja

| | EPS | MPS | ROCE | ROE | ROA | EVA / CE |
|------------------------------|-----------------|-----------------|-----------------|-----------------|------------------|----------|
| Mean | 77.65101 | 212.4833 | 0.169771 | 0.122204 | 0.086183 | -0.03136 |
| Variance | 218.3322 | 1234.291 | 0.002216 | 0.001337 | 0.000802 | 0.00219 |
| Observations | 6 | 6 | 6 | 6 | 6 | 6 |
| Pearson Correlation | 0.578303 | -0.73963 | 0.943202 | 0.941361 | 0.934599 | |
| Hypothesized Mean Difference | 0 | 0 | 0 | 0 | 0 | |
| df | 5 | 5 | 5 | 5 | 5 | |
| t Stat | 12.9013 | 14.8023 | 31.1378 | 21.5234 | 12.688102 | |
| P(T<=t) one-tail | 2.49E-05 | 1.27E-05 | 3.21E-07 | 2.01E-06 | 0.000027 | |
| t Critical one-tail | 2.015048 | 2.015048 | 2.015048 | 2.015048 | 2.015048 | |
| P(T<=t) two-tail | 4.98E-05 | 2.54E-05 | 6.41E-07 | 4.02E-06 | 0.000054 | |
| t Critical two-tail | 2.570582 | 2.570582 | 2.570582 | 2.570582 | 2.570582 | |

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: Shree Cement

| | EPS | MPS | ROCE | ROE | ROA | EVA / CE |
|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------|
| Mean | 25.4428 | 8,865 | 0.2007 | 0.1780 | 0.1137 | -0.13 |
| Variance | 95.240 | 29813050.31 | 0.006 | 0.004 | 0.001 | 0.00 |
| Observations | 6 | 6 | 6 | 6 | 6 | 6 |
| Pearson Correlation | 0.3148 | -0.2412 | 0.5540 | 0.6294 | 0.7056 | |
| Hypothesized Mean Difference | 0 | 0 | 0 | 0 | 0 | |
| df | 5 | 5 | 5 | 5 | 5 | |
| t Stat | 6.4307 | 3.9770 | 11.8039 | 13.4563 | 12.5313 | |
| P(T<=t) one-tail | 0.00068 | 0.00528 | 0.00004 | 0.00002 | 0.00003 | |
| t Critical one-tail | 2.01505 | 2.01505 | 2.01505 | 2.01505 | 2.01505 | |
| P(T<=t) two-tail | 0.00135 | 0.01056 | 0.00008 | 0.00004 | 0.00006 | |
| t Critical two-tail | 2.570582 | 2.570582 | 2.570582 | 2.570582 | 2.570582 | |

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: India Cements

| | EPS | MPS | ROCE | ROE | ROA | EVA / CE |
|------------------------------|-----------------|-----------------|-----------------|----------------|-----------------|----------|
| Mean | 2.5445 | 98.975 | 0.0808 | 0.01541 | 0.007995 | -0.11 |
| Variance | 33.9422 | 1,226.11 | 0.0010 | 0.0023 | 0.000384 | 0.00 |
| Observations | 6 | 6 | 6 | 6 | 6 | 6 |
| Pearson Correlation | 0.38673 | -0.19408 | 0.57492 | 0.41619 | 0.43737 | |
| Hypothesized Mean Difference | 0 | 0 | 0 | 0 | 0 | |
| df | 5 | 5 | 5 | 5 | 5 | |
| t Stat | 1.12062 | 6.93024 | 14.94826 | 6.79736 | 8.93462 | |
| P(T<=t) one-tail | 0.15668 | 0.00048 | 0.00001 | 0.00052 | 0.00015 | |
| t Critical one-tail | 2.01505 | 2.01505 | 2.01505 | 2.01505 | 2.01505 | |
| P(T<=t) two-tail | 0.31337 | 0.00096 | 0.00002 | 0.00105 | 0.00029 | |
| t Critical two-tail | 2.570582 | 2.570582 | 2.570582 | 2.57058 | 2.570582 | |

