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Value Creation of EVA and Traditional Accounting Measures: Indian Evidence

1. Introduction

The objective of corporate financial policy is to maximize the wealth of shareholders. To analyse how effectively the firm is contributing wealth to its shareholders is not only important for management of the firm but also for the other users of financial information. In order to judge the financial health of the firm, a variety of financial performance measures are used. These accounting measures also indicate the contribution of the firm to the wealth of shareholders. The wealth of shareholders is measured in terms of the returns they receive from their investments. The total return on investments includes the cash dividend or capital appreciation or both. Therefore, total return on the stock of the firm is supposed to indicate the wealth generated by the firm for shareholders. Theoretically, the firm having better financial and accounting measures should contribute more positively to the wealth of the shareholders. Therefore, it is logical to relate a good accounting measure with the positive stock returns of the firm. The financial measure which is highly associated with the stock returns should be considered as a good performance measure.

The association of financial performance measures with shareholder's wealth has been analysed by several researchers. Some of them have reported that there is no single accounting measure that explains the variability in shareholders' wealth (Chen and Dodd, 1997; Rogerson, 1997). Also the traditional accounting measures such as Earning per share (EPS), Return on assets (ROA) and Return on equity (ROE) do not report the residual income for shareholders after the consideration of the cost of capital.

In the early 1990s, in order to overcome the criticisms against traditional accounting measures, several scholars suggested new performance measures. One of these new measures is economic value added (EVA). EVA which is a trade-marked variant of residual income, developed by Stern Stewart & Co. Stewart (1994, p. 75) mentions that "EVA is almost 50% better than its closest accounting-based competitor (including EPS, ROE and ROA) in explaining changes in shareholder wealth".

Several empirical studies have been conducted to test the hypothesis given by Stern Stewart that EVA is a better value-based performance measure than traditional accounting measures. However, the results are mixed and do not provide any conclusive evidence. Some studies report that EVA is positively related to the stock returns and adds more to the

wealth of shareholders (Lefkowitz, 1999; Lehn & Makhija, 1997; O'Byrne, 1996; Uyemura et al., 1996; Forker and Powell, 2004; Worthington and West, 2004) than any traditional accounting measure. On the other hand, some studies fail to find any support to Stern Stewart Hypothesis (Biddle et al., 1997 and 1998; Maditinos et al., 2006, 2009; Ismail, 2006). The review of the existing literature for this study reveals that most of the studies are conducted either in the US (Milunovich and Tsuei, 1996; O'Byrne, 1996; Uyemura et al., 1996; Biddle et al., 1998; Chen and Dodd, 1997, 2001; Bao and Bao, 1998; De Villiers and Auret, 1998; Turvey et al., 2000; Kyriazis and Anastassis, 2007) or other developed economies (Worthington and West, 2001, 2004; Ismail, 2006; Maditinos et al., 2009) and limited empirical work has been done in developing markets. Since the emerging economies have different institutional environments, the findings of developed countries could not be generalized for other developing nations. In this regard, the reinvestigation of the Stern Stewart hypothesis is essential.

In the existing literature market price of stock is used as a proxy for shareholders' wealth. Previous studies have examined the relationship of financial performance measures with the market price of individual stocks or market returns in order to test the relative and incremental information content. However, the wealth of the shareholders includes not only the capital appreciation through market price of stock but also the cash dividends. Therefore it is more appropriate to consider total returns while examining this relationship.

The current study seeks to fill the above mentioned research gap by examining the superiority of EVA over the other traditional accounting measures in Indian context. For this purpose, a relative and incremental information content test is conducted by examining the association between these performance measures and stock returns. The analysis is performed for a sample of 50 Indian companies selected from the index Nifty 50 for the period of 2008-2011.

The novelty of this study is that unlike the previous literature it relates total return of firm's stock with the financial measures. The study contributes to the existing literature on superiority of value-based performance measure EVA by providing evidence of Indian firms. The results reveal that EVA has more relative and incremental information content than the traditional measures and therefore confirm the claim of Stern Stewart. The study has implications for the management and corporate managers who are responsible for generating the wealth of shareholders by formulating corporate financial policies. The findings would also help the investors who are closely concerned with the financial health of

the firm while taking their investment decisions. The results are also important for the indirect users of the financial information such as employees, government and creditors.

The remainder of the paper is divided as follows. The following section describes the literature review. In the next section, the research question and the hypothesis are presented which is followed by the data and methodology. The paper ends with results, discussion and conclusion sections.

2. Literature Review

The empirical studies examining the superiority of EVA over traditional measures fall under two schools of thoughts. One of them says that EVA is a better performance measure and adds more to the shareholders' wealth. Initial studies were focussed on developed markets. Lefkowitz (1999) analyzed the US companies and results of the study supported Stern-Stewart hypothesis. Lehn & Makhija (1997) examined the degree of correlation between different performance measures and stock market returns. The results reveal that EVA is the most highly correlated measure with stock returns. O'Byrne (1996) indicates that the explanatory power of EVA changes is more than that of earning changes in explaining market value changes. Uyemura et al. (1996) showed that EVA is superior to accounting based measure, including ROA, ROE, NI and EPS. Furthermore, similar results are reported by Milunovich and Tsuei (1996), Forker and Powell (2004) and Worthington and West (2004).

There are some studies that do not support the claim of Stern-Stewart hypothesis. (Biddle et al., 1997 and 1998) analyzed a sample of firms over the period 1984-93 by comparing the stock market adjusted returns against EVA, Residual Income and Operating Cash Flow. The results do not support that EVA dominates traditional performance measures in its association with the stock market returns. Maditinos et al. (2006, 2009) report that traditional accounting measures are superior compared to EVA. Moreover, Ismail (2006) reports that NOPAT and net income outperform EVA and residual income in explaining stock returns. Palliam (2006) finds that EVA is somewhat invalid, unreliable, and questionable.

Since the existing literature is not conclusive on the issue, this topic requires further investigation.

