The Quest for the Superior Financial Performance Measures

Mehdi Arabsalehi
Department of Accounting, Faculty of Administrative Science and Economics
University of Isfahan, Hezarjerib Street, Isfahan, Iran

Iman Mahmoodi
Department of Accounting, Faculty of Administrative Science and Economics
University of Isfahan, Hezarjerib Street, Isfahan, Iran

Abstract

This study tries to answer whether value based measures are superior to traditional accounting measures in explaining stock returns. A pooling panel data method on 115 Iranian listed companies in the Tehran Stock Exchange (TSE) from 2001 to 2008 is used to investigate the explanatory power of four value-based measures (including Economic Value Added, Refined Economic Value Added, Market Value Added and Shareholder Value Added) compare to five accounting-based measures (including Earning Per Share, Return On Equity, Return On Assets, Cash Flow from Operations and Return On Sales) in explaining stock returns. Our findings do not provide evidence which support assertions that value-based measures are superior compared with other traditional accounting measures. Relative information content tests revealed that stock returns are more closely associated with ROA and ROE than other performance measures. Furthermore, incremental information content tests suggest that value-based measures add only marginally information content beyond accounting measures. However, the results indicate that accounting measures generally dominate value-based measures.

Key words: Firm Performance, Value-Based Measures, Accounting-Based Measures, Stock Return, Tehran Stock Exchange

1. Introduction

After Rappaport's publication of "Creating Shareholder Value" in 1986, it is widely believed that the primary aim of every business entity is to maximize shareholders wealth using efficient allocation of resources (Rappaport, 1998; Worthington and West, 2001, 2004 and Maditions et al., 2006, 2009). Therefore, all of the firm activities must be directed to achieve this objective.

Since the 1900s, shareholders to induce managements to adopt a shareholder orientation; lenders to determine the security of their loans; managers to monitor the profitability of the firms and also to make strategic decisions have used traditional accounting-based measures including return on assets (ROA), return on equity (ROE), earning per share (EPS), return on sales (ROS) and cash flow from operations (CFO) (Worthington and West, 2001, 2004).

During the 1980s, the capital markets became more internationalized (Tortella and Brusco, 2003 and Maditions et al., 2009) and there was a lot of competition between American and Japanese firms in that time. In addition, it became clear that managers can manipulate accounting earnings to show that their firms have a good performance (Jensen and Murphy, 1990 and Tortella and Brusco, 2003). Moreover, investors interested to know all financial information on a firm (Maditions et al., 2009). Therefore, accounting-based measures came under attack and the need for new performance indicators increased.

Since the 1990s, several scholars and consulting firms have suggested new performance measures namely value-based measures, and also argued that these new measures are better than traditional

measures for monitoring the real performance of the firms. For example, Shareholder Value Added (SVA) developed by Rappaport and LEK/Alcar Consulting Group (Rappaport, 1986, 1998), Economic Value Added (EVA[®]) and Market Value Added (MVA) proposed by Stern Stewart & Co (Stewart, 1991, 1994) and Bacidore et al. (1997) developed Refined Economic Value Added (REVA).

EVA[®], which is a trade-marked variant of residual income, considers cost of total employed capital (including debts and equity) for evaluating firm performance. Stewart (1991, p. 66) argues:

> "Earnings, earnings per share and earnings growth are misleading measures of corporate performance. The best practical periodic performance measure is EVA[®]. EVA[®] is the financial performance measure that comes closer than any other to capturing the true economic profit of an enterprise. EVA[®] also is the performance measure most directly linked to the creation of shareholder wealth over time".

Moreover, Stewart (1994, p. 75) states "EVA[®] is almost 50% better than its closest accounting-based competitor (including EPS, ROE and ROI) in explaining changes in shareholder wealth". In addition, other sources strongly supported the EVA[®]. Fortune, for example, called it "Today's hottest financial idea", "The Real Key to Creating Wealth" (30 September, 1993) and "A New Way to Find Bargains" (9 December, 1996) (Worthington and West, 2001, 2004 and Biddle et al. 1997). These promotions of EVA[®] have led to widespread adoption of EVA[®] initially in the USA by several international companies, including AT&T, Coca Cola, DuPont, Eli Lilly, Polaroid, Quaker Oats, Sprint, Teledyne, Tenneco and Whirlpool and later in the other countries, like Australia, the UK, Canada, France, Germany, Japan and Turkey (Worthington and West, 2001, 2004 and Biddle et al. 1997).

Despite all the widespread support for the EVA[®], and the claim that value-based measures are superior to traditional accounting-based measures, several empirical studies (e.g. Biddle et al, 1997; Zimmerman, 1997; Turvey et al, 2000; Chen and Dodd, 2001; Worthington and West, 2001; Copeland, 2002; Sparling and Turvey, 2003; Ismail, 2006; Maditions et al, 2006, 2009 and Lee and Kim, 2009) indicate either poor or no significant association between EVA[®] and stock return or market value. However, the reported results are mixed and our inquiry is motivated by these results.

