Information Content of Economic Value Added: Evidence from Indian Banking Industry

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Abstract

Many studies have been conducted in the last two decades to answer questions such as whether it is really better to use modern value based measures than the traditional performance measures to gauge corporate financial performance, or which performance measure best explains corporations' change in market value. While there have been quite a few successful EVA stories are to encourage the EVA users, evidence supporting the rhetoric has been primarily anecdotal. There has not been sufficient empirical research to substantiate the claim that EVA is the best performance measure in terms of value relevance. This study is basically motivated by the claims cited above including the interest in EVA in the business press, increasing use of EVA by firms, increasing interest in EVA among academics and potential interest in EVA among accounting policy makers. We have tried to provide independent empirical evidence on the information content of EVA and two mandated performance measures like earnings and operating cash flow.

The first part of analysis uses pooled time series, cross sectional data of 34 listed Indian Banks during the period 2—1-2010 to evaluate the usefulness of EVA and other accounting based performance measures. The relative information content indicate that over this period EVA explains some 27 per cent of variation in stock return which is the maximum compared with the other mandated performance measures in our study. Notwithstanding the obvious importance of earnings figures in value relevance studies, EVA is significant at the margin in explaining variation in stock returns. This would support the potential usefulness of EVA type measures for internal and external performance measures.

In the second part of the analysis, the components of EVA are specified as explanatory variables in regression with excess returns. When examining components of EVA (which are shared with closely related performance measures) the after tax interest was found to be the most significant component in explaining stock returns. This was followed by CFO and accruals respectively. However, the capital charge was found to have the least information content.

Keywords: EVA, Information Content, Relative, Regression

Introduction

There has been increasing interest of shareholders monitoring the performance of companies where they have invested their money. This issue has resulted in the creation of a culture related to shareholder wealth, where shareholders do not conform to, invest and wait, for the return obtained by managers, as they used to do in past. To measure the performance of firms the accounting rates of return like ROE, ROI and EPS have traditionally been used. However, these accounting measures have been severely criticized for their inability to measure economic profitability (Fisher and McGowan, 1983). These conventional profitability measures can be substantially distorted by the choice of accounting treatment. This fact was acknowledged by other studies which opened the door for other performance yardsticks to be used, such as cash flow and residual income. Modern value based performance measures have attempted to divert management focus away from earnings and towards cash flows. These measures recognize that capital invested in the corporation is not free, and make a charge for the use of the capital employed by the corporation in its operations (O'Hanlon and Peasnell, 1998)

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This study is basically motivated by the claims cited above including the interest in EVA in the business press, increasing use of EVA by firms, increasing interest in EVA among academics and potential interest in EVA among accounting policy makers. We have tried to provide independent empirical evidence on the information content of EVA and two mandated performance measures like earnings and operating cash flow.

Literature review

The choice of performance measures is one of the most critical challenges facing organisations (Knight, 1998). Poorly chosen performance measures routinely create the wrong signals for managers, leading to poor decisions and undesirable results. There are enormous hidden costs in misused performance measures. Shareholders pay the bill each day in the form of overinvestment and acquisitions that do not pay off etc. It is not that management is poor. Simply, it is the wrongly chosen performance measures, which in turn push management to take improper decisions (Ferguson and Leistikow, 1998; Knight, 1998).Hence the corporate, which gave the lowest preference to shareholders curiosity, are now bestowing the utmost preference to it. Shareholder's wealth is measured in terms of returns they receive on their investment. It can either be in forms of dividends or in the form of capital appreciation or both. Capital appreciation depends on the changes in the market value of the stocks. The market value of stocks depends upon number of factors ranging from company specific to market specific. Financial information is used by various stakeholders to assess firm's current performance and to forecast the future as well.

Traditional performance measurement systems were developed at a time when decision-making was focused at the center of the organisation and responsibilities for decision-making were very clearly defined. According to Knight (1998, p. 173) 'these performance measurement systems were designed to measure accountability to confirm that people *met their budget* and followed orders'. However, during the last two decades it was widely argued (Rappaport, 1986; 1998; Stewart, 1991; 1999) that most of the performance measurement systems failed to capture and encourage a corporation's strategy, producing mostly poor information leading to wrong decisions. The empirical studies highlight that there is no single accounting measure which explains the variability in the shareholders wealth (Chen and Dodd, 1997; Rogerson, 1997). Any financial measures used in assessing firm's performance must be highly correlated with shareholders wealth and on the other hand should not be subjected to randomness inherent in it. To measure the performance of firms the accounting rates of return like ROE, ROI and EPS have traditionally been used. However, these accounting measures have been severely criticized for their inability to measure economic profitability (Fisher and McGowan, 1983). These conventional profitability measures can be substantially distorted by the choice of accounting treatment. Knight (1998), in an attempt to explain why traditional performance measures were so misused, asserted that part of the answer lies in three myths surrounding performance measurement, which are: growing quarterly EPS is all that matters, accounting measures tell the whole story, and that you can manage anything only with financial reporting methods. These myths are all based on the common belief that accounting is the only means of measuring performance.

