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Stock Market Behavior after Large Price Changes and Winner-Loser Effect: Empirical Evidence from Pakistan

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Abstract

The study examines the behavior of stock prices after large price changes. It further examines the effect of firm size on stock returns, and the presence of the disposition effect. The study employs the event study methodology using daily price data from Pakistan Stock Exchange (PSX) for the period January 2001 to July 2012. Furthermore, to examine the factors that explain stock price behavior after large price movements, the study employs a two-way fixed-effect model that allows for the analysis of unobservable company and time fixed effects that explain market reversals or continuation. The findings suggest that winners perform better than losers after experiencing large price shocks thus showing a momentum behavior. In addition, the winners remain the winner, while the losers continue to lose more. This suggests that most of the investors in PSX behave rationally. Further, the study finds no evidence of disposition effect in PSX. The investors underreact to new information and the prices continue to move in the direction of initial change. The pooled regression estimates show that firm size is positively related to post-event abnormal returns while the fixed-effect model reveals the presence of unobservable firm-specific and time-specific effects that account for price continuation.

Keywords: Market Efficiency, Price Momentum, Market Reversal, Disposition Effect, Event Study

JEL Classification Code: G00, G1, G4, G14, G41

1. Introduction

One of the most debated questions in finance literature is whether the stock markets are efficient? The Efficient Market Hypothesis (EMH) presents the theoretical base for the concept. The notion of market efficiency means that all available information is incorporated immediately in share prices. The EMH theory states that share prices reflect all information. The EMH hypothesizes that stocks trade at their fair market value on exchanges. Market efficiency also means that strategies based on all available information do not generate abnormal returns. In an efficient market, all market participants behave rationally, and securities are correctly priced.

Despite much evidence in favor of market efficiency, several anomalies - such as overreaction, size effect, momentum effect, January effect, and week effect, see Lu and Gao (2016); Hoang et al. (2020); Gharaibeh et al. (2021). They have been identified in the literature that challenges the basic theme of market efficiency. DeBondt and Thaler (1985, 1987), for instance, discovered that

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markets tend to be a mean revert. The explanation for this mean reversion offered is the overreaction hypothesis which states that investors overreact to good or bad news which takes the prices away from their equilibrium level.

Stock markets only react to a new set of information. The investors respond to the new information both actively and passively. When the investors behave rationally to the arrival of new information, the prices move in the same direction depending on the good or bad news. Sometimes investors underreact to new information which results in price continuation in the direction of initial movement and thus shows momentum (Mazouz et al., 2009). The reasons for both reversal and continuation are usually behavioral. If investors behave and act rationally, the prices continue in the direction of initial change based on favorable and unfavorable information. Contrary to this, when investors behave irrationally to new information without caring about the underlying cause of news there becomes a price reversal.

In some cases, good or bad news results in stock market overreaction. Followed by this overreaction there is a possible price reversal to bring the stock price to its normal level. When this reversal occurs, some investors sell their stocks to realize a return as early as possible due to fear that stock will decline and thus realize a low return. On the other hand, investors whose stock declines may continue to hold onto it with an expectation to get some return. So, the winner realizes less return and the loser continues to lose. This phenomenon is called as Disposition Effect (Shefrin & Statman 1985). Disposition-prone investors (winners) sell their stocks too early to gain returns thus pressing price downward. Similarly, losers hold on to the stocks and that creates a low demand which makes the prices reverse. The disposition effect is also the reason behind market reversal (Cressy & Farag 2010).

When an investor overreacts to information there will be a subsequent adjustment in the price which can be predictable. Thus, there can be possible market strategies that outperform the market (Jagadeesh & Titman 1993). The strategies can be momentum strategy or contrarian strategy. Jagadeesh and Titman (1993), for instance, identified the momentum strategy which says that strategy based on buying winners and selling losers performs better than the market. This strategy is profitable only when share prices move in the same direction as the initial price change. The opposite of this strategy is the contrarian strategy. Investors' optimism and pessimism take the prices away from their fundamental value, this overreaction is adjusted in subsequent periods. Based on this activity of the market, investors can formulate a trading strategy by selling winners and buying losers. Such a trading strategy is referred to as a contrarian strategy in the finance literature. This strategy is based on the overreaction hypothesis which says that buying losers and selling winners earn significantly positive abnormal returns.

