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Size premium, value premium and market timing: evidence from an emerging economy

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Abstract

Purpose – This study aims to investigate the market timing strategy in different market conditions (i.e. up, down, normal and in-financial-crisis situation) in the emerging market of Pakistan over the period 1995 to 2015. Furthermore, this study tests the validity of the capital asset pricing model (CAPM) and Fama and French model.

Design/methodology/approach – This study considers monthly stock returns of 167 firms and constructs six different portfolios on the basis of different size and book to market ratio. The Treynor and Mazuy model is used to capture the market timing strategy.

Findings – The results indicate evidence of the market timing in normal market conditions. However, there is less supportive evidence of market timing in up-market, down-market and in-financial-crisis situations. This study also confirms the validity of the capital asset pricing model and Fama and French three-factor model with strong support of value premium and size premium in the stock market.

Practical implications – The findings of this study are helpful to companies in estimating the cost of issuing equity more accurately. The investors can use market timing to make their investment in a more better and profitable manner.

Originality/value – Unlike other previous studies, this study considers an extended period to test the validity of the capital asset pricing model and Fama and French model. In addition, this study is novel in testing the marketing timing of the firms in the context of emerging economy of Pakistan.

Keywords Pakistan, Emerging market, Market timing, CAPM, Size premium, Value premium

Paper type Research paper

1. Introduction

Bernoulli (1954) suggests that to determine the value of an asset, we should assess the utility rather than focus only on the price of the asset. The theory of modern finance is based upon

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three assumptions: first, the markets are efficient; second, the investors always try to exploit arbitrage opportunity, i.e. to buy an asset at lower price and selling it at a high price to gain the profit; and third, investors are always rational. Various asset pricing models are proposed to describe the relationship between expected returns and risk. Most of the models are developed on the basis of systematic and unsystematic risk.

Markowitz (1952) laid foundation of asset pricing model. He presented the concept of tradeoff of risk and return and proposed optimal portfolios. Tobin (1958) developed the "Separation Theorem" to simplify the portfolio selection. According to the theorem, investors' need to identify risky assets and then decide his borrowing or lending preferences. In this manner, investors' will hold one portfolio, which would also be a market portfolio. Sharpe (1964) introduced a much simple version of portfolio analysis models, and provided method of asset pricing, to price the portfolios by simply taking the weighted average of the returns which is known as capital asset pricing model (CAPM).

CAPM can be helpful to quantitatively find out the association among the beta of the asset, its expected associated return, while beta is the measure of sensitivity for the non-diversifiable risk of the asset. For portfolio investment, beta is an important factor for making the investment decision as well as to estimate the expected returns. Moreover, according to the CAPM, the relationship between the risk and return is always linear in nature, but Fama and French (1992) proved that relationship between risk and return is quadratic and not linear. Hence, there are other risk factors that explain the returns of assets, except those that are explained by the market beta.

On the other hand, there are two more variables that are included by the Fama and French (1992) in the original CAPM to observe the selectivity and value premium and size premium, which is the micro-forecasting ability of the managers. As CAPM is a single factor model, and includes only the market risk, Fama and French proposed a three-factor model. In their model, they included two more variables: size variable, or the size premium, and BV/MV ratio, or the value premium, along with the original market risk. They proposed that two types of stocks performed well than the other stocks. They are either growth stock, which has low BV/MV ratio, or value stocks which has high BV/MV ratio of the stocks. They argued that companies with low BV/MV ratio indicate the higher earnings and performance, while companies or stocks with low BV/MV indicate the distress position of the company. Moreover, small-sized companies or companies with small market capitalization show low earnings, but returns on such companies' stocks compensate the low earnings. Hence, investments in small-sized firms and high-BV/MV ratio firms are compensated with higher returns.

Treynor and Mazuy (1966) introduced the market timing model to observe if investors time the market while making investment decisions. Market timing, in simple words, is a strategy to decide the right time to invest in a particular stock or fund. It can be done by predicting if the market will be bullish or bearish, which is basically forecasting the future trend of the stock market (Olbrys, 2010). A portfolio is shaped in such a manner that it moves according to the price changes and the market as a whole. Portfolios are structured according to these expectations. The purpose of this strategy is to outperform or beat the market as investor tries to forecast the market trends in near future. This strategy is used to structure the portfolio for the mutual funds mostly, hence mostly used by the mutual funds manager (Škrinjarić, 2013). According to Prigent (2007), market timing is a strategy that is linked with the beta, if the beta is less than one than the stock market is bearish and if it is greater than 1, than the stock market is bullish. Research on funds is done initially by the Treynor and Mazuy (1966) and Henriksson and Merton (1981). Most of the later research on

the market timing has been done by using the two market timing models mentioned in the study.

This study is an attempt to investigate the validity of CAPM, Fama and French three-factor model and the presence of market timing in the emerging stock market of Pakistan. In reference to Pakistan, only few studies have been carried out[1], in which most of the studies investigate mutual funds and considered small sample period. In contrast, this study focused on individual stocks with a sample of 167 companies. In addition, this study considers an extended period of 20 years (1995-2015) for analyses, which will provide more robust results. To the best of the authors' knowledge, this study is the first to investigate the market timing in the stock market of Pakistan, considering different market conditions. In particular, this study adds to the literature in four aspects. First, this study will provide information about the market timing in Pakistan Stock Exchange (PSE). Second, this study will provide information about market timings in different market conditions, i.e. up-market (bullish), down-market (bearish) and normal conditions. In addition, this study will examine the market timing during the financial crisis period[2]. Third, this study will test the validity of CAPM. Fourth, this study will test the validity of the Fama and French three-factor model. More specifically, this study will explore the effect of value and size premiums on the stock market. This study will provide valuable information to investors, fund managers, policymakers and companies.

