Capital Assets Pricing on KSE - Pakistan and Fundamental Values: An Analysis of FCF and EPS

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Abstract: Valuation of assets and prediction of stock returns has remained at the heart of financial literature which is evidenced from development of numerous asset pricing models based on macroeconomic variables and fundamental financial factors. Fundamental financial factors play dominant role in servicing investors in long run otherwise capital gains without support of earnings and cash flows are zero sum game. As in the long run only companies with positive earnings and cash flows can survive hence importance of fundamentals cannot be undermined. Impact of fundamentals on security pricing is well documented in the literature, however, evidence on KSE an emerging market is lacking. This study is conducted to test the impact of two fundamental financial factors i.e Free Cash Flows (FCF) and Earnings Per Share (EPS), depicted through financial reports, on security prices. Sample includes all nonfinancial firms listed in KSE-30 Index and covers 9 years period 2000-08. Valuation of securities done through discounting of cash flows and impact is calculated by regressing FCF and EPS with market price. Findings suggest that on KSE investors place EPS in higher ranks than FCF while pricing securities.

JEL Classifications: G11 · G12 · G32

Key words: KSE · Pakistan · Free Cash Flows · valuation · EPS · FCFE

INTRODUCTION

Valuation of assets and prediction of stock returns has remained at the heart of financial literature which is evidenced from development of numerous asset pricing models based on macroeconomic variables as well as fundamental financial factors. Assets pricing models can be classified objectively as fundamental and technical valuation models. Fundamental valuation models are those which take into account organizational performance reported through accounting numbers while assigning a value to the security. The major fundamental models include dividend discount model, abnormal earnings discount model, free cash flows discount model [1] and economic value added. On the other hand certain technical models (CAPM, APT and Multifactor Models) developed which are not directly using the fundamental business attributes rather focusing on relationship of security prices with other macro-economic factors.

Fundamental financial factors, by depicting performance of underlying firm, play dominant role in servicing investors in long run otherwise capital gains without support of earnings and cash flows are zero sum game. As in the long run only companies with positive earnings and cash flows can survive hence importance of fundamentals cannot be undermined. Impact of fundamentals on security pricing is well documented in the literature, however, evidence on KSE an emerging market is lacking. This study is conducted to test the impact of two fundamental financial factors (FCF and EPS), depicted through financial reports, on security pricing at KSE. Selection of these two microeconomic variables is justified as both are measures of performance of a firm in terms of cash flows and accounting income respectively. We want to document the magnitude of cumulative as well as individual impact on security pricing by each variable. To our knowledge it is the first study of its nature in local security market. Sample includes all nonfinancial firms listed in KSE-30 Index and covers 9 years period 2000-08. Valuation of securities (calculation of intrinsic value) done through discounting of free cash flows to equity on cost of equity and impact on security prices variation is calculated by regressing FCFE and EPS with market price.

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Findings are surprising to the authors as on KSE investors give relatively higher (62%) weightage to EPS and very low (9%) to FCFE in pricing the securities. It depicts that accounting income has gained more weight in the eyes of investors than free cash flows while making investment decisions, against the general perception of superiority of cash flows over the accounting income.

It could be due to any of the following reasons. First, during the study period cash flows of firms in sample were lacking patterns and huge variations existed, hence investors were unable to predict the expected cash flows. Second, irrational behavior of investors and noise traders leading to dominance of speculative activities in the market. Another aspect of these findings could be a higher degree of confidence of investors in financial reports and accounting profession in Pakistan. Our findings are in line with Francis [1] and against the results of studies conducted by Kaplan [2], Brown [3], Hackel [4], JokipiI [5]. Rest of the study proceeds as follow. Section two reviews literature followed by purpose and methodology in section three. Results are provided and discussed in section four while section five concludes.

**Literature Review:** The foremost cash flow discounting model of security pricing is the dividend discount model (DDM) which states that value of a security is the present value of expected dividends to investors discounted at risk adjusted rate of return. The focus of the model is upon cash distributed to equity holders. Empirical studies have documented that management smooth out dividend distribution prudently hence in the days of prosperity certain amount of earnings is retained and distributed in rainy days. Consequently, dividends cannot be accepted as depiction of true earnings capacity. Dividend discount model lacks two things in depiction of true value. First that dividend is not the total cash available to share holders as certain portion of earnings is retained. Second dividend is based on accounting profit which is not true representative of earning power due to number of reasons; including earnings manipulation by management, collection risk of cash from accounts receivables, historical cost principle of accounting leads to charging of depreciation on book value ignoring the market value of services used.

