

A Comparative Analysis of the Explanatory Power of Accounting Performance Indexes and Economic Value Added for Explaining the Firm Value

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ABSTRACT

The creation of value and enhancement of stockholders' wealth in long term is one of the firms' most important objectives. Performance evaluation systems are employed to realize this objective. The present study examined the performance of food group companies in Tehran Stocks Exchange in order to perform a comparative analysis of traditional performance indexes such as return on assets (ROA), return on equities (ROE), and earnings before interest and taxes (EBIT) and value-based indexes (economic value added). Kolmogrov-Smirnov Test was used to examine the normality of the data and simple regression test was employed to test research hypotheses. The results of the study indicated that economic value added (EVA), return on assets (ROA), and earnings before interest and taxes (EBIT) are positively and significantly related to the market value (MV). On the other hand, it was noted that there is no significant relationship between return on equities and the market value (MV). In addition, economic value added (EVA) was found to be a better performance evaluation index than return on equities (ROE) and earnings before interest and taxes (EBIT).

KEYWORDS: EVA, ROA, ROE, EBIT, MV

1. INTRODUCTION

With the advent of the Industrial Revolution and the emergence of large corporations and the separation of ownership from management, the need for evaluating managers' performance is increasingly important for stockholders. The creation of value and enhancement of stockholders' wealth is one of the most important objectives pursued by managers of such corporations. Performance evaluation is one of the most important issues considered by managers, investors, and creditors. The most important issue for shareholders is whether the value of their investment has increased due to the management performance or not. In the present study, the two groups of indexes i.e. traditional indexes used to evaluate performance and value-based indexes have been compared to explain companies' performance. Since the traditional indexes such as earnings before interest and taxes (EBIT), rate of return on assets (ROA), rate of return on equity (ROE), and earnings per share (EPS) only focus on accounting earnings and take no notice of costs of capital resources, as a result, some scholar believe that they are not suitable to be used for performance evaluation. One of the widely used indexes recently to evaluate corporate performance is the economic value added in which the costs of all financing sources will be considered.

2. REVIEW OF LITERATURE

Ramana (2005) examined the relationship between economic value added (EVA) and market value added and compared the explanatory power of EVA in explaining firms' performance with that of traditional indexes such as operational earnings after-tax, net income, earnings before interest and taxes, and operating cash flows in Indian capital market. The result of the study suggest economic value added (EVA) has relatively less information content than the traditional indexes of performance evaluation and empirical evidence confirms the increasing power of economic value added in explaining corporate performance (Ramana, 2005). Palium(2006) in a study entitled "Further evidence on the information content of economic value added (EVA)" has performed a comparative analysis of the power of economic value added (EVA) and the explanatory power of the traditional measures extracted from financial reports in explaining the performance (return on equity). The result of the study indicated that economic value added (EVA) has relatively less information content (Palium, 2006). Tesuji(2006) in a study titled "Is EVA better than earnings and cash flow in Japan?" has compared the relationship of the economic value added (EVA) and several traditional measures of performance such as operating cash flow, operating profit, and net profit with the company market value. The findings of this study suggested that the relationship between operating

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cash flow and other accrual benefits is stronger than the relationship between operating cash flow and economic value added (EVA) (Tesuji, 2006). Ismail (2006) conducted a comparative analysis on the relationship between economic value added (EVA) and the ratio of return on stocks to the UK equity market and found that net operating profit after tax (NOPAT) and net income are more efficient in explaining returns on stocks than economic value added (EVA) and residual income (RI) (Ismail, 2006). Maditinos *et al.*, (2009) conducted a study in order to model value-and-accounting based performance indexes to explain companies' returns on stocks in the Greek capital market. They observed that the earnings per share (EPS) were reviewed more frequently in explaining returns on stocks than EVA and other traditional indexes (Maditinos & Sevice Theriou, 2009).

In order to measure value creation resulting from investment in IT sector, Lee *et al.*, (2009) used new evaluation criteria and traditional measures of performance such as return on sale (ROS), return on equity (ROE) and the rate of return on assets (ROA). Their findings indicated that investment in IT sector has a positive and significant relationship with economic value added (EVA), return on sales (ROS), and return on equity (ROE). But it had no significant relationship with return on assets (ROA) (Lee & Steven Siew, 2009).

