A Study of the Relationship between Economic Criteria and Performance Evaluation Accounting with Market's Value added in the Firms Listed in the Tehran Stock Exchange

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Abstract

Currently most analysts believe that market's value added is a major indicator in assessing the shareholders' wealth increase. Therefore, one purpose of the present paper is to specify criteria which are closely related to this issue and are capable of assessing the performance of economic units and ultimately, their wealth in a more accurate fashion. This paper examines the relationship between moderated economic value added as well as some accounting and financial criteria such as return on stock, earnings per share (EPS), return on assets and return on equities with the market's value added as an external indicator of value-creation (the study's dependent variable) between 2006 and 2010 using the pooled data method. Results indicate that all study variables are in direct linear and significant relationship with market value added at a 95% confidence level. At the same time, the results suggest that moderated economic value added, after returns on equities, has the strongest relationship with market value added.

Keywords: Market value added, moderated economic value added (MEVA), performance evaluation accounting criteria.

Introduction

Today's managers, given serious competitive conditions, need to control environmental changes and plan and direct them such that the best benefit is achieved from existing capital resources and maximum wealth is created for investors and shareholders. Essentially, various criteria such as economic and/or financial and accounting ones may be used to evaluate the increase levels in shareholders' wealth and managers' performance.

Use of financial and accounting criteria, such as earnings per share, return on equities, return on assets, and alike, has been prevalent for many years until value-base criteria such as economic value added, moderated economic value added and similar indicators were proposed for corporate performance evaluation. Traditional performance evaluation methods only took into consideration the debt financing costs while methods based on the concept of economic value added take both debt financing and stock finances costs into account.

Some investigators believe that economic value added is a strong and efficient criterion in describing firms' performances and is more capable of general and traditional criteria in describing market value of firms' stock. In contrast, some others claim that this criterion has a weaker correlation to firms' stock's market value than traditional ones[1]. Therefore, and given the controversies in this area, the present paper tries to examine whether criteria such as economic value added- and more

specifically, its moderated version as used in this investigation-can be used together with traditional accounting criteria in describing and evaluating firms' performances and whether the said criteria have any significant relationship with market value added as a measure of shareholders' wealth.

In recent years, corporate managers have defined a new role for themselves, which is value creation for shareholders. Multiple factors such as capital market globalization, IT advancements, changes in general attitude towards saving and investment, and development of investing institutes have changed managers' attitudes[2].

Considering the current conditions in global competition which will be more serious in the years to come, managers should control and plan environmental changes in order to take the best from existing capital resources and create maximum value for investors and shareholders. The main criteria which can be used for the economic unit managers' performance evaluation are included in accounting and financial, as well as economic criteria.

Economic Criteria: By converting accounting information to economic information (through some adjustments), economic criteria try to use the latter as a foundation to evaluate firms' performances. In other words, these criteria assess a firm's performance by considering the power to achieve profit on existing assets and potential investment and by taking the cost of capital into account[3].

Economic Value Added (EVA): EVA is an economic criterion, consisting of the difference between rate of return and a firm's cost of capital in monetary terms. Economic value added explains economic profitability by measuring the profit after subtracting the shareholders' expected returns. Improved EVA means increased shareholders' wealth[4].

While EVA is very similar to traditional accounting criteria, there is a major difference. EVA considers total cost of capital while traditional accounting considers interest expense and not the equities costs. Firms capable of achieving a yield higher than mean capital cost rate, have positive economic value added which leads to economical offering of their stock in the market. EVA is calculated as: EVA=(r-c)*Capital.