Over the last few years an increasing number of consultants, corporate executives, institutional investors and scholars have taken part in the debate on the most appropriate way to measure performance. Consultants are willing to demonstrate the mastery of their recommended performance models. Corporate executives show clearly that the performance models adopted by their corporations are the most appropriate and successful. Institutional investors debate the advantages of alternative performance models for screening underperforming companies in their portfolios. Finally, scholars develop performance measurement models and test the extent to which existing performance evaluation and incentive compensation systems inspire management decisions and performance itself.

In this backdrop, Stern Stewart & Company has aggressively marketed a trademarked variant of residual income, Economic Value Added (EVA) as a management tool that creates value for the customers (Tulley, 1998). However, during the nineteenth century, a similar concept had been contemplated by economists. For example, it was the famous economist Alfred Marshall in 1890, who first spoke about the notion of economic profit, in terms of the real profit that a company makes when it covers, besides the various operating costs, the cost of its invested capital. It is clear that under the EVA approach performance measurement gains a new meaning in contrast with the traditional approach which is merely based on the simple notions of accounting profits and the relevant ratios derived from them, such as the return on equity (ROE) and the return on assets (ROA). The difference is that the traditional performance measurement benchmarks do not consider the cost of invested capital (equity and debt) in order to generate the profits made by a company. Thus, under the traditional approach two companies that have the same ROE would be considered as equally successful, whereas under the EVA approach the same conclusion could not be reached if these two firms had a different cost of capital, in other words if their economic profit or residual income was different.

Based upon the above meaning of economic profit, Stern Stewart & Co., developed the concept of the Economic Value Added Model. The basic difference between the notions of economic value and residual income concerns the method for calculating profits and invested capital. Stern Stewart suggested various adjustments in the financial statements of the firms, in order to move away from the concept of accounting profits caused by the application of the Generally Accepted Accounting Principles (GAAP), and approach the notion of real economic value. Considering this, it follows that, if the EVA model with the adjustments that Stern Stewart

proposes is closer to the real economic value of the firm, and then its application will enable management to monitor and control more efficiently the use of invested capital. Stewart (1994) cites in-house research indicating that "EVA stands out as the single best measure of wealth creation on a contemporaneous basis" and "EVA is almost 50 per cent better than its closest accounting based competitor in explaining changes in shareholder wealth". Support for EVA has also been forthcoming from other sources. *Fortune* has called it 'today's hottest financial idea', 'The Real Key to Creating Wealth' (Anonymous 1993) and 'A New Way to Find Bargains' (Topkis 1996). And Peter Drucker in the *Harvard Business Review* suggested that EVA's growing popularity reflected the demands of the information age for a measure of 'total factor productivity' (Drucker 1991). McClenahen (1998) similarly observes that 'traditional corporate performance measures are being relegated to second-class status as metrics such as EVA become management's primary tools'. According to Stern, Stewart and Chew (1996), EVA is not just another performance measure, but can be the main part of an integrated financial management system, leading to decentralised decision making. Thus, the adoption of EVA should indirectly bring changes in management, which in turn can enhance firm value. In fact, several US companies (e.g. Coca Cola, AT&T, Briggs & Stratton, Quaker Oats etc.) which have adopted EVA as the basis of management performance measurement, have experienced a significant increase in their shareholders' wealth.

Finally, there has been the widespread adoption of EVA by security analysts since 'instead of using a dividend discount approach, these models measure value from the point of view of the firms' capacity for ongoing wealth creation rather than *simply* wealth distribution' (Herzberg 1998, p. 45)

Such kind of claim has also been backed by independent researchers like Chenn and Dodd (1997), whose study showed that there was a dramatic improvement in stock performance among EVA users. Coca Cola's stock returned about 200 per cent from the inception of EVA in 1987 to 1993. Lehn and Makhija (1996, 1997) report that "EVA has a slight edge as a performance measure" compared to other accounting earnings measures. O'Byrne (1996, 1997) shows 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.

Worthington and West (2004) studied the information content of EVA in the Australian context. The first part of the analysis used pooled time-series, cross-sectional data of 110 listed Australian companies to evaluate the usefulness of EVA and other accounting-based performance measures. The measures of relative and incremental information content indicate that over the period 1992 to 1998 some 27 per cent of the variation in the level of stock returns could be explained by these measures, and 44 per cent of the variation in returns defined as year-to-year changes. Notwithstanding the obvious importance of earnings figures in value-relevance studies, EVA was significant at the margin in explaining variation in stock returns. This would support the potential usefulness of EVA-type measures for internal and external performance measurement. In the second part of the analysis, the components of EVA were specified as explanatory variables in regressions with EVA. When examining the components of EVA (most of which are shared with closely-related performance measures) the capital charge and after-tax interest payments were found to be the most significant components explaining EVA differences, and, accordingly, the level of stock returns. However, the accounting adjustments entailed in EVA calculations were found to be more significant in explaining changes in EVA and hence stock returns. Net cash flow, after-tax interest, accruals and the capital charge followed this. Overall the proponents of EVA have made the following major claims about the measure:

