



Association of EVA and accounting earnings with market value: evidence from India

EVA and
accounting
earnings

83

Satish Kumar and A.K. Sharma

Indian Institute of Technology Roorkee, Roorkee, India

Abstract

Purpose – The purpose of this paper is to examine the claim of economic value added (EVA) proponents about its superiority as a corporate financial performance measure, compared to traditional performance measures in non-financial Indian companies and provide empirical evidences.

Design/methodology/approach – The paper uses a sample of 873 firms-year observations from the Indian market and applies pooled ordinary least square regression to test the relative and incremental information content of EVA and other accounting-based measures in explaining the market value added.

Findings – The results about relative information content test reveal that NOAPT and OCF outperform EVA in explaining the market value of Indian companies. Incremental information content test shows that EVA makes a marginal contribution to information content beyond traditional performance measures such as NOPAT, OCF, EPS and RONW, etc. Overall the authors' results do not support the hypothesis that EVA is superior to traditional accounting-based measures in association with market value of the firm.

Originality/value – The authors conclude that non-financial variables such employees, product quality and community satisfaction should be considered in order to capture the unexplained variation in the market value of the firm.

Keywords India, Corporate finances, Performance measures, Economic value added (EVA), Traditional performance measures, Market value added (MVA), Relative information content, Incremental information content

Paper type Research paper

1. Introduction

Shareholder's wealth or value maximization is a well-accepted objective among corporate financial managers in the recent years. Shareholders activism has reached to unprecedented level partially because due to integration of financial markets and partially because of regulatory reforms (in terms of disclosure requirement and investor protection) and this has led to increased pressure on firms to increase shareholders value consistently. The corporates, which gave the lowest preference to shareholders curiosity, are now bestowing the utmost preference to it (Sharma and Kumar, 2010). However, despite their best efforts, many companies failed to create shareholders wealth (Kim, 2006). Modern value-based performance measures, such as economic value added (EVA)[1], cash flow return on investment (CFROI)[2], cash value added (CVA)[3], discounted economic profits (EP), shareholders value added (SVA)[4], have been developed recently by various consulting companies to gauge the real performance of companies and also to shift the focus from accounting earnings to cash flows. Traditional performance measures such as such as NOPAT, EPS, ROI, ROE, etc. have been criticized due to their inability to incorporate full cost of capital. Hence, accounting



earnings is not consistent predictor of firm value and cannot be used for measuring corporate performance. On the other hand, value-based measures recognise that capital invested in a corporation is not free, and thus make a capital charge for the use of the capital employed by the corporation in its operations (O'Hanlon and Peasnell, 1998). The most popular value-based performance measure is Stern Stewart's EVA.

EVA is financial performance measure that most accurately reflects company's true profit (Stewart, 1991). EVA is the calculated after subtracting the cost of equity capital and debt from the operating profits. EVA is a revised version of residual income (RI) with a difference the way the economic profit and the economic capital are calculated. Coined and popularized by New York-based management consultancy firm Stern-Stewart and Co., in 1991, EVA over the years has gained popularity as a reliable measure of corporate performance. In the later years, the concept has received recognition and support from various corporate houses; those adopted it as an internal control measure. The selling point of EVA is that it considers economic profits and economic capital in order to know the value created and destroyed by an organization during a particular period. Economic profit and economic capital is calculated by making certain adjustments into the accounting profits. There exist anomalies in the academic literature about the number of adjustments required to reach economic profit and economic capital. Stern-Stewart and Company have suggested 164 such accounting adjustments to convert generally accepted accounting principles profits to economic profits. Another important point in calculation of EVA is calculation of the weighted average cost of capital. As suggested by various researchers, cost of equity capital under EVA may be calculated using capital assets pricing model (CAPM). Various researchers have used CAPM to calculate the cost of equity thereby establishing the empirical validity of EVA calculation.

The basic objective of this paper is to provide empirical evidence about the superiority of EVA, as claimed by its proponents in comparison to traditional accounting-based measures in explaining the market value added (MVA). We have examined the association of EVA along with five popular traditional accounting performance measures (NOPAT, ROCE, RONW, EPS and OCF) with MVA using a sample of 97 Indian companies for the period 2000-2008 and tested the assertion that EVA is better linked with MVA as compared to traditional performance measures. Contrary to the claim of Stern-Stewart and Co., we report that accounting earning-based measures such as NOPAT and OCF are better in explaining the market value of the sample companies. We find evidence supporting the earlier work of Peterson and Peterson (1996), Biddle *et al.* (1997), Chen and Dodd (2001), Kim (2006) and Ismail (2006) suggesting that traditional accounting-based measures are more associated with MVA than EVA. However, our incremental information content tests reveal that EVA makes a marginal contribution to information content beyond traditional performance measures such as NOPAT, OCF, EPS and RONW, etc. Overall, results of our study do not support the hypothesis that EVA is superior than traditional accounting-based measures in association with market value of the firm. The study further concludes that other non-financial variables such as employees, product quality community satisfaction should be considered in order to capture the unexplained variation in the market value of the firm.

