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Full Length Article

Economic value added or earnings: What explains market value in Indian firms?

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Abstract

The purpose of this paper is to empirically test the claim made by Stern Stewart & Company that economic value added is a better metric that traditional earning based measures in explaining market value. For better exposition, a sample of 325 Indian firms has been divided into two parts- 170 firms belonging to Indian manufacturing companies and 155 companies belonging to the Indian service sector. After performing univariate and multivariate regression analyses, the results of the study reveal that the operating income has a strong linkage with market value added in both manufacturing and service sectors. For both the sectors, the economic value added shows weaker but positive relationship with the market value added.

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1. Introduction

Measurement of market value addition (MVA) has received increasing attention in recent years (Athanasakos, 2007). Accordingly, a number of empirical studies have been focused on determining as to which metric is best for measuring value creation. It is been argued that traditional accrual based earning measures like operating income (OI) operating profit (OP), profit after tax (PAT), return on investment (ROI) etc. are often incompetent, manipulative and misleading in explaining value creation (Armitage, Wong & Douglas, 1995; Kaur & Naratng, 2009; Palliam, 2006). In 1990s Stern Stewart & Company came out with a new metric “Economic Value Added (EVA)” that, according to them, drives stock prices, creates wealth and can explain the changes in shareholder value in a better possible way than other traditional performance measures (Stewart, 1994). They claim EVA as the performance measure that comes closer to measuring the true economic profitability of a company and is directly linked to the shareholders' value. In an empirical evidence by Stewart (1994) it was amplified that EVA is about 50% better than traditional earning based measures in explaining changes in shareholders' value on a contemporaneous basis. It is against this backdrop, scholars have devoted considerable time and effort on investigation of the claim, whether EVA is a better measure to explain MVA than traditional earning based measures. However, the empirical literature debating as to which measure among EVA and earnings is superior in explaining the MVA creation offers conflicting findings (Anderson, Bey & Weaver, 2004; Athanasakos, 2007; Awan, Siddique & Sarwar, 2014; Hasani & Fathi, 2012; Kaur & Narang, 2009; Largani & Fathi, 2012; Palliam, 2006; Shen, Zou & Chen, 2015). These conflicting findings have

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resulted in the creation of two distinct camps; one camp belongs to those researchers who argue that EVA dominates traditional earning based measures in explaining MVA (See e.g., Ahmed, 2015; Awan et al., 2014; Bhatnagar, Bhatnagar & Bhatia, 2004; Feltham, Issac, Mbagwu & Vaidyanathan, 2004; Medeiros, 2005; Parvaei & Farhadi, 2013; Sparling & Turvey, 2003; Tortella & Brusco, 2003). Contrary to this, the other camp belongs to those researchers who found traditional earning based measures to dominate EVA in explaining MVA (See e.g., Kaur & Narang, 2009; Mangala & Joura, 2002; Pandya, 2014; Peixoto, 2002; Ramadan, 2016; Ramana, 2007; Sharma & Kumar, 2010; Sharma & Kumar, 2012; Venkateshwarlu & Kumar, 2004).

In addition, these studies have been mostly focused on samples from developed nations. With regard to the emerging Indian market, fewer studies have examined the premises as to which metric is superior in explaining MVA. Further, the studies conducted in Indian markets also offer mixed findings, for instance, Kukreja and Giridhar (2005), Mangala and Joura (2002), Singh and Garg (2004) and Singh and Mehta (2012), found EVA to be a superior metric than traditional measures in explaining MVA. Contrary to this, researchers like Kaur and Narang (2009), Pandya (2014), Poornima, Narayan, and Reddy (2015), Ramana (2005, 2007) and Sharma and Kumar (2012), hold that traditional measures are better explanatory variables of MVA.

Keeping in view the above mentioned literature this study attempts to advance the literature in following ways. Firstly, we revisit the claim made by Stern Stewart & Company (1994) as “EVA stands well out from the crowd as the single best measure of wealth creation” in the context of an emerging market like India and thus further strengthens the applicability of the metric to the nascent body of research on the dominance of performance measure in emerging market firms. Moreover, the only measured evidence of EVA as a superior performance is an in house study conducted by Stern Stewart; except that, only few single firm or industry field studies have been conducted to examine the relevance of EVA as a best metric for explaining MVA (Brewer, Chandra & Hock, 1999). Accordingly, this study would be an attempt to advance the literature in this direction. Second, in the process of determining the best metric for explaining MVA of Indian firms, the study seeks to shed light on the divergent findings of prior studies. Third, this study uses sample from both the service and manufacturing sector and treats them separately, since there are a priori reasons to believe that the two sub-sectors will behave differently. This will again broaden the existing body of knowledge on the metric war between EVA and traditional earning based measures. Further, it must be acknowledged that India has certain unique characteristics that provide a natural setting for testing the aforementioned relationships. For instance, financial market imperfections and information asymmetries (Ghosh, 2006); under-developed capital markets and opaque financial reporting practices (Sasidharan, Lukose & Komera, 2015); limited role and size of the capital markets in allocating resources, under-utilized banking sector, incapable of providing demanded credit to the corporate sector (Ghosh, 2006). All these factors, along with the lack of empirical evidence on the superiority of a metric to explain value creation, make India a unique country for testing these relationships.

