Economic Value Added vs. Accounting Residual Income; Which One Is a Better Criterion for Measurement of Created Shareholders Value?

Mohamadreza Abdoli, Mohamadreza Shurvarzi and Akram Davodi Farokhad

Department of Accounting, Shahrood Branch, Islamic Azad University, Shahrood, Iran
Department of Accounting, Neyshabur Branch, Islamic Azad University, Neyshabur, Iran

Abstract: In this paper, the relationship between each independent variable including economic value added and residual income as the representatives of economic models with the created shareholders value is studied. The research is inferential-inductive in terms of methodology and is cross-sectional correlation in terms of test statistical method. The studied statistical population consists of all the companies listed in Tehran Stock Exchange during 2006-2009, except for investment and holding companies. The statistical sample consists of 85 companies. Simple and multi-variable regression methods are used to test the hypothesis. The effect and importance of most independent variables are examined through Forward method. The results indicate that both economic value added and residual income have significant relationship with the shareholders’ created wealth. However, the residual income criterion is more significant than the economic value added in relation with the created shareholders value. The difference between the impacts of these two variables is due to accounting adjustments through which the effect of accrual accounting is eliminated, hence it is considered as a better criterion for performance evaluation and increase in shareholders value.

Key words: Economic Value Added (EVA) • Residual Income (RI) • Created Shareholders Value (CSV)

INTRODUCTION

At present, most financial analysts believe that companies should create a turnover higher than the capital cost (liability and equity interests) in order to create value. This concept has become operational using such models as economic value added and residual income. In 1980s, along with the changes Stewart applied to the concept of residual income, the economic value added developed as one of the new financial performance measurement tools. Stewart believed that the economic value added should be used as an internal and external performance evaluation criterion instead of profits and cash from operation [1]. Stewart’s study also indicated that the common accounting criteria, such as income, income growth, cash income growth, equity interests outcome and even cash flow cannot be considered This has covered only cost of capital deficiency otherwise income manipulation exists even in this approach as proper criteria, since none of them has correlation with the market value variations of selected companies [2]. Accordingly, in this paper the relationship of each independent variable including economic value added and residual income as representatives of evaluation economic models, with the created wealth of shareholders is analyzed.

In article 47 of statement 1 of Financial Accounting Standards Committee, it is stated that income can be used for evaluation of profitability, capacity of dividends payment, predicting future revenues as well as assessment of investment risk. Thus, accounting income is one of the most important traditional performance evaluation criteria. But this criterion has got some deficiencies. The accounting income can be manipulated through different methods for evaluating inventory, R&D costs, depreciation and supplies. Also, the capital cost is not considered in calculating the accounting income. In performance evaluation based on accounting traditional income, the financing cost is only applied via liability while in calculating the economic value added, the financing cost is applied through both liability and stocks [1]. Lohman et al. contend that performance evaluation is an activity that managers undertake in order to reach their goals and implement their
strategies. The selection of appropriate criteria for performance evaluation and using it to accomplish company goals adds to the importance of the method used to arrive at suitable criteria for performance evaluation [3]. What is most important to investors is whether the company has produced value for them or not. To put it differently, they would like to know if management performance has led to growth in the value of their investments or not.

EVA and RI are methods that have been developed in recent years to measure performance evaluation with an emphasis on the creation or destruction of value.

EVA begins with adjusting ROA as a component. The purpose of these adjustments in accounting income and stockholders’ equity is achieving NOPAT (Net Operating Capital After Tax) and capital so that the rate of cost of capital can be worked out. Then by incorporating the rate of cost of capital we can measure changes in value.

Nowadays, EVA has become an important instrument for measuring management performance across the world. There are a range of views about the superiority of EVA over traditional performance measurement tools. The use of the concept of EVA and their practical application as a management control system for performance evaluation in organizations has been emphasized [4]. On the other hand recently, the residual income (RI) model has become very popular in valuation because it purports to measure "value added" by explicitly taking into account the cost for capital in the income statement. Some proponents of the residual income approach have even suggested that the RI model is superior to the discount cash flow (DCF) method and consequently, the DCF model should be abandoned in favor of the RI model. The residual income model is seductive because it purports to provide assessments of performance at any given point in time [5].

The residual-income (RI) valuation model is an earnings-based approach. It affords accountants with a framework to analyze company performance within the context of accrual accounting. It defines total common shareholders' equity and net income determined in accordance with GAAP and thus is particularly well suited to support instruction of ratio analysis [6].

