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Stock Markets and Major Sport Events: Evidence from Cricket World Cup 2019

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Abstract

The effect of major sport events on stock markets has been studied by many researchers, most of them focused on soccer without considering if it's the most popular sport in the countries under study and without considering if the matches are important or not. The enquiry that the researcher tried to answer in this study was whether the stock market is affected by the results of the major event of the sport that is the most popular in the country of that market. To answer this question, the researcher studied the effect of the world cup of cricket, the most popular sport in India, on the main Indian stock exchanges: Bombay stock exchange and national stock exchange. A quantitative approach was followed to conduct this study using data for the period from May 24,2018 to July 15, 2019. The collected data was analyzed using ordinary least squares method and one sample *t*-test. Study conclusions indicated that loss results in the world cup have a significant positive effect on the stock prices in the two stock exchanges while there was no significant effect for winning results.

Keywords: major sport events, cricket, sport effect, Bombay stock exchange, national stock exchange, Indian stock market

1. Introduction

Stock markets have been affected by many events including the pandemic of COVID-19 (Ammy-Driss, & Garcin, 2023), financial crisis (Zhu et al., 2019), environmental disasters (Assis et al., 2023), political crises (Ahmed et al., 2022), and sport events (Gao et al., 2022). Such events may impact the economy through affecting the prices of stocks in the market with no mean to predict the positive or negative consequences. The problem is that major sport events can affect the mood and behavior of its fans (Wu, 2022) including the investors in the stock markets (Galloppo & Boido, 2020); this effect may lead to significant fluctuations in the market and, subsequently, in the economy without being recognized. The specific problem is that it's unknown whether the effect of major events of sports on stock markets is the same for all sports across all parts of the world since one sport may be popular in one country but not in the others. For instance, the most popular sport in the United States of America is the American football (Injai, 2022) so studying the impact of another sport on the American stock market may not be realistic and the results may be misleading because investors are part of their community and thus, its more reasonable to assume that their behavior is affected by the events of the most popular sport and not by other sports. Most studies were focused on analyzing the effect of the major events of sports like soccer (Graziano& Vicentini, 2017), basketball and hockey (Fan & Wang, 2018), summer Olympic games (Wang & Markellos, 2018), and football (Payne et al., 2018). Some of these studies did not consider whether the sport under study is the most popular sport in the country of the study. In this study, the researcher selected the most popular sport in India (i.e., Cricket) to explore the effect of its world cup results on the Indian stock market; this selection was made to be more reasonable by assuming that the most popular sport in the country is the most likely sport to affect investors' behavior in the market of that country and consequently, impact the stock prices in the market.

Many researchers studied the effect of sport events on the stock prices (Beer & Lin, 2019; Galloppo & Boido, 2020; Škrinjarić & Barišić, 2019), but this is different than studying the effect of major events in that major events may have more importance and thus, more impact on the behavior of its fans including investors in the stock market. Major sports' events include events at the international level like the world cup, Asian cup, and others. Some studies were conducted to explore the effect of cricket matches on the Indian stock market but no studies were focused on testing the effect of the world cup matches on that market. The main purpose of this study was to test the effect of the results of the Indian cricket national team in the world cup - 2019 on the Indian stock market. Cricket sport was selected to focus more on the effect of sports other than soccer which was tested in many studies and Indian stock market was selected because cricket is the most watched sport in India and thus, it's the most likely sport to affect the behavior of investors. This study may add value to the literature by testing how the stock market is affected by the results of the most popular sport, cricket, in the most major event of that sport, world cup. In addition, this study is different than previous studies in that it included testing data from the two major indices in India instead of one. Testing the effect of major sport events can benefit investors in following some profitable strategies during the events of a specific sport in countries where that sport is the most popular by linking their investment decisions to the results of the matches (buy or sell based on win or lose results). In addition, exploring the effect of major sports on stock prices may enhance the current knowledge about how investors sentiment and emotions may affect their behavior in the market reflected by the movement of stock prices. The main hypotheses in this study were whether the results of the Indian cricket team in the world cup 2019 affected the stock prices in the Indian stock market and which results (win or lose) has the higher significant effect.