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 lies between - 2.570582 & + 2.570582. Therefore, we reject Null Hypothesis stating that the variances are 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: Prism Cements

| | EPS | MPS | ROCE | ROE | ROA | EVA / CE |
|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------|
| Mean | -0.3906 | 68.15 | 0.0846 | -0.01738 | -0.0045 | -0.0455 |
| Variance | 0.76579 | 774.41800 | 0.00059 | 0.00145 | 0.00009 | 0.00030 |
| Observations | 6 | 6 | 6 | 6 | 6 | 6 |
| Pearson Correlation | -0.5342 | -0.3931 | -0.4088 | -0.5315 | -0.5310 | |
| Hypothesized Mean Difference | 0 | 0 | 0 | 0 | 0 | |
| df | 5 | 5 | 5 | 5 | 5 | |
| t Stat | -0.956 | 6.001 | 9.040 | 1.386 | 4.214 | |
| P(T<=t) one-tail | 0.192 | 0.00092 | 0.00014 | 0.112 | 0.004 | |
| t Critical one-tail | 2.015 | 2.015 | 2.015 | 2.015 | 2.015 | |
| P(T<=t) two-tail | 0.383 | 0.002 | 0.000 | 0.224 | 0.008 | |
| t Critical two-tail | 2.570582 | 2.570582 | 2.570582 | 2.570582 | 2.570582 | |

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 lies between - 2.570582 & + 2.570582. Therefore, we reject Null Hypothesis stating that the variances are 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: Binani Cements

| | EPS | MPS | ROCE | ROE | ROA | EVA / CE |
|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------|
| Mean | -13.970 | 87 | 0.0284 | 0.8874 | -0.0586 | -0.08169 |
| Variance | 45.1566 | 421 | 0.0011 | 3.1390 | 0.0007 | 0.0659 |
| Observations | 6 | 6 | 6 | 6 | 6 | 6 |
| Pearson Correlation | 0.5457 | -0.0744 | 0.3505 | -0.4963 | 0.5894 | |
| Hypothesized Mean Difference | 0 | 0 | 0 | 0 | 0 | |
| df | 5 | 5 | 5 | 5 | 5 | |
| t Stat | -5.1674 | 10.3388 | 1.0922 | 1.2414 | 0.2344 | |
| P(T<=t) one-tail | 0.0018 | 0.0001 | 0.1623 | 0.1348 | 0.4120 | |
| t Critical one-tail | 2.0150 | 2.0150 | 2.0150 | 2.0150 | 2.0150 | |
| P(T<=t) two-tail | 0.0036 | 0.0001 | 0.3245 | 0.2695 | 0.8240 | |
| t Critical two-tail | 2.570582 | 2.570582 | 2.570582 | 2.570582 | 2.570582 | |

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 lies between - 2.570582 & + 2.570582. Therefore, we reject Null Hypothesis stating that the variances are 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 lies between - 2.570582 & + 2.570582. Therefore, we reject Null Hypothesis stating that the variances are 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 lies between - 2.570582 & + 2.570582. Therefore, we reject Null Hypothesis stating that the variances are equal.

Exhibit –25: T-Test: Two-Sample Assuming Unequal Variances: Ramco Cements

| | EPS | MPS | ROCE | ROE | ROA | EVA / CE |
|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------|
| Mean | 165.108 | 332 | 0.1725 | 0.1407 | 0.0584 | 0.0082 |
| Variance | 6911.51 | 34,715 | 0.003217 | 0.00335 | 0.000794 | 0.001209 |
| Observations | 6 | 6 | 6 | 6 | 6 | 6 |
| Pearson Correlation | 0.6967 | 0.0924 | 0.8886 | 0.9374 | 0.7677 | |
| Hypothesized Mean Difference | 0 | 0 | 0 | 0 | 0 | |
| df | 5 | 5 | 5 | 5 | 5 | |
| t Stat | 4.8659 | 4.3590 | 13.2605 | 11.5712 | 5.5065 | |
| P(T<=t) one-tail | 0.0023 | 0.0036 | 0.0000 | 0.0000 | 0.0014 | |
| t Critical one-tail | 2.0150 | 2.0150 | 2.0150 | 2.0150 | 2.0150 | |
| P(T<=t) two-tail | 0.0046 | 0.0073 | 0.0000 | 0.0001 | 0.0027 | |
| t Critical two-tail | 2.570582 | 2.570582 | 2.570582 | 2.570582 | 2.570582 | |