Where r is the return on capital which is used to measure the efficiency of capital allocated to the economic unit and is obtained through dividing the operating net profit after tax (NOPAT) by employed capital's book value (Capital)[5].

$$r = \frac{NOPAT}{Capital}$$

Thus, EVA can be formulated as: EVA=NOPAT-(C*Capital)

Where c is the capital cost rate calculated based on weighted average of capital costs employed. Capital cost or financing cost is the least rate of returns the achievement of which is essential to maintain a firm's value. In the context of capital cost, the term _capital_ has a broader concept than in accounting terms and includes all funds and financial resources which individuals expect to achieve appropriate returns from making them available. Thus, given the above definition, capital consists of two parts: i. Equities,. ii. Long term liabilities and interest payable current liabilities.

As various forms of financing have different risks and ultimately, different expenses, therefore the weighted average of capital cost can be calculated as:
C = Wd. Kd (1- t) +We. Ke

where _wd_ is the weight of debt; _kd_, is the cost of debt**;** _we_ is the weight of common stock and the _ke_ is the cost of common stock, reserves/retained earnings[6].

REVA = NOPAT – (WACC × M.Capital)

Market Value Added (MVA): MVA is the difference between a firm's market value and the economic book value of its capital employed[7].
MVA= firm's market value-firm's capital employed

In the equation above, the employed capital equals the sum of the stockholders' equities items and its liabilities. The firm's market value, on the other hand, consists of the market value of debt and the market value of equities. Among the above factors, the firm's stock's market price is available but it is not easy to calculate the debt's market value. Therefore, most analysts use

the value of liabilities reported in financial statements or the book value of liabilities as an estimation of its market value. Consequently, provided that the market value of debt equals to their book value, the MVA will be calculable from the following equation:
MVA= stock's market value issued - book value of equities

The MVA is the product of actual value of past projects and future profitable opportunities of a firm and indicates how successfully the firm employs its capital and has predicted future profitable opportunities and has planned to achieve them. In other words, the aforesaid amount indicates the market's evaluation of a firm's current and future investment opportunities' value and it may be considered as an evaluation of the firm's competitive strategy and its resource allocation[8].
On this basis, a firm's MVA equals the actual value of its EVAs and/or residual profit that is expected to be created in the future:

$$MVA = \frac{EVA_1}{(1+c)^1} + \frac{EVA_2}{(1+c)^2} + \ldots + \frac{EVA_n}{(1+c)^n}$$

If future EVAs are positive, the firm's shares will be sold economically in the market. But, if EVAs are negative, the firm's shares will be sold with a price lower than book value (by deficit)[3].

Accounting and Financial Criteria: This category of criteria measure the firm's performance mainly using historical information contained in substantial financial statements and accompanying notes as well as market information.

Earning PER SHARE (EPS): EPS (basic earnings) is calculated by dividing net profit or losses attributable to ordinary shareholders by weighted average of number of ordinary shares during the period in question. Purpose of EPS is to provide an indicator to measure the profits of any individual ordinary share from the economic unit's performance during the reporting period (Audit Org., Audit Standard #30).

Return on Equities (ROE): ROE is a performance evaluation accounting criteria which is obtained from dividing net profit belonging to ordinary shareholders by ordinary equities (or its mean). This ratio indicates the return on cash amounts invested by ordinary shareholders in the firm and shows the enterprise's management in employing such funds. A corporation with a high ROE ratio substantially has the ability to create cash funds[9].

Return on Assets (ROA): ROA is considered a performance evaluation criterion and is calculated through dividing net profits/earnings by total (or mean) assets. This ratio indicates management's efficacy in employing the existing resources towards profit achievement. This ratio is often used by existing or potential investors to evaluate corporate management.

Return on Stock: The actual return on individual ordinary shares, given the variations of stock price, cash earnings, earning per share and capital increase, can be calculated as:

Year end stock price – year beginning stock price + cash earnings - stockholders' cash input year beginning stock price + stockholders' cash input

Research Background: In a study conducted to determine the relationship between a firm's market value with EVA and traditional accounting criteria such as ROA, ROE and EPS in the United States in the period of 1986-1995, Uyemura et al.[10] concluded that EVA had more correlation with the firm's market value in comparison with other criteria.