2. Literature Review

2.1 Behavior of Investors in the Stock Markets

Investors in the stock markets are humans and have emotions toward national and international events; these emotions can impact their behavior in the financial markets as stated by Duxbury et al. (2020). Since the financial crisis of 2008, investors' behavior is considered the main source of effect on stock markets (Parveen et al., 2020) and can significantly impact the economy (Naseem et al., 2021). This behavior may suffer from many cognitive biases like heuristics which represents the most significant bias as stated by Rasool and Ullah (2020). In addition to cognitive biases, investors' behavior may be impacted by emotional biases like loss aversion and regret aversion (Yuniningsih & Taufiq, 2019). These emotional and cognitive biases may affect investment decisions of the investors in the stock markets and lead to a noticeable impact on stock prices. The fluctuation in investors' selections and beliefs caused by their emotions is called investors' mood (Hirshleifer et al., 2020); investors' mood can be affected by many factors including weather (Kathiravan et al., 2019), pandemics like COVID-19 (Subramaniam & Chakraborty, 2021), days of the week (Luxianto et al.,2020), and sports events (Škrinjarić & Barišić, 2019).

Investors' mood can affect their investment decisions and consequently, affect the stock prices (Chancharat, 2018) and based on this, variables that affect investors' mood can affect the stock prices. One of these variables is the sport events that can affect stock markets through affecting the behavior of investors (Graziano& Vicentini, 2017); this impact may occur because after each match, feelings of the individual investors who support that game may change based on the results of that march leading them to take their investment decisions without a rational analysis. The impact of sports matches may become higher if the match or the tournament is more important as concluded by Truong et al. (2021); for instance, the results of a friendly match may not have that much effect like a match in the national league or a match in the world cup. Based on this, sport events, especially the important ones, may have higher impact on the mood of investors and then their behavior in the market; this change in behavior can affect the stock market by the irrational investment decisions of the investors and thus, compromising the efficiency of the market.

2.2 The Impact of the Sports Matches' Results on Equity Markets

Many studies were conducted to explore how can the results of sports matches impact stock markets; in these studies, the results of many sports were analyzed including soccer, American football, basketball, handball, tennis, hockey, cricket, and the Olympic games. The effect of sport matches on the stock markets was evidenced by many studies; the results of international soccer matches, for instance, were concluded to have an impact on the stock market (Truong et al., 2021). The stock market was also concluded to be affected by the results of the matches of basketball, hockey, American football, and baseball as concluded by Fan and Wang (2018). Another major sport event at the international level is the Olympic games which affect the volatility and trading volume in the stock market (Wang & Markellos, 2018). Other studies, however, reported no impact for the sport events on the stock market including the study of Devy and Irawan (2019) who concluded that the Asian games did not impact the stock market while Anghel (2018) found that the impact is economically weak. From these contradicted results about the impact of sports' events on the stock market, which were concluded from studying different countries and considering many sports, it can be noticed that there is no agreement among researchers about the significance of the impact and about which sport has the highest effect on stock markets. This disagreement leaves the doors open for more research using more sports and considering more important sports' tournaments.

Some of previous studies about sport impact on stock markets were conducted without considering whether the sport under study is the most popular in the country on which the study was conducted. For instance, Gao et al. (2022) studied the effect of soccer team's results on the stock prices of the firm that owns or sponsor that team using the Chinses stock market although soccer is not the most popular sport in the country (Klingelhöfer, 2022,). Another example is the study of Wang and Markellos (2018) who analyzed the effect of the results of summer Olympic games on the stock markets of many countries including the United States of America and the United Kingdom while most people in the former country prefer to watch American football (Injai, 2022) and most people in the latter country like to watch soccer and cricket matches (Das, 2023). In addition, results of matches used in some of previous studies were analyzed without considering the level of importance of the match as a variable that can affect investors' behavior. This includes studies like the study of Gkillas et al. (2020) who studied the impact of the results of all one-day international cricket matches for the Indian national team on the stock market regardless of the importance of the match and the study of Truong et al. (2021) in which the results of all international soccer games for the Vietnamese national team were tested without controlling for the importance of the match. In this study, the stock market analyzed was the Indian stock market and the sport studied was cricket which is the most popular sport in India; this means that the popularity of the sport is considered. In addition, the matches considered in this study were matches of the World cup which is the most important tournament for all teams, and this means that the importance of the matches was also considered.

