THE RELATIONSHIP OF EVA AND STOCK RETURNS: EMPIRICAL EVIDENCE FROM KSE

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ABSTRACT

This paper aims at investigating and finding empirical support of the relationship between Economic Value Added (EVA) and stock prices/returns in Pakistani firms. There have been studies conducted to empirically investigate the relationship of EVA with stock returns. However, there is lack of literature on the empirical relationship between EVA and stock returns in Pakistan. The study uses linear regression methods to test the hypothesis that EVA statistically significantly relates to stock prices/returns. The sample comprises of 16 companies of fuel and energy sector traded in the Karachi stock exchange over sample period 2001 to 2008. The findings of the study suggest that stock returns and stock prices are positively related with EVA. However, the relationship is stronger between stock prices and lag EVA as well as between stock returns and change in lag EVA.

I. INTRODUCTION

The use of the term ‘Economic Profit’ traces back to Hamilton (1777) and Marshall (1890). However, it was in the last decade of the twentieth century that the academic literature on corporate finance acquainted itself with economic value added (EVA) and market value added (MVA). These concepts got too much importance in academic and corporate world. Prior to the emergence of EVA and MVA Discounted Cash Flow-Net Present Value (DCF-NPV) method was used for company valuation. However, now EVA and MVA are used as an alternative to DCF-NPV. In addition both EVA and MVA are now standard tools to evaluate management performance, compensation and bonuses.

EVA is the tool used for measurement of economic profits earned by firms. EVA is normally defined as the net operating profit after tax (NOPAT) minus the cost of capital in dollars i.e. beginning book value of capital multiplied by WACC. EVA not only focuses on profits, rather it also portrays that how much capital will be necessary to generate such level of profits. According to Stewart (1990), EVA is a tool to assess how much value is created or destroyed in a firm. Another use of EVA is as a compensation management tool for managerial staff. It is the return in addition to what the investors require over the capital supplied.

When markets are in equilibrium current stock prices reflect all available information. Hence current stock prices should reflect information concerning expected future EVA. Therefore, we can investigate a short run relationship between stock returns and EVA. However, an understanding of the concept of market value added (MVA) allows us to establish a long run relationship between EVA and stock returns. A positive EVA indicates that value has been created while a negative EVA indicates that value has been destroyed. In other words when return on capital (ROC) is greater than cost of capital value is created. Otherwise when return on capital (ROC) is less than cost of capital value is destroyed.

Market value added is defined as the excess of market value of capital over book value of invested capital (Stewart, 1990). In contrast to EVA, MVA measures cumulative performance of management over a period of time i.e. whether value has been created or destroyed over a period of time. Mathematically it can be written as:

\[ MVA = TMVF - TBCF \] (1)

where TMVF is the total market value of a company, including market value equity and market value of debt. TBCF is the total book value of the capital employed, including the book value of equity and book value of debt. Therefore, we can re-write equation (1) can as:

\[ MVA = (MVE + MVD) - (BVE + BVD) \] (2)

In equation (2) MVE and BVE are the market and book value of equity, MVD and BVD are the market and book value of debt. We can simplify equation (2) further as:

\[ MVA = MVE - BVE \] (3)

Or

\[ MVE = BVE + MVA \] (4)

Based on the relationship in equation (3) it can be concluded that the present value of all future EVA is

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equal to MVA (Stewart, 1990). Mathematically this connection can be written as;

\[ MVA = \sum_{t=1}^{\infty} \frac{EVA}{(1+WACC)} \]  

(5)

where WACC denotes the weighted average cost of capital of the firm. By putting the value of MVA in equation number (4) we get;

\[ MVE = BVE + \sum_{t=1}^{\infty} \frac{EVA}{(1+WACC)} \]  

(6)

Equation (6) suggests the theoretical relation and impact of EVA on MVE and stock prices subsequently. Section II shows relevant literature, Section III presents the methodology, Section IV exhibits empirical results and discussions, Section V summarizes conclusions.

II. LITERATURE REVIEW

The relationship between EVA and stock returns has been investigated by many researchers in the past. Lehn & Makhija (1997) found significantly higher degree of correlation between EVA and stock returns as compared to other performance measurement indicators. Lefkowitz (1999) found that EVA was better measure of performance relative to other accounting measures for US companies. Medeiros (2005) reported similar findings.

Chen and Dodd (1997) investigated the hypothesis of usefulness of EVA as compared to other accounting earnings and found that the information content of EVA is greater than other performance measures. They further found that EVA and stock returns are significantly correlated. Bao and Bao (1998) studied the same hypothesis for US companies and found that explanatory power of EVA is higher as compared to other accounting performance measures. Another study by Worthington and West (2004) investigated the evidences regarding the information content of EVA. They found that relative to other accounting and cash flows measure EVA is more related with stock returns in the Australian market.

