Conventional and Islamic Equity Market Reaction towards Terrorism and Disasters: An Evidence Based on Type, Location and Islamic Calendar Months

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Conventional and Islamic Equity Market Reaction towards Terrorism and Disasters: An Evidence Based on Type, Location and Islamic Calendar Months

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ABSTRACT

Most prior researches have tested conventional equity market response towards terrorism and disasters. However, little attention has been paid to Islamic equity market. Besides, the equity market response towards terrorism and disasters based on the target/event type, event location and the Islamic calendar months has also remained underrepresented. The objective of this study is to investigate the conventional and Islamic equity market reactions towards terrorism and disasters in Pakistan based on the target/event type, event location and Islamic calendar months. In this regard, data from the year 2009 to 2016 was analyzed using Ordinary Least Square (OLS) regression and Generalized Autoregressive Conditional Heteroskedasticity (GARCH) (1,1) models. The key findings of the study indicate that the conventional and Islamic equity market reactions towards terrorism and disaster events are very short lived. The equity markets in Pakistan respond negatively to attacks on educational institutes and businesses whereas reacts positively to attacks on armed forces' facilities. The equity markets respond negatively to the earthquakes and positively to the storm and extreme temperature. The conventional equity market responds negatively to the terrorist attacks in Karachi and positively to the attacks in financial cities and Federally Administered Tribal Areas (FATA). Islamic equity market responds positively towards attacks in financial cities and FATA. However, coefficient values are small which indicate very minor reaction magnitude. Likewise, the equity markets are insensitive towards disaster locations with exception of Gilgit. Overall, this study finds little evidence that conventional and Islamic equity markets react towards terrorism and disasters, whereas, the markets reactions vary based on event/target type, event location and different Islamic calendar months. The positive equity market response towards attacks on armed forces indicates the investor perception that armed forces are confronted with terrorist groups. The government may restore the investor confidence by initiating counterterrorism policies.

Keywords: terrorism, disasters, conventional equity market, Islamic equity market, Pakistan

ABSTRAK

Banyak kajian terdahulu telah menguji tindak balas pasaran ekuiti konvensional terhadap keganasan dan bencana. Walau bagaimanapun, perhatian kurang diberikan kepada pasaran ekuiti Islam. Selain itu, tindak balas pasaran ekuiti terhadap keganasan dan bencana berdasarkan kepada sasaran /jenis peristiwa, lokasi peristiwa dan bulan kalendar Islam juga kurang diberi perhatian. Objektif kajian ini adalah untuk menyiasat tindak balas pasaran ekuiti konvensional dan Islam terhadap keganasan dan kemusnahan di Pakistan berdasarkan sasaran/jenis peristiwa, lokasi peristiwa dan bulan kalendar Islam. Sehubungan ini, data dari tahun 2009 hingga 2016 dianalisis dengan menggunakan regresi Kuasadua Terkecil Biasa (OLS) dan model Autoregresif Am Heteroskedastisiti Bersyarat (GARCH) (1,1). Dapatan kajian menunjukkan bahawa reaksi pasaran ekuiti konvensional dan Islam terhadap keganasan dan peristiwa bencana adalah sangat singkat. Pasaran ekuiti di Pakistan bertindak balas secara negatif terhadap serangan ke atas institusi pendidikan dan perniagaan tetapi bertindak balas secara positif terhadap serangan di kemudahan angkatan bersenjata. Pasaran ekuiti bertindak secara negatif terhadap gempa bumi dan positif kepada ribut dan suhu yang melampau. Pasaran ekuiti konvensional bertindak balas secara negatif terhadap serangan pengganas di Karachi dan secara positif terhadap serangan di bandaraya kewangan dan *Federally Administered Tribal Areas* (FATA). Pasaran ekuiti Islam bertindak balas secara positif terhadap serangan di bandar-bandar kewangan dan FATA. Namun demikian, nilai koefisien yang kecil menunjukkan magnitud reaksi yang minor. Sebaliknya, pasaran ekuiti tidak sensitif terhadap lokasi bencana, kecuali di Gilgit. Secara keseluruhan, kajian ini memperoleh sedikit bukti berkaitan tindak balas pasaran ekuiti konvensional dan Islam terhadap keganasan dan bencana, manakala tindak balas pasaran berbeza mengikut jenis peristiwa/sasaran, lokasi peristiwa dan bulan kalendar Islam yang berlainan. Tindak balas positif pasaran ekuiti terhadap serangan ke atas tentera bersenjata menunjukkan persepsi pelabur bahawa angkatan bersenjata berhadapan dengan kumpulan pengganas. Kerajaan boleh memulihkan keyakinan pelabur dengan memulakan dasar-dasar mencegah keganasan.

Kata kunci: keganasan, bencana, pasaran ekuiti konvensional, pasaran ekuiti Islam, Pakistan

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ARCH	Autoregressive Conditional Heteroskedasticity
ARMA	Autoregressive Moving Average
BLUE	Best Linear Unbiased Estimator
EM-DAT	Emergency Events Database
EMH	Efficient Market Hypothesis
GTD	Global Terrorism Database
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
OLS	Ordinary Least Square Regression
GDP	Gross Domestic Product
USD	United States Dollars
TTP	Tehrik-e-Taliban Pakistan
FATA	Federally Administered Tribal Areas
NGO	Non-Government Organization
MQM	Muhajir Quumi Movement
RET	Return
AF	Armed Forces
BUS	Business
EI	Educational Institutes
GOV	Government
PC	Private Citizen
RF	Religious Figures
OA	Other Attacks
FE	Flood Event
EE	Earthquake Event
ETE	Extreme Temperature Event
LS	Land Slide
ST	Storm
TD	Technological Disasters
KC	Karachi City

FC	Financial City
LC	Lahore City
FBA	FATA/Border Area
KSH	Kashmir
MUH	Muharram
SAF	Safar
RA	Rabi’ al-awal
RTH	Rabi’ al-thani
JA	Jumada al-awal
JTH	Jumada al-thani
RAJ	Rajab
SHA	Sha’aban
RAM	Ramaḍan
SHW	Shawwal
DQ	Duh al-Qidah

CHAPTER ONE

INTRODUCTION

1.1 Background and Motivation of Study

Equity market is an organized and regulated market to trade shares at prices determined by the forces of demand and supply. Equity market performs the functions of primary market as well as the functions of secondary market. As primary market, it provides the mechanisms to corporations to raise their capital through channelizing investors saving into productive businesses. As secondary market, it provides the mechanisms to investors where they may liquidate their securities by selling to other investors. The development of equity market and steady performance increases the level of investment from domestic and foreign investors positively affecting the overall economic situation of a country (Levine & Zervos, 1996; Alfaro *et al.,* 2004; Zhang *et al.,* 2012). However, the performance of equity markets is influenced by different types of economic and non-economic events (Cao & Wei, 2005; Chesney *et al.,* 2011; Khalid *et al.,* 2012; Nazir *et al.,* 2014; Cao *et al.,* 2015).

Naturally, performance of equity market might be influenced by economic and non-economic events (Nazir *et al.,* 2014). Any negative event creates volatility in the stock market, therefore, it increases the financial distress. It may ultimately affect the performance of market by creating fear among investors who are reluctant to take risk (Ali & Afzal, 2012). Terrorism events are non-economic events that have gained

considerable attention by the prior research (see, for example, Brück & Wickström, 2004; Enders & Sandler, 2006; Bird *et al.,* 2008; Chesney *et al.,* 2011; Khan *et al.,* 2016). Terrorism events also bring many economic consequences which makes investors concerned about these events (Chesney *et al.,* 2011; Kollias *et al.,* 2011; Alam, 2012). The economic losses arising due to terrorism are the immediate physical loss to assets and the cost borne on resources needed to cope with the terrorism (Kollias *et al.,* 2011).

Similarly, Schmid (2012) defined terrorism as, "a method of fear generating, direct violent action without legal or moral restraints, targeting mainly civilians and non-combatants, performed for its propagandistic and psychological effects on various audiences and conflict parties". Likewise, Section 6 of The Anti-Terrorism Act, 1997 by National Public Safety Commission of Pakistan defines a 'terrorist act' in the following terms: "Whoever, to strike terror in the people, or any section of the people, or to alienate any section of the people or to adversely affect harmony among different sections of the people, does any act or thing by using bombs, dynamite or other explosive or inflammable substances, or fire-arms, or other lethal weapons or poisons or noxious gases or chemicals or other substances of a hazardous nature in such a manner as to cause, or to be likely to cause the death of, or injury to, any person or persons, or damage to, or destruction of, property or disruption of any supplies of services essential to the life of the community or displays fire-arms, or threatens with the use of force public servants in order to prevent them from discharging their lawful

duties commits a terrorist act[1]." Terrorists employs physical violence and threat violence using different types of terrorism events including kidnappings, armed assaults and bombings (Schmid, 2012).

Moreover, terrorist actions can have multitudes of economic consequences that may adversely affect a number of sectors which may include investor sentiment (Drakos, 2009); tourism (Drakos & Kutan, 2003), macroeconomic consequences (Eckstein & Tsiddon, 2004); economic growth (Shahbaz *et al.,* 2013); foreign direct investment (Enders & Sandler, 1996; Enders *et al.,* 2006), employment and business activity (Greenbaum *et al.,* 2007), cost of debt (Procasky & Ujah, 2016) stock market volatility (Mnasri & Nechi, 2016), oil prices (Blomberg *et al.,* 2009), capital markets (Drakos & Kutan, 2003; Chen & Siems, 2004; Eldor & Melnick, 2004; Nedelescu & Johnston, 2005; Arin *et al.,* 2008; Karolyi & Martell, 2010; Kollias *et al.,* 2011; Aslam & Kang, 2013).

Previous researchers investigated the impact of terrorism in developed countries (Lenain *et al.,* 2002; Carter & Simkins, 2004; Nedelescu & Johnston, 2005; Graham & Ramiah, 2012) and in the developing countries (Öcal & Yildirim, 2010; Meierrieks & Gries, 2012; Shahbaz *et al.,* 2013). However, Derin-Güre (2009) expounded that richer countries are the main target of terrorism as compared to poor countries. Similarly,

[1] National Public Safety Commission. Anti-Terrorism Manual (Islamabad, National Police Bureau, 2008), 8. Available at: http://www.satp.org/satporgtp/countries/Pakistan/document/papers/images/Pakistan%20Doc.pdf.

Blomberg *et al.* (2002) propounded that increase in per capital income is positively related to the number of terrorist attacks. Many of the later studies have shown that terrorism creates fear among investors of the developed countries. For instance, Eldor and Melnick (2004) examined the impact of terrorism on Israeli equity market. Their results demonstrated that terrorism has negative and permanent impact on the equity market in Israel.

Yet another example of terrorist attack in developed countries is the terrorist attack of September 9, 2001 on World Trade Centre USA. According to Nedelescu and Johnston (2005), these attacks affect the global financial system and have caused major decline in financial market. Similarly, Chesney *et al.* (2011) suggested that terrorism significantly affects the equity markets in the USA, Europe, Switzerland, and other equity markets globally. In this connection, Graham and Ramiah (2012) examined the impact of terrorist attack on all Japanese industries and reported that most of the industries are affected by the terrorist attacks. In contrast, there are few studies which report that development of a country has insignificant association with terrorism (Dreher & Gassebner, 2008; Sambanis, 2008).

Moreover, the previous research has also provided the evidences on the impact of terrorism on equity markets of developing countries (Alam, 2012; Graham & Ramiah, 2012; Aslam & Kang, 2013; Mnasri & Nechi, 2016; Tavor, 2016) and found that the effects of terrorism on equity market are severe in emerging markets as compared to those of the developed markets (Arin *et al.,* 2008). Moreover, recent evidence shows higher investment, trade openness, and consumption levels are indicative of positive

individual's level of income, wealth, education, and prestige thereby negatively effects terrorism (Nizami *et al.,* 2014). Thus, it implies that the level of development in any country may reduce the level of terrorism events in that country.

According to Diamonte et al. (1996), emerging markets are more severely affected by uncertainty in terms of their equity returns as compared to the developed markets. Their results proved that emerging market returns are significantly influenced by the uncertainty events. Even at individual level, income plays a major role in terrorism. For instance, survey conducted by Asal *et al.* (2008) in Pakistan reported that families with good income do not let their children join any terrorism-related activities whereas individuals from low income families are more involved in these activities. Even at country level, Pakistan is country which has faced many problems since its creation such as low income level, literacy, diseases, uncertainty, and inequality (Nizami *et al.,* 2014).

Likewise, Aslam and Kang (2013) examined the impact of terrorist attacks on equity returns in Pakistan and reported that the effect of these attacks differs based on the location of attack, type of attack and severity of attack. Likewise, Aslam *et al.* (2015) examined the impact of terrorism in India, Bangladesh, Sri Lanka, Philippines and Indonesia. Their results demonstrated that terrorism significantly affects these equity markets. Moreover, effects of terrorism are harsher for equity market if target is business place or security forces. In addition, there are some other studies reporting the significant impact of terrorism on the equity markets of developing countries like Malaysia (Bora Ramiah, 2012), Thailand (Arin *et al.,* 2008), Nigeria and Turkey (Arin

et al., 2008). Pakistan is one of the developing countries which has been facing terrorism issue since the 9/11 US attacks. Following Table 1.1 presents the number of terrorism events that happened in Pakistan since 2000 to 2015.

Table 1.1
Total Number of Terrorism Events that happened in Pakistan (since 2000 to 2015)

Year	Total Incidents Reported at GTD	Incidents with Causalities between 1-10	Incidents with causalities between 11-50
2000	49	26	15
2001	53	29	13
2002	46	24	11
2003	29	17	4
2004	67	34	10
2005	78	29	9
2006	163	73	20
2007	260	107	39
2008	564	270	40
2009	667	295	57
2010	700	341	38
2011	993	516	69
2012	1652	836	140
2013	2213	1073	136
2014	2147	1112	93
2015	1235	665	43
Total	**10916**	**5447**	**737**

Source: Global Terrorism Database (Extracted on 23-04-2017)

Terrorism risk is difficult to predict and the main problem with terrorism is to quantify this risk (Chesney *et al.,* 2011). In this connection, many models have been proposed and the recent studies have linked it with the catastrophe modelling. In many ways, terrorism risk creates similar risk of natural vulnerability such as earthquakes floods, forest fire, and storms (Berrebi & Ostwald, 2011; Chesney *et al.,* 2011; Berrebi & Ostwald, 2013). These entire events create huge loss and affects the whole economy. For instance, the 9/11 attacks have showed that terrorism is one of the potential catastrophic risk. Therefore, Chesney *et al.* (2011) stated that there are several similarities between the terrorist event and disaster event. Overall, all types of disaster

may have adverse economic consequences. There might be different types of natural and man-made disasters such as flood, earthquake, storms, volcanos, terrorism, wars, wild fires and technological disasters (McDonald, 2007).

One possible explanation for association between disaster and terrorism events is the turmoil after disaster event that the terrorist groups may exploit. For instance, Berrebi and Ostwald (2011) reported that strong positive association exists between the disaster-related deaths and successive terrorism incidence and fatalities. Moreover, they reported that this relationship is stronger in developing countries. Besides, there are other studies reporting that catastrophic event is followed by the terrorism events (Billon & Waizenegger, 2007; Renner & Chafe, 2007; Berrebi & Ostwald, 2013). According to Berrebi and Ostwald (2013) terrorism events increases after the disasters because terrorist groups exploit the situation when government is busy in recoveries, militants target those places. For example, in Pakistan, the 2010 monsoon rains affected large number of population resulting entry of large number of militant groups to these affected areas (Berrebi & Ostwald, 2013). These groups came into these areas to get the public support by helping them in relief work (Witte, 2010). During this turmoil, government is normally busy with relief work which provide cushion to these militant groups to attack (Berrebi & Ostwald, 2013).

In addition, the risk arising from terrorism and disasters vary from other sources of risk in variety of ways. For instances, terrorism and disasters may cause death of large number of people whereas, this number might be lower in other incidents. Moreover, these events also differ from other events in that these events create fear at broader

level, cause threat to national security and failure to recover from these events and failure to take prevention measures as a disgrace to country (Viscusi, 2009).

Another explanation for similarity between disaster and terrorism is the health issues. Disasters cause diseases due to displacement of population, lack of safe water and sanitation facilities and lack of health care facilities (Watson *et al.,* 2007; Memon, 2011), change in environment (Kouadio *et al.,* 2012) and food insecurity (Memon, 2011). The health effects of disasters on the moods of the investors are similar to the ways in which terrorism affects the investors' behaviours. There are many studies which support the argument that mental health of investors is related to their portfolio decisions (see, for example, Becker & Mulligan, 1997; Berkowitz & Qiu, 2006; Edwards, 2010; Bogan & Fertig, 2013).

Based on the arguments given above these two types of events have strong relationship, thus in turn calls for more empirical examination. Similar to the terrorism and equity market research, many previous studies also have focused on the impact of disaster events and equity markets (Bosch *et al.,* 1998; Worthington & Valadkhani, 2005; Khanser & Galido, 2013; Wang & Kutan, 2013; Sharon & Tchai, 2014; Cao *et al.,* 2015; Bourdeau-Brien & Kryzanowski, 2016; Humphrey *et al.,* 2016).

Natural disaster events have caused large economic and human losses all over the world. For instance, the United States has suffered approximately average USD 154 billion annual losses due to natural disasters from the year 2012 to 2015 ("EM-DAT ", 2016). A part of these losses may be attributed to climate change globally which

influence the disasters such as hurricane, flood and tornados and extreme temperature. Moreover, other part may be attributed to population growth in disaster-prone states such as hurricanes in Florida, North Carolina and Texas and earthquakes in California and Washington. Similarly, Australia has suffered average USD 6.8 billion losses annually due to natural disasters from the year 2012 to 2015 ("EM-DAT ", 2016). In Japan total cost of natural disasters from 2012 to 2015 was approximately USD 9.9 billion ("EM-DAT ", 2016).

Likewise, floods only recorded almost 47 percent of total weather-related disasters from year 1995 to 2015. These floods affected 2.3 billion people in the world out of which most people were living in the Asia. Although frequency of storms is low but are considered as deadliest kind of weather disaster. In previous twenty-one years' storms, has caused the death of approximately 242,000 people. This ratio is forty percent of total deaths due to weather related disasters around the globe. Among these human losses approximately 89 percent happened in low income countries despite of the fact that only 26 percent of all storms were encountered by these countries (USAID April 2016).

Despite huge losses of high-income countries in terms of total cost, these losses as percentage of their GDP are very low as compared to the low-income countries. For instance, economic costs due to natural disaster as percentage of GDP are 0.2 percent in high income countries, 1.1 percent of GDP in upper middle income and 1.3 percent of GDP in lower middle-income countries whereas, these economic costs as percentage of GDP are 5 percent in lower income countries (USAID April 2016). Moreover,

Nakamura *et al.* (2013) propose that catastrophes are followed by significant reduction in personal consumptions and Bourdeau-Brien and Kryzanowski (2016) find that this adverse outcome is limited to developing states. Similarly, Toya and Skidmore (2007) expound that development of economy reduces the number of deaths due to disasters and ratio of damages to GDP also reduces. Further controlling for income, education level, financial development, open economies and countries with smaller governments have lower chances of economic and human losses (Toya & Skidmore, 2007).

Similarly, literature shows that disasters affect the human behaviours like international financial flows (Yang, 2008), mental health (Frankenberg *et al*., 2008) and ultimately risk taking behaviour (Cameron & Shah, 2015). According to Rosenzweig and Stark (1989) risk taking behaviour shapes the savings and investment behaviours. If disasters affect the investment behaviour, it will also bring change to the equity market returns. The chances of psychiatric illness are at its peak when traumatic events contain seeming life risk, unpredictability, lesser control, losses and higher injuries, chances of repetition, and exposure to death and disfigurement (Ursano *et al.,* 2007).

Similarly, the organized and professional support for the people who are affected by such psychopathology are lacking in Pakistan. Skills and expertise required to deal with stress, mental disorders, depression and anxiety arising after traumatic events are scarce in mental health professionals of Pakistan (Nizami *et al.,* 2014). Therefore, the impact of these events on investors' moods might be higher in the country. Like terrorism, the psychological impacts of disasters are also related to the mental health of the affected people. For instance, Frankenberg *et al.* (2008) state that natural disasters affect mental

health of people. Pakistan is also one of the developing countries of South Asia that faced a number of disasters in the past. Following Table shows the total deaths, people affected and total economic losses that Pakistan has suffered due to the disasters since 1947.

Table 1.2
Economic and human losses due to disasters (since 1947 to 2015)

Sr. No.	Disaster Type	Disaster subtype	Total Deaths	Total Affected	Total Damage ('000 USD)
1	Drought	Drought	143	2200000	247000
2	Earthquake	Ground Movement	79733	7275488	5329755
3	Extreme Temperature	Heatwave	2756	80574	18000
4	Flood	-	5140	22250735	1170030
5	Flood	Riverine Flood	9088	34962945	9725030
6	Flood	Flash Flood	3075	22102792	10074118
7	Landslide	Landslide	222	29719	18000
8	Storm	Tropical cyclone	11555	2589940	1715036
9	Technological	Technological Accidents	7102	34832	-

Source: EM-DAT (2017)

Terrorism and disaster have severe economic consequences towards human and physical capital of the country (Chesney *et al.,* 2011) thus decreasing the investor's confidence (Lenain *et al.,* 2002; Nedelescu & Johnston, 2005). There are numerous studies which reported that the reduced investor confidence negatively affects the equity returns (Brown & Cliff, 2005; Schmeling, 2009; Drakos, 2010) which implies that terrorism may reduce investor's confidence which in turn negatively affects the equity returns (Drakos, 2010). Based on these facts, this study intends to examine the

impact of disasters on conventional and Islamic equity market returns along with the impact of terrorism on the equity returns in Pakistan.