2. Review of theory and empirics

EVA as an organizational performance metric was introduced by Stern Stewart & Co., in the 1990s. This metric evaluates the performance of an organization on the premises whether the net operating profit after tax (NOPAT) exceeds the cost of capital (Tsuji, 2006). It is amplified that it is economic profit and not the value-added which is central to the explanation of EVA (Poornima et al., 2015). A firm adds value by the combined efforts of capital, management and workforce while as it is the competitive advantages that tend to generate economic profits for the firm. The concept of EVA is a measure of economic profit of an enterprise (De Wet, 2005; Ho, Hui & Li 2000; Kaur & Narang, 2009; Serra, Martelanc & Securato, 2011). Before the explanation of EVA, let me bring forth a set of differences that exist between the concepts of value-added and EVA. Firstly, EVA is the surplus that an organization has generated after paying off an equitable charge to capital providers, while value-added is the wealth generated by the collective efforts of capital, management and workforce. Secondly, EVA takes into consideration the time value of money which value-added does not (De Wet, 2005; Ehrbar, 1999; Palliam, 2006; Tsuji, 2006). Thirdly, EVA reporting utilizes the information of the market estimates like beta, risk-free rate, market returns and cost of capital etc. while, value-added reporting is based on the information contained in profit and loss accounts. Lastly, EVA focuses on the ability of the firm to generate returns above the expectations of shareholders. On the other hand value-added remains focused on the entity's performance in terms of contribution towards shareholders (Poornima et al., 2015).

EVA in its basic form resembles residual income¹ – the profits remaining after deducting the cost of capital in investments (Pattanayak, 2009). Thus EVA in its basic form states that an organization is adding value when after the tax earnings before interest are higher than the weighted average cost of capital of the resources employed (Helfert, 1997). In 1950s, General Electric applied the concept of residual income for measuring performance in their decentralized divisions (Stewart, 1994). However the concept of residual income as a performance measurement tool was not found to be valid and could not generate interest among business executives until 1990s. In 1991, Stewart modified residual income by making a series of accounting adjustments to standardize the residual income closer to an economic cash flow basis, parallel to economic measurement concept and labeled it as EVA (Biddle, Bowen & Wallace, 1997; De Wet, 2005; Ho et al., 2000; Pattanayak, 2009; Pattanayak & Mukherjee, 1998; Stark & Thomas, 1998; Tsuji, 2006). The basic aim of these adjustments was to make an EVA model closer to the real economic value of the firm. Moreover, it was asserted that these adjustments would tend to enhance the validity of EVA as a performance measurement tool since the real economic value enables management to monitor and control more efficiently the use of the invested capital (Kyriazis & Anastassis, 2007; Pattanayak & Mukherjee, 1998).

Thus, it naturally follows that EVA attempts to measure the true economic profit generated by the firm and serves as a metric for knowing the company's success (or failure) over a period of time (Stewart & Stern, 1991). EVA also finds support in the classical finance theory that asserts that corporates must strive to maximize the wealth of stockholders (Palliam, 2006). Further, it suggests three conceptual pillars in support of EVA. First, cash flows are more reliable than accruals (Biddle et al., 1997; Ho et al., 2000; Palliam, 2006; Tsuji, 2006). Second, certain expenses are, in economic reality, actually long-term investments because they are capable of generating revenue in long run (Ho et al., 2000; Lehn & Makhija, 1996) and lastly, it suggests that value is not created until a minimum level of returns (threshold level) is generated for shareholders.

EVA does not only serve as a measure of financial performance but is also regarded as the centerpiece of a strategy development and implementation process. Further, it is widely recognized that EVA can serve as an analytical framework for evaluating alternatives. As an evaluating tool, EVA can be used to identify a set of variables shaping payoffs and also find ways to improve them. EVA can also be used to benchmark performance and find out what's working and what's not working. Furthermore, being a single measure EVA tends to eliminate the conflict and confusion by integrating all the business issues from strategy to all the operating decisions. This single measure simplifies and speeds up decision making, strengthens communication channels, enhances teamwork and reduces parochial behavior (Ehrbar, 1999).

Moreover, it is suggested that successful value-based management companies keep the technical accounting aspects of EVA simple, making very few changes to their accounting practices. They devote time and effort in identifying and assessing the operational factors, or value drivers that have the greatest influence on the creation of economic profits (Fletcher & Smith, 2004). Further, implementation of EVA will tend to establish a link between performance and shareholders' wealth. Since EVA has been widely accepted as a performance measure, a number of Fortune 500 companies, for instance, SPX Corp., GE, and Chrysler, and in India, for instance, Tata group, Infosys and Hero Motors, report EVA as additional information in their annual reports.

Even though EVA is considered as a superior measure of performance, it too suffers from certain limitations. One major limitation of EVA is that it is over reliant on financial metrics like the amount of capital invested, profit margins, cost of capital etc. Empirical studies have shown that these metrics are often incapable of indicating future performance (Fletcher & Smith, 2004). Further, it is regarded that EVA has high financial orientation. The computation of EVA relies heavily on revenue realization and expense recognition. For getting better financial results, managers of the companies can manipulate these financial numbers (Hornngren, Foster & Datar, 1997). For instance, revenue recognized in a fiscal year can be manipulated by giving preference to the larger and profitable customer orders and delaying smaller and less profitable orders. This practice will boost EVA but would have an adverse effect on customer retention and satisfaction. Similarly a company can reduce expense recognition by delaying or cancelling expenditures in favor of better financial results. For instance, a company can terminate the employee training program and thereby tend to save the consultation fees which increases EVA but puts the commitment to work at halt. Another major problem connected with EVA is that managers in pursuit of increasing

¹The concepts of residual income and EVA appear similar but they are different. Residual income is simply the excess of earnings over the cost of capital while value is said to be added when investments earn returns over and above the expectations of investors.

EVA tend to use fully depreciated assets; such practice lowers the asset base in the books of accounts and also ensures no depreciation is charged or recognized, thereby increasing EVA. The examples cited above determine the choice to be made by the manager between personal gains or corporate welfare. From the companies' perspective, these practices are considered as unethical or even dysfunctional. However, from the perspective of managers, high reliance on EVA to measure their performance is considered as dysfunctional because it fails to depict the true level of performance at a particular point of time. Thus, manipulation of accounting numbers would be genuine in case managers know that they have improved the performance dramatically but is not immediately reflected in books of accounts (Brewer et al., 1999; Pustynnick, 2011).

