

Impact of Terror Attacks on Indian Stock Market

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Abstract

Terrorism is intentional use of violence to create fear amongst the masses. The objective of the terrorism is to achieve political or other vested interest by the perpetrators of such attacks. Terrorism is an international phenomenon and India is one country that has lost many precious life and resources due to it. Terrorism has a significant impact on political and economic position of a country. Stock markets are considered as critical barometer to measure the economic strength of an economy. Stock market does not like uncertainty and like other catastrophes terror attack also creates uncertainty that affects stock market. The present research work is an attempt to examine the impact of terror attack on Indian Stock market. This study has been conducted using Event Study Methodology to analyze the impact of terror attacks on S&P BSE 500 companies. Every terror attack has been considered as an event and the result has been complied by using -10 to +10 day's window period. It was observed that except few attacks there is no significant impact of terror attack on the S&P BSE 500 companies.

Key Words: Terror attacks, Indian stock market

Introduction

India has always remained under the threat of terrorism. It has many forms such as ethno-nationalist terrorism, religious terrorism, left wing terrorism and narco terrorism. The center of terrorist activities in India include Jammu and Kashmir, east and south India as some states are affected from naxalism. Although as per Indian Govt. most of the terror activities are funded by Pakistan yet there are some nationalist insurgent groups active in Assam, Jharkhand, Chhattisgarh, Odisha, and in some portions of Bihar and West Bengal. The terror attack in all consensus will lead to decrease in shareholders wealth. It is pertinent to examine whether such assumptions hold true or not. The present research work is an attempt to find out

whether such attacks have an impact on stock market in India or not.

Research Methodology

Objective of the Study

The study is aimed at examining the impact of terror attacks on Indian stock market. The topic has not much been considered by the researchers in India. The spillover impact of the event will also be the focus area of the study.

Event Study Methodology

Event study methodology is used to determine the impact of specific event on stock markets. The concept of event study was introduced by Dolley (1933)ⁱ on stock splits. It was followed by Bakay (1948)ⁱⁱ and

Barker, (1956)ⁱⁱⁱ. The methodology was further developed by Fama (1969)^{iv} and new application area of the same are considered. Finally, Brown and J Warner (1985)^v gave a detailed account about the method of conducting event study. Event study consists of 7 steps as quoted by Campbell, Lo, & MacKinlay (1997)^{vi}.

Event Definition

The day on which the terror attack takes place is considered as event day. If the attack happens after market hours or the on the day when stock market is closed the next working day is considered as event day.

Hypothesis of the study

H₀:- There is no impact of terrorist attacks on Indian stock market i.e. BSE 500 index

Sample

The sample under study is 20 terrorist attacks that happened from 1st January 2000 to 7th march 2019.

Sample Selection Criterion

In all 102 terrorist attacks has been reported in India from 8-Jun-80 to 7-Mar-19. The number decreased to 91 if we consider data after 1st January 2000. As the present research is looking to consider the impact of terror activities on stock market a search was made for attacks that has been widely reported in media and considered major attacks. For this attacks that resulted in more than 40 deaths all over India and as Delhi and Mumbai are considered to be the centers of political and financial activity all attacks resulting in more than 5 deaths has also been considered. On this basis the

author was able to find out 20 terrorist attacks that happened from 1st January 2000 to 7th march 2019.

Data Collection

Information regarding terror attacks has been gathered from the Global Terrorism Database. The proxy for stock market data has been considered as BSE 500 indices. The relevant proxy for expected market return is taken as BSE Sensex as Bombay Stock Exchange happens to be the oldest stock exchange in Asia. Data regarding share prices has been collected from the Bombay Stock Exchange (BSE).

Abnormal Return

To examine the impact of terror attack the abnormal returns were calculated for 20 days window period (± 10 days from event day). The abnormal returns were measured through Market Model in which return of the stocks were related with market portfolio return to find the abnormal return.