The remainder of the paper is organized as follows: Section 2 presents a brief account of the literature review, Section 3 explains the data, variables and hypothesis of the study, Section 4 presents model specifications, Section 5 presents empirical analysis and findings and the conclusion is presented in Section 6.

2. Literature review

There is a growing debate in the academic literature about which performance measures that best explain change in market value of the firms. Some researchers performed empirical analysis to examine the assertion of Stern-Stewart that EVA is a better performance measure in prediction of market value. EVA, unlike earnings is expected to be linked to market value (O'Byrne, 1996). Despite the evidences provided by EVA proponents (Grant, 2003; Stewart, 1991; Milunovich and Tsuei, 1996; O'Byrne, 1996; Lehn and Makhija, 1997; Uyemura *et al.*, 1996; Worthington and West, 2004; Irala, 2007; Lee and Kim, 2009), the results of many empirical studies do not support the claim that EVA is superior to other traditional accounting-based performance measures (Biddle *et al.*, 1997; Kramer and Pushner, 1997; Chen and Dodd, 1997, 2001; Worthington and West, 2001; Ismail, 2006; Kyriazis and Anastassis, 2007; Ramana, 2007; Ismail, 2008). We have categorized the studies in two categories, one supporting the superiority of EVA and other supporting the superiority of traditional corporate performance measures in explaining the market value of firm.

2.1 Studies supporting superiority of EVA

The following studies validate the claim of EVA's superiority over traditional performance measures in its association with stock returns or market values of firm. Stewart (1991) provided evidence of the correlation between EVA and MVA using a sample US companies and examining both constant and changes in EVA and MVA, he found that there is a relationship between both the levels of EVA and MVA. Since the correlation between changes in EVA and MVA was high, Stewart suggested that adopting the goal of maximizing EVA and EVA growth would in fact build a premium into the market value of the company. In a major study by Stern *et al.* (1994) argues that the accounting measures such as earnings, earnings growth, dividends, dividend growth, ROE, or even cash flow are not key measures of corporate performance, but in fact EVA is one such measure that is closely linked with market value of company. Following Stewart (1991) and Grant (2003) also validate the relationship between EVA and corporate valuation using a sample of 983 US companies. The results suggest that EVA has a significant impact on the MVA of a firm thereby supporting Stern-Stewart hypothesis. Similarly, O'Byrne (1996) analyzed industrial companies and found that EVA explains more than twice as much of the variance in market/capital ratio as NOPAT when the EVA model has positive and negative EVA coefficients, and an $\ln(\text{capital})$ term. He also showed that EVA changes explain significantly more of the variation in market value changes. Lehn and Makhija (1997) studied the relationship between six widely used performance measures and stock returns. The results revealed that EVA and MVA are effective measures of performance. Moreover, the correlation of EVA with stock returns (0.59) was slightly higher than the correlation of MVA (0.58), ROE (0.46), ROA (0.46) or ROS (0.39). Thus, EVA and MVA appear to be somewhat better long-run performance measures than conventional accounting performance measures. Irala (2007) analyzed whether EVA has got a better predictive power relative to the traditional accounting measures such as EPS, ROCE, RONW, capital productivity (K_p) and labor productivity (L_p). Analysis of 1,000 companies across six years (6,000 company years), very much supports the claim that the EVA is the better predictor of market value compared to other accounting measures. EVA is gaining

recognition as fundamental measure of company performance despite the fact that it has been in existence for a relatively short span of time.

In another study by Misra and Kanwal (2007) about Indian companies argued that accounting-based metrics are misleading measures of corporate financial performance as they are vulnerable to “accounting distortions”. Results of their study reveal that EVA (percent) is the most significant determinant of MVA as it explains the variations in share value better than the other conventional accounting-based measures of firms’ financial performance. Lee and Kim (2009) introduced refined EVA (REVA) to the hospitality industry and compared it to EVA, MVA and other traditional accounting measures (cash flow from operations (CFO), return on assets (ROA) and return on equity (ROE)). The study provides interesting and meaningful findings that REVA and MVA can be considered good performance measures throughout the three hospitality sectors (i.e. hotel, restaurant and casino). According to the findings, REVA and MVA significantly explain the market-adjusted return by presenting positive coefficients.

2.2 Studies rejecting superiority of EVA

Many studies refute the claim that EVA is more highly associated with stock returns or market value of the firm. The results of these studies fail to establish that EVA is superior to traditional measures in explaining the market value of the companies. A number of these studies report either poor or no statistical relation between EVA and stock return, or between EVA and market value (Olsen, 1996; Peterson and Peterson, 1996; DeVilliers and Auret, 1997; Chen and Dodd, 1997; Kramer and Pushner, 1997; Kim, 2006) For example, Biddle *et al.* (1997) tested the assertions that EVA is more highly associated with stock returns and firm’s value than accrual earnings, and evaluated which component of EVA, if any, contributed to these associations. The results indicated that earnings ($R^2 = 12.8$ percent) were significantly associated with market adjusted annual returns than either residual income ($R^2 = 7.3$ percent) or EVA ($R^2 = 6.5$ percent) and that all three of these measures dominate cash from operations ($R^2 = 2.8$ percent). The empirical results regarding relative information content, rather suggest that earnings generally outperform EVA. Similar results were revealed by Kramer and Pushner (1997) by analyzing the strength of the relationship between EVA and MVA, using the Stern-Stewart 1,000 companies for the period between 1982 and 1992. They found that although MVA and NOPAT were positive on average, the average EVA over the period was negative. No clear evidence is found to support the contention that EVA is the best internal measure of corporate success in adding value to shareholders’ investment.