1.2 Performance of Conventional and Islamic Equity Market Returns

There were three stock exchanges in Pakistan which are (i) Pakistan stock exchange (formally known as Karachi stock market), which is formed in 1947; (ii) Islamabad stock market, which is formed in 1989; and (iii) Lahore stock market formed in 1971. Karachi stock market was the largest stock market in Pakistan (Ahmed, 2007). To measure the performance of Pakistan stock exchange, an index named as KSE 100 index was introduced in November, 1991 calculated on 1000 base points (Obienugh, 2010). The KSE 100 index is composed based on sector representation and market capitalization. The index represents more than eighty percent of the overall market capitalization of the firms listed at the Exchange.

Likewise, KMI-30 index which represents the Shariah compliant firms was launched in the year 2009 with the association of Meezan Bank Limited, Pakistan. A subsidiary company of the Meezan Bank, Al-Meezan Investment Management Limited, managed to provide the Shariah guidelines and expertise regarding composition and selection of stocks to launch the index. The Pakistan stock exchange manages the index and provides dissemination support. The KMI-30 index includes thirty firms which meet the requirements shariah screening standards. These shariah screening standards are determined by a screening procedure conducted by Al-Meezan Investment

Management Limited which are reassessed by the Capital advisory division of Product Development and Shariah Compliance Department.

The market capitalization of KSE 100 index on December 30, 2009 as reported by Pakistan Stock Exchange Limited was PKR 2493.504 billion with turnover of 118,504,810 shares. Later, this market capitalization became PKR 2464.775 billion rupees with turnover of 154,529,040 as on December 30, 2016. On the other side, the market capitalization of KMI 30 on December 30, 2009 was PKR 309.91913 billion with turnover of 36,515,090 shares which became PKR 981.28192 with turnover of 70,585,000 as on December 30, 2016. These statistics shows overall increase in the market capitalization of KMI 30 whereas decrease was observed in the market capitalization of KSE 100 index over the time. According to Alam et al. (2016), one feature of shariah based Islamic investment is that the goods produced are intended to benefit the society. The high efficiency of sectors and companies involved in public goods during economic booms and crises can be the reason for possible higher interest of the investors. The variation in these two indices represents the performance of equity markets in Pakistan. This study has used the returns of KSE 100 index as measure of conventional equity market returns, whereas, returns of KMI 30 index are used measure of Islamic equity market returns.

In this connection, the previous studies highlighted that performance of conventional and Islamic equity markets vary specifically during the problematic period. For instance, Jawadi *et al.* (2014), reported that Islamic funds outperforms conventional after the subprime crisis and during the problematic period. Since, the effects of

financial crises of 2008-2009 are less substantial for Islamic markets as compared to the conventional markets, therefore, it suggests that investors can manage their investments by considering Islamic finance products (Jawadi *et al.,* 2014). These findings imply that Islamic index is more resilient to negative events as compared to the conventional index.

Conversely, later studies compared the performance of conventional and Islamic equity markets. For instance, previous studies have analyzed the returns and volatilities of conventional and Islamic stock indices (Yusof *et al.,* 2007; Ho *et al.,* 2014) and the performance of both indices have been compared in some of the studies (Al-Khazali *et al.,* 2014; Ho *et al.,* 2014; Jawadi *et al.,* 2014; Alam *et al.,* 2016). The findings of these studies show that the Islamic index outperforms that conventional index during financial crises.

Moreover, Al-Zoubi and Maghyereh (2007) compared the performance of Islamic index with conventional index based on their risk by taking the Dow Jones Islamic Index (DJIS) and DJI Market World Index representing Islamic and Conventional Indices respectively. The findings of their study indicate that risk of Islamic index is lower as compared to the conventional one. They contend that these findings might be due to the profit-and-loss allocation rule inherent in Islamic economics. On the other hand, results of some studies show the identical movement of conventional and Islamic indices which indicates the absence of any performance difference. Majid and Shabri (2006) compared the performance of the Malaysian Islamic and conventional equity markets based on their risk and returns from year 1992 to 2000. Their findings show

that risk calculated by taking conditional standard deviation is not related to returns. Furthermore, their results demonstrated absence of significant time varying risk premium for conventional and Islamic stock returns. In the Pakistani context, Rana and Akhter (2015) compared the performance of conventional and Islamic stock indices and found that performance of Islamic stock index is inferior as compared to conventional stock index.

Furthermore, previous studies also examined the impact of terrorism and disaster events on the conventional stock market indices (Bosch *et al.,* 1998; Worthington & Valadkhani, 2004; Worthington, 2008; Capelle-Blancard & Laguna, 2010; Chesney *et al.,* 2011; Aslam & Kang, 2013; Ramiah & Graham, 2013; Wang & Kutan, 2013). However, the impact of terrorism and disaster events on the Islamic equity market indices is non-existent in the previous literature up to best of author's knowledge. Therefore, this study examined the impact of terrorism and disaster events on the conventional and Islamic stock market indices. Similarly, this study also examined the impact of terrorism and disaster events on the conventional and Islamic equity returns based on the type and location of events. Furthermore, previous studies have documented abnormal returns during different Islamic months (Białkowski et al., 2012; Ramezani *et al.,* 2013; Al-Khazali, 2014; Halari *et al.,* 2015), however, the interaction effect of different Islamic months with terrorism and disaster events is non-existent up to best of authors knowledge. Therefore, this study examined whether the impact of terrorism and disaster events on the conventional and Islamic equity market returns varies during different Islamic months by taking the interaction effect of Islamic months with terrorism and disaster events.

1.3 Problem Statement

Pakistan is one of the countries that has been facing terrorism issue since the 9/11 US attacks. Up till now, terrorism in Pakistan has caused death of more than 56,000 people and caused injuries to more than 40,000 people. Furthermore, Pakistan has borne a huge direct and indirect amount as cost of terrorism near to USD 102.51 billon, or equivalent to PKR 8,260 billion (Ministry of Finance, 2013-14). Likewise, Pakistan has suffered huge losses due to different disasters. For instance, in October 2005, Pakistan faced the worst earthquakes in the history of Pakistan. The earthquake of 8th October 2005 was recorded at 7.6-Richter scale causing huge property and human loss and second earthquake of 8th October 2015 was recorded at 8.1- Richter scale. Similarly, EM-DAT reported average 335 weather-related disasters occurred in Pakistan from the year 2005-2014 which is fourteen percent higher than the years from 1995 to 2004 and is approximately double than the level reported during the years 1985-1994. From the year 2012-2015, Pakistan suffered from an economic loss of USD 18 million due to extreme weather and another USD 100 million due to earthquakes ("EM-DAT ", 2016). Only climatic change related disaster caused losses of 1 percent of gross domestic product during the period 2005-2013 (Lead, 2015).

Since 2010 flood, Pakistan consistently remained one of the top ten countries that had highest losses due to weather related disasters events[2] (Lead, 2015). Pakistan has also faced many floods in her history such as floods of 1948, 1950, 1955, 1956, 1973, 1975,

[2] storms, floods, heat waves etcetera

1976, 1978, 1998, 1992, 1995, 1998, 2001, 2003, 2010 and 2011 (RAZA & Haq, 2015). Moreover, floods, during the year 2010, 2011 and 2012 in Pakistan were very severe and these floods had huge impact on the economy of Pakistan (Ahmad, 2015). The huge floods due to monsoon rains in 2010 resulted in economic losses of approximately USD 16 billion. These huge floods caused approximately two thousand deaths and twenty million affected populations. In addition, approximately 7.8 million people were insecure in terms of availability of food. (Ahmad, 2015). In September 2014, the flood has caused Pakistan a loss of 346 deaths, 620 people injured, and 1.8 million people were displaced. Additionally, this flood devastated 928 villages, 55,200 households and a loss of 2.4 million acres crops (Abdullah *et al.,* 2015).

Pakistan is an agricultural country which has 21 percent share from agriculture sector in its total GDP. The, agriculture sector accounts for forty five percent of jobs and sixty percent of exports for Pakistan and the floods during the year 2010 caused a loss of 7.5 million tons of sugarcane, 2.5 million tons of rice, 0.7 million tons of cotton and 0.3 million tons of maize (Ahmad, 2015). Likewise, different types of technological disasters have also affected the GDP in Pakistan (Swathi, 2015). Moreover, approximately 7102 people were killed, whilst 34832 people were affected due to different technological disasters in Pakistan since its inception in the year 1947 to the year 2015 as recorded by EM-DAT. Similarly, disasters spoiled the human capital, physical capital and caused drop in gross domestic product in Pakistan. For instance, continuous drought reduces the gross domestic product by fifty percent from the year 1998 to 2001.

Sometimes negative events create high negative volatility which may coerce the investors to quit the market (Ali & Afzal, 2012). Terrorism and disasters may also negatively affect the equity returns causing the slowdowns in the equity market. For instance, Chen and Siems (2004) studied the effects of terrorism on global equity markets and found that the terrorist attack does affects the global equity markets. In addition, Arin *et al.* (2008) also stated that terrorism affects financial markets and their results demonstrated that terror has significant impact on equity market returns and equity market volatility. Similarly, Eldor and Melnick (2004) also claimed that any distress in market in relation to terrorism have an impact on the pricing of financial markets.

Likewise, Koerniadi *et al.* (2016), reported that natural disasters negatively affect the equity returns. According to Worthington and Valadkhani (2004) earthquakes, cyclones and wildfires affect the equity markets whereas storm and floods do not affect the equity market. Likewise, negative equity market reaction towards different technological disasters has been reported by prior studies. For instance, Capelle-Blancard and Laguna (2010) reports negative market reaction towards chemical disasters. Furthermore, negative market reaction was documented towards air crashes (Bosch *et al.,* 1998; Kaplanski & Levy, 2010) and nuclear accidents (Hill & Schneeweis, 1983; Ferstl *et al.,* 2012; Kawashima & Takeda, 2012). Nonetheless, the impact of terrorism and disaster on the equity returns may differ for conventional indices and Islamic indices. Recent literature has highlighted the difference in behaviours of conventional and Islamic equity market indices (Al-Khazali *et al.,* 2014; Ho *et al.,* 2014; Alam *et al.,* 2016; Akhtar & Jahromi, 2017). However, the impact of terrorism and disasters on Islamic

equity market returns are non-existent in the previous literature up to author's knowledge. Hence, this study examined the conventional and Islamic equity market reaction towards terrorism and disaster events.

Given the relationship of terrorism and disasters with equity returns, later studies found significant differences based on characteristics of companies, type of events, location of events and date of events. For instance, Eldor and Melnick (2004) reported varying behavior of equity market towards different targets of terrorist attacks. Similarly, Aslam *et al*. (2015), reported that equity market response varies based on target type of attacks. Furthermore, Nedelescu and Johnston (2005) documented some variances in the financial market response to different terrorist attacks. They documented that 9/11 events had more severe effect on equity returns as compared to Madrid. Therefore, their results emphasized that terrorist attack reaction on financial market was perceived differently based on the place of attack. Similarly, Aslam and Kang (2013) also reported that terrorism events at different locations in Pakistan has different impacts on equity market returns. However, prior research unheeded the Islamic equity market reaction towards terrorism and disasters based on different event/target types and locations.

Likewise, there is no evidence on what happens to investor moods if any negative event occurs during different Islamic calendar months. Hence, there is a need to investigate, whether any event of terrorism or disasters happened in the different Islamic months would have different impacts on investor moods and equity returns? Most of the studies agree with the Ramadan effect in stating that during this month, investors behaviour is optimistic. In contrast evidence shows that the magnitude of Ramadan effect

diminished during global financial crises (Al-Khazali, 2014). It implies that the investor optimism during Ramadan might be reduced if any negative event happened during this month. Chung et al. (2012) stated that the return predictability of sentiment should be most pronounced when investors' optimism increases. According to Białkowski *et al.* (2012) Ramadan positively affects the investors moods therefore positively influence the equity returns.

Similarly, other Islamic months that contain sadness in moods like Muharram[3] may increase the investor pessimist behaviour if any negative event of terrorism or disasters happens. Al-Ississ (2010) reported the sadness in investor moods during Muharram. Moreover, riskiness is attached with the investor mood which comes from different sources. Similarly, other studies have supported this argument, that, in certain Islamic months, investors' behaviour is different as compared to the other months (Białkowski et al., 2012; Ramezani *et al.,* 2013; Al-Khazali, 2014; Halari *et al.,* 2015). For instance, Ramezani *et al*. (2013) stated that stock returns are positively related to Ramadan, Shawwal and Rabi months whereas, negatively related to the Jumada II, Rabi al-awwal, Muharram and Rajab months. It indicates that investors moods are vary in different Islamic months. Therefore, this study intends to investigate the impact of terrorist and disaster events on conventional and Islamic equity returns. Similarly, this study also

[3] According to Al-Ississ (2015), during Muharram, there are significant negative returns which are associated to bad/negative mood of investors. However, this finding is depending upon the proportion of Shia (Shia is one of the branches in Islam whereby another branch is known as Sunni) in a country. From the Shia perspective, Muharram is a month of mourning due to the death of Prophet Muhammad's grandson, Hussein ibn Ali, who was killed in the Battle of Karbala. The commemoration of the mourning event starts from the first of Muharram to twentieth of Safar, which is the Ashura day. The current population in Pakistan is estimated around 196 million and, there is approximately 16 to 30 million people of Shia population in Pakistan.

investigated the impact of terrorism and disaster events on conventional and Islamic equity returns based on event/target and type. Furthermore, the interaction effect of terrorism and disaster events with Islamic calendar months on the conventional and Islamic equity market returns is examined.

1.4 Summary of the Problem Statement

Pakistan is one of the countries which has more events of terrorism as compared to the other countries in the world. Since 2007, Pakistan has been ranked among the top five worst countries regarding terrorism events and six times, it was ranked the second worst (GTD, 2017). As far the economic costs, Pakistan has faced huge cost of terrorism from the year 2001 to 2014 which is around USD 102.51 billon (Ministry of Finance, 2013-14). In addition, Pakistan has also confronted a number of disasters including earthquakes, floods, landslides, storms, extreme temperature and technological disaster events which have caused damage to the economy. Similarly, it has faced two worst earthquakes including the earthquakes in 2005 and 2015 which has caused huge human and economic losses. Only the earthquake of 2005 has caused the death of more than 73000 people in Pakistan and has affected approximately 2.8 million people ("EM-DAT ", 2016). Moreover, Pakistan has been consistently ranked among the top ten countries facing huge losses due to different weather-related disasters since 2010 (Lead, 2015). Likewise, technological disasters have caused the death of around 7102 and affected around 34832 people in Pakistan since its inception in the year 1947 to the year 2015 ("EM-DAT ", 2016).

Thus, the aforementioned facts show that terrorism and disasters may bring huge economic and human losses for any country which may increase uncertainty for the investors. In the same way, the findings of the past studies have indicated negative world equity markets response towards terrorism and disasters which further show the insecurity that investors may feel due to these events. According to Ali and Afzal (2012), negative events increase market volatility which compel the investors to leave and go for safe markets**.** These significant impacts of such disaster events on equity markets have been documented in the previous research (Chen & Siems, 2004; Eldor & Melnick, 2004; Arin et al., 2008; Chesney et al., 2011). Equally, significant equity market response towards such disaster events has also been documented (Chesney et al., 2011; Wang & Kutan, 2013; Koerniadi et al., 2016). However, the issue of terrorism in Pakistan has comparatively been an underrepresented area and, therefore very few studies have examined the effects of terrorism and disasters on the equity market of Pakistan.

Hence the scarcity of literature on the equity market response towards terrorism in Pakistan raises some questions such as; do terrorism and disaster events affect the equity markets in Pakistan? If so, does equity market response towards terrorism and disasters vary based on the event/target type and location? Similarly, does equity market response towards terrorism and disasters vary during different Islamic calendar months? Accordingly, this study aimed to answer these questions by studying the equity market response with respect to terrorism and disaster events. Furthermore, the impact of terrorism and disaster events on the equity returns may differ for conventional indices and Islamic indices because recent literature has highlighted the difference in

performances of conventional and Islamic equity market indices (Al-Khazali et al., 2014; Ho et al., 2014; Alam et al., 2016; Akhtar & Jahromi, 2017). However, the impact of terrorism and disasters on Islamic equity market returns has not been addressed in the previous studies up to author's knowledge. Theretofore, this study also compared the conventional and Islamic equity market reactions towards terrorism and disaster events. Furthermore, this study also examined conventional and Islamic equity market reactions towards terrorism and disasters based on Islamic calendar months.

1.5 Research Questions

This study intends to answer following research questions:

1. Do the terrorism events in Pakistan affect the conventional and Islamic equity market returns in Pakistan?
2. Do the disaster events in Pakistan affect the conventional and Islamic equity market returns in Pakistan?
3. Does the impact of terrorism events on conventional and Islamic equity returns in Pakistan vary based on the type of event and location of event?
4. Does the impact of disaster events on conventional and Islamic equity returns in Pakistan vary based on the type of event and location of event?
5. Does the impact of terrorism and disaster events on conventional and Islamic equity market returns in Pakistan vary based on the Islamic calendar months?

1.6 Research Objectives

This study explored the changes in equity market returns in response to different terrorism and disaster events in Pakistan. The objectives of this study are as follows:

1. To investigate the impact of terrorism events on the conventional and Islamic equity market returns in Pakistan.
2. To investigate the impact of disaster events on the conventional and Islamic equity market return in Pakistan.
3. To investigate the impact of terrorism events on conventional and Islamic equity returns in Pakistan based on the type of event and location of event.
4. To investigate the impact of disaster events on conventional and Islamic equity returns in Pakistan based on the type of event and location of event.
5. To investigate the impact of terrorism and disaster events on conventional and Islamic equity returns in Pakistan based on the Islamic calendar months.

1.7 Significance of Study

This study aims to explore the impact of terrorism and disaster events on the conventional and Islamic equity market returns in Pakistan. Likewise, a few previous studies have also examined the impact of these events on the equity returns based on the event type and location (Eldor & Melnick, 2004; Aslam & Kang, 2013; Aslam *et al.,* 2015). However, previous studies have overlooked some potential gaps in this area. For instance, these studies did not examine the impact of terrorism and disasters on the Islamic equity market returns. Thus, up to the author's knowledge, this study is among

the first of those studies examining the impact of terrorism and disaster events on the Islamic equity market returns.

Furthermore, this study has also examined the impact of terrorism and disaster events on the conventional and Islamic equity market returns based on the event type and event location. Since, recent studies have indicated that the performance of conventional and Islamic equity markets is different during crises periods (Yusof *et al.,* 2007; Al-Khazali *et al.,* 2014; Ho *et al.,* 2014; Jawadi *et al.,* 2014; Alam *et al.,* 2016), therefore, it is also pertinent to investigate the differential behavior of conventional and Islamic equity markets during the aftermath of terrorism and disaster events. Therefore, this study is among pioneer studies on the Islamic equity markets response towards terrorism and disaster events.

Likewise, this study also examined the Islamic equity market response towards different target/event types of terrorism and disaster events and different locations of terrorism and disaster events. Information of the events happening at the main locations get more media coverage (Oliver & Myers, 1999), therefore, might become public soon as compared to the information about the events happening at remote areas. Moreover, institutions and influential people are normally centered at important location in the big cities. It is also well established that influential people and institutions have more ready access to the media (Shoemaker & Reese, 2013). Therefore, media may provide more coverage to those events involving important locations even if the losses are low. Similarly, Oliver and Myers (1999) stated that media do not provide coverage to every news. Based on this point, the researcher assumes that even the smaller events

happening in large cities and important location may become more destructive for the equity market as compared to the others.

Moreover, Schuster *et al.* (2001) stated that the people living at distant locations from the terrorist attack are less likely affected by the attack. Their study reported that stress among people living at distant place from 9/11 attacks was lower as compared to the people living near to the places of attack. Furthermore, events happening in cities where financial markets are located have more severe economic consequences as compared to the events happening in other cities (Aslam & Kang, 2013; Aslam *et al.,* 2015).

However, most of previous studies considered the terrorism events and similar investigation should be conducted on disaster events by dividing the events based on location of an event. Therefore, this study conducted investigation by dividing the sample of disaster events in to different types and location. Prospect theory states that people respond more severely to the probability of losses as compared to the gains. Furthermore, people make one event as reference point for the other and expects similar events in the aftermath of any catastrophe (Tversky & Kahneman, 1975; Kahneman & Tversky, 1979; Tversky & Kahneman, 1992; Sunstein, 2003). Thus, this study addressed these gaps, first by investigating the impact of disaster events on equity returns based on the type and location of event, second, to investigate the impact of these events by investigating the impact on the Islamic equity market returns.

In addition, another contribution of this study is to examine whether Islamic calendar anomalies persist, diminish or increase if any event of terrorism and disaster happens.

This potential gap has not been addressed by any of the previous study up to best of the researcher's knowledge. Most of the initial studies supported the Efficient Market Hypothesis (EMH) whereas many of the later studies cast doubt on its application and identified numerous anomalies making the validity of theory skeptical (Jensen, 1978). Those anomalies were found while testing for; different times of the day (Harris, 1986; Ariel, 1987), different days of the week (Jaffe & Westerfield, 1985; Brooks & Kim, 1997) and different months of the year (Gultekin & Gultekin, 1983; Gamble, 1993). Among anomalies, monthly calendar anomaly was found prevailing anomaly in most of the world equity markets.

Previous studies have examined the abnormal behavior of equity returns based on different calendar anomalies such as day-of-the-week effect (Wingender & Groff, 1989), January anomaly (Seyhun, 1993; Dahlquist & Sellin, 1996), Monday effect (Cho *et al.,* 2007), Ramadan effect (Husain, 1998; Białkowski *et al.,* 2012; Al-Khazali, 2014) and Islamic calendar anomalies (Al-Ississ, 2010; Halari *et al.,* 2015). Similarly, Islamic calendar anomalies have been tested by many other previous studies (Białkowski *et al.,* 2012; Ramezani *et al.,* 2013; Al-Khazali, 2014; Halari *et al.,* 2015). The findings of these studies indicated abnormal returns during certain Islamic calendar months. However, to the best of researcher's knowledge, previous studies have not considered the impact of terrorism and disaster events on equity returns during different Islamic calendar months. Thus, this study is pioneer to investigate the interaction effect of terrorism events and Islamic calendar months on the conventional and Islamic equity market returns. Likewise, this study is also pioneer to investigate the interaction effect of disaster events and Islamic calendar months on the conventional and Islamic equity

market returns. This study contributed significantly to the capital market literature by providing new insights regarding the impact of terrorism and disaster events on the equity market in Pakistan.

