

## Size, P/E Ratio and Equity Stock Returns in Pakistan

Aima Razzaq

Faculty of Management sciences, Islamia University of Bahawalpur, sub Campus Bahawalnagar

Mahawish Rehman

Department of Management sciences, PHD Scholar, Mohammad Ali Jinnah University Islamabad

Abdul Qadeer

Faculty of Management Sciences, University of Central Punjab, Lahore

Asif Razzaq

Department of Economics, University of Sargodha

### Abstract

This study examine the impact of size and price earning ratio on equity returns by using Fama and French (1992, 1993). Results demonstrate that market premium exist in Pakistani equity market and size factor found positive related to portfolio returns. Size premium does not explain the big portfolios returns. In the period of 2002 to 2011 and 2007 to 2011 HML better explains the low price earning stocks and price earning is a negative proxy for book to market. In addition this study also confirms that Fama and French three factor model is a better approach to explain the returns in Pakistani equity market.

**JEL Classification Number:** G11, G12, C52

**Keywords:** CAPM, APT, Fama and French Three Factor, Equity Market

### Introduction

Today's finance is purely based on seven interdependent theories i.e. Utility Theory, State Preference Theory, Mean-Variance Theory, Capital Market Theory, Arbitrage Pricing Theory, Option Pricing Theory and Miller and Modigliani Theory that keep and transmit significant results about different circumstances. Utility theory provides the platform for resource allocation in the prevailing situation of risky alternatives. State Preference Theory, Mean-Variance Theory, Capital Market Theory, Arbitrage Pricing Theory, Option Pricing Theory centralized the basic concept of objects of choices. Whereas Miller and Modigliani study the effect that method of financing has on the value of a firm. The combination of theory of choice with object of choice, it generate the way of valuation of risky securities. There are number of theories of asset pricing i.e. Sharpe (1964), Linter (1965), Black (1972), Intertemporal Models of Merton (1973), Rubinstein (1976) Cox (1985) and Arbitrage Pricing Theory of Ross (1976). But capital asset pricing model is the dominating model studied in the literature. The historical foundation is the publication of Markowitz articles on Portfolio Selection in 1952 whereas Markowitz's model of portfolio choice (1958) positioned the foundations of CAPM. Since the inception of CAPM by Sharpe (1964), Linter (1965) and Mossin (1966), many anomalies have been identified in CAPM. Basu (1977, 1983) finds high earning-to-price (E/P) ratio companies outperform low earning-to-price (E/P) ratio companies. Banz (1981) finds small stocks outperform large stocks. Stattman (1980), Rosenberg et al (1985) find that companies with high book-to-market value (B/M) outperform companies with low book-to-market value (B/M). Jacobs and Levy (1988) report that high cash-to-price (CF/P) ratio companies outperform low cash-to-price (CF/P) ratio companies. Jagadeesh and Titman (1993, 2001) report that stocks with high returns in the past (the winners) outperform the stocks with low returns (the losers) over a 12 month period. Many researchers have documented the relationship between these factors and stock returns. One of the important determinants is the price earning ratio. For the Pakistani context, this study is aimed to investigate the impact of size and price earning ratio on "stock returns of all non financial sector" listed at Karachi Stock exchange. The objectives of the study was to investigate the role of Fama and French three factor model explains the Pakistani equity market returns to investigate the impact of market premium on equity stock returns, to examine the impact of size premium on equity stock returns, to examine the impact of price earning premium on equity stock returns and to test a model of asset pricing for Pakistan on the basis of size and price earning ratio. As there is a voluminous literature on the topic size, price to earning ratio and stock returns. Equity market of Pakistan is emerging market and there is not too much literature in the context of Pakistan for different periods to find out the consistency outcome as identified by other countries literature. The scope of this study is focused to determine the effects of size and price earning ratio on the performance of stock returns. Moreover this study will help in explaining the role of size and price earning ratio in pricing stock in Pakistani equity market. This study is an effort to help investors to understand the role of price earning ratio in pricing stock. It is aimed that this study is also important theoretically because it uses the price earning premium to see its effect in Pakistani equity market.