3. Research Question and Hypothesis

The developer of EVA, US-based business consultants Stern Stewart, argue that “earnings, earnings per share, and earnings growth are misleading measures of corporate performance [and that] the best practical periodic performance measure is economic value-added” (Stewart 1991, p. 66). In addition, Stewart (1994, p. 75) mentions that “EVA is almost 50% better than its closest accounting-based competitor (including EPS, ROE and ROA) in explaining changes in shareholder wealth”. The reason behind the superiority of EVA against other traditional measures is that it measures residual income contributed to the shareholders after considering the appropriate charge for the capital employed in the business. Therefore it can be argued that EVA reports the true wealth generated by the firm to the shareholders and should be considered better than the other traditional measures.

This study aims to address the research question whether EVA is a better financial performance measure than traditional accounting measures. In the existing literature the superiority of financial measures has been judged by testing the relevant and incremental information content in which the association of financial measures is determined with stock returns (Bowen, Burgstahler & Daley, 1987; Jennings, 1990; Easton & Harris, 1991; Ali & Pope, 1995; Biddle, Seow & Siegel, 1995, Worthington and West, 2004). This study also follows the literature and proposes the following hypotheses,

H₁: EVA has more relevant information content than traditional accounting measures

H₂: EVA has more incremental information content than traditional accounting measures

To test the given hypotheses, panel univariate and multivariate regression methods are applied.

4. Research Methodology

4.1 Sample selection

The study is conducted for a sample of 50 Indian companies listed on the National stock exchange (NSE) and constitutes the index of Nifty 50. NSE has outperformed BSE (Bombay stock exchange) in terms of turnover, advancement and growth so it is worthwhile to take Nifty 50 for analysis. The post-crash period 2008-2011 has been considered for the analysis in order to avoid any biases.

4.2 Measurement of Variables

The main objective of the study is to judge the superiority of EVA over the traditional measures by determining the association between EVA and stock returns. To achieve this, the dependent variable is taken as annual stock total returns of the firms directly collected from the database PROWESS. The independent variables are EPS, ROA, ROE and EVA. The variable EVA has been scaled by the lagged value of capital employed (CE_{it-1}) for analysis to provide meaningful comparison.

EPS is calculated by dividing the Profit after Tax by the average number of common shares outstanding. ROA is a profitability ratio and is calculated by dividing Profit after Tax by average total assets. ROE is another measure of profitability that focuses on the return on the shareholders' equity. This variable is measured by dividing net income by average equity. Data for all the variables for the sample firms are collected from database proweess and complied (Appendix 1A, 1B). Independent variables used for the study have been calculated from appendices 1A and 1B (Appendix 3).

EVA is the surplus left after making an appropriate charge for the capital employed in the business. It can be calculated in the following way,

$$EVA = NOPAT - (TCE \times WACC) \dots\dots\dots (1)$$

Where,

NOPAT = Net operating profit after tax

TCE = Total capital employed

WACC= Weighted average cost of capital

While calculation of NOPAT, interest expenses are added to the Profit after Tax. The total capital employed is the sum of shareholders funds as well as loan funds. In determining the WACC, cost of equity is measured on the basis of capital asset pricing method. Under capital asset pricing model, cost of equity, i. e, K_e is given by the following:

$$K_e = R_f + \beta_i (R_m - R_f) \dots\dots\dots (2)$$

Where,

R_f = Risk free return

R_m = Expected market rate of return

β_i = Risk coefficient of particular investment

Risk free return is taken as 3 month Treasury bill rate for each year. β_i is extracted directly from the database for each firm and each year. R_m is calculated as the annual return of index Nifty 50. The calculation of cost of capital is given in Appendix 2.

4.3 Model

In order to examine the relative and incremental information content of EVA and traditional measures, panel data regression methods are employed. The general equation for panel data is following,

$$Y_{it} = \alpha_{it} + \beta X_{it} + \varepsilon_{it} \quad \text{where } i = 1, 2, \dots, 50 \text{ and } t = 1, 2, \dots, 4$$

Where Y_{it} is the dependent variable (annual stock total return) for firm i in year t and X_{it} is the independent variable (EPS, ROE, ROA and EVA/CE) for firm in year t and ε_{it} is the error term.

Specifically, the following univariate regression equations are used to test the relative information content of variables,

$$R_{it} = \alpha + \beta ROA_{it} + \varepsilon_{it} \quad (1)$$

$$R_{it} = \alpha + \beta ROE_{it} + \varepsilon_{it} \quad (2)$$

$$R_{it} = \alpha + \beta EPS_{it} + \varepsilon_{it} \quad (3)$$

$$R_{it} = \alpha + \beta EVA_{it}/CE_{it-1} + \varepsilon_{it} \quad (4)$$

where; R_{it} is stock return of firm i in year t , and α , β are the coefficients of regressions and ε_{it} is the error term. Comparisons of the R^2 of the regression results are made to determine which variable better explains the variation in the stock returns and therefore has more relevant information content.

To test the incremental information content of EVA and accounting measures, the following multiple regression models are used,

$$R_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 ROE_{it} + \beta_3 EPS_{it} + \varepsilon_{it} \quad (5)$$

$$R_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 ROE_{it} + \beta_3 EPS_{it} + \beta_4 EVA_{it}/CE_{it-1} + \varepsilon_{it} \quad (6)$$

The change in the value of R^2 from the regression models (5) to (6) indicates the incremental information content of EVA.

4.4 Choice of panel regression technique

In order to test the relative and incremental information content of variables, panel regression methods are applied. Fixed effects and random effects both have used to measure the association of variables with the stock returns. However, the Hausman test has been used to find the suitability of both the methods.

5. Results and Discussion

5.1 Descriptive Statistics

Table 1 shows descriptive statistics for variables used for analysis.

<Insert Table 1 here>

The mean value is highest for EPS (42.74355) but with high standard deviation (46.90219) and overall stock return is negative (-0.17795). EVA/CE has a lowest standard deviation (0.46751) and range (2.90143) with mean value of 0.76 which shows that the firms have a stable EVA/CE and overall they are adding value to the shareholders.

5.2 Relative Information Content Test

Table 2 and Table 3 (extracted from the regression output presented in Appendix 4) indicate the results of the relative information content tests of performance measures based on fixed effects and random effects respectively. Each Table shows the results of regression models (1 to 4).