The rest of the study is organized as follows. The Section 2 reviews the models. Then Section 3 presents the methodology. Section 4 presents the results, and Section 5 concludes.

2. Review of literature and models

2.1 Market timing

Treynor and Mazuy (1966) are the pioneers in conducting the research on the market timing ability of funds. They studied 57 American funds and concluded that only one of the funds was following market timing ability. Several studies conducted on market timing ability of funds have confirmed the original findings (Cumby and Glen, 1990; Gjerde and Sættem, 1991; Liljeblom and Löflund, 2000).

However, Treynor and Mazuy (1966) market timing model received several criticisms. Ippolito (1993) criticized Treynor and Mazuy for using insufficient observations of each fund and for studying the market timing model of individual funds. Ferson and Schadt (1996) suggested that investors increased their investment when they predicted higher returns in future and that it could be the reason for the funds to have low market exposure during the period when the expected returns in the market were high. Henriksson and Merton (1981) used a new approach in market timing model and included a dummy variable to assess the macro-forecasting ability of the fund's manager. However, they observed similar results such as Treynor and Mazuy research.

Several studies have been conducted on investigating the market timing model, among which a few of the studies reported the absence of the market timing model (Bollen and Busse, 2001; Cumby and Glen, 1990; Eun *et al.*, 1991; Henriksson, 1984; Kao *et al.*, 1998; Liljeblom and Löflund, 2000; Romacho and Cortez, 2006). Apart from the aforementioned studies, some of the studies reported the presence of positive market timing ability in the funds (Black *et al.*, 1992; Gjerde and Sættem, 1991; Sandvall, 2001; Yu *et al.*, 2010). On the contrary side, few of the studies reported negative market timing abilities (Ferson and Schadt, 1996; Leger, 1997; Yu *et al.*, 2010).

The literature also provides evidence of market timing abilities of managers in emerging markets. For example, Unal and Tan (2015) studied the Polish fund managers over the period January 2009 to November 2014, considering the post-financial-crisis period of 2008.

They suggested that Polish fund managers had no ability to time the market during the quantitative easing era. Similarly, Aiken *et al.* (2016) found no evidence of overall market timing ability in emerging market using pooled and calendar-time approaches. However, they found some evidence of market timing in the financial crisis period and during the subsequent recovery period. In contrast, Liao *et al.* (2017) documented that Chinese mutual fund managers have the ability to time market returns, liquidity and volatility. Similarly Yi *et al.* (2017) found strong evidence that Chinese mutual funds can time the market liquidity and volatility. They further suggested that only growth mutual funds have the ability to time the market returns. The aforementioned discussion shows that there is inconsistent evidence regarding the market timing ability of the managers in emerging markets. Therefore, studying the market timing ability of managers in the context of Pakistan will add some valuable knowledge to the existing literature regarding emerging markets.

2.2 Fama and French

Fama and French (1992) added two more factors into the original CAPM to measure the company specific risk factors. They separated the firms on the basis of size of the company and the BV/MV ratio of the company. They argued that companies with high BV/MV ratio are valued firms, which provide more returns to compensate for the level of extra risk associated to those, while companies with low BV/MV ratio are the growth firms, and these companies provide less returns as compared to the value firms. Moreover, small-sized companies tend to have small market capitalization, and to compensate the extra risk associated with small-size firms, the returns provided by such firms are greater than the firms with high market capitalization.

Fama and French (1992) added value and size premiums as additional variables to the original CAPM model. They studied stock of three American markets: NASDAQ, NYSE and AMEX. They sorted the stocks by their size, i.e. the equity market value for the selected markets and ten portfolios were constructed on the basis of size. By applying the Fama and MacBeth approach, they found that beta was not enough to explain return variations; the size and value premium ratio was also explaining changes in the returns. In the subsequent paper (Fama and French, 1993), confirmed similar results by considering stocks and bonds, which confirmed the reliability of the three factor model.

Several studies have been carried out to study the three-factor model and CAPM. Most of the studies reported supportive arguments in favor of the three-factor model, that the three-factor model is better in explaining returns than CAPM (Abbas *et al.*, 2014; Aleati *et al.*, 2000; Claessens *et al.*, 1995; Drew, 2003; Drew and Veeraraghavan, 2002; Hassan and Javed, 2011; Mirza and Shahid, 2008). However, Qi (2004) concluded that CAPM is still a better measure to explain stock returns.

2.3 Up-market and down-market

The single factor CAPM model was not able to describe the returns of the stocks, and it was criticized because of up-market and the down-market conditions in the stock market. Pettengill *et al.* (1995) mentioned that beta has a tendency to behave altogether different in the up-market as well as down-market conditions. According to them, bullish market, or the up-market, is when the returns from the market are positive and beta is positive and it results in normal relationship of risk and return. In case of down-market, or bearish market, however, the beta is negative; hence, there is a negative relationship between the risk and the return. They ascertained it through their study and provided sufficient amount of evidence showing inability of the beta to describe the returns in the market as described by Fama and French in their different researches.

Fletcher (2000) used the international markets returns of 18 international markets' stocks to show the conditional behavior of the beta for the period between 1970 and 1998. Their results showed consistency with Pettengill *et al.* (1995) that beta did change the relationship as well as the significance of the relationship with returns. Woodward and Anderson (2009) also verified the conditionality of beta and concluded that investors' tend to move through the different markets, which indicates the consistent beliefs. Zhang and Wihlborg (2010) collectively analyzed the six international markets by using the data of more than one thousand companies from 1996 to 2006. They reported consistent findings such as Pettengill *et al.* (1995) that performance of the beta varies in the up market and in the down market.