To evaluate the performance of the car companies in Tehran Stock Exchange, Asghari (2006) examined the correlation between economic value added (EVA) and return on assets (ROA). Given the nature of automobile industry, the results of this study indicated that there is no significant relationship (neither positive nor negative) between EVA and ROA (Asghari, 2006, 1). Delshad (2009) conducted a comparative study of modern and traditional performance measures in explaining economic performance of manufacturing companies. The results of the study suggested that there is a significant relationship between companies' performance and the market value added, return on assets, return on equity, and return on sales. However, there was no significant correlation between EVA and companies' performance (Delshad, 2009:1). To determine superior performance evaluation indexes from among new and traditional indexes, Dastmalchian (2010) examined the effects of information content of economic value added, cash flows, and accruals on the stock market value of the sample companies listed in the stocks market. A significant and positive relationship was found between operating income, operating cash flows (OCF), and economic value added (EVA) and the value of the stocks market of the sample companies. In addition, operating profit was found to have a stronger relationship with the value of the stocks market than other variables (Dastmalchian, 2010, 1).

Key components taken into account in determining economic value added are: net operating profit after taxes (NOPAT), weighted average cost of capital (WACC), capital (CAPITAL) and adjustments.

3. RESEARCH HYPOTHESES

1. There is a significant positive relationship between EVA and the value of stocks market.
2. There is a significant positive relationship between ROA and the value of stocks market.
3. There is a significant positive relationship between ROE and the value of stocks market.
4. There is a significant positive relationship between EBIT and the value of stocks market.
5. EVA is a superior performance index than EBIT.
6. EVA is a superior performance index than ROA.
7. EVA is a superior performance index than ROE.

4. Testing the research hypotheses: EXCEL Software was used to measure variables under study and SPSS Software was employed to perform data analysis. In addition, Kolmogrov-Smirnov Test was used to examine the normality of the data and simple regression test was employed to test research hypotheses.

5. Research population: Given the importance of food companies and their considerable number in the stock exchange and also since researchers have paid less attention to companies involved in the food industry, the population in the present study included all food companies in the Stock Exchange. In addition, since the present study aimed to present an overview of all companies under study, no sampling procedure was employed.

6. Data collection: The needed data were collected using information from the balance sheets, and profit and loss statements disclosed by Pars Portfolio Company and the stocks market website. In addition, the material related to the literature in the field was collected through the library methods using available resources in libraries and articles on the Internet. Finally, the collected data were analyzed using EXCEL and SPSS Software Packages.

7. Estimating variables

7.1. Economic value added (EVA): EVA is calculated as follows:

$$\begin{aligned} \text{EVA} &= (r - \text{WACC}) \cdot \text{CAPITAL} \\ \text{EVA} &= \text{NOPAT} - (\text{WACC} \times \text{CAPITAL}) \end{aligned}$$

Where, NOPAT represents net operating profit after taxes and CAPITAL stands for economic capital.

7.1.1. NOPAT: To calculate net operating profit after taxes, first operating income is derived from the financial statements and the resultant value will be deducted from income tax expense (5.22%). The result is net operating profit after taxes (accounting earnings). In this study, some modifications such as tax items and end-of-service benefits were made while other adjustments were omitted as they were not accessible or negligible.

7.1.2. CAPITAL: To calculate economic capital, interest-bearing debts, either short-term or long-term should be added to equities. The total obtained is the capital based on accounting principles and standards. As a result, economic capital is obtained given the accounting adjustments mentioned.

7.1.3: WACC: WACC shows weighted average cost of capital and is obtained from the following equation:

$$\text{WACC} = K_e W_e + K_d W_d$$

In the above equation, $K_d W_d$ represents the weighted cost of debt which is the same as 17% of the rate at which saving bonds are issued. In addition, $K_e W_e$ shows the weighted cost of common stocks and retained earnings.

