Terrorism and the Response of Investors at Capital Market: A Case of Pakistan

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Abstract

The impact of terrorism on capital market of Pakistan has been examined in this research by using the ten biggest attacks of the last decade (with different targets and venue) out of a total of 941 attacks of this period. Event study methodology has been applied using one way ANOVA post-hoc and multivariate Regression techniques to investigate the impact of terrorist attacks on Karachi Stock Exchange. The results indicated that KSE is becoming insensitive to terrorist attacks. The assaults which target some important political figure and create countrywide violence can only disturb the functioning of KSE. The findings suggest that investors, unlike the stock exchanges of developed countries, should confidently invest at KSE because of numb behavior of market against terrorist attacks. However, the study has picked by only the biggest attack of every year, so future research can be made on all important attacks.

Keywords: Karachi stock exchange, terrorism, event study methodology, capital markets.

1. Introduction

The stock market is the leading indicator of economic strength of a country. It provides an estimation of future economic doings. History shows that it has always been a fine predictor of upcoming dejection of the economy. Numerous studies have provided evidence of a sturdy link between stock market returns and economic activity (Fischer & Merton, 1984; Mullin & Wadhwani, 1989; Asprem, 1989; Barro, 1990; Fama, 1990; Schwert, 1990).

Pakistan is a developing country, running with three stock exchanges i.e. Karachi stock exchange (KSE), Lahore stock exchange (LSE) and Islamabad stock exchange (ISE). Among these the Karachi stock exchange is the biggest stock exchange of the country. It was established on 18th September 1947 with a total paid up capital of 37 million rupees. At present there are 582 companies listed at KSE with a total market capitalization of 4,836.362 billion rupees.

1.1 Background

The terrorist attacks put significantly negative influence on economy of any country in short run. Nearly all the macroeconomic variables like GDP, employment, domestic investment and foreign direct investment are greatly influenced by the terrorist attacks or threat of these attacks (Abadie & Gardeazabal, 2003; 2008; Enders et al. 2006). It is because when terrorist events take place, a widespread uncertainty is created which shakes the confidence of domestic as well as foreign investors. The spending of government also increases to improve the security situation against the potential threats of terrorism. Thus, investments decline and the level of unemployment also shatters which ultimately reduces the GDP.

Most of the studies have found that the major aim of all terrorist activities is to hamper the economy of any country to convince the government for its demands (Enders & Sandler, 2008; Bird et al., 2008; Abadie & Gardeazabal, 2008; Gessenber & Luechinger, 2011). The results of all these studies have concluded that terrorism lead to massive destruction of the economy both in short and long run. To quote an example, (Crain & Crain, 2006) calculated that terrorism costed $3.6 trillan US dollars of world GDP in the year 2002. In another research, (Enders & Sandler, 1996) have studied the impact of terrorism on economy of Spain and Greece during 1975-91. They found that the terrorism resulted in decline in foreign direct investment of these two countries by 13.5 and 11.9 percents respectively. Abadie & Gardeazabal, (2003) have estimated a loss of 10 percent of GDP of Basque country due to last two decades of terrorism.

1.2 Aim of Study

Over the years, the terrorist activities are on an increase in Pakistan. According to the ranking by the Institute of Economics and Peace, Pakistan has been placed at number three in terms of biggest terrorism affected country. However, the Karachi Stock Exchange (KSE), the biggest stock market of Pakistan, is also outperforming. So, this study aims to investigate the behavior of KSE in retort of terrorism. The findings of study will add to literature by highlighting the reaction of KSE against terrorism. The recent research of (Alam, 2013) investigates the reaction of KSE against terrorism but his study has provided only an overall impact of terrorism on KSE, while this study not only provides information on overall impact of terrorism but also the difference in reaction of KSE against a variety of different terrorist attacks. This is the main contribution of this study.