3. Methodology

3.1 Sample selection

The sample consists of monthly stock returns from the Pakistan Stock Exchange over the period from February 1995 to May 2015. The main aim of using monthly returns for such a longer period is to get more accurate results[3]. The final sample includes 167 firms, considering availability of the data[4]. We used Pakistan's Treasury Bill yield, with six months maturity as a proxy for the risk-free rate of return. In particular, there is no risk-free asset available in the market, and that's why government securities are treated as risk-free assets. However, even though government securities are considered to be risk-free, they are not entirely without risk; for example, inflation risk is always attached to such securities.

3.2 Treynor and Mazuy market timing model

Treynor and Mazuy introduced the market timing model, which was based on regression analysis. The proposed model is built on the quadratic term to find out the realized portfolio returns. The model is given as follows:

$$r_{P,t} = \alpha_P + \beta_P \,.\, r_{M,t} + \gamma_P \,.\, (r_{M,t})^2 + \varepsilon_{P,t} \tag{1}$$

In equation (1), $r_{P,t} = \mathrm{R_{P,t}} - \mathrm{R_{F,t}}$ is the simple excess return on portfolio P in period t, $r_{M,t} = \mathrm{R_{M,t}} - \mathrm{R_{F,t}}$ is the simple excess return on portfolio M in period t, $R_{P,t}$ is the one-period return on portfolio P, $R_{M,t}$ is the one-period return on market portfolio M, $R_{F,t}$ is the one-period return on riskless securities, β_P is the systematic risk measure of portfolio P, Υ_P measures the market-timing skills of the manager of portfolio P, α_P measures the selectivity skills of the manager of portfolio P and $\varepsilon_{P,t}$ is a residual term, with the following standard CAPM conditions $E\,\varepsilon_{P,t} = 0$, $\mathrm{E}\,(\varepsilon_{P,t}\ \varepsilon_{P,t-1}) = 0$.

Furthermore, if the manager of the portfolio forecasts the stock prices successfully, the α_P will be positive, and vice versa. If the manager successfully times the market, then the Υ_P will be positive, showing the existence of the market timing.

3.3 Modified three factor model after the incorporation of market timing

Fama and French introduced the multifactor model for size and value premiums along with the market premium from the original CAPM, which is given as follows:

$$r_{P,t} = \alpha_P + \beta_P \,.\, r_{M,t} + \delta_{1P} \,.\, r_{SMB,t} + \delta_{2P} \,.\, r_{HML,t} + \varepsilon_{P,t} \tag{2}$$

In equation (2), $r_{SMB,t} = R_{SMB,t} - R_{F,t}$ is the simple excess return on the mimicking portfolio *SMB* in the period t, $r_{HML,t} = R_{HML,t} - R_{F,t}$ is the simple excess return on the mimicking portfolio *HML* in the period t, δ_{1P} is the measure of the sensitivity of the returns on portfolio

P to changes in the *SMB* factor returns and δ_{2P} is the measure for the sensitivity of the returns on portfolio P in response to the changes in the *HML* factor returns.

However, this model still does not incorporate the market timing premium. Hence, Olbrys (2010) introduced a modified Henriksson and Mazuy model for their research and included market timing variable into the original Fama and French three-factor model by including the square of $r_{M,t}$. We monitor the following model in this study:

$$r_{P,t} = \alpha_P + \beta_P \cdot r_{M,t} + \delta_{1P} \cdot r_{SMB,t} + \delta_{2P} \cdot r_{HML,t} + \gamma_P \cdot (r_{M,t})^2 + \varepsilon_{P,t} \quad (3)$$

From equation (3), $r_{P,t}$, $r_{M,t}$, α_P, β_P, Υ_P and $\varepsilon_{P,t}$ are explained in equation (1) and δ_{1P}, δ_{2P}, $r_{SMB,t}$ and $r_{HML,t}$ are explained in equation (2).

3.4 Market timing model under conditional markets

We created dummy variables for the up-market and down-market conditions and for the financial crisis period, and included in the Treynor and Mazuy market timing model.

3.4.1 Up-market condition. For the up-market condition, a dummy variable $r_{UM,t}$ for the up-market was created, which was then included into the Treynor and Mazuy market timing model. The model is given below:

$$r_{P,t} = \alpha_P + \beta_P \cdot r_{M,t} + \gamma_P \cdot (r_{M,t})^2 + \beta_U \cdot r_{UM,t} + \varepsilon_{P,t} \quad (4)$$

From equation (4), $r_{P,t}$, $r_{M,t}$, α_P, β_P and $\varepsilon_{P,t}$ are explained in equation (1), β_U measures the market-timing skills of the manager of portfolio in up market, and $r_{UM,t} = (r_{M,t})^2$*UM, where UM is the proxy variable for the up market.

3.4.2 Down-market condition. For the down-market condition, a dummy variable $r_{DM,t}$ for the down market is created, which is then included into the Treynor and Mazuy market timing model. The model is given below:

$$r_{P,t} = \alpha_P + \beta_P \cdot r_{M,t} + \gamma_P \cdot (r_{M,t})^2 + \beta_D \cdot r_{DM,t} + \varepsilon_{P,t} \quad (5)$$

In equation (1), β_D measure the market-timing skills of the manager of portfolio in down market,

$r_{DM,t} = (r_{M,t})^2$*DM, where DM is the proxy variable for the up market.

3.4.3 Financial crisis. For the down-market condition, a dummy variable $r_{FC,t}$ for the down-market is created, which is then included into the Treynor and Mazuy market timing model. The model is given below:

$$r_{P,t} = \alpha_P + \beta_P \cdot r_{M,t} + \gamma_P \cdot (r_{M,t})^2 + \beta_{FC} \cdot r_{FC,t} + \varepsilon_{P,t} \quad (6)$$

In equation (6), β_{FC} measures the market-timing skills of the manager of portfolio during financial crisis and $r_{FC,t} = (r_{M,t})^2$*FC, where FC is the proxy variable for the financial crisis.