The purpose of this paper is to examine the explanatory power of four value-based measures (including SVA, EVA[®], REVA and MVA) compare to five traditional accounting measures(including EPS, ROA, ROE, CFO and ROS) in explaining stock return in Iranian capital market, as an emerging market. In this study, both a relative and an incremental information content approach and also a pooling panel data procedure on 115 listed firms in the Tehran Stock Exchange are employed. However, the results indicate that traditional measures are superior to value-based measures in explaining stock returns and also reveal that value-based measures add only slightly information content beyond accounting measures.

The rest of this paper is structured as follows: the following section presents literature review. The next section describes variables and methodology of the research. The next to last section presents empirical findings. Finally, the results are summarized and discussed in the last section.

2. Literature Review

The literature on EVA[®] does not provide conclusive evidence. Although some studies (e.g. Stewart, 1991, 1994; Stern et al., 1995; O'Byrne, 1996; Bao and Bao, 1998; Uyemura et al. 1996; Lehn and Makhija, 1997; Forker and Powell, 2004 and Worthington and West, 2004) revealed that EVA[®] is more associated with stock return and market value than accounting measures, but several studies (e.g. Biddle et al. 1997; Turvey et al., 2000; Chen and Dodd, 2001; Worthington and West, 2001; Copeland, 2002; Palliam, 2006 and Maditions et al., 2006, 2009) found opposite results and questioned the efficiency of EVA[®].

Stewart (1991) suggested that there is a strong relation between the averaged standardized values of EVA® and MVA. Lehn and Makhija (1997) found that EVA® and MVA are more associated with stock return than accounting indicators, such as ROA, ROE and ROS. O'Byrne (1996) concluded that EVA® outperforms earnings in explaining firm values. Milunovich and Tseui (1996) and Uyemura et al. (1996) indicated the similar results. Bao and Bao (1998) examined the usefulness of value added and abnormal economic earnings and found that the explanatory power of value added is higher than that of earnings. Worthington and West (2004) investigated the relative information content of EVA® and other commonly-used accounting-based measures, including earnings, net cash flow and residual income, of 110 Australian companies over the period 1992-1998. They revealed that returns are more closely associated with EVA® than residual income, earnings and net cash flow, respectively. Dastgir and Izadinia (2004) indicated that there are significant correlations between EVA®, market value and market value added measures.

On the other hand, there are several empirical studies that used the same methodology but found opposite results. Biddle et al. (1997) examined the relative and incremental information content of EVA®, RI, CFO and accounting earnings of 773 firms over the period 1984-1993 (6174 firm-year observations) and found accounting earnings outperform other indicators. They suggested EVA® adds only marginally to information content beyond earnings. Kramer and Pushner (1997) found the explanatory power of NOPAT is higher than that of EVA® in the explaining MVA. Bacidore et al. (1997) developed REVA and examined the explanatory power of REVA and EVA® in explaining abnormal returns and their ability to predict shareholder value creation. They revealed that REVA statistically outperforms EVA®.

Ismail (2006) revealed that NOPAT and net income outperform EVA® and residual income in explaining stock return and also found that accruals and operating cash flow have significant incremental information content, while the accounting adjustments of EVA® proponents have significantly less contribution in explaining stock return. Palliam (2006) concluded EVA® is somewhat invalid, unreliable, and questionable. Moreover, similar results were reported by Chen and Dodd (1997, 2001), Kim (2006), Maditions et al. (2006), Kyriazis and Anastasis (2007), Lee and Kim (2009).

Maditions et al. (2009) investigated the explanatory power of EVA® and SVA compare with EPS, ROE and ROI in explaining stock returns in the Athens Stock Exchange over the period 1992-2001. They found that stock returns are more closely associated with EPS than EVA® and other measures. Moreover they suggested that the pairwise combination of EVA® with EPS increases significantly the explanatory power of EPS in explaining stock market returns. Arabsalehi and Mahmoodi (2011) conclude that accounting measures have more explanatory power than EVA® in the explaining stock return in the TSE.

However, the results of the empirical studies on the value relevance of traditional accounting and value-based performance measures are mixed. In addition, evidence exists that emerging market stock returns are influenced by different factors than those that influence the stock returns in developed capital markets (Harvey, 1995 and Bhattacharya et al., 2001). Therefore, it seems it is very important to provide more evidence for the literature by conducting a comprehensive study, for the first time in the Tehran Stock Exchange as an emerging market with specific features, which employs four value-based measures (EVA®, REVA, SVA and MVA) and five accounting-based measures (EPS, ROE, ROA, ROS and CFO) and also uses both a relative and incremental information content approaches.

3. Sample, Variables and Methodology

3.1. Sample

In this study, a sample of listed firms in the Tehran Stock Exchange (TSE) over the years from 2001 to 2008 is used. The firms with long periods without transactions (more than three months) are omitted. Moreover, since all the financial companies and banks operate in a different way, they are excluded from

the sample. Furthermore, the sample is reduced because of the lack of some company data. Finally, a sample consisting of 115 Iranian firms during 2001-2008 is selected.

