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**MOB PSYCHOLOGY IMPLIED IN PAKISTAN STOCK  
MARKET VIA SPORTING EVENTS**
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**ABSTRACT**

This study investigates the impact of international cricket matches on the stock market via sudden changes in social mood associated with the sporting event. This study also considers three important macroeconomic variables to explain changes in the stock market prices. The evidence shows that cricket matches have a short-term adverse effect on the Pakistani stock market. The significant impact of the matches played in financial cities implies that the moods of local investors are induced by sporting events that affect the stock market. The negative effects of game losses are stronger than the game wins, which confirms the existence of asymmetrical biases. The matches against India particularly generates a downward movement in the market returns. Furthermore, there is no evidence of match-fixing and stock market returns.

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**1. INTRODUCTION**

The efficient-market hypothesis (EMH) asserts that financial markets are efficient and asset prices fully reflect the effects of information (Fama, 1965). Stock markets are volatile, and a number of factors and events affect the stock prices. The reasons particular stocks rise and fall can be complex. However, the most common influences of the stock market include economic health, adjustment of interest rate, exchange rate, industrial productions, foreign direct investment, development within companies and changes in the government economic policies, among others. Based on the Efficient Markets Hypothesis (EMH), non-economic events should have no impact on asset prices. However, numerous psychological research studies challenge this assumption and provide substantial evidence that actual asset prices significantly deviate from the theoretical equilibrium prices postulated by the efficient market hypothesis (Thaler, 1992; Shefrin, 2000; Shleifer, 2000). The psychological evidence shows that non-economic events such as sports can

influence the investors' decision-making process (Ashton et al., 2003). For example, Boyle and Walter (2003) documented that sporting events are able to alter the investor mood, confidence, and temper that reflects in the asset prices. The sporting events produce substantial and correlated mood swings in the large proportion of a country's population (Edmans et al., 2007). A team's win increases the risk tolerance, while a loss decreases the risk tolerance of the investors (Berument and Ceylan, 2013). The impacts of sporting events are even beyond simple mood changes. The poor performance of the national team leads to a significant increase in heart attacks (Carroll et al., 2002), riots (Wann et al., 2001), homicides (White, 1989) and suicides (Trovato, 1998).

The trading behavior is often synchronized (Barberis et al., 2005). The investors are socially embedded in an environment and the social mood is accompanied by specific events like sports (Mishra and Smith, 2010), political changes (Hira Irshad, 2017) and social discontent. Sporting events present a sense of group solidarity when everyone has the same goal of hoping for a win or disappointed in a loss. Under such emotional situations, the people have a natural desire to be accepted in society, rather than branded as a leper. Furthermore, a high degree to herding is also expected when investors are optimistic or pessimistic due to the performance of their national teams. The investors having identical preferences unintentionally make similar decisions that affect the stock market as a whole. The mood swings are rooted in irrational investing practices driven by the emotional attachment towards such sporting events. The mass psychological dynamics of human aggregate behavior and non-rational herding may deviate the financial markets from mean reverting dynamism (Prechter and Parker, 2007). The aggregation of this type of behavior often entails dynamics that cause an exuberant rise or fall in market prices. The investors experience a positive reaction (more confident and bullish) when their team performs well, resulting in asset prices increase and vice versa.

## 1.1 CRICKET IN PAKISTAN

Being the 2<sup>nd</sup> most popular sport, cricket is played by 120 million people. The British introduced the game to the subcontinent (India, Pakistan & Bangladesh) during colonization. Therefore, after the creation of Pakistan in 1947, the roots of cricket had already been established. Pakistan played its first test match against India in October 1952.

Cricket involves 11 players on each side. On the international level, cricket is played across three formats. However, for this paper, only those matches are considered which complete in one-day-more commonly known as one-day internationals (ODIs). An ODI consists of two innings of 50 overs each and normally takes 8 hours to complete. ODI takes place in the daytime as well as day-night. The impact of matches played at daytime is estimated on the match day ( $T=0$ ), while the impact of day-night matches is estimated on the next working day ( $T=+1$ ). Likewise, the impact of matches played on weekends is estimated on the next trading day. More detail has been provided in the "Data Collection and Methodology" section.

Pakistan is an ideal subject to investigate the effects of sports sentiment on the financial market due to strong emotional attachment with Cricket and lack of institutional investment in the stock market. The cricket matches are not merely a game in Pakistan as it produces substantial mood swings of people. Pakistan, like other developing markets, has a limited institutional shareholding in the Pakistan stock market listed companies. The institutional holding is insignificant as compared to

individual investors. Non-institutional and institutional investors exhibit different investment behavior. The institutional investors are expected to be less prone to psychological biases than individual investors, because of professional portfolio managers, expertise and skills. The sports sentiments have a significant strong effect on individual investors as compared to institutional investors. For instance, Cohen et al. (2002) and Loughran and Schultz (2004) point out that the individual investors value the securities less rationally as compare to the institutional investors. Furthermore, sports sentiments have significantly more effect on the trading activities of non-institutional investors. The individual investors are less-informed, rely more on media, and are more vulnerable to the influence of the market sentiment and noticeable events (Kaniel et al., 2008; Barber and Odean, 2008; Keswani and Stolin (2008). Thus, based on all these views, the sports-induced impact is expected to be more pronounced in Pakistan stock market.