1) EVA helps in reducing agency conflict and improve decision making (Costigan & Lovata, 2002; Biddle et al. 1999)

2) EVA is more strongly associated with stock return than other measures. (Maditinos et al., 2006; Lehn and Makhija,1997)

3) EVA improves stock performance (Ferguson et al., 2005)

4) EVA adds more informational content in explaining stock returns (Erasmus, 2008; Chen and Dodd, 1997; Kim, 2006)

5) EVA and Market Value are correlated (Lefkowitz, 1999; O'Byrne, 1996; Uyemura, 1996; Peterson and Peterson, 1996).

While successful EVA stories are quite encouraging, evidence supporting the rhetoric has been primarily anecdotal. There has not been sufficient empirical research to substantiate the claim that EVA is the best performance measure in terms of value relevance. In contrast, limited empirical evidence has suggested otherwise. Biddle, Bowen and Wallace (1997) used relative and incremental information tests to examine whether stock returns were more highly associated with EVA, residual income or cash flow from operations. They concluded that while 'for some firms EVA may be an effective tool for internal decision making, performance measurement and incentive compensation, it does not dominate earnings in its association with stock market returns' (p. 333).

Chen and Dodd (1997) likewise examined different dimensions of the EVA system and concluded: '… not a single EVA measure [annualised EVA return, average EVA per share, change in standardised EVA and average return on capital] was able to account for more than 26 per cent of the variation in stock return'. Lehn and Makhija (1997) Rogerson (1997) and Biddle, Bowen and Wallace (1997) reached similar conclusions.

Bacidore et al (1997) developed a refined EVA (REVA),

computing capital charges based on market values of debt and equity instead of adjusted book values. For the years between 1982 and 1992, they compared the explanatory power of EVA and REVA on market-risk adjusted excess returns, and found that REVA out-performed EVA in measuring firm performance. Kramer and Peters (2001) examined the correlation between EVA and NOPAT with MVA, and reported that NOPAT exhibited higher explanatory powers than EVA in 42 of the 53 industries, based on adjusted R2, from ordinary least-squares regressions. They concluded that there is no significant 'industry effect' to EVA, and that

EVA is not better suited to manufacturing versus knowledge-based businesses.

Clinton and Chen (1998) also compared share prices and returns to residual cash flow, economic value-added and other traditional measures, and recommended that companies using EVA consider residual cash flow as an alternative.

However, Bao and Bao (1998, p. 262) in an analysis of price levels and firm valuations concluded that the 'results are not consistent for earnings and abnormal economic earnings, but are consistent for value-added, that is, value-added is significant in both levels and changes deflated by price analyses'. Similarly,

Uyemura, Kantor and Petit (1996) demonstrated that EVA has a high correlation with market value added (the difference between the firm's value and cumulative investor capital) and thereby stock price, while O'Byrne (1996) estimated that changes in EVA explain more variation in long-term stock returns than changes in earnings. Finally, and from a stock selection perspective, Herzberg (1998, p. 52) concluded that the residual income valuation model (including EVA) 'appears to have been very effective in uncovering firms whose stock is underpriced when considered in conjunction with expectations for strong earnings and growth'.

Ferguson et al (2006) investigated the effectiveness of trading strategies derived from EVA and MVA for the period 1994–2003. They formed 10 groups of portfolios from the top 100 to the bottom 100 of the SS1000 firms, ranked by adjusted-EVA (dEVA/MVt_1) and adjusted-MVA (dMVA/MVt_1). They did not find statistically significant differences between the top and the bottom portfolios based on both ranking variables. However, they observed unique characteristics of the winner groups using two different ranking variables, but not for the loser groups. EVA and MVA were also compared using a portfolio separation test (Fountaine et al, 2008), and the differing results between the highest and lowest performers from each were found to be significant and generally similar to one another. The portfolio separation test was further used to compare the best (highest) and worst (lowest) EVA performers from each of the years between 1995 and 2004, chaining the cumulative returns of each group together in two annually rebalanced portfolios. The cumulative wealth creation was shown to differ between the high and low groups, and regressions of the daily returns of each showed the difference between them to be statistically significant. The researchers concluded that EVA has explanatory power on relative shareholder wealth creation across both bull and bear market environments.

Ismail (2006) examined the claim of EVA advocates of its superiority as a financial metric compared with other measures using a sample of 2252 firm year observations from the UK market and applied panel data regression to examine the value relevance of EVA, RI, NI, NOPAT and OCF. The results pointed out that NI and NOPAT outperform EVA and RI in their association with stock returns. The changes in independent variables were used rather than levels and confirmed that EVA does not outperform earnings. The incremental information content test of EVA components revealed that all the components are highly significant but the one unique to EVA has less incremental information content than the others.