Different studies show the success of investment strategies in different markets. Kang et al. (2002) found positive returns using contrarian strategies in the Chinese market. Reddy et al. (2021) also found the success of contrarian strategies in the Chinese market following overreaction. Lobe and Rieks (2011) find in the presence of high transaction cost and portfolio rebalancing cost, none of the strategies outperform the other. The small changes in share prices may be due to the investor's short-term liquidity needs or the rebalancing of portfolios. Contrary to this, large price changes are most likely due to the unexpected new information. The large price change phenomenon provides an opportunity to figure out whether the new information is incorporated immediately and completely, or it's partially incorporated or there can be a possibility that it overreacted. Further, momentum or reversal phenomena are important predictors of returns in the future. This study takes larger shocks movements of prices as the arrival of new information and post-shock period behavior shows how investors reacted to the newly arrived information. Our main purpose is to examine the behavior of stock prices after large price changes. We also examine the disposition effect and behavior of investors following large price changes. The study also highlights the useful potential strategies for both winners and losers. Further, we examine the size effect on market reversals. Finally, we explain how the reversals or price continuation patterns in prices affect the return distribution of investors.

This study contributes to the finance literature, specifically on emerging markets. Contrary to developed markets, emerging markets are characterized by less developed regulations and more pronounced information asymmetries. This study focuses on Pakistan Stock Exchange (PSX) which is an emerging market, smaller in size; volatile, and opaque thus have important implications for other emerging markets. Another important fact about PSX is that due to political instability and a decade-long war against terrorism, it has become quite unpredictable. PSX was declared among the best performing stock market in the world in 2002 and the best performing emerging markets in 2008. PSX has attracted the attention of global equity funds and institutional investors with significant investments due to its strong performance prospects. Recently, PSX made its place in the emerging market index, which means more fund managers will be interested in investing in PSX.

In the presence of these facts, our study has important implications for emerging markets specific and equity markets in general. First, the findings of this research shed light on the movement of prices and volatility in emerging markets, which has important implications for fund managers

and investors who have major stakes in emerging markets. Second, it aims to provide useful insights for portfolio managers and individual investors to form superior trading strategies. Third, the findings are also helpful for the market regulators as they would highlight potential inefficiencies in the market. Finally, the study also contributes to the earlier literature of market efficiency, overreaction hypothesis, and behavior of market prices under influence of different market and non-market factors in emerging markets particular and equity markets in general.

2. Literature Review

2.1. Long-Term Market Behavior

Much of the initial evidence provided in early literature addresses long-term market movements. The behavior of stock prices is examined for a long period of time (3 to 4 years) following the portfolio formation period. DeBondt and Thaler (1985) probably for the first time observed a new market anomaly which they called as "overreaction hypothesis". Their findings showed that the past loser's portfolio significantly outperforms the past winner's portfolio by 24.6%. DeBondt and Thaler (1987) find further evidence which supports the "overreaction hypothesis". They found that the portfolio of losers earns on average 31.9% more return than the winner's portfolio. The earnings of both the winning and losing firms show a reversal pattern consistent with overreaction.

2.2. Short-Term Market Behavior

The work cited in section 2.1 only considers the long-term behavior of stocks after the identification of winners and losers in the formation period. Many scholars investigated the behavior of stock prices following large price shocks (changes). They used different benchmarks to define a shock (event) but most of them used a certain percentage change. The evidence is there of using monthly, weekly, or daily individual prices and indices values as well. Atkins and Dyl (1991) are probably the first to investigate short-term market reversals in the US market. They used mean adjusted and risk-adjusted market models and provided some of the very initial support for the overreaction hypothesis. Loser stocks earn significant positive abnormal returns after a price decline, while winner stocks experience a negative abnormal return after the price increase. They attribute this reversal to the irrational behavior of investors following the specific news. Another important and early support of the overreaction phenomenon was presented by Bremer and Sweeney (1991). The study advocated the overreaction hypothesis and results strongly supported reversal patterns. Recently, in Germany, Herberger (2020) found strong support for reversal after adjusting to market and portfolio sizes.

Cox and Peterson (1994) found positive abnormal returns after large price declines which means that markets display reversal patterns in the US market. On the one hand, if the news is already expected, investors who are unaware of specific news are less likely to overreact. On the one hand, if the news is already expected then fewer investors overreact who are not informed about specific news. Chan (2003) found stocks that have good public news, experience very little drift. Contrary to this, extreme price shocks that have no news headlines experience a subsequent reversal and abnormal returns.