This study makes a fourfold contribution to the existing knowledge. In this study, we consider three economic variables, the match day, venue of the match, the outcome of the match and the opponent teams. First; this study captures the impact of 297 ODI matches by using the estimation window from day -1 to the day +1 [-1,0,1], surrounding the matches. Second, we undertake the impact of the venue of the match by using three models. In *Model 1*, we compare the impact of matches played at home ground (matches played in Pakistan) and outside Pakistan. To capture the importance of matches played in the cities with stock market, in *Model 2*, we divide the home ground matches into cities with stock markets and cities without stock market. Similarly, to estimate the impact of matches particularly played in Karachi, in *Model 3*, we further subdivide the matches played in cities with stock markets into two categories, i.e. Karachi and cities with stock markets other than Karachi (Lahore and Rawalpindi). Third, we analyze the impact with respect to matching outcome and opponent teams. In *Model 1*, the impact of all 297 matches is estimated against the nine major opponent cricket teams namely, Australia, India, South Africa, Sri Lanka, England, Bangladesh, West Indies, New Zealand, and Zimbabwe. In *Model 2* and *Model 3*, we estimate the impact of matches by the interaction of match outcome (win and lost) with all opponent teams. Finally, we add the daily returns of Oil, Gold and Exchange rates in all models. The findings of this study might be useful in trading, investment analysis, portfolio management, and policymaking.

## 2. LITERATURE REVIEW

The area of the financial impact of sporting events is relatively new and in the developing stage. A number of studies in behavioral finance document that sporting events affect human behavior and mood. However, most of the studies have focused on mega-events in developed countries, though a few have broadened the perspective for developing countries.

Several studies estimate the impact of sporting events on the performance of stock markets in South Africa (Botha and Beer, 2011), India (Patnaik et al., 2013; Mishra and Smith, 2010), Australia (Worthington, 2007), England (Ashton et al., 2003) and New Zealand (Boyle and Walter, 2003). The unusual stock market returns also exist in the countries, whose national teams did not even play (Gerlach, 2011). Likewise, Kaplanski and Levy (2010) found that during World Cup soccer tournaments, US stock returns are significantly lower. Saayman (2001) argued that sporting events are part of tourism and estimated to have a large impact on the South Africa economy.

Several studies suggest that Cricket, in particular, is an important part of many country's nations. However, there is no consensus on the impact of sporting events on financial markets. For instance, Patnaik et al. (2013) argued that only home ground matches affect the decision making of investors. The authors found that the defeat of India, against Pakistan and Sri Lanka generated a negative daily return of -0.9% to -1.2%, respectively. The world cup or knock out matches also affect the Indian stock market negatively. This study is partly related to Mishra and Smith (2010) found an asymmetric relationship between the performance of the Indian cricket team and the National Stock Exchange (NSE) of India. They found that victory of Indian national cricket team had a small positive impact, whereas a loss generated a significant negative impact on stock market. In a similar study, Botha and Beer (2011) examined the impact of three popular sports (soccer, cricket, and rugby) in South Africa on the Johannesburg stock exchange. The authors found that descriptive analysis confirms the relationship between stock market returns and sporting performance. However, the regression analysis confirms that the sporting performance of South Africa has no significant impact on the performance of stock market.

A number of studies estimated the impact of match results on the financial markets and economy. Most of the studies found a positive effect, in the case of a win and a negative impact in case of a loss of the match. For instance, Scholtens and Peenstra (2009) found that victories have significant and positive, while defeats have a negative impact on the performance of stock markets. The winnings improve the confidence and outlook of the investors that increase the willingness to invest in risky investments, whereas game losses lower the investor confidence and investment activity (Boyle and Walter, 2003). The investors respond positively to clubs' win, resulting in an increase in the share prices (Benkraiem et al., 2009). Relatedly, Ashton et al., (2003) examined the impact of the performance of the England soccer team and found that that good performance by the national soccer team was followed by the good performance of FTSE-100 index. From a different perspective, Baur and McKeating (2011) found that going public through initial public offering (IPO) does not improve the performance of the football clubs.