2.3 Cricket Sport and its Effect on the Stock Markets

Cricket was played for the first time in the year 1611 AD in England, the country of origin for cricket, while the first international cricket match was played in the year 1844 (International Cricket Council, n.d.). The main event in this study, cricket world cup, occurred for the first time in 1973 in England and this tournament was for women teams only while the world cup for men started in 1975 in the same country (International Cricket Council, n.d.). the total number of world cup tournaments held since 1975 is 12 tournaments taking into consideration that the tournament occurred every four years in general; the most winning country in the tournament since the beginning until 2019 is Australia followed by India, the country of this study, then West Indies, England, Pakistan, and in the last place is Sri Lanka (Sportskeeda, 2019). In India, however, the game reached the country in the 17th century when the British were ruling India and the first match was played in 1721 (IndiaNetZone, 2019); the country will host the cricket men's world cup of 2023 for the fourth time in its history (International Cricket Council, 2022). More than 90% of cricket fans are from the Indian sub-continent region ("ICC Research", 2018) this region includes: India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan, and Maldives. Since its starting in India, cricket's popularity was increasing till it became the most watched sport in the country (Kogi, 2023).

If there is an impact for the sports event on stock markets, cricket may be the most likely sport to have that effect in India because it's the most popular sport there and this fact has motivated researchers to conduct some studies to test its impact. Beer and Lin (2019) explored that impact by analyzing the results of all matches played by the Indian cricket team from 2008 to 2015 and found that the results of cricket matches do not affect stocks' prices in Bombay stock exchange. The conclusion of this latter study was supported by the study of Gkillas et al. (2020) who concluded that the impact of international cricket matches of the Indian team on Bombay stock exchange is weak. The same stock exchange, however, was studied by Nachimuthu and Selvam (2018) and concluded to be affected by the results of (Twenty 20) and (one day international) cricket matches of the Indian team. The impact of cricket results on the Indian stock market was also evidenced by the study of Jethwani et al. (2017) in which the returns of Indian stock market was affected by the results of the one day international cricket matches of the Indian team. From the results of these studies, it can be concluded that there is no agreement on the impact of the performance of the Indian cricket team on the Indian stock market. This disagreement among the results may be caused by the different importance of the analyzed matches or the different market indices used. In this study, however, all matches are important because they are all played in the most important tournament, world cup, and the two main indices in the Indian stock market were analyzed to reach a conclusion about the real effect of the cricket results on the Indian stock market. This study may add value to the literature by providing new evidence about the effect of major sports events on the stock market but using the most important matches and not all matches as in the previous studies. In addition, the new evidence is based on studying the most popular sport in India and not any other sports which makes the evidence more reliable than that in the previous studies. Finally, the new evidence may be more comprehensive because the researcher used the two main indices in India, Bombay stock exchange index and national stock exchange index to explore the impact of sport major events on the returns of the market.

2.4 Hypotheses

There is no agreement in the literature about the impact of the results of sports events on the stock markets, some researchers concluded that there is no effect while others claimed that the effect does exist. In India, however, the effect of the results of the most popular sport, cricket, was studied by some researchers and the disagreement about the effect is also noticeable. Researchers who studied the effect of the Indian cricket team results on the Indian stock market tested the effect of the results of all matches during a specific period regardless of its level of importance. To compensate for this limitation in the previous studies, the researcher tried to capture the impact of the sports event on the behavior of investor and consequently on the stock markets by testing the results of the most important matches, world cup, of the most popular sport in India, cricket. To achieve this purpose, it was hypothesized that the Indian stock market was affected by the results of the Indian cricket team in the world cup 2019 and that win and loss results have different impact on that market. These hypotheses can be expressed as follows:

H1: The results of the Indian cricket team in world cup 2019 had an impact on the returns of the Indian stock market.

H2: The effect of the results of win on the Indian stock market is significantly different than the effect of loss.

These hypotheses were tested using data from the two major stock indices in India namely: BSE SENSEX and NIFTY50.