Zaima et al.[11] examined the relationship between EVA, GDP and MVA in the United States between 1988 and 1997. They found a positive and significant relationship between EVA, GDP and MVA.

Ramana[12], in an investigation performed between 1999 and 2003, examined the relationship between MVA and EVA with traditional accounting criteria through a correlation test. The results revealed that net operating profit after tax (NOPAT) and net profit after tax could explain changes of the firm's market value better than EVA.

Abzari et al.[2] evaluated the performances of the firms in the Base Metals companies in Tehran Stock exchange and examined their relationships with accounting earnings criteria. They found no significant relationship between EVA and accounting indicators.

Pooyanfar et al.[13] studied the relationship between accounting and economic criteria with firms' values in Cement and Petrochemical Industries in Tehran Stock exchange. They found a high correlation between EVA and NOPAT in petrochemical industry.

Hejazi and Hosseini[14] compared the relationships between MVA and EVA with accounting criteria in Tehran Stock Exchange and found a strong correlation between MVA and EVA as compared to accounting criteria.

Ghanbari[15] studied the relationship between EVA and MVA in member companies of Indian Automobile Industry between 2001 and 2005. Results indicated that EVA was a suitable criterion to describe MVA and to evaluate firms' performance.

Yahyazadeh Far et al.[16] examined the relationship between EVA and profitability ratios with MVA of the enlisted firms of Tehran Stock Exchange. Results indicated a significant relationship between EVA, ROE, and MVA; but not between ROA, EPS and MVA.

Research Hypotheses: The hypotheses tested by the present paper were as:
H1. There is a significant relationship between MVA and accounting and financial performance criteria: i. There is a significant relationship between MVA and ROA. ii. There is a significant relationship between MVA and ROE. iii. There is a significant relationship between MVA and EPS. iv. There is a significant relationship between MVA and return on stock (ROS).

H2. There is a significant relationship between MVA and MEVA.

Material and Methods

Population, Sample and Sampling Method: The research population includes all firms enlisted in Tehran Stock Exchange from March 21, 2006 by March 20, 2011. The study sample size, consisting of 130 firms (650 year-firm) was selected through screening method and with considering the following criteria. i. Financial and investment firms were excluded. ii. The study firms' fiscal years ended March 20th. iii. The study firms have not changed their fiscal years during the study period. iv. Study firms were profitable. v. Maximum operating pause of study firms was four months per year. vi. All required information for study firms were available.

Data Analysis Method: The present study has a positivism approach and is application- oriented. In terms of purpose, it is of hypothesis-test nature and the research type being used is survey. In order to summarize data, first the related variables were calculated using the collected data for each firm and each test year. All summarizations were done using Excel software, and then, hypotheses were tested using Eviews 6 software. This investigation uses the panel data method which while increasing the statistical strength of coefficients, reduces the collinearity among variables and due to increased degree of freedom, makes the estimation more efficient[17].

In this research, in order to select the appropriate method to examine the variables' interrelations, first the appropriate method was selected using Chow test between pooled and fixed effects models; and then, using Hausman test, the intended model was selected between fixed effects and random effects models. Also, in order to estimate the model coefficients, estimated generalized least squares (EGLS) method was applied.

Research Variables: In order to examine the regression relationships, three groups of variables were used.
A. Dependent Variables. MVA was used as dependent variable in the present paper.
B. Independent Variables. MEVA, ROE, ROA, EPS, and ROS were used as independent variables in this study.
C. Control Variables. In the regression model applied, changes in total price index (TEPIX) were used as control variable.

Research Model: Given the research objectives and proposed hypotheses, the models presented in Table.1 were used to examine the interrelations of dependent and independent variables.