3.2. Definition and measurement of the variables

In this study, the dependent variable is the annual stock return which is directly obtained from an Iranian Database, namely Rahavard Novin. The independent variables are EPS, ROE, ROA, ROS, CFO, EVA[®], REVA, SVA and MVA.

EPS shows how much profit is created on per share over a period and is calculated by dividing net income by the average number of common shares outstanding. ROE is a profitability ratio that focuses on the return on the shareholders' equity and is calculated by dividing net income by average equity. ROA is another profitability ratio that presents the return on all of the firm's assets and is calculated by dividing net income plus interest expenses by average total assets. ROS is measured by dividing operating income by total sales. CFO shows net cash provided by operating activities and, in this study, is gotten from the statement of cash flows.

EVA[®] is defined as the profit of a firm from operating activities after consideration of the cost of all invested capital. In the other words, EVA[®] is computed as follows:

$$EVA_t = NOPAT_t - (\ WACC_t \times IC_{t-1}\ )$$

Where; NOPAT is net operating profit after tax in year t. IC is the total invested capital in year $t-1$, WACC is weighted average cost of capital in year t.

In this study, the EVA[®] is calculated by adopting the Stern Stewart's approach. Therefore, firstly NOPAT, then IC and finally, WACC are calculated. Moreover, to calculate NOPAT and IC a series of adjustments is needed. These accounting adjustments are considered to shift the book value closer to their economic values.

However, NOPAT is calculated by subtracting tax from earnings before interest and tax (EBIT). Invested Capital (IC) is computed by adding the book value of equity and all of the interest-bearing short and long term liabilities. The accounting adjustment figures to NOPAT and IC are manually gotten from accompanying notes. In this paper, the adjustments to IC include: adding certain marketing costs, R&D and training expenses; adding allowance for bad debts and inventory obsolescence; adding employee retirement, investment and accrued expense reserves. Moreover, to consider adjustments to NOPAT, changes of these items over one year are added to NOPAT.

The cost of capital (WACC) is calculated as follows:

$$WACC = \left[\left(\frac{D}{E+D} \right) \times K_d \times (1-T) \right] + \left[\left(\frac{E}{E+D} \right) \times K_e \right]$$

Where; D is the book value of debts, E is the market value of equity, K_d is the cost of debts, T is the rate of tax and K_e is the cost of equity.

In this study, The Capital Assets Pricing Model (CAPM) is employed to estimate the cost of equity (K_e). The CAPM assumes that higher expected returns require taking higher risks (Fama and French, 1992, 1993). However, to estimate the cost of equity for every firm in each year, firstly using 36-monthly returns of each stock (R_i) and 36-monthly returns of market (R_m) the annual systematic risk (β) is estimated for each stock in every year using following equation:

$$\beta_i = \frac{Cov(R_i, R_m)}{Var(R_m)}$$

Then, the three-month rate of government bonds, which is acquired directly from the website of the Central Bank of Iran[1], is considered as risk free interest rate (R_f). Finally, the cost of equity (K_e) is estimated for each firm in year t using the following equation:

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

Bacidore et al. (1997, p. 15) state:
> The key distinction between EVA® and REVA is that REVA assesses its capital charge for period t on the market value of the firm at the end of period $t - 1$ (or beginning of period t) rather than on the economic book value of the assets in place.

Therefore, following Bacidore et al. (1997), the REVA is calculated as follows:

$$REVA_t = NOPAT_t - (WACC_t \times MV_{t-1})$$

Where; REVA is refined EVA®, NOPAT is the net operating profit after tax and MV is the market value of total invested capital which is calculated by adding the market value of equity and the book value of total interest-bearing liabilities.

SVA presents the change in shareholder's wealth over a period (Rappaport, 1986, 1998). Following Rappaport (1986, 1998), SVA is calculated as follows:

$$SVA = \frac{\Delta NOPAT_t}{K \times (K+1)^{t-1}} - PV\Delta \, Inv$$

Where; $\Delta NOPAT$ is the changes in NOPAT, K is the cost of capital (WACC) and $PV\Delta \, Inv$ is the present value of total annual changes in investments.

Finally, MVA is the difference between the market value of firm and its book value. Since the debt is estimated according to the book value, therefore in this study, the MVA is computed as the market value of equity minus the book value of equity.

3.3. The Model

This study investigates the superiority of value-based measures over the traditional measures in explaining of stock returns using pooling panel data procedure. A pooling method, in general terms, is as following:

$$Y_{it} = \alpha_{it} + \beta X_{it} + \varepsilon_{it} \quad i = 1, \dots, N; \quad t = 1, \dots, T$$

Where; Y_{it} is the dependent variable (annual stock return) of firm i in year t. α is the intercept of model and X_{it} represents the performance measures (e.g. EVA®, REVA, SVA, MVA, EPS, ROA, ROE, ROS and CFO) of firm i in year t. In this study, all of the financial performance measures except for ROA, ROE and ROS are divided by market value of equity in year t-1.