Several studies documented that the stock returns of the individual teams are significantly related to the outcome of the game (Brown and Hartzell, 2001; Berument et al., 2009). The Japanese parent company stock prices rise significantly when their own teams qualified for the baseball final championship series (Chen and Chen, 2012). Relatedly, Wann et al. (1994) conclude that sports fans experience a strong reaction to their team performance and such reactions extend to positive or negative feelings about general life. The venue of the match also played an important role, while estimating the stock market's reactions to sporting events. Benkraiem et al. (2011) found that the STOXX Football Index reaction depends upon the sporting performances (defeat, draw, or win) and venue of the match. Arkes et al. (1988) found that victory of the Ohio State University football team significantly increased the sales of Ohio State lottery tickets.

### **3. RESEARCH METHODOLOGY**

#### **3.1 DATA DESCRIPTION**

To estimate the impact of international cricket matches on the Pakistan stock exchange, two types of data were collected. The first data set of daily prices of the KSE-100 index is collected from

Wharton Research Data Services (WRDS) database, for the period from July 02, 1997 to September 28, 2018 (this corresponds to 5196 observations). Three important determinants of variation in the daily USD to PKR exchange rate returns are included in the model. For this purpose, the daily prices of Oil, Gold, and Exchange rates are collected from the same database. This KSE-100 index represents a weighted average of the share prices of 100 largest companies, by market capitalization, traded on Pakistan stock exchange.

The second data set of the characteristics of all one-day international cricket matches is collected from <http://www.espncricinfo.com>. Matches take place in the daytime as well as day-night. The impact of matches played at daytime is estimated on the match day ( $T=0$ ), while the impact of day-night matches is estimated on the next working day ( $T=+1$ ). Likewise, the impact of matches played on weekends is estimated on the next trading day. The impact of matches played on weekends is estimated on the next trading day. We considered only one-day international matches against major teams and ignored the matches against the teams which played a very small number of matches against Pakistan i.e. Hong Kong, the USA, Kenya, among others. We also neglect the matches that end up as a tie or no result, due to weather or any other reason.

**Table 1:** One-day International Matches Played by Pakistan, July-1997 to Sep-2018

	Number of Matches	Proportion
<i>Opponent Team</i>		
Australia	30	10.10%
Bangladesh	23	7.74%
England	30	10.10%
India	41	13.80%
New Zealand	35	11.78%
South Africa	32	10.77%
Sri Lanka	48	16.16%
West Indies	26	8.75%
Zimbabwe	32	10.77%
<i>Location</i>		
Home Ground	50	20.24%
Abroad	247	83.16%
Lahore & Rawalpindi	26	8.75%
Karachi	11	3.70%
Other non-SM cities	13	4.38%
<i>The outcome of the Match</i>		
Win	157	52.86%
Loss	140	47.14%

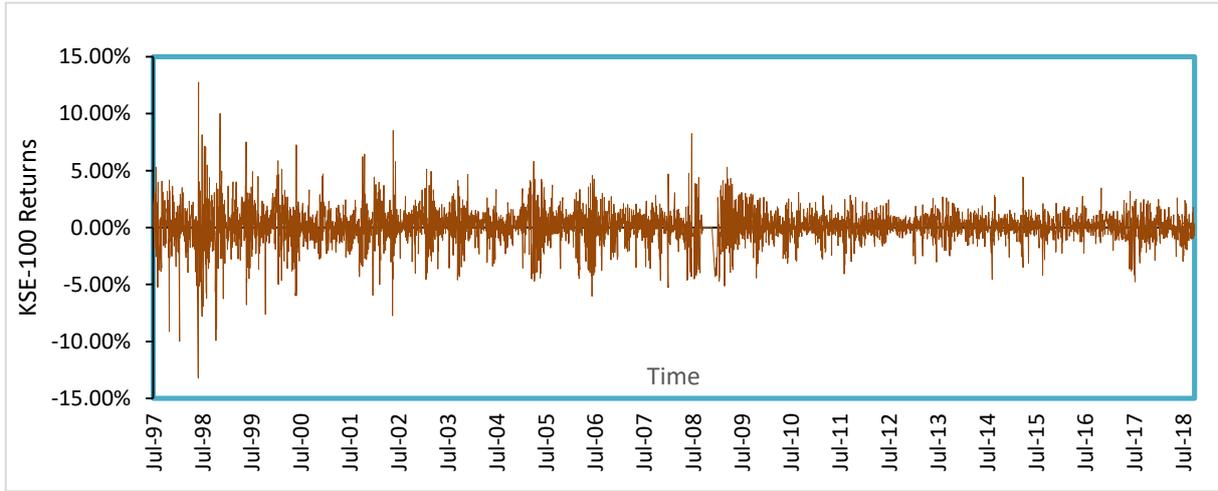
The detail information of the cricket matches played by the Pakistani team from July-1997 to Sep-2018 is presented in Table 1. Pakistan has played in 297 ODI cricket matches against major teams from July-1997 to Sep-2018, with 157 (53%) victories and 140 (47%) defeats. Out of 297 matches, Pakistan played 50 (20.24%) matches at home ground (played within Pakistan) and 247 (83.16%) abroad. The home ground ratio is very low because no international team has played in Pakistan since a terrorist attack on the Sri Lankan team in March 2009. There were only 11 matches (5%) played in Karachi, 26 (8.75%) in Lahore and Rawalpindi (cities with stock markets, in addition to Karachi) and 13 (4.38%) matches were played in other cities of the country. Pakistan played most of his matches against Sri Lanka (16.16%), India (13.80%) and New Zealand (11.80%).