Palliam (2006) used 33 non-EVA users and 75 EVA users to test the assertion that EVA is more highly associated with stock returns and firm values than other metrics. The variables used for the study were revenues, profits, assets, stockholder's equity, market value, earning per share, total return to investors and percentage cost reduction over time. The study revealed that there is weaker positive correlation (0.503) between the market price of the stock of EVA users and the synthetic price determined by discounting the future EVAs than the correlation (0.798) between the market price of the stock of non-EVA users and the synthetic price. The empirical evidence supported that EVA is somewhat invalid, unreliable and questionable and raised serious doubts about its capacity to deliver superior metrics as a result.

Kyriazis and Anastassis (2007) investigated the relative explanatory power of the Economic Value Added (EVA) model with respect to stock returns and firms' market value, compared to established accounting variables (e.g. net income, operating income), in the context of a small European developing market, namely the Athens Stock Exchange, in its first market-wide application of the EVA measure. Relative information content tests reveal that net and operating income appear to be more value relevant than EVA. Additionally, incremental information tests suggested that EVA unique components add only marginally to the information content of accounting profit. Moreover, EVA does not appear to have a stronger correlation with firms' Market Value Added than the other variables, suggesting that EVA, even though useful as a performance evaluation tool, need not necessarily be more correlated with shareholder's value than established accounting variables.

Nevertheless, the bulk of empirical evidence indicates that the superiority of EVA over earnings (as variously defined) has not been established. The results at best could be termed mixed and controversial. This study is inspired by the controversial results of the previous studies and the lack of similar in-depth research available in India. This study aims to investigate whether EVA is

Sources: Field data

superior in explaining financial performance better than the earnings and cash-flows. We have tried to provide independent empirical evidence on the information content of EVA and two mandated performance measures like earnings and operating cash flow.

Research Problem

The first research question addresses the assertion that EVA dominates traditional performance measures in explaining firm value, through the following:

- Do EVA dominate the more commonly used accounting performance measures such as Net income, earning and operating cash flow in explaining the contemporaneous annual stock returns?

The second research question examines whether EVA complements currently mandated performance measures. This is equivalent to asking: does the market appear to value a given EVA component beyond the information contained in other components? To address this incremental information content question, we decompose EVA into several components and evaluate the contribution of each component towards explaining contemporaneous stock returns through the following question:

- Do components unique to EVA explain stock returns beyond that explained by currently mandated performance measures?

Empirical Methodology

The calculation of EVA consists of two separate but related steps. The primary adjustment is where a capital charge is subtracted from net operating profit after tax. The capital charge is derived from multiplying the firm's overall financing cost, as reflected in the weighted average cost of capital by the amount of invested capital. Invested capital in turn is defined as total assets, net of non-interest bearing current liabilities. In this form, EVA is essentially the same as residual income, though the latter measure is normally expressed as net income less a charge for the cost of equity capital (with the cost of debt already included in the calculation of net income). The second and more controversial step consists of a series of adjustments to GAAP-based numbers. These modifications to a company's conventional accounts may be meaningfully grouped as adjustments to research and development, deferred taxes, intangibles, depreciation, provisions for warranties and bad debts, restructuring changes, and macroeconomic conditions (see Stewart 1991, 1994; O'Hanlon & Peasnell 1998, 2000; Young 1999; Stern Stewart 1999; Worthington & West 2001 for a detailed discussion of these accounting adjustments).

The analysis contained in this paper consists of two closely related empirical questions. The first question relates to the purported dominance of EVA over both operating profit and the conventional accounting performance measures of earnings before extraordinary items and net cash flow from operations in explaining contemporaneous stock returns. The second empirical question concerns those components unique to EVA that help explain these contemporaneous stock returns beyond that explained by residual income, earnings before extraordinary items and net cash flow from operations. Assuming that equity markets are (semi-strong form) efficient, stock returns may be used to compare the information content (or value-relevance) of these competing accounting-based performance measures (Bowen, Burgstahler & Daley 1987; Jennings 1990; Easton & Harris 1991; Ali & Pope 1995; Biddle, Seow & Siegel 1995). Both relative and incremental information content comparisons are made. In terms of specific studies, the approach selected in the current study is most consistent with that used by Biddle, Bowen and Wallace (1997) and Bao and Bao (1998).