Further, EVA focuses on short term gains and immediate results that deter managers to invest their time and effort in innovative products and processes. Since costs associated with R&D in projects are immediately recognized, at least in part, by accountants, their benefits accrue to an organization few years down the line. The net effect of such investment by managers is lower EVA in the current accounting year, which could result in demotion, bypassed promotion or even layoffs. Hence, managers tend to forgo investment in R&D oriented projects that may produce greater returns. Such motivation to risk aversion emerges because EVA evaluates performance of managers in terms of immediate results that may result in poor competitive position of an organization in future. Moreover, EVA helps to identify the divisions that exhibit poor performance but do not point out to the root causes of operational inefficiencies (Pustynnick, 2011). It is asserted that operation managers are more concerned with non-financial performance measures like yield and throughput in order to enhance yields and remove bottle necks (McKinnon & Bruns, 1993). The only financial information needed by operation managers is cost information. Financial numbers, such as EVA, are least helpful to operation managers because they do not point towards the root causes of operational inefficiencies (Brewer et al., 1999).

Furthermore, EVA does not take into consideration size differences (Hansen & Mowen, 1997; Horngren, et al., 1997). It is amplified that EVA is calculated on the total amount of invested capital, due to capitalization differences among larger and smaller firms, EVA will also tend to differ. For a large sized firm with high capitalization, EVA will be more compared to smaller counterparts (Brewer et al., 1999; Pustynnick, 2011). Finally researches like, Biddle et al. (1997), Chen and Dodd (1997) and Mishra (2009) assert that EVA does not strongly correlate with stock returns as claimed by its proponents.

2.1. EVA or earnings – what explains MVA better?

The effectiveness of EVA as a performance metric to explain MVA has been rigorously debated by the scholars but the results have been inconclusive. Much of this debate has centered on whether EVA is a superior metric than traditional accrual based earning measures for accessing the value of a firm (Anderson et al., 2004). It has been argued that EVA and MVA are closely linked because MVA is the present value of future EVA (Ehrbar, 1999). Further increased interest of corporate managers in EVA and MVA reflect their concerns towards the creation of value for shareholders. In the quest for increasing the value of shareholders, managers and scholars have been focused on determining as to which metric explains the MVA better (Lehn & Makhija, 1996; Serra et al., 2011; Visaltanachoti, Luo & Yi, 2008).

Accordingly, the results of empirical studies are divided into two distinct camps, one camp belongs to those researchers who found EVA to dominate earning based measures in explaining MVA (See e.g., Ahmed, 2015; Awan et al., 2014; Bhatnagar et al., 2004; Kukreja & Giridhar, 2005; Medeiros, 2005; Parvaei & Farhadi, 2013; Singh & Garg, 2004; Singh & Mehta, 2012; Tortella & Brusco 2003). Contrary to this, other camp belongs to those researchers who found earning measures dominate EVA in explaining MVA (See e.g., Kaur & Narang, 2009; Pandya, 2014; Peixoto, 2002; Poornima et al., 2015; Ramadan, 2016; Ramana, 2007; Sharma & Kumar, 2010; Sharma & Kumar, 2012; Venkateshwarlu & Kumar, 2004). An overview of the past studies regarding the association of EVA and various earning based metrics with market value creation is given in Table 1.

It has been amplified in literature that traditional earning based performance measures of the firm performance lag EVA because of the following reasons. Earning based measures ignore the cost of equity; they only illustrate a company's interest expense. Thus it becomes difficult to ascertain whether the firm is adding value for shareholders (Visaltanachoti et al., 2008). EVA takes into account whole information in income and position statement, giving a holistic picture of profits generated and the costs associated with generation of these profits (Young & O'byrne, 2001). It becomes easier for a firm to communicate its performance by one measure rather than by several (Dierks &

Table 1

An overview of the past studies regarding the association of EVA and various earning based metrics with market value.

Author(s)(year)	Country	Sample size	Results
Stewart and Stern (1991)	U.S.A	613 companies	Relationship between EVA and MVA holds. However the relationship between negative EVA and negative MVA does not hold
O'Byrne (1996)	U.S.A	7,546 firm years	EVA beats NOPAT & FCF in explaining market value
Biddle et al. (1997)	U.S.A	773 companies	$R^2(\text{EBEI}) > R^2(\text{RI}) > R^2(\text{EVA}) > R^2(\text{CFO})$ EVA most significant
Banerjee and Jain (1999)	India	50 companies	EVA most significant
Moore(1999)	Michigan	95 companies	Economic efficiency > customer satisfaction
Peixoto (2002)	Portugal	39 companies	NI > OI > EVA
Bhatnagar et al. (2004)	India	56 companies	EVA most significant
Feltham et al. (2004)	Canada	4086 Firm years, 2068 Firm years & 386 Firm years	1.EVA > RI > EBEI > CFO 2.RI > EVA > EBEI > CFO 3.EVA > EBEI > CFO > RI
Firer (2004)	South Africa	3 samples–127,128 & 125 companies	Earnings > value added
Malik (2004)	India	50 companies	Earning measures do not reflect shareholders wealth
Ramana (2005)	India	243 companies	$R^2(\text{PAT}) > R^2(\text{PBIT}) > R^2(\text{NOPAT}) > R^2(\text{EVA}) > R^2(\text{CFO})$ EVA most significant
Singh and Garg (2004)	India	50 companies	EVA most significant
Worthington and West (2004)	Australia	110 companies	EVA most significant
Medeiros (2005)	Brazil	6 companies	Past EVA influences stock returns
Pandey (2005)	India	229 companies	Positive association between EP and M/B ratio
Palliam (2006)	Random	33 EVA non-users & 75 EVA user companies	EVA did not outperform traditional earning measures
Tsuji (2006)	Japan	561 companies	Earning measures outperform EVA
Kyriazis and Anastassis (2007)	Europe (Athens)	121 companies	Traditional earning measures beat EVA
Ramana (2007)	India	50 companies	Small proportion of MVA is explained by EVA and other measures
Kaur and Narang (2009)	India	104 companies	Traditional earning based measures beat EVA
Serra et al. (2011)	Brazil	52 companies	NOPAT & NI explain MVA better than EP
Sharma and Kumar (2012)	India	BT-SS survey companies	EPS is best measures of shareholder valuation
Awan et al., 2014	Pakistan	59 companies	EVA dominates accrual earning in associated with stock return
Poornima et al. (2015)	India	50 companies	Weak correlation between EVA and EPS; Strong correlation of EVACE with ROIC and RONW
Ahmed (2015)	Bangladesh	5 companies	Share price is more significantly explained by EVA
Ramadan (2016)	Jordan	77 companies	EVA is a function of inflation, interest rate, GER and GDP

Note: EVA- economic value added, MVA- market value added, NOPAT-net operating profit after tax, FCF-free cash flow, EBEI- earnings before extraordinary items, RI=residual income, CFO-cash flow from operations, NI-net Income, OI-operating income, PAT-profit after tax.