There are different methods of pooling panel data (including pooled models, fixed effect models and random effect models) therefore an F-test and Hausman test are employed to distinguish the best model from pooling models (Baltagi, 2005). In this study, both relative and incremental information content approaches are used. Since there are nine performance measures, thus, nine models are conducted to assess the relative information content. Moreover, twenty models are developed using pairwise combinations of one value-based measure and one traditional measure.

Furthermore, in this study, the stationary of all variables is tested using a panel unit root test, namely Levin, Lin and Chu test (2002). Levin, Lin and Chu (LLC) test assumes that there is a common unit root process across cross-sections and employs a null hypothesis of a unit root against the alternative that each variable is stationary. Heteroskedasticity also is tested using both Levene (1960) and Brown-Forsythe tests (1974).

---

[1]. www.cbi.ir

4. Empirical results

4.1. Descriptive statistics

Table I shows the descriptive statistics of all variables. The first interesting finding is that all variables, except for MVA, have a positive mean. Mean statistics indicate that CFO (1.252) has the largest and EPS (4.95E-09) has the lowest mean among the other variables. Furthermore, descriptive statistics reveal that SVA (38.05), MVA (22.09) have the highest, EPS (9.79E-09) and ROA (0.136) have the lowest standard deviation compare to the other variables. The LLC tests suggest that all variables are stationary.

Table I: Descriptive statistics

Variables	Mean	Median	Maximum	Minimum	Std.Dev	LLC Test
EVA®	0.598	0.082	41.90	-13.57	2.992	-28.34*
REVA	0.646	0.023	54.62	-12.48	3.566	-3.665*
MVA	-0.327	0.387	546.69	-140.17	22.09	-4.706*
SVA	1.084	0.005	937.82	-202.16	38.05	-9.033*
EPS	4.95E-09	2.97E0-9	1.81E-07	-1.00E-08	9.79E-09	-7.006*
ROE	0.567	0.452	11.23	-1.120	0.647	-10.94*
ROA	0.210	0.184	0.788	-0.299	0.136	-12.41*
CFO	1.252	0.185	122.01	-7.689	6.857	-2.589*
ROS	0.247	0.215	1.953	-0.752	0.218	-16.39*
R (%)	34.54	12.18	820.16	-79.52	86.28	-25.10*

Note: * significance at 1 percent level.

4.2. Relative information content tests

Table II presents the results of the relative information content tests for each performance measure. The first step in the analysis is to select the most appropriate pooling panel data techniques. In order to distinguish the preferable set of results statistically, the F-tests and Hausman tests are employed. Firstly, the models are estimated by pooled model, and tested against the fixed and random effects models using an F-test. Then, Hausman tests are used to choose between a fixed or random effects model.

However, the F-tests are not statistically significant for all models which indicate the preference of the pooled models over the fixed and random effects models. Therefore, the results of pooled models are used to assess relative information content of performance measure.

Table II shows that there are statistical relationships between two value-based measures, including EVA® and MVA, and stock returns at 10 percent level while the association between REVA and stock return is significant at 5 percent level. Moreover, there is no significant relation between SVA and stock return. The results reveal that the associations between stock returns and all accounting-based measures, except for CFO, are significant at 1-percent level.

Table II: Results of relative information content tests of measures

Measures	Pooled Model		Fixed Effect Model		Random Effect Model		F-Test	Haus-Test
	R^2(%)	F- Stat.	R^2(%)	F- Stat.	R^2(%)	F- Stat.	Statistic	Statistic
EVA	1.35	2.74*	0.03	0.743	0.08	0.931	0.742	11.038***
REVA	3.70	5.083**	1.10	0.805	0.32	2.316	0.792	15.976***
MVA	1.03	0.215*	0.07	0.679	0.04	0.344	0.682	3.899**
SVA	1.22	1.574	0.04	0.664	0.09	0.698	0.664	0.230
EPS	7.26	40.038***	2.133	0.813	3.02	22.417***	0.635	0.1232

ROA	24.89	238.66[***]	19.54	1.273[**]	7.08	34.916[***]	0.816	16.50[***]
ROE	14.15	118.682[***]	16.20	1.018	5.96	45.67[***]	0.649	1.003
CFO	2.46	1.777	0.00	0.714	0.11	0.789	0.714	7.944[***]
ROS	5.40	41.104[***]	0.00	0.802	1.68	12.35[***]	0.704	4.829[**]

Note: [*] significant at 0.10; [**] significant at 0.05; [***] significant at 0.01. The pooled models are tested and corrected for heteroskedasticity using Levene and Brown-Forsythe tests.

The results indicate that ROA (R^2 = 24.89 percent) and ROE (R^2 = 14.15 percent) provide more information in explaining stock returns than other performance measures respectively. These findings are consistent with Chen and Dodd (1997) who revealed that ROA (R^2 =25%) have the strongest correlation with stock returns. REVA (R^2 = 3.70 percent) have the highest explanatory power among value-based measures which is consistent with Bacidore et al. (1997) who suggest REVA dominates EVA[®].

However, our findings reveal that ROA, as an accounting-based measure, is more closely associated with stock returns than other measures. In the other words, relative information content tests indicate that traditional accounting measures provide more information in explaining stock returns than value-based measures, especially EVA[®]. These results are consistent with Biddle et al. (1997), Worthington and West (2001), Chen and Dodd (1997, 2001), Ismail (2006) and Maditions et al. (2006, 2009) who indicate traditional measures dominate value-based measures.