3. Methodology and Data

3.1 Research Design

To test the effect of sport's results on the stock markets, researchers used many quantitative methods including generalized autoregressive conditional heteroskedasticity model (GARCH) (Beer & Lin, 2019; Kashif et al., 2020), linear regression model (Graziano & Vicentini, 2017) and event study (Asim et al., 2021; Galloppo & Boido, 2020; Škrinjarić & Barišić, 2019). The method used in this study, however, was the event study because the population size was small (trading days of the Indian team matches in the world cup) and thus, the other methods used in the literature cannot be utilized. Another reason for selecting the event study methodology is that it's the methodology used to test the impact of an event on the movement of stock prices as stated by Sorescu et al. (2017). The main events in this study were the cricket matches of the Indian team in the world cup 2019 and the objective was to explore the impact of this event on the stock prices of the Indian market. Based on the event study methodology, the first step is estimating the expected return for the indices and then compare it to the actual returns to find the abnormal return and finally, test the significance of the calculated abnormal returns. The abnormal returns were calculated for the first trading day after each match. The reason behind selecting the first trading day after the match and not the day of the match itself is that all matches of Indian team were held at 3:00 PM in Indian time (IST) and took a maximum of nine hours; at the end time of each match, the stock market of Bombay and the national stock market are closed and thus, the effect will be reflected in the first trading day after the match. One step in the event study is the calculation of the accumulated abnormal return for two days before the event and the event day to account for any effects before the event day but in this study the results can't be known before the match and thus, no effect is expected before the match end and no need to calculate the accumulated abnormal return. The abnormal return was calculated using the following equation:

$$\mathrm{AR}_{i,t} = \mathrm{r}_{i,t} - E\ (\mathrm{r}_{i,t}) \tag{1}$$

Where $AR_{i,t}$ is the abnormal return for the index i at date t, $r_{i,t}$ is the actual return of index i at date t, and E ($r_{i,t}$) is the expected return of index i at date t.The actual return $r_{i,t}$ for each index was calculated using the following formula:

$$\mathrm{r}_{i,t} = [(\mathrm{P}_{i,t} - \mathrm{P}_{i,t-1}) / \mathrm{P}_{i,t-1}] * 100 \tag{2}$$

where $P_{i,t}$ is the price of the index in trading day t and $P_{i,t-1}$ is the price of that index in the previous trading day. The expected return E ($r_{i,t}$) can be estimated using the average return for the pre-event window or by estimating a regression model for that window based on the following market model as explained by Škrinjarić and Barišić (2019):

$$E\ (\mathrm{r}_{i,t}) = \alpha_i + \beta_i \mathrm{R}_{m,t} + \varepsilon_{i,t} \tag{3}$$

Where $R_{m,t}$ is the market return at day *t*, α_i and β_i are the model parameters, and $\varepsilon_{i,t}$ is the error term. In this study, however, a two market indices were included for which a benchmark index to proxy for the market cannot be identified because if the effect of matches does exist in the Indian market, it will affect any index calculated based on that market and this will result in that the expected return and the actual return be very close to each other and thus, the abnormal return will be unrealistic. For this reason, the average return for each index for the period prior to the beginning of the world cup 2019 was used to estimate the expected return. This average was calculated for the period from trading day -250 (May 24, 2018) till the trading day -31(April 11, 2019) considering that day zero was the starting day of world cup 2019 (May 30, 2019).

In each market, there are some calendar anomalies that affect the stock prices and should be considered in estimating the expected return. In the Indian market, anomalies of day-of-the-week and turn-of-the-month were concluded to exist by Wats (2019). Day-of-the-week effect means that the movement of stock prices is different for some days of the week (Zilca, 2017) while turn-of-the-month means that stock prices increase in the last few days or the first few days of each month (Wats, 2019). To check if the effect of the mentioned anomalies exists for the period of estimating the expected return, the following model was tested:

$$r_{i,t} = \alpha_i + \sum_{g=1}^{5} \beta_{dg} D_g + \beta_{tom} TOM + \varepsilon_{i,t} \tag{4}$$

Where Dg's are binary dummy variables added to represent the days of the week: D_1 will take the value of 1 if the day is Monday or zero otherwise, D_2 is 1 if the day is Tuesday or zero otherwise and so on for the rest of the five trading days in the week. TOM is also a binary dummy variable that equals 1 if the trading day is within the period from the last trading day of the month until the third trading day of the next month and zero otherwise. After calculating the abnormal return for each trading day next to the match day based on Equation 1, the last step was to divide the abnormal returns to two groups for each index: abnormal returns for win matches and abnormal returns for lose matches and test the significance of each group using one sample *t*-test.