Free cash flows model came on surface in eighties [6-8] and [1]. Jensen [6] defines free cash flow as the excess amount of cash after funding all projects with positive NPV discounted at relevant cost of capital. Stowe [9] states free cash flow to the firm is amount of cash left over after meeting the operations and necessary investment in fixed assets and working capital to match the growth requirements. Underlying assumption is that any cash left over from operations and financing of fixed assets and working capital necessary to match the growth belongs to capital providers.

Dow Theory Forecasts [10] states “The ratio of share price to free cash flow per share ranks among the most effective stock-picking metrics since 1990 and the trend in free cash flow is among our favorite indicators of company operating momentum”

Empirical studies have proven the performance of free cash flow discounting model reliable. Kaplan [2] documented that discounted cash flow method provides reliable estimates of security value. In their study they found only 10% difference between (Median) value calculated through discounted cash flow and market value. Brown [3] recommends the free cash flow method for assessing the past and future earnings power of real property assets.

Arzak [11] concluded that FCF method should be avoided while valuing levered firm as it can lead to significant error. For valuation of securities free cash flows are also used in comparison of other valuation methods. Shriives [12] argues that free cash flows and Economic value added are same theoretically and found no difference at conceptual level. Francis [1] documented that abnormal earnings value estimates are more accurate than FCF estimates. In their study FCF estimates mean difference was (-31.5%) while for abnormal earnings it was (-20%). Apart from valuation free cash flows are also helpful in portfolio construction. Hackel [4] documented that an investment strategy based on free cash flows can consistently outperform market portfolio and other benchmarks. JokipiI [5] tested the free cash flow anomaly in Finnish institutional settings and documented that large-capitalization companies with positive free cash flows outperformed the market index during period of 1992-2006.

Free cash flows provide an opportunity to management to spend money for their personal gains ignoring the corporate objectives. Jensen [6] develop a theory known as free cash flow and agency cost argues that firms with free cash flows have to pay agency cost as managers invest in non profitable projects including diversified businesses to increase their control over resources and secure the jobs and rewards. As a remedial measure he suggested the introduction of debt and going private mitigates agency cost associated with free cash flows. Lehn [13] concluded with a larger sample of 263 firms going private covering eight years period from 1980-87, that a significant relationship exists in undistributed cash flows and decision to go private. These findings are in line with Jensen's cash flow theory. Mann [7] state that shareholders of firms with free cash flows fear that managers will misuse and invest in projects...
with -ve NPV. They further documented that bonding of cash flow through debt issue is helpful in creating a check on managers. Brush [14] concluded that “firms with free cash flow gain less from sales growth than firms without free cash flow”.

Chen [15] rejected the Jensen free cash flow theory and supported the investment opportunity hypothesis in assessing the stock market reaction to announcement of cross border Investment. They concluded that firms with favorable investment opportunities got positive response from market and vice versa. Chung [16] found positive relationship between FCF and discretionary accruals leading to earnings management in low growth companies on a larger sample of 22,576 company years. As a remedial action they suggested the quality audit and institutional investors.

Free cash flows are valuable tool to judge the management performance. These cannot be manipulated like accounting numbers. These are free from risk of default unlike accounting profits based on accruals. Free cash flows ensure the liquidity of underlying firm and depict the ability of firm to service capital providers. Valuation through free cash flows is much reliable than accounting profits. Dividend discount valuation is also free from number of issues relating to accounting profits however as whole profit is not distributed through dividends hence the model has inherent limitation to predict the partial value of equity. This limitation is removed through discounting of free cash flows as the model includes the total distributable cash to capital providers.

Purpose and Methodology: This study is an attempt to test the performance of free cash flow discounting model of equity valuation and to document the impact of free cash flows to equity (FCFE) and earnings per share (EPS) on stock prices in local institutional frame work. To our knowledge it is the first study of its nature in local security market. Earlier studies e.g. [17-20] on security valuation at KSE were conducted by applying technical valuation models based on macroeconomic factors.

Following Are the Research Questions to Be Précisé:

- Accounting income or free cash flows? Which of the two basic financial factors play dominant role in investment decisions?
- What is the magnitude of impact by fundamental financial factors [accounting income and cash flows] on security pricing collectively and individually at KSE?

Free cash flow method can be an ideal valuation method in countries like Pakistan where accounting and auditing profession is not much stronger in comparison with industrially advanced countries. Chances of earnings manipulation are very high through accruals management and transactions structuring as the corporate governance institutions are weaker.