The abnormal returns has been calculated as

$$AR_{it} = R_{it} - E(R_{it})$$

Where,

AR_{it} = abnormal return on security i for day t

R_{it} = actual return on security i for day t

$E(R_{it})$ = expected return on security i for day t

Actual return on security i for day t will be calculated as

$$R_{it} = \text{Log}(P_{it}/P_{it-1})$$

The market return was computed as,

$$R_{mt} = \text{Log}(I_t/I_{t-1})$$

Where,

Ln was natural logarithm¹,

¹Logarithm measured returns were considered as less volatile as compared to traditional percentage method

P_{it} = adjusted closing price of BSE 500 on day t

P_{it-1} = adjusted closing price of BSE 500 i on day t-1

I_t = adjusted closing price of Sensex on day t

I_{t-1} = adjusted closing price of Sensex on day t-1

The estimation period² is 200 days preceding the window period (-210 days to -11 days) for which the daily returns were available. Furthermore the event window had itself been omitted from the estimation period as the event itself effects the estimation of the parameters (MacKinlay 1997)^{vii}.

To measure the expected returns, the following market model was used:

$$E(R_{it}) = \alpha_i + \beta_i * R_{mt} + e_{it} \quad \text{for } i=1, \dots, N$$

Where

α_i = Ordinary Least Square (OLS) estimate of the intercept of the market model

Regression

β_i = Slope of the line representing sensitivity of return on security to market return

R_{mt} = Return on market (BSE Sensex) at time t.

e_{it} = Standard error term

T statistic of Abnormal Return

T statistic of Cumulative Average Abnormal Return had been calculated by using following formula

$$T\text{-Stat} = \text{ARit} / \hat{S}(\text{ARit})$$

Where (ARit) = Abnormal Return for each day in window period

\hat{S} (CAARit) = Standard deviation of Abnormal Returns of the companies in question during the estimation period i.e (-210 to -11 days).

The Test statistics used to test whether AR was statistically significant in various window periods.

Review of Literature

- **Agarwal, Ghosh P. & Haibei Zhao^{viii} (2018)** in their paper “Violence and investor behavior: Evidence from terrorist attacks” examined the effect of violence on investors’ trading behavior in the stock market. The findings shows that the investors located in the areas near the attacks tend to trade less and performed worse compared with their peers. Decrease in trading activity is on account of the loss of cognitive abilities due to stress and fear after the attack. Lastly, institutional trading activity is not affected by the exposure to violence.
- **Chaudhry et.al.^{ix} (2018)** in their article “Impact of terrorism on stock markets: empirical evidence from the SAARC region” examines the impact of terrorism on stock markets in SAARC countries during 2000–2015. The study found that terrorism produces adverse effects in the stock markets of the SAARC countries.
- **Stelios Markoulis & Savvas Katsikides^x (2018)** “The Effect of Terrorism on Stock Markets: Evidence from the 21st Century” This paper has made an attempt to analyses the impact of 11 major terrorist attacks in 21st century. The results shows that earlier

as Natural logs covers the variation of 2% to 3% in share return originating through market fluctuations.

² Estimation period is assumed to have no effect of the announcement of event.

attacks has more impact as compared to recent attacks. Moreover, recent attacks has no impact on local or worldwide market.

- **Muneeswaran & Babu^{xi} (2017)** in their paper “Impact of Terrorism on Indian Capital Market: An Empirical Study” offers to check the impact of terrorist attacks on stock markets of India. The five major terrorist attack events, over the period 2005 to 2009 were taken into consideration. The findings of the study recommends that investors need to wait and should not take immediate decision on investment, during abnormal events in the market.
- **Ali Hashmat et.al^{xii}. (2017)** in their paper “How Different Terrorist Attacks Affect Stock Returns Evidence from Pakistan Stock Exchange” The aim of the study was to find the impact of terrorism on Karachi stock exchange. The study has been conducted by examining ten out of 995 major terrorist attacks in Pakistan during the period 2007-2014. The finding shows that the news of terrorist attacks has resulted in negative impact on Karachi Stock Exchange (KSE).
- **Schepers M^{xiii}. (2016)** in his master thesis “Effect of terror attacks on the bond and stock market of European countries” investigated the effects of terror attacks on the stock and bond market of five European countries. The period under study is 1994-2014. Finding shows a significant on the bond market of those countries. No significant impact was found in the stock market.
- **Ghani, Maria^{xiv} (2016)** “Impact of Terrorism on Stock Market: Evidence from Pakistan Banking Sector” this study investigates the impact of two terrorist attacks of 2014 on banking sector in Pakistan. All listed commercial bank in Karachi stock exchange were considered. The results indicated significant impact of one attack and insignificant for the other.
- **Tahir Suleman, Muhammad^{xv} (2012)** “Stock Market Reaction to Terrorist Attacks: Empirical Evidence from a Front Line State” In this study, the author investigated the effect of terrorist attack on Karachi Stock Exchange. The results point to negative impact on the returns of all the sector indices.
- **Chesney, M., Reshetar, G. and Mustafa Karaman^{xvi} (2010)** “The Impact of Terrorism on Financial Markets: An Empirical Study” the main aim of this study is to study impact of terrorism on stock, bond and commodity markets during the period from January 4, 1994 to September 16, 2005 for 25 countries. The results indicates that at least two thirds of the terrorist attacks resulted in negative impact on one market only.
- **Brounrn, D. and Jeroen Derwall^{xvii} (2010)** “The Impact of Terrorist Attacks on International Stock Markets” in this paper the authors examines the impact of terrorist attacks on major economies of the world. Event study methodology was adopted that points out to marginally negative price effects. The impact of attacks was more prominent to local