<Insert Table 2 here>

It is evident from the Table 2 that the models for ROE, ROA and EVA/CE are significant. However, the variable EVA/CE is able to explain the highest variation in the dependent variable as the value of R-square (16%) has improved for model 4. The one unit change in EVA/CE will lead to the positive change of 1.841 percent in stock returns. But the other variables ROA and ROE have negative impact on the stock returns which is quite surprising.

Therefore, results indicate that EVA better explains the variation in the stock returns than traditional measures based on the fixed effects model and therefore has more relevant information content.

<Insert Table 3 here>

Table 3 clearly indicates the preference of fixed effects model over random effects through the results of Hausman Test. For the models 2 to 4, the Hausman test indicates that the fixed effects model is appropriate. However, model 4 is significant for random effects also. Therefore it is evident that the variations in stock returns are more explained by EVA than traditional measures. This leads to acceptance of the first hypothesis (H_1) that EVA has more relevant information content than traditional measures.

5.3 Incremental Information Content Test

Table 4 presents the results for incremental information content test. Model 1 and 2 represent the results from regression equation (5) and (6). Only fixed effect model has been used as it is more appropriate.

<Insert Table 4 here>

The results reveal that the inclusion of the variable EVA/CE in the model 2 increases the value of R-square to 30 percent from 17 percent, and therefore, explaining 13 percent more of the variation in the stock returns. This leads to acceptance of the second hypothesis (H_2) that EVA has more incremental information content than traditional measures.

6. Findings of the study

The study employs panel regression in order to test the relative and incremental information content of EVA and other accounting measures. Based on the fixed effects model, the study finds evidence in support of the hypotheses that EVA has more relevant and incremental information content than accounting measures. The findings are consistent with the prior literature. Therefore EVA is a better performance measure than traditional accounting measures. The findings have implications for corporate managers, investors and management of firm for maintaining the value of the firm.

7. Limitations of the study

The study employs the cost of equity for calculating the EVA because of the non-availability of data regarding cost of debt. The yield on the corporate bonds, which is used as a cost of debt, could have been calculated.

8. Direction for Future Research

The study could be further extended for a sample of other firms covering the specific industries and sectors. The calculation of EVA could be modified with respect to the adjustment in Profit after Tax and the calculation of cost of capital. The comparison could have been done with the other traditional measures of accounting.

9. Conclusion

The study examines the superiority of the EVA to the traditional accounting measures. For this purpose the relative and incremental information content of EVA and other performance measures are examined for a sample of 50 Indian firms during 2008-2011. The panel regression methods based on fixed and random effect models are applied. It is found that EVA has more relevant and incremental information content than accounting measures. EVA is more associated with positive stock returns and adds more wealth to the shareholders than other traditional measures of financial performance. The study reveals usefulness of EVA measure for evaluating the financial performance of the firm. Firms should focus on EVA in analyzing their financial health as it is consistent with the shareholder's wealth maximization. Indian firms should take into account the measurement of EVA while analyzing financial performance apart from the traditional measures. It has important practical implications for direct and indirect users of financial information of the firm such as management, Board of directors, corporate managers, shareholders, employees, creditors and government. The findings are helpful to the investors who are closely concerned with the financial health of the firm while taking their investment decisions. The findings are also important for the indirect users of the financial information such as employees, government and creditors who need to judge the overall performance of the firm for various purposes. Therefore, the study concludes that EVA is a better financial performance measure than traditional measures.

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Author Biographies

Dr. Vijay Kumar Gupta is a professor in Finance & Accounting Area at the Indian Institute of Management Indore. He has over 20 years of experience in academics, research and consultancy. He has edited two books in the area of Finance and published numerous articles in leading journals besides presenting papers at conferences in India and abroad. Professor Gupta is on board of many professional bodies and has received awards for excellence in teaching. He has received 2nd Asia B-Schools Award – “Best Professor in Financial Management” from the Asia CMO Council in Singapore. He received 16th Business School Affair & Dewang Mehta Business School-Best Teacher in Financial Management Award across all Indian Business Schools. He has also received the Amity Academic Excellence Award for Contribution in the field of Finance and Accounting. His interest areas include International Accounting, Strategic Cost Management, Management Control Systems, Corporate Performance Management, Intellectual Capital and Third Generation Balanced Scorecard.

Ekta Sikarwar is a Fellow Participant in the area of Finance and Accounts at Indian Institute of Management Indore. Her research interest areas include Corporate finance and International Finance.

**Table 1:
Descriptive
Statistics**

	R_{it}	EPS	ROE	ROA	EVA/CE
Mean	-0.178	42.744	20.913	0.753	0.076
Median	0.065	31.420	18.320	0.630	0.058
Standard					
Deviation	3.078	46.902	17.378	0.652	0.468
Kurtosis	0.456	14.155	15.489	2.625	0.647
Skewness	-0.502	2.737	3.056	1.487	-0.071
Range	18.170	448.880	163.289	3.210	2.901
Minimum	-8.960	-69.830	-29.505	0.000	-1.078
Maximum	9.210	379.050	133.784	3.210	1.823

In Table 1, EPS figures are in Rs (INR) per share, ROE, R_{it} figures are in percentages and ROA, EVA/CE are ratios.

**Table 2: Fixed Effects
Models**

	Model 1 (EPS)	Model 2 (ROE)	Model 3 (ROA)	Model 4 (EVA/CE)
α	0.0592885 (0.13)	1.9865 (2.454) **	5.23341 (3.481)***	-0.318731 (-1.348)
β	0.00555028 (-0.6125)	-0.103497 (-2.794)***	-7.18974 (-3.643)***	1.84105 (3.343)***
R square	0.082494	0.125973	0.155419	0.164374
F value	0.267936	0.429507*	0.548375*	0.502831*
Durbin				
Watson	2.001094	2.024342	2.171054	1.605562

*Significant at 10 percent ** Significant at 5 percent and *** significant at 1 percent level

Table 3: Random Effects**Models**

	Model 1 (EPS)	Model 2 (ROE)	Model 3 (ROA)	Model 4 (EVA/CE)
α	-0.0810597 (-0.2744)	0.114669 (-0.3364)	-0.130312 (-0.3906)	-0.295477 (-1.374)
β	0.00226678 (-0.4863)	-0.0139921 (-1.115)	-0.0632932 (-0.1887)	1.53694 (3.378)***
Hausman Test	0.239437	8.28955***	16.5455***	2.09091***