## Literature Review

In previous work, huge literature found for testing CAPM, APT and Fama French Three Factor Model in different markets for different time span. Basu (1977) explored that low P/E ratio securities lead to high risk-adjusted market returns. Stattman (1980) and Rosenberg et al. (1985) found that book to market explains the returns of stocks. Banz (1981) examined the association among the returns and market by using asset pricing model. Results confirm that small firms have large returns in contrast to big firms. In market value the effect of size is not linear the main effects arise for the small firms and there is very little difference is found among the returns of small and large firms. Basu (1983) extended the research and analyzed the relationship between the earning's yield, size and returns on securities of NYSE firms and confirmed that P/E ratio is useful technique in the clarification of the returns although P/E is not completely independent of size and beta. Chan et al., (1991) investigated the differences in cross sectional returns by undertaking BTM ratio, size, earnings and cash flow yield by using SUR model, Fama and Macbeth (1973) methodology and other statistical methods. Results concluded that earning price ratio has affirmative and noteworthy impact on the stock returns. Fama and French (1992) examined the role of size, BTM equity and E/P ratios in the determination of stock returns. Average stock returns were used as a dependent variable and size, book to market ratio, leverage and price earnings ratios were used as a determinant of average returns by constructing portfolio on the basis of size, book to market ratio and earning price. Results reveal that size and BTM confine the variations in stock returns along with the leverage and E/P. Moreover the size effect was found less powerful as compared to book to market ratio. Positive relationship was found between BTM ratio and stock returns. In addition the E/P is also capable of enlighten the deviation in stock returns. Fama and French (1993) examined the three risk factors related to stocks and two with bonds. The risk factors associated with stocks were size, BTM equity and market factor. Bonds market related risk factors were default premium and term premium. Result shows that three stock related factors explain the volatility and variations in stock returns. Portfolios that have positive E/P have high returns and vice versa. Moreover, they concluded that highest E/P portfolios has an HML same of that highest BTM equity. Fama and French (1995) examined that either stock prices depicts the behavior of earnings in association with size and BTM equity. Portfolios were formed and all portfolios sorted on the basis of size and book to market equity. Time series regression approach was used for the analysis. Results confirmed that firms with high BTM equity have low ratios of earnings and vice versa. Barber and Lyon (1997) studied the relationship of size, book to market ratio and stock returns. Finding shows that firms of small size exhibit high returns where as the big firms show the low returns. In addition stocks of high book to market equity show that returns are higher for these stocks and vice versa. Fama and French (1998) studied the relationship between value stocks and growth stocks. Results demonstrate that there is the better performance of growth stocks in all markets during the studied period. There is also a value premium and this value premium is similar when sorted on BTM, earning price, C/P and D/P. On the contrary to Fama and French (1993) and Daniel and Titman (1997) time series regression approach was used for analysis. The results of the study demonstrate that BTM predicts the time variation in expected returns economically and significantly. Further they explained that BTM strongly relate with the changes in risk. Chui and Wei (1998) investigated the linkage of stock returns, market beta, BTM equity, and size by using Fama and Macbeth (1973) model. They found that there exist the weak association amid returns and market beta. Also found that BTM equity can explain the cross-sectional variation of expected stock returns and moreover January effect found and BTM premium is significant in this month. Lewellen (1999) investigated the connection between expected return, risk and BTM ratio. Aleati et al., (2000) analyzed the association between risk and returns. Factor analysis and time series regression approach was used and results reveal that size and value premium features are doable for shaping the asset returns for Italian stocks. In addition to SMB and HML they also predict some other factors are also important in determining the asset returns. Faff (2001) examined the three factor model. The main findings indicate that risk premia for the market and for the BTM aspect found to be positive significantly and size risk premium found significantly negative. Drew, Naughton, Veeraraghavan (2003) studied the size and value premium exists in the China. The results challenged the findings of Fama and French (1996) and found that mean-variance efficient investors can select some combination of small and low book to market equity firms in China and market portfolio generate superior risk adjusted returns. No Evidence was found in support of seasonal effects. Gaunt (2004) investigated the size, BTM ratio and found consistent findings with Fama and French (1993) that significant positive relationship between size, BTM ratio and companies with small size and low BTM ratio have greater risk, but the size effect is smaller as compared to book to market ratio effect. Ong, Yichen and Teh (2010) explored the capability of price earning ratio on the prediction of future stock performance. Results reject the second hypothesis of the study that high price earning ratio will lead to future stock declines. Another study that conducted by Hassan and Javaid (2011), in Pakistani equity market and this study investigated the asset pricing mechanism for the period 1998-2007 by using the monthly prices. To explore the effect of size and value premium, Fama and French three facto model was tested. Value premium is found significantly related to all portfolios except low BTM stocks. Results of the study show that market premium effect is present in Pakistani equity markets. Stocks having high BTM ratio perform better

than low BTM stocks. Size premium is found significantly related to small portfolio returns but it is found insignificant for portfolios of big stocks. Zeytinoglu, Akarim and Çelik (2012) tested the impact of market based ratio on the stock returns by using EPS, P/E and BTM ratio as a substitute of the market based ratio. Results found that market based ratios have explanatory power on both the changes of the returns of current stocks as well as one period ahead stock returns. These ratios explain 6% change in current stock returns and 63% change in one period ahead stock returns. The findings of their study are important for investors to obtain abnormal returns in financial markets.

### Data and Methodology

This study includes non financial sector of KSE for the period of December 2002 to December 2011. Twelve-Month Treasury bill used as a proxy for risk free rate. The month ended closing prices were collected from business recorder, State Bank of Pakistan and Karachi Stock Exchange. Companies were selected on the bases of positive earning price ratio. Market risk premium, size factor (SMB) and value factor (HML) was taken as independent variable. The weighted average stock return is used as dependent variable. Companies were excluded that have negative price earning ratio and portfolio sorted on the basis of size then subdivided into the ratio of 30,30 and 40. Size sorted portfolios are named as Small (S), medium (M) and big (B) portfolios. Size sorted portfolios are further divided into three parts on the basis of price to earning ratio. These are subdivided in the same ratio of 30, 30 and 40. These portfolios are named as S/H, S/M, S/L and B/H, B/M, B/L. Variable size premium is constructed as size equal to market price per share multiplied by number of outstanding shares. Size premium is calculated as:

