

RELATIONSHIP BETWEEN EVA, MVA AND OTHER ACCOUNTING MEASURES OF FERTILIZER COMPANIES IN INDIA

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ABSTRACT

This paper examines the value creations for shareholders of fertilizer companies in India through Economic Value Added and Market Value Added. The objectives of the study are to examine the relationship between EVA, MVA and other accounting measures like Return on Investment (ROI), Return on Equity (ROE), Earnings per Share (EPS) and Return on Net worth (RONW) through correlation analysis and also ANOVA is used to compare the mean value of EVA and MVA for studied fertilizer companies. In case of violation of the assumption of ANOVA, non-parametric test: Kruskal Wallis statistics used. The research result shows that high degree of positive relationship between EVA and MVA was found in Chambal fertilizer and Zuari while other fertilizers companies have no statistical correlation between EVA and MVA. Further the results of relationship between EVA and other accounting measures reveal that National Fertilizer Limited and Deepak Fertilizers have high degree of positive correlation between EVA and ROE, EPS and RONW. Also Madras fertilizers have also high degree of positive correlation between EVA and ROE. While other firms' having no relation with EVA and other accounting measures. Further it was found that all firms were differing in value creation for the shareholders equally with respect to EVA and MVA. The analysis indicates that Chambal fertilizer and Zuari can create shareholders' value through increase in ROE, RONW and EPS while other companies can create shareholders' value according to degree of correlation between EVA and other accounting measures.

Key Words: Accounting Measures, Economic Value Added, Market Value Added.

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INTRODUCTION

The development in the Indian capital market, both in depth and breadth along with the increased awareness among the shareholders, has increased the pressure on the companies to consistently perform better. The indicators of such performance of the firms are the Economic value Added (EVA) and Market Value Added (MVA).

Both EVA and MVA are applicable to investor-owned organizations; however, EVA also is an appropriate measure for not-for-profit organizations. MVA assesses the effect of managerial actions on shareholder wealth from an organization's inception, while EVA assesses managerial effectiveness in a given year.

An important goal of any investor-owned organization is to maximize shareholder wealth. And, although the fundamental goal of shareholder wealth maximization is widely accepted, financial managers must recognize that maximizing shareholder wealth is not the same thing as maximizing the organization's total market value. An organization's total market value can be increased by raising and investing as much capital as possible, which increases the size of the organization and, therefore, often benefits managers. However, this strategy rarely is in the best interests of shareholders because it ignores the fact that shareholders have opportunity costs, and must earn a reasonable rate of return on their investments.

What is EVA...?

Economic value added (EVA), developed by Stern Stewart & Company, is the difference between the firm's after-tax return on capital and its cost of capital. Stewart (1991) defined EVA as residual return that subtracts the cost of invested capital from net operating profit after tax. EVA is equal to the economic book value of the capital at the beginning of the year and the difference between its return on capital and cost of capital.

The concept of EVA helps in understanding the value creation process and increasing the operating income from assets in place by reducing costs or increasing sales.

- Reducing the cost of capital by changing the financing mix.
- Reducing the amount of capital tied up in existing projects, without affecting operating income.

What is MVA...?

Stewart (1991) defines MVA as the excess of market value of capital (both debt and equity) over the book value of capital. If the MVA is positive, the company has created wealth for its shareholders. According to Stern and Shiely (2001), to determine the market value, equity is

taken at the market price on the date the calculation is made, and debt at book value. The total investment in the company since day one is then calculated as interest-bearing debt and equity, including retained earnings.

Present market value is then compared with total investment. If the former amount is greater than the former, the company has created wealth. While EVA is an accounting-based measure for the corporate performance of one year, MVA is a market generated number. MVA is cumulative measure of the value created by the management in excess of the capital invested.

Other Traditional Accounting Measures:

The usefulness of traditional accounting measures, such as Earnings per Share (EPS), Return on Assets (ROA), Return on Equity (ROE), and Cash Flow from Operations (CFO) and their effect on shareholder (market) value have been discussed for some time. Since the 1990s, strong arguments have been raised in favor of economic value added (EVA) as an accounting measure, mainly by the Stern Stewart Consulting Company and Associates (Stewart 1991:215; Stern 1993:36).