**Literature Review and Extraction of Hypotheses:** Hess et al. [7] investigated the discounted cash flow (DCF) and residual income (RI) valuation methods. In their research, the companies were grouped into 20 portfolios, including 69 companies listed in New York Stock Exchange (NYSE), American Exchange (AMEX) and National Association of Securities Dealers Quotations (NASDAQ) markets and then the value of each company was evaluated using the above mentioned methods. The empirical results of the research indicate that the RI method robust than other valuation methods in most studied companies during 1988-1998.

El Mir, Seboui [8] in their study on corporate governance and earnings management and the relationship between economic value added and created shareholders value concluded that there are different case of convergence and divergence between the created shareholders value and the economic value added which can be described using governance and earnings management mechanisms.

Worthington and West [9] compared the information content of economic value added for 110 Australian companies during 1992-1998 with the information content of residual income, operational cash flow and income before extraordinary items. In their study, income before extraordinary items and economic value added showed the highest and lowest relationship with the stock returns, respectively. Analysis showed that the economic value added had more increasing information content than RI and operational cash flow.

Lovata, Linda M., and Cochrane, Michael [10] tried to compare companies which apply economic value added as a criterion for performance evaluation with companies which do not bring into play this criterion. In this study, 115 companies in the U.S which use this criterion were selected against 1,271 companies which do not use this criterion. The results of this study showed that companies with lower sole proprietorship percentage which most of their capital are by institutional investors try to use the economic value added criterion.

Also, Fernandes [11] conducted a research on the relationship between economic value added and created shareholders value and concluded that the economic value added is unable to measure the created shareholders value.

Similarly Biddle, et al. [12] investigated the information content of economic value added, residual income and two common performance measurement criteria, i.e. income and operational cash flow and also compared the relationship between the economic value added and accrual income with the company’s stock returns. The results of analysis indicated that R² for the net income was 128%, for residual income (refined economic value added) was 7.3%, for EVA was 6.5% and for operational cash flow was 2.8%. In fact, the annual
accounting income is two times more powerful in describing the annual returns variations than the economic value added.

Besides, Biddle and Valance [13], studied the created changes in companies through application of economic value added. They compared the performance of companies which employ economic value added criterion with the performance of a control group. This control group includes companies which do not use the economic value added criterion. The authors believe that application of economic value added criterion causes changes in decisions regarding company’s finance, operation and investment. Also, the economic value added criterion increases the RI and shareholders’ wealth.

Moreover, Bacidore et al. [14] tried to study the correlation and explanatory power of economic value added (EVA) and refined economic value added (REVA) in predicting and creating wealth for shareholders. They extracted their information from the database of 1,000 companies provided by Stern and Stewart Institute. Their sample included 600 companies during 1982-1992. The results of this research showed that REVA has more correlation and capability in predicting the market value compared with the EVA.

Likewise, Obyrne [15] investigated the relationship between EVA, net operating profit after tax (NOPAT), free cash flow (FCF) and market value. In this research the data of years 1983-1992 was used. It was concluded that EVA and NOPAT usually have similar explanatory capability. Also, the changes in EVA explain 31% of changes in market value, while NOPAT explains 17% of such changes.

Stewart [16] compared the accounting general criteria with EVA. He believed that the EVA criterion is more general than other similar criteria, such as income, dividend, equity interest output as well as cash flow. It was also shown that the changes in market value of selected companies group (especially in their market value added) have weak correlation with accounting general criteria, while the maximum correlation is between EVA and market value added.

Accordingly, Tarverdi and Daghani [17] focused on the relationship between RI, discounted cash flow (DCF) and refined income in determining company’s market value. It was concluded that the value indicated by RI method is 14% closer to the average value for the initial public offering (IPO) than DCF method. Also, the value obtained from DCF is in line with values obtained from the refined income method, but the assessments on both RI and refined income methods showed different results. Finally, the RI method significantly helps investors and analysts in determining the impartial value of a business unit.

In this context, Vakilian, Vadi’e and Husseini Ma’ssoum [1] investigated the relationship between EVA and RI in predicting the earnings per share for the next year and concluded that there is no significant relationship between EVA and earnings per share and it has no prediction capability and RI is effective on investors’ decisions as the representative of economic model of performance evaluation.