*Significant at 10 percent ** Significant at 5 percent and *** significant at 1 percent level

Table 4: Fixed Effects Models

	Model 1	Model 2
α	5.684 (1.514)***	7.682 (1.452)***
EPS	0.009 -0.009	0.0125 -0.0089
ROE	-0.077 (0.042)*	-0.078 (0.0389)*
ROA	-6.17 (2.135)***	-9.255 (2.062)***
EVA/CE	-	2.704 (0.528)***
R square	0.175	0.30
F value	0.6	0.42*
Durbin Watson	2.1	2.02

*Significant at 10 percent ** Significant at 5 percent and *** significant at 1 percent level

APPENDIX 1A: Data for Variables during 2007-08 to 2008-09

S.No.	Company Name	Mar-08		Mar-08		Mar-08		Mar-08		Mar-08		Mar-09		Mar-09	
		Opening Price	Closing Price	EPS	Total income / Avg. total assets	Profit after tax	NW	Opening Price	Closing Price	EPS	Total income / Avg. total assets	Profit after tax			
1	A C C Ltd.	845	826.15	66.05	1.26	14385.9	41524.1	568	574.4	66.48	1.09	12127.9			
2	Ambuja Cements Ltd.	124	121.05	8.14	1.23	17691	46612.5	70.35	70.6	9.19	1.06	14022.7			
3	Axis Bank Ltd.	805	789.85	29.94	0.1	10710.3	87707	402	414.95	50.57	0.11	18153.6			
4	Bajaj Auto Ltd.	615.1	618.45	48.84	0	7557.8	14864.1	615.1	618.45	45.37	1.82	6545			
5	Bharat Heavy Electricals Ltd.	2060	2061.35	58.65	0.71	28593.4	107742	1485	1510.55	62.53	0.71	31382.1			
6	Bharat Petroleum Corpn. Ltd.	420	408.55	43.72	3.18	15804.7	116768	370.15	376.05	20.35	3.21	7358.1			
7	Bharti Airtel Ltd.	825.7	826.25	32.9	0.74	62441.9	202403	618.45	625.75	40.79	0.73	77438.4			
8	Cairn India Ltd.	227	224.1	-0.53	0	-788.2	293735	180	184.1	0.25	0.01	542.4			
9	Cipla Ltd.	218	220	9.02	0.87	7014.3	37558.2	220	220.05	9.99	0.81	7768.1			
10	Coal India Ltd.	342.4	346.5	3.42	0.18	24538	133693	342.4	346.5	5.41	0.22	33715.7			
11	D L F Ltd.	695.7	645.75	15.1	0.35	25745.9	112692	168	167.3	9.13	0.16	15775.8			
12	Dr. Reddy'S	571	591.25	29.05	0.62	4753	48117	466	490.2	33.96	0.65	5609			

40	Sesa Goa Ltd.	3150	3151.55	379.05	1.13	14920	27911.3	101.5	99.6	24.67	0.94	19424.9
41	Siemens Ltd.	659	616.4	11.45	1.29	5933.3	20690.8	247	268.1	28.2	1.03	10448.5
42	State Bank Of India	1674	1600.25	106.56	0.09	67291.2	490327	1032.05	1067.1	143.67	0.09	91212.3
43	Steel Authority Of India Ltd.	195.1	185.3	17.48	1.22	75367.8	230636	94.1	96.45	14.77	1.05	61704
44	Sterilite Industries (India) Ltd.	760	714.5	14.18	1.04	9516.3	131650	355	357.6	16.67	0.7	12364.3
45	Sun Pharmaceutical Inds. Ltd.	1210.55	1229.35	61.09	0.69	10140.4	42076.2	1090	1111.45	61.09	0.7	12652.9
46	Tata Consultancy Services Ltd.	871.05	810.45	42.48	1.51	45087.6	109048	525	538.55	43.66	1.36	46962.1
47	Tata Motors Ltd.	641	622.7	52.63	1.48	20289.2	78394.5	170	180.3	22.26	0.94	10165.5
48	Tata Power Co. Ltd.	1222	1171.5	39.42	0.53	8699	80378.6	770	768.6	41.65	0.54	9222
49	Tata Steel Ltd.	716	694.35	66.21	0.53	46870.3	218280	199	205.9	71.2	0.44	52017.4
50	Wipro Ltd.	449.6	432.1	20.96	1.07	245.9	115527	236.05	0.98	702	706.95	29738

APPENDIX 1B: Data for Variables during 2009-10 to 2010-11

S.No.	Company Name	Mar-10	Mar-10	Mar-10	Mar-10	Mar-10	Mar-10	Mar-10	Mar-10	Mar-10	Mar-11	Mar-11	Mar-11	Mar-11	Mar-11	Mar-11	Mar-11	Mar-11	Mar-11	
		Opening Price	Closing Price	EPS	Total income / Avg. total assets	Profit after tax	NW	Opening Price	Closing Price	EPS	Total income / Avg. total assets	Profit after tax	NW	Opening Price	Closing Price	EPS	Total income / Avg. total assets	Profit after tax	NW	
1	A C C Ltd.	947	951.05	85.6	0.95	16067	16068	1083	1074.6	48.27	0.8	11209.4	646							
2	Ambuja Cements Ltd.	118.2	119.85	9.18	0.95	12184	12185	151	147.4	7.86	0.91	12643.2	7							
3	Axis Bank Ltd.	1172	1168.3	62.06	0.1	25145	25145	1429	1403.9	82.54	0.09	33884.9	18							
4	Bajaj Auto Ltd.	1990	2014.8	117.57	1.74	17001	17003	1433	1463.3	90.38	1.83	33397.3	49							
5	Bharat Heavy Electricals Ltd.	2416.9	2390.7	87.26	0.75	43106	43107	2071.9	2062.7	121.1	0.75	60112	20							
6	Bharat Petroleum Corpn. Ltd.	526	518.05	42.53	2.6	15375	15378	611	611.85	42.78	2.95	15465.3	14							
7	Bharti Airtel Ltd.	308.7	312.55	24.82	0.64	94262	94263	357.5	357.4	20.32	0.54	77169	44							
8	Cairn India Ltd.	300.25	305.65	-0.41	0.01	-689.5	-689.49	350.3	350.95	-1.12	0	-2126.7	31							
9	Cipla Ltd.	339	338.35	12.29	0.73	10815	10816	329	321.65	11.96	0.71	9603.9	66							
10	Coal India Ltd.	342.4	346.5	5.98	0.21	38603	38603	342.4	346.5	7.44	0.23	47956.2	19							
11	D L F Ltd.	312	308.9	4.52	0.12	7650.6	7650.7	264.5	268.55	7.34	0.13	12695.8	13							
12	Dr. Reddy'S Laboratories Ltd.	1264.8	1275	52.01	0.61	8461	8461.6	1636	1639.1	56.07	0.62	8934	6							
13	G A I L (India) Ltd.	410	410.6	24.75	0.92	31398	31399	462.9	464	28.07	1.06	35611.3	19							
14	Grasim Industries Ltd.	2816	2814.9	191.53	0.76	20921	20922	2460	2456.9	128.9	0.55	11817.1	81							