Patel, 1997). Adopting a single measure of firm, performance guides an organization towards common goal and tends to reduce conflicts arising out of messages sent by different performance measures. Companies that have adopted EVA as an important component of management control systems (Chen & Dodd, 2002), internal performance measures and basis for incentives have seen significant improvements in investing, financing and operating activities that tends to increase shareholders' wealth (Kleiman, 1999). Further, it has been found that the correlation between earnings and MVA while as the correlation between stock returns and EVA is high (Chen & Dodd, 1997; Lehn & Makhija, 1996).

Contrary to this, a number of studies have asserted that traditional earning based performance measures outperform EVA in explaining MVA, for instance, a recent study by Biddle et al. (1997) found that earnings are a better metric in explaining stock returns than EVA in terms of relative information content. They asserted that EVA adopters continue to base their external performance on earnings because earnings continue to remain the focus of financial

analysts in terms of performance measurement. Accordingly Biddle et al. (1997) amplify the weak value- relevance of EVA in explanation of MVA, because of the prevalent notion in markets ‘earnings myopia’. Kramer and Peters (2001) found that marginal costs are not justified by marginal benefits when EVA is used as a proxy for MVA. A further plausible explanation to this phenomenon has been given by Kramer and Peters (2001) who asserted that markets constantly receive information on earnings and that is why it is less responsive to EVA in short run. Further, the accounting adjustments made to the residual income by Stern Stewart might contain a measurement error or may not be in accordance to what market uses for valuing firms or may remove accruals used by various stakeholders to determine the future prospectus of the firm. Thus, while EVA attempts to determine the true economic profitability of a firm, its association with stock returns is lost (Biddle et al, 1997; Kramer and Peters, 2001). Similarly, Chen and Dodd (1998) found that unadjusted accounting measures show greater correlation with stock returns than EVA. Keeping in view the contrasting findings and the peculiarities offered by India as an emerging market give rise to a salient empirical question – whether EVA beats earnings in India?

3. Methodology

3.1. Determination of EVA and testing models

As mentioned earlier, Stern Stewart & Company modified residual income by making a series of accounting adjustments to standardize the residual income; this standardized residual income was labeled as EVA. EVA was developed first making accounting adjustments to the net operating profit after tax (NOPAT), which they call “distortions” due to accounting rules. From this adjusted NOPAT, they subtract the cost of capital. The underlying logic of EVA is to evaluate the corporate performance on the basis of whether the adjusted NOPAT exceeds the cost of capital employed. Mathematically EVA can be defined as:

$$EVA_{it} = \text{adjNOPAT}_{it} - \text{adj Capital}_{it-1} \times WACC_{it} \quad (1)$$

where adjNOPAT_{it} is the net operating profit after tax, accounted for certain adjustments, $\text{adj Capital}_{it-1}$ is capital invested after making certain modifications and $WACC_{it}$ is weighted average cost of capital.

Further, EVA's validity is tested when one desires to rank various performance measures in terms of information content or while making exclusive choice among various performance measures i.e. to determine the best performance measure among the set of performance measures (Abate, Grant, and Stewart, 2004; Biddle et al.,1997; Feltham et al., 2004; Kaur & Narang, 2009). In order to test these relationships in this study, the methodology used by Kaur and Narang (2009) has been followed. Initially a univariate regression analysis has been performed. The aim of this exercise is to single out the most significant predictor of market value added (MVA). The following univariate regression model is used:

$$MVA = \alpha + \beta(\text{independent variable}) + \mu \quad (2)$$

where α (intercept) is the value of MVA when the independent variable is zero, β is regression coefficient that shows the change in MVA for the unit change in independent variable and μ is classic error term.

Univariate regression analysis has been followed by multivariate regression. Multivariate regression has been performed to find out the predictive power of performance variables on the MVA. Accessing the predictive power helps us to single out one performance variable that has the strongest impact on MVA. However, before proceeding to multivariate regression, multicollinearity diagnosis has been performed by using Pearson's correlation matrix and variance inflation factors (VIFs). It must be noted, that for the purpose of this study, a backward elimination method of stepwise regression technique has been used. This method begins with the inclusion of all the independent variables in the model and then eliminating those variables that do not make significant contribution to the dependent variable (Kaur & Narang, 2009).

3.2. Data source and sample characteristics

Most of the data for the study has been collected from the Center for Monitoring Indian Economy (CMIE) PROWESS database. This database contains information of over 20,000 firms belonging to manufacturing, services, and other industries. It is worth mentioning that the firms included in the database account for a total of

70% of the economic activity in a organized sector (Goldberg, Khandelwal, Pavcnik & Topalova, 2008). Moreover this database provides detailed financial information on various key financial variables. Further, this database contains a detailed financial statements of firms that are mainly sourced from the annual reports of the firms. This database was previously employed by many firm level studies for suggesting the best performance metric among EVA and traditional earnings (see e.g., Kaur & Narang, 2009; Poornima et al., 2015; Sharma & Kumar, 2012).