Chen and Dodd (2001) empirically examined the value relevance of three profitability measures – operating income (OI), residual income (RI) and EVA and concluded that the market may place higher reliance on audited accounting earnings than the unaudited EVA metric. Their findings failed to support the assertion that EVA is the best measure for valuation purposes. Ismail (2006) in a study about UK companies tested the relative and incremental information content of EVA and other performance measures using panel data regression. The results of the study fail to support the Stern-Stewart hypothesis as net operating income after taxes and net income outperform EVA and residual income. The paper concludes that apart from financial variables other factors like employee, customer satisfaction and R&D initiatives must be considered to capture the changes in the stock return.

Similarly, Kim (2006) provides empirical evidence on the relative and incremental information content of EVA and traditional performance measures, earnings and cash flow of hospitality industry of the USA. The information content of EVA and other explanatory variables indicates that earnings are more useful than cash flow in explaining the market value of hospitality firms. Kyriazis and Anastassis (2007) investigated the relative explanatory power of the EVA model with respect to stock returns and firms' market value. They conclude that net and operating income (NOPAT and OP) appear to be more value relevant than EVA in explaining the market value of firms listed at Athens Stock Exchange (ASE). Ismail (2008) provides evidence regarding EVA and company performance in Malaysia. The study sought to explain the ability of EVA, compared to traditional tools, in measuring performance under various economic conditions; pre-economic crisis, during economic crisis and post-economic crisis period. The result of the study found that traditional tools particularly EPS is able to correlate and had a relationship with stock returns. Further the study revealed that EVA is also able to correlate with stock returns and is superior in explaining the variations in the stock returns as compared to the traditional tools under varying economic conditions. Maditinos *et al.* (2009) examined the explanatory power of two value-based performance measurement models, EVA and SVA, compared with three traditional accounting performance measures: earnings per share (EPS), return on investment (ROI) and return on equity (ROE), in explaining stock market returns in the ASE. Relative information content tests reveal that stock market returns are more closely associated with EPS than with EVA or other performance measures. However, incremental information content tests suggest that the pairwise combination of EVA with EPS increases significantly the explanatory power in explaining stock market returns.

The examination of literature on the efficacy of various performance measures brings two important issues. First and foremost is that most of the research on EVA and its superiority has been from USA and other developed markets. There is an obvious requirement to examine the usefulness of EVA alongwith traditional financial performance measures in an alternative institutional setup. Less evidence is available about developed market. This motivates us to analyze the highly controversial but important Stern-Stewart assertion regarding the superiority of EVA in Indian context and contribute to the existing literature. Second, empirical evidences about EVA and its superiority are inconclusive and controversial. So, there is further to examine Stern-Stewart hypothesis and help in establishing the empirical validity of EVA. Therefore, we believe that it is important to offer a further contribution to the literature by conducting a new study using Indian market, which is characterized as emerging and fastest growing economy and find out the empirical validity of Stern-Stewart hypothesis.

3. Data and variables

3.1 Sample selection

Our sample consists of 97 non-financial companies all listed on Bombay Stock Exchange. Initially, a sample of top 200 companies was selected from BT-500 (India's most valuable companies, *Business Today*, 2006). The rationale behind selecting BT-500 as sample base is that these companies are ranked on the basis of market capitalization in the Indian Stock Market and hence, can be considered as India's most valuable companies. The sample was constructed using following criteria; firms must

be available during the study period of year 2000-2008. Because of the specific nature of their activities, firms related to banking, financial and non-banking financial institutions are excluded from the sample. Some firms with missing data were also removed from the sample. The final sample, after considering any missing data, consists of 97 firms. Thus, a balanced panel set of 873 firm – year observations was obtained, with observation of 97 firms over the period 2000-2008. The data required for the purpose of this study have been taken from the Prowess and Capitaline database. Further, data related to EVA and MVA have been taken from BT-SS survey (*Business Today*, 2000) and computed using the methodology used in the survey.

3.2 Variables definition

The study examines the association of EVA and traditional earning based with the market value of the companies. To achieve this, MVA is used as dependent variable. Market value of the company includes both the market value of the equity as well as debt. MVA measures the value added by the management over and above the capital invested in the company by its shareholders and lenders. It is the cumulative amount by which a company has enhanced or diminished shareholders wealth (Kaur and Narang, 2009). Similar variable was used by Ramana (2007), Kim (2006) and Vijayakumar and Manor Selvi (2007) in their studies about US hospitality industry, NSE-listed Indian companies and Indian automobile industry, respectively. Alongwith MVA as dependent variable, EVA, return on capital employed (ROCE), return on net worth (RONW), EPS, net operating profits after taxes (NOPAT) and cash flow from operations (CFO) are used as explanatory variables. These variables are widely used by various researchers in examining the relationship between EVA alongwith traditional performances measures with MVA. Table I. summarizes the variable definitions and calculations.