4.3. Incremental information content tests

The incremental information content approach tries to answer whether combination of one value-based measure and one accounting measure can increase the explanatory power in explaining stock return. Since this study employs five traditional measures and also four value-based measure, therefore, twenty separate regressions are developed from pairwise combinations of each traditional accounting measure (EPS, ROA, ROE, ROS and CFO) with each of the value-based measure (EVA[®], SVA, REVA and MVA). The following equations (1 to 5) have been employed to test the incremental information content of the EVA:

$$R_{it} = \alpha + a_1 EPS_{it}/MV_{it-1} + a_2 EVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (1)$$

$$R_{it} = \alpha + b_1 ROA_{it} + b_2 EVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (2)$$

$$R_{it} = \alpha + c_1 ROE_{it} + c_2 EVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (3)$$

$$R_{it} = \alpha + d_1 ROS_{it} + d_2 EVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (4)$$

$$R_{it} = \alpha + e_1 CFO_{it}/MV_{it-1} + e_2 EVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (5)$$

Table III shows the results of incremental information content test of the EVA[®]. The results of F-test indicate that pooled models are appropriate to use. Incremental information tests of EVA[®] show that all regressions, except for regression 5, are statistically significant at 1 percent level. The highest R^2 (26.61) is reported in the model 2 which EVA[®] is combined with ROA. In the other words, by combining EVA[®] and ROA the explanatory power of ROA increases from 24.89 percent to 26.61 percent. In addition, the combinations of EVA[®] with EPS, EVA[®] with ROE and EVA[®] with ROS increase the R^2 of EPS, ROE and ROS from 7.26, 14.15 and 5.40 to 7.895, 14.92 and 6.61 percent respectively. Therefore, EVA[®] adds only slightly to information content beyond accounting-based measures. These findings are consistent with Biddle et al. (1997) who indicate the same results.

Table III: Incremental information content of EVA

Models	Pooled Model		Fixed Effect Model		Random Effect Model		F-Test	Haus-Test
	R^2(%)	F- Stat.	R^2(%)	F- Stat.	R^2(%)	F- Stat.	Statistic	Statistic

Model 1	7.895	22.52***	1.20	0.92	3.27	12.171***	0.737	13.11***
Model 2	26.61	130.36***	6.08	1.40***	7.45	30.00***	0.908	26.92***
Model 3	14.92	63.02***	1.44	1.091	6.18	23.69***	0.713	9.123**
Model 4	6.61	25.43***	0.00	0.903	1.17	7.250***	0.796	6.39***
Model 5	0.37	1.34	0.00	0.743	0.00	0.503	0.748	11.79***
Note: ** significant at 0.05; *** significant at 0.01. The pooled models are tested and corrected for heteroskedasticity using Levene and Brown-Forsythe tests.								

Table IV shows the results of the incremental information content tests of REVA. The results of F-tests notice that it is better to use pooled models to estimate the following equations:

$$R_{it} = \alpha + a_1 EPS_{it}/MV_{it-1} + a_2 REVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (6)$$
$$R_{it} = \alpha + b_1 ROA_{it} + b_2 REVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (7)$$
$$R_{it} = \alpha + c_1 ROE_{it} + c_2 REVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (8)$$
$$R_{it} = \alpha + d_1 ROS_{it} + d_2 REVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (9)$$
$$R_{it} = \alpha + e_1 CFO_{it}/MV_{it-1} + e_2 REVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (10)$$

Our findings indicate that regressions 6 to 9 are significant at 1 percent level while regression 10 is significant at 5 percent level, and also the combination of REVA and ROA (regression 7) has the highest explanatory power in explaining stock returns. In comparison to incremental information content of EVA®, the main point is that the results of the pairwise combinations of REVA with one traditional measure (EPS, ROA, ROE, ROS and CFO) provide more information content. These results are consistent with Bacidore et al. (1997) who suggest REVA outperforms EVA®.

Table IV: Incremental information content of REVA

Models	**Pooled Model**		**Fixed Effect Model**		**Random Effect Model**		**F-Test**	**Haus-Test**
	R^2(%)	F- Stat.	R^2(%)	F- Stat.	R^2(%)	F- Stat.	Statistic	Statistic
Model 6	8.34	24.349***	3.05	0.9943	3.47	12.95***	0.792	18.92***
Model 7	32.42	164.757***	21.86	1.459***	7.82	30.50***	0.953	31.79***
Model 8	16.12	64.044***	2.18	1.1390	6.05	24.23***	0.751	13.16***
Model 9	6.89	26.625***	0.00	0.9662	1.89	7.96***	0.847	21.62***
Model 10	1.77	2.7817**	0.00	0.7974	0.365	1.3152	0.789	15.75***
Note: ** significant at 0.05; *** significant at 0.01. The pooled models are tested and corrected for heteroskedasticity using Levene and Brown-Forsythe tests.								