LITERATURE REVIEWS

- 1. Dr. N.R.V. Ramana Reddy & M. Rajesh (2008)** have studied the relationship between EVA, MVA and Dividend paid for the study periods of 6 years from 2002 to 2007 from the financial reports of Shilpa Medicare Ltd. They found that a strong positive correlation between the variables called as EVA, MVA and dividend paid. They have applied Pearson correlation analysis to analyze the relationship. They have concluded that both EVA and MVA are two financial keys to create shareholders wealth and the true indicators of a company's financial performance.
- 2. JH de Wet and JH Hall (2004)**, a spreadsheet model was developed using different levels of operating leverage and financial leverage. The relationship between PAT and EVA was determined. Furthermore, the EVA leverage factor was combined with the operating and financial leverage. They have concluded that the organization's sensitivity to changes in sales volume is determined by its degree of operational leverage and by its total cost of capital (as represented by the financial leverage and EVA leverage). The way the company is financed (assuming there is no change in the WACC) will not affect the total leverage.

3. **JHvH de Wet (2005)** has endeavored to analyze the results of companies listed on the JSE Securities Exchange South Africa; the findings do not support the purported superiority of EVA. The results suggest stronger relationships between MVA and cash flow from operations. The study also found very little correlation between MVA and EPS, or between MVA and DPS, concluding that the credibility of share valuations based on earnings or dividends must be questioned.
4. **Dr. N. Sakthivel (2008)** has attempted to analyze the trend and growth of shareholders' value in terms of EVA and MVA in Indian pharmaceutical industry from 1997-98 to 2006-07. To study this trend and growth, the statistical tools used like mean, standard deviation, CV, LGR (Linear Growth Rate) and t statistics for analyzing the financial data of sample companies. The study showed shareholders' value creations tend to go up every year from 2000-01.
5. **Gregory T. Franker (2006)** has titled using economic value added to measure and improve bank performance. He concluded that EVA can be an important that bankers can use to measure and improve the financial performance of their banks. Since EVA takes the interest of banks shareholders into consideration, the use of EVA by bank management may lead to different decisions than if management relied solely on other measures.
6. **Banerjee (1997)** has conducted an empirical research to find the superiority of EVA over other traditional financial performance measures. Ten industries have been chosen and each industry is 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. Some of such companies are Ranbaxy Laboratories, Samtel India Ltd and Infosys Technologies Ltd.
7. **Pattanayak and Mukherjee (1998)** discussed that there are traditional methods to measure corporate income or known as accounting concept and there is also a modern method to measure corporate income or known as economic concept. EVA, which is based on economic concept, is professed to be a superior technique to identify whether the organization's NOPAT (Net Operating Profit after Tax) during a period is covering its WACC (Weighted Average Cost of Capital), thus generating value for its owners. But it is very tricky to calculate EVA.

8. **Ashok Banerjee and Jain (1999)** examined the relationship between shareholder wealth and certain financial variables. This study was conducted with a sample of top 50 companies from Drugs and Pharmaceutical industry. This study concluded that out of selected independent variables, EVA has proved to be the most explanatory variable and the capital productivity is a predictor of shareholder wealth.

OBJECTIVES & METHODOLOGY

A correlation analysis and ANOVA was used to check the degree of relationship among the variables and mean differences among the groups. The study examines the value creations for shareholders through EVA and MVA of thirteen fertilizer companies like NFL, GNFC, Tata Chemical and Fertilizers, RCF, Nagarjuna Fertilizers, Zuari, Chambal Fertilizer, Coromandel Fertilizer, Deepak Fertilizer, Madras Fertilizers, GSFC, Mangalore Fertilizers and FACT by using **secondary data** that are available at annual reports of the firm and on websites of respective companies from 2005 to 2010 for six years of study periods.