The success of an investment strategy largely depends on market behavior and investors' response to market activities. Lobe and Rieks (2011) found that in the German stock market none of the strategies outperformed the other. This is due to unforeseen market conditions and uncertain market behavior. Mazouz et al. (2009) provided contradicting evidence on short-term price overreaction in UK firms. They found investors mostly underreact to both positive and negative shocks and thus returns tend to continue in the same direction. Bowman and Iverson (1998) found evidence in favor of short-term overreaction. Unlike others, they use large (10%) weekly changes in prices rather than daily price changes. Reddy et al. (2021) also found asymmetrical overreaction in the Chinese market thus contrarian strategies yielding positive returns.

Moreover, Bremer et al. (1997) provided further support for price reversal in Japan. However, the large transaction cost for individual investors restricts profits from such reversals. Kang et al. (2002) investigate different investment strategies in the Chinese stock market using data for only those shares which are accessible to only local investors. They found significant positive abnormal returns for the contrarian strategies for some short-term horizon and profitable momentum strategies for an intermediate period. This overreaction is mainly due to the firm-specific information, dominance of individual investors, and lack of reliable information in the Chinese stock markets.

Otchere and Chan (2003) found Hong Kong stocks show short-term price overreaction and it is more observable in winners' market in pre- and post-Asian financial crises. Further, they explained that abnormal returns generated through contrarian strategies become economically insignificant after adjusting for transaction costs. Cressy and Farag (2011) stated investors overreact to bad information pressing the price down which subsequently reversed. Further, they presented that some temporary unobservable factors[1] which are common to all companies explain the price reversal. They also found that smaller firms experience higher post-event abnormal returns (AR) which shows that smaller firms show a higher tendency to reverse.

Cressy and Farag (2010) investigated the performance of stocks experiencing a large daily price change of 10% or more in both directions and found losers perform better than winners. The price reversal is due to the presence of a behavioral bias disposition effect, in which winners sell too soon and losers hold stock.

3. Data and Methodology

3.1. Data

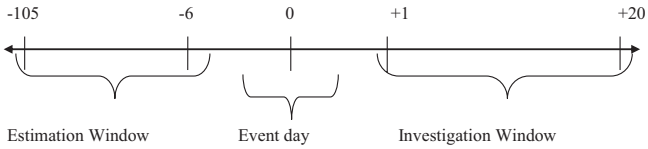
The present study focuses on Pakistan Stock Exchange (PSX), KSE 100 Index that shows the largest buying and selling in PSX. The data for the study comprises 100 trading stocks that are included in a value-weighted KSE 100 Index. The idea behind the selection of KSE 100 index companies is to ensure the representation of the whole market. The winners include 84 events while the losers have 261 events[2]. The data for the daily market price, market capitalization, and trading volume is collected from January 2001 to July 2012 from PSX.

3.2. Methodology

3.2.1. Event Study

We define the event for each security on the day it faces a 10% increase or decrease in the daily price. The securities facing a 10% increase in prices are called winners and which lost 10% or more are treated as losers (Cressy & Farag, 2010). We do not include securities having a price of less than Rs. 10. The reason for this restriction is to avoid excessive events because, for such a low price, a small variation in price brings large percentage changes (Cox & Peterson 1994). To avoid confusing effects, we also exclude all events that occur within 10 days of another event (Mazouzet al., 2012). Finally, we have 84 winning events and 261 losers' events. The losers are larger in numbers that show investors in PSX react more to negative information by which prices fall immediately. Another reason for losers to be larger in numbers is that negative news comes with greater uncertainty and investors react pessimistically to the new information. On the other hand, favorable news is somewhat expected beforehand so they cause little variation in price that is why we have only 84 winning events.

After defining event criteria we develop an event window. A smaller window may fail to capture some important information while a larger window might be inflated by unnecessary information or events. So the selection of event window is critical to event study investigation but there are no specific rules about the right length of estimation and investigation window[3] but it should be long enough to include a handful of observations for parameter estimation. The estimation period of regression coefficients (α and β) is 100 days (–105, –6) prior to the event. We exclude 5 days prior to the event from estimation (Cressy & Farag, 2011). The investigation period is 20 (+1 to +20) days after the event (Cox & Peterson, 1994; Cressy & Farag 2010, 2011).



3.2.2. Returns Generating Models

We use two basic return-generating models for measuring abnormal returns around event day. Before calculating abnormal returns, the simple returns for each security around the event are calculated as the natural log of the firm's daily price to its previous day price.

$$\boldsymbol{R_t = ln\ (pt/p_{t-1})} \quad (1)$$

Where $\boldsymbol{R_t}$ is a return on security $\boldsymbol{i}$, $\boldsymbol{p_t}$ is closing price for the day $\boldsymbol{t}$ and $\boldsymbol{p_{t-1}}$ is last day closing price.