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 –26: T-Test: Two-Sample Assuming Unequal Variances: Birla Corp

| | EPS | MPS | ROCE | ROE | ROA | EVA / CE |
|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------|
| Mean | 26.0152 | 388.75 | 0.0909 | 0.0756 | 0.039 | -0.0316 |
| Variance | 45.3905 | 33,002 | 0.00087 | 0.00067 | 0.00026 | 0.00101 |
| Observations | 6 | 6 | 6 | 6 | 6 | 6 |
| Pearson Correlation | 0.7067 | -0.0647 | 0.7264 | 0.7630 | 0.5797 | |
| Hypothesized Mean Difference | 0 | 0 | 0 | 0 | 0 | |
| df | 5 | 5 | 5 | 5 | 5 | |
| t Stat | 9.50162 | 5.24210 | 13.18209 | 12.73402 | 6.64975 | |
| P(T<=t) one-tail | 0.00011 | 0.00167 | 0.00002 | 0.00003 | 0.00058 | |
| t Critical one-tail | 2.01505 | 2.01505 | 2.01505 | 2.01505 | 2.01505 | |
| P(T<=t) two-tail | 0.00022 | 0.00335 | 0.00004 | 0.00005 | 0.00116 | |
| t Critical two-tail | 2.570582 | 2.570582 | 2.570582 | 2.570582 | 2.570582 | |

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 –27: T-Test: Two-Sample Assuming Unequal Variances: J K Cements

| | EPS | MPS | ROCE | ROE | ROA | EVA / CE |
|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------|
| Mean | 2.1391 | 491 | 0.1177 | 0.0903 | 0.0297 | -0.0106 |
| Variance | 1.0977 | 97,066 | 0.0021 | 0.0019 | 0.0004 | 0.0002 |
| Observations | 6 | 6 | 6 | 6 | 6 | 6 |
| Pearson Correlation | 0.9600 | 0.1281 | 0.7627 | 0.9701 | 0.7919 | |
| Hypothesized Mean Difference | 0 | 0 | 0 | 0 | 0 | |
| df | 5 | 5 | 5 | 5 | 5 | |
| t Stat | 5.08992 | 3.86042 | 8.59574 | 8.23989 | 7.94244 | |
| P(T<=t) one-tail | 0.00190 | 0.00594 | 0.00018 | 0.00021 | 0.00025 | |
| t Critical one-tail | 2.01505 | 2.01505 | 2.01505 | 2.01505 | 2.01505 | |
| P(T<=t) two-tail | 0.00380 | 0.01187 | 0.00035 | 0.00043 | 0.00051 | |
| t Critical two-tail | 2.570582 | 2.570582 | 2.570582 | 2.570582 | 2.570582 | |

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. The Mean Value of all the Cement Companies is negative in terms of EVA except Binani Cement. In General the companies are not generating positive EVA from their Operations.
2. In terms of NOPAT and Capital Employed Ultratech Cement is in the top position.
3. In terms of Debt Equity Ratio Ramco & India Cement have the max ratio while D/E ratio of Ambuja and ACC is the minimum.
4. Shree Cement has the maximum WACC while Binani Cement has the minimum WACC.
5. Shree Cement reported the highest mean value in terms of MVA Enterprise Value (EV) and Cash Flow Return on Investment (CFROI).

T-Test Conducted With Selected Cement Firms 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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