The objective of the study is to determine the relationship between Economic Value Added, Market Value Added and other accounting measures like ROI, ROE, EPS and RONW and also to compare the mean value of EVA and MVA for studied fertilizer companies. The study used **descriptive research design**. Although there are certain **limitations** to this study as Both the EVA and MVA approaches are an improvement over the traditional accounting measures of performance but both do suffer that they are partially based on accounting numbers. Another limitation that researcher is unable to include opportunity cost of capital in calculating cost of capital.

EMPIRICAL ANALYSIS

The study statistically tests the relationship between EVA, MVA and other accounting measures like ROE, ROI, EPS and RONW of fertilizer companies for the study period of six years from 2005 to 2010. Table 1 show the EVA, MVA and other accounting measures calculations for NFL which is followed in every other fertilizer companies. Now we will compare the mean value of each group through ANOVA.

ANOVA (Analysis of Variance)

When one wish to compare the means of more than two groups or levels of independent variables, a one way analysis of variance is appropriate. Before performing the statistical analysis, however, we should review the assumptions required to such type of statistical test. We will able to formally test the **NORMALITY** and the **HOMOGENEITY** of variance

assumptions. We can examine the normality assumptions by the use of a formal statistical test.

Test of Normality:

It assesses whether there is a significant departure from normality in the population distribution for each of the thirteen fertilizer companies' EVA and MVA. However the null hypothesis stated as follows.....

H₀ (Null hypothesis) = the population is normally distributed.

H₁ (Alternate hypothesis) = the population distribution is not normal.

Significance Level = 0.05

Looking to the table number 2 test statistics, we have the Kolmogorov-Smirnov and Shapiro-Wilk. But we see the result of Shapiro-Wilk because it is more appropriate when the sample size is less than one hundred. Thus from the tested significance of two variables, called EVA and MVA value is 0.045 and 0.000 respectively which is lower than 0.05, so H₀ is rejected and interpreted that data are not normally distributed. Now we have not met the first assumption of the independent measures of ANOVA, so here it is also advised to have nonparametric test i.e. Kruskal Wallis instead ANOVA because EVA and MVA in each group is not normally distributed.

Non Parametric Test:

When we have various violations of the distribution assumptions of parametric tests, alternative nonparametric test can be used. These tests tend to be less powerful than their parametric counterparts.

Kruskal Wallis Test:

Here also we need to have nonparametric test for EVA and MVA because it does not fulfill the first assumptions for ANOVA i.e. Population Normality. So against ANOVA, Kruskal Wallis hypothesis are as under...

H₀ (Null hypothesis) = there are no significance differences among the mean value of fertilizer companies' EVA and MVA

H₁ (Alternate hypothesis) = there are significance differences among the mean value of fertilizer companies' EVA and MVA

Significance Level = 0.05

Interpretation:

From the table 3 we can see non parametric test of Kruskal Wallis, the significance value for EVA and MVA is 0.000, 0.000 respectively which is lower than 0.05 that means H_0 is rejected and interpreted that there is some significance difference among the fertilizer companies' EVA and MVA.

CORRELATION ANALYSIS

Correlation is one of the most common and most useful statistics which depicts the single number that describes the degree of relationship between two variables.

In this report, researcher want to find out the relationship between EVA, MVA and other accounting measures like ROI, ROE, EPS and RONW of thirteen fertilizer companies. So now let's check the normality assumptions. However, normality is checked through the test significance of Kolmogorov-Smirnov and Shapiro-Wilk statistics. The table number 6 represents the tests of normality.

Test of Normality Hypothesis:

H_0 (Null hypothesis) = the population is normally distributed.

H_1 (Alternate hypothesis) = the population distribution is non normal.

Significance Level = 0.05

Interpretation:

From the table 4, we find that there are few variables which are non normal as their probability value is less than 0.05 that means we accept the alternate hypothesis and interpret that these variables are not normally distributed and many of them are normal as their probability value is greater than 0.05 that means we accept the null hypothesis and interpret that they are normally distributed.

So the correlation result for each variable in table 4 is taken as **spearman's correlation** for non normal variables and **Pearson correlation** for remaining normal variables. Also table 4 represents the normal probability, correlation result and its probability. Now following are the hypothesis for correlation between EVA, MVA and other accounting measures.