2. Literature Review

In the recent past, there is mounting attention of research to study the behavior of stock market in response of terrorist attacks (Sandler, 2003; Sandler & Enders, 2004; Bruck & Wickstrone, 2004; Bruck, 2005; Brounrn & Derwall, 2010). It has been observed that terrorism can affect the capital market to a greater extent in a very short time period (Chen & Siems 2004). Terrorist activities directly influence the sentiments of investors and thus lead towards downturn of stock market. This is because the investors become defensive in the phase of uncertainty caused by such events and it results in huge price fluctuation at stock exchange (Arin et al. 2008; Drakos, 2010).

The 9/11 attack on World Trade Centre was the first one which drew the attention of researchers to study the capital markets in response of terrorism (Chen & Siems, 2004; Hon et al. 2004; Nikkinen et al. 2008). In another study (Chesney et al. 2011) studied the

impact of 77 terrorist attacks which occurred in 25 countries over the period of 11 years. They reported that almost 66 percent of the terrorist attacks unfavorable effects on stock market. The study concluded to have significant negative impact on stock markets. The negative impact is extreme on the day a terrorist attack occurs and later on the intensity declined. After the 9/11 attacks, there is another mega terrorist event which is Madrid and London bomb attacks. Kollias et al. (2011) investigated the impact of these events on stock markets of Barcelona, Madrid, Valencia and London. The findings of their paper confirmed a significant negative impact of the attacks on all these stock exchanges. The reaction of all the stock exchanges was similar on the day of the event; however their recovery was different.

The venue and target of attack is one of the most important factors in determining the impact of terrorist event on stock market returns. A terrorist event targeted in a less populace city or near residential area may has lower impact on stock returns whereas an attack targeted at corporate area or at important political places may has sever repercussions on stock returns (Kollias et al, 2011).

On the basis of this literature, the research hypothesis for this study can be formulated as:

➢ **H₁**: Terrorist attacks of the last decade in Pakistan have a significant impact on KSE 100 index.

➢ **H₂**: Terrorist attacks of the last decade in Pakistan have a significant impact on top ten sectors of KSE.

3. Methodology

The current study investigates the impact of major terrorist attacks of the last ten years ranging from 2003 to 2012 on KSE 100 index. The terrorist attacks include 2003 Quetta Attack in Mosque, 2004 Sialkot Attack in Mosque, 2005 Jhal Magsi Attack on Shia Muslims, 2006 Karachi Attack on Sunni Muslims, 2007 Rawalpindi Attack on Benazir Bhutto, 2008 Islamabad Attack on Marriott Hotel, 2009 FATA Attack on armed forces, 2010 Darra AdemKhel Attack in Mosque, 2011 Charsada Attack on military personnel and 2012 Kurram Agency attack in Mosque. All these attacks have been treated as independent variables. The major events have been determined on the basis of number of casualties and injuries, i.e. the attack which produced the maximum number of casualties or injuries or the one which created the greatest violence in the country in every year under study. These attacks have been taken chronologically from the list of past ten years starting from January 2003 to December 2012.

The impact of these variables has been checked on KSE 100 index, so KSE 100 index is the dependent variable. The data regarding these terrorist attacks and KSE 100 index has been collected from South Asian Terrorism Portal and the official website of KSE respectively.

3.1 Procedure

There are various approaches to study the impact of an event on stock returns. This study has used a different approach to divide the time period of every attack between three estimation windows which are pre-event, event and post event window. Test statistics of Post Hoc Tukey and multivariate regression model have been used after fulfilling the assumptions to investigate the influence of all variables on KSE 100 index. The rationale of using this methodology has been given by Thompson, (1985). According to