In order to make our sample representative of the population, non-financial firms, being index contributors to the BSE 500 index, have been chosen as sample. It must be acknowledged that BSE 500 is the broad based index of the Indian economy with a total market capitalization of 93% on BSE (Sharma & Kumar, 2012). Further, BSE 500 consists of 500 companies both financial and non-financial spread across 20 industries giving due representation to all the industries and sectors of the Indian economy. In this study, a systematic deletion method of sampling has been followed to arrive at the final sample. First, the sample is restricted to non-financial firms i.e. deleting financial firms from the overall 500 firms belonging to BSE 500 index. It is worth to mention that BSE 500 consists of 76 financial firms, leaving behind 424 non-financial firms. Out of 424 firms data for 37 firms was not available on all the variables, such firms were also deleted from the sample. In addition, some firms did not end their financial year in March, such companies were also deleted from the final sample, leaving a total number of 325, classified in to manufacturing and service sectors. Thus, the final sample of the study comprises of 325 firms over a period of 10 years (2005–2006 to 2014–2015) making the total number of observations equal to 3250 (i.e. 325 firms over the period of 10 years). For better exposition, the sample has been divided into two parts – 170 firms belonging to Indian manufacturing and 155 companies belonging to the Indian service sectors.² Furthermore, the data for this study has been analyzed through a special econometric software STATA13.

3.3. Choice of variables

Ten financial variables are chosen for this study, out of which MVA has been taken as dependent variable and EVA, operating income (OI), operating profit (OP), profit after tax (PAT), cash flow (CF), earning per share (EPS), return on investment (ROI), return on capital employed (ROCE), return on net worth (RONW) have been taken as independent variables. A brief description of all the variables is given in Table 2.

4. Results and discussion

4.1. Univariate regression analysis

Tables 3 and 4 present the results of univariate cross-sectional regression for the period of 2006–2015 and overall univariate panel data regression for the overall period of 10 years. It must be noted that univariate regression analysis has been performed to identify the most significant predictor (s) of market value added (MVA) and also to rank the independent variables on the basis of the variations explained by them in the dependent variable. Further, these results are based upon the frequent occurrence of significant and positive relationship of individual independent variable and dependent variable. In other words it depicts the number of years for which each independent variable remained significant or non-significant determinant of MVA.

In addition, it must be noted that a variable is considered to have non-significant impact when it is level of significance is higher that or above 10%. It is evident from Table 3 that EVA, OI, OP, ROCE and RONW qualify to be the most significant determinants of MVA at 1% level of significance and also occur significant throughout the study period. Moreover, these variables remain the significant determinants of MVA in both manufacturing and services sector. Further, it is found that in manufacturing sector PAT remains non-significant for 3 years (i.e. in 2012, 2014 and 2015), while as in services sector PAT remains non-significant for 2 years (i.e. in 2010 and 2015). Further, ROI turned out to be the significant predictor of MVA for 5 years (i.e. in 2007, 2008, 2013, 2014 and 2015) in manufacturing sector and for 7 years (i.e. in 2006, 2007, 2008, 2010, 2012, 2013 and 2014) in services sector. Moreover, EPS and ROI turn out to have non-significant relationship with MVA throughout the study period.

²The details of sample description is given in Appendix A and B.

Table 2

A brief description of variables, notations, formulas and data sources used in the study.

Variables	Notations	Sources
1. Data and formula relating to NOPAT		
Net operating profit after tax (NOPAT)	$[\text{EBITDA}_{i,t} - \text{Dep}_{i,t}] \times (1 - T) + \Delta \text{PROV}_{i,t}$	
Earnings before interest, taxes, depreciation and amortization	EBITDA _{i,t}	CMIE PROWESS
Depreciation	Dep _{i,t}	CMIE PROWESS
Corporate tax rate	T	RBI website
Provisions	PROV _{i,t}	CMIE PROWESS
2. Data and formula relating to capital = Capital _{i,t} = DEBT _{i,t} + EQUITY _{i,t} + REPRSU _{i,t} + MI _{i,t}		
Liability with interest	DEBT _{i,t}	CMIE PROWESS
Shareholders' equity	EQUITY _{i,t}	CMIE PROWESS
Reserves, provisions and surplus	REPRSU _{i,t}	CMIE PROWESS
Minority interest	MI _{i,t}	CMIE PROWESS
3. Data and formula relating to weighted average cost of capital calculated by capital assets pricing model(CAPM)-= WACC		
(CAPM)	$K_e = K_f + \beta[(R_m) - R_f]$	
Under the CAPM, a firm's beta (β) captures all the relevant risk to estimate the cost of equity as:		
Cost of equity shareholders' funds	K_e	Calculated from CAPM
Cost of debt	K_d	Financial Expenses/(Gross debt _t + Gross debt _{t+1})/2
Market capital	E_i	CMIE PROWESS
Liability with interest	D_i	CMIE PROWESS
Corporate tax rate	T	RBI website
Risk free rate	R_f	Interest rate on gilt securities taken from RBI website
Beta	β	Capital line database
Long-term expected return	R_m	Calculated as logarithmic function of SENSEX Index
4. Dependent variable		
Market value added	MVA _i	Market capitalization-economic capital
5. Independent variables		
Economic value added	EVA _{i,t}	Calculated as Eq. (1)
Operating income	OI _{i,t}	CMIE PROWESS
Operating profit	OP _{i,t}	CMIE PROWESS
Profit after tax	PAT _{i,t}	CMIE PROWESS
Cash flow	CF _{i,t}	CMIE PROWESS
Earnings per Share	EPS _{i,t}	CMIE PROWESS
Return on investment	ROI _{i,t}	CMIE PROWESS
Return on capital employed	ROCE _{i,t}	CMIE PROWESS
Return on average net worth	RONW _{i,t}	CMIE PROWESS

The results presented in Table 4 exemplify the explanatory power of the independent variables in explaining MVA. Further, all the variables are ranked on the basis of their explanatory power and level of significance. In manufacturing sector, among all the explanatory variables OI is found as the most significant explanatory variable of MVA with the explanatory power of about 56.5%. OP is placed second with the explanatory power of about 48.6%,

Table 3
Summary of Univariate Regression Analysis for manufacturing and services sector