1.8 Scope of Study

This study aimed at examining the effect of terrorism and disaster on conventional and Islamic equity market returns in Pakistan. Moreover, the impact of these events was tested based on the location of event and type of event. Further, an interaction effect of terrorism and Islamic calendar months on conventional and Islamic equity returns was examined. Likewise, the interaction effect of disaster events with Islamic calendar months on the conventional and Islamic equity market returns was documented. Secondary data was used for events and equity returns. Regarding selection of terrorism events, this study used four samples based on three, seven, ten and twenty causalities. Regarding the disaster events, this study used all the events that happened during the selected time.

1.9 Conclusion

The evidence regarding the impact of economic events on equity markets and the impact of non-economic events on equity market has been documented in the previous research. Likewise, the previous studies documented the equity markets response towards terrorism and disaster events. However, the previous studies have overlooked the impact of terrorism and disaster events on the Islamic equity market returns.

Therefore, this study is among the pioneer studies which documented the Islamic equity market response towards terrorism and disaster events based on event types and location. Likewise, this study is among the pioneer studies which examined persistence of Islamic calendar anomalies in the aftermath of terrorism and disaster events. For this purpose, interaction of terrorism events with Islamic calendar months was regressed on the conventional and Islamic equity market returns. Also, the interaction of disaster events and Islamic calendar months on the conventional and Islamic equity market returns was regressed.

1.10 Organization of the Study

The organization of the study is as follows: The first chapter covers the introduction of the study. The chapter 2 sets forth the literature review. Similarly, the research methodology is described in chapter 3. The chapter 4 presents the data analysis and empirical findings and the chapter 5 provides the conclusion of the thesis.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Does stock market price reflect all existing public information? Efficient market hypothesis states that share prices reflect all current information. Market efficiency is classified into three forms, weak form of efficiency, semi strong form and strong form of efficiency (Malkiel & Fama, 1970; Fama, 1990). A market which reflects past share prices information is termed as weak form efficient and market which reflects past share price information and current information is termed as semi strong form efficient. A market which reflects past share prices information, current information and inside information can be termed as strong form efficient. As mentioned earlier that the semi-strong form of efficient market hypothesis postulates that stock prices indicates past and current public information. The effect of any information or news that can have possible effect on equity market should have reflection in the prices. Information can be economic information or the non-economic information.

The economic information can be about the economic events which can be further classified into macroeconomic events and microeconomic events. The macroeconomic events (see, for example, Chen *et al.,* 1986; Sohail & Hussain, 2009; Ahmed & Mustafa, 2012; Hussain *et al.,* 2012; Khalid *et al.,* 2012; Engle *et al.,* 2013; Mustafa *et al.,* 2013) are those that may influence the overall market, while microeconomic events might

affect particular company (see, for example, Merton, 1973; Breeden, 1979; Duso *et al.,* 2007).

In macro events, for instance, Laopodis (2007) studied the impact of fiscal policy on equity market of USA and found that shares prices are influenced by the previous budget deficits. Moreover, they stated that market is not efficient in reflecting plans regrading coming fiscal policy. Hardouvelis *et al.* (2006) studied European Monetary Union (EMU) and European Stock Market Integration. Their results showed Euro zone countries do not have integration into the equity markets of the world market at large.

Similarly, Duso *et al*. (2007) examined the determinants of European Union (EU) merger control decisions by equity market pricing of different competitor to merger firms. The results of their study showed that merging firms have statistically significant positive effect on abnormal returns at the announcement date. Birz and Lott Jr (2011) examined the effect of macroeconomic news on equity market returns and their finding show that news about unemployment and GDP have significant impact on equity market returns. The impact of macroeconomic news on equity markets has been documented in the prior studies (see, for example, Merton, 1973; Breeden, 1979). The aforementioned studies were conducted on developed equity markets and there are other studies conducted on the impact of macroeconomic events on equity market returns of developing countries (see, for example, Sohail & Hussain, 2009; Benaković & Posedel, 2010; Ahmed & Mustafa, 2012; Khalid *et al.*, 2012).

As stated earlier, the economic events can be macroeconomic events and microeconomic events; the microeconomic events or firm specific events are those that may affect the equity market returns of specific companies. Numerous studies have documented the equity market response to different public news in the previous three decades where many of these studies investigated equity market response to the firm specific news (see, for example, Asquith & Mullins, 1986; Taib *et al.,* 2011; Tanveer *et al.,* 2015). For instance, Asquith and Mullins (1986) examined the signaling effect of dividends, stock repurchase and equity issue on stock price.

Similarly, the impact of other firm specific news on equity market has been examined in the past, for instance Jorion and Zhang (2007) studied announcement effects of rating reclassifications on equity returns, Taib *et al*. (2011) examined the information value of rating changes announcements. Irshad *et al.* (2014) examined the relation among oil prices, gold prices and stock prices. Similarly, Tanveer *et al.* (2015) examined the equity market response of acquiring companies to the mergers and acquisitions.

In addition to the economic events (both macroeconomic and microeconomic), literature also provided the evidences on the impact of non-economic events on the equity market returns. For instance, Nazir *et al.* (2014) stated that equity market performance is affected by the economic events and non-economic events. There are studies that have examined the impact of different events on equity market pricing based on non-economic events instead of the economic events (Frieder & Subrahmanyam, 2002; Eldor & Melnick, 2004; Worthington, 2008; Karolyi & Martell, 2010; Symeonidis *et al.,* 2010; Ferreira & Karali, 2015; Seif *et al.,* 2017).

There are many studies that have investigated the impact of different non-economic events on equity markets such as, equity market reaction to airline crash (Ho *et al.,* 2013), Gulf oil spill (Humphrey *et al.,* 2016), corporate philanthropic disaster response (Muller & Kräussl, 2008), earthquakes (Shan & Gong, 2012), tsunami (Ramiah, 2013) whereas a few studies have examined the impact of disaster events on equity returns despite the fact that impact of these events was severe on the equity returns (Bosch *et al.,* 1998; Capelle-Blancard & Laguna, 2010; Chesney *et al.,* 2011; Cao *et al.,* 2015; Bourdeau-Brien & Kryzanowski, 2016). The severe response of investor towards the terrorism and disaster events may be referred to the 'probability neglect' as described by Sunstein (2003) and to the prospect theory given by Tversky and Kahneman (1975) and later advanced and referred by others (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992; Sunstein, 2003). Based on the prospect theory, this study assumes that investors may respond more severely to the terrorism events resulting from the 'probability neglect' (Sunstein, 2003) and similar behavior is expected in disaster events based on the its similarity with the terrorism in terms of losses and uncertainty (Chesney *et al.,* 2011). Following sections discuss the possible causes of terrorism in the Pakistan.

2.2 The Possible Causes of Terrorism in Pakistan

Pakistan is in the South Asia bordering India, Iran, Afghanistan and China. Pakistan is located at the east of India having boarder of approximately 1,950 km. Pakistan shares the boarder of 1,200 km with Afghanistan located at north of it and Persian Gulf Area is at the southwest of Pakistan having border of 800 km. China and Pakistan shares

border of 600 km to the north border of Pakistan (Nizami *et al.*, 2014). Among different causes of terrorism in Pakistan, one reason might be the controversial relationships between India and Pakistan because of their claims on Kashmir (Wolpert, 2010; Ganguly, 2013; Behera, 2016). Owing to this reason, Pakistan and India had wars and many conflicts (Jiang & Ya, 2016). These conflicts have endlessly brought many incidents of terrorism in the whole region (Nizami *et al.,* 2014).

Another reason might be the sectarian conflicts. Iranian revolution of 1979 was one of the causes that ignite terrorism in Pakistan (Saeed *et al.,* 2014). Iranian revolution raised the "Shia-Sunni" sectarian conflict in the country which became the reason of assassination of many renowned scholars of both sects. There are number of incidents where people were killed based on sectarian conflicts (Yusuf, 2012). Iranian revolution strengthened the different problems between Sunni Gulf states and Shia dominant Iran. The purpose to create regional dominance, based on sectarian issues, was a reason for a proxy terrorist war Pakistan has faced inside the border areas (Saeed *et al.,* 2014).

In the same period, General Zia's[4] government pursued a policy of Islamization in Pakistan. The policy of his regime was to take a frontline stand against the Soviet Red Army which made the Afghan Russia war of 1980 as another reason of terrorism in Pakistan (Saeed *et al.,* 2014). The militants from different areas of the world set together in north of Pakistan to fight against Russians. Afterwards, these militant groups become

[4] "General Zia declared martial law in 1977 and served as the 6th President of Pakistan from 1978 until his death in 1988"

a foundation of terrorism in Pakistan and become main cause of terrorism in the world (Weiner, 1998). Moreover, Pakistani support for the USA in the Afghanistan war might be another reason for terrorist activities within Pakistan (Khan *et al.,* 2016).

Moreover, after Afghanistan war, a multitude of militant groups came to Pakistan and resided in the FATA (Federally Administered Tribal Areas). Many militant groups in the FATA area of Pakistan were originated during the period from 1970 to 1980 for anti-Soviet mujahedeen mobilization (Johnston & Sarbahi, 2016). FATA is an area in the north of Pakistan neighbouring Afghanistan (Johnston & Sarbahi, 2016). Local militant groups have given sanctuary to the many senior members of al-Qaida's in FATA area of Pakistan during the years 2001 and 2002 (Rashid, 2010).

These local jihadists called "The TTP (Tehrik-e-Taliban Pakistan)" were properly recognized after year 2007 when forty militant leaders from across Khyber Pakhtunkhwa and FATA joined hands under single leader Baitullah Mehsud of South Waziristan (Abbas, 2014). These militant groups based in Pakistani tribal areas, supposed to linked with Al-Qaida and Tehrik e Taliban, were attacked by the US drone strikes (Johnston & Sarbahi, 2016). Being counterproductive, drone attacks have also become the cause of terrorism in the country. It is because violence is associated with negative effect on attitudes toward the forces, resulting in public support towards militant groups (Lyall *et al.,* 2013).

Most recently, FATA based militants groups and Pakistani armed forces had asymmetric war situation (Johnston & Sarbahi, 2016). These militant groups also

targeted public and even schools. On December 16, 2014 terrorist attacks on army public school in Peshawar killed 148 children which resulted in change of government policy towards terrorism. A national action plan (NAP) was defined with objective to eliminate terrorism from country (Interior Ministry Pakistan, 2015).

Moreover, as part of the national action plan, special military courts were established to hear the terrorism related cases and to finalize them in shortest possible period. In this regard, a military operation called "Zarb-e-Azab" was started in June 2014 in North Waziristan against all the militant groups including Tehrik-e-Taliban Pakistan (TTP), the Islamic Movement of Uzbekistan, the East Tarkistan Islamic Movement, Laskar-e-Jhangvi, Al-Qaeda, Jundullah, and the Haqqani network. This operation killed many terrorists in the country. In addition, the government tried to stop the foreign funding's to the NGO's after getting evidence on the NGOs support to these militant groups. All the NGO's were instructed to register with the government and 171 NGO's were banned by Ministry of Foreign Affairs. In addition, 60 more organizations were banned by the Interior Ministry (Gishkori, June 28, 2015) of the land.

In addition to the contribution of Afghan war in terrorism in Pakistan, Weiner (1998) put forth that terrorism in Pakistan started since 1970 when General Zia-Ul-Haq came into power and arrested the elected prime minster Zulfiqar Ali Bhutto and later Bhutto was executed in 1979. To counter the anger of Zulfiqar Ali Bhutto's Pakistan people's party, General Zia helped another new group called Muhajir Quumi Movement (MQM) (Kukreja, 2003; Lansford, 2014) which is the second largest political party in the Sindh province in 2013 national elections. In 1994, Altaf Hussain (Party Leader MQM) with

two other members was sentenced prison for 27 years in absentia on the charges of terrorism but in 1997 the convictions were quashed (Lansford, 2014). Hussain (2010) claimed that many incidents of violence happened in Karachi against MQM and by MQM. After certain phases of violence, ninety percent of terrorist incidents in Hyderabad and Karachi and forty percent of the incidents in the rest of the country were linked to MQM.

All the terrorism causes, and events discussed in this section bring along the economic consequences. Terrorism losses create financial instability, destroy the market infrastructure and become the reason for reduction in investor confidence (Nedelescu & Johnston, 2005). Pakistani economy bears the terrorism cost in form of human loss in addition to the financial loss. It destructs the infrastructure and create investment loss. Fear of terrorism and migration reduces the production and creates unemployment. The losses that are borne by the country as a result of terrorism include human losses, investment environment and loss to the physical capital of the country (Aslam & Kang, 2013). Khan *et al.* (2016) demonstrated that terrorism has badly affected the exports, foreign investments and import demands in Pakistan. Their findings showed that during 2013 terrorism in Pakistan caused around 2,891 lives in terrorist attacks as compared to 118 deaths in the year 2000.

In addition, Pakistan also bears the economic loss in term of security price paid for terrorism. Owing to terrorism, Pakistan faced direct and indirect costs around USD 103 billon which is equivalent to PKR 8260 billion which increased from USD 2.669 billion in 2001–2002 to USD 13.6 billion (Khan *et al.,* 2016). Terrorism has severely damaged

the economic indicators of Pakistan like exports, foreign investment and tax collections. Moreover, Pakistan has also suffered in terms of increased security spending and reduction of tourism in the country. As a result investment to GDP ratio in Pakistan declined from 22.5 % in 2006–2007 to 13.4 % in 2010–2011 (GOP, 2013).

2.3 Terrorism and Equity Market

There are many studies highlighting the issue of terrorism in Pakistan (Aslam & Kang, 2013; Ismail & Amjad, 2014; Nazir *et al.,* 2014). Moreover, past studies have investigated the initiating reasons of terrorism in Pakistan (Looney, 2004; Asal *et al.,* 2008) anti-terrorism policies and efforts by Pakistan (Riedel, 2008; Siddiqa, 2011), support for terrorism (Williams, 2008), culture of jihad (Stern, 2000), role of madrassa (Schaffer, 2008), sect based issues (Grare, 2007) and consequently reduction in foreign and local investment due to terrorism (Gaibulloev & Sandler, 2008, 2011; Meierrieks & Gries, 2012, 2013). Moreover, past research reported that economic situation is negatively influenced by terrorism.

Terrorism caused many indirect losses to the economy as postulated by the recent research. Prior studies looked into the effects of terrorism by considering any specific economic variable such as tourism share (Enders *et al.,* 1992; Drakos & Kutan, 2003), FDI (Enders & Sandler, 1996; Enders *et al.,* 2006; Powers & Choi, 2012; Filer & Stanišić, 2016), defense industry (Apergis & Apergis, 2016) and; cost of debt (Procasky & Ujah, 2016). Furthermore, research has shown that economic decisions are governed by emotions and sentiments (Daniel *et al.,* 2002; Lucey & Dowling, 2005; Shu, 2010;

Shu & Chang, 2015). There are many studies that have reported the significant effects of terrorism on equity returns (Alam, 2012; Bora Ramiah, 2012; Aslam *et al.,* 2015; Mnasri & Nechi, 2016).

According to Enders and Sandler (2011) "Terrorism is premeditated use, or threat of use, of extra normal violence to obtain a political objective through intimidation or fear directed at a large audience". Brennan (2007) stated that terrorist organization require large number of people to be affected to attain their political purposes. Terrorism causes the reduction in economic growth (see, for example, Hess & Orphanides, 1995; Stewart & Fitzgerald, 2000; Hess & Orphanides, 2001; Addison, 2003; Blomberg *et al.,* 2004). People tend to respond to rare/catastrophic events and that is why these events create anxiety in the society (Enders & Sandler, 2011).

According to Brennan (2007) terrorism has epistemic and emotional aspects whereas; the emotions can be irrational too. Moreover, he claims that it is not only that someone will have emotional reaction after being affected but a perception that he might be affected be the thoughts that somebody holds. The result of mindset of someone can also drive the human behaviors. For instance, Chen and Siems (2004) stated that investors search for the markets that are safe. Brennan (2007) states that terror might play in shaping action and creates fear. It diminishes the capacity for rational thought but in some circumstances, fear enables more rapid and effective response for careful calculation. This reaction initiates the panic buying/selling in the market and it creates anxiety in the market. Investors due to the fear of loss respond quickly after the

announcement of any negative events and it impacts the value of stocks and bonds (see, for example, Chen & Siems, 2004; Enders & Sandler, 2011).

Terrorism negatively affects the investors attitudes consequently affecting the equity market (Drakos, 2010). Investment decisions of any firm are sensitive to different terrorist attacks which restyle the investors behavior and sentiments. Furthermore, the investor behavior regarding growth stock and investor behavior regarding value stocks is different in terms of cross-section of returns (Essaddam & Karagianis, 2014). According to Abadie and Gardeazabal (2008) a terrorism event reduces the equity market returns, hence, reducing the investment in equity market.

In addition to the aforementioned studies there are other empirical evidences stating that terrorism has significant impact on equity market returns (see, for example, Karolyi & Martell, 2005; Brounen & Derwall, 2010; Drakos, 2010; Essaddam & Karagianis, 2014). Moreover, there are other research studies which have examined the spillover effect of terrorism on equity market returns. For example, Abadie and Gardeazabal (2008) reported that terrorism reduces the returns on the investments thereby increasing the movement of capital across the countries. They found that one standard deviation change in terrorism reduces the foreign direct investment by five percent of the overall gross domestic product.

Amid existing research, this empirical study is one of those that studies the link between terrorism and equity market behavior (see for example; Chen & Siems, 2004; Eldor & Melnick, 2004; Karolyi & Martell, 2005; Arin *et al.,* 2008). Eldor and Melnick (2004)

claimed that foreign exchange market and equity market are affected by the terrorist attacks. Similarly, Shahbaz *et al*. (2013) focused on economic effects of terrorism in Pakistan and postulate that terrorism is the cause of decline in foreign direct investment and portfolio investment.

According to Essaddam and Karagianis (2014) the effect of terrorism events on equity market is stronger in the wealthier countries, more democratic countries. Their study also concluded that volatility in stock returns due to terrorism events was low. Therefore, based on existence of mixed evidence on the impact of terrorism events on the equity market returns, this study has examined the impact of terrorism events on equity market returns.

Arin *et al*. (2008) proposed that European markets are less affected by the terrorism shocks as compared to the other markets. Moreover, they suggest that equity market investors of European countries tend to show resilient behavior to the terrorism events. It indicates that effect of terrorism on equity market may differ based on country. Likewise, interaction of finance and terrorism was studied by Essaddam and Karagianis (2014) considering the US firms. Analysis of return volatilities of firms reveal that terrorism affects equity markets differently depending on the country where terrorist events are happened. Moreover, it also differs based on the specific firms that are targeted. According to Sandler and Enders (2008), equity markets of developed countries demonstrate minor response to terrorism events. In addition, Karolyi and Martell (2010) reported that there is no steady long term response of equity markets to terrorism events.

The developed countries offer sectors substitution because investor can avoid investing in the sectors more vulnerable to terrorism by substituting in other sector which have lower negative shocks. On the other side, developing economies are characterized by lower level of diversification shortening substitution areas. These countries suffer in lower gross domestic product and lower development during prolonged campaigns (e.g., Israel since September 27, 2000). Prolonged terrorism events may generate expectation of recurrence of these events in future resulting in high risk premiums and reducing investments in sectors that are more vulnerable to the terrorism. Foreign and local investment flew away to other safer countries that are less prone to terrorism. (Sandler & Enders, 2008). Table 2.1 shows the impacts of terrorism on the equity markets in the developed countries.

Table 2.1

Terrorism in Developed Markets

Serial	Author	Country	Data	Methodology	Findings
1.	Eldor and Melnick (2004)	Israel	1990-003	Regression	Negative equity market response to terrorism
	Rigobon and Sack (2005)	USA	January 2003-April, 2003	Heteroscedasticity-Based Estimator	Negative equity market response to terrorism
2	Arin *et al.* (2008)	Israel, Spain, UK	2002-2006	GARCH	Terrorism has significant impact on equity returns and volatility
3.	Brounen and Derwall (2010)	international financial markets	1990-2005	Event-study	Negative impact of terrorism on equity market
	Drakos (2010)	22 countries	1970-2004	Pooled Regression, ARCH	Terrorist has significant impact on daily equity market returns
4.	Chesney *et al.* (2011)	Global, European, Swiss and American Markets	January 4, 1994 until September 16, 2005	Event-study Filtered GARCH–EVT	Negative impact of terrorism on equity market
5.	Graham and Ramiah (2012)	Japan	Five major attacks including New York World Trade Centre, Bali, Madrid, London, and Mumbai	Event Study, Regression	US, Madrid and Bali attacks significantly affected the Japanese equity market
6.	Kollias *et al.* (2011)	Spain and London	March 2004 attack in Madrid and July 2005 in London	Event Study	Negative impact on majority of sectors in Spanish equity market whereas London equity market recovered soon after attacks
7.	Kumar and Liu (2013)	Twenty developed and developing countries	1990-2010	Event study, Logit regression	Negative impact of terrorism on equity market
8.	Essaddam and Mnasri (2015)	USA	1995–2011	Event-study, Bootstrapping technique	Equity markets of developed countries do not respond to terrorist attacks.

Many prior studies have reported that magnitude of equity market response to terrorism events is minute and equity market response to terrorism events is very short lived (Chen & Siems, 2004; Chesney *et al.,* 2011; Essaddam & Mnasri, 2015). However, most of these studies did not address the equity markets of developing countries, whereas, the impact of terrorism events on stock markets lasts longer in the emerging countries in sharp contrast to the developed countries (Mnasri & Nechi, 2016).