H_0 (Null hypothesis) = there is no correlation between EVA, MVA and other accounting measures.

H_1 (Alternate hypothesis) = there are correlation between EVA, MVA and other accounting measures.

Significance Level = 0.05

Now for correlation analysis the hypothesis is as above. According to the hypothesis, the table 5 represents that if probability value of correlation is higher than 0.05 then H_0 is accepted that means we can say that there is no relationship between two variables. On the contrary if probability value is less than the 0.05 then we reject null hypothesis and said that there is some relationship between two variables. So the findings of correlation between EVA, MVA and other accounting measures are given in table 5.

OBSERVATIONS & FINDINGS

The major findings of the report are, from the correlation analysis; it was found that Chambal Fertilizer and Zuari have high degree of positive correlation between EVA and MVA i.e. 0.94 and 0.87 respectively while others have no relation with EVA and MVA.

Further the results of relationship between EVA and other accounting measures reveal that NFL and Deepak Fertilizers have high degree of positive correlation between EVA and ROE, EPS and RONW. Also Madras fertilizers have also high degree of positive correlation between EVA and ROE. While other firms' having no relation with EVA and other accounting measures.

Moreover from the ANOVA statistical test; it was found that all firms were differing in value creation for the shareholders equally with respect to EVA and MVA. So we can say that all companies' management is different in utilizing shareholders wealth efficiently.

The highest EVA mean value was found in GSFC i.e. 64.67 followed by Tata Chemical i.e. 63.33 while lowest value found in FACT i.e. 7.17. That means GSFC and Tata Chemical have earned more than its cost of capital. Further in MVA, highest value was found in FACT i.e. 69.00 followed by RCF i.e. 56.25 while lowest value found in Nagarjuna Fertilizer i.e.14.40.

MANAGERIAL IMPLICATION

- It's well recognized that managers do not have a direct control over market value but their actions influence the drivers of market value. Thus, managers can directly study and can see the effect of their actions through EVA and MVA.

- As in many cases EVA and other accounting measures are also found to be highly correlated, so managers are advised to focus on enhancing accounting measures which directly increases Economic Value of the firm.
- Also MVA cannot be used as a system of evaluating, motivating and incentivizing managers but accounting based measures are directly related to the absolute performance and actions of managers.

CONCLUSION

The research were concluded that EVA is the internal performance measure that is tied with most directly to the creation of shareholder wealth but MVA is the difference between current market value of a firm and the capital contributed by the investors. However all firms were differing in creating value for the shareholders equally with respect to EVA and MVA. Further research was concluded that the high degree of positive correlation between EVA and MVA was found in Chambal fertilizer and Zuari other 11 fertilizers firms' have no correlation in EVA and MVA. Research particularly suggests to the Chambal fertilizer and Zuari that they need to focus on other accounting measures to increase EVA.

Tables & Charts:

Table 1: Results of calculation of EVA, MVA and other accounting measures for NFL

	2010	2009	2008	2007	2006	2005
						(Rs. In Cr)
Sales	5,091.34	5,127.10	4,140.65	3,865.68	3,590.53	3,474.06
Operating Costs	4,704.30	4,940.59	3,954.37	3,505.55	3,297.60	3,114.56
Tax	83.91	87.86	90.97	104.62	84.04	73.96
Operating Costs including taxes	4788.21	5028.45	4045.34	3610.17	3381.64	3188.52
NOPAT (Sales - OC including Tax)	303.13	98.65	95.31	255.51	208.89	285.54
Cost of Equity	91.09	94.74	94.00	105.06	126.59	134.12
EVA	212.04	3.91	1.31	150.45	82.30	151.42
Shares in issue	490.58	490.58	490.58	490.58	490.58	490.58
Price of the share on 31st March	98.4	33.1	40	27.5	10.00	10.00