In their research titled “comparing market added value and EVA with accounting criteria in Tehran Stock Exchange (TSE)” Hejazi and Husseini [2] concluded that the EVA criterion is more connected to market values than other accounting criteria and it can be referred as the best internal performance evaluation criterion which is an index of external performance criteria, i.e. market value added.

Noravesh et al. [18] studied the relationship between operating cash flows, operating income and EVA with created wealth of shareholders. The results of research indicated that EVA is a better index for predicting the created shareholders value and represents the management’s capability in increasing the company’s value (shareholders’ wealth).

Moreover, Nazarieh [19] investigated the relationship between earnings per share and EVA in non-metal mineral products companies listed in Tehran Stock Exchange during 1993-1998. The information analysis illustrated that there is no relationship between EVA and earnings per share and accordingly the EVA is a better criterion in evaluating the effectiveness of non-metal mineral companies’ performance than earnings per share. The factors such as inefficient capital market and higher income cost than the acquired output are the reasons for lack of relationship between EVA and earnings per share.

Research Hypotheses: In this paper is done for answer this questions, whether EVA and RI have effect on the CSV, with this intention, the following hypotheses are defined:

H1: There is a significant relationship between the EVA and created shareholder value.
H2: There is a significant relationship between the RI and created shareholder value.
H3: The impact of EVA is more significant than RI's in calculating the created shareholder value.
Research Method: The research method is inferential-inductive in terms of style and is cross-sectional correlation in terms of test statistical method. The statistical samples are selected through omission systematic method and based on the following conditions:

- The companies should be listed in Tehran Stock Exchange during the research period.
- Their fiscal year must end in mid-March.
- They should not be listed as investment and holding companies.

The statistical sample of research includes 85 companies. The data needed for research are obtained from Rahavard Novin information software, Tadbir Pardaz as well as the website of Islamic Research Development Center of Tehran Stocks and Securities Organization.

Variables Economic Value Added (EVA): EVA is an independent variable which presents the residual income after covering the capital costs [20]. Some adjustments are performed on net operating profit after tax (NOPAT) and the entire used capital. In EVA model, we have:

\[ \text{EVA} = (\text{ROIC} - \text{WACC}) \times (\text{IC}) \]  

Where:
- EVA = Economic value added;
- ROIC = Return on invested capital (total capital return)
- WACC = Weighted average cost of capital
- IC = Investment capital

Return on Invested Capital (ROIC): To calculate this, the operating profit after tax is divided to the invested capital. The operating profit after tax is obtained as follows:

The expenses of RandD, advertising, marketing, training as well as rental fees which are extracted from the financial statements, are added to the operating profit after tax [operating profit × (1-22.5%)] as accounting adjustments. Also, increase in supplies, bad debt receivables, decline of inventory value and pensions extracted from notes of financial statements are added to the operating profit after tax. In order to determine and measure the weighted average cost of capital, the following equation is used [2]:

\[ \text{WACC} = \text{We} \times \text{Ke} + \text{Ws} \times \text{Ks} + \text{Wd} \times Kd \]  

In order to determine the company’s cost of capital, it is essential to independently calculate the cost of each component of capital and based on their ratio in the total structure, the average company’s cost of capital can be obtained.

Where: \( W_e \) = weight of equity; \( W_s \) = weight of retain and reserves earnings; \( W_d \) = weight of debt; \( K_e \) = cost of equity; \( K_s \) = retains and reserves cost of income; \( K_d \) = rate of debt.

Any of the above mentioned rates are calculated as follows:

- Rate of debt = (interest expense / interest debt) × (1-tax rate)
- Cost of equity = dividend per share / market value of each share.

In calculating the cost of retain and reserves earnings, the dividend approach or the Gordon model was used [21]:

\[ g = \text{(interest per share / market value of each share)} + \text{(undivided earning percentage)} \]

Undivided earning percentage = 1 – (profit paid per share / profit per share)

Residual Income (RI): The residual income is another independent variable and is equal to the difference between the incomes of investing centers and the cost of application opportunity [22]. In RI evaluation model [6], we have:

\[ \text{RI} = \text{I} - (r \times \text{BV}) \]  

\[ = \left(1 - \frac{r \times \text{BV}}{\text{BV}}\right) \times \text{BV} = \text{BV} - (\text{ROE} - r) \times \text{BV} \]

RI= Residual income; I= net profit after tax; ROE= return on equity; \( r \) = cost of capital; BV= Book value of stock during the first period.