The basic equation for calculating abnormal return is:

$$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt} \quad (2)$$

The Abnormal Returns (AR) for each security $\boldsymbol{i}$ is first calculated using the market-adjusted return model. The basic underlying assumption in the market-adjusted model is that expected returns on security are equal to market returns. The abnormal returns calculated using this model account for market-wide movement. This model is helpful for investors looking for an above-average return from the market. This model is extensively used in literature.[4] For this model, the parameters α_i and β_i are set to zero and 1 respectively. Thus, the above equation market model can be written as

$$AR_{it} = R_{it} - R_{mt} \quad (3)$$

This shows the AR can be obtained by simply taking the difference of security return and benchmark return (market return). This model is not as comprehensive as a risk-adjusted model.

A more sophisticated and reliable measure of AR is the use of a risk-adjusted return model. It is a preferable method for calculating ARs because it takes into account both security risk and market-wide movements. According to this model, the expected return of a security is a linear function of the market. Both parameters in equation 2, α_i and β_i are obtained by regression using security return and market

return. Then Cumulative Abnormal Returns (CAR'S) for the security are calculated as:

$$CAR_{it} = \sum AR_i$$

And the cumulative average abnormal returns are calculated as:

$$CAAR_{it} = \sum CAR_i / I$$

Where I = the number of events included in each sample.

We use pooled Ordinary Least Square (OLS) regression for estimation. We regress AR_{it} on event day AR, Size of the firm, and trading volume. The idea behind using AR as a regressor instead of using CAR is to avoid possible autocorrelation that is more likely to be present in CAR's.

$$AR_{it} = \alpha + \beta_1 AR_{i0} + \beta_2 lnmcap_{it} + \beta_3 trvol_{it} + \varepsilon_{it} \quad (4)$$

Where AR_{it} is abnormal Return for each security after event formation, $AR_{i,0}$ is abnormal Return on event day, $lnmcap_{it}$ is the natural log of the market capitalization, $trvol_{it}$ is trading volume and ε_{it} is the white noise error term.

4. Results and Discussion

4.1. Return Generating Models (RGM's)

We used two versions of the market model i.e. Risk-Adjusted ARs and Market Adjusted ARs. Both ARs reported 20 days following the event. Figure 1 shows abnormal returns (ARs) for winners using two basic return-generating models. These results show there is no difference in using any of the two models. Both models are equally good and give almost the same results.

4.2. Abnormal Return (ARs) for Winners and Losers

Table 1 presents the results of abnormal returns for both winners and losers. We only consider the risk-adjusted ARs because these are more sophisticated and realistic. Results show ARs for both winners and losers are highly significant on the event days. Our main objective is to find out the behavior of stock prices after large price shocks (event day). For winners, there is a significant positive abnormal return of 1.95% on the 4th day following the event. Similarly, on the 7th day, there is a positive abnormal return of 0.78%. ARs for the other post-event days are mostly positive but insignificant.

Losers who are larger in numbers than winners also show return continuation patterns. On day 2, after event day, losers show –0.37% significant abnormal return, and further on day 10th,13th and 19th there is also significant negative abnormal returns. However, for losers on day 16, there is a significant positive abnormal return of 0.46% which immediately turns into a significantly negative return after one day. The overall results show returns continuation and no support for the "overreaction hypothesis".

Our findings support the presence of momentum in stock prices following large price changes. Winners continue to earn positive abnormal returns; on the other hand, losers continue to lose more. We find significant return continuation after large price shocks following 20 days after the event day. These findings are consistent with the recent findings of Mazouz et al. (2009) who also find return continuation