Furthermore, the following models are employed to test the incremental information of MVA:

$$R_{it} = \alpha + a_1 EPS_{it}/MV_{it-1} + a_2 MVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (11)$$
$$R_{it} = \alpha + b_1 ROA_{it} + b_2 MVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (12)$$
$$R_{it} = \alpha + c_1 ROE_{it} + c_2 MVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (13)$$
$$R_{it} = \alpha + d_1 ROS_{it} + d_2 MVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (14)$$
$$R_{it} = \alpha + e_1 CFO_{it}/MV_{it-1} + e_2 MVA_{it}/MV_{it-1} + \varepsilon_{it} \qquad (15)$$

Table V presents the results of the incremental information of MVA. The results of F-tests suggest that pooled models should be used. As shown in the Table V, models 11 to 14 are significant at 1-percent level while the model 15 is insignificant. In addition, model 12 reports the highest correlation ($R^2 = 25.16$ percent) which combines MVA with ROA. Generally, by considering the results of the relative information content of accounting measures, MVA adds only slightly to information content beyond those measures.

Table V: Incremental information content of MVA

Models	Pooled Model		Fixed Effect Model		Random Effect Model		F-Test	Haus-Test
	R^2(%)	F- Stat.	R^2(%)	F- Stat.	R^2(%)	F- Stat.	Statistic	Statistic
Model 11	7.29	20.119[***]	2.80	0.831	3.08	11.44[***]	0.655	3.908
Model 12	25.16	120.89[***]	4.306	1.279[**]	7.16	27.74[***]	0.829	19.16[***]
Model 13	14.08	58.916[***]	0.313	1.019	5.97	22.86[***]	0.658	3.50
Model 14	5.39	20.502[***]	0.00	0.813	1.74	6.372[***]	0.718	8.024[**]
Model 15	0.25	0.906	0.00	0.715	0.122	0.439	0.720	9.103[**]

Note: [**] significant at 0.05; [***] significant at 0.01. The pooled models are tested and corrected for heteroskedasticity using Levene and Brown-Forsythe tests.

Finally, the incremental information content of SVA is examined using five following models:

$$R_{it} = \alpha + a_1 EPS_{it}/MV_{it-1} + a_2 SVA_{it}/MV_{it-1} + \varepsilon_{it} \quad\quad (16)$$

$$R_{it} = \alpha + b_1 ROA_{it} + b_2 SVA_{it}/MV_{it-1} + \varepsilon_{it} \quad\quad (17)$$

$$R_{it} = \alpha + c_1 ROE_{it} + c_2 SVA_{it}/MV_{it-1} + \varepsilon_{it} \quad\quad (18)$$

$$R_{it} = \alpha + d_1 ROS_{it} + d_2 SVA_{it}/MV_{it-1} + \varepsilon_{it} \quad\quad (19)$$

$$R_{it} = \alpha + e_1 CFO_{it}/MV_{it-1} + e_2 SVA_{it}/MV_{it-1} + \varepsilon_{it} \quad\quad (20)$$

Table VI indicates the results of incremental information content of SVA. The results of F-tests show the preference of the pooled model over fixed and random effects model. All regression models, except for model 20, are statistically significant at 1-percent level.

By adding SVA to EPS, ROE and ROS the explanatory power increases from 7.26, 14.15 and 5.40 to 7.41, 14.25 and 5.44 percent respectively while the combination of SVA with ROA decreases the R^2 of ROA from 24.89 to 24.78 percent. Our findings suggest that SVA has low incremental information content which these findings are largely consistent with Maditions et al. (2009) who report the similar results.

Table VI: Incremental information content of SVA

Models	Pooled Model		Fixed Effect Model		Random Effect Model		F-Test	Haus-Test
	R^2(%)	F- Stat.	R^2(%)	F- Stat.	R^2(%)	F- Stat.	Statistic	Statistic
Model 16	7.41	20.60***	3.01	0.813	3.09	11.49[***]	0.637	0.594
Model 17	24.78	118.44***	4.02	1.260[**]	7.08	27.41[***]	0.815	17.07[***]
Model 18	14.25	59.784***	0.263	1.016	6.02	23.03[***]	0.652	1.60
Model 19	5.44	20.69***	0.00	0.797	1.72	6.29[***]	0.706	5.412[*]
Model 20	0.531	1.921	0.00	0.714	0.21	0.762	0.713	8.247[***]

Note: [*] significant at 0.10; [**] significant at 0.05; [***] significant at 0.01. The pooled models are tested and corrected for heteroskedasticity using Levene and Brown-Forsythe tests.

5. Summary and Conclusions

In this study, pooling panel data methods and also both relative and incremental information content approaches were employed to investigate whether it is better to use value-based measures (including EVA[®], REVA, MVA and SVA) than traditional accounting measures (including EPS, ROA, ROE, ROS and CFO).