Developed and developing countries may handle terrorism events differently in many ways. For instance, developing countries are equipped with lesser disaster management systems. In contrast, developing countries unlike developed countries may possess less capable governmental institutions. These low capable government institutions may not be capable of applying monetary, fiscal, and other policies to tackle with the wide ranging or a protracted terrorism (Sandler & Enders, 2008). Moreover, there are other reasons that may explain why the equity markets of the developing countries are more prone to terrorism events. For instance, Sandler and Enders (2008) postulated that the reasons might be the their internal conflicts, lack of decisive and effective security measures and dependence of developing countries for goods and services.

Gul *et al*. (2010) examined the impact of terrorism on equity market of Pakistan using the ordinary least square (OLS) method. Their results demonstrated that equity market of Pakistan is negatively affected by the terrorism events. However, there are other studies reporting similar effects of terrorism in the developed as well as developing countries. For instance, Drakos (2010) studied the impact of terrorism attacks in twenty-

two developing and developed countries and reported that terrorism negatively influence the share prices.

The extent of terrorist attacks in any country may also depend on the level of development of the country. There might be numerous causes of terrorism in any country. For instance, Nizami *et al*. (2014) claimed that wealth, income and education reduces the terrorism in any country. Similarly, Estrada *et al.* (2015) analysed the impact of income per capita and GDP per capita on the incidents of terrorist attacks in Pakistan. Their results demonstrated that growth of economy is negatively related to the terrorism in the country.

According to Asal *et al.* (2008), the choice of individuals to indulge in terrorism activities also depends on their families. Their survey showed that materially better off families do not allow their children to join militant groups. These facts support the notion that developing countries due to high poverty ratios might face more incidents of terrorism as compared to the developed countries.

In addition to the causes of terrorism, economic consequences of terrorism may also depend on several factors. According to Eldor and Melnick (2004), the form of financial regime in any country determines the magnitude of the equity market response to the terrorism. For instance, they suggested that liberalized and competitive markets are more efficient in adjusting to market changes due to terrorism activities. Similarly, level of development of a country is another reason. It implies that extent of economic costs borne by developed and developing countries because of terrorism may also differ. For

instance, Tavor (2016) stated that negative effect of terrorism is higher in developing countries as compared to developed countries due to difference of ability of government institutions to cope with these events.

Similarly, Arin *et al.* (2008) argued the results of terrorist events on financial markets of six different countries UK, Turkey, Israel, Indonesia, Spain, and Thailand. The authors examined the effect of terrorist events on equity market and measure the volatility. Results of their study reported that terrorism has significant impact on equity market returns and equity market volatility and it was found that this impact is even stronger in the case of emerging markets. Table 2.2 shows the findings of the previous studies regarding the impact of terrorism on the equity markets in the developing countries.

Table 2.2

Terrorism in Developing/Emerging Markets

Serial	Author	Country	Data	Methodology	Findings
1.	Arin *et al.* (2008)	Indonesia, Thailand, Turkey	2002-2006	GARCH	Terrorism has significant impact on equity returns and stock volatility
2.	Bora Ramiah (2012)	Malaysia	1999-2008	Events Study	Shows that equity markets are insensitive to most terrorist events
3.	Aslam and Kang (2013)	Pakistan	2000-2012	Event Study	Terrorism has significant impact on equity returns
4.	Ramiah and Graham (2013)	Indonesia	1999-2008	Event Study	Negative impact of terrorism on equity returns
5.	Hassan and Hashmi (2015)	Pakistan	2003-2012	Event Study	Terrorism has significant impact on equity returns only for severe attacks otherwise market is insensitive to attacks
6.	Aslam *et al*. (2015)	Bangladesh, Philippines, Sri Lanka, India, Indonesia	1997-2011	Event Study	Terrorism has significant impact on equity returns
7.	Tavor (2016)	Twenty-two developed and developing countries	108 incidents in twenty-two countries	Regression	Terrorism has negative relationship with equity returns and developing countries showed steeper decline as compared to the developed countries.
8.	Holwerda and Scholtens (2016)	Global Oil and Gas Companies	2001/2010 and 2012/2012	Event Study	No evidence that shareholders respond in a significant manner to these attacks
9.	Kutan and Yaya (2016)	Colombia	2002-2012	Event Study, GARCH	Negative impact of terrorism on equity returns
10.	Mnasri and Nechi (2016)	MENA Region	2000-2015	Event Study	Impact of terrorist attacks on equity returns remains for longer days as compared to developed counties

2.4 Disaster Events and Economic Growth

The previous studies have reported different outcomes of disasters like economic costs (Kahn, 2005; Toya & Skidmore, 2007), short and long-run secondary impacts of disaster on equity returns (Bosch *et al.,* 1998; Worthington, 2008; Ho *et al.,* 2013; Khanser & Galido, 2013; Wang & Kutan, 2013; Bourdeau-Brien & Kryzanowski, 2016), health (Watson *et al.,* 2007; Kouadio *et al.,* 2012), public consumption (Noy & Nualsri, 2011), GDP per capita (Barone & Mocetti, 2014) productivity and output (Skidmore & Toya, 2002; Noy, 2009) and fiscal consequences (Noy & Nualsri, 2011).

Although disasters cause huge human miseries, however, their economic impacts are inconclusive as past researches found mixed result of negative impact, positive impact or no impact at all (Loayza *et al.,* 2012). Further, Loayza *et al*. (2012) reported that disasters do not necessarily bring along negative effects but their effect on economy depends on the type of disaster and the type of sector that encountered the disaster. Prior studies have reported that disaster may become positive bringing "creative destructions" in the affected areas. This might happen due to the replacement of the old technologies with the new one, resulting in increase in production capacity and growth of the economy (Skidmore & Toya, 2002). Likewise, positive post disaster consequences are followed by decrease in unemployment (Ewing *et al.,* 2005) and higher income levels (Belasen & Polachek, 2008) in affected countries.

Barone and Mocetti (2014) reported that disasters might sometimes increase technical efficiency after financial aid. Disaster may bring positive economic outcomes through

replacement of old technology with new technology. This prospect is termed as productivity effect (Hallegatte & Dumas, 2009). Literature posits that productivity effect may positively affect the economy. After the occurrence of disaster events existing technology and capital stock is replaced with the new and improved technology. (see, for example, Okuyama; Stewart & Fitzgerald, 2000; Hallegatte & Dumas, 2009). This replacement of old technology with the new and improved technology brings positive economic consequences (Hallegatte & Dumas, 2009).

Noy and Vu (2010) reported that disasters may bring reduction in output growth, but destruction of property and capital may bring overall positive economic effects in short run. Moreover, Skidmore and Toya (2002) reported the positive outcomes of climate related disaster in the long run by taking the gross domestic product from year 1960 to 1990. An empirical evidence for this idea can be traced back from Albala-Bertrand (1993). Results of this study indicated that growth in gross domestic product increases after the occurrence of disaster events in most of the sample countries. This positive effect was attributed to the replacement of old technology with modern and efficient technology in the effected countries. Additionally, any negative economic outcomes may also reduce due to increase in foreign aid and remittances after happening of any disaster event (Hochrainer, 2009).

However, Barone and Mocetti (2014) claimed that disasters might sometimes decrease efficiency due to increased corruption, distorting the markets and deteriorating social capital. Rasmussen *et al.* (2004) found, for instance, that disasters lead to a median reduction of 2.2 percent in the same-year real Gross Domestic Product (GDP) growth

rate. Similarly, Hochrainer (2009) reported the evidence revealing adverse macroeconomic consequences of disasters on GDP. Studies also found that geological disasters are negatively associated with growth (Crespo Cuaresma *et al.,* 2008; Leiter *et al.,* 2009).

2.5 Disaster Events and Equity Market

Cameron and Shah (2015) focused Indonesian people, who directly suffered due to flood and earthquakes. Their study reported that disaster affects risk taking behavior. Moreover, the impact of severe disasters remained for several years on behaviors of people. Furthermore, their study observed risk averse behavior resulting from severe disaster by changing background risk perceptions. According to Chesney *et al*. (2011), occurrence of natural disaster events affects the economic situation of any country which in turn affect the capital markets.

Prior studies have reported market reaction towards different types of disasters such as earthquakes (Shelor *et al.,* 1990; Worthington, 2008; Shan & Gong, 2012; Scholtens & Voorhorst, 2013), floods (Worthington, 2008), hurricanes (Worthington, 2008), temperature (Hirshleifer & Shumway, 2003; Symeonidis *et al.,* 2010; Lu & Chou, 2012),energy accidents (Scholtens & Boersen, 2011), air crashes (Bosch *et al.,* 1998; Kaplanski & Levy, 2010), chemical (Capelle-Blancard & Laguna, 2010), nuclear accidents (Hill & Schneeweis, 1983; Ferstl *et al.,* 2012; Kawashima & Takeda, 2012) and oil accidents (Kollias *et al.,* 2012; Humphrey *et al.,* 2016).

The negative impact of disasters on equity markets has also been observed in the previous studies (Bosch *et al.,* 1998; Capelle-Blancard & Laguna, 2010; Chesney *et al.,* 2011; Li, 2012; Ho *et al.,* 2013; Li *et al.,* 2015). Chesney *et al*. (2011) studied the effects of natural disasters on equity markets. According to their study natural disaster negatively affect the equity markets. Similarly, Li (2012) reported that Australian equity market is also negatively affected by the natural disaster. Moreover, results of their study demonstrated that these effects were observed before two days of the event, at event date and after the date of the event. Similarly, Li *et al*. (2015) postulated that natural disasters negatively affect Chinese equity market. However, these results vary across different industries. Furthermore, Worthington and Valadkhani (2004) reports that equity markets are affected by the earthquakes wildfires and cyclones.

On contrary, Worthington (2008) investigated the impact of natural and rare disaster events on Australian equity market and reported that these events have no significant impact on the equity market returns. Worthington and Valadkhani (2004) found that storms and floods do not affect the equity markets. Likewise Brounen and Derwall (2010) reported that natural disasters have insignificant impact on the equity markets. Furthermore, he reported that equity markets of different countries that were directly affected by tsunami were almost unresponsive to this disaster despite negative sentiment prevailing in those countries. The portfolio constructed in the study showed no change in their risk and returns. Table 2.3 shows the impact of disasters on the equity markets of the developed countries.

Table 2.3
Disasters and Equity Markets in Developed Countries

Serial	Author	Country	Data	Methodology	Findings
1.	Worthington and Valadkhani (2004)	Australia	1982-2002	Autoregressive moving average (ARMA) models	Natural disasters affect equity returns
2.	Worthington (2008)	Australia	1980-2003	GARCH-Mean Model	Natural disasters have no significant impact on equity returns
3.	Yang *et al.* (2008)	Japan	1990-2000	Event Study	For the Japanese equity market as a whole, there is no significant catastrophe effect
4.	Kaplanski and Levy (2009)	USA	1950-2007	Regression	Bad mood and anxiety affect the investment decisions, and negative events affects the less stable industries
5.	Brounen and Derwall (2010)	Canada, France, Germany, Italy, Japan, Netherlands, UK, and US	1990-2005	Event Study	Natural disasters affect equity returns
6.	Chesney *et al.* (2011)	Global, European, Swiss and American Markets	January 4, 1994 until September 16, 2005	Event-study, Filtered GARCH–EVT	Significant impact of natural disasters on equity market
7.	Hood et al. (2013)	Japan	Japan's 2011 Earth quack	Regression	Individual investors typically show contrarian trading patterns and foreign investors showed momentum trading strategies
8.	Wang and Kutan (2013)	US and Japan	1989-2011	Regression	Natural disasters have significant impact on US and Japanese equity markets
9.	Koerniadi *et al.* (2016)	US, Australia, Italy, Japan, New Zealand	1974-2010	Event study	Equity market negatively affected by earthquake, hurricane, tornado and not affected by flood, tsunami and volcanic. Furthermore, construction industry is positively affected

As countries grow, more resources are allocated to the safety and prudent steps are taken to lessen the effect of disaster (Toya & Skidmore, 2007). Kahn (2005) reported that human losses due to disaster are reduced as the level of income in any country increases. (Toya & Skidmore, 2007). It reflects that economic outcomes of disasters may differentiate in the developing as well as developed countries. For instance, Noy (2009) stated that negative consequences of disaster are lower in those countries where education level, income, financial system and trade openness is high. It has also been observed by their study that disaster with the same magnitude severely affects the output in the developing countries.

The aforementioned arguments indicate that disaster related losses are associated with the degree of technological transmission between developed countries and developing countries. Further, income level interacts and research and development elasticity depends on development of the economy resulting in creative destruction in developed countries (Loayza *et al*., 2012). Findings of Javid (2007) highlighted that equity market of Pakistan responds to the unanticipated shocks quickly and consequently affecting the trading activities. According to Loayza *et al*. (2012) positive effect of disasters in few sectors will prevail in case of moderate disasters instead of intense disasters.

Instead, Hsiang and Jina (2014) find strong support for the alternative situation that developed and developing countries show similar post disaster trend. However, it is also reported by their study that post disaster growth declines and does not recover within twenty years. Table 2.4 shows some of the studies conducted on the impact of disasters on equity returns in the developing countries.

Table 2.4

Disasters and Equity Market in Developing/Emerging Countries

Serial	Author	Country	Data	Methodology	Findings
1.	Bolak and Ömür (2011)	Turkey	Marmara earthquake, 1999	Event Study	Equity market negatively affected by earthquake
2.	Ramiah (2013)	Indonesia, Sri Lanka, India, Thailand, Malaysia, Bangladesh and Kenya	1999-2007	Event Study	Equity markets are insensitive to disaster events
3.	Scholtens and Voorhorst (2013)	Twenty-one markets including developed and developing	197-2011	Event Study	Natural disasters and equity returns are negatively related. Moreover, there is no difference between low and high-income countries.
4.	Cao *et al*. (2015)	China	2005-2011	Event Study	Significant effects of climatic disasters on equity market
5.	Ferreira and Karali (2015)	Thirty-five countries including developed and developing	1995-2013	GARCH	Impact of earthquakes on stock returns is more severe in developed countries as compared to the developing countries.
6.	Li *et al*. (2015)	China	2003-2013	Event Study	Equity market negatively affected by natural disasters
7.	Koerniadi *et al*. (2016)	India, Indonesia, Thailand	1974-2010	Event Study	Equity market negatively affected by earthquake, hurricane, tornado and positively affected by flood, tsunami and volcanic
8	Capelle-Blancard and Laguna (2010)	World Equity Markets	1990-2005	Event Study	Negative relationship between chemical disasters and share prices

2.6 Type of Event

Different types of terrorist attacks may create different types of fear among equity market investors. Terrorism may generate fear and uncertainty (Yehuda & Hyman, 2005) which in turn is reflected in investor behaviours. Sunstein (2003) reported that any event involving strong emotions results in "probability neglect". It means that people consider the negative consequence instead the probability of real consequences. Terrorist events may have influence on the behaviours making them exaggerated in terms of risk perception. Moreover, these effects are not different in disaster events in that both have similar effect on human behaviour (Slovic *et al.,* 2000).

Few of the previous studies have reported that impact of terrorism events may differ based on the type of events. For instance, Aslam and Kang (2013) reported that among five types of terrorist attacks (bomb attacks, suicide attacks, attacks on foreigners, mosque attacks and drone attacks) only bomb attacks were found significantly affecting equity returns. Similarly, Aslam *et al*. (2015) studied the impact of terrorism on equity markets of Asian countries based on five types of attacks. Their results demonstrated that Asian markets are more severely affected by suicide attacks and bomb attacks.

Another study by Eldor and Melnick (2004) reported the results of terrorism on equity returns based on the five type of events (suicide, cold weapon, armed assault, bombing and kidnapping). The results of their study demonstrated that among these five types of attacks, suicide attacks bring permanent effects on equity returns. The results of aforementioned studies are based on the premise that different types of attacks might

have different psychosocial impact. For instance Drakos (2010) stated that impact of terrorism may not be similar across different stages of psychosocial impact.

Similarly, Koerniadi et al. (2011) claimed that the impact of earthquake, hurricane and tornado is negative on the equity market returns. Furthermore, the negative impact of these events remained several weeks on the equity returns, whereas, the impact of flood, tsunami and volcanic eruption showed positive impact on the equity returns. Likewise, Capelle-Blancard and Laguna (2010) reported negative impact of chemical disasters on equity markets. These results imply that impact of all types of disaster events on equity returns may not show similar market reactions.

Although there are very few studies on impact of disaster events on equity returns but many of studies have examined the impact of single type of catastrophes on equity returns (Hill & Schneeweis, 1983; Lamb, 1998; Dasgupta *et al.,* 2001; Capelle-Blancard & Laguna, 2010; Ferreira & Karali, 2015). Results of these studies has provided mixed evidence on the impact of these events on equity returns. For instance, Dasgupta *et al*. (2001) reported that environmental event news do not affect the equity returns in developing countries. Similarly, Ferreira and Karali (2015) reported that global financial markets are resilient to the earthquakes. Moreover, these events do not affect the equity market volatility of global equity markets except Japan. In addition, Lamb (1998) reported mixed evidence on impact of hurricanes on equity returns with some industries showing no effect and others showing significant effects.

2.7 Locations of Event

There are numerous studies that have examined the impact of extreme events based on firm characteristics, industry type and level of development of country (Lenain *et al.,* 2002; Raby, 2003; Carter & Simkins, 2004; Toya & Skidmore, 2007). Few of empirical studies have also drawn attention to the importance of the type of event (Eldor & Melnick, 2004; Hochrainer, 2009; Aslam & Kang, 2013; Aslam *et al.,* 2015). Any event happening in major cities like London, Madrid, New York may point out the chances of similar attacks at other places in the world. It may increases the systematic risk which in turn will affect the equity returns (Coleman, 2012). Brounen and Derwall (2010) claimed that share prices response to terrorism are stronger for local industries.

This effect may also vary depending on the country where firm is incorporated. For instance, research shows that effect of terrorism on equity returns may vary in developing and developed countries (Carter & Simkins, 2004). Previous studies have examined the impact of terrorism events on equity returns in many developed and developing countries like European, American and Swiss markets (Chesney *et al*., 2011), UK and Spain (Kollias *et al*., 2011), world capital markets (Chen & Siems, 2004), USA (Essaddam & Karagianis, 2014), Israel (Eckstein & Tsiddon, 2004), Indonesia, Israel, Spain, Thailand, Turkey and UK (Arin *et al*., 2008), Pakistan (Aslam & Kang, 2013), Bangladesh, Sri Lanka, Philippines, Indonesia and India (Aslam *et al*., 2015).

Eldor and Melnick (2004) examined the impact of terror attacks on equity returns based on location of event, type of event, target type and frequency of events. Their findings demonstrated that impact of these events vary based on type of event whereas location of attack was not found to have an effect on equity returns. (Eldor & Melnick, 2004). Furthermore, Aslam and Kang (2013), examined the impact of terrorist events based on location of event, type of event and causalities and their results demonstrated that the impact of attack varies depending on the location of attack and type of attack.

Similarly, place of disaster may also have different economic outcomes. For instance, Leiter *et al*. (2009) documented that firms having their operations in the areas effected by floods show high growth in their assets and employees as compared to the firms having operations in the unaffected areas. Likewise, Noy and Vu (2010) shows the evidence on varying type of macroeconomic effects of disasters in different geographical areas. Moreover, other studies have reported the impact of disaster events on equity returns of developed and developing countries (Hill & Schneeweis, 1983; Spudeck & Moyer, 1989; Bosch *et al.,* 1998; Bolak & Ömür, 2011; Chesney *et al.,* 2011; Wang & Kutan, 2013; Koerniadi *et al.,* 2016).

The results of Ferreira and Karali (2015) have provided the evidence that the economic consequences of these extreme events vary in different countries depending on their level of development. Shelor et al. (1990) reported that stock value of firms that were operating within the earthquake affected area showed negative behaviour whereas other firms were not affected by it. Similar results were reported by the study of Shan and Gong (2012) stating that returns for the firms located near earthquake were lower than

the firms that were headquartered far away. Moreover, place of an event is important because extreme events happening near equity markets may affect more severely as compared to the events happening at distant places. Only few of the studies have examined the impact of terrorism and disaster events based on the location of an event. Therefore, this study intends to study the impact of terrorism and disaster events based on the type of events.

2.8 Calendar Anomalies

The effect of extreme events on equity returns channelizes through the investor moods. These extreme events create panic in the markets, therefore, affecting the equity returns. According to Shu (2010) equity returns are positively related to the investor moods. Equity prices may increase in response to better mood whereas decrease in response to negative mood. The previous studies suggested that investor mood significantly affects judgment and decision-making, subsequently varying investor behaviour (Lucey & Dowling, 2005; Shu, 2010). For instance, Ariel (1990) reported that rising stock price behaviour of pre-holiday returns is due to good mood of investors based on having a holiday ahead.

It implies that investor mood may also change on specific days, therefore, affecting the equity returns. These specific days were also called the calendar anomalies in the efficient market theory. There are many studies reporting the impact of these calendar anomalies on the equity returns. For instance, Edmans *et al*. (2007) find equity markets returns decreases in response to the defeat of soccer team in matches. Hirshleifer and

Shumway (2003) find positive relationship of sunshine with equity returns. Cao *et al*. (2015) examined the influence of climatic change events on equity returns and reported that these events significantly affect the equity markets.

Similarly there are other studies reporting the impact of calendar anomalies on equity returns like temperature (Cao & Wei, 2005), Monday effect (Cho *et al*., 2007), weather (Symeonidis *et al*., 2010), January effect (Kohers & Kohli, 1991), and week-end effect (Jaffe & Westerfield, 1985). However, most of these calendar anomalies were based only on the Gregorian calendar. Recently, few of the studies also identified the calendar anomalies based on the Islamic calendar (Al-Ississ, 2010; Al-Khazali, 2014; Halari *et al*., 2015). According to Al-Ississ (2010) investor's mood is affected by religious events which may also influence their investment choices.