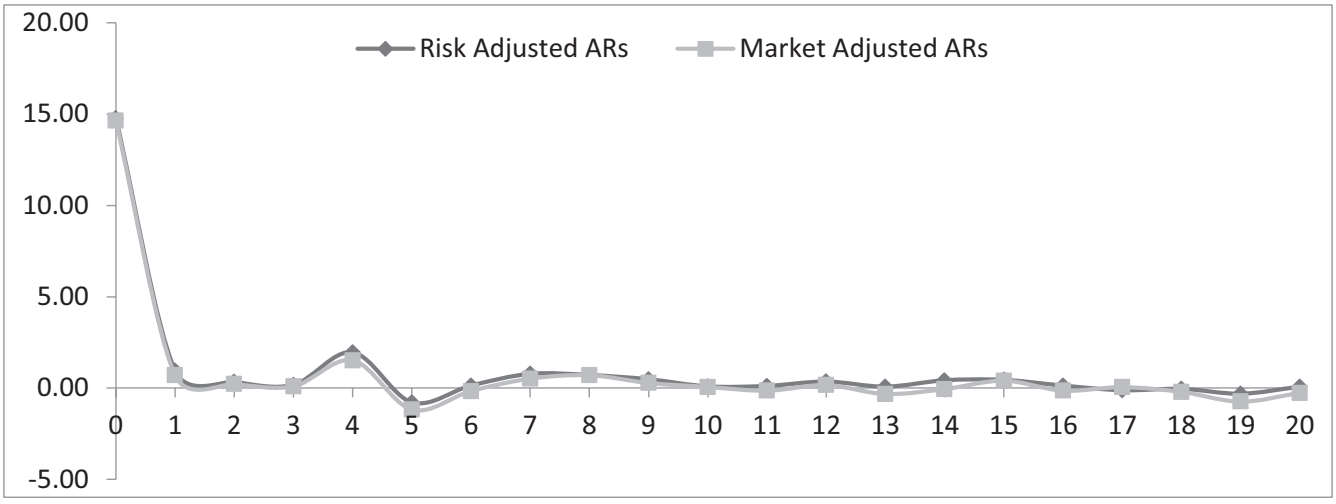


Figure 1: Risk-adjusted and Market Adjusted Abnormal Returns (ARs) for Winners

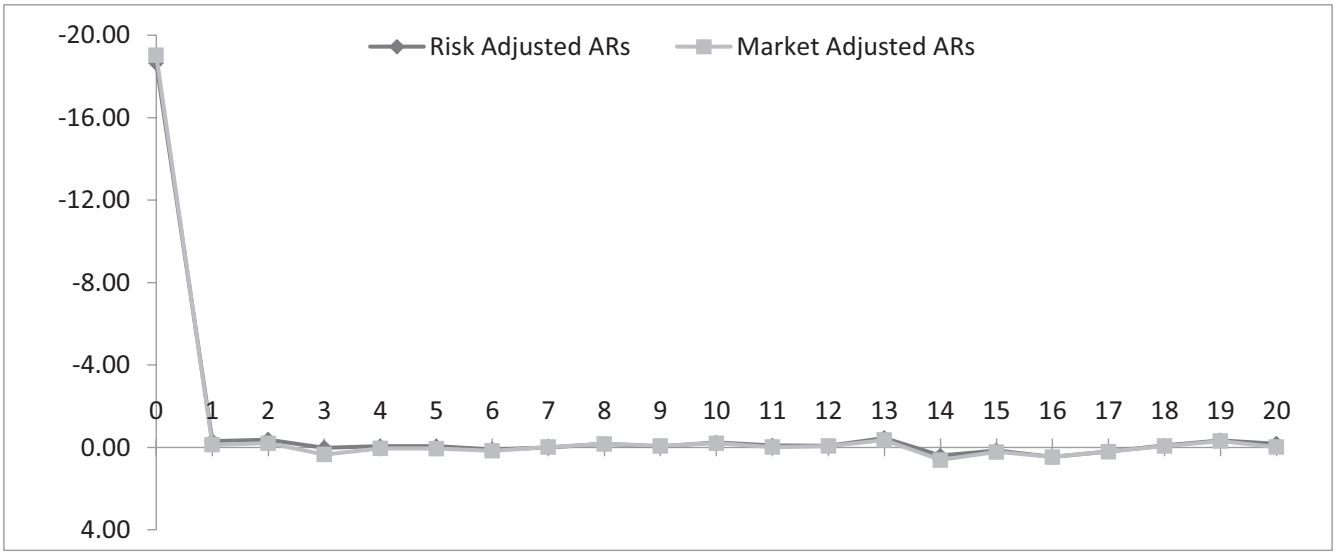


Figure 2: Risk-adjusted and Market adjusted Abnormal Returns (ARs) for Losers

in the UK market. Moreover, Mazouz et al. (2012) found similar return continuation patterns after large one-day prices changes for both winners and losers.

4.3. Cumulative Average Abnormal Return (CAARs) for Winners and Losers

As we observed the results of ARs that those are showing return continuation (momentum), CAARs also showing the same behavior. Column 2 of Table 2 shows the 20 days CAARs of winners. We see on the day 4 following event, winners earn a significant positive CAAR of 3.44% which shows strong evidence in favor of price continuation (momentum in prices). Winners continue to earn significantly positive returns for the following 20 days except for some days which have also positive CAARs but are statistically insignificant. CAAR on day 16 reaches a peak at 6.46% and then comes down to 6.30% on day 18.