Relative information content tests revealed that ROA (R^2 = 24.89 percent) is more closely associated with stock return. These results are more consistent with Chen and Dodd (1997) who show that ROA

provides more information than other measures. In addition, it was noticed that REVA has the highest explanatory power among value-based measures, which is consistent with Bacidore et al. (1997) who suggest REVA outperforms EVA$^{®}$. Relative information content tests, in general terms, do not support assertions that value-based measures are superior to traditional indicators which are consistent with Biddle et al. (1997), Worthington and West (2001), Chen and Dodd (1997, 2001), Maditions et al. (2006, 2009), Ismail (2006), Palliam (2006), Kyriazis and Anastasis (2007) and Lee and Kim (2009).

Incremental information content tests indicated interesting results. First, the pariwise combination of REVA with ROA increases the explanatory power of ROA in explaining stock returns from 24.89 to 32.42 percent. Second, REVA outperforms other value-based measures in this regard. Finally, in sum, value-based measures add only slightly to information content beyond accounting measures which are consistent with Biddle et al. (1997) who revealed similar results.

There are at least three ways in which this study can be further extended. First, in this paper we used the CAPM to estimate the cost of capital, so it might be a good idea to use another approaches, such as Arbitrage Pricing Theory (APT) or Gordon Growth Model. Second, this study can be done in the developed capital markets and investigates whether the results are maintained. Finally, in this paper stock returns are used as dependent variable, other variables such as MVA or Tobin's Q could be used.

References

[1]   Arabsalehi, Mehdi and Mahmoodi, Iman, (2011), "EVA$^{®}$ or Traditional Accounting Measures, Empirical Evidence from Iran", *International Research Journal of Finance and Economics*, Issue 65, pp. 51-58.

[2]   Bacidore., J., Boquist, J., Milbourn, T. and Thakor, A. (1997), "The search for the best financial performance measure", *Financial Analyst Journal*, May/June, pp. 11-20.

[3]   Baltagi, B. H., (2005), "*Econometric Analysis of Panel Data*", third Edition, John Wiley & Sons Inc, New York, NY.

[4]   Bao, B. H. and Bao, D. H., (1998), "Usefulness of value added and abnormal economic earnings: an empirical examination", *Journal of Business Finance and Accounting*, Vol. 25, No. 1-2, pp. 251-65.

[5]   Bhattacharya U, Daouk H, Jorgenson B, Kehr C-H., (2000), "When an event is not an event: the curious case of an emerging market". *Journal of Financial Economics*, Vol. 55, pp. 69–101.

[6]   Biddle, G. C., Bowen, R. M. and Wallace, J.S. (1997), "Dose EVA beat earning? Evidence on associations with stock returns and firm values"., *Journal of Accounting and Economics*, Vol. 25, No. 3, pp. 301-36.

[7]   Chen, S. and Dodd, J.L. (1997), "Economic value added: an empirical examination of a new corporate performance measure", *Journal of Managerial Issues*, Vol. 9 No. 3, pp. 318-33.

[8]   Chen, S. and Dodd, J.L. (2001), "Operating income, residual income and EVA: Which metric is more value relevant?", *Journal of Managerial Issues*, Vol. 13 No. 1, pp. 65-86.

[9]   Copeland, T. (2002), "What do practitioners want?", *Journal of Applied Finance*, Vol. 12 No. 1, pp. 5-12.

[10] Dastgir, M, & Izadinia, N., (2004). "The Relationship between Internal and Measures of Value Creation and External Measures of Operation Evaluation"., *Iranian Accounting Studies*., vol. 5, pp.131-155.

[11] Fama E.F, and French K.R., (1992), The cross-section of expected stock returns. *The Journal of Finance*, Vol. 47, pp. 427–65.

[12] Fama E.F., and French K.R., (1993)., Common risk factors in the returns on stocks and bonds, *The Journal of Finance*, Vol. 33, pp. 3–56.

[13] Forker, J. and Powell, R. (2004), "Does EVA beat earnings? Evidence on associations with stock returns and firmvalues – revisited", paper presented at *EAAMeeting*, Prague, 1-3 April 2004.

[14] Harvey CR., (1995), "Predictable risk and returns in emerging markets". *The Review of Financial Studies*, Vol. 8, pp. 773–816.

[15] Ismail, Ahmad, (2006), "Is economic value added more associated with stock return than accounting earnings? The UK evidence"., *International Journal of Managerial Finance*, Vol. 2, No. 4, pp. 343-353.

[16] Jensen, M.C. and Murphy, K.J. (1990), "CEO Incentives – it's not how much you pay but how", *Harvard Business Review*, Vol. 68, pp. 138–149.

[17] Kim, W.G., (2006). EVA and traditional accounting measures: which metric is a better predictor of market value of hospitality companies? *Journal of Hospitality & Tourism Research*, Vol. 30, No. 1, pp. 34–49.

[18] Kramer, J.K., Pushner, G., (1997). An empirical analysis of economic value added as a proxy for market value added, *Financial Practice and Education*, Vol. 7, No. 1, pp. 41–49.

[19] Kyriazis, D. and Anastasis, C., (2007), "The validity of the economic value added approach: an empirical application", *European Financial Management*, Vol. 13 No. 1, pp. 71-100.