Given that previous studies have identified many calendar anomalies based on Gregorian calendar and few calendar anomalies based on Islamic calendar, none of these studies has examined the impact of extreme events happening on these calendar anomaly dates. For instance, research studies stated that investor moods are better during Ramadan which results in their optimistic investment behaviour (Al-Ississ, 2010). However, none of the studies has reported whether this optimistic behaviour will persist in case some extreme event happens during Ramadan. Similarly, sadness in investor moods during the month of Muharram has been observed (Al-Ississ, 2010) but none of the studies has examined how investors responds towards negative events happening during the month of Muharram.

Different events based on specific religion and culture have significant role in the equity market movements and different events may cause positive or negative equity market responses. Furthermore, the more forceful the religious atmosphere, the lesser the chances of share price crash (Li & Cai, 2016). There might be reasons why investor behaved differently during different Islamic calendar months. For instance, some Islamic months contains specific religious feelings such as months of Ramadan and Muharram. Muslims observed these two months, however, with dissimilar "valence" from one another. Moods of Muslims are normally positive during the month of Ramadan because of dominance by optimistic valence, since they practice their faith to reap the blessings and to get mercy of their previous sins. On the other hand, Muharram keeps negative valence arising because of the rage and sorrow of mourning[5](Al-Ississ, 2010). Since, the mood of individuals is affected by their faith, it may also affect the decisions of investors regarding financial markets. Thus, every month should have varying type of investor mood, therefore, it might impact equity markets differently (Al-Ississ, 2010, 2015; Mugeha, 2015).

Mugeha (2015) studied the abnormal equity returns during Muharram and other Islamic months during 2013 and 2014 in Nairobi equity market. Their results demonstrated that during the year 2013 there was only slight change in the abnormal returns. However, during the year 2014, negative trend of equity returns was noticed for the month of Muharram. Another study by Husain (1998) supported these arguments by reporting

[5] During Muharram investor moods are negative documenting negative returns linked to the proportion of Shia in a country (Al-Ississ, 2015).

the Islamic month of year effect. Their findings suggest that during month of Ramadan return volatility may decrease due to less working hours and sluggish commercial activities. Moreover, Halari *et al*. (2015) reported that equity market in Pakistan responded differently during different Islamic months. However, as Pakistan has faced many terrorism and disaster events, none of the study has examined the impact of these events happening during Islamic calendar months. Hence, there was a need to examine the impact of these events during Islamic calendar months because effect of these events may increase/decrease or neutralize during different months.

2.9 Underpinning Theories

The efficient market hypothesis and prospect theory are the underpinning theories that this study has employed.

2.9.1 Efficient Market Hypothesis

The focus of prior studies remained on the question whether sentiments arising out of the investor feelings administer their trading behaviour. Initial studies undertook the traditional economic analyses grounded on the efficient markets hypothesis (EMH). Efficient market hypothesis is based on the supposition that investor make their decisions having all available information and their sentiment do not matter in their trading behaviours. (Malkiel & Fama, 1970; Fama, 1990).

Semi strong form of equity markets means that markets rapidly reflect new information (Malkiel & Fama, 1970). Thus the examination of market efficiency means testing that

how much time market takes to incorporate the information such as terrorism events information (Coleman, 2012). By using terrorism events information for conducting tests to examine market efficiency provides some advantages. First, time/date of terrorist attacks is unknown except to the terrorist, hence, pre-event prices may not incorporate the effect due to absence of their information. Thus a sample of terrorist attacks offers a chance to determine that how much time equity markets take to respond the unanticipated price-sensitive information (Coleman, 2012).

Similarly, timing of disasters is normally not noticed by common investors in turn making it like the terrorism events. Secondly, every attack occurs at specific point of time which is clearly different from other financial events which involves multiple stages till that event becomes public information, mainly corporate events which involves multiple phases to complete. In addition, the chances that attacks may occur are predictable, however, timing of attack is not predictable dissimilar to the company specific information (Malatesta & Thompson, 1985).

In the same way, information leakage regarding terrorism events is difficult before the occurrence of event. Since, terrorism events are difficult to predict, these events are free, confounding events and sharing of privileged knowledge that complicate most tests of market efficiency (Coleman, 2012). However, in case of disasters, few of the events might be predicted but controlling mechanisms might differ among countries depending on the level of development of any country (Loayza *et al*., 2012). The developed countries are rich in terms of infrastructure and own better safety measures to cope with disasters (Toya & Skidmore, 2007). Moreover, increase in income reduces

the expected losses from disasters (Kahn, 2005; Toya & Skidmore, 2007). Thus, despite of prediction of disasters, economic consequences most of the time do not differ from terrorism events.

There are empirical evidences supporting the market efficiency signifying that share prices can absorb the uncertain events information (Chen & Siems, 2004; Eldor & Melnick, 2004; Barry Johnston & Nedelescu, 2006; Apergis & Apergis, 2016). According to Apergis and Apergis (2016) share prices reflect different events rapidly and effectively. It supports the semi-strong form of the EMH which states that share prices reflect public information. Similarly, Chen and Siems (2004) and Eldor and Melnick (2004) contend that stock markets are efficient, and no evidence supports that market becomes desensitized over time to terror. Besides, Eldor and Melnick (2004) reported that volatilities due to terrorism are not reflected in equity markets in asset pricing. The main finding of their study was to confirm the efficiency of markets. According to Coleman (2012) major world equity markets recovers from unpredicted terrorism events very soon irrespective of the location of attack. Similarly, Brounen and Derwall (2010) comparing different world terrorism events reported that except 9/11 attacks, significant effect of only few of the terrorism events prevailed more than the event day itself.

However, the growing research in behavioural finance reported that financial decisions making is subject to moods and sentiments instead of logic (Brown & Cliff, 2005; Edmans *et al.,* 2007; Schmeling, 2009; Drakos, 2010; Chung *et al.,* 2012; Shan & Gong, 2012; Shu & Chang, 2015). Behaviour is the outcome of what an individual feel and

thinks, therefore, the examining of investor sentiment may offer promising means to understand the way investor behave. Many studies concluded that investment decisions are influenced by the feelings and emotions (Brown & Cliff, 2005; Schmeling, 2009).

Recent studies have reported that investor sentiment caused equity market volatility (Brown & Cliff, 2005; Schmeling, 2009; Drakos, 2010; Chung *et al.,* 2012; Shu & Chang, 2015). Terrorism and disaster events affect investors' sentiment thereby causing their investment decisions. There are many studies questioning the validity of efficient market hypothesis and presented different market anomalies (Kohers & Kohli, 1991; Brooks & Kim, 1997; Cao & Wei, 2005; Cho *et al.,* 2007; Lucey & Zhao, 2008; Doyle & Chen, 2009; Halari *et al.,* 2015). Similarly, many of the previous studies have provided evidence on the abnormal returns after the occurrence of any terrorism or disaster event (Chesney *et al.,* 2011; Khanser & Galido, 2013; Aslam *et al.,* 2015; Apergis & Apergis, 2016; Bourdeau-Brien & Kryzanowski, 2016).

However, the test of efficient market hypothesis by taking the terrorism and disaster events based on location of event, type of event is scarce. Moreover, there is no evidence on testing of these events by taking Islamic calendar months. According to Hilary and Hui (2009) religion has negative relation with the level of risk. Moreover, (Al-Ississ (2010)) stated that different Islamic months generate a different mood and hence a potentially different impact on equity returns. Thus, effect of these events happening in certain Islamic months may affect equity returns differently.

2.9.2 Prospect Theory

Kahneman and Tversky (1979) developed the prospect theory (PT) and later revised it (Tversky & Kahneman, 1992). The prospect theory describes the behavior of people to give more value to the potential losses instead of the real outcomes of any expected event (Sunstein, 2003). The element of prospect theory most relevant to this study is the concepts of loss aversion. This concept recognizes that losses and gains get completely different type of reactions specifically about their magnitude. The main result about this concept is that dissatisfaction due to losses is higher as compared to the joys of gains (Tversky & Kahneman, 1975; Kahneman & Tversky, 1979; Tversky & Kahneman, 1992). Furthermore, individuals are loss averse, therefore, losses are given more importance as compared to the gains (Phillips & Pohl, 2017).

Hence, it is to be expected that events of terrorism and disaster may cause great variations in private and public behavior, even in the case of no justification for these variations is available based on the extent of the risk. In addition, public would be more concerned and terrified if any risk is difficult to control (Slovic *et al.,* 2000). Therefore, loss aversion effect may induce investor to sell which may lower the expected market returns.

A type of "probability neglect" is described by the Prospect theory (Kahneman & Tversky, 1979). This probability neglect supports in describing the abnormal responses to the disaster which otherwise may not prove high risk. Based on same type of probability neglect and having the working knowledge of it, terrorist groups wants to

produce public threat and fear which significantly surpass the discounted damage. Accordingly public also weigh more to these type of risk as compared to the larger risk which they are facing in their routine life (Sunstein, 2003). According to Sunstein (2003) probability neglect is highly likely in the aftermath of terrorism. This study expects similar response to the disaster by the individuals based on the similar type of fear and uncertainty created in the aftermath of disaster. This assumption is based on the findings of the studies reporting that terrorism and disaster are similar in terms of their economic and human losses (Billon & Waizenegger, 2007; Renner & Chafe, 2007; Berrebi & Ostwald, 2011; Chesney *et al.,* 2011).

Moreover, Phillips and Pohl (2017) and Masters (2004) elaborated the main behavioral bias given in the prospects theory that individuals while making decisions depend on certain reference point regarding risk and do not consider the absolute situation. Based on Kahneman and Tversky (1979) prospect theory, terrorism and disaster events may shape risk perception of investors in the aftermath of these event because investor may consider these events as reference point. Kahneman and Tversky (1979), stated that gains or losses are not absolute but relative to any reference point that they frame in their minds. Moreover, in period after any terrorist acts people may expect another similar event whether or not that event happens in actual (Sunstein, 2003). The perception of individuals that terrorism events may be followed by other similar events is consistent in other catastrophes having immediate effect on the behaviors (Slovic *et al.,* 2000). According to availability heuristic probability of any outcome is taken by asking if an example of such outcome comes to the mind (Tversky & Kahneman, 1975).

Sunstein (2003) outlined how public fear may exaggerate the individual perception about the risk. Public fear is itself a cost, and it is connected to other costs, in the form of "ripple effects" formed by distress (Sunstein, 2003). Based on it, terrorism and disasters may also generate more fear for the public being not easy to control. Based on the very nature of these two types of events, these events are not easy to control in the developing countries. Therefore, happening of these events in developing countries may generate more severe effects. Thus, this study assumes that impact of terrorism and disaster on equity returns in Pakistan can be explained based on the prospect theory.

2.10 Chapter Summary

This chapter outlines the prior research studies about terrorism, disaster and equity returns. The findings of the prior literature depict that terrorism and disaster share many common characteristics in terms of their post event consequences. However, most of the studies have focused only on terrorism whereas, studies on impact of disaster on equity returns are scarce. Furthermore, there is scarcity of studies that investigated the equity market response based on type of event and location of event. Previous studies have also tested the validity of efficient market hypothesis and identified several anomalies. One of the significant anomalies identified is calendar anomaly. However, previous studies focus on studying the calendar anomalies based on Gregorian calendar. Hence, this study has examined the response of equity market to terrorism and disaster events happened in different Islamic months.

CHAPTER THREE

DATA AND METHODOLOGY

3.1 Theoretical Framework

A lot of research studies have been conducted on the terrorism in the fields of political science, sociology and history, however, recent studies in the field of economics have also paid attention to the role of terrorism in the financial markets (Chesney *et al.,* 2011; Ramiah & Graham, 2013; Essaddam & Karagianis, 2014; Aslam *et al.,* 2015; Khan *et al.,* 2016). According to Chesney et al. (2011), natural disaster events are similar to the terrorism events in a variety of ways. However, very little attention has been paid to the role of disaster events in the equity markets.

Semi strong form of efficient market hypothesis assumes that all current information is quickly reflected in share prices. However, many of the later studies have contradicted and found disequilibria in share prices. This disequilibria was found in many of the later studies providing evidence on numerous anomalies to the theory (Jensen, 1978; Kohers & Kohli, 1991; Schwert, 2003; Cao & Wei, 2005; Symeonidis *et al.,* 2010; Halari *et al.,* 2015). Similarly, a few of the studies provided the anomalous behavior of share prices in response to the terrorism events (Chen & Siems, 2004; Kollias *et al.,* 2011; Hassan & Hashmi, 2015). The previous studies have identified different anomalies such as low p/e ratio (Basu, 1977), Monday effect (Connolly, 1989; Schwert, 2003; Cho *et al.,* 2007), January effect (Kohers & Kohli, 1991; Seyhun, 1993; Dahlquist & Sellin, 1996), Halloween effect (Bouman & Jacobsen, 2002; Lucey & Zhao, 2008; Dichtl &

Drobetz, 2014), wandering week day effect (Doyle & Chen, 2009), Islamic calendar anomalies (Ramezani *et al.,* 2013; Al-Khazali, 2014; Halari *et al.,* 2015), sports (Edmans et al., 2007), temperature (Cao & Wei, 2005), daylight (Kamstra *et al.,* 2003) which did not support the efficient market hypothesis.

Among those anomalies, Islamic calendar anomalies have been reported by many of the previous studies (Białkowski *et al.,* 2012; Al-Khazali, 2014; Halari *et al.,* 2015). These studies have found that different Islamic months creates different type of social mood. Islamic calendar anomalies may also affect the mental health of investors by affecting their portfolio decision, thus influence the equity returns. For instance, research postulates that Islamic months may positively affect the mental health thereby increasing the probability of optimistic behaviour by the investors (Białkowski *et al.,* 2012; Halari *et al.,* 2015). Bogan and Fertig (2013) stated that mental health of an individual effects human emotions which cause the ability to make portfolio decisions. Many of the other studies support this argument that mental health is related to the portfolio choices (Becker & Mulligan, 1997; Berkowitz & Qiu, 2006; Edwards, 2010).The main argument is that any negative event or any positive event happening in certain months may increase or decrease its effects. For instance, Schuster *et al.* (2001) stated that people turn towards religion after terrorist attacks for getting out of the mental stress.

During the month of Ramadan, moods are positive and Muslims anticipate the blessings of Allah whereas, during Ashura moods are sad and these days' entail mourning (Al-Ississ, 2010). According to Al-Ississ (2010) reported that returns are higher during the

month of Ramadan due to positive social mood and negative in the days of Ashura due to sadness prevailing in those days. Similarly, Halari *et al*. (2015) reported the existence of Islamic calendar anomalies in stock returns and volatilities. Based on these studies, it might happen that effect of terrorism events happening in different Islamic months increases, decreases or neutralizes due to social mood of investor during that month. The severe investor response towards terrorism and disaster events can also be traced back to the prospect theory and the several behavioral biases discussed like "probability neglect", and "availability heuristic". Therefore, this study intends to examine the impact of terrorism and disasters events based on these Islamic calendar anomalies.

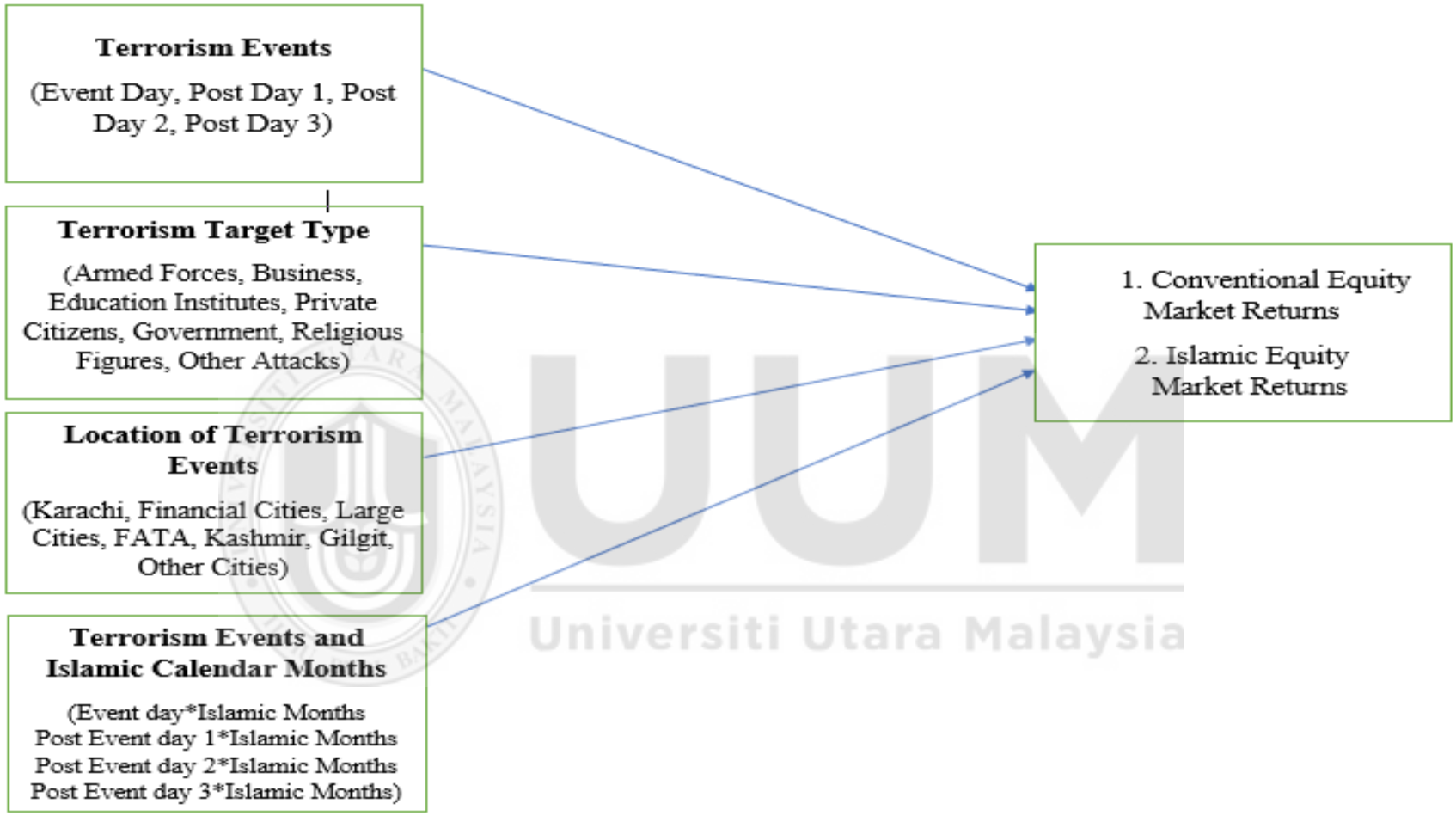

Figure 3.1
Research Model

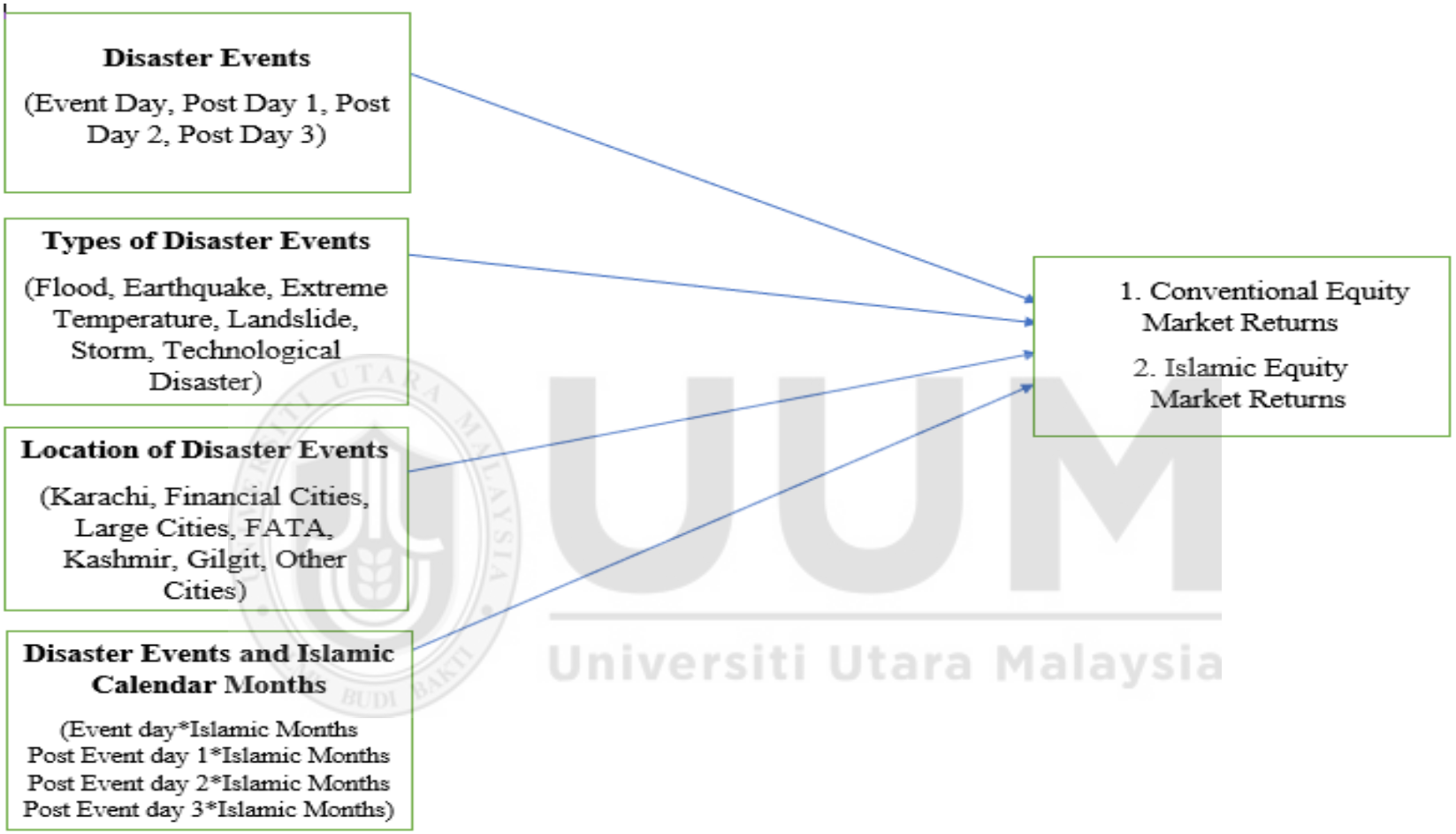

Figure 3.2
Research Model

3.2 Hypothesis Development

3.2.1 Terrorism events and Market Reactions

Many of the previous studies have reported negative effects of terrorism on equity returns in the developed countries (Arin *et al.,* 2008; Drakos, 2010; Chesney *et al.,* 2011; Graham & Ramiah, 2012; Kumar & Liu, 2013; Essaddam & Mnasri, 2015). Similarly, there are other studies reporting negative impact of terrorism events on equity market returns in developing countries (Aslam & Kang, 2013; Ramiah & Graham, 2013; Aslam *et al.,* 2015; Kutan & Yaya, 2016; Tavor, 2016).