3.1.1 Computation of EVA

The first methodological requirement is to describe the linkages that exist between the various components of economic value-added (*EVA*). Starting with earnings from operating activities as the most basic indicator of firm value we have:

$$EOA_t = CFO_t + ACC_t \qquad (1)$$

where *EOA* is the sum of cash from operations (CFO) and accruals (*ACC*) with the *t* sub-script denoting the time-period. *ACC* is defined as total accruals relating to operating activities and is composed of depreciation, amortisation, changes in non-cash current assets, changes in current liabilities, and changes in the non-current portion of deferred taxes. Net operating profit after tax (NOPAT) is a closely related indicator of current and future firm performance and is calculated by adding after-tax interest expense (*ATI*) to EOA:

$$NOPAT = EOA + ATI = CFO + ACC + ATI \qquad (2)$$

As indicated, the most significant difference between EOA and NOPAT is that the latter separates operating activities from financing activities by including the after-tax effect of debt financing (interest expense). As a measure of operating profit, no allowance is therefore made in (2) for the financing activities (both debt and equity) of the firm. One measure that does so is Economic Value added (EVA) where operating performance is reduced by a net charge for the cost of all debt and equity capital employed:

$$EVA = NOPAT \text{ “ } WACC \times CE = CFO + ACC + ATI \text{ “ } CC \qquad (3)$$

where *WACC* is an estimate of the firm's weighted average cost of capital, and capital employed (*CE*) is defined as assets (net of depreciation) invested in going-concern operating activities, or equivalently, contributed and retained debt and equity capital, at the beginning of the period. The product of the firm's *WACC* and the amount of contributed capital thereby forms a capital charge (*CC*) against which NOPAT is reduced to reflect the return required by the providers of debt and equity capital. A positive (negative) EVA *indicates* profits in

surplus (deficit) of that required by the suppliers of debt and equity capital and is associated with an increase (decrease) in shareholder wealth.

3.2 Hypotheses

By assuming that equity markets are (semi-strong) efficient, forward-looking and can form estimates of performance measures, we use stock market returns to compare the information content, or value-relevance, of CFO, EOA, and EVA. Following Biddle, Seow and Siegel (1995), we draw a distinction between relative and incremental information content. Relative information content comparisons are appropriate when one desires a ranking of performance measures by information content or when making mutually exclusive choices among performance measures, i.e., when only one measure can be chosen. In contrast, incremental information content comparisons assess whether one measure provides value-relevant inferences beyond those provided by another measure and apply when assessing the information content of a supplemental disclosure or the information of a component measure (e.g., Bowen, Burgstahler and Daley, 1987).

Despite claims by Stern Stewart and others that EVA is more value-relevant to market participants than EOA and CFO, we take a neutral position and conduct two-tail tests of the null hypotheses that CFO, EOA, and EVA have equal relative information content:

H_R: The information content of measure X_1 is equal to that of X_2

where X_1 and X_2 represent pair wise combinations from the set of performance measures: CFO, EOA and EVA. Rejection of HR is viewed as evidence of a significant difference in relative information content.

We examine the incremental value relevance of EVA components by testing the null hypotheses that individual components of EVA do not provide incremental information content beyond other components that also comprise CFO and EOA:

H_I: Component X_1 does not provide information content beyond that provided by the remaining components X_2 through X_4

Where X_1 through X_4 are components of EVA (i.e., CFO, Accrual, ATI, and CC). Rejection of H_I is viewed as evidence of incremental information content.

3.3 Statistical Tests

A standard approach for assessing information content is to examine the statistical significance of the slope coefficient, b1, in the following ordinary-least-squares regression (that omits firm subscripts):

$$D_t = b_0 + b_1 FEX_t/MVE_{t-1} + e_t \quad (4)$$

Where:

D_t is the dependent variable, a measure of (abnormal or unexpected) returns for time period t,

FEX_t / MVE_{t-1} is the unexpected realization (or forecast error) for a given accounting measure, X (e.g., CFO, EBEI, EVA), scaled by the beginning-of-period market value of the firm's equity, MVEt-1, 7 and e_t is a random disturbance term.

Because little is known about suitable proxies for market expectations for performance measures other than earnings, we use an approach from Biddle and Seow (1991) and Biddle, Seow and Siegel (1995) that estimates market expectations "jointly" with slope coefficients. This is accomplished by first expressing the forecast error as the difference between the realized value of a performance measure and the market's expectation: $FE_t = X_t - E(X_t)$. It is then assumed that market expectations are formed according to a discrete linear stochastic process (in autoregressive form):

$$E(X_t) = ä + ö_1 X_{t-1} + ö_2 X_{t-2} + ö_3 X_{t-3} + \ldots \quad (5)$$

Where the ä is a constant and ö's are autoregressive parameters. Substituting equation (5) into equation (4) yields:

$$D_t = b_0 + b_1 (X_t - (ä + ö_1 X_{t-1} + ö_2 X_{t-2} + ö_3 X_{t-3} + \ldots)) / MVE_{t-1} + e_t. \quad (6)$$

$$= b2_0 + b2_1 X_t/MVE_{t-1} + b2_2 X_{t-1}/MVE_{t-1} + b2_3 X_{t-2}/MVE_{t-1} + b2_4 X_{t-3}/MVE_{t-1} + \ldots + e_t.$$