### 3.2 EMPIRICAL SPECIFICATION

Assessment of the relationship between ODI cricket matches played by Pakistani cricket teams and the KSE-100 index is undertaken by using the event study methodology. In this study, one-day international matches are our events. To begin with we generate daily returns ( $R_{KSE,t}$ ) series as

$$R_{KSE,t} = \ln\left(\frac{KSE_t}{KSE_{t-1}}\right) \quad (1),$$

where  $R_{KSE,t}$  is KSE-100 index returns,  $KSE_t$  represents the close price at the end of period  $t$ . Figure 1 illustrates the log return of the KSE-100 index from July-1997 to Sep-2018.



**Figure 1:** Log Returns of Daily KSE-100 Index, July-1997 to Sep-2018.

We analyze the impact of one-day international cricket matches, with respect to the match day, venue of the match, results of the matches and the opponent teams. Below is a brief discussion of analytical techniques, used in every group.

#### 3.2.1 IMPACT OF MATCHES AROUND THE MATCHDAY

We estimate the impact of one-day international cricket matches by using the non-overlapping estimation windows from day -1 to the day +1 [-1,0,+1]. The non-overlapping event windows remove the possibility of serious bias in the standard error estimates. The event day ( $T=0$ ) estimates the effect of the event day; one day before the event ( $T=-1$ ) is meant to capture the possibility of match-fixing, prior to the match. One-day after the event ( $T=+1$ ) is used to take into account the possibility that the market may not reflect the full information one the match day. We defined following three-match day's dummy variables to estimate the impact on KSE-100 index returns, surrounding the event:  $D_i = 1$  if the date is  $i$  day from the cricket match, and 0 otherwise ( $i = -1, 0, 1$ ).

This study also considers three important macroeconomic variables to explain changes in stock market prices including the returns of oil, gold, and forex. We use a multiple regression approach, where the dependent variable is the KSE-100 index return and independent variables are returns of Oil, Gold, USD to PKR Exchange rate and three defined dummy variables. Based on the famous work by MacKinlay (1997) on event studies, we use the Ordinary Least Squares (OLS) regression model, postulated in Equation (2).

$$R_{KSE,t} = \beta_0 + \beta_1 R_{Oil} + \beta_2 R_{Gold} + \beta_3 R_{ER} + \sum_{d=-1}^{+1} \beta_d D_d + \varepsilon_t \quad (2),$$

where  $\alpha$ ,  $\beta$  are parameters to be estimated, and  $\varepsilon_i$  is the random error. The returns  $R_{oil}$ ,  $R_{Gold}$  and  $R_{ER}$  are calculated by using Equation (1).

All cricket match day's dummy variables are regressed by examining the single-day returns surrounding the matchday [-1, 0, 1], in the same regression model.

### 3.2.2 IMPACT OF MATCHES WITH RESPECT TO VENUE OF THE MATCH

The impact of the venue of the one-day international cricket matches is estimated in three models. In *Model 1*, we compare the impact of cricket matches played at home ground (matches played in Pakistan) and abroad. We specify the relationship with the regression model

$$R_{KSE,t} = \beta_0 + \beta_1 R_{Oil} + \beta_2 R_{Gold} + \beta_3 R_{ER} + \beta_4 D_{Home\_Ground} + \varepsilon_i \quad (3),$$

where Home\_Ground is the dummy variables indicating whether the match was played at home ground (match played in Pakistan) or not. Thus, a dummy variable Home\_Ground takes a value of one, if the match is played at Home Ground and a value of zero otherwise. In *Model 2*, we divide the home ground matches into two categories of *SM\_CITY* (stock market cities i.e. Karachi, Lahore and Rawalpindi) and *NON\_SM\_CITY* (matches played within Pakistan, but in cities without stock markets). We defined the following two-venue dummy variables:  $D_i = 1$  if the venue of the match is  $i$ ; 0 otherwise. Where,  $i = SM\_CITY, NON\_SM\_CITY$ . We specify the regression model Equation (4)

$$R_{KSE,t} = \beta_0 + \beta_1 R_{Oil} + \beta_2 R_{Gold} + \beta_3 R_{ER} + \beta_4 D_{SM\_CITY} + \beta_5 D_{NON\_SM\_CITY} + \varepsilon_i \quad (4).$$

