THE EFFECT OF SECTORAL-LEVEL TERRORISM ON PAKISTAN STOCK MARKET RETURNS [*]

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ABSTRACT

This study examines the impact of sectoral-level terrorism (i.e. terrorist attacks on business sector; defense sector; NGOs, educational and religious institutions; citizens and property; political parties; government general and diplomatic; media and telecommunication sector; and public transportation sector) on stock market using the daily time series data, over the period of sixteen years from January 2000 to December 2015. Our finding affirm that financial markets are sensitive to terrorist shocks and therefore, terrorist attacks have negative impact on stock market. Whereas, some sectors are more sensitive to reaction of terrorist attacks and some are less. Results revealed that defense is most sensitive sector. Contrary, public transportation is less sensitive sector. Therefore, concerned authorities should take terrorism activities on a serious note to make the country financially and economically more strong. Implications and future research areas are discussed.

Keywords: Stock returns; Sectora-level terrorism; Terrorist attacks; KSE 100 index.

INTRODUCTION

Pakistan uniquely, is both the major injured and subsidizer of terrorism (Reidel, 2008). Pakistan is facing this problem since 9/11 incident. In 2009 a new wave of terrorism started in the country, when military operation has started in South Waziristan which continued till the end of 2010 and after that the average number of attacks in a week was 10, which greatly obstruct the confidence of foreign as well as local investor (Suleman, 2012).

Prevailing literature conclude that terrorist attacks have negative and significant impact on financial markets of all over the world. Terrorist attacks affect a country's economy by shaking the confidence of investors and encourage the investors to save rather than to spend or invest (Johnston & Nedelescu, 2005). Empirical literature focused mostly on some particular events for example, 11/13 Paris terrorist attacks (Apergis & Apergis, 2016), Charlie Hebdo shooting (Bilefsky and De La Baume, 2015), 9/11 (Ahmed & Farooq, 2008),

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Boston marathon bombing (Baumert, Buesa Blanco, & Lynch, 2013), and London's subway attack (Brounen & Derwall, 2010). Previous studies found that terrorist activities have negative significant impact on stock market (Balcilar, Gupta, Pierdzioch, & Wohar, 2016; Aslam and Kang, 2015; Hudson, & Urquhart, 2015; Kumar & Liu, 2013; Suleman, 2012; Kollias, Papadamou, & Arvanitis, 2013; Barros and Gil-Alana, 2009; & Arin, Ciferri, and Spagnolo, 2008).

Since 2001, Pakistan's economy badly affected due to incidents (e.g., army public school attack Peshawar in 2014, Jinnah international airport Karachi attack in 2014, darra adam khel attack in 2010, Islamabad Marriott hotel attack in 2008, assassination of Benazir Bhutto (former Pakistan prime minister) in 2007, siege of lal masjid in 2007). Pakistani stock markets also adversely affected by terrorist attacks (Aslam and Kang, 2015; Hassan, 2015; Hassan, 2014; Alam, 2013; Bashir, 2013; Bilal, 2012; & Qaiser, 2012). There are various areas that are targeted by terrorists and thus ultimately affected in terms of business. Previous studies mostly focused on impact of overall terrorism and some specific event (as mentioned above) rather than sectoral-level terrorism, therefore, against this backdrop we focused on sectoral-level terrorism in other word those areas/sectors which are mainly targeted by terrorists. These areas/sectors include business sectors, political parties, military personnel, police department, NGO's, educational sector, common citizens, property, public transports etc. This study is not an event study. Our study includes novelty in the concerned area research because it is first time attempt in context of Pakistan, which contributes to existing literature in sense of incorporating sectoral-level terrorism variables to check their impact on stock market returns.

EMPIRICAL PERSPECTIVES

Mostly researchers focus on the specific events and particularly 9/11. To observe the effect of global terrorist attacks on stock Karolyi and Martell (2010) took the sample of 75 terrorist attacks (1995-2002), they explored that after every attack stock exchange has decreased by USD 401 million. According to Al-Sharkas and Adel (2004) terrorist activities have negative significant impact on stock market returns of developing economies rather than developed countries. Moreover some studies conclude that financial markets are flexible and can absorb the terrorist's shocks.Chen andSiems(2004) andEldor & Melnick, (2004)mentioned that financial markets are not sensitive to the terrorist attacks they didn't find any evidence which supports this theory that financial markets are sensitive to terrorist shocks.

Although more of literature supports this argument that terrorist events have negative significant impact on stock market returns.Barth et al.(2006) analyzed that terrorism is inversely proportion to economic growth of a country. The authors discovered that types of terrorism have different effects. Terrorist events on private organizations have a negative relationship with economic prosperity.

Arin, Ciferri, and Spagnolo (2008) examined that terrorism has a strong negative impact on money market returns. Barros and Gil-Alana (2009) examined "the effects of terrorist attacks on the Basque stock market (Bolsa de Bilbao stock market)" from 2001 to 2006. The study applied "long-memory regression model" on day to day market returns as a regressor and terrorist violence as regressand. The researchers concluded that terrorist violence has indirect relationship with stock market returns.