3.2 Data

Variables of this study consisted of match results for the Indian cricket team in the world cup 2019 and daily returns of the Indian two indices: BSE SENSEX and NIFTY50. BSE SENSEX index was selected in this study because it's the benchmark index of Bombay stock exchange (BSE) (Business Standards, 2023) which represents one of the two major stock exchanges in India (Study.com, 2022) while NIFTY50 index was selected because it's the most important index in the second major stock exchange in India, the national stock exchange (NSE) (Groww, 2023). Data about the results of cricket matches in world cup 2019 were obtained from business standard website (www.business-standard.com); this tournament was held during the period from 30 May to 14 July 2019. Daily prices of NIFTY50 index were downloaded from www.niftyindices.com while data for the daily prices of BSE SENSEX were obtained from www.bseindia.com. Indices' prices were downloaded for the period from May 24, 2018 to July 15, 2019. To analyze the collected data two statistical tests were used: t-test and ordinary least squares (OLS).

4. Results

4.1 Descriptive Statistics

As can be noticed from Table 1 which contains descriptive statistics about the indices of the study for the period from May 24,2018 to July 15, 2019, the highest average return and the maximum return for the period were achieved by the index BSE SENSEX. During the cricket world cup of 2019, Indian team played 10 matches out of 48 matches played in the tournament; the team won seven matches, lost two matches, and share the points of one match with the opponent team because the match was abandoned. In addition, the Indian team played only one match in the knockout stage (semi-finals) and lost it while the other nine matches were in the group stage.

Table 1. Descriptive Statistics for the Indices: BSE SENSEX and NIFTY50: May 24,2018- July 15, 2019

Index	Average return%	Standard deviation%	Minimum return%	Maximum return%
BSE SENSEX	0.05	0.81	-2.25	3.75
NIFTY50	0.04	0.83	-2.67	3.69

4.2 Hypotheses Testing

The first hypothesis in this study was about the effect of the results of Indian cricket team in the world cup of 2019 on the Indian stock market. This hypothesis was formulated as follows:

H1: The results of the Indian cricket team in world cup 2019 had an impact on the returns of the Indian stock market.

This hypothesis was tested using event study methodology which consists of the following steps:

1. Calculate the average of returns for the period from May 24, 2018 to April 11, 2019 to use it as an estimation for the expected return.
2. Calculate the abnormal return for the event days during the period from May 30, 2019 to July 15, 2019 using Equation 1, and
3. Test the significance of the abnormal returns calculated in step 2.

Before calculating the average returns in step 1, the time series of returns for the period from May 24, 2018 to April 11, 2019 was tested to check if the effects of the day-of-week and the turn-of-the-month exist because it may affect the average. To check for these anomalies, the regression model in Equation 4 was run after testing the assumptions of the linear regression and the stationarity of data. Testing of the linear regression assumptions was performed using SPSS software and the results indicated that all of them were met. In addition, test for stationarity was conducted using the Augmented Dickey-Fuller test for which the alternative hypothesis is that the time series is stationary; the results of this test showed that this alternative hypothesis can be accepted because for all variables, p = .01, and this means that all the variables in the model are stationary. The results of running the regression model are summarized in Table 2. The model for NFITY50 was statistically insignificant, F (5,214) = 654, p = .659) and also for SENSEX, F (5,214) = 416, p = .837). in addition, all variables in the model were insignificant. The dummy variable for Friday was excluded by SPSS for both models and its effect was included in the constant term. These results mean that the anomalies of the day-of-the-week and the turn-of-the-month do not exist in the period for which the average was calculated. The calculated average return for the mentioned period was 0.051% for NIFTY50 and 0.056% for SENSEX.