3.3 Hypotheses of the study

The prime purpose of our study is to provide evidences about the superiority of EVA over the traditional performance measures. To achieve this, relative and incremental information content of EVA and traditional performance measures are analyzed. Relative information content comparisons examine if one measure provides greater information content than another. On the other hand, incremental information content comparisons assess whether one measure provide more information content than another. The following hypotheses were formulated in the present study to examine the relative and incremental information content of various performance measures:

- H1.* The relative information content of EVA is superior to traditional performance measures (NOPAT, RONW, ROCE, EPS and OCF) in explaining market value of Indian companies.

H1 related to relative information content investigates which variables (EVA, NOPAT, RONW, ROCE, EPS and OCF) have greater association with firm value. For assessing relative information content, coefficient of determination (R^2) of various performance measures will be examined and analyzed. Comparison of R^2 of various performance measures will provide a direct test of Stern Stewart's claim about the superiority of EVA over traditional corporate performance measures. Following Biddle *et al.* (1995), we examine the relative information content of various competing measures to explain variation in dependent variable (MVA):

Variable	Definition	Symbol used
EVA	Net operating profits adjusted for cost of capital (NOPAT – total cost of capital)	EVA
Net operating profits after taxes	Profits after taxes	NOPAT
Return on capital employed	Ratio of earnings before interest and taxes to capital employed	ROCE
Return on net worth	Ratio of net income after taxes to net worth	RONW
Earning per share	Ratio of net income to number of shares outstanding	EPS
Cash flow from operations (operating cash flows)	Company's net cash flow resulting directly from its regular operations (NOPAT adjusted for items)	OCF

Table I.
Definition of independent variables

H2. EVA adds information content to that provided by NOPAT, RONW, ROCE, EPS and OCF in explaining market value of the sample firms.

Following Biddle *et al.* (1995) and Kim (2006), we examine the incremental information content of various performance measures. The basic objective of incremental information content is to examine whether inclusion of EVA alongwith traditional performance measures increases the explanatory power of MVA or not. Incremental information content is assessed using *t*-test on individual coefficient and comparing R^2 of regression equations (7) and (8).

4. The model specification

The present study examines the relative and incremental information content of various performance measures and their association with MVA using ordinary least square (OLS) regression analysis. To achieve this, we developed six simple regression models to compare the relative power of each explanatory variable. Our methodology is based on the similar work of Kim (2006), Irala (2007), Ismail (2008) and Vijayakumar and Manor Selvi (2008). The simple regression models used are as follow:

$$MVA_{it} = \beta_0 + \beta_1 EVA_{it} + \varepsilon_{it} \quad (1)$$

$$MVA_{it} = \beta_0 + \beta_1 NOPAT_{it} + \varepsilon_{it} \quad (2)$$

$$MVA_{it} = \beta_0 + \beta_1 ROCE_{it} + \varepsilon_{it} \quad (3)$$

$$MVA_{it} = \beta_0 + \beta_1 RONW_{it} + \varepsilon_{it} \quad (4)$$

$$MVA_{it} = \beta_0 + \beta_1 EPS_{it} + \varepsilon_{it} \quad (5)$$

$$MVA_{it} = \beta_0 + \beta_1 OCF_{it} + \varepsilon_{it} \quad (6)$$

where: MVA_{it} , amount of MVA for the firm i in period t ; EVA_{it} , amount of EVA of firm i in period t ; $NOPAT_{it}$, net operating profits after taxes for firm i in period t ; $ROCE_{it}$, ratio of earning before taxes to capital employed for firm i in period t ; $RONW_{it}$, ratio of net income after tax to networkth for firm i in period t ; EPS_{it} , net income to total number of shares outstanding for firm i in period t ; OCF_{it} cash flow from operations for firm i in period t ; ε_{it} , stochastic error term for firm i at time t and $i = 1, \dots, 97$ and $t = 1, \dots, 9$.

Further, to test *H2* regarding the incremental content of EVA, NOPAT, ROCE, RONW, EPS and OCF, multiple linear regression models are used. The present study use two separate multiple regression models, one with all explanatory variables and another after exclusion of EVA:

$$MVA_{it} = \beta_0 + \beta_1 EVA_{it} + \beta_2 NOPAT_{it} + \beta_3 ROCE_{it} + \beta_4 RONW_{it} + \beta_5 EPS_{it} + \beta_6 OCF_{it} + \epsilon_{it} \quad (7)$$

$$MVA_{it} = \beta_0 + \beta_1 NOPAT_{it} + \beta_2 ROCE_{it} + \beta_3 RONW_{it} + \beta_4 EPS_{it} + \beta_5 OCF_{it} + \epsilon_{it} \quad (8)$$

where: MVA_{it} , amount of MVA for the firm i in period t as above; EVA_{it} , amount of EVA of firm i in period t ; $NOPAT_{it}$, net operating profits after taxes for firm i in period t ; $ROCE_{it}$, ratio of earning before taxes to capital employed for firm i in period t ; $RONW_{it}$, ratio of net income after tax to networth for firm i in period t ; EPS_{it} , net income to total number of shares outstanding for firm i in period t ; OCF_{it} , cash flow from operations for firm i in period t ; ϵ_{it} , stochastic error term for firm i at time t ; and $i = 1, \dots, 97$ and $t = 1, \dots, 9$.