There are several studies that negate the hypothesis that EVA is better performance indicator and shares higher relationship with stock returns. Peterson and Peterson (1996) analyzed the relationship of stock returns with traditional and value added measures of performance. They found that value added measures are not more related to stock returns than traditional measures of performance. Biddle, Bowen and Wallace (1997, 1999) studied the relationship of stock returns with EVA, residual income and operating cash flow. However, they failed to report higher association between stock returns and EVA relative to other performance measures. Ismail (2006) found that net operating profit after taxes and net income are relatively more related with stock returns then EVA. According to Anastassios and Kyriazis (2007) the information content of operating income is relatively more valuable than EVA. Biddle (1999) argued that the main reason of EVA being a less effective measure of performance compared with other accounting measures is estimation error in calculation of WACC relative to what the market uses for valuation of the firm. Makelainen (1998) opined that the market values of companies are based on expected cash flows. Hence today’s stock prices and stock returns portray information regarding future cash flows and hence future expected EVA.

Since expected future EVA depends upon the past trends of EVA and similar is the case for stock prices. Stock prices are adjusted daily but the corresponding values of EVA are unknown and calculation of EVA depends upon available accounting figures published in financial statements that can be available after announcement of final accounts by companies. Hence we can expect that current market value of company should be related with present as well as past trends on EVA.

III. METHODOLOGY

The sample consists of 16 companies from fuel and energy sector of Karachi Stock Exchange for the period from 2001 to 2008. Stock prices were collected from the website of KSE and the daily "Business Recorder". Further data was extracted from the State Bank of Pakistan’s Publication “Balance Sheet Analysis of Joint Stock Companies”.

While investigating the relationship between EVA and stock returns most of the researchers have used the R-Square and Panel Date Regression Models to measure the relationship. In order investigate the relationship between the stock returns and EVA the following four linear regression models are used.

\[ \log P_{it} = \alpha + \beta EVA_{it} + \mu_{it} \]  

(7)

\[ \log P_{it} = \alpha + \beta EVA_{it-1} + \mu_{it} \]  

(8)

\[ \Delta \log P_{it} = \alpha + \beta \Delta EVA_{it} + \mu_{it} \]  

(9)

\[ \Delta \log P_{it} = \alpha + \beta \Delta EVA_{it-1} + \mu_{it} \]  

(10)

In above four econometric models, \( \log P_{it} \) is the log of price of the stock of firm \( i \) at time i.e. year \( t \), \( \Delta \) is the first difference operator i.e. \( \Delta \log P_{it} = log P_{it-1} - log P_{it} \), \( EVA_{it} \) is economic value added of firm \( i \) at time i.e. year \( t \), \( EVA_{it-1} \) is first lag of EVA for firm \( i \) time (t-1) year, \( \alpha \) and \( \beta \) represents the coefficient to be estimated, and \( \mu_{it} \) is the error term. The four stated models test the hypotheses that:

a. there exists no statistically significant relationship between stock prices & current year’s EVA.
Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Med</th>
<th>Min</th>
<th>Max</th>
<th>S.D</th>
<th>C.V</th>
<th>Skew.</th>
<th>Kurt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA_t</td>
<td>372.84</td>
<td>-23.52</td>
<td>-4518.92</td>
<td>9401.22</td>
<td>1519.52</td>
<td>4.08</td>
<td>1.74</td>
<td>10.15</td>
</tr>
<tr>
<td>LogP_t</td>
<td>3.69</td>
<td>3.83</td>
<td>-0.33</td>
<td>6.67</td>
<td>1.67</td>
<td>0.45</td>
<td>-0.20</td>
<td>-1.09</td>
</tr>
</tbody>
</table>

b. there exists no statistically significant relationship between stock prices & last year's EVA i.e. lag EVA.

c. there exists no statistically significant relationship between stock returns & the change in current years' EVA i.e. change in EVA.

d. there exists no statistically significant relationship between stock returns and change in the last years' EVA i.e. change in lag EVA.