Equation (6) relates abnormal returns and (scaled) lagged measures of accounting performance, where $E(b2_0) = b_0 - b_1ä$, $E(b2_1) = b_1$, and $E(b2_i) = - b_i ö_i$-1 for i > 1. In equation (6), the proxy for market expectations is estimated jointly with the slope coefficient ($b2_i$) using the same data and optimization criterion (minimum mean squared errors). Equation (6) encompasses a range of alternative specifications for market expectations, including random-walk, ARIMA, constant stock price multiple, and combined "levels and changes" specifications. Although equation (6) is flexible in terms of allowing any number of lagged observations to be included as explanatory variables, in the presence of possible structural change across time, we limit equation (6) to one lag

$$D_t = b_0 + b_1 X_t / MVE_{t-1} + b_2 X_{t-1}/MVE_{t-1} + e_t \quad (7)$$

This "one-lag" version is equivalent to the "levels and changes" specification proposed by Easton and Harris (1991), but it is motivated differently. It also is in a more convenient form that allows the slope or "response" coefficient (b_1) to be observed directly (rather than being derived from separate coefficients on levels and changes)

3.3.1 Tests for relative information content

To assess relative information content, we employ a statistical test from Biddle, Seow and Siegel (1995) that allows a test of the null hypothesis of no difference in the ability of two competing sets of independent variables to explain variation in the dependent variable. Using this test, we make three pair wise comparisons of regressions among the accounting performance measures CFO, EOA, and EVA, as specified in equation (7). The test is

constructed as a comparison of R^2s. Under usual regularity conditions (uncorrelated homoskedastic errors), it is finite sample exact, generalizes to any number of predictor variables, and can be used in conjunction with White's (1980) correction for heteroskedastic errors. As a result, it is well suited to evaluate the significance of relative information content comparisons in accounting contexts.

3.3.2 Tests for incremental information content

Following standard methodology (e.g., Bowen, Burgstahler, and Daley, 1987), incremental information content is assessed by examining the statistical significance of regression slope coefficients. Specifically, for the one-lag specification in equation (7) generalized to two accounting performance measures X and Y, incremental information content is assessed using t-tests on individual coefficients and F-tests of the joint null hypotheses:

H_{0X}: $b_1 = b_2 = 0$

H_{0Y}: $b_3 = b_4 = 0$

Where b_1, b_2, b_3, and b_4 are from equation (8) below:

$$D_t = b_0 + b_1 X_t / MVE_{t-1} + b_2 X_{t-1} / MVE_{t-1} + b_3 Y_t / MVE_{t-1} + b_4 Y_{t-1} / MVE_{t-1} + e_t \quad (8)$$

To control for the potential effects of heteroskedastic errors, White's (1980) correction is employed in both the relative and incremental information content tests.

3.4 Source of Data

Data about the companies were obtained from the PROWESS database of CMIE. For the variable like EOA, CFO, NI, Operating income etc. data was obtained from the audited financial statement of companies available in the database. The beta, excess return and market capitalisation data were obtained from the stock price ratio and indicator section of the database.

3.5 Sample Selection

The sample includes all the banks listed on or before year 2003 in Mumbai Stock Exchange (BSE). Out of the total list of 42 banks available with CMIE, only 34 satisfied our requirement. Hence the entire data set boils down to total 340 firm year observations. This further reduces due to missing PROWESS data point or to provide a lagged observation for each variable. Then some other data point is lost in the process of rationalizing the data. We deleted some extreme outlier observations defined as more than 8 standard deviation from the median. Next data Greater (less) than 4 standard deviations from the median of the firm year observations are assigned a value equal to median plus (minus) 4 standard deviations. The resulting sample has 282 firm year observations for the whole set.

3.6 Variable definition

In the regression equation two sets of dependent and independent variables are used. We have used the excess return as our dependent variable. The monthly excess return of each stock has been calculated as a firms' 12 month compounded stock return less the 12 month compounded return of BSE SENSEX collected from the PROWESS database of CMIE. The independent variables are as follows:

EOA: Earnings from operating activities, which is defined as net profit before tax and extraordinary items in PROWESS and is collected directly from the database.

CFO: Cash from operations is defined as the net cash flow from operating activities in the database and is also collected directly from the database.

Accrual: Operating accruals defined as EOA less CFO. This can be positive or negative, but are more likely negative reflecting non-cash expenses such as depreciation and amortisation.

ATI: After tax interest expense computed as 1 minus the firm's tax rate multiplied by the interest expense. The interest expense is collected from the database. The tax rate is assumed to be zero if net operating losses are present. ATI is non-negative.

CC: Capital charge is defined as the firm's weighted average cost of capital times the capital employed. The cost of debt is calculated as the annual interest paid divided by the total borrowings, adjusted for the effective tax rate. The cost of equity is calculated using the CAPM and the formula, $K_e = R_f + â(R_m - R_f)$, where R_f is the risk free rate of return assumed to be 6 per cent for the period under study. The market premium ($R_m - R_f$) is assumed to be 10 per cent for our study period. The firm betas are obtained from the PROWESS database.