5. Empirical results and analysis

5.1 Descriptive statistics

Table II provides summary of descriptive statistics of MVA (dependent variable) and six explanatory variables used in the study. It is evident from the table that all performance measures considered in the present study have a positive mean value. MVA has 2,623.32 as mean value of Indian companies whereas mean value of EVA is 10.95, which implies that most of Indian companies included in the study are able to earn more than the cost of capital. Table II further reveals that median EVA value is negative (-0.59), whereas median value of all other measures exhibit positive values. Another important observation is that MVA has the largest mean and median followed by OCF, NOPAT, EPS, ROCE, RONW and EVA. These results are partially consistent with many international studies with similar and different variables. Low values of EVA are noticed, since in the long term, companies cannot continue to earn more than the cost of capital due to competitiveness of markets as companies cannot earn supernormal growth over long time.

Variable	Obs.	Mean	Median	SD	Minimum	Maximum
MVA	97	2,623.324433	630.94	6,002.853	-394.21	25,4462.5
EVA	97	10.95546392	-0.59	195.9894	-774.15	1,062.68
RONW	97	22.90106529	20.78333	12.44447	3.112222	2,221.403
NOPAT	97	371.2425165	113.7389	844.0958	-79.5367	36,010.52
ROCE	97	26.14649485	20.79667	16.78594	4.1	2,536.21
EPS	97	31.87802978	20.09778	48.65719	1.371111	3,092.169
OCF	97	438.8973998	144.3756	1,152.521	-615.67	1,0467.66

Table II.

Descriptive statistics of dependent and explanatory variables

Notes: MVA, market value added; EVA, economic value added; RONW, return on net worth; NOPAT, net operating profit after taxes; ROCE, return on capital employed; EPS, earning per share; OCF, operating cash flows

Pair-wise correlations between dependent and independent variables are presented in Table III. We observe that all the variables are positively correlated with each other. EVA is positively correlated with MVA (0.483) with statistical significant value at 1 percent level but lower correlation as compared to NOPAT and OCF. Highest correlation value can be observed between NOPAT, OCF and ROCE, RONW. It is important to note from the table that EVA under-perform traditional accounting measures (NOPAT and OCF), which reject the claim of EVA advocates (Stewart, 1991; O'Byrne, 1996; Makeleainen, 1998; Taufik *et al.*, 2008) that it is highly associated with MVA or stock returns.

5.2 Relative information content test

In Table IV, we report the results of relative information content test of every independent variable. The assessment is made by analyzing six separate regressions for each performance measures, i.e. EVA, NOPAT, ROCE, RONW, EPS and OCF. This estimation is done by OLS regressions based on equations (1)-(6). Table IV reveals coefficients and adjusted R^2 values of each variables alongwith F -statistics. First, we find that all of the regressions, except EPS are significant according to F -statistics at the 0.01 level. Similarly, the coefficients result suggest that in terms of relative information content of all six explanatory variables, except EPS ($p = 0.465$), all performance measures are statistically significant at the level of 0.01.

	MVA	EVA	RONW	NOPAT	ROCE	EPS	OCF
MVA	1						
EVA	0.483*	1					
RONW	0.396*	0.546*	1				
NOPAT	0.675*	0.161	0.148	1			
ROCE	0.336*	0.519*	0.917*	0.102	1		
EPS	0.075	0.087	0.061	0.114	0.111	1	
OCF	0.567*	0.050	0.065	0.975*	0.035	0.097	1

Notes: Correlation is significant at the *0.01 level; MVA, market value added; EVA, economic value added; RONW, return on net worth; NOPAT, net operating profit after taxes; ROCE, return on capital employed; EPS, earning per share; OCF, operating cash flows

Table III.
Correlation matrix

	NOPAT	OCF	EVA	RONW	ROCE	EPS
Coefficients	1.042 (8.915)*	0.965 (6.710)*	0.733 (5.373)*	0.447 (4.202)*	0.391 (3.479)*	0.098 (0.734)
p -value	0.000	0.000	0.000	0.000	0.001	0.465
F	79.472*	45.030*	28.864*	17.660*	12.105*	0.539
R^2 (percent)	45.55	32.16	23.30	15.68	11.30	0.56
Adjusted R^2 (percent)	44.98	31.44	22.50	14.79	10.37	-0.48

Notes: Statistically significant at: *1 percent level; MVA, measure market value added; EVA, economic value added; RONW, return on net worth; NOPAT, net operating profit after taxes; ROCE, return on capital employed; EPS, earning per share; OCF, operating cash flows

Table IV.
Test results of the
relative information
content of EVA, RONW,
NOPAT, ROCE, EPS and
OCF using OLS
regression measures