The standard model for the calculation of EVA is given as:

\[ EVA = NOPAT - (TCE \times WACC) \]

where

\[ NOPAT = \text{net operating profit after taxes and} \]
\[ NOPAT = \text{Net Profit + Financial Charges - Taxes} \]
\[ TCE = \text{total capital employed = the sum of shareholders fund and loan funds.} \]

WACC is weighted average cost of capital of both shareholders funds as well as loan funds as per their respective percentages in capital structure; therefore its proper calculation is mandatory. The standard model for the calculation of WACC is as:

\[ WACC = W_d * k_d + W_e * k_e \]

Where

\[ W_d = \frac{MVofDebt}{MVofDebt + MVofEquity} \]

\[ k_d = \text{percentage of financial charges relative to total debt and is considered after tax cost of debt.} \]
\[ W_e = \frac{MVofEquity}{MVofEquity + MVofDebt} \]
\[ k_e = \frac{1}{(P \div E)\text{ratio}} \]

or \( ke = Rfr + \beta(MR - Rfr) \) which ever is greater. The second equation enables to over come the problem of negative P/E ratios too that makes estimation of the cost of equity impossible using the first method based on P/E ratio.

IV. EMPIRICAL RESULTS & DISCUSSIONS

Table 1 contains descriptive statistics of the variables under investigation. Table 2 reveals that there exists a statistically significant positive correlation between the log of stock prices (LogP) and EVA (in million dollars).

To empirically test the stated hypotheses of the study, equation (7) and equation (8) were first estimated using pooled ordinary least squares (OLS) method. The results are reported in Table 3.

The results suggests that current year's EVA is statistically significant at explaining the variations in the log of stock prices i.e. LogP. Same finding is reported in the case of the lag EVA. The R-square and adjusted R-square for both the models are the same. The F-values for both the models are statistically significant at 1%. However, even using robust standard errors the lower values of D.W test suggests the problem of positive serial-correlation exists in both of the estimated models. To overcome this problem, equation (7) and equation (8) were re-estimated using pooled weighted least squares (WLS) method. The results are reported in Table 4.

Table 2: Correlation

<table>
<thead>
<tr>
<th></th>
<th>EVA_t</th>
<th>LogP_t</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA_t</td>
<td>1.00</td>
<td>0.46***</td>
</tr>
<tr>
<td>LogP_t</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

*** Significant at 1%
Table 3: Pooled OLS, using 128 observations Included 16 cross-sectional units Dependent variable: LogP, Robust (HAC) standard errors

<table>
<thead>
<tr>
<th>Model</th>
<th>Coeff</th>
<th>S.E</th>
<th>t.stat</th>
<th>p-val</th>
<th>R.Sqr</th>
<th>A.R.Sqr</th>
<th>D.Ws</th>
<th>F-val</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eq. 7</td>
<td>const</td>
<td>3.50</td>
<td>0.35</td>
<td>10.15</td>
<td>0.00***</td>
<td>0.21</td>
<td>0.20</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>EVA</td>
<td>0.00</td>
<td>0.00</td>
<td>4.18</td>
<td>0.00***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq. 8</td>
<td>const</td>
<td>3.61</td>
<td>0.36</td>
<td>9.99</td>
<td>0.00***</td>
<td>0.21</td>
<td>0.20</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td>EVA</td>
<td>0.00</td>
<td>0.00</td>
<td>4.70</td>
<td>0.00***</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Durbin-Watson *** Significant at 1%

Table 4: WLS, using 112 observations Included 16 cross-sectional units Dependent variable: LogP, Weights based on per-unit error variances

<table>
<thead>
<tr>
<th>Model</th>
<th>Coeff.</th>
<th>S.E</th>
<th>t.stat</th>
<th>p-val</th>
<th>R.Sqr</th>
<th>A.R.Sqr</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eq.7</td>
<td>const</td>
<td>3.62</td>
<td>0.09</td>
<td>40.95</td>
<td>0.00***</td>
<td>0.36</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>EVA</td>
<td>0.00</td>
<td>0.00</td>
<td>8.48</td>
<td>0.00***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq.8</td>
<td>const</td>
<td>3.72</td>
<td>0.10</td>
<td>38.54</td>
<td>0.00***</td>
<td>0.43</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td>EVA</td>
<td>0.00</td>
<td>0.00</td>
<td>9.08</td>
<td>0.00***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** Significant at 1%

Table 5: Pooled OLS, using 112 observations Included 16 cross-sectional units Dependent variable: ΔLogP, Robust (HAC) standard errors

<table>
<thead>
<tr>
<th>Model</th>
<th>Coeff</th>
<th>S.E</th>
<th>t.stat</th>
<th>p-val</th>
<th>R.Sqr</th>
<th>A.R.Sqr</th>
<th>D.W</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eq.9</td>
<td>const</td>
<td>0.05</td>
<td>0.04</td>
<td>1.55</td>
<td>0.12</td>
<td>0.00</td>
<td>-0.01</td>
<td>1.60</td>
</tr>
<tr>
<td></td>
<td>ΔEVA</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.28</td>
<td>0.78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq.10</td>
<td>const</td>
<td>-0.06</td>
<td>0.04</td>
<td>-1.58</td>
<td>0.12</td>
<td>0.02</td>
<td>0.01</td>
<td>1.83</td>
</tr>
<tr>
<td></td>
<td>ΔEVA</td>
<td>0.00</td>
<td>0.00</td>
<td>2.04</td>
<td>0.04**</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Significant at 5%