Thompson, (1985) multivariate Regression provides more comprehensive and more flexible results when the events are clearly given to check their impact. The results of multivariate regressions are more elaborative and easily understandable as contrast to econometric technique. Also, this methodology has already been tested and applied by Ashfaq in a recent study of KSE. The three estimation windows have been depicted in Figure 1.
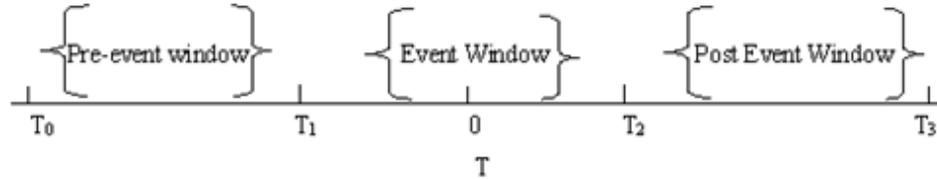
3.2 Event Study Windows

Figure 1: Event Study Windows

4. Results

The data has been analyzed using SPSS 18.0. The impact of selected terrorist attacks has been checked using one way ANOVA Post Hoc test and multivariate regression analysis. The data set fulfills the assumptions for running the Post Hoc test and multivariate Regression model. For Post Hoc test, normality and homogeneity have been tested using P-P plots and levene statistics of homogeneity, while all the observations are independent of each other (Feild, 2009). For multiple Regression test, the assumptions of linearity, normality, multicollinearity and homoscedesiticity have been checked through P-P plots, correlation coeffeicients and scatterplot respectively (Pallant, 2005). Table 1 summarizes the results of Post Hoc Tukey as under:

Table 1: Post Hoc Tukey

Attack	I	J	Mean Difference (I-J)	Sig.	95% Confidence Interval Lower Bound	Upper Bound
2003	Pre-	Event	-289.99*	0.000	-408.52	-171.4625
	Event	Post Event	-712.03*	0.000	-830.56	-593.5045
2004	Pre-	Event	-299.98*	0.000	-373.8	-226.101
	Event	Post Event	-316.15*	0.000	-390.04	-242.2697
2005	Pre-	Event	1138.15*	0.000	671.24	1605.0686
	Event	Post Event	2110.84*	0.000	1643.93	2577.7612
2006	Pre-	Event	-397.14*	0.002	-665.74	-128.5387
	Event	Post Event	264.07	0.050	-4.53	532.672
2007	Pre-	Event	438.70*	0.000	217.89	659.5112
	Event	Post Event	560.48*	0.000	339.67	781.2945
2008	Pre-	Event	63.57*	0.000	41.51	85.6263
	Event	Post Event	66.16*	0.000	44.11	88.225
2009	Pre-	Event	-1310.27*	0.000	-1618.05	-1002.4913
	Event	Post Event	-1314.76*	0.000	-1622.55	-1006.986
2010	Pre-	Event	-465.45*	0.000	-590.46	-340.4401
	Event	Post Event	-1049.51*	0.000	-1174.52	-924.5048
2011	Pre-	Event	-125.45*	0.006	-219.15	-31.75
	Event	Post Event	-385.14*	0.000	-478.84	-291.43
2012	Pre-	Event	-753.71*	0.000	-957.70	-549.72
	Event	Post Event	-1274.63*	0.000	-1478.62	-1070.64

Table 1 is showing the results of one way ANOVA Post Hoc Tukey for all major attacks under study. The first column labels all the attacks. The results of mean difference column show the increase or fall in index as a result of an attack.

First of all it is showing the results for 2003 attack. It can be seen that there is an increase of almost 290 points from pre-event to event time period. While it was below 422 points in event time period as compared to post event period. It means that the market went on increase throughout all estimation windows. Hence the 2003 Quetta attack did not affect the market rather it increased further its trading in post event period.

The mean difference column for 2004 attack shows that the market was increasing in pre-event period. It increased to 290 points in event time period as compared to pre-event. And in post event period it further increased by 16 points, on an average, as compared to event window. All this indicates that although the attack does not have any major influence of stock exchange index but the index moved upward slowly in post event period.