$$SMB = 1/6 \{ (SHPE - BHPE) + (SMPE - BMPE) + (SLPE - BLPE) \}$$

Whereas SMB is small minus big, SHPE is small but high price earning ratio, SMPE is small but medium price earning ratio, SLPE is small but low price earning ratio, BHPE is big but high price earning ratio, BMPE is big but medium price earning ratio and BLPE is big but low price earning ratio. P/E ratio is defined as market price per share divided by earning of per share. Value premium is calculated as

$$HML = 1/4 \{ (SHPE - SLPE) + (BHPE - BLPE) \}$$

Whereas HML is used as a proxy for relative distress and is the difference between the high price earning stocks and low price earning stocks. Returns was calculated as  $R_m = \ln(P_t / P_{t-1})$  whereas  $\ln$  stands for natural log,  $P_t$  is Closing value of share on Month 't' and  $P_{t-1}$  is closing value of share on Month 't-1'. Fama and French three factor model (1992) and Fama and Macbeth (1973) one pass regression was used for data analysis.

$$R_p - R_{ft} = \alpha + \beta_1 (\text{Market premium}) + \beta_2 (\text{Size Premium}) + \beta_3 (\text{Value Premium}) + \varepsilon_{it}$$

$$R_p - R_{ft} = \alpha + \beta_1 (R_m - R_f) + \beta_2 SMB + \beta_3 HML + \varepsilon_{it}$$

Whereas  $R_m$  is zero risk return,  $R_m - R_f$  is market premium, SMB is size premium, HML is value premium and  $\varepsilon_{it}$  stands for epsilon term. Dependent variables are  $R_p$  stands for overall portfolio, S stands for portfolio of small size, M stands for portfolio of medium size, B stands for portfolio of big size, S/H stands for portfolio of small size but high price earning ratio, S/M stands for portfolio of small size but medium price earning, S/L stands for Portfolio of small size but low price earning, B/H stands for portfolio of big size but high price earning, B/M stands for portfolio of big size but medium price earning and B/L stands for portfolio of big size but low price earning. Following equations were examined.

$$R_p - R_{ft} = \alpha + \beta_1 MKT + \varepsilon_{it} \quad (\text{Eq. 01})$$

$$R_{PS} - R_{ft} = \alpha + \beta_1 MKT + \varepsilon_{it} \quad (\text{Eq. 02})$$

$$R_{PM} - R_{ft} = \alpha + \beta_1 MKT + \varepsilon_{it} \quad (\text{Eq. 03})$$

$$R_{PB} - R_{ft} = \alpha + \beta_1 MKT + \varepsilon_{it} \quad (\text{Eq. 04})$$

$$R_{PS/H} - R_{ft} = \alpha + \beta_1 MKT + \varepsilon_{it} \quad (\text{Eq. 05})$$

$$R_{PS/M} - R_{ft} = \alpha + \beta_1 MKT + \varepsilon_{it} \quad (\text{Eq. 06})$$

$$R_{PS/L} - R_{ft} = \alpha + \beta_1 MKT + \varepsilon_{it} \quad (\text{Eq. 07})$$

$$R_{PB/H} - R_{ft} = \alpha + \beta_1 MKT + \varepsilon_{it} \quad (\text{Eq. 08})$$

$$R_{PB/M} - R_{ft} = \alpha + \beta_1 MKT + \varepsilon_{it} \quad (\text{Eq. 09})$$

$$R_{PB/L} - R_{ft} = \alpha + \beta_1 MKT + \varepsilon_{it} \quad (\text{Eq. 10})$$

$$R_p - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \varepsilon_{it} \quad (\text{Eq. 11})$$

$$R_{PS} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \varepsilon_{it} \quad (\text{Eq. 12})$$

$$R_{PM} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \varepsilon_{it} \quad (\text{Eq. 13})$$

$$R_{PB} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \varepsilon_{it} \quad (\text{Eq. 14})$$

$$R_{PS/H} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \varepsilon_{it} \quad (\text{Eq. 15})$$

$$R_{PS/M} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \varepsilon_{it} \quad (\text{Eq. 16})$$

$$R_{PS/L} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \varepsilon_{it} \quad (\text{Eq. 17})$$

$$R_{PB/H} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \varepsilon_{it} \quad (\text{Eq. 18})$$

$$R_{PB/M} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \varepsilon_{it} \quad (\text{Eq. 19})$$

$$R_{PB/L} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \varepsilon_{it} \quad (\text{Eq. 20})$$

$$R_p - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (\text{Eq. 21})$$

$$R_{PS} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (\text{Eq. 22})$$

$$R_{PM} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (\text{Eq. 23})$$

$$R_{PB} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (\text{Eq. 24})$$

$$R_{PS/H} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (\text{Eq. 25})$$

$$R_{PS/M} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (\text{Eq. 26})$$

$$R_{PS/L} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (\text{Eq. 27})$$

$$R_{PB/H} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (\text{Eq. 28})$$

$$R_{PB/M} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (\text{Eq. 29})$$

$$R_{PB/L} - R_{ft} = \alpha + \beta_1 MKT + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (\text{Eq. 30})$$

### Results and Findings

As shown in Table 1, results shows small size portfolios (S) have low returns and big size portfolios (B) have high returns. Moreover the returns of the portfolios having high price earning (S/H and B/H) ratio depicts more returns and portfolios having low price earning (S/L and B/L) ratio show the low returns. Maximum return for B/H earned was 0.349 and minimum loss was is 0.351 for the period 2002 to 2011. All portfolios are negatively skewed except RPM. All portfolios have platykurtic behavior as the values are less than 3.0.