For this study we used the following free cash flow discounting model adopted from Stowe [9].

\[ Firm\ Value = \sum_{s=1}^{\infty} \frac{FCFE_s(1+g)}{(Ke-g)} \]  \hspace{1cm} (1)

\[ FCFE = NI + NC + I + CE + \Delta WC + \Delta LTD \]  \hspace{1cm} (2)

Where by:

- FCFE = Free cash flow to the equity
- Ke = Cost of equity
- G = Growth component
- NI = Net income to common equity holders
- NC = Non cash expenses booked in income statement
- I = Interest expenses \times (1-tax rate)
- CE = Investment in capital expenditures and
- \Delta WC = Investment in working capital required
- \Delta LTD = Increase/ decrease in long term debts

\[ Ke = \frac{EPS}{MPS} \]  \hspace{1cm} (3)

EPS is Earnings per Share and MPS is Market Price per Share: This study is conducted on historical data covering period from 2000 to 2008 nine years. Earlier data is not available at our convenience. Sample size includes all nonfinancial firms listed in KSE-30 index a representative of the market. As at June 17, 2010, KSE-30 covers 17% of market, with a value of Rs; 454,838 billion. Data for fundamentals is used from balance sheet analysis prepared by state bank of Pakistan and historical prices from KSE website for the period under review.
We have used the five years average of cost of capital (KE) as discounting factor. After calculation of FCFE as per equation 2, we discounted cash flows for nine years (2000-08) and calculated equity value as at January 1, 2000. Once the value of the total equity is determined, Value per share is calculated by dividing upon number of shares outstanding. After calculation of intrinsic value a comparison is made with the market price to conclude about the performance of model.

We conducted three regression tests. First between FCFE and market price. Second regression test was administered between EPS and market price. Third regression test was conducted among FCFE, EPS (independent variables) and market price (dependent variable) to document the combined effect of these fundamentals on market price.

To quantify the magnitude of impact on market price created by FCFE following equation was tested.

$$MPS = \beta_0 + \beta_1 (FCFE) + \epsilon$$  \hspace{1cm} (4)

To determine the variation in prices generated by EPS following regression equation was tested.

$$MPS = \beta_0 + \beta_1 (EPS) + \epsilon$$  \hspace{1cm} (5)

To document the combined impact of FCFE and EPS following regression model was tested.

$$MPS = \beta_0 + \beta_1 (FCFE) + \beta_2 (EPS) + \epsilon$$  \hspace{1cm} (6)

Free Cash flows have at least three advantages over other valuation models; first the method talks about the cash which is real concern of investors. Second, the method account for investment required in working capital and fixed assets. Third, unlike earnings cash flows cannot be managed. Empirical studies e.g. [21-27] and [8] documented that managers have succeeded in managing the earnings and concealing the true financial position in spite of all safeguards in the form of conventional accounting standards, principles and conventions. Empirical studies have also documented that cash flows contain incremental information over earnings to explain variation in stock returns (Livnat, Ali, Kallunki, as cited in [5]).

RESULTS AND DISCUSSION

Descriptive statistics of FCFEs are displayed in Table 1. Average capital expenditures are more than depreciation depicting arrangements for growth in firms under considerations. Positive figure of working capital changes also support the hypothesis of growth in firms under review. Range between net income figure is Rs. 64,253 million although very high however range between FCFE is Rs. 102,257 million displays more variation in comparison with net income.

During research process it is found that valuation through discounting of FCFE could not be achieved as no pattern of cash flows exist in majority of sample companies. Table 2 depicts results of each company in sample. Ke is the simple average of five years (2000-05) calculated through EPS/MP. Average annual growth is calculated for nine years (2000-08). Market price is of January 2000. To apply discounting free cash flow technique with constant growth, in calculation of value per share, certain features are needed to be fulfilled. First, the latest available figure of cash flows (FCFE) should be positive. In two cases we find the free cash flow figure negative as at December 2008. Second, growth figures should meet two criteria’s including (1) should be positive and (2) should be less than Ke. In this study we found negative growth in 5 cases and growth in excess of Ke in 13 cases. So, not a single company meets the requirements of free cash flows. Column four shows the discounted value of free cash flows for nine years (2000-09) and fifth shows Market price in January 2000. Interestingly we find 5 cases where DCF value (of only nine years) is higher than Market price showing the irrelevance of free cash flows for investors. The difference in DCF value (for nine years only) and market price is ranging from (-8% to -872%) and from (17% to 704%). These findings suggest extreme inconsistencies in generation of free cash flows by firms. Perhaps due to this reason investors are not giving higher weightage to FCFE while making pricing decision as depicted in regression.

Regression results are presented in Table 3. As per Table 3 impact of cash flows on price is only 9% while of EPS is 62% much better than FCFE. It shows investors are basing their decisions on EPS and ignoring FCFE. Value of $R^2$ is also very low (0.09) with FCFE and significant (0.62) with EPS.