Table 2. Results of Regression Model to Test for the Effects of the Day-of-the-week and the Turn-of-the-month

Details	α	D_1 (Monday)	D2 (Tuesday)	D_3 (Wednesday)	D_4 (Thursday)	TOM
NIFTY50						
β	0.131	-0.184	0.017	-0.031	-0.220	0.012
P value	.290	.281	.920	.854	.205	.930
SENSEX						
β	0.111	-0.136	0.023	-0.021	-0.167	0.022
P value	.361	.415	.889	.900	.327	.872

The next step was to calculate the abnormal returns for the first day after each match of the Indian cricket team in the world cup of 2019 and then test the significance of these abnormal returns using one sample *t*-test. The average abnormal returns of the two indices for win and lose matches along with the results of *t*-test are summarized in Table 3. As can be noticed from Table 3 and based on a significance level of 5%, the matches that the Indian team lost had a significant effect with a positive average abnormal return for both indices while the win matches had an insignificant negative average abnormal return. This means that the first hypothesis can be partially accepted because only the lose matches had a significant effect on the Indian market. Regarding the second hypothesis, only the loss had a significant effect and no effect for win matches which means that the loss effect is significantly different than the win effect.

Table 3. Results of One Sample t-test for the Abnormal Returns

Details	Average abnormal return%	*t value*	Significance
NIFTY50			
Win	-0.773	-2.203	.070
Lose	0.639	16.102	.039
SENSEX			
Win	-0.744	-2.243	.066
Lose	0.659	25.966	.025

5. Discussion

Based on the results of the statistical tests, it can be concluded that the results of the Indian team in the cricket world cup affect the Indian stock market but only when the team lost the match. This means that the results of losing a match by the Indian team in the cricket world cup affects the behavior of investors in the Indian stock market during the trading day next to the match. In addition, the results showed that losing a match by the Indian cricket team in the world cup can increase the stock prices in the stock market during the next trading day after the match. These results were the same for the two most important indices in India: NIFTY50 and SENSEX. From these conclusions, it can be claimed that major sport events can affect stock markets through affecting the feelings and behavior of investors in the market during the next trading day after that event. Another conclusion reached in this study is that losing a match can affect the investors' behavior more significantly than winning a match and that the effect of loss on the stock prices is positive. One indication from these results is that the Indian investors buy more stocks when they have a bad mood after losing a cricket match in the world cup. The results of this study are inline with the results of Graziano and Vicentini (2017) who concluded that soccer world cup results have an effect on the stock market and the results reached by Fan and Wang (2018) in which they claimed that stock market is affected by the results of matches of basketball, hockey, American football, and baseball. The significant effect for cricket matches on the stock market was concluded by Jethwani et al. (2017) and Kashif et al. (2020) which also supports the results of this study. Some other studies, however, do not support the results of this study including the study of Devy and Irawan (2019) who concluded that the ASIAN games had no impact on the stock market and Anghel (2018) who claimed that the impact is weak. In addition, the Indian stock market was concluded to be not affected by the results of the Indian cricket team as reported by Beer and Lin (2019) and Gkillas et al. (2020) which is also not supported by the results of this study. Regarding the effect of win and loss on the stock market, the results of this study are not inline with the results of Truong et al. (2021) who concluded that losing an international soccer match has a negative impact on the stock prices and the study of Nachimuthu and Selvam (2018) in which the authors claimed that both win and loss of an international one-day cricket match affect the Bombay stock exchange while in this study only loss has a significant and positive impact.

The reason behind the insignificant effect of winning may be related to the intensive media coverage of the Indian cricket team's matches in the world cup because good information and deep analysis in media may lead to pricing the stocks reasonably by investors as stated by Fan and Wang, 2018. On the other side, low quality information and bad analysis of matches in the media may have deceived the investors and resulted in significant effect for the loss in the stock market. One indicator for the robustness of the results of this study is that the same conclusions were reached for two different indices in Indian market (NIFTY50 and SENSEX) and not one, which means that the effect is true for the entire stock market. The results of this study can be generalized to other stock markets using the results of the most popular sport in the countries of these markets and using the matches in the most important tournament for that sport. This generalizability is derived from the appropriate selection of tested sport (cricket), from the importance of the selected tournament (world cup), and from the selection of the country (India) in which the sport is the most popular. Variations in the level of these three elements can lead to different levels of effects on the stock market. This study can add a new evidence to the current literature about the psychological effect of sports' results on the decisions of investors and consequently, on the prices of stocks in the markets. The investment strategy that may be derived from the conclusions of this study is that if the investor expect loss for the Indian team, she or he can buy stocks included in the NIFTY50 and SENSEX indices and then sell it in the next first or second trading day after the match. Future research may be needed to explore the reason for this reaction of the Indian investors after their cricket team lose a match in the world cup and why winning a match has no significant effect on their behavior.

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