There are three trading floors of Pakistan stock exchanges located in Karachi, Lahore, and Islamabad. The main trading floor of PSX is in the city of Karachi. To estimate the impact of matches particularly in Karachi, in *Model 3*, we further subdivide the *SM\_CITY* (stock market cities), into two categories of *Karachi* (Pakistan stock market, is located in Karachi) and *SM\_LSEISE* (stock market cities other than Karachi, i.e. Lahore and Rawalpindi). We defined the following three-venue dummy variables:  $D_i = 1$  if the venue of the match is  $i$ ; 0 otherwise. Where,  $i = KARACHI, SM\_LSEISE, NON\_SM\_CITY$ . The relationship between the dependent variable and independent variables is specified in the regression model

$$R_{KSE,t} = \beta_0 + \beta_1 R_{Oil} + \beta_2 R_{Gold} + \beta_3 R_{ER} + \beta_4 D_{KHI} + \beta_5 D_{SM\_LSEISE} + \beta_6 D_{NON\_SM\_CITY} + \varepsilon_i \quad (5)$$

### 3.2.3 IMPACT OF MATCHES WITH RESPECT TO OPPONENT TEAM AND MATCH OUTCOME

Finally, we compare the impact of cricket matches with respect to opponent teams and match outcome by dividing the analysis into three models. In *Model 1*, we estimate the impact of all 297 ODIs cricket matches with respect to nine opponents' teams. The following nine (9) dummy variables defined to estimate the impact of ODI matches against every opponent team;  $D_i = 1$  if the opponent team is  $i$ ; 0 otherwise.  $i = Australia, India, South Africa, Sri Lanka, England, Bangladesh, West Indies, New Zealand, Zimbabwe$ .

Equation (6) is used for estimation of the impact of one-day cricket matches on the KSE-100

index, with respect to the opponent team.  $\varepsilon_t$  is the error term.

$$R_{KSE,t} = \beta_0 + \beta_1 R_{Oil} + \beta_2 R_{Gold} + \beta_3 R_{ER} + \sum_{i=1}^9 \beta_i Team_i + \varepsilon_t \quad (6)$$

To explore the impact of match outcome against every team, in *Model 2*, the impact of won matches is estimated against all the team. The model is postulated in Equation (7).

$$R_{KSE,t} = \beta_0 + \beta_1 R_{Oil} + \beta_2 R_{Gold} + \beta_3 R_{ER} + \sum_{i=1}^9 \beta_i Team_i * WIN + \varepsilon_t \quad (7)$$

Likewise, in *Model 3*, the impact of lost matches is separately estimated against nine opponents. *Model 3* is postulated in Equation (8).

$$R_{KSE,t} = \beta_0 + \beta_1 R_{Oil} + \beta_2 R_{Gold} + \beta_3 R_{ER} + \sum_{i=1}^9 \beta_i Team_i * LOST + \varepsilon_t \quad (8).$$

## 4. EMPIRICAL FINDINGS

### 4.1 IMPACT OF MATCHES AROUND THE MATCHDAY

In this section, we examined the impact of one-day international cricket matches, by using the estimation windows from day -1 to the day +1 [-1, 0, 1]. The results of the regression model are reported in Table 2.

**Table 2:** Impact of Matches around the Event Day, July-1997 to Sep-2018

Variable	Coefficients	Stand. Error
Intercept	0.0007***	0.0002
T=-1	0.0001	0.0009
T=0	-0.0024***	0.0009
T=+1	0.0006	0.0009
Oil	0.0132	0.0082
Gold	0.0043	0.0190
Exchange Rate	-0.0639	0.0529
Durbin-Watson test:		
Durbin-Watson stat	1.8104	
Breusch-Pagan test:		
F-statistic	1.4968	
Notes: The sample size is 5196 observations. Coefficients are given in each cell followed by std. errors in parentheses; *, **, and *** shows significance at the 10%, 5% and 1% levels respectively.		

For robustness check, we investigate the autocorrelation and heteroscedasticity. The estimated value of Durbin Watson Statistics is 1.79, which confirms that there is no statistical evidence that the error terms are autocorrelated. Similarly, about heteroscedasticity, we run the Breusch-Pagan test. The significance of F-statistic confirms the absence of heteroscedasticity. The intercept ( $\alpha=0.0007$ ) indicates a significant (.01 level) positive return of 7 basis points in the absence of any international cricket match. Our empirical findings show a negative relation between one-day international cricket matches and KSE-100 index returns. The results show match events have a significant negative impact on KSE-100 index returns, on the day of the match (T=0). The OLS coefficient on the matchday dummy variable ( $\beta=-0.0024$ ) indicates that every additional cricket match played by Pakistani team, is associated with return of -24 basis points on the day of match (T=0), statistically significant at the .01 level. However, KSE recovered quickly and absorbed the effects of such sports

events in one-day. We did not find any significant impact of cricket matches on the KSE-100 index, one-day after the match ( $T=+1$ ). Our results also show that there is no significant impact, one-day before the cricket match ( $T=-1$ ). This finding reveals that there is no evidence of abnormal profit one day before the match. However, there is no significant impact of the returns of Oil, Gold and exchange rates on KSE-100 index returns.