Market Value of Equity	4827.31	1623.82	1962.32	1349.10	490.58	490.58
Total Common Equity	1,582.14	1,470.70	1,407.67	1,370.75	1,256.42	1,186.47
MVA	3245.17	153.12	554.65	-21.66	-765.84	-695.89
Net Profit After Tax	171.51	97.46	108.65	176.1	116.4	160.91
Total Investment	1,985.30	1,735.57	1,932.33	1,697.88	1,483.81	1,245.97
Return on Investment(ROI)	0.0864	0.0562	0.0562	0.1037	0.0784	0.1291
Net Profit After Tax	171.51	97.46	108.65	176.1	116.4	160.91
Total Equity Capital	490.58	490.58	490.58	490.58	490.58	490.58
Return on Equity(ROE)	0.3496	0.1987	0.2215	0.3590	0.2373	0.3280
Earning Per Share(EPS) in Rs.	3.32	1.88	2.1	3.41	2.26	3.15
Net Profit After Tax	171.51	97.46	108.65	176.1	116.4	160.91
Net Worth or Shareholders Fund	1,582.14	1,470.70	1,407.67	1,370.75	1,256.42	1,186.47
Return on Net Worth (RONW)	0.1084	0.0663	0.0772	0.1285	0.0926	0.1356

Table 2: Results of test of normality for ANOVA

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
EVA	.113	78	.015	.968	78	.048
MVA	.136	78	.001	.881	78	.000

Table 3: Results of Kruskal Wallis Test

	Company Name	N	Mean Rank
EVA	National Fertilizers	7	35.86
	GNFC	6	57.67
	Tata Chemical	6	63.33
	RCF	8	38.50
	Nagarjuna Fertilizer	5	54.20
	Zuari	6	25.33
	Chambal Fertilizers	5	60.80
	Coromandel Fertilizer	6	38.50
	Deepak Fertilizers	5	36.40
	Madras Fertilizers	6	17.67
	GSFC	6	64.67
	Mangalore Fertilizers	6	19.83
	FACT	6	7.17
	Total	78	
MVA	National Fertilizers	7	37.43
	GNFC	6	33.00
	Tata Chemical	6	52.00
	RCF	8	56.25
	Nagarjuna Fertilizer	5	14.40
	Zuari	6	32.67
	Chambal Fertilizers	5	55.40
	Coromandel Fertilizer	6	17.17
	Deepak Fertilizers	5	36.00
	Madras Fertilizers	6	55.67
	GSFC	6	25.67

	Mangalore Fertilizers	6	21.50
	FACT	6	69.00
	Total	78	

Test Statistics		
	EVA	MVA
Chi-Square	49.367	41.082
df	12	12
Asymp. Sig.	.000	.000