A. Calculating the cost of common stocks and retained earnings (K_e): To calculate the cost of common stocks, the CAPM Model with the following equation was used:

$$k_e = R_f + \beta(R_m - R_f)$$

Where, K_e is the expected return on common stocks, R_f is risk-free rate of return, β is the systematic risk coefficient, and R_m is the return on the market.

B. Calculating returns on the market (R_m): To calculate the rate of return on the market, it is necessary to examine the changes in the general index which is calculated for the following equation:

$$R_m = \frac{I_t - I_{t-1}}{I_{t-1}}$$

In the above equation, I_t is the general market index at the end of period t and I_{t-1} is the general market index at the beginning of period t (Mansouri, 2008: 94).

C. Calculating the risk-free rate of return R_f : Since during the period under study the average rate of returns on bonds issued by different government ministries was approximately 17%, R_f was determined as 17% in the same way. This is the same as the rate of return on investment derived from short-term safe banking investments.

D. Calculating the systemic risk (β): Systematic risk is represented by β and is determined from the following equation:

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

Data obtained from monthly portfolios were used to determine the value of beta.

7.2. Calculating the rate of return on assets (ROA): One of the ratios discussed in this study is the rate of return on assets which is calculated using the following equation:

$$\text{Rate of returns} = \text{Net profit on sale} \times \text{Sale of assets} = \text{Net profit on assets}$$

7.3. Calculating the rate of return on equity (ROE): Another ratio discussed in the present study is the rate of return on equity which is measured through the following equation:

$$\text{Return on equity} = \frac{\text{Net profit}}{\text{Equity}}$$

7.4. Calculating earnings before interest and taxes (EBIT): EBIT can be measured from profit and loss statements available at stocks market website.

7.5. Determining the market value (MV): The dependent variable in this study is the market value determined from data available in Pars Portfolio Software.

8. Data analysis

One of the basic assumptions of regression test is that the dependent variable (which is MV in the present study) should be normal. As a result, the value of MV (market value) from 2005 to 2008 was tested and given the

significance level obtained it was noted that the dependent variable does not have a normal distribution. Therefore, the natural logarithm (Ln) for stock market was used. Then the scatter plot between the independent and dependent variables was drawn and the simple linear regression was used to examine the relationship between the variables quantitatively. The evaluation model is presented as follows:

$$Y = \alpha + \beta X$$

In the above equation, Y is the dependent variable (MV), α is the intercept, β is the slope, and X is the independent variables. If the slope of β should be positive, a direct, significant, and positive relationship will exist between the dependent and independent variables. What was mentioned above is used to test the first four research hypotheses. To test the fifth and sixth hypotheses to see whether these two variables are superior to the market value or not, a confidence interval should be defined which can be determined based on the following equation:

$$Tgh\left(\frac{-z_{(1-\frac{\alpha}{2})}}{\sqrt{n-3}} + Tgh^{-1}R\right) < P < Tgh\left(\frac{+z_{(1-\frac{\alpha}{2})}}{\sqrt{n-3}} + Tgh^{-1}R\right)$$

Where, P is the correlation coefficient for the population under study and R is the correlation coefficient for the sample under study. If there are some common points in the confidence intervals it suggests that there is no significant difference between the two variables otherwise there is a significant difference between the two variables

Testing the first research hypothesis

As shown in Table 1, the correlation coefficient between these two variables in general and for four years is equivalent to 0.681, which suggests the existence of a relatively strong positive correlation between the two variables. Generally, the value of significance level is equal to zero. Since the value of significance level here is less than 0.05 ($\alpha = 0.05$) it can be said that in general there is a positive relationship between economic value added and market value. As a result, the first hypothesis is confirmed.

Table 1: Result for the first hypothesis: the relationship between economic value added and market value

Variables Year	Correlation coefficient (R)	R Square	Beta	Sig F	Confidence	Sig.
1384	.643	.339	2/595	.045	%95	yes
1385	.947	.898	8/12	0	%95	yes
1386	.886	.785	1/673	0	%95	yes
1387	.641	.411	1/83	.013	%95	yes
All years	.681	.464	1/181	0	%95	yes

Testing the second hypothesis

As shown in Table 2, the correlation between these two variables in general and for four years is equivalent to 0.515, indicating that there is a relatively strong positive correlation between the two variables. Generally, the value of significance level is equal to zero. Since the value of significance level here is less than 0.05 ($\alpha = 0.05$) it can be said that in general there is a positive relationship between return on assets and market value. As a result, the second hypothesis is confirmed.