The attack of 2005 led to decrease the index from pre-event to event time period by 1138 points while it further decreased by 972.6267 points in post event period. It concludes that the Jhal Magsi attack resulted in significant negative influence on stock exchange of Pakistan. In case of 2006 attack, the market index was increasing in pre event period by an average of 397 points while it decreased in post event period by an average of 661 points. Both these results are statistically significant. It can be concluded that the attack resulted in significant negative influence on trading at stock exchange.

The mean difference column for 2007 attack is showing unusual results. The market index decreased in pre event to event time period and this result is significant at a level of .05 as shown by the significance column. And it dropped further by 121 points in post event period but the results are not significant as shown by the significance column. All this means that the market dropped as a result of this attack in both event and post event period. However, the drop in index in post event period was lesser than the event time period which means that the market started to recover in post event period.

There is a drop of 63.57 points before in event window for 2008 attack and this result is statistically significant. However, the index remained almost stagnant in post event period as it decreased to only 2 points on an average after the occurrence of attack. But the results are not significant as the p value is .956.

The mean difference column of 2009 attack is showing the statistically significant difference exists in pre event to event time period. The stock market increased 1310 points during pre-event to event time period. It means that the market was enjoying good time period but immediately after the attack it increased by almost 4 points during post event window. Hence, it confirms that although the index did not go negative as a result of this attack but it became stagnant after the occurrence of this attack.

The mean difference of 2010 Darra Adam Khel attack shows that there is an average increase of 465 points in index during pre-event time period while it increased further by 584 points in post event period. It means that the attack has no impact on the index rather it moved more positively after the occurrence of event. The attack of 2011 increased the index to 125 points in pre event time period while it further increased by 259 points in post event period. Both these results are statistically significant at a level of .05. Finally, the 2012 attack resulted in increase of 753.71 points in pre event period while the index increased further by 520.91 points in post event period after the occurrence of attack. Both these results are statistically significant at a level of .05.

Table 2: Multivariate Regression Analysis

Events	Constant	Pre-event	Post Event	R-Square	F-Statistics
2003 Quetta Attack in Mosque	3646.579	-289.995	422.042	0.837	107.717
	34.499	48.789	48.789		
	105.701	-5.944	8.65		
	0.000	0.0000	0.0000		
2004 Sialkot Attack in Mosque	5372.979	-299.988	16.169	0.765	68.55
	21.505	30.413	30.413		
	249.849	-9.864	0.532		
	0.0000	0.0000	0.598		
2005 Jhal Magsi Attack on Shia muslims	8097.241	1138.155	-972.693	0.742	60.441
	135.896	192.185	192.185		
	59.584	5.922	-5.061		
	0.000	0.0000	0.0000		
2006 Karachi Attack on Sunni Muslims	11912.871	-397.141	-661.211	0.463	18.125
	78.177	110.559	110.559		
	152.384	-3.592	-5.981		
	0.000	0.0000	0.0000		
2007 Benazir Bhutto Assassination Attack	14032.67	438.701	-121.783	0.500	21.041
	64.267	90.887	90.887		
	218.35	4.827	-1.34		
	0.000	0.0000	0.187		
2008 Marriott Hotel Attack	9186.111	63.571	-2.599	0.619	34.081
	6.419	9.078	9.078		
	1431.009	7.002	-0.286		
	0.0000	0.0000	0.776		
2009 FATA Attack on armed forces	7390.29	-1310.274	4.495	0.773	71.56
	89.58	126.686	126.686		
	82.499	-10.343	0.035		
	0.0000	0.0000	0.972		
2010 Darra AdamKhel Attack	11060.216	-465.452	584.065	0.909	208.892
	36.385	51.456	51.456		
	303.979	-9.046	11.351		
	0.0000	0.0000	0.0000		
2011 Charsada	12070.139	-125.458	259.683	0.712	51.878
	27.272	38.568	38.568		

Attack on military personnel	442.584	-3.253	6.733		
	0.0000	0.0000	0.0000		
2012 Kurram Agency attack in Mosque	12859.616	-753.716	520.916	0.847	116.509
	59.371	83.964	83.964		
	216.597	-8.977	6.204		
	0.0000	0.0000	0.0000		