3.5 Size and BV/MV portfolios

Size portfolios are based on the market capitalization of the stocks. To make the size portfolios, stocks from the Pakistan Stock Market are initially arranged according to their market capitalization, in which market capitalization represents the size of the firm. We then calculated the median size of the sample and divided into two equal parts. Stocks above the

median represent the big size (B) firms, while those below the median represent small size (S) firms. We define the size of the firms according to the aforementioned method.

Initially book value is divided by the market value of the stock to calculate the BV/MV ratio. After calculating the book value to the market value ratio for the stocks, all stocks are arranged in descending order according to their BV/MV ratio. After arranging the stocks in order, they are divided into three parts; bottom 30 per cent, middle 40 per cent and top 30 per cent. These stocks are classified according to their rank, as top 30 per cent stocks are categorized as high (H), middle 40 per cent stocks are categorized as medium (M), while bottom 30 per cent is categorized as low (L). By doing this, stocks are divided into high (H), medium (M) and low book (L) value to market value ratio.

After getting the two portfolios on the basis of their size and three portfolios on the basis of the BV/MV ratio, intersection of both types of portfolios is done. Following the aforementioned procedure, we constructed six different type of portfolios based upon different size and BV/MV ratio. These six portfolios are B/H, B/M, B/L, S/H, S/M and S/L. The B/H stocks are stocks that have big size and high BV/MV ratio. B/M stocks are stocks that have big size and medium BV/MV ratio. B/S stocks are stocks that have big size and low BV/MV ratio. S/H stocks are stocks that have small size and high BV/MV ratio. S/M stocks are stocks that have small size and medium BV/MV ratio. S/L stocks are stocks that have small size and low market ratio.

Table I provides the summary of the number of firms in each portfolio over the years. We used monthly data from Feb 1995 to May 2015. The number of firms' average is taken for the year and that average is used as yearly mean number of firms in each portfolios.

Year	S/L	S/M	S/H	B/L	B/M	B/H	Total
1995	2	7	10	11	9	2	42
1996	2	8	10	11	10	3	44
1997	2	9	9	14	12	6	52
1998	2	8	8	16	15	10	58
1999	3	9	8	18	17	10	65
2000	4	10	9	18	19	12	71
2001	4	11	10	18	17	11	70
2002	4	9	10	20	19	11	74
2003	4	11	12	22	20	9	77
2004	5	8	13	21	25	7	79
2005	11	18	20	25	29	10	113
2006	10	22	27	32	31	9	131
2007	10	23	28	31	33	9	134
2008	9	23	28	30	33	9	132
2009	5	23	28	30	33	9	128
2010	7	23	28	30	33	9	131
2011	4	22	28	30	34	9	127
2012	4	22	28	30	34	9	127
2013	7	22	29	30	34	8	129
2014	7	21	29	30	34	8	129
2015	6	21	29	30	34	8	128
Average	5	16	19	24	25	9	

Table I.
Portfolios

Note: This table provides information about the year wise portfolios
Source: Own elaboration

According to Table I, on average, there are 5 firms through the period of the study in S/L while there are 16, 19, 24, 25 and 9 firms are in the S/M, S/H, B/L, B/M and B/H, respectively.

Once portfolios are developed, next step is to find out HML and SMB.

SMB is the risk premium for the returns related to the size of the firm. It is calculated by taking the difference among the returns of the equally weighted three small size firms' portfolios and three big size firms' portfolios. It is calculated by using the formula given below:

$$SMB_t = \frac{\left({}^{S}/_{L} - {}^{B}/_{L}\right) + \left({}^{S}/_{M} - {}^{B}/_{M}\right) + \left({}^{S}/_{H} - {}^{B}/_{H}\right)}{3} \quad (7)$$

HML is the portfolio's value premium. It is the difference between the high, medium and low BV/MV ratio stocks' portfolio returns.

$$HML_t = \frac{\left({}^{S}/_{H} - {}^{S}/_{L}\right) + \left({}^{B}/_{H} - {}^{B}/_{L}\right)}{2} \quad (8)$$

Portfolio returns are taken at $t + 1$ period, as taking returns at time t is conceptually wrong because one cannot earn the return at the time investment is made, hence returns are generated after at least one period of the investment.

4. Empirical results

4.1 Descriptive statistics

Table II presents the summary statistics of the variables. The results show that mean returns increases from the low to high BV/MV ratio as the BV/MV ratio increases with increase in average returns. On the other hand, except for the portfolio SL and BL, small-sized portfolios have high average returns as compared to the large size, which confirms the negative relationship between the size and return. Average returns for the six portfolios ranges between 0.0106 to the 0.0403. The standard deviation of the portfolios is also very

	Mean	SD	Minimum	Maximum	Skewness	Kurtosis
Monthly dependent portfolios returns						
S/L	0.0106	0.1000	−0.752	0.464	−1.308	18.02
S/M	0.0226	0.0792	−0.175	0.455	0.887	6.896
S/H	0.0403	0.0987	−0.205	0.373	0.779	4.096
B/L	0.0127	0.0692	−0.205	0.216	−0.108	3.702
B/M	0.0216	0.0855	−0.337	0.287	0.179	4.186
B/H	0.0254	0.127	−0.279	0.682	0.799	5.586
Descriptive statistics for the monthly explanatory variables excess returns						
SMB(δ_{1P})	0.0046	0.0591	−0.223	0.176	−0.400	4.927
HML(δ_{2P})	0.0211	0.0812	−0.204	0.355	1.059	5.984
RM (β_P)	0.0120	0.0899	−0.449	0.241	−1.029	7.368
MT (γ_P)	0.0082	0.0196	3.93e−08	0.201	6.614	57.67