Table 2: Testing the second hypothesis: the relationship between return on assets and stock market

Variables Year	Correlation coefficient (R)	R Square	Beta	Sig F	Confidence	Sig.
1384	.6	.36	18589/5	.023	%95	yes
1385	.524	.274	9676/02	.055	%95	yes
1386	.507	.257	8351/4	.065	%95	yes
1387	.727	.529	21511/8	.003	%95	yes
All years	.515	.265	9981/231	0	%95	yes

Testing the third hypothesis

As can be seen in Table 3, the correlation between these two variables in general and for four years is equivalent to 0.074, indicating that there is a direct and weak correlation between the two variables. In general, the

value of significance level for the two variables is 0.580 which is greater than 0.05 ($\alpha = 0.05$). Therefore, it can be said that there is no positive and significant relationship between return on equities and market value at 95% level of confidence. As a result, the third hypothesis is rejected.

Table 3: Testing the third hypothesis: the relationship between return on equity and the market value

Variables Year	Correlation coefficient (R)	R Square	Beta	Sig F	Confidence	Sig.
1384	.456	.208	4771/331	.087	.95	No
1385	.3581	.128	1559/336	.191	.95	No
1386	.544	.296	398/487	.068	.95	No
1387	.383	.147	2534/846	.158	.95	No
All years	.074	.005	534/456	.580	.95	No

Testing the fourth hypothesis:

As can be seen Table 4, the relationship between earnings before interest and taxes and the market value from 2005 to 2008 is 0.353, indicating a relatively weak and direct relationship between these two variables. The significance level for the two variables is 0.006 which is smaller than 0.05 ($\alpha = 0.05$). Therefore, it can be said that there is a positive and significant relationship between earnings before interest and taxes and the market value at 95% level of confidence. As a result, the fourth hypothesis is confirmed.

Table 4: Testing the fourth hypothesis: the relationship between IBIT and the market value

Variables Year	Correlation coefficient (R)	R Square	Beta	Sig F	Confidence	Sig.
1384	.837	.7	5/55	0	%95	Yes
1385	.643	.414	2/16	.01	%95	Yes
1386	.757	.573	3/301	.001	%95	Yes
1387	.878	.771	4/374	0	%95	Yes
All years	.353	.124	1/25	.006	%95	Yes

Testing the fifth hypothesis

As shown in the tables 1 and 4, the correlation between economic value added and the market value is 0.681 and the correlation between earnings before deducting interest and taxes and the market value is equal to 0.353. In addition, both of these variables have a significant linear relationship with the market value (Sig = 0 for economic value added and the market value and Sig = 0.006 for earnings before interest and taxes and the market value). Therefore, to determine which of the two variables (either economic value added or earnings before deducting interest and taxes) is superior over the other, a new confidence interval has to be defined for each correlation coefficient. The correlation coefficients for the two variables for the 2005-2008 period is as follows:

The confidence interval for the correlation between economic value added and the market value equals 0.526-0.797 and confidence interval for the correlation between earnings before interest and taxes and the market value is equal to 0.108-0.51. Given the scale used for the confidence intervals and non-existence of any overlap, it can be concluded there is a significant difference between the correlation for economic value added and the market value and the correlation for earnings before interest and taxes and the market value, showing the superiority of economic value added over earnings before interest and taxes. As a result the fifth hypothesis is confirmed.

Testing the sixth hypothesis

As shown in tables 1 and 2, the correlation between economic value added and the market value is 0.681 and the correlation between the rate of return on assets and the market value is generally equal to 0.515. In addition, both of these variables have a significant linear relationship with the market value (Sig = 0 for economic value added and the market value and Sig = 0.006 for return on assets and the market value). Therefore, to determine which of the two variables (either economic value added or return on assets) is superior over the other, a new confidence interval has to be defined for each correlation coefficient. The correlation coefficients for the two variables for the 2005-2008 period is as follows:

The confidence interval for the correlation between economic value added and the market value equals 0.516-0.797 and confidence interval for the correlation between return on assets and the market value is equal to 0.3-0.767. Given the scale used for the confidence intervals and the existence of a limited overlap, it can be concluded there is no significant difference between the correlation for economic value added and the market value and the correlation

for return on assets and the market value, showing the relative superiority of economic value added over return on assets. However, the sixth hypothesis is not confirmed.