Relative information content test as measured by adjusted R^2 of six regressions is also presented in the Table IV. The test results suggest that accounting earnings (NOPAT) have the greatest ability to explain market value of Indian companies with adjusted R^2 of 44.98 percent. Next, OCF has significantly larger adjusted R^2 (31.44 percent) followed by EVA, RONW and ROCE. EVA, a value-based performance measures stand third with adjusted R^2 in terms of explanatory power and thereby confirming that earnings dominate in explaining the variations in market value of Indian companies. One important observation from the Table IV is that EPS, accounting earning-based performance measure contribute negatively (adjusted $R^2 = -0.48$) in terms of explanatory power of the performance measures. Moreover, the coefficients value about EPS is not statistically significant at any level of significance. So, empirical results of the present study fails to confirm *H1* that relative information content of EVA is superior to traditional performance measures (NOPAT, RONW, ROCE, EPS and OCF) in explaining firm value of Indian companies. Our results about to relative information test are consistent with many international studies (Chen and Dodd, 1997; Biddle *et al.*, 1998; Ray, 2001; Worthington and West, 2001; Peixoto, 2002; DeWet, 2005; Ismail, 2006; Kim, 2006; Kyriazis and Anastassis, 2007; Vijayakumar and Manor Selvi, 2007; Visaltanachoti *et al.*, 2008; Maditinos *et al.*, 2009) but different from many studies (Irala, 2007; Sunitha, 2008, Taufik *et al.*, 2008) suggesting superiority of EVA.

Finally, the results of our OLS regressions lead to the conclusion that EVA does not outperform NOPAT and OCF. So, our relative information content tests discard the claim of EVA proponents that EVA is far best performance measure that explains market value of a firm.

5.3 Incremental Information content test

As discussed earlier, incremental information content comparisons assess whether one measure provide more information content than another. Table V shows the results of the incremental information content test of all six explanatory variables. Before running the OLS regression models, we detect the presence of first-order autocorrelation among the residuals. For this purpose, we used Durbin Watson (D-W) statistics.

Independent variables	Model 1	Model 2
RONW	0.130 (0.708)	0.083 (0.461)
NOPAT	3.425 (7.246)*	2.943 (5.880)*
ROCE	0.075 (0.407)	0.029 (0.159)
EPS	-0.046 (-0.562)	-0.051 (-0.633)
OCF	-2.725 (-5.300)*	-2.216 (-4.088)*
EVA	-	0.292 (2.449)*
R^2	0.653	0.674
Adjusted R^2	0.634	0.653
F-value	34.199*	31.064*
ΔR^2	-	0.019
Durbin-Watson	1.92	1.85

Table V.
Test results of the incremental information content of EVA, RONW, NOPAT, ROCE, EPS and OCF

Notes: Statistically significant at *1 percent; MVA, measure market value added; EVA, economic value added; RONW, return on net worth; NOPAT, net operating profit after taxes; ROCE, return on capital employed; EPS, earning per share; OCF, operating cash flows; *t*-statistics are provided in parentheses

The D-W statistics of the residuals report 1.92 and 1.85, respectively, for regression equations (7) and (8). D-W statistic, ranges in value from 0 to 4 with an ideal value of 2 indicating that errors are not correlated (eNumerys, 2009). Analysis of D-W statistics suggests no presence of auto-correlation in the data. To detect the presence of multicollinearity, variance inflation factor (VIF) was also analyzed. A general rule is that the VIF should not exceed 10 (Belsley *et al.*, 1980). VIF values of all independent variables was in range with a highest value of 6.253 for NOAPT indicating a low degree of multicollinearity among the variables.

In order to determine the incremental information content of EVA, we used two regression models (equations (7) and (8)), with all variables and another regression model except EVA. The overall model results suggest that both Models 1 and 2 are significant with F -values (34.199 and 31.064) statistically significant at 0.01 levels. Result about coefficients reveals that only NOPAT, OCF and EVA are statistically significant and can be included in the model. OCF has negative association whereas NOPAT and EVA are positively related with MVA. We also observe increase in the value of R^2 (coefficient of determination) from 65.3 to 67.4 percent in Models 1 and Model 2, respectively. Further, the overall increase in adjusted R^2 is minimal (1.9 percent) between the first model with NOPAT, RONW, ROCE, EPS and OCF and the second regression on all six independent variables. Thus, we can conclude that although, the contribution of EVA in explaining market value of Indian companies is slight but increased R^2 is statistically significant. So, our results accept $H2$ and thereby concluding that EVA still adds incremental information to that provided by NOPAT, RONW, OFC, ROCE and EPS in explaining the MVA of Indian companies.

6. Summary and conclusion

EVA has gained massive popularity in the academia and attracted many of the largest corporation to implement EVA as performance measurement system. There is growing debate about what influence the market value of the company. Various researchers have criticized earnings-based performance measures due to their inability to incorporate full cost of capital. Since then, there is growing amount of literature on the efficiency of the various performance measures and their relationship with market value of the company. These results of the studies are mixed and controversial suggesting that sometime traditional measures outperform value-based measures and another claiming the superiority of value added measures in terms of their associations with market value of the company. These inconclusive evidences motivate us to examine the SS hypothesis in Indian market. The prime objective of the present study is to find empirical evidence about the association of EVA along with traditional performance measures with MVA and contribute to the existing literature. To achieve this, we test the relative and increment information content of all six explanatory variables (NOPAT, EVA, ROCE, RONW, FCF and EPS) about 97 Indian companies for the period from 2000 to 2008.