**Table 1: Descriptive Statistics (For 2002 to 2011)**

	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP
	...	S	M	B	S/H	S/M	S/L	B/H	B/M	B/L
Mean	0.006	0.003	0.004	0.008	0.004	0.005	-0.001	0.013	0.011	0.005
S.E	0.005	0.006	0.005	0.006	0.008	0.006	0.006	0.009	0.007	0.006
Median	0.006	0.002	0.001	0.010	0.002	0.003	-0.005	0.015	0.013	-0.003
S.D	0.056	0.062	0.056	0.071	0.084	0.066	0.064	0.098	0.075	0.064
Kurtosis	-0.100	1.375	-0.149	0.297	1.474	1.350	1.663	2.128	1.336	-0.158
Skewness	-0.090	-0.321	0.032	-0.374	-0.211	-0.147	-0.005	-0.290	-0.208	-0.029
Minimum	-0.138	-0.211	-0.131	-0.221	-0.292	-0.209	-0.239	-0.351	-0.226	-0.140
Maximum	0.126	0.162	0.131	0.191	0.213	0.191	0.196	0.349	0.252	0.178

As shown in Table 2, return for overall portfolio (RP) is 0.019 whereas small size portfolios (S) have low returns, big size portfolio (B) has large returns, high price earning ratio (S/H and B/H)

**Table 2: Descriptive Statistics (For 2002-2006)**

	RP	S	M	B	S/H	S/M	S/L	B/H	B/M	B/L
Mean	0.019	0.015	0.02	0.022	0.02	0.015	0.009	0.027	0.022	0.016
Median	0.019	0.011	0.012	0.033	0.012	0.01	0.001	0.029	0.033	0.018
S.D	0.058	0.063	0.055	0.069	0.08	0.067	0.063	0.087	0.063	0.07
Kurtosis	-0.549	0.407	-0.547	-0.578	0.44	0.729	0.478	-0.3	-0.259	-0.387
Skewness	-0.048	0.018	0.139	-0.06	0.055	-0.004	0.618	0.063	-0.059	-0.066
Minimum	-0.107	-0.152	-0.089	-0.125	-0.174	-0.157	-0.104	-0.17	-0.124	-0.137
Maximum	0.126	0.162	0.131	0.191	0.186	0.191	0.196	0.234	0.172	0.178

depicts more returns and portfolios of low price earning (S/L and B/L) ratio show the low returns with risk of 0.058 for the overall portfolio (RP), 0.063 for small size portfolios (S), 0.069 for big sized (B) and 0.08, 0.087, 0.063, 0.07 for S/H, B/H, S/L and B/L respectively. Maximum return was 0.234 for high price earning (B/H) portfolio and minimum loss incurred during the period was -0.174 for small size and high price earning (S/H) portfolio. Returns for small size portfolios (S), medium sized portfolio (M), high price earning portfolios (S/H), low price earning portfolios (S/L) and (high price earning portfolios) (B/H) are positively skewed. Whereas Returns for (overall portfolio) (RP), (big sized portfolio) (B), medium price earning portfolios (S/M, B/M) and low price earning portfolios (B/L) are negatively skewed. Kurtosis for all portfolios is platykurtic as the value of kurtosis is less than standard level of 3.

**Table 3: Descriptive Statistics (For 2007-2011)**

	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP
	...	S	M	B	S/H	S/M	S/L	B/H	B/M	B/L
Mean	-0.01	-0.01	-0.01	-0.01	-0.01	-0.004	-0.011	0	0	-0.007
Median	-0.01	-0.01	-0.01	-0	-0.02	-0.012	-0.006	0.001	0.006	-0.008
S.D	0.051	0.06	0.05	0.07	0.085	0.063	0.064	0.106	0.085	0.056
Kurtosis	0.24	2.336	-0.05	0.725	2.296	2.255	2.402	3.038	1.564	-0.157
Skewness	-0.41	-0.83	-0.18	-0.7	-0.38	-0.409	-0.583	-0.37	-0.094	-0.332
Minimum	-0.14	-0.21	-0.13	-0.22	-0.29	-0.209	-0.239	-0.35	-0.226	-0.14
Maximum	0.1	0.132	0.1	0.121	0.213	0.153	0.16	0.349	0.252	0.11

As shown in Table 3, returns for all the portfolios are negative as -0.01 for the overall portfolio (RP) small sized portfolio(S) medium sized (M) big sized (B) and high price earning portfolios respectively. The returns of portfolios S/M, S/L and B/L are -.004, -.011 and -.007 respectively whereas for high price earning (B/H) and medium price earning (B/M) are 0. All the portfolios are negatively skewed having the values of 0.14, 0.21, 0.13, 0.22, 0.29, 0.209, 0.239, 0.35, 0.226, and 0.14 for the RP, S,M, B, S/H, S/M, S/L, B/H, B/M and B/L respectively. Kurtosis for all the portfolios is platykurtic as the value is not at the standard level of 3. The maximum gain is 0.349 incurred by the portfolio high price earning portfolio (B/H) and the minimum loss is incurred by the medium sized portfolio (M).