Table -1
Models used to explain the variables' interrelations

Hypotheses	Regression model	Model #
H1. a	$MVA_{it}=\beta_0 + \beta_1\ ROA_{it}+ \beta_2 RM_t + e_{it}$	Model (1)
H1.b	$MVA_{it}=\beta_0 + \beta_1\ ROE_{it}+ \beta_2 RM_t + e_{it}$	Model (2)
H1.c	$MVA_{it}=\beta_0 + \beta_1\ RT_{it}+ \beta_2 RM_t + e_{it}$	Model (3)
H1.d	$MVA_{it}=\beta_0 + \beta_1\ EPS_{it}+ \beta_2 RM_t + e_{it}$	Model (4)
H2	$MVA_{it}=\beta_0 + \beta_1\ REVA_{it}+ \beta_2 RM_t + e_{it}$	Model (5)

Results and Discussion

In order to analyze the information, first the data's descriptive statistics, including central indexes, dispersion and deviation from symmetry were calculated and presented in table 2.

Results of descriptive analysis indicate that skewness coefficient, as related to all variables, was positive. This suggests a right-ward skewness and tendency of variables towards smaller values. Also, positiveness of elongation coefficients indicate that variables, distribution is linger than normal distribution and data are more concentrated around average. Finally, results of Jarque-Bera test –given that calculated error level is greater than 0.05- indicates normal distribution of all research variables. Results of regression test (table 3), given the probability value of F statistic provides support for general regression model in 99% certainty level and for linearity of research variables' interrelations.

Also, the probability level obtained from Durbin-Watson test supports the lack of correlation between error terms. Results of hypotheses tests (Fig.3), given the obtained p-value, indicates that all correlation coefficients of model are significant at a 95% confidence level and have a positive relationship with MVA. Also, Roe (together with RM control variable) with a 43% adjusted coefficient of determination and REVA with a 36% adjusted coefficient of determination were the most effective on MVA among variables, respectively, and could explain a considerable part of changes in the said variable.

Tests for Estimation Model Selection: In order to determine the type of model used in pooled data, various models have been designed. If the goal is to select an appropriate model between two models of fixed and random effects, so called 'Hausman

test' can be applied. Also, when selecting between integrated regression and fixed effect models, usually Chow test is applied. Hypotheses for the latter test are as follows:

$$H_0 : \alpha_1 = \alpha_2 = \dots = \alpha_{n-1} = 0 \qquad \text{y-intercepts are equal.}$$

$$H_1 : \alpha_i \neq 0 \quad \exists_i \in 1,\dots n-1 \quad \text{At least one y-intercept}$$
is different from others.

In this test, H0 represents equality of coefficients and y-intercepts in study firms and therefore, rejection of H0 would prescribe the appropriateness of panel data (fixed effects) model; and its support would represent the requirement to use pooled data method. Test results for each hypothesis indicate the rejection of H0 and necessity to use panel data method with the approach of fixed effects model.

In the process of selection between random and fixed effects models, Hausman test is used. This test was designed based on correlation between independent variables and individual effects and H0 and H1 can be presented therein as follows:

$$H_0 = COV[\alpha_i, x_i] = 0$$
$$H_1 = COV[\alpha_i, x_i] \neq 0$$

where the random error component (individual effect) is correlated with explanatory variables (H0 is rejected), the random effects model will be biased and in this case, the fixed effect model should be used. Test results for all research hypotheses provide support for H0 and the requirement to use random effects.

Variables' Viability Test: In order to make sure of research results and authenticity of relationships in regressions and significance of variables, a viability test was performed and unit root of research variables were calculated in EGLS model. This test was performed using Eviews 6 software and Levin, Lin and Chu [18] test procedures, Im, Pesaran and Shin [19] test, Augmented Dickey-Fuller Unit Root Test (Fisher-ADF), and Fisher-Phillips-Perron, Chu's unit root test. Results show that research variables have been viable and therefore, H0 –speculating the common root of variables- is rejected.