Empirical Results

4.1 Results for Relative information content Test

As in the data set we have not used any control variable for the size of the firm. To reduce heteroscedasticity, all the independent variable have been deflated by the market value of equity of the fiscal year t-1. Descriptive data on both the deflated and un-deflated data pooled across time series are presented in Table 1. The undeflated data is reported without any prefix whereas, the deflated data is reported with a prefix such as dEVA, dEOA and dCFO. The EOA has the lowest standard deviation, median and mean among all the performance measures. The CFO reports the highest value followed by the EVA and the EOA. This is quite consistent with the smoothing effect of the accruals with respect to EOA and CFO.

Table - 1: Descriptive Statistics of Relative Information Test

Descriptive statistics	Excess retum	EVA	CFO	EOA	dEVA	dCFO	dEOA
Mean	0.205	2954.69	2944.84	1071.75	1.0359	1.1198	0.2922
Median	0.133	1307.19	1252.35	425.62	0.7503	0.6950	0.2161
Standard Deviation	0.541	4348.75	8940.8	1801.67	1.0135	1.7669	0.2907
Kurtosis	3.454	19.091	85.55	21.62061	8.8004	2.7219	15.5752
Skewness	1.467	3.714	6.55	4.014724	2.5393	1.4172	3.1196
Range	3.370	34578.07	155526.2	14325.66	7.2394	10.9389	2.7493

The un-deflated median values of each performance measure are plotted across time in Figure 1. The smoothest of the lines appears in case of earnings figure, whereas the cash-flows line is the most drastic. The banks have been able to consistently earn more than their cost of capital which is evident from the positive EVA line. The banking industry has not reported any negative or near zero EVA figures.

The correlations among these measures are provided in Table 2. Correlations among all these independent variables are positive and significant. It is interesting to note that the highest correlation with excess return is reported in case of earnings followed by the cash flow. The EVA notably has the lowest correlation with the firm returns.

Table-2 : Correlation Matrix of Relative Information Test

	Excess return	dEVA	dCFO	dEOA
Excess return	1			
dEVA	0.1856	1		
dCFO	0.2363	0.5621	1	
dEOA	0.2823	0.7790	0.5867	1

Source: Computed

To explore the first research question three variations of equation 7 were developed as follows:

$$\text{Excess returns} = b_0 + b_1 \, EOA_t / MCap_{t-1} + b_2 \, EOA_{t-1} / MCap_{t-1} + e_t \quad (7.a)$$

$$\text{Excess returns} = b_0 + b_1 \, CFO_t / MCap_{t-1} + b_2 \, CFO_{t-1} / MCap_{t-1} + e_t \quad (7.b)$$

$$\text{Excess returns} = b_0 + b_1 \, EVA_t / MCap_{t-1} + b_2 \, EVA_{t-1} / MCap_{t-1} + e_t \quad (7.c)$$

The relative information content is assessed by comparing R^2 from three separate regressions, one for each performance measure, earnings (EOA), Cash flow (CFO) and Economic profit (EVA). The R^2 from these regressions are reported in Table 3. The higher R^2s are shown on the left and the lowest is shown on the right. The model was estimated using both the pooled cross-sectional and intertemporal sample.

Table - 3 : Summary results of relative information test

All Years	Regression 7 (c) EVA	Regression 7 (a) EOA	Regression 7 (b) CFO
Adj. R^2	0.272	0.253	0.209
F	53.615	48.653	38.146
Significance	0.000	0.000	0.000

Source: Computed

As visible from the F-values, all the regressions are significant at the 1% level. Secondly, comparing the reported adjusted R^2s of the three pooled regression, it is noticed that they are not consistent to those of Biddle, Bowen and Wallace (1997), Worthington and West (2001), and Chen and Dodd (2001).

The results of the present study show that EVA (R^2 = 27.2%) provide more information in explaining stock returns than earnings (R^2 = 25.3%) followed by cash flow (R^2 = 20.9%). Biddle, Bowen and Wallace (1997) found that Earnings Before Extraordinary Items-EBEI with an R^2 = 9.0 per cent provides more information than Residual Income-RI (R^2 =6.2 per cent), and EVA (R^2 = 5.0 per cent) followed by cash from operations, CFO (R^2 = 2.38 per cent). Worthington and West (2001) also found similar results: EBEI (R^2 = 23.6 per cent), RI (R^2 = 19.2 per cent) and EVA (R^2 =14.3 per cent), while Chen and Dodd (2001) reported that Operating Income-OI with an

R^2 = 6.2 per cent explains the stock returns better than RI (R^2 = 5.0 per cent) and EVA (R^2 = 2.3 per cent). The only consistency between our study and those cited above is that all of them found cash flow to be of lowest importance as a performance measure. The results of this research suggest that in the Indian scenario, the new information provided by the EVA measure is more value relevant than the earnings and the cash flow measure, at least from the stock return perspective.

4.2 Results for Incremental information content Test

The descriptive statistics of both the un-deflated and the deflated components of the incremental information test are presented in Table 3. The convention followed is the same as that of Table 1.