15	H C L Technologies Ltd.	360	358.4	14.96	0.65	10565	10566	476.05	477.95	14.27	0.73	11982.2	58
16	H D F C Bank Ltd.	1900	1933.5	64.42	0.1	29487	29487	2350	2345.9	84.4	0.1	39264	25
17	Hero Motocorp Ltd.	2001	1944.4	111.77	2.43	22318	22321	1560	1589.5	100.5	2.22	19279	29
18	Hindalco Industries Ltd.	184	181.25	9.42	0.54	19156	19157	206	209.15	11.11	0.58	21369.2	29
19	Hindustan Unilever Ltd.	241.1	239.55	9.58	2.1	22020	22022	278.5	287.1	9.72	2.13	23059.7	26
	Housing Development												
20	Finance Corpn. Ltd.	2668	2717.2	98.45	0.11	28416	28416	700.05	701.2	24.1	0.1	35315.9	17
21	I C I C I Bank Ltd.	964.8	952.5	36.1	0.09	40250	40250	1112.2	1116.2	44.73	0.09	51513.8	55
22	I T C Ltd.	269.8	263.05	10.64	1.26	40616	40617	178.25	182.1	6.45	1.28	49882.1	15
23	Infosys Ltd.	2653.9	2616	100.97	0.95	58030	58031	3182	3241.3	112.2	0.96	64430	24
	Infrastructure Development												
24	Finance Co. Ltd.	162.25	160.95	7.79	0.11	10128	10129	155.85	154.6	8.74	0.11	12771.5	10
25	Jaiprakash Associates Ltd.	150.55	149.55	8.04	0.41	17123	17124	93.7	92.8	5.42	0.41	11677.8	93
26	Jindal Steel & Power Ltd.	695.55	703.1	15.89	0.47	14797	14797	686.2	697.3	22.09	0.46	20641.2	86
27	Kotak Mahindra Bank Ltd.	750	748.15	16.12	0.12	5631.2	5631.3	459.2	457.85	11.1	0.11	8181.8	6
28	Larsen & Toubro Ltd.	1639	1630.9	70.41	0.92	43752	43753	1665	1651.9	59.54	0.85	39573.2	21
29	Mahindra & Mahindra Ltd.	556.9	541.35	34.52	1.36	20878	20879	709	700.35	43.36	1.46	26621	10
30	Maruti Suzuki India Ltd.	1391.6	1418	86.45	1.68	24976	24978	1269	1262.2	79.22	1.82	22886	13
31	N T P C Ltd.	203	207.25	10.46	0.42	87282	87282	189.65	193.1	7.9	0.45	91025.9	67
	Oil & Natural Gas Corpn.												
32	Ltd.	1098.1	1098.7	78.3	0.41	167676	167676	282.85	291.3	21.58	0.42	189240	97
	Power Grid Corpn. Of India												
33	Ltd.	107	107.15	5.07	0.13	20141	20141	101	101.9	5.83	0.13	26744.2	21

34	Punjab National Bank	1000.5	1012.8	119.01	0.09	39054	39054	1220	1212.7	139.9	0.09	44335	21
35	Ranbaxy Laboratories Ltd.	476.5	475.4	52.83	0.47	5719.8	5720.3	445.2	445.6	14.81	0.52	11487.3	51
36	Reliance Communications Ltd.	167	169.95	2.44	0.19	4789.3	4789.5	109.4	107.65	-4.2	0.18	-7589.9	48
37	Reliance Industries Ltd.	1092.9	1074.3	49.65	0.85	162357	162358	1034.5	1049.1	61.97	1	202863	151
38	Reliance Infrastructure Ltd.	995	999.05	47.03	0.43	11517	11517	680	689.95	36.14	0.33	10809.1	17
39	Reliance Power Ltd.	151	149.45	1.14	0.03	2732.3	2732.3	125	130.4	0.9	0.03	2745.5	15
40	Sesa Goa Ltd.	460	470.45	25.49	0.62	21181	21182	290.7	291.35	39.5	0.6	34328	11
41	Siemens Ltd.	741.2	740.15	26.94	0.92	8272.1	8273	879	881.05	27.13	1.05	8454.3	3
42	State Bank Of India	2085	2078.2	144.37	0.09	91661	91661	2879.7	2765.3	130.2	0.09	82645.2	64
43	Steel Authority Of India Ltd.	246.5	252.55	16.17	0.77	67544	67544	168.15	169.6	11.84	0.67	49047.4	37
44	Sterilite Industries (India) Ltd.	848.7	849.95	13.15	0.61	8241.3	8241.9	171.25	173.7	4.22	0.57	14197.1	23
45	Sun Pharmaceutical Inds. Ltd.	1775	1792	43.39	0.42	8986.5	8986.9	446	442.5	13.36	0.47	13838	66
46	Tata Consultancy Services Ltd.	800	780.65	28.71	1.13	56185	56186	1152	1183.9	38.68	1.22	75699.9	19
47	Tata Motors Ltd.	758	757.7	61.04	0.9	22401	22402	1254.9	1248.4	33.66	0.99	18118.2	20
48	Tata Power Co. Ltd.	1382	1373.7	39.56	0.42	9387.6	9388	1334	1335.2	39.67	0.37	8941.4	11
49	Tata Steel Ltd.	635	632.05	56.88	0.39	50468	50468	617.2	622.25	71.58	0.4	68611.5	46
50	Wipro Ltd.	702	706.95	471.15	480.2	48980	49460	471.15	0.84	71.58	0.4	48437	21