Table 2 is showing the results of multivariate regression analysis. The F-statistics for all terrorist attacks is significant at a level of 0.05. The values of R squarefor all events is showing that a significant amount of variance is explained by the model. The regression coefficients are also depicting the same picture as explained by the Post Hoc test. In case of 2003 attack the market was at 3354.584 (3646.579-289.995) and in post event period it reached to 4068.621 (3646.579+422.042). The attacks of 2005, 2006, 2007 and 2008 resulted in decline of index at the end of post event period.

5. Discussion

This applied research is focused on impact of terrorism on biggest capital market of Pakistan i.e. Karachi Stock Exchange. The condradicting results of previous researchers have provided space for this study. Statistical tests including One way ANOVA using Posthoc Tuckey and multivariate Regression has been used to investigate the relationship between ten different terrorist attacks of the past decade in Pakistan with KSE 100 index.

The results have shown that the KSE 100 index is influenced by certain terrorist attacks, however, it is insensitive to most of the terrorist activities. The news headlines of only 2007 Benazir Bhutto Assasssination attack confirm that the drop in index was caused only by the mega terrorist attack and for the rest of attacks, there are other political and economical reasons which are more contributing factors for dropping the index (Dawn News 2008).

The impact of terrorist attacks can also be analyzed by dividing them on the basis of target of attack. In this regard it can be seen that the attack of 2007 on famouse political leader has adverse impact on KSE while the attacks of 2009 and 2011 on millitary did not caused serious implication for KSE. The civilian attacks of 2005 and 2006 on Shia and Sunni muslims respectively led the index to decline which means the attacks targeted on a particular race or sect can result in decline of index.. The venue of attack cannot be a determinant of severity. As an attack in a remote area of Pakistan like 2005 attack of Jhal Magsi resulted in decline of index and those of Charsada, Darra Adam Khel, FATA and Kurram Agency did not resulted in a negative impact. Similarly, the 2006, 2007 and 2008 attacks of Karachi and Rawalpinidi resulted in decline of index, however, the index remained positive during 2003 Quetta and 2004 Sialkot attacks.

6. Conclusion

Analyzing the impact of terrorism on capital markets is the growing area of research all over the world. This applied research was also undertaken for the same purpose using KSE 100 index. A total of 941 terrorist attacks for the period 2003 to 2012 were taken. Out of which, 10 biggest terrorist attacks with different targets were selected to analyze their impact on stock exchnage. The results of study conclude that the Karachi Stock

Exchange is almost insensitive to terrorist attacks. However, the attacks which can cause the countrywide violence have serious implications for KSE.

7. Future Research

This study investigates the impact of terrorist attacks on KSE 100 index. However, the political and economic news have also an important blow for capital market. So, future research can be undertaken by making a comined impact factor of both terrorism as well as political and economic news. The sectorwise eaction of the bigger sectors of KSE 100 index should also be analyzed to provide guidance to investors for portfolio diversification.

REFERENCES

Abadie, A., & Gardeazabal, J. (2008). Terrorism and the world economy. *European Economic Review , 52* (1), 1-27.

Abadie, A., & Gardeazabal, J. (2003). The economic cost of conflict: a case study of the basque country. *American Economic Review , 93*(1), 113-132.

Alam, A. (2013). Terrorism and stock market development: causality evidence from Pakistan. *Journal of Financial Crime , 20*(1), 116-128.

Andy Field (2009), *Discovering statistics using SPSS*, Dubai, Sage Publications.

Arin, K., Ciferri, D., & Spagnolo, D. (2008). The price of terror: The effects of terrorism on stock market returns and volatility. *Economic Letters*, 101 (3), 164-167.

Asprem, M. (1989). Asset portfolios and macroeconomic variables in ten European countries. *Journal of banking and finance , 13* (5-5), 589-612.