Panel A: Manufacturing sector companies

Year	EVA	OI	OP	PAT	CF	EPS	ROI	ROCE	RONW
2006	✓*	✓*	✓*	✓**	×	×	×	✓*	✓*
2007	✓*	✓*	✓*	✓**	×	×	✓**	✓*	✓*
2008	✓**	✓*	✓*	✓*	×	×	✓**	✓*	✓*
2009	✓**	✓*	✓*	✓**	×	×	×	✓*	✓*
2010	✓*	✓*	✓*	✓**	×	×	×	✓*	✓*
2011	✓*	✓*	✓*	✓**	×	×	×	✓*	✓*
2012	✓*	✓*	✓*	×	×	×	×	✓*	✓*
2013	✓*	✓*	✓*	✓**	×	×	✓***	✓*	✓*
2014	✓*	✓*	✓*	×	×	×	✓*	✓*	✓*
2015	✓*	✓*	✓*	×	×	×	✓**	✓*	✓*
Overall	✓*	✓*	✓*	✓*	×	×	×	✓*	✓*

Panel B: Services sector companies

Year	EVA	OI	OP	PAT	CF	EPS	ROI	ROCE	RONW
2006	✓*	✓*	✓*	✓**	×	×	✓**	✓*	✓*
2007	✓*	✓*	✓*	✓**	×	×	✓*	✓*	✓*
2008	✓*	✓*	✓*	✓*	×	×	✓***	✓*	✓*
2009	✓*	✓*	✓*	✓*	×	×	×	✓*	✓*
2010	✓*	✓*	✓*	×	×	×	×	✓*	✓*
2011	✓*	✓*	✓*	✓*	×	×	✓***	✓*	*
2012	✓*	✓*	✓*	✓***	×	×	×	✓*	✓*
2013	✓*	✓*	✓*	✓**	×	×	✓**	✓*	✓*
2014	✓*	✓*	✓*	✓*	×	×	✓*	✓*	✓*
2015	✓*	✓*	✓*	×	×	×	✓**	✓*	✓*
Overall	✓*	✓*	✓*	✓*	×	×	✓*	✓*	✓*

Note: Table 3 reports empirical results estimated after running cross-section regression over a period 2006–2015 and panel data regression for overall period of 10 years. Estimates obtained are based on robust standard errors corrected for potential heteroskedasticity and autocorrelation. The notation of all the variables is same as defined in Table 2. Panel A includes the companies from manufacturing sector, Panel B includes companies from services sector. ✓ indicates significant and × indicates non-significant association between MVA and the respective independent variable. Asterisks indicate significance at 1% (*), 5% (**) and 10% (***).

Table 4
Ranking of explanatory power of independent variables.

Variables	Panel A: Manufacturing sector				Panel B: Services sector			
	R ² values	Rank	Association with MV	Sig. level	R ² values	Rank	Association with MV	Sig. level
EVA	0.092	6	Positive	0.000*	0.174	5	Positive	0.000*
OI	0.565	1	Positive	0.000*	0.592	1	Positive	0.000*
OP	0.486	2	Positive	0.000*	0.501	2	Positive	0.000*
PAT	0.185	5	Positive	0.000**	0.131	6	Positive	0.000*
CF	0.004	8	Negative	0.389	0.008	9	Positive	0.314
EPS	0.008	9	Negative	0.432	0.013	8	Negative	0.278
ROI	0.012	7	Positive	0.000*	0.122	7	Positive	0.000*
ROCE	0.223	4	Positive	0.000*	0.312	3	Positive	0.000*
RONW	0.402	3	Positive	0.000*	0.304	4	Positive	0.000*

Note: This table reports the explanatory power of all independent variables. The notation of all the variables is same as defined in Table 2. Panel A includes the companies from manufacturing sector, Panel B includes companies from services sector. Asterisks indicate significance at 1% (*) and 5% (**).

followed by RONW with 40.2% of variation explained by it. ROCE, PAT are next in line with the explanatory power of 22.3% and 18.5% respectively. EVA holds 6th rank following PAT with the explanatory power of 9.2%. ROI follows EVA for 7th rank with the explanatory power of about 1.2%. It must be noted here that all the variables are

Table 5
Correlation co-efficient of all variables.

Variables	MV	EVA	OI	OP	PAT	ROI	ROCE	RONW
MV	1.00							
EVA	0.368**	1.00						
OI	0.321*	0.286**	1.00					
OP	0.278**	0.369**	0.326*	1.00				
PAT	0.529**	0.462*	0.377*	0.432**	1.00			
ROI	0.312*	0.421*	0.429*	0.685*	0.571	1.00		
ROCE	0.201**	0.326***	0.341**	0.278	0.265***	0.348***	1.00	
RONW	0.286**	0.278**	0.258*	0.205	0.376***	0.366***	0.376**	1.00

Note: This table presents pair-wise correlation coefficients based on full sample of 3250 firm-year observations in manufacturing and services sector. The notation of all the variables is same as defined in Table 2. Asterisks indicate significance at 1% (*), 5% (**) and 10% (***).

positively significant at 1% level of significance for manufacturing sector except then PAT, that remains positively significant at 5% level of significance. Moreover, it is found that CF and EPS hold lowest ranks and show a non-significant negative association with MVA. Thus, the overall the results of univariate regression analysis for manufacturing sector can be summarised as:

$R^2(OI) > R^2(OP) > R^2(ROCE) > R^2(ROI), R^2$ suggests the amount of variation in MVA, as explained by each independent variable in manufacturing sector companies.