In case of EPS value of intercept [57.62] is relatively low and value of standard error [106.4] is also relatively low while coefficient of EPS [4.3] is positive, hence $[Y \sim a \pm bx \pm \epsilon]$ $[Y \sim 57.62+4.3x+106.4]$ better prediction power in comparison of FCFE. In case of $F$ statistics value under FCFE is negative hence absolutely insignificant. While value of $T$ statistics (9.4) under EPS is much better than mark [2], hence significant. P value is also very high [28] in case of FCFE while very low with [0.0000000000000061] EPS confirming reliability of results. Results of multiple regressions are not much different from EPS and

Table 1: Descriptive statistics (Rs in millions)

<table>
<thead>
<tr>
<th>Description</th>
<th>Net income</th>
<th>C. Exps</th>
<th>Depreciation</th>
<th>LTD</th>
<th>W. Capital</th>
<th>FCFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean value</td>
<td>4161</td>
<td>924</td>
<td>812</td>
<td>70</td>
<td>952</td>
<td>4144</td>
</tr>
<tr>
<td>H. value</td>
<td>57268*</td>
<td>20213</td>
<td>5955</td>
<td>13623</td>
<td>45622</td>
<td>89633*</td>
</tr>
<tr>
<td>L. value</td>
<td>(6985)</td>
<td>(29970)</td>
<td>0</td>
<td>(9880)</td>
<td>(10922)</td>
<td>(12624)</td>
</tr>
</tbody>
</table>

*significant

Table 2: Results of all Companies (Growth in FCF, Ke, DCF Value per share, Market price per share)

<table>
<thead>
<tr>
<th>Company</th>
<th>Compound Growth</th>
<th>Ke</th>
<th>DCF Value</th>
<th>Mps</th>
<th>Difference</th>
<th>% Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.G.K. Cement</td>
<td>-1.502</td>
<td>0.000***</td>
<td>-47.5</td>
<td>6.15</td>
<td>-53.64</td>
<td>872%</td>
</tr>
<tr>
<td>Engro Chemical</td>
<td>1.463</td>
<td>0.12</td>
<td>52.8</td>
<td>127</td>
<td>-74.16</td>
<td>58%</td>
</tr>
<tr>
<td>Fauji Fertilizer XD</td>
<td>2.326</td>
<td>0.000****</td>
<td>106.9</td>
<td>13.3</td>
<td>93.66</td>
<td>704%</td>
</tr>
<tr>
<td>Pak Petroleum Ltd.</td>
<td>0.765</td>
<td>0.130****</td>
<td>94.9**</td>
<td>144.***</td>
<td>-49.11</td>
<td>34%</td>
</tr>
<tr>
<td>Oil and Gas Deve. XD</td>
<td>8.313</td>
<td>0.120****</td>
<td>341.1*</td>
<td>52.0*</td>
<td>-17.85</td>
<td>34%</td>
</tr>
<tr>
<td>Hub Power Co.</td>
<td>-0.352</td>
<td>0.15</td>
<td>18.2</td>
<td>21.9</td>
<td>-3.702</td>
<td>17%</td>
</tr>
<tr>
<td>Attock Refinery Ltd.</td>
<td>7.867</td>
<td>0.130****</td>
<td>176.6</td>
<td>46.3</td>
<td>130.3</td>
<td>281%</td>
</tr>
<tr>
<td>Lucky Cement</td>
<td>2.035</td>
<td>0.1</td>
<td>28.07</td>
<td>6.6</td>
<td>21.47</td>
<td>525%</td>
</tr>
<tr>
<td>Pak Giffelds Ltd.</td>
<td>0.929</td>
<td>0.182</td>
<td>200.5</td>
<td>234.5</td>
<td>-33.95</td>
<td>14%</td>
</tr>
<tr>
<td>Nissh Mills Ltd.</td>
<td>-0.56</td>
<td>0.13</td>
<td>-3.8</td>
<td>27.7</td>
<td>-31.5</td>
<td>114%</td>
</tr>
<tr>
<td>Fauji Fertilizer XD</td>
<td>0.504</td>
<td>0.17</td>
<td>62.4</td>
<td>53.2</td>
<td>9.223</td>
<td>17%</td>
</tr>
<tr>
<td>P.S.O.</td>
<td>0.469</td>
<td>0.11</td>
<td>125.4</td>
<td>211.4</td>
<td>-86.03</td>
<td>41%</td>
</tr>
<tr>
<td>Kot Addu Power</td>
<td>-0.055</td>
<td>0.18</td>
<td>9.23**</td>
<td>52.8**</td>
<td>-43.56</td>
<td>83%</td>
</tr>
<tr>
<td>Attock Petroleum</td>
<td>0.097</td>
<td>0.140****</td>
<td>109.2</td>
<td>214</td>
<td>-104.78</td>
<td>49%</td>
</tr>
<tr>
<td>National Refinery</td>
<td>0.890</td>
<td>0.160****</td>
<td>119.8</td>
<td>38.9</td>
<td>80.92</td>
<td>208%</td>
</tr>
<tr>
<td>ICI Pakistan</td>
<td>1.379</td>
<td>0.118</td>
<td>27.9</td>
<td>10.5</td>
<td>-7.7</td>
<td>73%</td>
</tr>
<tr>
<td>Shell Pakistan</td>
<td>-0.552</td>
<td>0.15</td>
<td>132.3</td>
<td>62</td>
<td>-137.6</td>
<td>51%</td>
</tr>
<tr>
<td>Packages Limited</td>
<td>1.533</td>
<td>0.15</td>
<td>56.5</td>
<td>62</td>
<td>-5.46</td>
<td>9%</td>
</tr>
</tbody>
</table>