Nguyen and Enomoto (2009) used the "Generalized Autoregressive Conditional Heteroscadastisity (GARCH) Model" to analyze the result of seven worldwide terrorist incidents on the stock exchanges of Pakistan and Iran. They concluded that incidents in London, Madrid, Indonesia and in the battle of Iraq showed strongly negative relationship with market returns. The 9/11 attack expressed statistically adverse effect of -0.92% on

Tehran stock market and on the other hand -2.76% on Karachi stock market of Pakistan. Drakos (2010) examined the influence of terrorism on financial market returns by taking a model of 22 countries of the world. After the analysis he concluded that incidents are negatively linked with the stock markets of a country. He also discovered that the negative result of violence is magnified when terrorist events resulted in higher psycho-social stress.

Gul, Hussain, Bangash, & Khattak, (2010) examined the "impact of terrorism on the stock markets of Pakistan" for the duration of two years. With the help of "ordinary least square (OLS) method" the result showed that that terrorism has inverse relation within stock markets and economy of Pakistan.Eldor and Melnick (2004) found that suicidal attacks and number of people killing have negative impact on stock market and foreign exchange. According to Bilal (2012) and his co-authors, terrorism have negative effect on KSE stock indexes. Bashir and his co-authors conduct similar study in 2013 and support the existing theory with highly significant results, that there is a negative relation in stock market and terrorism.

Bashir (2013), Qaiser (2012), Rehman, Luqman and Suleman(2011), Hassan (2015) and Hassan (2014) conducted similar researches; they applied GARCH & GARCH-EVT, "Multiple Regression Model" to check the relationship of these variables. And they explored negative impact of terrorism on stock market. Arin, Ciferri and Spagnolo(2008) observed that terrorism had significant impact on stock market returns but this impact varies from country to country or place to place. In their view European stock markets are less affected by terror shocks.

Alam(2013) argued that terrorism negatively impacts on stock market returns in long run. In short run, they couldn't estimate significant relationship. They applied Engle – Granger method along with ADF (Dickey and Fuller). Eldor and Melnick(2004) determined that suicide attacks have a permanent effect on stock and foreign exchange market, whereas location didn't effect. Granger causality test had been applied on data and get significant results which proved the above said argument.

Aslam and Kang (2015) say that Pakistani stock markets are adversely affected by terrorist attacks. However, such effects are "albeit short-lived" which means that the market covered up the loss from terrorist shocks in normally one day. The research also found that the locations and types of attacks play an important role in this regard such as more severe attack (i.e. more people killed), will result into more negative return in the KSE-100 index.

The above findings show that literature agrees with the negative relation of terrorism and stock markets. However, significance level varies from market to market and country to country.

DATA AND METHODOLOGY

We use daily time series data over the period of sixteen from January 2000 to December 2015. Two kinds of data sets have been used in this study, one is daily returns of KSE 100 index and other is terrorist attacks on daily basis in Pakistan. This is not an event study because we used all terrorist attacks in our desired time period instead of focusing on specific events or attacks. Both types of data sets are available on different sources but we have taken our data from the most authentic sources. Data for daily returns of KSE 100 index were collected from the website of Karachi Stock Exchange (KSE). Whereas, data on daily terrorist attacks were gathered from Global Terrorism Database, South Asian Terrorist Portal and from different newspaper (e.g. The Nation and The Daily Dawn).

We choose eight target types of terrorist attacks. If in a day more than one attack took place we considered as a single event.We designated the terrorist activities into dummy variables naming D1, D2 and D3 ….D8. D1, D2,….,D8. A quick discussion on dummy variables is given below:

- D_1 will be 1 in case of terrorist attack on business sector of Pakistan, 0 for non-occurrence of any such activity.
- D_2 will be 1 for terrorist attack on military and police, 0 for otherwise.
- D_3 will be equal to 1 if there will be any attack on NGO, Educational and religious institutions of Pakistan, 0 for otherwise.
- D_4 will be 1 for happening of terrorist attack on citizens of country and property, 0 for no attack.
- D_5 will be 1 if there will be any terrorist attack on political parties of Pakistan and 0 for otherwise.
- D_6 will be equal to 1 if there will be any attack on government general and diplomatic, 0 for otherwise.
- D_7 will be 1 for happening of terrorist attack on media and telecommunication sector of Pakistan, 0 for no attack.
- D_8 will be 1 is there will be any terrorist attack on public transportation in Pakistan and 0 for non-occurrence of any such terrible activity.