Furthermore, Table 4 reports the results of Panel B i.e. service sectors. It is found that no substantial difference exists between the results of manufacturing sector and service sectors. OI ranks 1st in terms of explanatory power in services sector also with the explanatory power of about 59.2%. OI is followed by OP with the explanatory power of about 50.1%. ROCE, RONW and EVA takes 3rd, 4th and 5th position, respectively in explaining MVA. With explanatory power of about 31.2%, 30.4% and 17.4% respectively. Moreover, the results reveal that PAT and ROI hold 6th and 7th rank with the explanatory power of 13.1% and 12.2% respectively. In addition to this EPS and CF show the least explanatory power, as found in manufacturing sector. It must be noted that all the independent variables show a significant positive relationship with MVA with 1% level of significance except that EPS and CF that show non-significant relationship with MVA. These results remain same as in manufacturing sector, thus we conclude that the results of study are robust across sectors. Lastly, the results from service sectors can be summarised as:

$R^2(OI) > R^2(OP) > R^2(ROCE) > R^2(ROI), R^2$ suggests the amount of variation in MVA, as explained by each independent variable in sector companies.

4.2. Multicollinearity diagnostic test

It is widely amplified in econometric literature that before performing multiple regression analysis, an initial investigation for the existence of multicollinearity among independent variables should be done. Accordingly, in this study, Pearson's correlation coefficients have been calculated. It must be noted that EPS and CF variables have been dropped from further analyses because of their non-significant association with the dependent variable investigated previously. Table 5 reports the pair-wise correlation coefficients of all the variables. Firstly, the correlation coefficients of all the independent variables with dependent variable being statistically significant offers a rough support for the proportion that independent variables interact with dependent variable. It implies these variables are capable of explaining changes in MVA. Secondly, the results presented in Table 5 also reveal that none of the correlation coefficients among independent variables are larger than the value of 0.80. Unless the coefficients of correlation among regressors exceed the threshold of 0.80, multicollinearity will not be a serious problem (Gujarati, 2004). Finally, having ruled out the possibility of multicollinearity among the independent variables the following multivariate regression model has been specified:

$$MVA_{i,t} = \beta_0 + \beta_1 EVA_{i,t} + \beta_2 OI_{i,t} + \beta_3 OP_{i,t} + \beta_4 ROCE_{i,t} + \beta_5 RONW_{i,t} + \beta_6 ROI_{i,t} + \mu \tag{3}$$

Table 6
Results of multivariate regression analysis.

Panel A: Manufacturing sector

Year	EVA	OI	OP	ROCE	RONW	ROI	F-ratio	R	R ²	Adj. R ²	D–W	VIFs
2006	3.29*	3.23*	7.08***	1.72**	8.98**	4.28**	67.72*	0.682	0.492	0.485	1.92	1.02
2007	3.78**	3.62*	6.54**	2.22**	×	3.21**	52.84*	0.671	0.531	0.493	2.22	1.09
2008	×	4.84*	×	3.92**	7.31***	×	44.39*	0.651	0.482	0.463	1.91	1.31
2009	×	6.76*	×	×	3.03*	7.26***	51.34*	0.531	0.431	0.419	1.76	1.27
2010	×	6.42**	8.81**	7.39**	5.38**	5.21*	46.89*	0.592	0.487	0.432	1.85	1.12
2011	4.04*	5.51**	8.07**	×	×	×	51.32*	0.576	0.466	0.448	2.06	1.16
2012	×	4.07*	6.21**	×	×	6.72***	43.21*	0.476	0.398	0.383	2.01	1.19
2013	9.68*	5.65*	3.70**	4.86***	×	×	58.68*	0.632	0.599	0.587	1.77	1.27
2014	×	6.23*	×	×	×	2.28*	47.92*	0.431	0.391	0.371	2.23	1.01
2015	×	6.22*	2.47**	×	5.62**	×	57.86*	0.602	0.582	0.562	2.04	1.13
Overall	3.07*	9.08*	6.90*	7.23*	5.01*	4.21*	434.98*	0.723	0.693	0.677	1.99	1.29

Panel B: Service sectors

Year	EVA	OI	OP	ROCE	RONW	ROI	F-ratio	R	R ²	Adj. R ²	D–W	VIFs
2006	×	6.05*	3.86**	5.34**	2.03*	×	47.12*	0.734	0.595	0.527	2.12	1.05
2007	4.32*	4.32*	7.36**	×	7.05**	×	42.43*	0.731	0.591	0.499	1.87	1.19
2008	×	5.03*	×	6.03*	×	3.04**	53.76*	0.542	0.449	0.407	2.18	1.34
2009	6.24*	2.43**	6.01*	5.94*	×	1.21**	62.30*	0.492	0.410	0.389	2.09	1.09
2010	6.88***	5.02*	5.61*	5.05*	6.74**	×	75.09*	0.629	0.512	0.493	2.11	1.13
2011	×	4.07*	3.47**	×	×	4.97**	61.12*	0.761	0.617	0.583	1.78	1.01
2012	4.82*	5.37*	×	×	8.95*	5.28**	32.14*	0.342	0.281	0.246	1.84	1.01
2013	8.78**	7.98*	7.65**	3.01*	×	×	47.46*	0.572	0.464	0.431	2.21	1.07
2014	×	6.48*	×	9.87*	4.71***	4.31***	58.10*	0.487	0.401	0.363	1.93	1.21
2015	×	5.48*	×	×	4.21**	2.20**	59.64*	0.494	0.407	0.374	2.01	1.04
Overall	3.23**	9.62*	4.89**	8.29**	6.03*	5.38*	492.76*	0.892	0.723	0.687	1.86	1.26

Note: This table reports empirical results estimated after running multivariate regression. Estimates obtained are based on robust standard errors corrected for potential heteroskedasticity and autocorrelation. The notation of all the variables is same as defined in Table 2. Panel A includes the companies from manufacturing sector, Panel B includes companies from services sector. Asterisks indicate significance at 1% (*), 5% (**) and 10% (***).