**Table 4: Descriptive Statistics of Fama and French Three Factors**

Item	MKT	SMB	HML
Mean	0.011	-0.012	0.010
Median	0.012	-0.016	0.010
S.D	0.087	0.128	0.081
Kurtosis	6.866	2.371	7.664
Skewness	-1.443	-0.570	-0.938
Minimum	-0.460	-0.546	-0.401
Maximum	0.236	0.309	0.319

As shown in Table 4, value premium (HML) and market premium (Rm-Rf) are positive whereas size premium (SMB) is negative. The volatility of market premium is more than that of the value premium. The market premium is higher as compared to size and value premium. It may be the effect of exceptional performance of Pakistani equity market during the period. Value stocks perform better than the growth stocks as it represented by positive value premium(HML). Negative size premium(SMB) indicates that big stocks average is higher than that of the small stocks.

**Table 5 Correlation Matrix (For the Period of 2002 to 2011)**

	RP	S	M	B	S/H	S/M	S/L	B/H	B/M	B/L
Rm-Rf	0.717	0.515	0.608	0.796	0.493	0.431	0.466	0.713	0.703	0.628
SMB	-0.007	0.378	0.101	-0.467	0.230	0.405	0.375	-0.280	-0.563	-0.434
HML	0.333	0.272	0.215	0.421	0.320	0.268	0.076	0.751	0.247	-0.040

**For Period of 2002 to 2006**

	RP	S	M	B	S/H	S/M	S/L	B/H	B/M	B/L
Rm-Rf	0.738	0.559	0.650	0.850	0.457	0.516	0.623	0.786	0.833	0.811
SMB	-0.010	0.341	0.042	-0.384	0.315	0.367	0.199	-0.299	-0.440	-0.389
HML	0.326	0.306	0.301	0.311	0.382	0.312	0.094	0.538	0.286	-0.024

**For the Period of 2007 to 2011**

	RP	S	M	B	S/H	S/M	S/L	B/H	B/M	B/L
Rm-Rf	0.680	0.443	0.530	0.738	0.483	0.324	0.304	0.652	0.610	0.426
SMB	0.002	0.439	0.163	-0.544	0.196	0.465	0.514	-0.271	-0.630	-0.518
HML	0.372	0.271	0.179	0.506	0.302	0.262	0.062	0.868	0.230	-0.073

As shown in Table 5 for the period of 2002 to 2011, Market premium (Rm-Rf) was positively correlated from overall portfolio (RP) to low price earning portfolios (B/L). Size premium (SMB) is negatively correlated to overall portfolio (RP), big portfolio (B), high price earning portfolio (B/H), medium price earning portfolio (B/M) and low price earning portfolio (B/L). Size premium (SMB) is positively correlated with small sized portfolio (S), medium sized portfolio (M), high price earning (S/H), medium price earning portfolio (S/M) and low price earning portfolio (S/L). Value premium (HML) is positively correlated from overall portfolio (RP) to medium price earning portfolio (B/M) and negatively correlated with low price earning (B/L). For the period of 2002 to 2006, market premium (Rm-Rf) is positively correlated to average returns from overall portfolio (RP) to low price earning portfolios (B/L) for the sub period of 2002-2006. Size premium (SMB) is negatively

correlated to the average returns of overall portfolio (RP), big sized portfolio B, high price earning portfolio (B/H), medium sized portfolio (B/M) and low price earning portfolio (B/L). Value premium is significantly positively correlated with the average returns of all the portfolios like overall portfolio (RP), small sized portfolio (S), medium sized (M), high price earning portfolios (S/H, B/H). For the period of 2007 to 2011, market premium (Rm-Rf) is positively correlated with the returns of all the portfolios from overall portfolio (RP) to low price earning portfolio (B/L). Size premium is positively correlated with the returns of the portfolios except big sized (B), high price earning (B/H), medium price earning (B/M) and low price earning (B/L). Value premium (HML) is also positively correlated with the returns of all portfolios. It is negatively correlated only with the portfolio low price earning portfolio (B/L).

**Table 6 Regression Analysis with Rm-Rf (For the Period 2002 to 2011)**

	RP	S	M	B	S/H	S/M	S/L	B/H	B/M	B/L
Coefficients	0.000	-0.001	0.000	0.001	-0.001	0.002	-0.005	0.004	0.004	-0.001
MP*	0.463	0.369	0.393	0.648	0.477	0.326	0.344	0.804	0.609	0.462
T-Value	11.162	6.524	8.310	14.293	6.157	5.189	5.728	11.051	10.737	8.771
P-Value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adj. R <sup>2</sup>	0.510	0.259	0.364	0.631	0.237	0.179	0.211	0.504	0.490	0.390

\*MP is Market Premium

As shown in Table 6, the value of adjusted R<sup>2</sup> is 0.510, 0.259, 0.364, 0.631, 0.237, 0.504, 0.179, 0.490, 0.211, 0.390 for overall portfolio (RP), Small sized portfolio (S), medium sized (M), big sized (B), high price earning (S/H; B/H), medium price earning (S/M; B/M), low price earning (S/L; B/L) respectively. It means that specific variation in stock returns is due to market premium. Market premium is positive and significant for all the portfolios. All portfolios are significant as well as market premium as shown by P-value that shows the efficiency and stupendous performance of Pakistani equity market. Market premium has significant linear relationship with the stock returns and it is unailing with CAPM.