Column three of Table 2 shows the CAARs of loser's stocks. Losers also show return continuation in the negative direction. There are significant negative CAARs from day 1 to day 15. On day 13, the negative CAAR rises to a peak high at –1.96% and then there is a little adjustment towards an equilibrium price and CAARs go down to –0.78% and then moves up to –1.39% on the 20th day.

Our results for both winners and losers are very interesting. Most of the evidence in the literature supports the overreaction phenomenon and establishes that there is always a price reversal after large price shocks[5]. Winners after price reversals become losers and earn negative CAARs (Cressy & Farag, 2010), and losers, on the other hand, perform better. The factor responsible for this reversal is considered as an overreaction. The reasons for both reversal and continuation are behavioral. If investors behave and act rationally, the prices continue in the direction of initial change based on favorable and unfavorable information. Contrary to this, when investors behave irrationally to new information without caring about the underlying cause of news there became a price reversal. We find evidence inconsistent with the winner-losers anomaly and price reversal.

Figure 3 shows a schematic representation of CAARs of both winners and losers. It is clear from the figure that both types of stock move in opposite directions. Stocks with positive initial change (winners) continue to earn positive returns and showing an upward trend. On the side, stocks with large negative price change (losers) continue to underperform and the graph is moving in a downward direction. We find winners continue to earn positive returns while the losers earn negative returns.

4.4. Pooled Regression

We use the pooled OLS regression to find out the factors that explain the stock market reversals or continuation (Table 3). The model is well specified having *F*-statistics 3.42 (0.016) and 5.35 (0.001) for winners and losers, respectively. R^2 for both winners and losers is small but it is not important for these types of studies. The coefficients of event day return (AR_{i0}) are positive suggesting the return continuation in the same direction, but these are insignificant. Size is negatively related to post-event ARs which indicates smaller size firms have high ARs. These results are insignificant for winners suggesting the absence of size effect in the Pakistani market.

Table 1: Abnormal Returns after Large Price Changes (both winners and losers)

Days	Winners	Losers
	Risk-Adjusted AR	Risk-Adjusted AR
0	14.782***	–18.653***
1	0.963	–0.307
2	0.337	–0.372**
3	0.181	0.017
4	1.958***	–0.058
5	–0.777	–0.053
6	0.141	0.100
7	0.782*	–0.001
8	0.717	–0.172
9	0.485	–0.046
10	0.095	–0.236*
11	0.121	–0.089
12	0.359	–0.069
13	0.082	–0.449*
14	0.429	0.399
15	0.451	0.152
16	0.138	0.468***
17	–0.116	0.205
18	–0.040	–0.086
19	–0.305	–0.338**
20	0.078	–0.180

Notes: The reported returns are a cross-sectional average of daily ARs of all the events included in each category. We employ a conventional *t*-test to check the statistical significance of ARs. $t_{AR} = \overline{AR_{it}} / \left(\sigma\left(AR_{it} / \sqrt{n}\right)\right)$.
Note: *p-value < 0.1; **p-value < 0.05; ***p-value < 0.001.

However, the significant negative coefficient of lnmcap shows smaller firms have larger ARs. This means that losers are mostly smaller firms because they have a greater tendency to give negative ARs as compared to winners. Trading volume is positively related to post-event ARs suggesting a higher trading activity for both the winners and losers making the prices move in the same direction of initial large change. For a large initial increase, there is buying pressure which moves up the prices further generating positive returns for holders. These findings are consistent with the earlier findings of Hameed and Ting (2000). On the contrary, for large initial declines there comes net selling pressure which further pushes prices downwards and negative ARs continue for losers.

Table 2: CAARs for Winners and Losers

Days	Winner's CAARs	Loser'S CAARs
1	0.963	–0.610***
2	1.300	–1.006***
3	1.480	–1.054***
4	3.438**	–1.126***
5	2.661	–1.115***
6	2.802	–0.952**
7	3.584*	–1.000**
8	4.301**	–1.166**
9	4.786**	–1.165**
10	4.881**	–1.391***
11	5.002*	–1.474***
12	5.361**	–1.529***
13	5.442*	–1.967***
14	5.871*	–1.611***
15	6.322**	–1.458***
16	6.461**	–0.966
17	6.345*	–0.788
18	6.305*	–0.874
19	6.000	–1.224
20	6.077	–1.398**

Notes: $CAAR_{it} = \sum CAR\ I/I$ where *I* am the number of events which is 84 for winners and 261 for losers. We use a *t*-test for CARs as $t_{CAR} = \overline{CAR}_{it} / (\sigma(CAR_{it} / \sqrt{n}))$.
Note: *p-value < 0.1; **p-value < 0.05; ***p-value < 0.001.