Notes: This table provides information about the six monthly portfolio returns constructed using the Fama and French method. The period is from February 1995 to May 2015
Source: Own elaboration

Table II.
Descriptive statistics

low, as for all of the portfolios standard deviation is under 0.1 except for the SL and BH portfolios. Furthermore, the range of the returns is wider for the small-sized portfolios and narrow for the big-sized portfolios. None of the portfolio has followed the normal distributed returns. As it can be seen in the table, SL, BL and BM are negatively skewed with kurtosis more than three, while the remaining three portfolios, SM, SH and BH, are positively skewed, and their kurtosis ranges from 4.096 to the 6.896.

Table II shows the descriptive statistics for the explanatory variables. Average returns for the SMB factor is 0.00468, for the HML factor 0.0211, for the market return 0.0120 and for the market timing it is 0.00820. The standard deviation for all of the four types of variables is below 0.1. The range for the returns is lowest for the SMB factor, and market return is highest for the market timing. Furthermore, none of the variables has followed the normal distribution, as SMB and market return factor has negatively skewed distribution with kurtosis more than three. On the other hand HML and market timing factors has positively skewed returns with kurtosis more than three too.

4.2 Correlation matrix

Table III represents the result of the correlation among six portfolios. The results show that SL portfolio has low correlation with the other five portfolios. On the other hand, rest of the portfolios has very strong correlation with each other. The minimum correlation lies between the S/L and the B/H, while highest degree of the correlation is between the B/L and the B/M. All these results suggest that if an investor wants to diversify the risks by investing in more than one portfolio, he/she should make a combination of portfolios with the S/L portfolio, as only S/L has the minimum degree of correlation with others.

The market risk return, SMB and HML have positive but weak correlation. The correlation between SMB and market risk premium is negative and more than 0.5, which is a slightly strong correlation. The market risk premium and HML are also positively correlated. However, the correlation between SMB and HML is negative (−0.413).

	1	2	3	4	−5	6
Correlation among the portfolios						
S/L	1.000					
S/M	0.388	1.000				
S/H	0.340	0.574	1.000			
B/L	0.339	0.685	0.544	1.000		
B/M	0.364	0.740	0.602	0.824	1.000	
B/H	0.311	0.726	0.641	0.729	0.806	1.000

	1	2	3	4
Correlation among the explanatory variables				
MT (γ_P)	1.000			
RM (β_P)	−0.315	1.000		
SMB(δ_{1P})	0.064	−0.578	1.000	
HML(δ_{2P})	0.060	0.389	−0.413	1.000

Table III.
Correlation matrix

Notes: This table provides information about the correlation among the portfolios constructed using the Fama and French method. In addition, it provides information about the correlation among the explanatory variables
Source: Own elaboration

Table IV. Regression results of the excess returns of portfolios

Variables	*S/L*	*S/M*	*S/H*	*B/L*	*B/M*	*B/H*
RM (β_P)	0.914*** (0.0555)	0.700*** (0.0476)	0.730*** (0.0344)	0.682*** (0.0300)	0.796*** (0.0378)	0.867*** (0.0552)
SMB(δ_{1P})	1.248*** (0.0854)	0.537*** (0.0733)	1.203*** (0.0531)	−0.0415 (0.0463)	0.0250 (0.0582)	0.00407 (0.0850)
HML(δ_{2P})	−0.399*** (0.0551)	0.233*** (0.0473)	0.855*** (0.0342)	−0.0808*** (0.0299)	0.105*** (0.0376)	0.665*** (0.0547)
Constant (α)	0.00231 (0.00424)	0.00684* (0.00364)	0.00784*** (0.00264)	0.00641*** (0.00230)	0.00971** (0.00289)	0.000842 (0.00423)
Observations	244	244	244	244	244	243
R-squared	0.617	0.551	0.848	0.765	0.757	0.765

Notes: The table provides the information of regression based on the Fama and French three-factor methodology. The table shows the details of market, size and value premiums and intercept. Six portfolios are formed by the cross-section of size and market to book ratio by using the Fama and French methodology. Standard errors are shown in parentheses. ***, ** and * indicates significance at 1%, 5% and 10%, respectively
Source: Own elaboration

4.3 Fama and French three-factor model with size and value premiums

Table IV shows the results of traditional Fama and French three-factor model. The impact of market, size and value premiums is tested on portfolio returns from the PSE. The results suggest that market premium for the systematic risk (β_p) is significant. In case of SMB factor or the size premium, (δ_{1p}) three out of the six portfolios are significantly positive, which suggests that investors do consider the size of the firm and its market capitalization while investing. It affirms the literature that small firms or portfolios offer more returns as compared to the big size firms or portfolios to compensate the investors for the extra risk, which they took for investing in small-sized firms or portfolios. The results of the HML factor or value premium (δ_{2p}) shows that value premium for four out of six portfolios indicated significant positive signs, while only two portfolios with low BV/MV ratio have negative coefficients, which indicates that few of the investors invest in high value firms or portfolios.