4.3. Multivariate regression analysis

Multivariate regression has been performed to identify that variable that has the strongest impact on MVA. For the purpose of this study multivariate regression analysis with backward elimination method has been performed, taking MVA as dependent variable and other performance variables as independent variables. The results of multivariate regression analysis are reported in Table 6. Under multivariate regression analysis 22 separate regressions are performed i.e. one regression for each period of study (2006–2015) for manufacturing and services sector and two regression for overall 10 year study period on manufacturing and services sector respectively. Among the independent variables OI has emerged as the single strongest determinant of MVA for both manufacturing and services sector throughout the period of study. From the results it is exemplified that OP remained significant determinant of MVA for 7 years in manufacturing sector and for 6 years in services sector. Further, both ROCE and RONW remained statistically significant for 5 years in manufacturing sector, however the years of significance varied. In case of service sectors, ROCE remained statistically significant for 6 years while as RONW also remained significant for 6 years during the period of study. ROI remained significant for 6 years in both manufacturing and service sectors during the study period. EVA remained significant for 4 and 5 years in manufacturing and service sectors respectively. Further, an important proposition to mention here is that EVA remained non-significant predictor of MVA in the most recent years of study (2014 and 2015). Such evidences have been found in both manufacturing and service sectors. The plausible explanation to this phenomenon has been given by Kaur and Narang (2009) who argued that even though the growth projects of companies are reporting positive EVA, but it seems to compromise with other performance measures (like OI) that investors, analysts and other stakeholders

consider more crucial for valuing firms. Thus, it is evident that Indian markets seem to be more dependent on traditional performance measures (like OI) but at the same time it cannot be ruled out that EVA is not the determinant of MVA. The only argument that can be made is that traditional performance measures dominate EVA in explaining MVA in Indian context. These results are consistent with the results of many recent studies, who found similar results that traditional performance measures dominate EVA (See eg., Kaur & Narang, 2009; Pandya, 2014; Poornima et al., 2015; Sharma & Kumar, 2010; Sharma & Kumar, 2012). The results of overall multivariate regression reveal that coefficient of correlation (R) is (0.72) for manufacturing sector and (0.892) for service sectors and the variability (R^2) in MVA explained by all the independent variables is (69.3%) for manufacturing sector and (72.3%) for service sectors. These statistics reveal that these independent variables are capable of explaining substantial portion of variation in MVA, exemplifying that model is well-fitted. Moreover, the positive and high value of adjusted R^2 (67.7%) for manufacturing and (68.7%) for service sectors further verifies the validity of the model. Furthermore, the F -statistics is quite large (434.98) for manufacturing sector and (492.76) for service sectors and is statistically significant at 1% level of significance also adds to the validity of the model. Moreover, all the independent variables are found to be positively significant i.e. they show a positive association with MVA. It is also evident that none of the Durbin–Watson statistics ($D-W$) is beyond the cut-off limit of 1.75 and 2.25, thus ruling out the possibility of auto-correlation. Variance inflation factors (VIFs) on an average is (1.30) for both manufacturing and service sectors. Thus, further ruling out the possibility of multicollinearity. Overall, all the above mentioned statistics reveal that empirical model is quite fit and valid. Furthermore, it is concluded that traditional earning based measures dominate EVA in explaining MVA.

5. Conclusion

The study attempted to examine whether EVA or earning based performance metrics are best for explaining MVA in Indian firms. The results do not support the claim of Stern & Stewart that EVA is superior than traditional earning based performance metrics in explaining MVA. However it has been found that traditional earning based performance measures better explain MVA and among them OI for both manufacturing and sector have shown strong linkages with MVA. Moreover, it is found that all the performance metrics have a significant positive relationship with MVA but the important conclusion to be made here is that OI's explanatory power is almost thrice the explanatory power of EVA in both manufacturing and service sectors. Furthermore, all the traditional earning based performance measures have shown a higher explanatory power than EVA, implying that Indian markets can continue to evaluate the performance on the basis of traditional earning based performance measures. There can be numerous reasons as to why EVA does not perform well in India, for instance, the accounting adjustments to NOPAT suggested by Stern Stewart & Co. may not be always effective in India and might contain measurement error relative to what information Indian markets use for valuing firms. This phenomenon has also been explained by Biddle et al. (1997) who argues that in an attempt to ascertain the EVA, the adjustments made to NOPAT may remove accruals that are used by market participants for determining the future prospectus of the company. Thus, while EVA determines the true economic profitability of the firm its association with market returns is lost. Further, Kramer and Peters (2001) suggests that as market is constantly fed with news on earnings, it may not be quite responsive to EVA in short run. Moreover, prior literature gives another plausible explanation to the weak relevance of EVA in explaining MVA may be due to financial analysts "earnings myopia". It is argued that certain adopters of EVA base their external performance on earnings because financial analysts continue to focus on the earnings as the measure of performance. Thus, it is widely acknowledged that market constantly fails to recognize the benefits of EVA reporting. With regard to Indian companies, EVA weak relevance can be because of non-mandatory disclosure of EVA statements in annual reports and also because of non-availability of detailed financial data. Thus, earning metrics are the only performance measures that financial analysts have to judge the performance of Indian companies. However, it must be acknowledged that in spite of the non-availability of financial data and non-mandatory disclosures of EVA, it has shown a significant positive association with MVA.

The above mentioned results can serve as a guide to investors, financial analysts and corporate managers, while developing value creation strategies. The results of the study can be equally helpful to academicians and researchers for conducting future research. Future research can be conducted by incorporating additional subsectors, as well as

data from other emerging economies. Thus would further strengthen the literature with regard to the applicability of EVA as a performance metric in emerging economies.

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Appendix A

See [Table A1](#).

Table A1
Sample description of manufacturing sector.

S.No	Industry	No. of firms	No. of observations
1.	Chemical and chemical products	24	240
2.	Construction material	22	220
3.	Consumer goods	20	200
4.	Food and agro-based products	23	230
5.	Machinery	14	140
6.	Metal and metal products	18	180
7.	Textiles	25	250
8.	Transport equipment	24	240
	Total	170	1700

Appendix B

See [Table B1](#).

Table B1
Sample description of services sector.

S.No.	Industry	No. of firms	No. of observations
1.	Mining	53	530
2.	Electricity	13	130
3.	Construction and real estate	23	230
4.	Hotels and tourism	17	170
5.	Information technology	22	220
6.	Transport services	27	270
	Total	155	1550

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