Table 4: Results of normality and correlation with probability value

	NFL	GNFC	TATA CHEM	RCF	NAGARJ UNA	ZUARI	CHAMBAL	Corom	Deepak	Madras	GSFC	Mangalore	FACT
EVA	0.396*	0.687*	0.238*	0.248*	0.944*	0.858*	0.417*	0.244*	0.213*	0.973*	0.946*	0.343*	0.548*
MVA	.053*	0.977*	0.527*	0.041*	0.168*	0.463*	0.725*	0.991*	0.397*	0.899*	0.067*	0.690*	0.002*
Correl	.43(.401)	.36(.480)	.21(.685)	-.03(.96)	-.11(.84)	.87(.025)	.93(.007)	-.20(.70)	-.65(.17)	.18(.74)	-.61(.18)	-.03(.94)	.03(.957)
EVA	0.396*	0.687*	0.238*	0.248*	0.944*	0.858*	0.417*	0.244*	0.213*	0.973*	0.946*	0.343*	0.548*
ROI	0.564*	0.426*	0.551*	0.781*	0.135*	0.015*	0.118*	0.192*	0.067*	0.976*	0.259*	0.015*	0.489*
Correl	.075(.08)	.42(.406)	-.48(.34)	.11(.835)	.37(.473)	-.37(.47)	-.32(.54)	.15(.783)	-.30(.57)	.73(.10)	.53(.278)	-.09(.872)	.17(.75)
EVA	0.396*	0.687*	0.238*	0.248*	0.944*	0.858*	0.417*	0.244*	0.213*	0.973*	0.946*	0.343*	0.548*
ROE	0.181*	0.756*	0.003*	0.064*	0.039*	0.042*	0.563*	0.063*	0.120*	0.110*	0.238*	0.105*	0.961*
Correl	.94(.006)	.78(.066)	.43(.397)	.63(.181)	.49(.329)	-.09(.87)	.67(.15)	.43(.392)	.88(.023)	.90(.01)	.49(.327)	.27(.60)	.11(.82)
EVA	0.396*	0.687*	0.238*	0.248*	0.944*	0.858*	0.417*	0.244*	0.213*	0.973*	0.946*	0.343*	0.548*
EPS	0.164*	0.743*	0.002*	0.113*	0.066*	0.040*	0.424*	0.264*	0.095*	0.000*	0.227*	0.067*	0.001*
Correl	.94(.006)	.78(.068)	.43(.397)	.62(.191)	.28(.589)	-.09(.87)	.62(.194)	.33(.526)	.88(.022)	.66(.158)	.50(.316)	.26(.61)	.21(.686)
EVA	0.396*	0.687*	0.238*	0.248*	0.944*	0.858*	0.417*	0.244*	0.213*	0.973*	0.946	0.343*	0.548*
RONW	0.71*	0.263*	0.593*	0.090*	0.119*	0.001*	0.481*	0.195*	0.050*	0.677*	0.391*	0.062*	0.620*
Correl	.82(.044)	.21(.691)	-.50(.31)	.77(.072)	.36(.484)	-.09(.87)	-.30(.56)	.18(.737)	.82(.045)	-.4(.43)	.48(.332)	.21(.69)	.27(.61)

() indicates probability values of correlation

* indicates probability values of normality testing – Shapiro Wilk test significance

Table 5: Results of correlations between EVA, MVA and other accounting measures

Correlations EVA, MVA and Other Accounting Measures					
	EVA & MVA	EVA & ROI	EVA & ROE	EVA & EPS	EVA & ROA
NFL	0	0	0.94	0.94	0.82
GNFC	0	0	0	0	0
Tata Chem.	0	0	0	0	0
RCF	0	0	0	0	0
Nagarjuna Fert	0	0	0	0	0
Zuari	0.87	0	0	0	0
Chambal Fert	0.93	0	0	0	0
Coromandel Fert	0	0	0	0	0
Deepak Fert	0	0	0.88	0.88	0.82
Madras Fert	0	0	0.90	0	0
GSFC	0	0	0	0	0
Mangalore Fert	0	0	0	0	0
FACT	0	0	0	0	0

EQUATIONS:

$$\text{EVA} = \text{NOPAT (Net Operating Profit After Tax)} - \text{Cost of Equity Capital (Ke)} \quad (1)$$

$$\text{Ke} = \text{Div}_1/\text{P}_0 + g \text{ (growth rate)} \quad (2)$$

$$\text{D}_1 = \text{Dividend Paid for the year} \quad (3)$$

$$\text{P}_0 = \text{Current Price of share (31}^{\text{st}} \text{ March)} \quad (4)$$

$$\text{MVA} = \text{Market Value} - \text{Total Common Equity} \quad (5)$$

$$\text{Market Value} = \text{No. of shares outstanding} * \text{Market Stock Price (As on 31}^{\text{st}} \text{ March)} \quad (6)$$

$$\text{Common Equity} = \text{Equity} + \text{Reserves \& Surplus} \quad (7)$$

$$\text{ROE} = \text{Net Income/Shareholders' Equity} \quad (8)$$

$$\text{ROI} = \text{Net Income/ Total Investments} \quad (9)$$

$$\text{EPS} = \text{Earnings After Tax/ No. of Shares outstanding} \quad (10)$$

$$\text{RONW} = \text{Net Income} / \text{Total Shareholders' Fund} \quad (11)$$

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Financial Statements:

- Balance sheets
- Income statements
- Profit & Loss Account
- Sales records