Table 6: WLS, using 96 observations Included 16 cross-sectional units Dependent variable: ΔLogP, Weights based on per-unit error variances

<table>
<thead>
<tr>
<th>Model</th>
<th>Coeff.</th>
<th>S.E</th>
<th>t.stat</th>
<th>p-val</th>
<th>R.Sqr</th>
<th>A.R.Sqr</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eq.9</td>
<td>const</td>
<td>0.04</td>
<td>0.06</td>
<td>0.81</td>
<td>0.42</td>
<td>0.00</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>ΔEVA</td>
<td>0.00</td>
<td>0.00</td>
<td>-0.59</td>
<td>0.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eq.10</td>
<td>const</td>
<td>-0.09</td>
<td>0.05</td>
<td>-1.85</td>
<td>0.06*</td>
<td>0.09</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>ΔEVA</td>
<td>0.00</td>
<td>0.00</td>
<td>2.99</td>
<td>0.00***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant at 1%, **significant at 5%, ***significant at 10%

The results in Table 4 confirm the findings from Table 3. The results are free of the serial-correlation problem as the use of WLS takes care of it. The R-square and Adjusted R-square have also improved. Further the R-square and Adjusted R-square of the second model i.e. equation (8) which uses the lag of EVA as an explanatory variable is greater than the first model i.e. equation (9) which uses the current year EVA as an explanatory variable. The F-values for both the models are statistically significant at 1%. This leads to the rejection of the first and second hypotheses of the study (at 5% level of significance) and establishes that there exists a positive relationship between stock prices and EVA as well as between stock prices and the lag EVA.
In the second part of the analysis, equation (9) and equation (10) were estimated using pooled OLS method. The results are tabulated in Table 5.

The results in Table 5 indicate that both the current year’s change in EVA (ΔEVA) and the lag change in EVA positively relate to change in the log of prices i.e. stock returns (ΔLogP). It is only the lag of change in EVA i.e. ΔEVA, is statistically significant at explaining the variations in stock returns i.e. ΔLogP. The F-values of both the models, however, are statistically insignificant and suggests a poor model fit. The D.W test also suggests some problem of positive serial-correlation in both the estimated models. Subsequently both equation (9) and equation (10) were re-estimated using pooled WLS. The results of the pooled WLS method are reported in Table 6. Again the use of WLS method overcomes the problem of serial-correlation. The results in Table 6 suggest that stock returns ΔLogP are positively associated with the change in EVA (ΔEVA) and the lag of change in EVA (ΔEVA). However, it is only the lag of change in EVA (ΔEVA) that is statistically significant (at 1% level of significance) in explaining the variability in stock returns (ΔLogP). The R-square of the second model i.e. equation (10) is 9%. The F-value is also significant at 1% level of significance. Based on the findings from Table 5 and Table 6 the null hypothesis of no statistically significant relationship between stock returns and the change in EVA cannot be rejected (at 5% level of significance). However, the null hypothesis of no statistically significant relationship between stock returns and the change in lag EVA is rejected at 5% level of significance (see Tables 5 and 6).

Overall the findings suggest that EVA and stock prices are positively related. The results suggest a stronger relationship between current stock prices and lag EVA as well between stock returns and the change in lag EVA.

V. CONCLUSIONS

The study investigated the theoretical relationship of stock prices/returns and EVA empirically by analyzing 16 companies of fuel and energy over sample period 2001-2008. The study used standard OLS and WLS methods. The results from data analysis suggest that there exists statistically significant positive relationship between stock prices and EVA as well as stock prices and lag EVA. These findings lead to the rejection of first and second hypotheses of the study. However, the study fails to find statistically significant relationship between stock returns and the change in EVA. Contrary to this stock returns were found to be statistically significantly related to change in lag EVA. This suggests that the EVA this year leads stock prices and stock returns in the next year. After going through this long procedure, it is clear that basic purpose of this paper, which was to capture the relationship between EVA and stock returns, was fulfilled. The model having dependent variable is the stock return and the independent variable is the one-year lagged value of EVA; that is equation 8, results from this model are consistent with the hypothesis that stock returns are influenced by the past behavior of EVA. The model having dependent variable is the stock return and independent variable EVA; that is equation 7; results based on this model are consistent with our hypothesis; that there exists positive relationship between stock returns and EVA.

REFERENCES