* Comparison for 2004 values; ** Comparison for 2005 values; *** Three years' average; **** Four years average

Table 3: Summary of Results of regression

<table>
<thead>
<tr>
<th>Description</th>
<th>FCFE Vs. Price</th>
<th>EPS Vs. Price</th>
<th>Multiple Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R²</td>
<td>0.001211</td>
<td>0.381583</td>
<td>0.379065</td>
</tr>
<tr>
<td>R²</td>
<td>0.99107</td>
<td>0.62126*</td>
<td>0.62279*</td>
</tr>
<tr>
<td>Multiple R</td>
<td>0.00829</td>
<td>0.38596*</td>
<td>0.38787*</td>
</tr>
<tr>
<td>Intercept</td>
<td>137.399</td>
<td>57.6207</td>
<td>60.3070</td>
</tr>
<tr>
<td>standard error</td>
<td>135.2287</td>
<td>106.4077</td>
<td>106.6242</td>
</tr>
<tr>
<td>F value</td>
<td>1.17106</td>
<td>88.0013</td>
<td>44.6385</td>
</tr>
<tr>
<td>F statistics</td>
<td>-1.0821*</td>
<td>9.38990*</td>
<td>[-0.65][9.284]*</td>
</tr>
<tr>
<td>P value</td>
<td>0.28104</td>
<td>0.000000</td>
<td>[0.52][0.000000]</td>
</tr>
</tbody>
</table>

* Significant at 5% confidence.

Table 4: Correlation Matrix (Independent Variables)

<table>
<thead>
<tr>
<th>Description</th>
<th>FCFE</th>
<th>EPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCFE</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>EPS</td>
<td>-0.076</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Further Table 4 shows correlation matrix between independent variables around 8% negative negligible relationship, hence evidence favoring the strong relationship between EPS and price while weaker between FCFE and price.

CONCLUSION

Theoretically free cash flows discounting technique is very much appealing as it is free from many accounting manipulations however practically results of the sample companies lacking persistance unlike earnings which are consistent during study period. Inconsistency in cash flows is according to expectations as rate of capital expenditures is not consistent and firms make decisions of capital expenditures according to market demand of products. Further more in certain periods firms have to invest more (e.g. to expand or replace an asset) hence consistent growth or even maintenance of free cash flows like earnings cannot be achieved. While free cash flows consistency is not achievable then how to calculate discounted value of expected cash flows and assist investors in security pricing.

Results of the study show that on KSE investors are giving negligible weight to free cash flows to equity (FCFE) while making investment decisions. FCFE explains only 9% variation in stock prices with an insignificant T statistics. These findings would be surprising to many including these authors. Following could be possible reasons. First indiscipline in cash management and extreme inconsistency in generation of free cash flows of
corporations as found during research process (i.e. lack of cash flow patterns and inability to even calculate useful compound growth). Second irrational behavior of investors and presence of noise traders, leading to higher rate of speculative transactions at KSE. Earnings per share (EPS) displayed a strong positive relationship (62%) with market prices for the sample period under review. Market rates EPS higher than FCFE surprisingly keeping in view the literature on accounts manipulation. Although earnings can be manipulated and economic reality of firm can be distorted, which is not the case with cash flows, still investors’ confidence in EPS shows higher degree of reliability on accounting and auditing profession in Pakistan. Future research area includes valuation through cash flows with a larger sample and longer duration. Also need to test the valuation through FCFE, dividend discount model and residual income to determine the role of fundamentals in asset pricing on KSE.

REFERENCES


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