Barro, R. (1990). The stock market and investment. *The review of financial studies , 3* (1), 115-131.

Bird, G., Blomberg, S., & Hess, G. (2008). International Terrorism: Causes, Consequencies and Cures. *The World Economy , 2*, 255-274.

Brounrn, D., & Derwall, J. (2010). The impact of terrorist attacks on international stock markets. *European Financial Management , 16* (4), 585-598.

Brown, S., & Warner, J. (1985). Using daily stock returns. *Journal of Financial Economics , 14* (1), 3-31.

Bruck, T. (2005). An economic analysis of security poicies. *Defence and Peace Economics , 16*, 375-389.

Bruck, T., & Wickstrom, B. (2004). The economic consequences of terror. *European Journal of Political Economy , 20*, 292-300.

Chen, A., & Seims, T. (2004). The effect of terrorism on global capital markets. *European Journal of Political Economy , 20*, 349-366.

Chesney, M., Reshetarb, G., Karamana, M. (2011). The impact of terrorism on financial markets: an empirical study. *Journal of Banking and Finance*, 35 (2), 253-267.

Crain, N., & Crain, W. (2006). Terrorized Economies. *Public Choice* 128 (1-2), 317-349.

Dawn News (2008, Jan 1) KSE index plunges by record 696.83 points, [Online] Available: http://www.dawn.com/news/282523/kse-index-plunges-by-record-696-83-points (December 20, 2014).

Drakos, K. (2010). Terrorism activity, investor sentiments and stock returns. *Review of Financial Economics*, 19(3), 128-135.

Enders, W., & Sandler, T. (2008). Economic consequences of Terrorism in developed and developing countries: An overview. *Terrorism, Economic Development and Political Openness* , 17-47.

Enders, W., & Sandler, T. (1996). Terrorism and Foreign Direct Investment in Spain and Greece. *Kyklos ,49* (3), 331-352.

Enders, W., Adolfo, S., & Sandler, T. (2006). The impact of Transnational Terrorism on US Foreign Direct Investment. *Political Research Quarterly , 59* (4), 517-531.

Fama, E. (1990). Stock returns, expected returns and real activity. *Journal of finance , 45* (4), 1089-1108.

Fischer, S., & Merton, R. (1984). Macroeconomics and finance: the role of stock market. *Conference series on public policy. 21*, 57-108. Carnegie-Rochester.

Gessenber, M., & Luechinger, S. (2011). Lock, Stock and Barrel: A comprehensive assessment of determinants of Terror. *Public Choice , (3-4)*, 235-261.

Hon, M., Strauss, J., & Yong, S. (2004). Contagion Financial markets after September 11: Myth or reality? *The Journal of Financial Reseach , XXVII*, 95-114.

Julie Pallant, (2005)*, SPSS Survival Manual,* sydney, Ligare Sydney.

Kollias, C., Papadamou, S., & Stagiannish, A. (2011). Terrorism and capital markets: The effect of the Madrid and London bomb attacks. *International review of Economics and Finance , 20*, 532-541.

Mullins, M., & Wadhwani, S. (1989). The effect of the stock market on investment: a comparative study. *European Economic Review , 33* (5), 939-961.

Nikkinen, J., Omran, M., Sahlstrom, P., & Aijo, J. (2006). Global stock market reactions to scheduled U.S. macroeconomic news announcements. *Global Finance Journal , 17* (1)*, 92-104.

sandler, T. (2003). Collective action and Terrorism. *The Word Economy , 17*, 779-802.

Sandler, T., & Enders, W. (2004). An economic perspective on transnational terrorism. *European Journal of Political Economy , 20* (2), 301-316.

Schwert, G. (1990). Stock returns and real activity: a century of evidence. *Journal of finance , 45* (4), 1237-1257.

Thompson R. (1985). Conditioning the Return-generating process on firm specific events: A discussion of event study methods. *Journal of Fianacial and Quantitative Analysis,* 20 (2), 151-168.