On the other side, some of the previous studies have reported that markets are efficient and adjust quickly after any terrorism event (Chen & Siems, 2004; Eldor & Melnick, 2004; Barry Johnston & Nedelescu, 2006; Peleg *et al.,* 2011; Christofis *et al.,* 2013). The aforementioned evidence was reported by studies conducted on developed countries as well as on developing countries. For instance, Chen and Siems (2004) reported that equity market in US are efficient and recover quickly after terrorist attacks. Similarly, Peleg *et al*. (2011) reported that Israeli equity market absorbs the effects of terrorism and market adjust quickly. In addition, Eldor and Melnick (2004) also reported that Israeli equity markets were not affected by terrorism events and market continue their operations efficiently.

There is also empirical evidence on the efficiency of emerging and developing equity markets. According Christofis *et al*. (2013) Istanbul Stock Exchange recovered quickly

after the terrorist attacks. Similarly, some other studies have also reported that terrorism events do not affect the efficiency of equity markets (Bora Ramiah, 2012; Hassan & Hashmi, 2015; Holwerda & Scholtens, 2016). Barry Johnston and Nedelescu (2006) studied the impact of terrorist events on global equity markets and reported that financial markets were efficient. All these studies showed mixed evidence on the impact of terrorism events on equity returns. However, most of previous studies have examined the impact of terrorism events on the conventional stock market returns whereas this study also intended to examine the impact of terrorism events on the Islamic index. Therefore, to examine the semi strong form of efficiency in the equity markets of Pakistan, the following hypotheses have been developed;

H_1 = Terrorist attack events in Pakistan affect the conventional equity market returns in Pakistan.

H_2 = Terrorist attack events in Pakistan affect the Islamic equity market returns in Pakistan.

3.2.2 Terrorism Event Target Type and Market Reactions

Most of the previous studies have examined the direct impact of terrorism on equity prices (Chen & Siems, 2004; Brounen & Derwall, 2010; Karolyi & Martell, 2010; Apergis & Apergis, 2016) and only few looked into the impact of terrorism on equity returns based on the type of an event (Eldor & Melnick, 2004; Aslam & Kang, 2013; Aslam *et al.,* 2015). Among these few studies, Aslam and Kang (2013) reported that

attacks on mosque have significant effects on equity returns. Furthermore, they stated that the mosque being a place of worship entails spiritual and emotional affiliations by Muslims. Thus, any attack on mosque may show severe decline in equity market prices. This fact shows that different types of terrorist attacks may have different impacts on equity returns.

Moreover, Aslam and Kang (2013) stated that equity market response towards terrorist attacks on mosques, foreigners and suicide attacks is insignificant. Recently, Aslam *et al*. (2015) reported that Asian equity markets negatively respond to the suicides and bombings. Similarly, Eldor and Melnick (2004) found that equity markets are affected by the terrorism based on different types of attacks whereas, equity markets are not affected by terrorism based on location of an attack. Their results demonstrated that suicide attacks have lasting effect on equity market returns. Likewise, equity market is affected by the terrorism events based on the target type such as attacks on armed forces, business, government and private citizens (Aslam *et al.,* 2015). These arguments show that effect of terrorism event may vary based on the type of event. In line with the previous hypotheses, this study also examined the impact of terrorism events on Islamic equity market returns based on the target type of terrorist attack. Therefore, to examine the semi strong form of efficiency in the equity markets of Pakistan based on target type of attack, the following hypotheses have been developed;

H_3 = Effect of terrorist attacks on conventional equity returns in Pakistan varies based on the target type.

H_4 = Effect of terrorist attacks on Islamic equity returns in Pakistan varies based on the target type.

3.2.3 Terrorism Event Location and Market Reactions

Terrorism events happening in those cities where equity markets are situated significantly affect the equity returns. (Aslam & Kang, 2013). However, Eldor and Melnick (2004) reported that terrorism events based on the location of events have no significant impact on the equity markets and post event recovery time is rapid.

Any event of terrorism in financial and big cities may affect the equity returns more severely as compared to the other cities. Terrorism events in financial and big cities may create fear among investors and may create a perception that other parts of the country may also be targeted. Moreover, most of the multinationals and banks are headquartered at these cities. Hence, this study intends to examine the impact of terrorism on equity returns based on the location of event in the conventional and Islamic equity market returns. Therefore, to examine the semi strong form of efficiency in the equity market of Pakistan based on location of an attack, the following hypotheses have been developed;

H_5 = Effect of terrorist attacks on conventional equity returns in Pakistan varies based on the location of terrorist attack.

H_6 = Effect of terrorist attacks on Islamic equity returns in Pakistan varies based on the location of terrorist attack.

3.2.4 Terrorism and Market Reactions During Different Islamic Calendar Months

The previous studies have documented that presence of abnormal returns during certain calendar dates. These abnormalities are known as anomalies to the efficient market hypothesis, for example January anomaly (Kohers & Kohli, 1991; Gamble, 1993; Lucey & Zhao, 2008), Monday effect (Cho *et al*., 2007), and, weekend effect (Connolly, 1989; Brooks & Kim, 1997). However, these anomalies are based only on the Gregorian calendar. Recent research has identified other anomalies in the equity returns based on the Islamic calendar months like Ramadan effect in various Islamic countries (Białkowski *et al.,* 2012; Ramezani *et al.,* 2013; Al-Khazali, 2014) and also other Islamic months based anomalies (Al-Ississ, 2010; Halari *et al*., 2015).

These anomalies are based on the assumption that investor moods are different in different months consequently affecting the equity returns. Based on the same premise, many of the other studies stated that terrorism events may also affect the investors sentiment thereby affecting the equity returns (Drakos, 2009, 2010). However, none of the studies up to best of researchers' knowledge has examined the impact of terrorism events on equity returns based on Islamic calendar dates. For instance, the impact of terrorism events may increase, decrease or neutralizes during certain Islamic month. The previous research postulates that Ramadan positively affects investor moods whereas terrorism events negatively affects investor moods. However, there is need to examine whether negative effects of terrorism on equity returns varies during different Islamic months. Furthermore, the impact of terrorism during different Islamic months is examined on conventional and Islamic equity returns. Therefore, to examine the semi

strong form of efficiency in the equity market of Pakistan based on Islamic calendar months, the following hypotheses have been developed;

H_7 = Effect of terrorist attacks on conventional equity returns in Pakistan varies in different Islamic months.

H_8 = Effect of terrorist attacks on Islamic equity returns in Pakistan varies in different Islamic months.

3.2.5 Disaster Events and Market Reactions

Many of the previous studies have reported the negative impacts of disaster events on equity returns of developed countries (Hill & Schneeweis, 1983; Bosch *et al.,* 1998; Chesney *et al.,* 2011; Wang & Kutan, 2013; Koerniadi *et al.,* 2016). Similarly, there are other studies reporting the negative impact of disaster events in equity returns of developing countries (Bolak & Ömür, 2011; Scholtens & Voorhorst, 2013; Li *et al.,* 2015; Koerniadi *et al.,* 2016). Moreover, Ferreira and Karali (2015) stated that the effect of disasters is more severe in the developed countries as compared to the developing countries.

However, Scholtens and Voorhorst (2013) stated that negative effect of disaster on equity returns is similar across developed and developing countries. Given this inconsistency, there are also other studies reporting inconsistent results about the impact of disaster events on equity returns. For instance, many of the previous studies have reported that equity markets are efficient, and their returns are not sensitive to the

disaster events. The evidence of equity market insensitivity is reported in developed countries (Worthington, 2008; Yang *et al*., 2008) and developing countries (Ramiah, 2013). This study intends to examine the impact of disaster events on the conventional and Islamic equity returns in Pakistan. Therefore, to examine the semi strong form of efficiency in the equity market of Pakistan due to disasters, the following hypotheses have been developed;

H_9 = Disaster events in Pakistan affect the Islamic equity market returns in Pakistan.

H_{10} = Disaster events in Pakistan affect the Islamic equity market returns in Pakistan.

3.2.6 Disaster Types and Market Reactions

There are many studies reporting the direct impacts of disaster events on equity returns (Hill & Schneeweis, 1983; Bolak & Ömür, 2011; Scholtens & Voorhorst, 2013; Li *et al.,* 2015; Bourdeau-Brien & Kryzanowski, 2016; Koerniadi *et al.,* 2016). These studies have provided mixed evidence on whether disaster events significantly affect equity returns. The studies reporting that equity returns are not sensitive to disaster supports the semi strong form of efficient market hypothesis (Worthington, 2008; Yang *et al.,* 2008; Ramiah, 2013).

Moreover, many of the studies have considered different types of disasters and examined their impact on equity returns. For instance, Koerniadi *et al*. (2016) reported that equity markets are affected by disasters based on different type of events. For instance, their results showed that the effect of hurricanes, earthquakes, and tornadoes

is negative on equity returns. In addition, volcanos, floods and tsunamis positively affect the equity markets. However, according to Brounen and Derwall (2010) earthquakes do not affect the equity markets of the world (Brounen & Derwall, 2010). According to Koerniadi *et al*. (2016) reported that impact of floods, tsunami and volcanic eruption do not remain in the long term which implies that aftershocks of every disaster events might differ.

Given that it might be possible that the response of market also varies depending on the type of disaster. However, the studies conducted on the impact of disasters on equity returns based on type of events are scarce. Furthermore, the impact of disaster events on the Islamic equity market returns is neglected in previous studies. Therefore, this study intends to examine the impact of disaster events on conventional and Islamic equity market returns based on type of event. Hence, the following hypotheses have been developed;

H_{11} = Effect of disasters on conventional equity returns in Pakistan varies based on the type of disaster.

H_{12} = Effect of disasters on Islamic equity returns in Pakistan varies based on the type of disaster.

3.2.7 Disaster Location and Market Reactions

Impact of disaster events on equity returns may also vary based on the location of an event. One possibility for this difference might be that firms that operate in disaster

affected areas show lower returns as compared to the others (Shelor *et al*., 1990). Another reason might be the level of development of the affected area. The developed areas are equipped with better level of post disaster capabilities. According to Loayza *et al*. (2012) developing countries development is more sensitive to disasters as compared to developed countries. Any event happening in major cities like London, Madrid, New York may point out the chances of similar attacks at other places in the world. It may increase the systematic risk which in turn will affect the equity returns (Coleman, 2012).

Moreover, disasters happening in the financial cities may experience severe response from the investors. For instance, Shan and Gong (2012) reported that returns of those firms were lower that were headquartered near the disaster place as compared to other firms. However, the studies conducted on the examination of impact of disaster events on equity returns are scarce. Therefore, this study intends to examine the impact of disaster events on equity returns. Based on the aforementioned arguments, the following hypotheses have been developed;

H_{13} = Effect of disasters on conventional equity returns in Pakistan varies based on the location of disaster.

H_{14} = Effect of disasters on Islamic equity returns in Pakistan varies based on the location of disaster.

3.2.8 Disaster and Market Reaction During Different Islamic Calendar Months

Many of the previous studies have reported abnormal returns based on Islamic calendar anomalies (Husain, 1998; Al-Ississ, 2010; Ramezani et al., 2013; Al-Khazali, 2014; Halari *et al.,* 2015). Husain (1998) examined the returns of equity markets of Pakistan during the month of Ramadan and reported that during this month returns are positive with low volatility. In addition, it has also been reported that returns of equity market in Pakistan vary during different Islamic months (Halari *et al*., 2015).

There are many explanations in the previous literature about difference of returns during Islamic months. For instance, Al-Ississ (2010) stated that months with positive valence like Ramadan positively affects moods of investors positively consequently increasing equity returns. Furthermore, days that entail negative valence like Ashura affect moods of investors negatively consequently decreasing equity returns. In addition, it has been reported by many of the previous studies that religious days and festivals are linked with equity markets returns (Frieder & Subrahmanyam, 2004; Oğuzsoy & Güven, 2004; Li & Cai, 2016). Similarly, Yuan *et al.* (2006) reported the relationship between lunar phases and stock market returns.

In addition to the calendar based anomalies there are other studies reporting the abnormal returns due to disaster events (Capelle-Blancard & Laguna, 2010; Bolak & Ömür, 2011; Chesney *et al.,* 2011; Wang & Kutan, 2013; Li *et al.,* 2015; Koerniadi *et al.,* 2016). Many of previous studies have reported that Islamic monthly anomalies may have impact on equity market returns (Oğuzsoy & Güven, 2004; Al-Ississ, 2010;

Białkowski *et al.*, 2012; Halari *et al.,* 2015). However, up to the best knowledge of the researcher, none of the previous studies has examined the impact of disaster events during Islamic calendar anomalies. Likewise, the impact of disaster events on Islamic equity market returns during Islamic calendar anomalies is neglected in previous studies. Therefore, this study intends to examine the impact of disaster events based on Islamic calendar anomalies. Based on these arguments, the following hypotheses have been developed;

H_{15} = Effect of disasters on conventional equity returns in Pakistan varies in different Islamic months.

H_{16} = Effect of disasters on Islamic equity returns in Pakistan varies in different Islamic months.

3.3 Data Sources and Sample Description

This study has obtained the data from different sources. Terrorism data has been obtained from the Global Terrorism Database (GTD) and for disaster events data was collected from the Emergency Events Database (EM-DAT). The data for stock market index was extracted from the business recorder website (khistocks.com). The data starting from July 2009 to December 2016 has been used for this analysis. The sample for terrorism events has been divided based on the number of causalities into four different groups as given in Table 3.1. The sample of disaster and terrorism events has been described in the Table 3.1. The further details about how the data for different

events was collected and the criteria on which the events were selected have been described in the following section 3.4.

3.4 Events Selection and Samples Used

This study examined the equity market reaction towards terrorism and disaster events. The data regarding terrorism events was collected from the Global Terrorism Database (GTD). National Consortium for the study of Terrorism and Responses to Terrorism (START) own and manage the global terrorism database (Global Terrorism Database, 2016). STARTS defines the terrorism as "the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation" (GTD, 2016). However, this study defines terrorism differently, therefore, the sample may not include some events from the GTD. This study adopted Lyngsø Jørgensen and Breum Nielsen (2017), as events are treated as terrorism events when it involves at least 3 human killings. This study used the data from year 2009 to 2016. Total number of events incurred during this period was 10,101.

Thus, based on above mentioned criteria indicate that terrorism events were selected based on severity of events because of large number of terrorism events happened during the sample period. Employing this criteria and eliminating events which do not fulfil this definition results in a list of 1206 terrorist attacks in Pakistan during the period under study. In addition, this study has also tested three more samples. These three more samples were based on selection criterions of the events which involves at least 7, 10 and 20 human killings respectively. Accordingly, these three samples were selected by

employing the selection criteria of taking all those events which involves at least 7, 10 or 20 human killings respectively whereas all other attacks which do not meet these criterions were removed. Thus, the number of events for these three samples become 438, 285 and 109 respectively based on 7, 10 and 20 human killings in an event. Overall four samples were tested in this study for terrorism which are described in Table 3.1. In regard to disasters, this study used all those disaster events which happened during the sample period. The number of events happened during the sample period were 85 ranging from the events of floods, earthquakes, extreme temperature, landslide, storm and technological disasters. Therefore, all disaster events were included in the sample.

Whenever more than one terrorist attack occurred on the same day, the attacks were considered as a single event. Likewise, those disaster which affected more than one city, dummies were assigned to all the locations affected by the event. The four samples tested for terrorism events and one sample tested for disasters events resulted in total five sample tested. Although, this study has tested five samples for the analysis as shown in the Table 3.1, however, only the results for sample 1 and sample 2 have been reported and discussed in chapter 4. The results for samples 3,4, and 5 have not been discussed in Chapter 4 because the model fits were weak. However, the findings for these samples have been made available in appendix at page 237 from Table 6.1 to Table 6.26. The following tables provide the sample of events used in this study for analyzing the impact of terrorism and disasters on the conventional and Islamic equity market returns.

Table 3.1
Samples used for Terrorism and Disaster Events

Serial No.	Sample Description	Criteria	No. of Events
1	Disaster Events	All types of disaster Events	85
2	Terrorism Events	All events with at least 20 killings	109
3	Terrorism Events	All events with at least 10 killings	285
4	Terrorism Events	All events with at least 07 killings	438
5	Terrorism Events	All events with at least 03 killings	1206

3.5 Techniques of Data Analysis

For analyzing the impact of terrorism and disaster events on equity returns, this study used the ordinary least square regression and generalized autoregressive conditional heteroscedasticity (GARCH) following the previous studies (Brounen & Derwall, 2010; Chesney *et al.,* 2011; Aslam & Kang, 2013; Ramiah, 2013; Koerniadi *et al.,* 2014; Aslam et al., 2015; Mnasri & Nechi, 2016). In addition to direct impact, this study also examined the impact of terrorism and disaster events on equity markets based on the type of event, location of event and Islamic calendar months. For this purpose, regression analysis was used following many of the previous studies (Drakos, 2010; Graham & Ramiah, 2012; Aslam & Kang, 2013; Wang & Kutan, 2013). This study used the dummy variables for measuring the existence of terrorism events and disaster events following previous studies (Hon *et al.,* 2004; Aslam & Kang, 2013; Aslam *et al.,* 2015; Apergis & Apergis, 2017). Following section discussed thoroughly the regression analysis and GARCH (1,1).

3.5.1 Regression Analysis

This study has used the ordinary least square regression using dummy variables. The use of dummy variables to measure the terrorism and disaster events has been used in the previous literature (Kahn, 2005). Accordingly, many of the studies used dummy variables while studying the impact of terrorism and disaster events on the equity market returns (Aslam & Kang, 2013; Aslam et al., 2015; Humphrey et al., 2016; Chaudhry et al., 2018; Javaid & Kousar, 2018). The dummies were assigned to each month for which behavior of equity market returns was observed (Halari et al., 2015; Syed & Khan, 2017). Moreover, this study examined the impact of interaction of Islamic months and terrorism events on the conventional and Islamic equity market returns.

Likewise, this study examined the impact of interaction of Islamic months and disaster events on the conventional and Islamic equity market returns by using dummy variable regression. In order to closely determine the factors that may affect the stock returns, this study also run different regressions on the conventional and Islamic equity market returns based on type of terrorism event, location of terrorism event. The assumptions such as multicollinearity, heteroskedasticity and autocorrelation were examined before using the ordinary least square regression. The following are the assumptions of ordinary least square regression. The regression model using the dummy variables can be expressed as follows:

$$Ret_t = \beta_0 + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 Ret_{t-1} \ldots\ldots\ldots + \beta_n D_n + \epsilon \quad (3.1)$$

This equation can be rewritten as follows by adding the interactive dummies;

$$Ret_t = \beta_0 + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_3 * D_1 + \beta_5 Ret_{t-1} \ldots\ldots + \beta_n D_n + \epsilon \quad (3.2)$$

Where, Ret_t indicates the market returns, β_0 represents the intercept, β_1 to β_n are the slope coefficients, D_1 to D_n represents the dummy variables used and $D_3 * D_1$ represents the interactive dummies. The detailed models that were being used in this study are given in the section 3.6 where equation 3.6 to 3.21 provides all the models used in this study.

3.5.2 Regression Diagnostics

The following section discusses the basic assumption that were applied before the ordinary least square regression.

3.5.2.1 Multi-collinearity

The regression assumes that there should be no multi-collinearity in the explanatory variables. According to this assumption, none of the explanatory variables should have perfect collinearity with any of other explanatory variables in the model (Hill & Adkins, 2001; Baltagi, 2008; Gujarati, 2014). In case of violation of this assumption, estimation of the equation becomes redundant (Baltagi, 2008). Given the following equation, perfect multicollinearity can be explained.

$$Z_1 = b_1 + b_2 m_{2i} + \ldots\ldots\ldots b_k m_{ki} + u_i \quad (3.3)$$

Where, $b_1$is the intercept, b_k represents coefficients, m_{ki} represents independent variables, u_i represents random error term. From this above mentioned equation perfect collinearity exist when $m_2 + 3m_3 = 1$ (Gujarati, 2014). Furthermore, Gujarati (2014) stated that perfect collinearity is a rare case. However, highly linear relationship between explanatory variables might be the most common situation. This situation is termed as imperfect collinearity or near collinearity (Hill & Adkins, 2001; Gujarati, 2014). This situation may not still provide BLUE (Best Linear Unbiased Estimator) estimate of the OLS but with large variances and covariance's (Gujarati, 2014). This study diagnosed the explanatory variables for checking the presence of multicollinearity.

3.5.2.2 Heteroscedasticity

The problem of heteroscedasticity may arise when variance of error terms is not constant resulting from different measures of scale, outliers, incorrect transformation of data and incorrect functional form of model. However, regression model assumes that variance of error term is constant across different observations. (Baltagi, 2008; Gujarati, 2014). In the situation of heteroscedasticity, OLS estimates obtained may no longer remain BLUE giving biased standard error estimates and misleading t-statistics (Baltagi, 2008). Given that, this study tested the presence of heteroscedasticity in the model. In case of presence of heteroscedasticity, White (1980) procedure was followed in order to get the heteroscedasticity consistent estimates of the ordinary least square regression.