Created Shareholders Value: This variable is a dependent variable. In order to obtain the created value for shareholders, we should first define the increase in market value of equity interest, increase in market value of stockholder and expected return on equity. These definitions are presented in the following equation [7]:
Table 1: Descriptive statistics

<table>
<thead>
<tr>
<th>Variance</th>
<th>Median</th>
<th>Kurtosis</th>
<th>Skewness</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.257E22</td>
<td>108932461480.50</td>
<td>10.022</td>
<td>2.654</td>
<td>Economic Value Added</td>
</tr>
<tr>
<td>4.511E21</td>
<td>2433580693.00</td>
<td>17.139</td>
<td>3.395</td>
<td>Residual Income</td>
</tr>
<tr>
<td>1.392E21</td>
<td>17236307199.50</td>
<td>.834</td>
<td>.792</td>
<td>Created Shareholders Value</td>
</tr>
</tbody>
</table>

Table 2: Statistical Results Summary of Hypotheses

<table>
<thead>
<tr>
<th>Results</th>
<th>Coefficients</th>
<th>ANOVA</th>
<th>Model Summary</th>
<th>Pearson Correlation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta</td>
<td>Sign</td>
<td>T-Test</td>
<td>Sign</td>
<td>F-Test</td>
<td>Sign</td>
</tr>
<tr>
<td>confirm</td>
<td>0.58</td>
<td>0.000</td>
<td>42.491</td>
<td>0.000</td>
<td>6.519</td>
</tr>
<tr>
<td>confirm</td>
<td>0.718</td>
<td>0.000</td>
<td>89.542</td>
<td>0.000</td>
<td>9.463</td>
</tr>
<tr>
<td>Reject</td>
<td>0.597</td>
<td>0.000</td>
<td>47.646</td>
<td>0.000</td>
<td>5.90</td>
</tr>
<tr>
<td></td>
<td>0.182</td>
<td>0.073</td>
<td>1.816</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reject</td>
<td>0.718</td>
<td>0.000</td>
<td>89.542</td>
<td>0.000</td>
<td>9.463</td>
</tr>
</tbody>
</table>

CSV = Shareholder value added – (equity market value ×Ke)

CSV: Created Shareholders Value.

Shareholder value added: Increase in equity market value - payments from shareholders (capital increases) + Dividends paid during the year + repurchases - conversions.

Increase in Equity Market Value: market value of equity in the first period - market value of equity at the end of period.

Equity Market Value: market value of each share × outstanding shares.

Ke: company's capital cost rate (expected return)

Results: According to Table 1 which shows the descriptive statistics of research, it could be observed that:

The skewness coefficient of shareholders wealth, RI and EVA variables are 0.792, 3.395 and 2.654, respectively. Given that the shareholders’ wealth variable is closer to 0.5 (proportion of symmetry), therefore its skewness coefficient is smaller than the other two variables. But these two variables are slightly skewed to the right. Also, the kurtosis coefficient of these three variables is 0.834, 17.139 and 10.022, respectively. This indicates that since the shareholders’ wealth variable is closer to 0.5 (proportion of kurtosis), therefore it is less scattered and is closer to normal. The other two variables are longer than the normal distribution, that is, they are less scattered.

The Statistical Results of First Hypothesis: The first hypothesis states that there is a significant relationship between the EVA criterion and CSV. In order to test this hypothesis, Pearson's correlation coefficient and simple linear regression is used. According to the obtained relationships, it is signified that there is a correlation between EVA and CSV. The coefficient of determination in this case is 0.336, i.e. about 0.336 of changes in CSV variable can be determined by EVA.

Significance Test of Coefficients: This test, in addition to determining the significance of coefficients, specifies their impact direction of those coefficients on dependent variable. The statistic related to the significance of coefficients is the t statistic, instead of which the Sig column can be used. After confirmation of coefficients significance, both direction and amount of each independent variable effect on the dependent variable can be determined using the calculated coefficients in Beta column.

H₀: β = 0
EVA has no effect on CSV.
H₁: β ≠ 0
EVA has effect on CSV.

In the Sig column of Table 2, it can be observed that the amount of Sig statistic for EVA is 0.000. Given that the considered error level for this study is 5%, Sig < 0.05 and t statistic > 2, therefore the variable is significant and the first hypothesis of research is confirmed. Thus, EVA has a significant impact on CSV.