**Table 7 Regression on Rm-Rf and SMB (For the Period of 2002 to 2011)**

	Coef.	Market Premium			Size Premium			Adj. R <sup>2</sup>
		MP*	T-Value	P-Value	SP**	T-Value	P-Value	
RP	0.001	0.510	-12.30	0.000	0.103	-3.671	0.000	0.556
S	0.001	0.499	-11.12	0.000	0.287	-9.451	0.000	0.576
M	0.001	0.456	-9.89	0.000	0.139	-4.457	0.000	0.452
B	0.000	0.587	-13.28	0.000	-0.135	-4.507	0.000	0.683
S/H	0.001	0.602	-8.31	0.000	0.276	-5.631	0.000	0.394
S/M	0.004	0.464	-8.98	0.000	0.304	-8.690	0.000	0.497
S/L	-0.003	0.474	-9.49	0.000	0.286	-8.456	0.000	0.506
B/H	0.004	0.781	-10.21	0.000	-0.050	-0.975	0.000	0.504
B/M	0.002	0.507	-9.86	0.000	-0.224	-6.443	0.000	0.620
B/L	-0.001	0.402	-7.64	0.000	-0.132	-3.708	0.000	0.449

\*MP stands for Market Premium; \*\*SP stands for Size Premium

As shown in Table 7, due to incorporation of one additional factor i.e. size premium leads to an increase in adjusted R<sup>2</sup> in all portfolios except high price earning portfolio (B/H). It means that size effect is present in all portfolios. Similarly size premium (SMB) is found significant for small portfolios returns and it is found insignificant for portfolio high price earning portfolio (B/H). It means that size premium (SMB) is not significantly influence the returns of big size and high price earning portfolios. Market premium is also found significant for all the portfolios and it is consistent with the conventional Capital Asset Pricing Model. So market factor can significantly explain the equity returns and size premium can better explain the returns for small portfolios.

**Table 8 Regression on Rm-Rf, SMB and HML (For the Period 2002 to 2011)**

	Coefficients	Market Premium	Size Premium	Value Premium	Adj. R <sup>2</sup>
P1	0.001	0.5033 (10.991) [0.000]	0.1017 (3.580) [0.001]	0.0169 (0.364) [0.716]	0.5531
S	0.001	0.4994 (10.069) [0.000]	0.2871 (9.332) [0.000]	-0.0002 (-0.004) [0.997]	0.5725
M	0.001	0.4775 (09.417) [0.000]	0.1432 (4.552) [0.000]	-0.0524 (-1.020) [0.310]	0.4517
B	-0.001	0.5300 (11.250) [0.000]	-0.1455(-4.980) [0.000]	0.1377 (2.885) [0.005]	0.7014
S/H	0.001	0.5637 (07.085) [0.000]	0.2686 (5.442) [0.000]	0.0937 (1.162) [0.248]	0.3961
S/M	0.004	0.4525 (07.936) [0.000]	0.3015 (8.525) [0.000]	0.0286 (0.496) [0.621]	0.4935
S/L	-0.002	0.5424 (10.225) [0.000]	0.2989 (9.085) [0.000]	-0.1659 (3.088) [0.003]	0.5396
B/H	0.001	0.4981 (08.873) [0.000]	-0.1048 (-3.009) [0.000]	0.6879(12.095) [0.000]	0.7788
B/M	0.002	0.5024 (08.847) [0.000]	0.225(-6.387) [0.000]	0.0109 (0.189) [0.850]	0.6171
B/L	0.001	0.5034 (09.413) [0.000]	-0.1124 (-3.387) [0.000]	-0.2472 (4.562) [0.000]	0.5288

( ) shows T-Value and [ ] shows P-Value

As shown in Table 8, value premium is positive and significant for portfolios(B/L) but negatively significant for B/H and S/L. It is insignificant for the overall portfolio (RP) and individual portfolios S/H, S/M and B/L. Incorporation of value premium leads to an increase in the value of adjusted R<sup>2</sup> for the portfolios S/L, B/H and B/L. It means that value premium effect is present in these portfolios. In this period it mostly explains the low price earning stocks.

**Table 9 Regression on Rm-Rf(For the Period of 2002 to 2006)**

	Coefficients	Market Premium	T-Value	P-Value	Adj. R <sup>2</sup>
RP	0.0022	0.5503	8.3385	0.000	0.5374
S	0.0010	0.4515	5.1319	0.000	0.3004
M	0.0056	0.4616	6.5093	0.000	0.4122
B	-0.0007	0.7497	12.298	0.000	0.718
S/H	0.0063	0.4675	3.9124	0.000	0.1952
S/M	0.0018	0.4455	4.5853	0.000	0.2534
S/L	-0.006	0.5033	6.0653	0.000	0.3776
B/H	0.0002	0.8781	9.6816	0.000	0.6112
B/M	0.0017	0.6743	11.445	0.000	0.6878
B/L	-0.0056	0.7252	10.552	0.000	0.6516

As shown in Table 9, market premium shows the significant results for all the portfolios for the period of 2002 to 2006. Adjusted R<sup>2</sup> for the overall portfolio is 0.5374.