Table-4: Descriptive Statistics of Incremental Information Test

Variables	Mean	Median	Standard Deviation	Kurtosis	Skewness	Range
CFO	2944.838	1252.35	8940.8	85.553	6.550	155526.2
d-CFO	1.119	0.695	1.767	2.722	1.417	10.938
Accruals	-2005.99	-909.185	8390.855	69.871	-4.615	148251.7
d-Accruals	-0.861	-0.510	1.579	3.084	-1.339	10.876
ATI	2547.054	1119.986	3854.186	17.129	3.601	29884.3
d-ATI	0.873	0.605	0.876	13.418	2.937	7.342
CC	664.107	209.518	1607.323	29.802	5.163	12650.61
d-CC	0.129	0.103	0.097	9.182	2.459	0.720

Source: Computed

The mean and median values of all variables are positive except the raw accrual data and the deflated accrual data. This is consistent with our belief of smoothing effect of accruals over some underlying cash flows. As in case of relative information content, the CFE in this case also reports the maximum standard deviation.

To assess the incremental information content of the EVA components, Equation 8 has been used in the following format:

$$\text{Excess returns} = b_0 + + b_1 CFO_t / MCap_{t-1} + b_2 CFO_{t-1}/ MCap_{t-1} + b_3 Accrual_t / MCap_{t-1} + b_4 Accrual_{t-1}/MCap_{t-} b_5ATI_t / MCap_{t-1} + b_6ATI_{t-1}/MCap_{t-11} + b_7CC_t / MCap_{t-1} + b_8CC_{t-1}/ MCap_{t-11} + e_t \quad (8.a)$$

Table 5 presents the results on incremental information content of EVA components from the above mentioned regression. We have made certain *a priori* assumptions about the predicted signs of the coefficients of each variable. We expect positive association between excess returns and the two components, CFO and Accruals and negative association between excess return and the two components representing no-negative capital costs, ATI and CC. The lagged terms are expected to have the opposite signs.

Table-5 : Summary results of relative information test

Variables	Predicted signs	Values	t-Statistics	Significance	F-Statistics
Constant		Nil	.303	.762	
CFO_t	+	1.299	1.935	.054	36.25223
CFO_{t-1}	-	-1.014	-2.035	.043	
$Accrual_t$	+	.959	1.474	.142	27.83128
$Accrual_{t-1}$	-	-.851	-1.721	.086	
ATI_t	+	.628	3.278	.001	73.16168
ATI_{t-1}	-	-.481	-2.656	.008	
CC_t	+	.045	.351	.726	24.85815
CC_{t-1}	-	-.001	-.009	.993	

Source: Computed

As expected all the coefficients are in the predicted direction and a single one contradicts our expectation. The one tail t-statistics has been computed for all the coefficients and are reported in the column next to the values. The significance levels which are also reported in the adjacent column present a different picture. Only the after tax interest and its lagged term are significant at 1 per cent level. The lagged term for CFO is significant at 5 per cent level. The CFO and the lagged term for accrual are significant at 10 per cent level; whereas the capital charge along with its lagged term and the accrual term are not significant at all. The values of the two tail F-test which are reported in the last column represent a completely contradictory picture. All of them are significant at 1 per cent level (279 degrees of freedom at 1per cent = 6.63). The meaning of the above mentioned test is that all the components of EVA have significant contribution towards explaining the stock returns. If we look at the absolute values of the F-ratio, it is clear that after tax interest by far make the largest incremental contribution in explaining stock return followed by the cash flow components while the accruals and the capital charge have much smaller contribution towards explaining the stock return.

When combined with the relative information content findings in the previous section, the results suggest that, EVA components offer substantial information content beyond the earnings components and their contribution to the information content of EVA is sufficient to provide greater relative information content than earnings.

Summary and Conclusions

Motivated by increased use in practice and increased interest in media and among academics, we examine the value relevance of EVA to currently mandated performance measures earnings and cash flow from operations. A number of points emerge from the present study. The first part of analysis uses pooled time series, cross sectional data of 34 listed Indian Banks during the period 2—1-2010 to evaluate the usefulness of EVA and other accounting based performance measures. The relative information content indicates that over this period EVA explains some 27 per cent of variation in stock return which is the maximum compared with the other mandated performance measures in our study. Notwithstanding the obvious importance of earnings figures in value relevance studies, EVA is significant at the margin in explaining variation in stock returns. This would support the potential usefulness of EVA type measures for internal and external performance measures.

In the second part of the analysis, the components of EVA are specified as explanatory variables in regression with excess returns. When examining components of EVA (which are shared with closely related performance measures) the after tax interest was found to be the most significant component in explaining stock returns. This was followed by CFO and accruals respectively. However, the capital charge was found to have least information content.

This study can be further extended in examining the incremental information content of not only the components of EVA but also from combinations incorporating more than one traditional or value based performance measure. The examination of EVA adopters should also provide interesting results. Another important suggestion for further research is to explore the value relevance of other factors beyond the above mentioned performance measures. Moreover comparative studies within stock markets with similar market characteristics as those of Indian market should add value to this kind of research.

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