The empirical results of the study do not support the claim that EVA is a better performance indicator than traditional accounting measures in explaining market value. Our relative information content test reveals that NOPAT and OCF outperform EVA in their association with market value. Our findings regarding relative information content support the findings of many international studies that EVA is not superior to traditional accounting measures in its association with firm values. The results regarding incremental information content test of various performance measures

revealed that EVA slightly adds to incremental information to that provided by NOPAT, RONW, OFC, ROCE and EPS in explaining the MVA of Indian companies. Our findings, in sum, do not support the claim of Stern-Stewart and Company that EVA is superior to other measures in explaining MVA. It was also evident from the results that one-variable EVA model is not able to capture more than 23 percent of the variations in the market value of Indian companies. This implies that there are other factors that drive market value and should be taken into account for shareholders' value creation or for performance measurement. As suggested by Chen and Dodd (2001), there are various factors related to customers, employees and community satisfaction, product quality, R&D innovations those affect the market value of firms apart from financial variables.

Notes

1. EVA by Stern-Stewart & Co.
2. CFROI by Boston Consulting Group (BCG) and HOLT Value Associates.
3. CVA by BCG and the Swedes Ottoson and Weissenrieder.
4. SVA by Rappaport and LEK/Alcar Consulting Group.

References

- Belsley, D.A., Kuh, E. and Welsch, R.E. (1980), *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity*, Wiley, New York, NY.
- Biddle, G.C., Bowen, M.R. and Wallace, J.S. (1998), "Economic value added: some empirical evidence", *Managerial Finance*, Vol. 24 No. 11, pp. 60-71.
- Biddle, G.C., Bowen, R.M. and Wallace, J.S. (1997), "Does EVA beat earnings? Evidence on associations with stock returns and firm values", *Journal of Accounting and Economics*, Vol. 24, December.
- Biddle, G.C., Seow, G.S. and Siegel, A.F. (1995), "Relative versus incremental information content", *Contemporary Accounting Research*, Vol. 12 No. 1, pp. 1-23.
- Business Today* (2000), "Just how much wealth does your company create?", *Business Today*, February 22-March 6, pp. 81-140 (BT-Stern Stewart Research Project).
- Business Today* (2006), "BT-500 India's most valuable companies", *Business Today*, November 19, pp. 118-38 (special issue).
- Chen, S. and Dodd, J.L. (1997), "Economic value added: an empirical examination of a new corporate performance measure", *Journal of Managerial Issues*, Vol. 9 No. 3, pp. 318-33.
- Chen, S. and Dodd, J.L. (2001), "Operating income, residual income and EVA: which metric is more relevant?", *Journal of Managerial Issues*, Vol. 13, pp. 65-86.
- DeVilliers, J.U. and Auret, C.J. (1997), "A comparison of EPS and EVA as explanatory variables for share price", *Journal for Studies in Economics and Econometrics*, Vol. 22, August, pp. 47-63.
- DeWet, J.H. (2005), "EVA versus traditional accounting measures of performance as drivers of shareholder value – a comparative analysis", *Meditari Accountancy Research*, Vol. 13 No. 2, pp. 1-16.
- eNumerys (2009), "Linear regression models", available at: <http://metriscient.com/linreg.htm> (accessed November 10, 2009).
- Grant, J. (2003), *Foundations of Economic Value Added*, Wiley, Hoboken, NJ.