Statistical Results of Second Hypothesis: Second hypothesis: there is a significant relationship between the RI criterion and CSV.
The Pearson’s correlation coefficient and simple linear regression are used to test this hypothesis. The squared coefficient of correlation, $R^2$, or coefficient of determination, states that 0.516 of changes in the CSV can be determined by RI.

**Significance Test of Coefficients:**

$H_0: \beta = 0$

RI has no impact on CSV.

$H_1: \beta \neq 0$

RI has impact on CSV.

In Sig column in table 2, it could be observed that the amount of Sig of the t statistic for EVA is 0.000. Given that the considered error level for this research is 5%, $\text{Sig} < 0.05$ and $t$ statistic $> 2$, therefore the variable is significant and the second hypothesis of research is confirmed. Thus, RI has a significant effect on CSV.

**Statistical Results of Third Hypothesis:** Third hypothesis: the impact of the EVA criterion is more significant than the RI’s in calculating the CSV. In order to test this hypothesis, Pearson’s correlation coefficient and multivariate regression is used.

$H_0: r_1 = r_2 = 0$

the relationship between EVA and RI with CSV is not linear.

$H_1: r \neq 0$

at least one of the $r$’s is not zero (linear).

Based on the above tables it can be concluded that since the Sig amount for the general hypothesis (multivariable regression) is 0.000 and lower than 5%, $H_0$ is rejected and $H_1$ is accepted. Therefore, the significance of the regression model for the general hypothesis can be confirmed and the regression model is able to describe the changes in dependent variable (CSV) through independent variables (RI and EVA).

**Significance Test of Coefficients:**

$H_0: \beta_1 = \beta_2 = 0$

EVA and RI have no impact on CSV.

$H_1: \beta_1 \neq \beta_2 \neq 0$

EVA and RI have impact on CSV.

Given that the considered error level for this research is 5% and the values of Sig statistic $< 0.05$ and the $t$ statistic $> 2$, therefore the RI variable is significant in the model and based on this the third hypothesis is rejected. However, according to Sig $> 0.05$ for the EVA variable and $t < 2$, therefore it has no significant impact on CSV.

**Third Hypothesis Test using Forward Method:** To specify the impact and significance of most independent variables are investigated through Forward method. In this research, Forward method is used to examine the control variables.

The above Table indicates that the RI variable is the first variable inputted to model and the other variable (EVA) is not inputted to model, because by adding it to the model, $R^2$ is not changed sufficiently. The advantage of this method is that each variable with observed significance level of lower than 5% would not be inputted to the model. The other advantage is that it is possible to determine how much the coefficient of a variable changes by adding other independent variables.

**CONCLUSIONS**

The results indicate that the EVA and RI variables have significant relationship with CSV. Now it must be determined that which one is more effective. In this research it was expected (third hypothesis) that the relationship between EVA and CSV is more significant, but the results showed that RI is more effective on CSV. The applied Pearson’s correlation coefficient and multivariable regression as well as Forward method in determining the impact and significance of most independent variables (EVA and RI) on dependent variable (CSV) indicated that RI has more impact on CSV. This can be due to the fact that one of the most important components of EVA is net operating profit after tax (NOPAT). NOPAT is a net profit which is obtained through some adjustments and the only difference between RI with EVA is in accounting adjustments applied to EVA. Therefore, this model (RI) provides a situation for accountants to analyze the company’s performance in accrual accounting conditions. As shown, the correlation between RI and CSV is more than EVA.

It should be noted that companies did not report any created economic value. On the other hand, EVA is not reported by companies and is not used in investors’ decisions. However, considering the limitations of capital resources in Iran and given that the managers do not
consider the cost of capital in their decisions, it is recommended to pay more attention to the criterion of RI in evaluating managers’ performance.

**Suggestions for Future Studies:** In this research, the CSV model was used, and in using this model, the expected rate of return should be calculated. In doing so, the company’s cost of equity is used here, but as in the research carried out by Noravesh *et al.* (2004) the capital asset pricing model (CAPM) can be applied. It is suggested that this model (CAPM) can be used for future researches in calculating the expected rate, and the results can be compared with the results of present study.

- Several methods as well as models are defined for the RI model. It is suggested to look into this relationship using other models.
- In order to make this issue practical in different industries, this research can be tested separately for different industries and the results can be analyzed.

**REFERENCES**