4.4 Modified Fama and French three-factor model with market timing

Table V presents the results of modified Fama and French's three-factor model. It shows that systematic risk (β_p) is significant for all portfolios. The results of the SMB factor or size premium (δ_{1p}) of three portfolios (with small capitalization) have significant positive coefficient, which suggests that small-sized firms offer more returns as compared to big-sized firms to compensate for the higher levels of risks associated with those. The HML factor or the value premium (δ_{2p}) is significant for all portfolios having positive coefficient in four out of six portfolios. The low BV/MV ratio portfolios has negative coefficients, which confirms that they are growth portfolios, and they give low returns as compared to the other four portfolios which have medium or high BV/MV ratio. The results of this study show that market timing (γ_p) is used by the investors in PSE. The results suggest the positive market timing ability of the investors, which means investors in PSE do anticipate the market trends in advance and get benefit out of the bullish market and minimize the deficits of bearish trend of the market.

4.5 Treynor and Mazuy market timing model

The impact of market timing by using the Treynor and Mazuy model is presented in Table VI. The market risk is significant for all of the portfolios. The value of the beta is also less than 1, which is owing to the inclusion of the market timing variable into the model. Furthermore, the impact of market timing is significant in five out of the six portfolios; hence, it can be concluded that market timing influence the PSE. The coefficient of the market timing is positive for all six portfolios. The intercept or the alpha, which also measure the selectivity, is significant for the three portfolios. So, it can be concluded that not all investors practice the selectivity while making investment in the PSE stock portfolios.

4.6 Capital asset pricing model

Table VII shows the results of traditional CAPM model. The results suggest that all six portfolios have significant coefficient ranging from 0.30 to 1.09 with standard errors less than 1. If we compare it with the modified three-factor model, the coefficients of original CAPM model are lower than the three-factor model and the range of the standard errors for the market risk is also greater than the three-factor model.

If we compare the R^2, results are quite different, as in case of one portfolio (SL), the value is only 0.074, while the highest value for any portfolio is 0.75. In case of the three-factor model, value of the R^2 ranges from 0.57 to 0.85. Hence, we can state that on the basis of R^2, the three-factor model explains the variation in the portfolio return more than the single

Table V. Regression results of the modified Fama and French three-factor model with incorporation of market timing

Variables	*S/L*	*S/M*	*S/H*	*B/L*	*B/M*	*B/H*
RM (β_P)	1.002*** (0.0577)	0.768*** (0.0498)	0.781*** (0.0360)	0.744*** (0.0305)	0.842*** (0.0399)	0.967*** (0.0569)
SMB(δ_{1P})	1.283*** (0.0832)	0.565*** (0.0717)	1.223*** (0.0519)	−0.0164 (0.0439)	0.0437 (0.0575)	0.0453 (0.0819)
HML(δ_{2P})	−0.439*** (0.0542)	0.202*** (0.0468)	0.832*** (0.0338)	−0.109*** (0.0286)	0.0844** (0.0375)	0.620*** (0.0533)
MT (γ_P)	0.883*** (0.214)	0.691*** (0.184)	0.510*** (0.133)	0.622*** (0.113)	0.466*** (0.148)	0.999*** (0.210)
Intercept (α)	−0.00531 (0.00450)	0.000886 (0.00389)	0.00344 (0.00281)	0.00105 (0.00238)	0.00568* (0.00311)	−0.00784* (0.00444)
Observations	244	244	244	244	244	243
R-squared	0.643	0.576	0.857	0.792	0.767	0.785

Notes: The table provides information of regression based on the modified Fama and French three-factor model with the incorporation of market timing. The table shows the details of market, size and value premiums and intercept. Six portfolios are formed by the cross-section of size and market to book ratio by using the Fama and French methodology. Standard errors are shown in parentheses. ***, ** and * indicates significance at 1%, 5% and 10%, respectively
Source: Own elaboration

Table VI.
Regression results of the Treynor and Mazuy model

Variables	*SL*	*SM*	*SH*	*BL*	*BM*	*BH*
RM	0.303*** (0.0726)	0.622*** (0.0441)	0.624*** (0.0626)	0.706*** (0.0245)	0.859*** (0.0315)	1.202*** (0.0559)
MT	0.0183 (0.333)	0.639*** (0.203)	0.727** (0.287)	0.538*** (0.113)	0.520*** (0.145)	1.501*** (0.256)
Constant	0.00686 (0.00693)	0.00997** (0.00421)	0.0268*** (0.00597)	−0.000188 (0.00234)	0.00704** (0.00300)	−0.00157 (0.00534)
Observations	244	244	244	244	244	243
R-squared	0.074	0.454	0.293	0.779	0.762	0.659

Notes: The table provides the information of regression results of the Treynor and Mazuy model by showing the market and market-timing premiums and intercept. The regression is run to get the slopes, intercept and the R^2 about all of the six portfolios. The table includes the coefficients for market risk premium for each portfolio along with their significance level. Standard errors are shown in parentheses. ***, ** and * indicates significance at 1%, 5% and 10%, respectively
Source: Own elaboration

Table VII. Regression results of CAPM model

Variables	*S/L*	*S/M*	*S/H*	*B/L*	*B/M*	*B/H*
RM (β_P)	0.302*** (0.0688)	0.578*** (0.0427)	0.575*** (0.0601)	0.670*** (0.0243)	0.823*** (0.0306)	1.099*** (0.0566)
Intercept (α)	0.00703 (0.00623)	0.0157*** (0.00386)	0.0334*** (0.00544)	0.00466** (0.00220)	0.0117*** (0.00277)	0.0120** (0.00513)
Observations	244	244	244	244	244	243
R-squared	0.074	0.431	0.274	0.758	0.749	0.610

Notes: The table provides the information of regression results of CAPM model. The table shows the details of market, size and value premiums and intercept. Six portfolios are formed by the cross section of size and market to book ratio by using the Fama and French methodology. Table includes the coefficients for market risk premium for each portfolio along with their significance level. Standard errors are shown in parentheses. ***, ** and * indicates significance at 1%, 5% and 10%, respectively
Source: Own elaboration

factor CAPM model. Furthermore, the value of β_p increased by adding the HML and SMB factors, which affirms the results of Fama and French (1993).