Here, D_1, D_2 and D3 ....D_8. D_1, D_2,....,D_8 will be 1 in case of terrorist attack, 0 for otherwise. Multiple regression model has been employed to check impact of sectoral-level terrorist attacks on stock market returns (KSE 100 index). Econometric form of out proposed model is mentioned below:

$$Y_t = \alpha_0 + \beta_1 D_{1t} + \beta_2 D_{2t} + \beta_3 D_{3t} + \beta_4 D_{4t} + \beta_5 D_{5t} + \beta_6 D_{6t} + \beta_7 D_{7t} + \beta_8 D_{8t} + \varepsilon_t$$

Where, stock market daily return of KSE 100 Index denoted by Y_t. Whereas, D_1, D_2,....,D_8 refers to business attacks; military and police attacks; NGO, educational and religious attacks; citizens and property attacks; political party attacks; general and diplomatic government attacks; media and telecommunication attacks; and public transportation attacks respectively. Proposed hypothesis of this are mentioned below:

H₁: Terrorist attacks on Business Sector have negative impact on daily returns of KSE 100 index from 2000-2014.

H₂: Terrorist attacks on Military and police have negative impact on daily returns of KSE 100 index from 2000-2014.

H₃: Terrorist attacks on NGOs, educational and religious have negative impact on daily returns of KSE 100 index from 2000-2014.

H₄: Terrorist attacks on property and citizens have negative impact on daily returns of KSE 100 index from 2000-2014.

H₅: Terrorist attacks on political parties have negative impact on daily returns of KSE 100 index from 2000-2014.

H₆: Terrorist attacks on general and diplomatic government have negative impact on daily returns of KSE 100 index from 2000-2014.

H₇: Terrorist attacks on public transportation have negative impact on daily returns of KSE 100 index from 2000-2014.

H₈: Terrorist attacks on media and telecommunication have negative impact on daily returns of KSE 100 index from 2000-2014.

EMPIRICAL RESULTS AND DISCUSSION

Table 1 presents the estimation results of proposed model. Value of coefficient of regression (R square) shows the variation in dependent variable (Daily returns of KSE 100 index) due to independent variables (terrorist attacks on different sectors). Whereas, F

statistic indicates overall goodness of fit of model. Value of coefficients presents change in dependent variable due to independent variables. Values of V.I.F., Tolerance, and DW-statistic indicate absence of multicollinearity and autocorrelation within the model.

TABLE 1
Estimation Results

	Betas	V.I.F.	Tolerance
(Constant)	8.49 (65.85)*	-	-
D1	0.29 (9.00)*	1.14	0.88
D2	0.70 (25.89)*	1.33	0.75
D3	0.28 (9.76)*	1.16	0.86
D4	0.36 (13.85)*	1.34	0.75
D5	0.20 (3.70)*	1.07	0.94
D6	0.23 (7.13)*	1.11	0.90
D7	0.24 (3.86)*	1.02	0.98
Value of R	0.582		
Value of R Squared	0.339		
DW-Statistic	1.90		
F Stat.	350.99*		

Note: * Significant at 5%.

Results shows that all concerned variables are significant. Furthermore, 1% increase in terrorist attacks on business sector will negatively affect the daily returns of KSE 100 index by 28.8%.Similarly, the coefficient value of D2indicates that increase in terrorist attacks on military and police by 1% will negatively affect the daily returns of KSE 100 index by 69.9%. 1% increase in terrorist attacks on NGO, Educational and religious sectors will decrease the daily returns of KSE 100 index by 28.3%. If terrorist attacks increase by 1% on citizens and property of the country will result in the decrease of 36% in the daily stock returns of KSE 100 index. Daily returns of KSE 100 index will decrease by 20% if terrorist attacks on political parties increase by 1%. Daily returns of KSE 100 index will decrease by 22.8% if terrorist attacks on General and Diplomatic Governments increase by 1%. 1% increase in terrorist attacks on Media and Telecommunication sector will result to decrease in the daily returns of KSE 100 index by 24.3%.If terrorist attacks on public transport will increase by 1%, daily returns of KSE 100 index will be affected negatively by 11.5%.Our results support the literature that terrorist attacks have negative significant impact on financial markets (Balcilar et al., 2016; Hassan, 2015; Hudson, & Urquhart, 2015; Aslam and Kang, 2015; Kumar & Liu, 2013; Suleman, 2012; Kollias et al., 2013; &Bashir, 2013).

CONCLUSIONS

This article examines the impact of different sector's level terrorism on KSE 100 index. Using the unique data set on terrorism we ran the analysis found that terrorism adversely affects the KSE 100 index. But this affect varies from sector to sector. We found that terrorist attacks on different sectors have negative impact on daily returns of KSE 100 index. But it differs, some sectors are more sensitive to the reaction of terrorist attacks and some are less. Based on proposed model's results, we found that military and police is most sensitive sector. If terrorists hit the military or police personals (law enforcement agencies), daily returns of KSE 100 Index will be affected more badly than others. The less sensitive area is public transportation as the result is less from all other sectors. Depending upon the

results, the study recommends that the law makers and other concerned parties must take terrorism activities on a serious note to make the country financially and economically more strong. In Pakistan this study is unique on the basis of under consideration variable i.e. sector's wise terrorism as independent variable. As we conducted this study to see the impact of sector wise terrorism on daily KSE 100 index by using simple regression model so this study can be further researched for in-depth investigation by adding more explanatory variables with the help of different tools and techniques

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