Testing the seventh hypothesis

As shown in tables 1 and 3, the correlation between economic value added and the market value (during 2005 to 2008) is 0.681 and the correlation between return on equity and the market value is 0.074. On the other hand, there is a positive and significant relationship between economic value added and the market value ($P = 0$). However, there is no positive and significant relationship between the rate of return on equity and the market value ($P = 0.580$). As a result, it can be concluded that the relationship between economic value added and the market value is significantly different from the relationship between return on equity and the market value which shows clearly that economic value added is superior than return on equity. Accordingly, the seventh hypothesis is confirmed.

9. Conclusions

Based on the results of testing the research hypotheses, it can be concluded stocks prices are predicted using information related to economic value added (EVA). EVA also can be used as an efficient measure to evaluate firms' performance. In addition it was noted that information related ROA can be used to predict the stocks prices, suggesting that ROA as a traditional index can still be used as a reliable criterion for assessing the companies' performance. However, we can not rely on the information derived from rate of return on equity to predict stocks prices. But information obtained from accounting earnings can be source of predicting stocks prices; suggesting that accounting earnings as a traditional measure can still be used as a reliable index to evaluate firms' performance as it contains the necessary information content. In addition, the result of data analysis related to the first and fourth hypotheses, a comparison of the confidence intervals estimated in this study, and the non existence of an overlap between the two confidence intervals indicate that the correlation between economic value added and the market value is significantly different from the relationship between earnings before interest and taxes and the market value which shows that economic value added is advantageous over earnings before interest and taxes in evaluating companies' performance and therefore it has a stronger predicting power. It was also observed that the correlation between economic value added and the market value is not significantly different from the correlation between return on equity and the market value of the companies listed in Tehran Stocks Exchange which shows clearly that economic value added is slightly superior than return on equity and that both indexes of economic value added and return on assets can be used to evaluate companies' performance. The findings of the study also suggested that there is no positive and significant relationship between return on equity and the market value. In contrast, it was found that economic value added is significantly related to the market value; indicating that economic value added is advantageous over return on equity as a more reliable index with stronger explanatory power. Overall, the findings of the present study indicated that traditional accounting indexes that have been already used are insufficient and do not possess enough information content to face increasing challenges of capital markets and owners and, therefore, the economic value added is a reliable index with regard to the market value.

10. Suggestions

10.1: Suggestions based on the findings of the study

- Given the EVA capabilities for the evaluation of managers' performance, it is recommended that EVA be employed along with other indexes (such as earnings before interest and taxes, proceeds etc.) to evaluate managers' performance and determine the real value of firms. In addition, given the EVA concentration on the quality of financing and efficiency or inefficiency of processes within companies it is suggested that stockholders and investors pay more attention to EVA as an efficient index for evaluating managers' performance and determining the real value of firms before they make any decisions.
- Since EVA is not exactly known to companies and stockholders it is recommended that this index and the way it must be used in making investment decisions be explained in workshops and seminars.
- Tehran Stocks Organization has used EVA with other indexes to evaluate the firms' values and to choose the desired stocks.

10.2. Suggestions for future research

Based on the findings of the present study, future researchers are recommended:

- To investigate the relationship between the adjusted EVA and the market value, the relationship between the adjusted EVA and earnings before interest and taxes and depreciation with regard to firm's value.
- To investigate the relationship between the adjusted EVA and cash flows resulting from operational activities with regard to firm's value.

- To examine the relationship between the adjusted EVA and EVA in Iranian companies listed in Tehran Stocks Exchange, evaluate different performance evaluation indexes used in Tehran Stocks Exchange, and compare them with EVA to determine their efficiency in predicting the market value.

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