3.5.2.3 Autocorrelation

Autocorrelation is the situation when disturbances are correlated at different point of times (Baltagi, 2008; Gujarati, 2014). In the case of violation of assumption of no autocorrelation, estimates produced may remain consistent and unbiased. However, these estimates may no longer remain BLUE (Baltagi, 2008; Gujarati, 2014). The presence of autocorrelation in the model may still produce consistent estimates but will not be considered BLUE implying that resulting t values are inflated (Gujarati, 2014). This situation will produce invalid estimates for t and F statistics. This study checked the data for diagnosing the assumption of no autocorrelation. However, in the case of presence of autocorrelation in the data, this study followed the procedure of (Newey and West (1987)) for getting autocorrelation consistent with covariance matrix in ordinary least square estimates.

3.5.3 GARCH (1,1)

A normal investor considers the risk of investment while considering the return on investment. It is, therefore, important to measure asset price and asset return volatility (Gujarati, 2014). In addition to the ordinary least square regression, this study used the GARCH (1,1) model to report the volatilities in equity returns in response to different terrorism and disaster events. The previous studies have commonly used the GARCH (1,1) while analyzing the impact of terrorism or disaster events on the equity market returns (Hon *et al.,* 2004; Arin *et al.,* 2008; Apergis & Apergis, 2017).

The situation where heteroscedasticity exists over different periods which is autocorrelated is termed as autoregressive conditional heteroscedasticity (ARCH). The ARCH model contains some drawbacks such as it consumes several degrees of freedom which are difficult to interpret. Furthermore, ARCH models often attribute a lot of persistence about return volatility and yet give comparatively weak estimates (Hamilton & Susmel, 1994). Therefore, literature suggests that generalized autoregressive conditional heteroscedasticity (GARCH) model is better estimated over the ARCH model (Gujarati, 2014). Further, GARCH (1,1) model is more economical in practice.

Therefore, this study used GARCH (1,1) model to capture the volatilities in equity returns in response of terrorism and disaster events. GARCH model has been previously used in many previous studies where volatility in equity market returns was documented (Berument & Kiymaz, 2001; Kiymaz & Berument, 2003; Narayan *et al.,* 2018). Moreover, the GARCH (1,1) specification is selected because higher order GARCH models do not affect the key inferences (Narayan *et al.,* 2018). Generally a GARCH (1,1) model with only three parameters in the conditional variance equation is suitable to attain a good model fit for economic time series (Zivot, 2009). In addition, Hansen and Lunde (2005), provided convincing evidence that is hard to find a volatility model that outperforms the simple GARCH (1,1).

To describe the GARCH model, two equations can be drawn, Equation 3.4 is the simple regression model which may also represent the mean equation in the GARCH model.

$$Y_t \backslash I_{1-1} = a_0 + b_1 x_t + u_t \tag{3.4}$$

If we suppose Y_t as equity returns, the equation 3.4 indicates that Y_t conditioned upon information arrival at time (t-1) is the function of the variable x_t which in this study are the terrorism or disaster events and u_t is the random error term.

By keeping this mean equation same, the variance equation for GARCH model can be expressed as follows;

$$\sigma_t^2 = \lambda_0 + \lambda_1 u_{t-1}^2 + \lambda_2 \sigma_{t-1}^2 \quad (3.5)$$

Where, σ_t^2 in this study is the variance in returns which is conditioned not only on the lagged squared error terms indicated by u_{t-1}^2 but also on the lagged squared variance term. Following section, describes the data analysis tools along with the different model used to analyze the data.

3.6 Data Analysis

This study analyzed the impact of terrorism and disaster events on the conventional and Islamic equity market returns. Further, it examined the impact of terrorism and disaster events on conventional and Islamic equity market returns based on the type and location of event. It also examined the impact of terrorism and disaster events on the equity market returns during different Islamic calendar months. To analyze the data, ordinary least square regression and GARCH (1,1) model have been applied.

3.6.1 Return Calculation

This study has examined the market reaction towards terrorism and disaster events by taking the conventional and Islamic equity markets in Pakistan. The first step before analyzing the data was to calculate the returns for conventional and Islamic equity markets. The conventional equity market returns were calculated by taking KSE-100 index returns whereas the Islamic equity market returns were calculated by taking the KMI-30 index returns. The return series for conventional equity market was calculated by using the following formula:

$$Ret_{KSE} = \ln(KSE100_t / KSE100_{t-1})$$

where Ret_{KSE} is the continuous return of KSE-100 index, $KSE100_t$ represents the KSE-100 index on the current day whereas $KSE100_{t-1}$ represents KSE-100 index on previous day.

In the same way, the returns for Islamic equity market was calculated by using the following formula;

$$Ret_{KMI} = KMI30_t / KMI30_{t-1}$$

where Ret_{KMI} is the continuous return of KMI-30 index, $KMI30_t$ represents the KMI-30 index on the current day whereas $KSE30_{t-1}$ represents KMI-30 index on previous day.

3.6.2 Descriptive Statistics

The main purpose of descriptive statistics is to describe and summarize the data in the way that can convey the important characteristics of the data (Heiman, 2013). The descriptive statistics can be used to examine the general behavior of the data by providing the mean, standard deviation, minimum and maximum values. Mean values may provide the average return of market whereas minimum and maximum values may indicate the highest and lowest returns. These high and low returns might indicate investor emotions and behavior towards equity returns. Likewise, standard deviation may represent the deviation in the stock market returns indicating the risk level. Standard deviation measures the difference between individual values and the mean and if that difference is small, standard deviation would be small (Randolph & Myers, 2013). In addition, this study has also provided the descriptive statistics for the terrorism and disaster events which describes the types/target types of events and location of events.

3.6.3 Event Day Analysis

This study has used dummy variable regression-based methodology instead of the traditional event study method following previous studies (see, for example, Hon et al., 2004; Nikkinen & Vähämaa, 2010; Aslam & Kang, 2013; Aslam et al., 2015; Apergis & Apergis, 2017). In this type of approach, the event day analysis is carried out by assigning dummies to the days before and after the occurrence of event. For this purpose, the dummies were assigned to the days before the event, event day and days

after the event. This study used seven days event window which includes three days pre-event, event day and three days post event dummies to examine the market reaction towards terrorism and disasters. Pre-event dummies were included in the event window following previous studies where pre-event dummies are taken to control the pre-event effect (see, for example, Aslam & Kang, 2013; Aslam et al., 2015; Hassan & Hashmi, 2015; Tavor, 2016).

The event window of seven days includes event day, post event day one, post event day two and post event day three. Past studies (see, for example, Nikkinen & Vähämaa, 2010; Aslam & Kang, 2013; Aslam et al., 2015; Tavor, 2016; Chaudhry et al., 2018; Javaid & Kousar, 2018), used dummy variables approach to examine the market reaction by taking different pre and post event dummies such as one day pre and post event dummies, two days pre and post event dummies and three days pre and post dummies. However, this study has used seven days events window in which event day, three days before the event day and three days after the event day were included. This methodology was adopted following many previous studies where impact of terrorism and disaster events has been analyzed using the dummy variables (Hon et al., 2004; Nikkinen & Vähämaa, 2010; Aslam & Kang, 2013; Aslam et al., 2015; Apergis & Apergis, 2017).

The impact of terrorism and disaster events on the conventional and Islamic equity market returns are measured by ordinary least square regression and GARCH (1,1). The following Table describes the measurement of variables to examine the impact of terrorism and disaster events on conventional and Islamic equity market returns:

Table 3.2

Variable Description

Serial No.	Variable	Notation	Description
1	Lagged returns	Ret_{t-1}	One period lagged returns
2	Three days Pre-Event	Neg_{t-3}	Dummy variable used to estimate the day which is three days before the event
3	Two days Pre-Event	Neg_{t-2}	Dummy variable used to estimate the day which is two days before the event
4	One day Pre-Event	Neg_{t-1}	Dummy variable used to estimate the day which is one days before the event
5	Event Day	$Eventday_t$	Dummy variable used to estimate event day
6	Post Event Day One	Pos_{t+1}	Dummy variable used to estimate the day which is one days after the event
7	Post Event Day Two	Pos_{t+2}	Dummy variable used to estimate the day which is two days after the event
8	Post Event Day Three	Pos_{t+3}	Dummy variable used to estimate the day which is three days before the event

Table 3.2 describes the variables used in this study that examined the direct impact of terrorism and disasters on conventional and Islamic equity market returns. Furthermore, to control for autocorrelation, one period lagged dependent variable has been used as a control variable in the equation in previous studies (Eldor & Melnick, 2004; Li & Schaub, 2004; Guo & Kliesen, 2005; Kutan & Yaya, 2016; Narayan *et al.,* 2018). Hence, following prior studies, this study also used one period lagged equity returns as a control variable to avoid autocorrelation.

To measure the impact of terrorism events on the conventional equity market returns, the following equation is used.

$$Ret_{KSE} = \beta_1 Ret_{t-1} + \beta_2 Neg_{t-3} + \beta_3 Neg_{t-2} + \beta_4 Neg_{t-1} + \beta_5 Eventday_t + \beta_6 Pos_{t+1} + \beta_7 Pos_{t+2} + \beta_8 Pos_{t+3} + \epsilon \quad (3.6)$$

And, following equation represents the impact of terrorism events on the Islamic equity market returns.

$$Ret_{KMI} = \beta_1 Ret_{t-1} + \beta_2 Neg_{t-3} + \beta_3 Neg_{t-2} + \beta_4 Neg_{t-1} + \beta_5 Eventday_t + \beta_6 Pos_{t+1} + \beta_7 Pos_{t+2} + \beta_8 Pos_{t+3} + \epsilon \quad (3.7)$$

The following equation incorporates the impact of disaster events on the conventional equity market returns.

$$Ret_{KSE} = \beta_1 Ret_{t-1} + \beta_2 Neg_{t-3} + \beta_3 Neg_{t-2} + \beta_4 Neg_{t-1} + \beta_5 Eventday_t + \beta_6 Pos_{t+1} + \beta_7 Pos_{t+2} + \beta_8 Pos_{t+3} + \epsilon \quad (3.8)$$

And, the following equation incorporates the impact of disaster events on the Islamic equity market returns.

$$Ret_{KMI} = \beta_1 Ret_{t-1} + \beta_2 Neg_{t-3} + \beta_3 Neg_{t-2} + \beta_4 Neg_{t-1} + \beta_5 Eventday_t + \beta_6 Pos_{t+1} + \beta_7 Pos_{t+2} + \beta_8 Pos_{t+3} + \epsilon \quad (3.9)$$

Where;

$Ret._{KSE}$ = return of conventional equity market measured as natural logarithm of closing price of KSE 100 index on day t divided by closing price at day t_{-1}

$Ret._{KMI}$ = return of Islamic equity market measured as natural logarithm of closing price of KMI 30 index on day t divided by closing price at day t_{-1}

Ret_{t-1} = indicates one period lagged returns

Neg_{t-3} = measured as 1 if 3 days before the event, zero otherwise

Neg_{t-2} = measured as 1 if 2 days before the event, zero otherwise

Neg_{t-1} = measured as 1 if 1 days before the event, zero otherwise

$Eventday_t$ = measured as 1 if event day, zero otherwise

Pos_{t+1} = measured as 1 if 1 day after the event, zero otherwise

Pos_{t+2} = measured as 1 if 2 days after the event, zero otherwise

Pos_{t+3} = measured as 1 if 3 days after the event, zero otherwise

ε = error term

3.6.4 Disaster Types and Terrorism Target Types

This section provides the details on different types/target types of events for analyzing the impact of terrorism and disaster events on conventional and Islamic equity market returns. Since, the data was collected from the Global Terrorism Database, therefore, target types have been taken from the categories given on Global Terrorism Database following previous research studies (Eldor & Melnick, 2004; Berrebi & Ostwald, 2013; Aslam et al., 2015). In regard to terrorism, this study has divided the targets types into seven different types which are presented in the Table 3.3. These seven target types include attacks on armed forces, business, educational institutes, governments, private citizens, religious figures and all other attacks. Furthermore, target types were analyzed using dummy variables. Every target type of attack was assigned a dummy for instance, dummy variable takes the value of 1 if the target type is armed forces, and it was zero otherwise. All other six types of attacks were assigned dummies accordingly.

During the sample period, six types of disaster events happened in Pakistan. Since, only six types of disasters events were happened in Pakistan during this sample period, therefore, all these six types were taken as disaster types in this study. These types are floods, earthquakes and extreme temperature, land slide, storm and technological disasters which are given in Table 3.4. Like the terrorism events, disaster events were assigned dummies, for instance, any event of flood was assigned a value of 1, zero otherwise. Other five types of disaster were assigned dummies accordingly.

The following Tables describe the target types of terrorism events:

Table 3.3
Terrorism Events based on Target Type

Serial No.	Terrorism Target Type	Notation	Description
1	Armed Forces	AF	Attacks on armed forces
2	Business	BUS	Attacks on business
3	Educational Institutions	EI	Attacks on Educational Institutions
4	Government	GOV	Attacks on government offices/departments
5	Private Citizens	PC	Attacks on private citizens
6	Religious Figures	RF	Attacks on religious figures
7	Other Attacks	OA	Other attacks

The following equations is developed to test the impact of terrorism events on equity returns in Pakistan based on type of events.

$$Ret_{KSE} = \beta_1 Ret_{t-1} + \beta_2 AF + \beta_3 BUS + \beta_4 EI + \beta_5 GOV + \beta_6 PC + \beta_7 RF + \beta_8 OA + \epsilon \quad (3.10)$$

And, the following equation describes the impact of terrorism events on Islamic equity market returns.

$$Ret_{KMI} = \beta_1 Ret_{t-1} + \beta_2 AF + \beta_3 BUS + \beta_4 EI + \beta_5 GOV + \beta_6 PC + \beta_7 RF + \beta_8 OA + \epsilon \quad (3.11)$$

where;

$Ret._{KSE}$ = return of conventional equity market measured as natural logarithm of closing price of KSE 100 index on day t divided by closing price at day t_{-1}

$Ret._{KMI}$ = return of Islamic equity market measured as natural logarithm of closing price of KMI 30 index on day t divided by closing price at day t_{-1}

Ret_{t-1} = indicates the lagged returns

AF = Attacks on armed forces measured as 1 if attack on armed forces, zero otherwise

BUS = 1 if attacks on business places, zero otherwise

EI = 1 if attacks on educational institutions, zero otherwise

GOV = 1 if attacks on government offices/departments, zero otherwise

PC = 1 if attacks on private citizens, zero otherwise

RF = 1 if attacks on religious figures, zero otherwise

OA = 1 for all other attacks except mentioned above, zero otherwise

ε = error term

Accordingly, following Tables describes the types of disaster events:

Table 3.4
Disaster Events Type

Serial No.	**Disaster Types**	**Notation**	**Description**
1	Floods	FE	Floods causing large destructions
2	Earthquakes	EE	Earthquakes causing human or financial losses
3	High Temperature	ETE	Events of extreme temperature causing human losses
4	Land Slide	LS	Events of Land Slide causing human losses
5	Storm	ST	Storm causing human or financial losses
6	Technological Disasters	TD	All types of technological disasters

The following equations is developed to test the impact of disaster events on equity returns in Pakistan based on type of events.

$$RET_{KSE} = \beta_1 Ret_{t-1} + \beta_2 FE + \beta_3 EE + \beta_4 ETE + \beta_5 LS + \beta_6 ST + \beta_7 TD + \epsilon \quad (3.12)$$

And, the following equation describes the impact of disasters events on Islamic equity market returns;

$$RET_{KMI} = \beta_1 Ret_{t-1} + \beta_2 FE + \beta_3 EE + \beta_4 ETE + \beta_5 LS + \beta_6 ST + \beta_7 TD + \epsilon \quad (3.13)$$

Where;

$Ret._{KSE}$ = return measured as natural logarithm of closing price of KSE 100 index on day t divided by closing price at day t_{-1}

$Ret._{KMI}$ = return measured as natural logarithm of closing price of KMI 30 index on day t divided by closing price at day t_{-1}

Ret_{t-1} = indicates the lagged returns

FE = 1 If flood event, zero otherwise

EE = 1 If earthquake event, zero otherwise

ETE = 1 If extreme temperature event, zero otherwise

LS = 1 If land slide event, zero otherwise

ST = 1 If storm event, zero otherwise

TD = 1 technological disaster event, zero otherwise

ε = error term

3.6.5 Location of Event

This study has also examined the equity market reaction towards terrorism and disaster events based on the event location following the past studies by considering the importance of location (Eldor & Melnick, 2004; Noy & Vu, 2010; Aslam & Kang, 2013; Aslam et al., 2015). There were five location categories taken by some of the past studies such as Karachi, financial cities, large cities, FATA/Border Area and other cities (Aslam & Kang, 2013; Aslam et al., 2015). However, this study has divided the location of events into seven different categories by taking Gilgit and Kashmir as separate categories. Since, these two areas were administratively different from the provinces like the FATA, therefore, they were assigned separate categories which makes total seven types of locations under study. Table 3.5 provides the description of all location of events used in this study.

Among these seven categories, events happening in the Karachi city falls into the first category. Karachi is the largest city having largest stock market in Pakistan, therefore, it has been given a separate category. The second category included events happening in financial cities. Financial cities mean cities which had equity markets except Karachi because Karachi has already been given a separate category. Third category included large cities that never had equity markets. These large cities were determined based on the population census of 2017 in Pakistan. Based on the results of census 10 most populated cities in Pakistan includes the cities of Karachi, Lahore, Islamabad, Quetta, Peshawar, Rawalpindi, Dera Ghazi Khan, Hyderabad, Faisalabad, and Multan (Government of Pakistan, 2017). Since, Karachi, Lahore and Islamabad were assigned separate categories, therefore, rest of the seven cities were taken as large cities.

The forth category includes the events happening in the FATA/Border area which is located between the Pakistan–Afghanistan border and was under federal administration Pakistan. Likewise, the fifth and the sixth category include the events happening in Kashmir and Gilgit respectively which are the areas administered by Pakistan. Last and seventh category is "Others" which included all those cities that do not fall in the first six categories. Accordingly, all locations of event were also assigned seven location dummies. For instance, any event of terrorism happening in Karachi was assigned a value of 1, zero otherwise. For other six types of locations, terrorism events would be assigned dummies accordingly. In addition, disaster events were also examined based on same categories of location of event and were assigned dummies using same method.

Table 3.5
Description of Location of Events

Serial No.	Events	Notation	Description
1	Karachi	KC	Karachi is the largest city having largest stock market in Pakistan
2	Financial City	FC	Two cities, Lahore and Islamabad as both cities had stock markets
3	Large Cities	LC	Large cities including large financial cities which never had stock markets including Quetta, Peshawar, Rawalpindi, Dera Ghazi Khan, Hyderabad, Faisalabad, and Multan
4	FATA/Border Area	FBA	FATA means federally administered tribal areas. These areas are Pakistan Afghan border areas
5	Kashmir	KSH	Azad Kashmir is a region which is nominally self-governing state administered by Pakistan
6	Gilgit	Gilgit	Gilgit is a northernmost administrative territory in Pakistan
7	Others	Others	All cities that do not fall in first six categories

The following equations have been developed to test the impact of terrorism and disaster events on equity returns based on location of event. The equation 3.14 models the impact of terrorism events on conventional equity market returns based on the event location.

$$Ret_{KSE} = \beta_1 Ret_{t-1} + \beta_2 KC + \beta_3 FC + \beta_4 LC + \beta_5 FBA + \beta_6 KSH + \beta_7 Gilgit + \beta_8 Others + \epsilon \quad (3.14)$$

and, the following equation represents the impact of terrorism events on the Islamic equity market returns based on event location.

$$Ret_{KMI} = \beta_1 Ret_{t-1} + \beta_2 KC + \beta_3 FC + \beta_4 LC + \beta_5 FBA + \beta_6 KSH + \beta_7 Gilgit + \beta_8 Others + \epsilon \quad (3.15)$$

Likewise, the following equation represent the impact of disaster events on the conventional equity market returns based on event location.

$$Ret_{KSE} = \beta_1 Ret_{t-1} + \beta_2 KC + \beta_3 FC + \beta_4 LC + \beta_5 FBA + \beta_6 KSH + \beta_7 Gilgit + \beta_8 Others + \epsilon \quad (3.16)$$

And, the following equation models the impact of disaster events on Islamic equity market returns based on event location.

$$Ret_{KMI} = \beta_1 Ret_{t-1} + \beta_2 KC + \beta_3 FC + \beta_4 LC + \beta_5 FBA + \beta_6 KSH + \beta_7 Gilgit + \beta_8 Others + \epsilon \quad (3.17)$$

Where;

$Ret._{KSE}$ = return of conventional equity market measured as natural logarithm of closing price of KSE 100 index on day t divided by closing price at day t_{-1}

$Ret._{KMI}$ = return of Islamic equity market measured as natural logarithm of closing price of KMI 30 index on day t divided by closing price at day t_{-1}

Ret_{t-1} = indicates the lagged returns

KC = 1 if an event occurs in Karachi city; 0 otherwise

FC = 1 if an event occurs at Financial city; 0 otherwise

LC = 1 if an event occurs in Large City, 0 otherwise

FBA = 1 if an event occurs at FATA/Border Area; 0 otherwise

KSH = 1 if an event occurs at Kashmir, 0 otherwise

Gilgit = 1 if an event occurs at Gilgit, 0 otherwise

Others = 1 if an event in any city not included in first six categories, 0 otherwise

ε = error term

3.6.6 Islamic Calendar Months

For analyzing the impact of terrorism and disaster events on conventional and Islamic equity returns based on Islamic calendar months, this study used an interaction effect of terrorism events with Islamic months and disaster events with Islamic months on the conventional and Islamic equity market returns. This method has been used in the past studies where interactive dummies were used to identify the impact of two dummy variables on the equity returns (Jaisinghani, 2016; Halari et al., 2018; Tantisantiwong et al., 2018). Furthermore, it may be termed as interactive dummy where we take the

product of two dummy variables (Gujarati, 2014). Accordingly, to measure the Islamic months, dummies were assigned. For instance, any event happening in the month of Muharram was assigned the value of 1, otherwise 0. Similarly, dummies were assigned to all other months. Likewise, dummies were assigned to terrorism events and disaster events. By assigning dummies to terrorism events, disaster events and Islamic calendar months, the interaction effect of Islamic calendar months with terrorism events and with disaster events on conventional and Islamic equity market returns was examined. The interaction effect of terrorism events and Islamic calendar months on the equity returns was examined to identify whether the impact of terrorism and disaster events on equity returns varies across different Islamic months.