- Irala, L.R. (2007), "Corporate performance measures in India: an empirical analysis", Working Papers No. WP-2007/01/A, available at: www.Papers.ssrn.com/sol3/Delivery../SSRN_ID967664_code709346.pdf?
- Ismail, A. (2006), "Is economic value added more associated with stock return than accounting earnings? The UK evidence", *International Journal of Managerial Finance*, Vol. 2 No. 4, pp. 343-53.
- Ismail, I. (2008), "Performance of public-listed companies in Malaysia: using EVA", paper presented at the 6th One-day Symposium on Accountability, Governance and Performance, Brisbane, February 15, available at: www.griffith.edu.au/school/gbs/afe/symposium/2008/Ismail.pdf
- Kaur, M. and Narang, S. (2009), "Shareholder value creation in India's most valuable companies: an empirical study", *The IUP Journal of Management Research*, Vol. VIII No. 8, pp. 16-42.
- Kim, W. (2006), "EVA and traditional accounting measures: which metric is a better predictor or market value of hospitality companies?", *Journal of Hospitality & Tourism Research*, Vol. 30 No. 1, pp. 34-49.
- Kramer, J.K. and Pushner, G. (1997), "An empirical analysis of economic value added as a proxy for market value added", *Financial Practice and Education*, Vol. 7 No. 1, pp. 41-9.
- Kyriazis, D. and Anastassis, C. (2007), "The validity of the economic value added approach: an empirical application", *European Financial Management*, Vol. 13 No. 1, pp. 71-100.
- Lee, S. and Kim, W.G. (2009), "EVA, refined EVA, MVA, or traditional performance measures for the hospitality industry", *International Journal of Hospitality Management*, Vol. 28 No. 3, pp. 301-484.
- Lehn, K. and Makhija, A.K. (1997), "EVA, accounting profits, and CEO turnover: an empirical examination 1985-1994", *Journal of Applied Corporate Finance*, Vol. 10 No. 2, pp. 90-7.
- Maditinos, D.I., Sevic, Z. and Theriou, N.G. (2009), "Modelling traditional accounting and modern value-based performance measures to explain stock market returns in the Athens Stock Exchange (ASE)", *Journal of Modelling in Management*, Vol. 4 No. 3, pp. 182-201.
- Makeleainen, E. (1998), "Economic value added as a management tool", MSc thesis, Helsinki School of Economics and Business Administration, Helsinki, available at: www.evanomics.com/evastudy.shtml
- Milunovich, S. and Tsuei, A. (1996), "EVA in the computer industry", *Journal of Applied Corporate Finance*, Vol. 9 No. 1, pp. 104-15.
- Misra, A. and Kanwal, A. (2007), "Economic value added as the most significant measure of financial performance: a study of select Indian firms", *Journal of International Business and Economics*, Vol. VII No. 1, pp. 76-85.
- O'Byrne, S.F. (1996), "EVA and market value", *Journal of Applied Corporate Finance*, Vol. 9 No. 1, pp. 116-25.
- O'Hanlon, J. and Peasnell, K. (1998), "Wall streets contribution to management accounting: the Stern Stewart EVA financial management system", *Management Accounting Research*, Vol. 9 No. 4, pp. 421-44.
- Olsen, E.E. (1996), *Economic Value Added: Perspectives*, Boston Consulting Group, Boston, MA.
- Peixoto, S.M. (2002), "Economic value added – application to Portuguese public companies", available at: SSRN: <http://ssrn.com/abstract=302687> or doi:10.2139/ssrn.302687 (accessed July 10, 2009).
- Peterson, P.P. and Peterson, D.R. (1996), *Company Performance and Measures of Value Added*, The Research Foundation of the Institute of Chartered Financial Analysts, Charlottesville, VA.

- Ramana, D.V. (2007), "Economic value added and other accounting performance indicators: an empirical analysis of Indian companies", *The ICAI Journal of Accounting Research*, Vol. VI No. 2, pp. 7-20.
- Ray, R. (2001), "Economic value added: theory, evidence, a missing link", *Review of Business*, Vol. 22, pp. 66-70.
- Sharma, A.K. and Kumar, S. (2010), "Effectiveness of EVA and conventional performance measures: evidences from India", *IIMS-Management Science*, Vol. 1 No. 1, pp. 60-78.
- Stern, J.M., Stewart, G.B. III and Chew, D.H. (1994), "The EVA financial management systems", *Journal of Applied Corporate Finance*, Vol. 7 No. 2, pp. 32-46.
- Stewart, G.B. III (1991), *The Quest for Value*, Harper Business, New York, NY.
- Sunitha, K. (2008), "Innovative versus traditional financial metrics: an appraisal", *Globsyn Management Journal*, Vol. 2 No. 1, pp. 19-26.
- Taufik, H., Isnurhadi, H. and Widiyanti, M. (2008), "The influence of traditional accounting and economic value added approaches on stock returns of banks listed on Jakarta Stock Exchange (JSX)", *Proceedings of The MFA Conference 2008*, available at: digilib.unsri.ac.id/download/SESSIONIIB.pdf (accessed July 15, 2009).
- Uyemura, D.G. Kantor, C.C. and Pettit, J.M. (1996), "EVA for banks: value creation, risk management, and profitability measurements", *Journal of Applied Corporate Finance*, Vol. 9 No. 2, pp. 94-109.
- Vijayakumar, A. and Manor Selvi, A. (2007), "EVA and MVA of Indian automobile industry – an empirical study of relationship", *Abhigyan*, Vol. 25 No. 3, pp. 54-65.
- Visaltanachoti, N., Luo, R. and Yi, Y. (2008), "Economic value added and sector returns", *Asian Academy of Management Journal of Accounting and Finance*, Vol. 4 No. 2, pp. 21-41.
- Worthington, A. and West, T. (2001), "The usefulness of economic value-added (EVA) and its components in the Australian context", *Accounting, Accountability and Performance*, Vol. 7 No. 1, pp. 73-90.
- Worthington, A.C. and West, T. (2004), "Australian evidence concerning the information content of economic value-added", *Australian Journal of Management*, Vol. 29 No. 2, pp. 201-224.

Further reading

- Garvey, T.G. and Milbourn, T.T. (2000), "EVA versus earnings: does it matter which is more highly correlated with stock returns?", *Journal of Accounting Research*, Vol. 38, pp. 209-45.
- O'Byrne, S.F. (1997), "EVA and shareholder return", *Financial Practice and Education*, Vol. 7 No. 1, pp. 50-4.
- Stern Stewart and Co. (2003), *Becoming an EVA Company*, Stern Stewart and Co., New York, NY.

Corresponding author

Satish Kumar can be contacted at: satisddm@iitr.ernet.in

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: www.emeraldinsight.com/reprints