[20] Lee, Seoki. And Kim, Woo.Gon., (2009), "EVA, refined EVA, MVA, or traditional performance measures for the hospitality industry ?", *International Journal of Hospitality Management*, Vol. 28, pp. 439-445.

[21] Lehn, K., and Makhija, A.K., (1997), "EVA, Accounting Profits, and CEO Turnover: An Empirical Examination, 1985-1994*", Journal of Applied Corporate Finance*, Vol. 10, No. 2, pp. 90-97.

[22] Levene, H. (1960), "*Robust Tests for Equality of Variances*", in Contributions to Probability and Statistics, ed. I. Olkin, Palo Alto, CA: Stanford Univ. Press.

[23] Levin, A., C.F. Lin and C. J. Chu., (2002), "Unit root tests in panel data: Asymptotic and finite-sample properties". *Journal of Econometrics*, Vol. 108, pp. 1–24.

[24] Maditions, I. Dimitrios., Sevic, Zeljko., and Theriou, N.Geordios., (2006), "The Introduction of Economic Value Added in the Greek Corporate Sector", *The Southeuropean Review of Business & Accounting*, Vol. 4, No. 2, pp. 1-11.

[25]   Maditions, I. Dimitrios., Sevic, Zeljko., and Theriou, N. Geordios., (2009), " Modelling traditional accounting and modern value-based performance measures to explain stock market returns in the Athens Stock Exchange (ASE)", *Journal of Modelling in Management*, Vol. 4, No. 3, pp. 182-201.

[26]   Milunovich, S., and Tsuei., A., (1996). "EVA in the computer industry", *Journal of Applied Corporate Finance*, Vol. 9, No. 2, pp. 104-15.

[27]   O'Byrne, S.F., (1996), "EVA and market value", *Journal of Applied Corporate Finance*, Vol. 9, No. 1, pp. 116-25.

[28]   Palliam, Ralph. (2006), "Further evidence on the information content of economic value added". *Review of Accounting and Finance*, Vol. 5, No. 3, pp. 204-215.

[29]   Rappaport, A. (1986), "*Creating Shareholder Value: A Guide for Managers and Investors*", 1st ed., The Free Press, New York, NY.

[30]   Rappaport, A. (1998), "*Creating Shareholder Value: A Guide for Managers and Investors*", 2nd ed., The Free Press, New York, NY.

[31]   Sparling, D. and Turvey, C. G., (2003), "Further thoughts on the relationship between economic value added and stock market performance". *Agribusiness*, Vol. 19, No. 2, pp. 255-67.

[32]   Stern, J.M., Stewart, G.B. and Chew, D.H. (1995), "The EVA financial system", *Journal of Applied Corporate Finance*, Vol. 8 No. 2, pp. 32-46.

[33]   Stewart, G.B. 1991. "*The Quest for Value: A Guide for Senior Managers*". HarperCollins, Publishers Inc., New York, NY.

[34]   Stewart, G.B. (1994), "EVA: fact or fantasy", *Journal of Applied Corporate Finance*, Vol. 7, No. 2, pp. 71-84.

[35]   Tortella, B. and Brusco, S., (2003), "THE ECONOMIC VALUE ADDED (EVA): AN ANALYSIS OF MARKET REACTION", *Advances in Accounting*, Vol. 20, pp. 265-290.

[36]   Turvey, C.G., Lake, L., Van Duren, E. and Sparing, D. (2000). "The relationship between economic value added and the stock market performance of agribusiness firms". *Agribusiness*, Vol. 16, No. 4, pp. 399-416.

[37]   Uyemura, D.G., Kantor, C.C. and Petit, J.M. (1996), "EVA for banks: value creation, risk management and profitability measurement", *Journal of Applied Corporate Finance*, Vol. 9 No. 2, pp. 94-111.

[38]   Worthington, A.C. and West Tracey., (2001), "Economic Value-Added: A Review of the Theoretical and Empirical Literature *", Asian Review of Accounting*, Vol. 9, No. 1, pp. 67-86.

[39]   Worthington, A.C. and West, Tracey, (2001), The usefulness of economic value-added in the Australian context, *Accounting Accountability and Performance*, Vol. 7, No. 1, pp. 73-90.

[40]   Worthington, A.C. and West Tracey., (2004), "Australian evidence concerning the information content of economic value-added", *Australian Journal of Management*, Vol. 29, No. 2, pp. 201-24.

[41]   Zimmerman, J.L., (1997), EVA and Divisional Performance Measurement: Capturing Synergies and Other Issues, *Journal of Applied Corporate Finance*, Vol. 10, No. 2, pp. 98-109.

About the authors

Dr. Mehdi Arabsalehi is an assistant professor of accounting at university of Isfahan. Dr. Arabsalehi has provided consulting services to a number of institutions and companies and also published many papers in academic journals. Dr. Arabsalehi can be contacted at: Mehdi_arabsalehi@acnt.ui.ac.ir.

Iman Mahmoodi is a graduated M.A student of finance at university of Isfahan. Iman Mahmoodi has published several papers in scholarly journals. Moreover he can be contacted at: im_mahmoodi@yahoo.com.