**Table 10 Regression on Rm-Rf and SMB (For the Period of 2002 to 2006)**

	Coefficients	Market Premium	Size Premium	Adj. R <sup>2</sup>
Rp	0.0021	0.6528 (-10.141)[0.000]	0.1975 (-3.9628) [0.002]	0.6309
S	0.0007	0.6704 (10.356) [0.000]	0.4216 (8.4132) [0.000]	0.6825
M	0.0055	0.5649 (8.0360) [0.000]	0.1991 (-3.658) [0.006]	0.5156
B	-0.0006	0.7319 (10.940) [0.000]	-0.0343 (-0.6619) [0.511]	0.7153
SH	0.006	0.7122 (6.8466) [0.000]	0.4714 (5.8537) [0.000]	0.4885
SM	0.0015	0.6832 (9.3717) [0.000]	0.458 (8.1144) [0.000]	0.6475
SL	-0.0062	0.6773 (9.5162) [0.000]	0.3352 (6.084) [0.000]	0.616
BH	0.0002	0.8869 (8.8803) [0.000]	0.017 (-0.2193) [0.827]	0.6047
BM	0.0018	0.6335 (9.9768) [0.000]	-0.0787 (-1.6013) [0.115]	0.696
BL	-0.0055	0.698 (9.2848) [0.000]	0.0524 (-0.899) [0.372]	0.6505

( ) shows T-value and [ ] shows P-value

As shown in Table 10, the addition of size premium is positive for all portfolios except B, BH, BM and BL. It means that SMB not significantly explain the returns of big size portfolios. Size premium leads to an increase in the value of adjusted R<sup>2</sup> for all portfolios except B and BH.

**Table 11 Regression on Rm-Rf, SMB and HML (For the Period 2002 to 2006)**

	Coef.	Market Premium	Size Premium	Value Premium	Adj. R <sup>2</sup>
Rp	0.0009	0.6257 (9.5136) [0.000]	0.1833 (3.668) [0.005]	0.137 (1.589) [0.118]	0.6405
S	-0.0002	0.65 (9.7315) [0.000]	0.411 (8.096) [0.000]	0.103 (1.180) [0.243]	0.6846
M	0.0044	0.5412 (0.0724) [7.4747]	0.187 (0.055) [3.393]	0.120 (0.095) [1.266]	0.5207
B	-0.0024	0.6932 (10.351) [0.000]	-0.0545 (1.0719) [0.2883]	0.196 (-2.234) [0.030]	0.7339
SH	0.0033	0.6522 (6.2618) [0.000]	0.440 (5.559) [0.000]	0.304 (-2.223) [0.030]	0.5216
SM	0.0004	0.6579 (8.7693) [0.000]	0.445 (7.801) [0.000]	0.128 (-1.306) [0.197]	0.6518
SL	-0.0049	0.7067 (9.7092) [0.000]	0.351 (6.339) [0.000]	-0.149 (-1.558) [0.125]	0.6254
BH	-0.0054	0.76 (9.3555) [0.000]	-0.049 (-0.800) [0.427]	0.642 (-6.029) [0.000]	0.756
BM	0.0003	0.6002 (9.3688) [0.000]	-0.0961 (-1.975) [0.053]	0.1684 (-2.006) [0.050]	0.7113
BL	-0.0034	0.7464 (10.026) [0.000]	-0.027 (-0.478) [0.635]	-0.245 (-2.5111) [0.015]	0.6802

As shown in Table 11, in this sub period of 2002 to 2006 market premium is significant for all the portfolios except portfolio (complete name) (M). In this period size premium is insignificant for the portfolios M, B, B/H and B/L. It means that in the period of 2002-2006 size premium factor is unable to significantly influence the returns of big stocks. Value premium is positive and significant for S/H but negatively significant for the B/H and B/L. It means that in the period of 2002-2006 HML can better explain the returns of these stocks. In addition in this period there is an increase in the value of adjusted R<sup>2</sup> for all the portfolios which means that effect of value premium is present in the sub period 2002-2006. In this period it explains the high price earning stocks.



**Table 12 Regression on Rm-Rf(For the Period of 2007 to 2011)**

	Coefficients	Market Premium	T-Value	P-Value	Adj. R <sup>2</sup>
RP	-0.005	0.380	7.057	0.000	0.453
S	-0.006	0.289	3.768	0.000	0.183
M	-0.009	0.305	4.757	0.000	0.268
B	-0.002	0.566	8.325	0.000	0.537
S/H	-0.008	0.451	4.200	0.000	0.220
S/M	-0.003	0.222	2.606	0.012	0.089
S/L	-0.009	0.213	2.433	0.018	0.077
B/H	0.006	0.757	6.541	0.000	0.415
B/M	0.004	0.563	5.856	0.000	0.361
B/L	-0.005	0.258	3.585	0.001	0.167

As shown in Table 12, market premium is significant for all portfolios in the sub period of 2007-2011. The minimum value of the adjusted R<sup>2</sup> is for the portfolio S/L.