19	Hindustan Unilever Ltd.	7.11	6.96	7.01	7.14	0.67	0.56	0.47	0.45	23.89	-36.19	73.76	11.14	18.35	-17.20	38.38
	Housing Development Finance Corpn. Ltd.	7.11	6.96	7.01	7.14	0.89	0.97	0.92	0.93	23.89	-36.19	73.76	11.14	22.04	-34.90	68.42
21	I C I Bank Ltd.	7.11	6.96	7.01	7.14	0.97	1.34	1.38	1.43	23.89	-36.19	73.76	11.14	23.39	-50.86	99.13
22	I T C Ltd.	7.11	6.96	7.01	7.14	0.62	0.61	0.47	0.48	23.89	-36.19	73.76	11.14	17.51	-19.36	38.38
23	Infosys Ltd.	7.11	6.96	7.01	7.14	0.57	0.49	0.45	0.46	23.89	-36.19	73.76	11.14	16.67	-14.18	37.05
	Infrastructure Development Finance Co. Ltd.	7.11	6.96	7.01	7.14	1.19	1.3	1.32	1.38	23.89	-36.19	73.76	11.14	27.08	-49.14	95.12
25	Jaiprakash Associates Ltd.	7.11	6.96	7.01	7.14	1.49	1.67	1.7	1.74	23.89	-36.19	73.76	11.14	32.11	-65.10	120.49
26	Jindal Steel & Power Ltd.	7.11	6.96	7.01	7.14	1.47	1.52	1.45	1.46	23.89	-36.19	73.76	11.14	31.78	-58.63	103.80
27	Kotak Mahindra Bank Ltd.	7.11	6.96	7.01	7.14	1.19	1.5	1.48	1.5	23.89	-36.19	73.76	11.14	27.08	-57.77	105.80
28	Larsen & Toubro Ltd.	7.11	6.96	7.01	7.14	1.08	1.14	1.2	1.22	23.89	-36.19	73.76	11.14	25.23	-42.23	87.11
29	Mahindra & Mahindra Ltd.	7.11	6.96	7.01	7.14	0.86	1.09	1.1	1.11	23.89	-36.19	73.76	11.14	21.54	-40.07	80.44
30	Maruti Suzuki India Ltd.	7.11	6.96	7.01	7.14	0.93	0.84	0.74	0.71	23.89	-36.19	73.76	11.14	22.72	-29.29	56.41
31	N T P C Ltd.	7.11	6.96	7.01	7.14	0.8	0.72	0.69	0.7	23.89	-36.19	73.76	11.14	20.53	-24.11	53.07
32	Oil & Natural Gas Corpn. Ltd.	7.11	6.96	7.01	7.14	1.1	0.86	0.9	0.88	23.89	-36.19	73.76	11.14	25.57	-30.15	67.09
	Power Grid Corpn. Of India Ltd.	7.11	6.96	7.01	7.14	0.89	0.78	0.74	0.73	23.89	-36.19	73.76	11.14	22.04	-26.70	56.41
34	Punjab National Bank	7.11	6.96	7.01	7.14	1.16	1.11	1	1.01	23.89	-36.19	73.76	11.14	26.57	-40.94	73.76
35	Ranbaxy Laboratories Ltd.	7.11	6.96	7.01	7.14	0.64	0.68	0.8	0.76	23.89	-36.19	73.76	11.14	17.85	-22.38	60.41
36	Reliance Communications Ltd.	7.11	6.96	7.01	7.14	1.09	1.28	1.31	1.36	23.89	-36.19	73.76	11.14	25.40	-48.27	94.45
37	Reliance Industries Ltd.	7.11	6.96	7.01	7.14	0.92	1.04	1.03	1.01	23.89	-36.19	73.76	11.14	22.55	-37.92	75.76
38	Reliance Infrastructure Ltd.	7.11	6.96	7.01	7.14	1.1	1.45	1.54	1.56	23.89	-36.19	73.76	11.14	25.57	-55.61	109.81

39	Reliance Power Ltd.	7.11	6.96	7.01	7.14	1.33	1.31	1.29	1.31	23.89	-36.19	73.76	11.14	29.43	-49.57	93.12
40	Sesa Goa Ltd.	7.11	6.96	7.01	7.14	1.18	1.31	1.2	1.21	23.89	-36.19	73.76	11.14	26.91	-49.57	87.11
41	Siemens Ltd.	7.11	6.96	7.01	7.14	0.86	1	1.07	1.06	23.89	-36.19	73.76	11.14	21.54	-36.19	78.43
42	State Bank Of India	7.11	6.96	7.01	7.14	1.05	1.05	1.08	1.11	23.89	-36.19	73.76	11.14	24.73	-38.35	79.10
43	Steel Authority Of India Ltd.	7.11	6.96	7.01	7.14	1.34	1.35	1.32	1.31	23.89	-36.19	73.76	11.14	29.60	-51.29	95.12
44	Sterilite Industries (India) Ltd.	7.11	6.96	7.01	7.14	1.38	1.46	1.41	1.4	23.89	-36.19	73.76	11.14	30.27	-56.04	101.13
45	Sun Pharmaceutical Inds. Ltd.	7.11	6.96	7.01	7.14	0.45	0.37	0.31	0.32	23.89	-36.19	73.76	11.14	14.66	-9.01	27.70
46	Tata Consultancy Services Ltd.	7.11	6.96	7.01	7.14	0.52	0.54	0.49	0.49	23.89	-36.19	73.76	11.14	15.84	-16.34	39.72
47	Tata Motors Ltd.	7.11	6.96	7.01	7.14	0.84	1.02	1.16	1.17	23.89	-36.19	73.76	11.14	21.21	-37.05	84.44
48	Tata Power Co. Ltd.	7.11	6.96	7.01	7.14	1.18	1.11	1.01	1	23.89	-36.19	73.76	11.14	26.91	-40.94	74.43
49	Tata Steel Ltd.	7.11	6.96	7.01	7.14	1.15	1.36	1.45	1.44	23.89	-36.19	73.76	11.14	26.41	-51.72	103.80
50	Wipro Ltd.	7.11	6.96	7.01	7.14	0.75	0.78	0.75	0.74	23.89	-36.19	73.76	11.14	19.70	-26.70	57.07