Our findings are in agreement with Kaplanski and Levy (2010) in which the authors compare returns during world cup trading days with returns during non-world cup trading days. The authors found that during world cup soccer tournaments returns in the US are significantly lower than the non-world cup period. Our findings also belong to the number of studies arguing that investors do not make their investment decision purely based on financial fundamentals (Heath and Tversky, 1991; Aspara and Tikkanen, 2010). Similarly, Fernandes et al. (2013) found that the sentiment had a negative impact on stock market returns. The national game of Pakistan is hockey; however, Cricket is the most favorite game in Pakistan. Pakistani cricket is the strongest unifying force that brings the entire nation together, irrespective of religion, caste, class or ethnicity. Bandyopadhyay (2007) points out: "Cricket is the de facto national game in Pakistan, if not its only secular religion in the last few decades". People love to watch cricket matches with their family and friends by especially arranging multimedia and large screens on grounds, parks, hotels, and markets. The sports channels broadcast the live matches; the news channels broadcast every little bit of news about the match, which grabs the people's attention. The cricket matches affect the normal routine and people left their important tasks and routine works incomplete to watch the cricket match with full devotion and attention. Even the Pakistan Stock Exchange closes early, Government employees are allowed to take the afternoon off, to watch the match. Particularly, during the matches against India, the stock markets of Pakistan and India are almost gone to sleep. The activities in the stock markets get slow-downed during the match, which affects the stock market performance negatively.

### 1.1 IMPACT OF MATCHES WITH RESPECT TO VENUE OF THE MATCH

The results of the venue regression models are reported in Table 3. The robustness tests confirm that there are no issues of autocorrelation heteroscedasticity in all three models. The empirical findings confirm that there is no significant impact of oil, gold and currency prices on the performance of KSE-100 index returns. In all three models, the intercept ( $\alpha=.0007$ ) indicates a significant positive return of seven basis points in the absence of any international cricket match.

Our empirical findings show that the matches played at home ground (matches played within Pakistan) have a significant negative impact on the KSE-100 index. In *Model 1*, The OLS coefficient on the Home Ground dummy variable ( $\beta=-.0054$ ) indicates that every additional international match at home ground generates a downward movement of -54 basis points, statistically significant at the .05 level. The results show in *Model 2*, that cricket matches played in the cities with stock markets have a significant impact on KSE-100 index performance, while the matches in cities without stock markets have no significant impact. The OLS coefficient for stock market cities ( $\beta = -0.0074$ ) indicates that every additional cricket match played in cities with stock markets (Karachi, Lahore, and Rawalpindi) has a negative impact of 74 basis points on KSE-100 index returns, statistically significant at the 0.01 level. We found that matches played in cities without stock markets have no

impact on the performance of the stock market. In *Model 3*, we document that matches played in Karachi and cities with stock markets other than Karachi (Lahore and Islamabad) have a significant negative, while matches in other cities have no impact on KSE-100 index returns. After separating the matches played in Karachi, from the stock market cities category, we have the same findings.

**Table 3:** Impact of Matches with Respect to the Venue of the Match, July-1997 to Sep-2018

Variable	Coefficients	Stand. Error
<i>Model 1</i>		
Intercept	0.0007***	0.0002
HOME GROUND	-0.0054**	0.0021
Oil	0.0134	0.0082
Exchange Rate	-0.0633	0.0529
Gold	0.0043	0.0190
<i>Model 2</i>		
Intercept	0.0007***	0.0002
NON-SM_CITY	0.0002	0.0042
SM_CITY	-0.0074***	0.0025
Oil	0.0134	0.0082
Exchange Rate	-0.0615	0.0529
Gold	0.0042	0.0190
<i>Model 3</i>		
Intercept	0.0007***	0.0002
NON-SM_CITY	0.0002	0.0042
SM_LSEISE	-0.0069**	0.0029
KARACHI	-0.0086*	0.0045
Oil	0.0134	0.0082
Exchange Rate	-0.0607	0.0530
Gold	0.0042	0.0190
<i>Diagnostic Tests</i>	<i>Durbin-Watson stat</i>	<i>Breusch-Pagan test</i>
<i>Model 1</i>	1.7988	1.4355
<i>Model 2</i>	1.7995	1.2513
<i>Model 3</i>	1.7997	1.0644
Notes: The sample size is 5196 observations. Coefficients are given in each cell followed by std. errors in parentheses; *, **, and *** shows significance at the 10%, 5% and 1% levels respectively.		