Table -2
Descriptive analysis of research data

Variable	Minimum	Maximum	Average	Skewness	Elongation	Jarque-Bera statistic
MVA	0	13.43	8.67	0.04	0.10	0.44
REVA	0	14.46	3.03	0.05	0.01	0.85
EPS	135	9987	976	0.06	0.06	0.30
RT	0.01	0.64	0.28	0.05	0.57	0.31
RM	00	0.54	0.23	0.00	0.15	0.14
ROE	0.05	0.75	0.27	0.02	0.14	0.45
ROA	0.01	0.42	0.18	0.09	0.17	0.24

Table -3
Results of research hypotheses testing

Test results :H1.a			
$MVA_{it}=\beta_0 + \beta_1 ROA_{it}+ \beta_2 RM_t +e_{it}$			
Method: Pooled EGLS (Cross-section random)			
Variable	Coefficients	*t* statistic	Probability value
Constant (C)	10.183	8.606	0.000
ROA	0.052	3.209	0.000
RM (index changes)	0.001	1.894	0.042
Moderated Determination factor	0.25	F statistic	11.233
Durbin–Watson statistic	1.824	F statistic's probability	0.000
Test results :H1.b			
$MVA_{it}=\beta_0 + \beta_1 ROE_{it}+ \beta_2 RM_t +e_{it}$			
Method: Pooled EGLS (Cross-section random)			
variable	Coefficients	*t* statistic	Probability value
Constant (C)	10.183	8.606	0.000
ROE	0.052	3.209	0.001
RM (index changes)	0.001	1.894	0.000
Adjusted coefficient of determination	0.25	F statistic	3.275
Durbin–Watson statistic	1.824	F statistic's probability	0.0028
Test results :H1.c			
$MVA_{it}=\beta_0 + \beta_1 RT_{it}+ \beta_2 RM_t +e_{it}$			
Method: Pooled EGLS (Cross-section random)			
Variable	Coefficients	*t* statistic	Probability value
Constant (C)	12.134	11.667	0.000
RT	0.206	2.269	0.002
RM (index changes)	0.002	1.476	0.007
Adjusted coefficient of determination	0.32	F statistic	11.876
Durbin–Watson statistic	2.177	F statistic's probability	0.000
Test results :H1.d			
$MVA_{it}=\beta_0 + \beta_1 EPS_{it}+ \beta_2 RM_t +e_{it}$			
Method: Pooled EGLS (Cross-section random)			
Variable	Coefficients	*t* statistic	Probability value
Constant (C)	7.359	6.674	0.000
EPS	0.021	1.957	0.042
RM (index changes)	0.003	1.237	0.023
Adjusted coefficient of determination	0.15	F statistic	25.569
Durbin–Watson statistic	1.952	F statistic's probability	0.000
Test results :H2			
$MVA_{it}=\beta_0 + \beta_1 REVA_{it}+ \beta_2 RM_t +e_{it}$			
Method: Pooled EGLS (Cross-section random)			
Variable	Coefficients	*t* statistic	Probability value
Constant (C)	6.128	12.292	0.000
REVA	0.030	4.609	0.00
RM (index changes)	0.012	1.671	0.006
Adjusted coefficient of determination	0.36	F statistic	6.129
Durbin–Watson statistic	1.672	F statistic's probability	0.004

Conclusion

Results from testing hypotheses indicated that in spite of different discussions made in relation to role and importance of each economic and accounting criteria in evaluating the value creation levels and performances of economic units, MVA (our dependent variable) –as an external indicator of value creation- , while being in direct and significant relationship with accounting and financial indexes of performance evaluation (such as ROA, ROE, EPS, and ROS), is also related to economic indexes of performance evaluation such as REVA (as internal index of value creation) as well. The results also indicate that Moderated EVA, after ROE, has the greatest relationship with MVA. The above findings indicate that economic criteria, along with accounting and financial ones, can be used by capital market analysts in assessing and evaluating the performance and value creation of firms and enterprises, and may have a supplementary role.

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