Appendix 3: Calculated Independent Variables for the Study

S.No.	Company Name	ROE (%)		ROE		ROA		ROA		EVA/CE		EVA/CE	
		Mar-08	Mar-09	Mar-10	Mar-11	Mar-08	Mar-09	Mar-10	Mar-11	Mar-08	Mar-09	Mar-10	Mar-11
1	A C C Ltd.	34.64	24.61	26.71	17.33	1.26	1.09	0.95	0.8	0.18147	0.58331	-0.3211	0.08148
2	Ambuja Cements Ltd.	37.95	24.72	18.83	17.25	1.23	1.06	0.95	0.91	0.24378	0.5632	-0.3808	0.10145
3	Axis Bank Ltd.	12.21	17.77	15.67	17.84	0.1	0.11	0.1	0.09	0.21493	0.95115	-0.4756	0.2413

4	Bajaj Auto Ltd.	50.85	35.01	58.06	68.02	1.7	1.82	1.74	1.83	0.05667	0.60172	-0.1548	0.67492
5	Bharat Heavy Electricals Ltd.	26.54	24.25	27.08	29.83	0.71	0.71	0.75	0.75	0.08214	0.67502	-0.4124	0.26625
6	Bharat Petroleum Corpn. Ltd.	13.54	6.07	11.75	11.00	3.18	3.21	2.6	2.95	-0.139	0.39859	-0.482	-0.0289
7	Bharti Airtel Ltd.	30.85	28.01	25.66	17.49	0.74	0.73	0.64	0.54	0.18658	0.55504	-0.2544	0.08891
8	Cairn India Ltd.	-0.27	0.17	-0.22	-0.67	0	0.01	0.01	0	-0.2315	0.33786	-0.6645	-0.1094
9	Cipla Ltd.	18.68	17.85	18.29	14.52	0.87	0.81	0.73	0.71	0.0208	0.39975	-0.2014	0.07175
10	Coal India Ltd.	18.35	22.13	22.63	24.67	0.18	0.22	0.21	0.23	0.00627	0.50066	-0.3232	0.16885
11	D L F Ltd.	22.85	12.75	5.96	9.19	0.35	0.16	0.12	0.13	0.17029	0.75065	-1.078	-0.0308
12	Dr. Reddy'S Laboratories Ltd.	9.88	10.67	14.31	14.84	0.62	0.65	0.61	0.62	-0.066	0.25964	-0.2464	0.04966
13	G A I L (India) Ltd.	20.00	18.98	18.69	18.50	0.94	1.06	0.92	1.06	-0.0434	0.50405	-0.3364	0.10194
14	Grasim Industries Ltd.	27.43	17.39	29.28	14.53	0.96	0.82	0.76	0.55	0.02609	0.46948	-0.4776	0.04755
15	H C L Technologies Ltd.	24.30	28.59	21.41	20.45	0.89	0.77	0.65	0.73	0.03494	0.61276	-0.3824	0.0984
16	H D F C Bank Ltd.	13.83	15.32	13.70	15.47	0.11	0.13	0.1	0.1	0.31491	0.91281	-0.2409	0.27713
17	Hero Motocorp Ltd.	32.41	33.72	64.41	65.22	2.74	2.59	2.43	2.22	0.20801	0.54507	0.21207	0.46266
18	Hindalco Industries Ltd.	16.54	9.39	6.86	7.19	0.79	0.61	0.54	0.58	-0.1025	0.60592	-0.8901	-0.0581
19	Hindustan Unilever Ltd.	133.78	121.10	85.23	87.55	2.14	2.92	2.1	2.13	0.51439	1.82339	0.50591	0.80349
20	Housing Development Finance Corpn. Ltd.	20.39	17.48	18.70	20.39	0.12	0.12	0.11	0.1	-0.0995	0.46525	-0.5854	-0.0101
21	I C I C I Bank Ltd.	8.95	7.59	7.80	9.35	0.11	0.1	0.09	0.09	0.05626	0.70743	-0.8397	0.02295
22	I T C Ltd.	25.88	23.79	28.88	31.27	1.35	1.28	1.26	1.28	0.12138	0.46342	-0.0855	0.26686
23	Infosys Ltd.	33.14	32.67	26.33	26.30	1.1	1.12	0.95	0.96	0.23381	0.57334	-0.0445	0.20263

43	Steel Authority Of India Ltd.	32.68	21.92	20.27	13.23	1.22	1.05	0.77	0.67	0.0679	0.75943	-0.7512	-0.0163
44	Sterlite Industries (India) Ltd.	7.23	8.81	3.70	6.11	1.04	0.7	0.61	0.57	-0.1509	0.64695	-0.9514	-0.0666
45	Sun Pharmaceutical Inds. Ltd.	24.10	24.56	15.72	20.71	0.69	0.7	0.42	0.47	0.1431	0.38426	-0.1033	0.15667
46	Tata Consultancy Services Ltd.	41.35	35.19	37.42	38.86	1.51	1.36	1.13	1.22	0.39803	0.59012	0.02011	0.40991
47	Tata Motors Ltd.	25.88	8.20	14.97	9.05	1.48	0.94	0.9	0.99	-0.0087	0.47778	-0.727	-0.0317
48	Tata Power Co. Ltd.	10.82	10.61	8.84	7.96	0.53	0.54	0.42	0.37	-0.1617	0.51965	-0.6474	-0.0307
49	Tata Steel Ltd.	21.47	21.06	13.65	14.67	0.53	0.44	0.39	0.4	-0.0255	0.66538	-0.917	0.00842
50	Wipro Ltd.	26.52	23.76	27.69	22.72	1.07	0.98	0.86	0.84	0.13575	0.47241	-0.2856	0.1101