The results show that the OLS coefficient on Karachi dummy variable ( $\beta = -.0086$ ) indicates that every additional match played in Karachi city (the Pakistan stock market is located in the same city) generates a significant downward movement of 86 basis points on KSE-100 index returns, statistically significant at .10 level. Similarly, the coefficient on cities with stock markets other than Karachi ( $\beta = -.0069$ ) indicates that every additional match played in Lahore/Rawalpindi generates a significant downward movement of 69 basis points in KSE-100 returns, statically significant at .05 level. Our empirical findings indicate that the cricket matches held in Karachi, Lahore, and Rawalpindi (twin city with Islamabad) have a significant negative impact on KSE-100 index returns. However, the matches in cities without stock markets have no significant impact. Our findings are in agreement with Edmans et al. (2007), supporting the view that the moods of local investors induced by sporting events significantly affect the local trading stocks' returns. The matches played in Karachi (the same city where the KSE is located) have the largest impact on KSE-100 returns. Karachi is the largest city, a financial hub and considered the economic engine of Pakistan. The Pakistan stock exchange, the largest trading floor is also located in this city. The three capital markets are integrated and have informational linkage with each other. The movement in one stock exchange adjusted in the other two stock markets after some time delay. The matches played in all cities with

stock markets have almost same impact due to this integration. These findings concur with Aslam and Kang (2015), in which the authors found that the terrorist events in Karachi and stock market cities significantly reduce the market returns. The inter-market information leads to exert an influence from one stock market to another.

## 1.2 IMPACTS OF MATCHES WITH RESPECT TO OPPONENT TEAM AND MATCH OUTCOME

In this section, the financial impact of the cricket matches is estimated with respect to the opponent team and match outcome. The independent variables are nine distinct opponent team's dummy variables and interaction among the opponent team and match outcome (win/lost) by controlling the impact of oil, gold, and ER returns. The results of the regression models are reported in Table 4.

**Table 4:** Impact of Matches with Respect to Opponent Team and Match Outcome, July-1997 to Sep-2018

Variable	Model 1-All Matches		Model 2-Win		Model 3-Lost	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Intercept	0.0008***	0.0002	0.0007	0.0002	0.0007	0.0002
Australia	-0.0026	0.0027	-0.0060	0.0050	0.0001	0.0031
Bangladesh	-0.0037	0.0031	-0.0037	0.0033	-0.0024	0.0086
England	0.0001	0.0027	-0.0002	0.0035	0.0036	0.0036
India	-0.0077***	0.0023	-0.0044***	0.0032	-0.0289***	0.0034
New Zealand	0.0000	0.0025	0.0008	0.0036	-0.0010	0.0033
South Africa	-0.0018	0.0027	-0.0010	0.0057	-0.0026	0.0031
Sri Lanka	-0.0013	0.0022	0.0021	0.0032	-0.0066**	0.0033
West Indies	-0.0019	0.0029	0.0000	0.0040	-0.0044	0.0047
Zimbabwe	-0.0016	0.0027	-0.0010	0.0029	-0.0289***	0.0106
Oil	0.0132	0.0082	0.0137	0.0082	0.0132	0.0082
Exchange Rate	-0.0624	0.0530	-0.0632	0.0531	-0.0689	0.0529
Gold	0.0042	0.0190	0.0042	0.0191	0.0049	0.0190
<i>Durbin-Watson test:</i>						
Durbin-Watson stat		1.7993		1.7985		1.7988
<i>Breusch-Pagan test:</i>						
F-statistic		1.5789		1.1524		1.6650
<i>Notes: The sample size is 5196 observations. Coefficients are given in each cell followed by std. errors in parentheses; *, **, and *** shows significance at the 10%, 5% and 1% levels respectively.</i>						

The findings reveal that the returns of Oil, Gold, and Dollars have no effect on the performance of Pakistan stock exchange. In the case of all matches (*Model 1*), the empirical findings show that that the matches against India particularly generate a significant downward movement in the Pakistan stock market returns. The coefficient for India dummy ( $\beta = -.0077$ ) indicates that every additional one-day international match against India has a negative impact of 77 basis points on KSE-100 returns, statistically significant at .01 level. The results reveal that the matches against other countries also have a negative impact on KSE-100 index returns; however, the impact is not significant. The interaction terms between the opponent teams and match outcome reveal that this overall negative impact is due to lost matches only, except India. The results show that the lost matches against India, Sri Lanka and Zimbabwe particularly generate downward movement in KSE-100 index returns. The coefficient for lost matches against India ( $\beta = -.0289$ ) shows that every additional lost match against

India is associated with a downward movement of 289 basis points in KSE-100 returns, statistically significant at .01 level or better. Likewise, the loss coefficient for Sri Lanka and Zimbabwe shows a negative impact of 66 basis points and 132 basis points, respectively. The results clearly confirm that the impact of lost matches is stronger than the impact of win matches.