market as compared to international level with only exception of September 11 attacks on twin tower in USA.

- **Cam, M. Anne^{xviii} (2008)** “The Impact of Terrorism on United States Industries” This paper examines the impact of Bali bombing and the Madrid bombing on USA Industries. I35

industries were selected for the purpose. There was an inconsistent response such as leisure, hotel and airline industries shows negative abnormal returns while defense and telecom exhibits positive returns. US industry equity returns were not much affected by Bali and the Madrid attacks.

List of Terror Attack from year 2000 onwards killing more than 40 people

Sr No	Date	Nature of Attack	Place	Killed	Injured	T Stat	Sig
1	13-Dec-01	Indian Parliament attack	Delhi	7	18	-0.01	NO
2	10-Sep-02	Rafiganj train wreck	Bihar	200	150+	-2.80	yes
3	13-Mar-03	Mumbai train bombing	Mumbai	10		-0.08	No
4	25-Aug-03	Mumbai bombings	Mumbai	52		-2.17	yes
5	29-Oct-05	Delhi bombings: Three powerful serial blasts	Delhi	70	250	2.14	yes
6	11-Jul-06	Mumbai train bombings: Series of 7 train bombing during the evening rush hour in Mumbai	Mumbai	209	500	-2.44	yes
7	18-Feb-07	Samjhauta Express bombings	Haryana	68	50	-0.32	No
8	25-Aug-07	Hyderabad bombings - Two blasts.	Hyderabad	42	54	0.94	No
9	13-May-08	Jaipur bombings: 9 bomb blasts along 6 areas in Jaipur	Jaipur	63	200	-0.15	No
10	26-Jul-08	Ahmedabad bombings: 17 serial bomb blasts	Gujarat	56	200+	0.16	No
11	13-Sep-08	Delhi bombings: 5 bomb blasts	Delhi	33	130	-0.83	No
12	30-Oct-08	Assam bombings	Assam	81	470	-2.60	yes
13	26-Nov-08	Mumbai Taj attacks	Mumbai	171	239	-1.93	No
14	6-Apr-10	Maoist attack in Dantewada	Chhattisgarh	42 (including 8)	8	0.37	No

				terrori sts)			
15	28-May-10	Jnaneswari Express train derailment	West Bengal	74	100+	0.76	No
16	13-Jul-11	Mumbai bombings	Mumbai	6	65	0.73	No
17	7-Sep-11	Delhi bombing	Delhi	9	38	-0.83	No
18	23-Dec-14	Assam violence	Assam	85		0.73	No
19	4-Jun-15	Manipur ambush	Manipur	176 (inclu ding 158 terrori sts)	15	0.35	No
20	14-Feb-19	Pulwama attack	Awantipora , Jammu & Kashmir	46	250-300	1.24	No

Conclusion

This study has been conducted using Event Study Methodology to analyze the impact of terror attacks on S&P BSE 500 companies. Every terror attack has been considered as an event and the result has been compiled by using -10 to +10 day's window period. It was observed that on individual event basis only 5 events out of 20 has pointed out to

significant negative return. Other 15 events has not indicated any impact of terror attacks on BSE 500. Overall, no significant impact on stock market prices were found when all the events are taken together. The results are consistent with many earlier studies that has found no impact of such attacks on stock market. It can be said that terror attacks barring few does not have any impact on stock market in India.

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