Appendix 4: Regression Output

Model 1: Fixed-effects, using 200 observations
 Included 50 cross-sectional units
 Time-series length = 4
 Dependent variable: TR_____

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>
Const	0.0592885	0.456141	0.1300	0.89676
EPS_	-0.00555028	0.00906139	-0.6125	0.54113
Mean dependent var	-0.177950	S.D. dependent var		3.078108
Sum squared resid	1729.934	S.E. of regression		3.407388
R-squared	0.082494	Adjusted R-squared		-0.225394
F(50, 149)	0.267936	P-value(F)		1.000000
Log-likelihood	-499.5398	Akaike criterion		1101.080
Schwarz criterion	1269.294	Hannan-Quinn		1169.153
Rho	-0.357793	Durbin-Watson		2.001094

Test for differing group intercepts -

Null hypothesis: The groups have a common intercept

Test statistic: $F(49, 149) = 0.26945$

with $p\text{-value} = P(F(49, 149) > 0.26945) = 1$

Model 2: Fixed-effects, using 200 observations
 Included 50 cross-sectional units
 Time-series length = 4
 Dependent variable: TR_____

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>
const	1.9865	0.809608	2.4537	0.01529 **
ROE_____	-0.103497	0.0370438	-2.7939	0.00589 ***
Mean dependent var	-0.177950	S.D. dependent var		3.078108
Sum squared resid	1647.955	S.E. of regression		3.325673

R-squared	0.125973	Adjusted R-squared	-0.167324
F(50, 149)	0.429507	P-value(F)	0.999579
Log-likelihood	-494.6850	Akaike criterion	1091.370
Schwarz criterion	1259.584	Hannan-Quinn	1159.444
rho	-0.367213	Durbin-Watson	2.024342

Test for differing group intercepts -

Null hypothesis: The groups have a common intercept

Test statistic: $F(49, 149) = 0.416563$

with p-value = $P(F(49, 149) > 0.416563) = 0.999687$

Model 3: Fixed-effects, using 200 observations

Included 50 cross-sectional units

Time-series length = 4

Dependent variable: TR_____

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	5.23341	1.50322	3.4815	0.00065	***
ROA	-7.18974	1.97348	-3.6432	0.00037	***
Mean dependent var	-0.177950	S.D. dependent var		3.078108	
Sum squared resid	1592.437	S.E. of regression		3.269173	
R-squared	0.155419	Adjusted R-squared		-0.127998	
F(50, 149)	0.548375	P-value(F)		0.992212	
Log-likelihood	-491.2580	Akaike criterion		1084.516	
Schwarz criterion	1252.730	Hannan-Quinn		1152.590	
rho	-0.417333	Durbin-Watson		2.171054	

Test for differing group intercepts -

Null hypothesis: The groups have a common intercept

Test statistic: $F(49, 149) = 0.558919$

with p-value = $P(F(49, 149) > 0.558919) = 0.989953$

Model 4: Fixed-effects, using 200 observations

Included 50 cross-sectional units

Time-series length = 4

Dependent variable: TR_____

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	-0.318731	0.236451	-1.3480	0.17971	
EVA_CE	1.84105	0.550654	3.3434	0.00105	***
Mean dependent var	-0.177950	S.D. dependent var		3.078108	
Sum squared resid	1613.261	S.E. of regression		3.290479	
R-squared	0.144374	Adjusted R-squared		-0.142749	
F(50, 149)	0.502831	P-value(F)		0.997024	
Log-likelihood	-492.5572	Akaike criterion		1087.114	
Schwarz criterion	1255.329	Hannan-Quinn		1155.188	
rho	-0.160897	Durbin-Watson		1.605562	

Test for differing group intercepts -

Null hypothesis: The groups have a common intercept

Test statistic: $F(49, 149) = 0.319435$

with $p\text{-value} = P(F(49, 149) > 0.319435) = 0.999993$

Model 5: Fixed-effects, using 200 observations

Included 50 cross-sectional units

Time-series length = 4

Dependent variable: TR_____

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	5.68424	1.51494	3.7521	0.00025	***
EPS_	0.00957159	0.00964953	0.9919	0.32286	
ROE_____	-0.0777938	0.0421063	-1.8476	0.06668	*
ROA_____	-6.17073	2.13545	-2.8897	0.00444	***
Mean dependent var	-0.177950	S.D. dependent var		3.078108	
Sum squared resid	1555.160	S.E. of regression		3.252587	
R-squared	0.175189	Adjusted R-squared		-0.116581	
F(52, 147)	0.600435	P-value(F)		0.982050	
Log-likelihood	-488.8893	Akaike criterion		1083.779	
Schwarz criterion	1258.590	Hannan-Quinn		1154.522	
rho	-0.413109	Durbin-Watson		2.158932	

Test for differing group intercepts -
 Null hypothesis: The groups have a common intercept
 Test statistic: $F(49, 147) = 0.607843$
 with p-value = $P(F(49, 147) > 0.607843) = 0.977101$

Model 6: Fixed-effects, using 200 observations
 Included 50 cross-sectional units
 Time-series length = 4
 Dependent variable: TR_____

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	7.68203	1.45299	5.2871	<0.00001	***
EPS_	0.0125649	0.00893418	1.4064	0.16174	
ROE_____	-0.0783225	0.0389014	-2.0134	0.04591	**
ROA	-9.25519	2.06281	-4.4867	0.00001	***
EVA_CE	2.70494	0.528252	5.1205	<0.00001	***
Mean dependent var	-0.177950	S.D. dependent var		3.078108	
Sum squared resid	1318.392	S.E. of regression		3.005009	
R-squared	0.300764	Adjusted R-squared		0.046932	
F(53, 146)	1.184893	P-value(F)		0.214487	
Log-likelihood	-472.3727	Akaike criterion		1052.745	
Schwarz criterion	1230.855	Hannan-Quinn		1124.824	
rho	-0.178319	Durbin-Watson		1.687326	

Test for differing group intercepts -
 Null hypothesis: The groups have a common intercept
 Test statistic: $F(49, 146) = 0.909169$
 with p-value = $P(F(49, 146) > 0.909169) = 0.642304$