Pakistan and India are the intense and strongest sports oppositions in the world. Cricket serves as a symbol for Pakistan's identity, expression of cultural nationalism and a cultural tool for normalization of diplomatic relations with India (Bandyopadhyay, 2007). Due to the separation of Pakistan and India in 1947, there has continually been an intense sporting rivalry between the two nations. The cricket matches between India and Pakistan are just not sports events. In media, these matches are defined as a 'battle', 'Explosive,' 'Nerve-racking,' 'the match of the century,' and a 'thrilling' event. Even heart patients are not allowed to watch the match, as there have been many events in which a spectator dies while watching a tense match between India and Pakistan. The media especially focuses on the matches between these two rivals. For instance, the 2011 World Cup Semifinal was the largest sports event with 1.5 billion TV viewers. A large number of big digital screens installed in different areas, particularly in big cities like Karachi, Islamabad, and Rawalpindi. As we mentioned earlier, the Pakistan Stock Exchange closes earlier, Government employees allowed to take the afternoon off to watch the match. The stock markets of Pakistan almost become dormant, while the Pakistani team is playing, particularly against India. The trading activities in the stock markets are affected during the match day, which negatively affects the stock market performance.

Several psychological pieces of evidence report a significant difference in the behavior of fans following lost and wins. Specifically, sporting losses are companies with crimes, an increase in heart attacks and suicides. However, the magnitude of the improvements in mood is significantly small after wins. Our results indicate a greater effect after losses against India and South Africa. This finding reveals that the Pakistani nation can't afford the cricket losses, particularly against India. The pre-game expectations seem biased and fans expect that Pakistani team will win.

This result can be explained with the prospect theory of Kahneman and Tversky (1979). According to famous prospect theory, gains and losses are carriers of utility, rather than the wealth levels. The reference point against which losses and gains are estimated determines the utility. The fans are subject to an "allegiance bias," that generate biased predictions (Markman & Hirt, 2002). Thus, if the reference point of Cricket fans is that the Pakistani team will win, it may have more effect on the stock market after losses than after wins. Stock market returns are conditional to event-driven sentiments. The sentimental investors simply demand stocks that are compatible with their sentiment. During such emotional events, the stock market is more prone to be affected, due to more speculators, optimists and hard to arbitrage (Baker & Wurgler, 2007). Likewise, from tactical portfolio allocation perspective, Kim and Kang (2014) found that investor's sentiment predicts both time series and cross-sectional variations of stock returns. These findings are not surprising in case of Pakistan, which has strong association with cricket and idolizes cricketers. On one hand, everyone prays for the victory of Pakistani team, On the other hand, fans cannot tolerate the defeat of Pakistani cricket team. In a moment, the fans bring their heroes to the ground, in case of bad performance. Even events of burning effigies attacks on homes of cricketers take place.

## 5. CONCLUDING REMARK

The national game of Pakistan is hockey; however, Cricket is the most popular game in Pakistan. The objective of this research study is to analyze the impact of 297 international cricket matches, played against nine famous teams, July-1997 to Sep-2018. We found that the impact of cricket matches varies with respect to match day, venue of the match, game outcome and the opponent team. The cricket matches have short-term negative effects on Pakistan stock market returns. These results are supported by those of Edmans et al. (2007), supporting the view that the moods of local investors are significantly induced by sporting events. In agreement with the study of Mishra & Smyth (2010) and Patnaik et al. (2013), we found an asymmetric impact of losing and winning matches. While a victory has no significant impact, a defeat against India and South Africa generates a downward movement of 157 basis points and 75 basis points in KSE-100 index returns, respectively.

This study focuses only on the stock market of Pakistan. The literature suggested that psychological changes/investor mood has a larger impact on trading as compared to information flow (Chang et al., 2008, Lo & Repin, 2002). Despite these limitations, this study can generate managerial implications for investors, fund managers, traders, and policymakers. In light of our finding that the impact of the cricket matches fades in one-day, investors could manage their holding period. The results confirm a negative impact of cricket matches on KSE-100 index returns, on match day. The impact is short-lived, so the long-term investor should not immediately sell the securities. The short-term investor and technical trader could even find possible profit opportunities by taking the long position on the KSE-100 index, one-day before the match. Investors can develop their portfolio in the light of the impacts of cricket matches with respect to venue, outcome and opponent team in the match. To minimize the negative impact of such events on financial markets, such sporting events should not carry the baggage of unsorted relations among the notations.

## 6. DATA AND MATERIAL AVAILABILITY

This study already includes all the information about this study.

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