4.7 Modified Treynor and Mazuy model with an up-market variable

The impact of market timing in the up-market condition is shown in Table VIII. The results show that systematic risk is significant in all of the portfolios. The notable finding suggests that market timing coefficient is significant and negative in all portfolios. The possible explanation of the negative coefficients will be that investors or managers are not able to time the market correctly in up market conditions. These results are inconsistent with the literature because most of the studies reported positive market timing coefficient. Olbrys (2010) studied the up- and down-market conditions, with one period lag variable for the conditional market timing. Hence, the same methodology is repeated in this study to see whether the theoretically achievable results could be achieved. Hence, the Treynor and Mazuy model is tested again for the up-market condition with a lagged dummy variable.

A dummy variable of market timing in an up-market condition was created, and one lag was included into the Treynor and Mazuy model to further justify the impact of the market timing in up market condition, as it was originally used by Olbrys (2010). The results are shown in the Table IX, which suggests that systematic risk is significant in all portfolios, while market timing in normal market conditions is significant in five out of six portfolios. However, the results of the market timing in the up-market condition with one lag are insignificant except one portfolio. Other than in small-sized firms, with high BV/MV ratio portfolio, all other portfolios have insignificant results. Furthermore, S/H portfolio coefficient for the up market condition is also greater than 1, which confirms earning super profit in up market conditions.

4.8 Modified Treynor and Mazuy model, with a down-market variable

Table X reports the results of the impact of market timing in the down-market conditions. It shows that systematic risk is significant in all of the portfolios. The notable findings suggest that the market timing coefficient is significant positive in four out of six portfolios in down-market conditions. This result shows positive market timing behavior in the down market confirming that managers cannot time the market in down-market conditions. This finding is inconsistent with the existing literature because negative market timing behavior is observed in the down-market conditions.

To deal with this, we followed Olbrys (2010) and created one-lag market timing in down-market condition too to see the impact of market timing in the down-market. The results are reported in the Table XI. Results suggest that systematic risk is significant for all of the portfolios in down market condition. The market timing in normal market conditions is significant in five out of the six portfolios. The results of the market timing in down market condition with one lag are insignificant except the one portfolio (B/L). Except in big-sized firms, with low BV/MV ratio portfolio, all other portfolios have insignificant results. The coefficient of the one-lag market timing in down-market is negative, which affirm the impact of market timing in the down-market.

4.9 Modified Treynor and Mazuy model for financial crisis

Table XII shows the results for use of market timing during the financial distress period. The results show that market premium is significant for all of the six portfolios. The market timing is also significant for five out of the six portfolios.

To check the use of market timing during the financial crisis a dummy variable was created to see the impact of financial crisis. The results show that only one portfolio, i.e. B/M,

Table VIII. Regression results of the modified Treynor and Mazuy model in up-market conditions

Variables	*S/L*	*S/M*	*S/H*	*B/L*	*B/M*	*B/H*
RM (β_P)	0.698*** (0.145)	0.882*** (0.0877)	0.799*** (0.127)	0.834*** (0.0490)	0.962*** (0.0636)	1.276*** (0.114)
MT (γ_P)	1.390** (0.546)	1.543*** (0.331)	1.333*** (0.478)	0.980*** (0.185)	0.878*** (0.240)	1.760*** (0.429)
MTUM (β_U)	−4.546*** (1.450)	−2.996*** (0.878)	−2.008 (1.269)	−1.466*** (0.491)	−1.188* (0.637)	−0.857 (1.137)
Intercept (α)	0.00946 (0.00685)	0.0117*** (0.00415)	0.0280*** (0.00600)	0.000649 (0.00232)	0.00771** (0.00301)	−0.00109 (0.00538)
Observations	244	244	244	244	244	243
R-squared	0.110	0.479	0.300	0.787	0.765	0.660

Notes: The table provides the information of regression results of the modified Treynor and Mazuy model in the up market condition. The table provides information about the coefficients for all of the variables for each portfolio along with their significance level. Standard errors are shown in parentheses. ***, ** and * indicates significance at 1%, 5% and 10%, respectively
Source: Own elaboration

Table IX.
Regression results of the modified Treynor and Mazuy model, with one-lag up-market dummy variable

Variables	SL	SM	SH	BL	BM	BH
RM (β_P)	0.308*** (0.0726)	0.623*** (0.0443)	0.634*** (0.0608)	0.708*** (0.0245)	0.859*** (0.0316)	1.200*** (0.0560)
MT (γ_P)	0.0243 (0.333)	0.642*** (0.203)	0.740*** (0.279)	0.538*** (0.112)	0.520*** (0.145)	1.496*** (0.257)
MTUM $_{t1}$ ($\beta_{U\ t-1}$)	0.973 (0.674)	0.365 (0.411)	2.255*** (0.565)	0.328 (0.227)	0.118 (0.294)	−0.548 (0.520)
Intercept (α)	0.00288 (0.00749)	0.00842* (0.00457)	0.0177*** (0.00628)	−0.00138 (0.00252)	0.00655** (0.00326)	0.000784 (0.00580)
Observations	243	243	243	243	243	242
R-squared	0.082	0.455	0.338	0.782	0.762	0.660

Notes: The table provides the information of regression results of the modified Treynor and Mazuy model, with incorporation of one-lag of up-market dummy variables. The table provides information about the coefficients for all of the variables for each portfolio along with their significance level. Standard errors are shown in parentheses. ***, ** and * indicates significance at 1%, 5% and 10%, respectively
Source: Own elaboration

Table X. Regression results of the modified Treynor and Mazuy model in down-market conditions