**Table 13 Regression on Rm-Rf and SMB (For the Period of 2007 to 2011)**

	Coefficients	Market Premium	Size Premium	Adj. R <sup>2</sup>
RP	-0.004	0.408 (7.508) [0.000]	0.0656 (2.000) [0.050]	0.48
S	-0.002	0.392 (6.372) [0.000]	0.2347 (6.332) [0.000]	0.512
M	-0.008	0.3547 (5.689) [0.000]	0.113 (3.005) [0.004]	0.357
B	-0.004	0.4899 (8.168) [0.000]	0.1737 (4.8019) [0.000]	0.664
S/H	-0.006	0.5361 (5.174) [0.000]	0.1957 (-3.131) [0.003]	0.323
S/M	0.001	0.3295 (4.628) [0.000]	0.2449 (5.703) [0.000]	0.41
S/L	-0.006	0.3306 (4.738) [0.000]	0.2693 (6.401) [0.000]	0.454
B/H	0.005	0.7247 (6.040) [0.000]	0.0747 (-1.033) [0.306]	0.415
B/M	0.001	0.4402 (5.545) [0.000]	0.2812 (-5.873) [0.000]	0.595
B/L	-0.007	0.1885 (2.826) [0.007]	0.1596 (-3.967) [0.000]	0.336

As shown in Table 13, size premium is significant for all the portfolios except BH. There is also an increase in the value of adjusted R<sup>2</sup> except in portfolio BH. It means that size premium better explains the returns of all portfolios except portfolio BH.

**Table 14 Regression on Rm-Rf, SMB and HML (For the Period 2007 to 2011)**

	Coefficients	Market Premium	Size Premium	Value Premium	Adj. R <sup>2</sup>
RP	-0.004	0.4028 (6.321) [0.000]	0.065 (1.953) [0.056]	0.0091 (0.165) [0.870]	0.471
S	-0.002	0.3948 (5.479) [0.000]	0.235 (6.248) [0.000]	-0.0053 (-0.085) [0.932]	0.503
M	-0.007	0.4027 (5.592) [0.000]	0.1184 (3.150) [0.003]	-0.0817 (-1.309) [0.196]	0.365
B	-0.006	0.3964 (6.014) [0.000]	-0.1843 (-5.3552) [0.000]	0.1592 (2.786) [0.007]	0.7
S/H	-0.006	0.5178 (4.265) [0.000]	0.1936 (3.054) [0.003]	0.0312 (0.297) [0.768]	0.312
S/M	0.001	0.3075 (3.693) [0.000]	0.2424 (5.575) [0.000]	0.0373 (0.516) [0.608]	0.402
S/L	-0.004	0.4053 (5.102) [0.000]	0.2778 (6.698) [0.000]	-0.127 (-1.844) [0.071]	0.476
B/H	-0.004	0.2672 (3.640) [0.000]	-0.1264 (3.2982) [0.002]	0.7785 (12.229) [0.000]	0.838
B/M	0.001	0.4592 (4.941) [0.000]	-0.279 (-5.750) [0.002]	-0.0324 (-0.402) [0.689]	0.589
B/L	0.005	0.2954 (4.046) [0.000]	-0.1475 (-3.869) [0.000]	-0.1819 (-2.874) [0.006]	0.411

As shown in Table14, market premium is significant for all the portfolios which shows the explanatory power of this factor during the period 2007-2011. Size premium is significant for all the portfolios during this period. It means that SMB significantly influence the returns of stocks during the period of 2007-2011. HML is positively significant for the B/L but negatively significant for the significant B/H. It means that during the period HML can better explain the returns of these portfolios. There is only increase in the value of adjusted R<sup>2</sup> of portfolios S/L, B/H and B/L. So it is concluded that in this period it again explaining the low price earning stocks.

### Conclusion

This study has examined the impact of size and price earning ratio on stock returns. The results of the study show that low price earning portfolios have low returns and high price earning portfolios have large returns. Market premium is found significant for all the portfolios in all periods that mean market premium explains the average returns of all portfolios for the period of 2002 to 2011 and sub periods of 2002 to 2006 and 2007 to 2011. These findings are consistent with the conventional CAPM and it is valid in Pakistani equity market under the assumption studied period. The results of size premium exhibit that in the period of 2002 to 2011 it is found insignificant for the portfolio B/H whereas for the period of 2002 to 2006 it is significant for all the portfolios excluding B and B/H. In the sub period 2007 to 2011 it is again insignificant for the portfolio B/H. It means that size premium does not explain the returns of big stocks. The findings of the study are in line with the two earlier studies in Pakistani equity market conducted by Hassan and Javed (2011) who concluded that size premium is insignificant for the big portfolios. By comparing the regression results of value premium in all the periods it is clear that the effect of value premium is present in Pakistani equity market. In the period of 2002 to 2011 and for both sub periods HML explains the low price earning stocks but in sub period of 2002-2006 it explains the high price earning stocks. As the results of the two periods are same so it is concluded that HML explains the low price earning stocks. The results are in consistent with the Hassan and Javed (2011) that the effect of value premium is present in Pakistani equity market. Price earning is a negative proxy of book to market in this study.

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