These results are consistent with the earlier findings of Cox and Peterson (1994) who also found that market liquidity is the factor behind post-event abnormal returns.

4.5. Fixed Effect Model

We use the Fixed Effect (FE) model to deal with the unobservable company-specific and time effects. For estimation of the FE model, we need to account for only those variables that vary with company and time, so we consider only lnmcap and trvol. We estimate a two-way fixed effect (company and time) model and results are reported in Table 4.

We observe the results are significantly different from our pooled OLS estimates. This is because in our pooled OLS regression we ignore the unobservable company-specific and time dimension factors. The new size variable is now positively related to both winners and losers, also the results are strongly significant. This shows there is no size

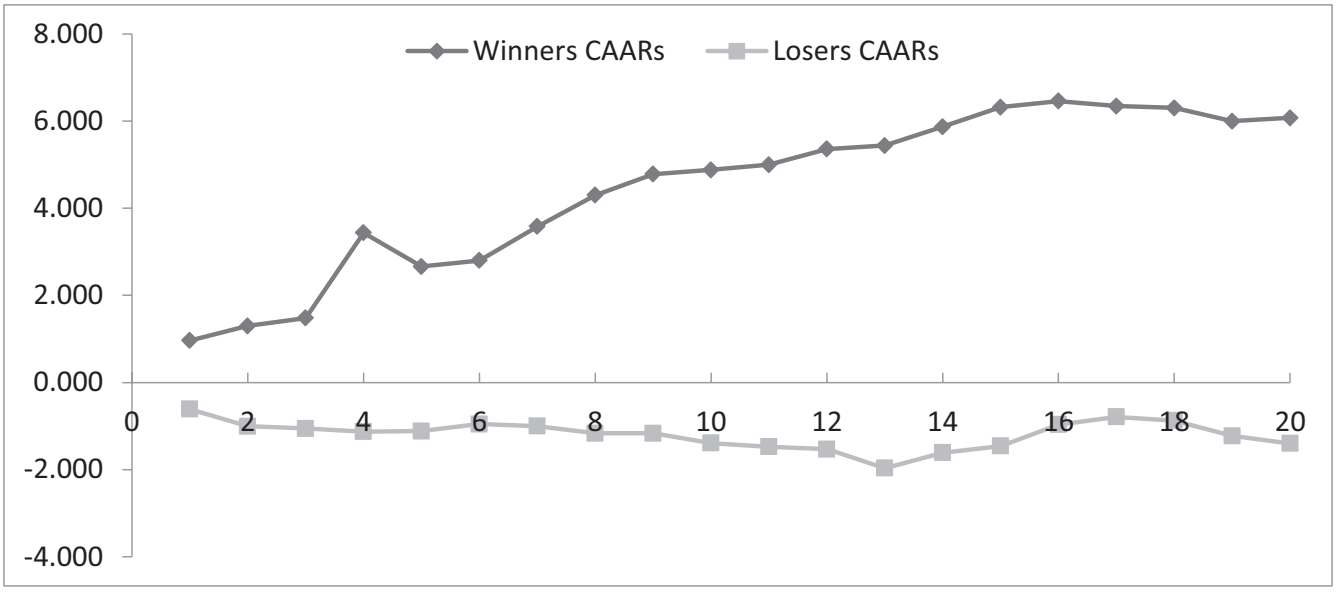


Figure 3: CAARs for Winners and Losers

Table 3: Pooled OLS Regression

Dependent Variable: AR_{it}		
Variables	**Winners**	**Losers**
Constant (*p*-value)	2.92 (0.1242)	1.649*** (0.0046)
AR_{i0} (*p*-value)	0.0042 (0.4522)	0.0022 (0.3350)
Lnmcap (*p*-value)	–0.138 (0.1246)	–0.076*** (0.0038)
Trvol *(p*-value)	0.00000003*** (0.0015)	0.000000019*** (0.0014)
R^2 Adjusted R^2	0.0061 (0.0043)	0.003 (0.0025)
F-test (*p*-value)	3.42 (0.016)	5.35 (0.0011)

Note: *p-value < 0.1; **p-value < 0.05; ***p-value < 0.001.