Variables	*SL*	*SM*	*SH*	*BL*	*BM*	*BH*
RM (β_P)	0.698*** (0.145)	0.882*** (0.0877)	0.799*** (0.127)	0.834*** (0.0490)	0.962*** (0.0636)	1.276*** (0.114)
MT (γ_P)	−3.156*** (1.064)	−1.453** (0.644)	−0.675 (0.932)	−0.486 (0.360)	−0.310 (0.468)	0.902 (0.834)
MTDM (β_D)	4.546*** (1.450)	2.996*** (0.878)	2.008 (1.269)	1.466*** (0.491)	1.188* (0.637)	0.857 (1.137)
Intercept (α)	0.00946 (0.00685)	0.0117*** (0.00415)	0.0280*** (0.00600)	0.000649 (0.00232)	0.00771** (0.00301)	−0.00109 (0.00538)
Observations	244	244	244	244	244	243
R-squared	0.110	0.479	0.300	0.787	0.765	0.660

Notes: The table provides the information of regression results of modified Treynor and Mazuy model in the down-market condition. The table provides information about the coefficients for all of the variables for each portfolio along with their significance level. Standard errors are shown in parentheses. ***, ** and * indicates significance at 1%, 5% and 10%, respectively
Source: Own elaboration

Table XI.
Regression results of the modified Treynor and Mazuy model, with one-lag down-market dummy variable

Variables	*SL*	*SM*	*SH*	*BL*	*BM*	*BH*
RM (β_P)	0.300*** (0.0727)	0.620*** (0.0442)	0.622*** (0.0626)	0.703*** (0.0237)	0.858*** (0.0316)	1.201*** (0.0561)
MT (γ_P)	0.0384 (0.334)	0.651*** (0.203)	0.741** (0.288)	0.559*** (0.109)	0.524*** (0.145)	1.505*** (0.258)
MTDM, $_{t-1}(\beta_{P,\,t-1})$	−0.426 (0.341)	−0.235 (0.207)	−0.363 (0.294)	−0.473*** (0.111)	−0.0868 (0.148)	−0.0968 (0.263)
Intercept (α)	0.00860 (0.00706)	0.0109** (0.00430)	0.0286*** (0.00608)	0.00181 (0.00230)	0.00738** (0.00307)	−0.00117 (0.00546)
Observations	243	243	243	243	243	242
R-squared	0.080	0.457	0.299	0.796	0.762	0.659

Notes: The table provides the information of regression results of the modified Treynor and Mazuy model in the one-lag down-market condition. The table provides information about the coefficients for all of the variables for each portfolio along with their significance level. Standard errors are shown in parentheses. ***, ** and * indicates significance at 1%, 5% and 10%, respectively
Source: Own elaboration

Table XII. Regression results of the modified Treynor and Mazuy model during the financial crisis period

Variables	SL	SM	SH	BL	BM	BH
RM (β_P)	0.292*** (0.0736)	0.625*** (0.0448)	0.610*** (0.0634)	0.710*** (0.0249)	0.846*** (0.0316)	1.192*** (0.0567)
MT (γ_P)	0.241 (0.416)	0.580** (0.253)	1.014*** (0.358)	0.458*** (0.140)	0.774*** (0.178)	1.696*** (0.320)
DFC (β_P)	−0.555 (0.617)	0.147 (0.375)	−0.715 (0.531)	0.197 (0.208)	−0.632** (0.265)	−0.486 (0.474)
Intercept (α)	0.00598 (0.00700)	0.0102** (0.00426)	0.0257*** (0.00602)	0.000128 (0.00236)	0.00602** (0.00301)	−0.00235 (0.00539)
Observations	244	244	244	244	244	243
R-squared	0.077	0.454	0.298	0.780	0.767	0.660

Notes: The table provides the information of regression results of the modified Treynor and Mazuy model during the financial crisis period. Table provides information about the coefficients for all of the variables for each portfolio along with their significance level. Standard errors are shown in parentheses. ***, ** and * indicates significance at 1%, 5% and 10%, respectively
Source: Own elaboration

has a significant negative coefficient during the financial crisis period. Furthermore, intercept is also significant only for three out of six portfolios; it means that selectivity is not practiced by all of the investors.

5. Conclusion

The purpose of this study was to test the market timing in the emerging market of Pakistan. This study tested the market timing in up-market (bullish) and down-market (bearish) conditions. In addition, this study tested the market timing in financial crisis period of 2007. This study followed the Fama and French methodology and created six Fama and French portfolios by considering data of 167 firms listed on the PSE from February 1995 to May 2015. This study also tested the validity of CAPM and Fama and French three-factor model.

The results highlighted the validity of CAPM and Fama and French three-factor model. It was evident that size and value premiums impacted portfolio's excess returns. The results also highlighted the presence of selectivity in portfolios. The results indicated the presence of market timing in the portfolios in normal market condition. However the results were not strong enough to justify the presence of market timings in up-market down-market and in-financial-crisis situations.

This study provides guidelines for investors, companies and regulators. Investors may benefit by timing their investments to maximize their returns. This study can be a guiding path for corporations to raise timely capital. Regulators can draft rules and regulations given the market dynamics and structure.

Notes

1. See, for example, Mirza and Shahid (2008); Hassan and Javed (2011); Javid and Ahmed (2008); Hamid *et al.* (2012); and Abbas *et al.* (2014).
2. There is no empirical evidence regarding market timing during the financial crisis period in reference to Pakistan. So this is the novel contribution to the literature.
3. The market timing becomes more prominent as the frequency of the data increases, and hence, it is another reason for selecting a longer range of data.
4. We excluded firms with missing observations. Furthermore, we considered all those firms for which the data was available for the selected period.

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