Table 4: Fixed Effect Model

Dependent Variable: AR_{it}		
Variables	**Winners**	**Losers**
Constant (*p*-value)	–199.68*** (0.0000)	–69.51*** (0.0000)
Lnmcap (*p*-value)	9.415*** (0.0000)	3.11*** (0.0000)
Trvol (*p*-value)	0.000000053*** (0.0006)	0.0000000422*** (0.0000)
R^2 (Adjusted R^2)	0.110 (0.056)	0.076 (0.023)
F-test (*p*-value)	1.964 (0.0000)	1.45 (0.0000)

Note: *p-value < 0.1; **p-value < 0.05; ***p-value < 0.001.

effect in PSX. Larger firms outperform the smaller firms and there is also return continuation for both winners and losers. We strongly reject the size anomaly, that smaller firms outperform the larger firms. The trading activity has the same sign for both winners and losers showing larger buying pressure on winners which appreciates the price further and selling pressure for losers pressing the prices further downward. Moreover, the model is well specified showing *F*-test 1.964 (0.0000) and 1.45 (0.0000) for winners and losers, respectively. The panel data approach to observe stock prices behavior adds a new dimension to the existing approaches and also outlines the presence of some fixed or time-variant unobservable factors that explain market reversals or continuations.

4.5.1. Redundant Fixed Effects Test

Table 5 reports the results for the redundant fixed effects test. We see the statistics for both cross-section fixed and period fixed are significantly different from zero. The alternate hypothesis is at least one of the covariates should be non-zero and we observe both cross-section and period fixed are different front from zero, so there is a fixed effect present.

5. Conclusion

This study investigates the behavior of stock prices experiencing larger price changes in either direction (rise and fall). The study used daily prices and other relevant data from Pakistan Stock Exchange (PSX) and the whole sample was differentiated into two panels' i.e. winners and losers. Finally, we have 84 winning events and 261 losing events.

We use two basic versions of the market model to estimate the post-event abnormal return and find no significant difference in results of market-adjusted and risk-adjusted AR models. The performance of winners and losers is compared for 20 days following the event day. The results show continuous patterns in ARs of both winners and losers during the investigation period. Winners show a significant positive AR of 1.95% on the 4th day following a price increase. While losers experience –0.37% AR on the 2nd day after price fall.

In PSX the winners remain, winners, while the losers continue to lose more. Investors respond rationally to new information and act accordingly. The investors underreact to new information and the prices continue to move in the direction of initial change. These findings are consistent with Mazouz et al. (2009, 2012). Finally, this study also investigated the presence of disposition effect in the Pakistani market. Price reversal sometimes results from the dispositioned behavior of investors. We find the investors behave rationally and there is no existence of disposition effect in PSX.

Further, to find out the different factors explaining the stock price behavior after large price changes we use a two-way fixed-effect model. This model enables us to find the unobservable company and period fixed effects that explain market reversals or continuation. The redundant fixed effects test shows the presence of unobservable factors that explains price continuation.

Our findings suggest that investors can earn ARs by employing momentum strategies. These strategies are based on buying the winners and selling losers. These findings are consistent with the prior findings of Jagadeesh and Titman (1993) who first introduced the concept of momentum strategies. Contrary to this, Contrarian strategies are not profitable in price continuation situations because these are based on selling winners and holding losers.

The study presents useful insights for further research in this area. The same type of research can be conducted in different emerging markets of the world. One can use different financial instruments (bonds and derivatives instruments) to see the behavior of markets. Another important idea is to observe the intraday data. This will help to understand how quickly investors react to new information during a single trading day. Future research may include an investigation of underlying news that causes such large changes in prices.

Table 5: Redundant Fixed Effect Test

Effect Test	Winners	Losers
Cross-section Fixed (*p*-value)	1.974*** (0.0000)	1.356*** (0.0002)
Cross-section χ^2 (*p*-value)	166.31*** (0.0000)	360.15*** (0.0000)
Period Fixed (*p*-value)	1.84** (0.0146)	2.31*** (0.001)
Period χ^2 (*p*-value)	37.055 (0.0078)	46.21 (0.0005)

Note: *p-value < 0.1; **p-value < 0.05; ***p-value < 0.001.

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Endnotes

[1]Investor's attitude towards risk and company quality etc.

[2]The stocks experience 10% or more upward price change are called winners while the stocks experience 10% or more decline are called losers.

[3]Typically the average length of estimation period ranges from 100 to 300 days and investigation periods length ranges from 21 to 121 days.

[4]See De Bondt and Thaler (1985) and Lobe and Rieks (2011).

[5]See DeBondt and Thaler (1985, 1987), Atkins and Dyl (1991), Bremer and Sweeney (1991), Otchere and Chan (2003), and Lobe and Rieks (2011).