This study used all Islamic months because every month have its own religious psychosocial impacts. Interaction effect of every Islamic month with terrorism events and disaster events on conventional and Islamic equity returns was examined. Moreover, interaction effect of Islamic calendar months with terrorism events and disaster events was examined by taking interaction of Islamic calendar months with event day, post event day one, post event day two and post event day three. Table 3.6 provides the detail on Islamic month and description of dummies to be assigned.

Table 3.6
Description of Islamic Calendar Months

Serial No.	Events	Notation	Description
1	Muḥarram	MUH	Events happening in Muharram are assigned value of 1, zero otherwise
2	Safar	SAF	Events happening in Ṣafar are assigned value of 1, zero otherwise
3	Rabi' al-awal	RA	Events happening in Rabi' al-awal are assigned value of 1, zero otherwise
4	Rabi' al-thani	RTH	Events happening in Rabi' al-thani are assigned value of 1, zero otherwise
5	Jumada al-awal	JA	Events happening in Jumada al-awal are assigned value of 1, zero otherwise
6	Jumada al-thani	JTH	Events happening in Jumada al-thani are assigned value of 1, zero otherwise
7	Rajab	RAJ	Events happening in Rajab are assigned value of 1, zero otherwise
8	Sha'aban	SHA	Events happening in Sha'aban are assigned value of 1, zero otherwise
9	Ramaḍan	RAM	Events happening in Ramaḍan are assigned value of 1, zero otherwise
10	Shawwal	SHW	Events happening in Shawwal are assigned value of 1, zero otherwise
11	Duh al-Qidah	DQ	Events happening in Duh al-Qidah are assigned value of 1, zero otherwise
12	Duh al-Ḥijjah	DH	Events happening in Duh al-Ḥijjah are assigned value of 1, zero otherwise

The following equations are developed to test the impact of terrorism and disasters on conventional and Islamic equity market returns based on different Islamic calendar months.

Equation 3.18 describes the impact of terrorism events on conventional equity market returns based on different Islamic calendar months. According to Gujarati (2014), dummy variable regression can be used by taking m-1 dummies to deal with the collinearity issues and to avoid to dummy variable trap. Accordingly, this study has

used (m-1) dummies for the Islamic months where Duh al-Ḥijjah was taken as reference category.

$$Ret_{KSE} = \beta_1 Ret_{t-1} + \beta_2 Neg_{t-3} + \beta_3 Neg_{t-2} + \beta_4 Neg_{t-1} + \beta_5 Eventday_t + \beta_6 Pos_{t+1} + \beta_7 Pos_{t+2} + \beta_8 Pos_{t+3} + \beta_9 MUH + \beta_{10} SAF + \beta_{11} RA + \beta_{12} RTH + \beta_{13} JA + \beta_{14} JTH + \beta_{15} RAJ + \beta_{16} SHA + \beta_{17} RAM + +\beta_{18} SHW + \beta_{19} DQ + \beta_{20} DH + \beta_{21} MUH * Day\ Dummy + \beta_{22} SAF * Day\ Dummy + \beta_{23} RA * Day\ Dummy + \beta_{24} RTH * Day\ Dummy + \beta_{25} JA * Day\ Dummy + \beta_{26} JTH * Day\ Dummy + \beta_{27} RAJ * Day\ Dummy + \beta_{28} SHA * Day\ Dummy + \beta_{29} RAM * Day\ Dummy + \beta_{30} SHW * Day\ Dummy + \beta_{31} DQ * Day\ Dummy + \beta_{32} DH * Day\ Dummy + \epsilon \quad (3.18)$$

And the following equation measures the impact of terrorism events on the Islamic equity market returns based on different Islamic calendar months.

$$Ret_{KMI} = \beta_1 Ret_{t-1} + \beta_2 Neg_{t-3} + \beta_3 Neg_{t-2} + \beta_4 Neg_{t-1} + \beta_5 Eventday_t + \beta_6 Pos_{t+1} + \beta_7 Pos_{t+2} + \beta_8 Pos_{t+3} + \beta_9 MUH + \beta_{10} SAF + \beta_{11} RA + \beta_{12} RTH + \beta_{13} JA + \beta_{14} JTH + \beta_{15} RAJ + \beta_{16} SHA + \beta_{17} RAM + +\beta_{18} SHW + \beta_{19} DQ + \beta_{20} DH + \beta_{21} MUH * Day\ Dummy + \beta_{22} SAF * Day\ Dummy + \beta_{23} RA * Day\ Dummy + \beta_{24} RTH * Day\ Dummy + \beta_{25} JA * Day\ Dummy + \beta_{26} JTH * Day\ Dummy + \beta_{27} RAJ * Day\ Dummy + \beta_{28} SHA * Day\ Dummy + \beta_{29} RAM * Day\ Dummy + \beta_{30} SHW * Day\ Dummy + \beta_{31} DQ * Day\ Dummy + \beta_{32} DH * Day\ Dummy + \epsilon \quad (3.19)$$

The impact of disaster events on conventional equity market returns based on different Islamic calendar months is measured by using the following equation.

$$Ret_{KSE} = \beta_1 Ret_{t-1} + \beta_2 Neg_{t-3} + \beta_3 Neg_{t-2} + \beta_4 Neg_{t-1} + \beta_5 Eventday_t + \beta_6 Pos_{t+1} + \beta_7 Pos_{t+2} + \beta_8 Pos_{t+3} + \beta_9 MUH + \beta_{10} SAF + \beta_{11} RA + \beta_{12} RTH + \beta_{13} JA + \beta_{14} JTH + \beta_{15} RAJ + \beta_{16} SHA + \beta_{17} RAM + +\beta_{18} SHW + \beta_{19} DQ + \beta_{20} DH + \beta_{21} MUH * Day\ Dummy + \beta_{22} SAF * Day\ Dummy + \beta_{23} RA * Day\ Dummy + \beta_{24} RTH * Day\ Dummy + \beta_{25} JA * Day\ Dummy + \beta_{26} JTH * Day\ Dummy + \beta_{27} RAJ * Day\ Dummy + \beta_{28} SHA * Day\ Dummy + \beta_{29} RAM * Day\ Dummy + \beta_{30} SHW * Day\ Dummy + \beta_{31} DQ * Day\ Dummy + \beta_{32} DH * Day\ Dummy + \epsilon \quad (3.20)$$

And following equation measures the impact of disaster events on the Islamic equity market returns based on different Islamic calendar months.

$$Ret_{KMI} = \beta_1 Ret_{t-1} + \beta_2 Neg_{t-3} + \beta_3 Neg_{t-2} + \beta_4 Neg_{t-1} + \beta_5 Eventday_t + \beta_6 Pos_{t+1} + \beta_7 Pos_{t+2} + \beta_8 Pos_{t+3} + \beta_9 MUH + \beta_{10} SAF + \beta_{11} RA + \beta_{12} RTH + \beta_{13} JA + \beta_{14} JTH + \beta_{15} RAJ + \beta_{16} SHA + \beta_{17} RAM + +\beta_{18} SHW + \beta_{19} DQ + \beta_{20} DH + \beta_{21} MUH * Day\ Dummy + \beta_{22} SAF * Day\ Dummy + \beta_{23} RA * Day\ Dummy + \beta_{24} RTH * Day\ Dummy + \beta_{25} JA * Day\ Dummy + \beta_{26} JTH * Day\ Dummy + \beta_{27} RAJ * Day\ Dummy + \beta_{28} SHA * Day\ Dummy + \beta_{29} RAM * Day\ Dummy + \beta_{30} SHW * Day\ Dummy + \beta_{31} DQ * Day\ Dummy + \beta_{32} DH * Day\ Dummy + \epsilon \quad (3.21)$$

Where;

$Ret._{KSE}$ = return of conventional equity market is measured as natural logarithm of closing price of KSE 100 index on day t divided by closing price at day t_{-1}

$Ret._{KMI}$ = return of Islamic equity market measured as natural logarithm of closing price of KMI 30 index on day t divided by closing price at day t_{-1}

Ret_{t-1} = indicates the lagged returns

MUH = 1 if an event occurs in the month of Muharram; 0 otherwise

SAF = 1 if an event occurs in the month of Safar; 0 otherwise

RA= 1 if an event occurs in the month of Rabi' al-awal; 0 otherwise

RTH = 1 if an event occurs in the month of Rabi' al-thani, 0 otherwise

JA = 1 if an event in occur in the month of Jumada al-awal, 0 otherwise

JTH = 1 if an event occurs in the month of Jumada al-thani; 0 otherwise

RAJ = 1 if an event occurs in the month of Rajab; 0 otherwise

SHA = 1 if an event occurs in the month of Sha'aban; 0 otherwise

RAM = 1 if an event occurs in the month of Ramaḍan, 0 otherwise

SHW = 1 if an event occurs in the month of Shawwal, 0 otherwise

DQ = 1 if an event occurs in the month of Duh al-Qidah, 0 otherwise

MUH*Day Dummy = Interaction of Muharram with the day dummies (Such as event day, post day one, post day two and post day three)

SAF*Day Dummy = Interaction of Safar with the day dummies (Such as event day, post day one, post day two and post day three)

RA*Day Dummy = Interaction of Rabi' al-awal with the day dummies (Such as event day, post day one, post day two and post day three)

RTH*Day Dummy = Interaction of Rabi' al-thani with the day dummies (Such as event day, post day one, post day two and post day three)

JA*Day Dummy = Interaction of Jumada al-awal with the day dummies (Such as event day, post day one, post day two and post day three)

JTH*Day Dummy = Interaction of Jumada al-thani with the day dummies (Such as event day, post day one, post day two and post day three)

RAJ*Day Dummy = Interaction of Rajab with the day dummies (Such as event day, post day one, post day two and post day three)

SHA*Day Dummy = Interaction of Sha'aban with the day dummies (Such as event day, post day one, post day two and post day three)

RAM*Day Dummy = Interaction of Ramadan with the day dummies (Such as event day, post day one, post day two and post day three)

SHW*Day Dummy = Interaction of Shawwal with the day dummies (Such as event day, post day one, post day two and post day three)

DQ*Day Dummy = Interaction of Duh al-Qidah with the day dummies (Such as event day, post day one, post day two and post day three)

DH*Day Dummy = Interaction of Duh al-Ḥijjah with the day dummies (Such as event day, post day one, post day two and post day three)

ε = error term

3.7 Chapter Summary

This chapter discussed the theoretical framework, hypotheses development, data collection and tools of data analysis. In addition, the chapter also outlined the details about regression analysis and GARCH (1,1) models. To investigate the impact of terrorism and disaster events more comprehensively, this study intended to test their impact based on type of event and location of event. Moreover, this study also investigated the impact of terrorism and disaster events based on Islamic calendar dates using interactive dummies in regression and GARCH (1,1) models. At the end, this chapter outlined the basic assumptions that were checked before using the regression analysis.

CHAPTER FOUR

EMPIRICAL FINDINGS AND DISCUSSION

4.1 Introduction

This chapter provides the results on the effects of terrorism and disasters on conventional and Islamic equity market returns. The impact of terrorism and disaster events on equity market returns was examined based on the type and location of the events. Furthermore, the impact of terrorism and disasters was examined during different Islamic calendar months to identify whether the impact of these events varies during different Islamic months. For this purpose, this study employed OLS regression with dummy variables and GARCH (1,1) methods. Finally, the acceptance and rejection of hypothesis have been reported based on the findings of the study followed by the conclusion.

4.2. Descriptive Statistics

The following table provides the descriptive statistics for conventional and Islamic equity market returns;

Table 4.1
Descriptive Statistics

	Conventional	**Islamic**
Mean	0.001019	0.001093
Median	0.001002	0.000709
Maximum	0.044186	0.116636
Minimum	-0.045580	-0.130810
Std. Dev.	0.009365	0.011444
Observations	1822	1822

Table 4.1 shows the descriptive statistics for conventional and Islamic equity market returns. The average return for conventional and Islamic equity markets are 0.1019 percent and 0.1093 percent respectively. The mean return shows that average returns for Islamic equity market returns is slightly higher than conventional equity market. The standard deviation values for conventional and Islamic equity markets as shown in the table 4.1 are 0.009365 and 0.011444 respectively. It shows that risk of Islamic equity market is also higher as compared to the conventional equity market. These average returns values in this study consistent with Sherif (2016) shows that Islamic equity market returns and risk are higher than the conventional equity market returns and risk. Likewise, these statistics are also consistent with KR and Fu (2014) which states that shariah compliant stocks have high returns and risk as compared to the conventional. The last row in Table 4.1 shows total number of observations used for this study which are 1822 days for conventional and Islamic equity market returns.

Tables 4.2 and 4.3 show the descriptive statistics for this study which describes the terrorism events based on different target types and location of events. Likewise, Tables 4.4 and 4.5 describes the disaster events based on different types and location of disaster events. This study has used four different samples of terrorism events, selected based on the number of causalities involving at least 3,7, 10 and 20 human killings. Tables 4.2 and 4.3 show the descriptive statistics for the sample of events resulting in the death of at least 20 people. However, the rest of three samples such as sample of events resulting in the death of three, seven and ten people showed that model is very weakly fit. Therefore, the final sample was selected based on 20 people killed in any event and findings for rest of three samples are reported in the appendix at page 238 starting from

Table 6.1 to Table 6.26. Table 4.2 shows the number of terrorism events based on the different target types of terrorism events for the sample of events happened during the year 2009 to 2016.

Table 4.2
Number of Terrorism Events based on Target Type

Target Types	No of Events	Total Deaths
Armed Forces	33	1053
Business	3	109
Educational Institutes	2	182
Religious Figures	17	748
Private Citizens & Property	37	1653
Government Offices	7	294
Other Attacks	10	293
Total	109	4332

The sample of the current study includes seven main target types of terrorism such as attacks on armed forces, business, educational Institutes, religious figures, private citizens and property, government offices and other attacks. Table 4.2 indicates that number of attacks on armed forces during the period 2009 to 2016 is 33 attacks resulting in the death of 1053 people. The number of attacks on businesses happening during the same years is three resulting in 109 human causalities.

Moreover, Table 4.2 shows that two terrorist attacks were perpetrated on educational institutes which resulted in the death of 182 people. The number of terrorist attacks on religious figures is 17 resulting in the death of 748 people. Moreover, the attacks on private citizens & property and government offices during the years 2009-2016 is thirty-seven and seven respectively. Likewise, the number of other attacks happening during the year 2009-2016 is ten resulting in the 293 deaths. Overall different target types of terrorist attacks happening during the year 2009-2016 is 109 events causing a

total death of 4332. Most of the attacks targeted armed forces and private citizens and property. Furthermore, human losses are also higher in case of terrorist attacks on armed forces and attacks on private citizens and property.

Table 4.3
Location of Terrorism Events

Locations	No of Events	Total Deaths
Karachi	4	173
Financial City	7	310
Large City	22	1174
FATA	36	1250
Other Cities	40	1425
Total	109	4332

Table 4.3 shows the location wise number of terrorism events and total deaths due to terrorist attacks for the period 2009 to 2016. The sample of the current study consists seven locations of terrorism events such as Karachi, financial city, large city, Federally Administered Tribal Areas (FATA), Gilgit, Kashmir and other cities. Since, the final sample was selected based on minimum 20 people killed in any terrorist attack, therefore, the locations of terrorism events was reduced to five as no attack was found in Gilgit and Kashmir involving more than 20 human killings. Hence, the final sample includes five different locations where terrorism events occurred during the period 2009 to 2016 involving more than 20 human killings. These five locations are Karachi, financial city, large city, FATA and other cities.

Table 4.3 shows that during the period 2009 to 2016, four terrorism events happened in Karachi which resulting in 173 human causalities whereas the number of terrorism events happened in the financial cities during the same period is seven resulting in 310 human causalities. Furthermore, the number of terrorism events happened in the large

cities during these years is 22 events which caused a total death of 1174 people. Moreover, the number of terrorism events happened in FATA during the year 2009 to 2016 is 36 events, resulting in 1250 human killings. Likewise, the number of terrorism events happening in other cities are 40 attacks causing the death of 1425 people. Overall number of terrorism events happening at different locations during the year 2009 to 2016 are 109 attacks raising the death toll of humans up to 4332.

Table 4.4 shows the types, number and total deaths due to disasters.

Table 4.4
Types of Disaster Events

Types	**No of Events**	**Total Deaths**
Earthquakes	6	747
Extreme Temperature	2	1368
Flood	22	2658
Landslide	5	216
Storm	3	73
Technological Disasters	47	1649
Total	85	7752

The sample of this study includes six main types of disasters such as earthquakes, extreme temperature, flood, landslide, storm and technological disasters. Table 4.4 shows that during the period 2009 to 2016; six earthquake events happened which caused a total of 747 human causalities. The number of extreme temperature events happening during the same period is two resulting in 1368 human causalities. Furthermore, the number of floods happened during these years are 22 which caused death of 2658 people. Likewise, five landslides and three storm events happened during these years which caused the death of 216 and 73 people respectively. Moreover, 47 technological disasters happened from the year 2009 to 2016 which caused the death of

1649 people. Overall number of disaster and technological disaster events happened in Pakistan were 85 causing the death of 7752 people.

Table 4.5
Location Wise Disasters

Locations	No of Events	Total Deaths
Karachi	12	735
Financial City	11	336
Large City	13	614
FATA	7	129
Gilgit	1	31
Kashmir	15	361
Other Cities	50	5546
Total	109	7752

Table 4.5 shows the location of disasters, number of events happened at these locations and total number of deaths due to disasters for the selected sample of events. The sample of this study includes 7 different types of disaster locations such as Karachi, financial city, large city, FATA, Gilgit, Kashmir and other cities. Table 4.5 indicates that during the period 2009 to 2016, 12 events happened in Karachi which caused 735 human causalities. The number of events happened in the financial cities during the same years were 11 resulting in 336 human causalities. The number of events happened in large cities during these years are 13 which caused death of 614 people. Moreover, the number of events happened in FATA, Gilgit and Kashmir are seven, one and fifteen respectively. Likewise, the number of disasters happening in other cities are 50 events causing the death of 5546 people. Total disaster events happening at different locations from the year 2009 to 2016 were 85 as indicated in Table 4.5, however, the number of locations is 109 because some disasters have affected more than one location at same time. For instance, floods, earthquakes and extreme temperature may affect more than

one location. Overall disaster events happened in Pakistan from the year 2009 to 2016 have caused the death of 7752 people.

4.3 Terrorism Events and Stock Market

This study has applied two different types of tests to examine the impact of terrorism on the equity market returns. Table 4.6 provides the results by using the ordinary least square regression and Table 4.7 provides the results by using the GARCH (1,1) model.

Table 4.6
Terrorism Events and Stock Market using OLS Regression

	Conventional			Islamic		
Variable	**VIF**	**Coefficient**	**SE**	**VIF**	**Coefficient**	**SE**
Ret_{t-1}	1.011	0.109063***	0.032167	1.009	-0.03638	0.08414
Neg_1	1.020	0.001475	0.000927	1.017	0.00233**	0.001001
Neg_2	1.016	0.002714***	0.000926	1.015	0.002223**	0.000989
Neg_3	1.018	0.000371	0.001115	1.018	0.000264	0.001172
Event day	1.018	0.000757	0.001037	1.018	0.001134	0.001137
Pos_1	1.016	0.000852	0.000968	1.015	0.002793*	0.001609
Pos_2	1.015	0.001646*	0.000843	1.017	0.000205	0.001464
Pos_3	1.018	-0.000037	0.001079	1.016	0.000237	0.000981
Durbin Watson test DW		2.001981			1.998312	
Breusch–Pagan test prob.		.000			.000	
Serial Correlation LM Test prob.		1			1	

Note: Ret_{t-1} indicate one period lagged return, Neg_1 is a dummy variable used to indicate one day before the event day, Neg_2 is a dummy variable used to indicate two days before the event day, Neg_3 is a dummy variable used to indicate three days before the event day, Event day is a dummy variable used to indicate the day event happened, Pos_1 is a dummy variable used to indicates one day after the event, Pos_2 is a dummy variable used to indicates two days after the event, Pos_3 is a dummy variable used to indicates three days after the event and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.3.1 Terrorism Events and Stock Market using OLS Regression

Table 4.6 shows the conventional and Islamic equity market reaction towards terrorism events. To measure the impact of terrorism events on the conventional and Islamic equity market returns, seven distinct day's dummy variables were used. These seven distinct dummy variables including event day, three days, two days and one day before the terrorism event to three days, two days and one day after the event. The dependent variables used are KSE-100 index returns and KMI-30 Index returns representing conventional and Islamic equity market returns. The estimated value of Durbin–Watson Statistics is 2.001981 which indicates that there is no statistical evidence that the error terms are autocorrelated. Durbin Watson value in the case of Islamic equity market returns is 1.998312 indicating absence of autocorrelation. Likewise, the insignificant value of LM test of autocorrelation indicates the absence of serial correlation in the data. However, the significance of F-statistic in Breusch–Pagan test reveals that the data violates the homoscedasticity assumption. To rectify this issue, the white standard error consistent regression model was used.

Regarding the multicollinearity, the VIF (variance inflation factors) values for conventional and Islamic equity markets are within the tolerance limit indicating absence of multicollinearity in the data. The impact of lagged returns is strongly significantly positive on the conventional equity market returns at one percent level whereas the impact of lagged returns is insignificant on the Islamic equity market returns. Likewise, the effect of two days pre-event dummy on conventional equity market returns is strongly significant positive at one percent level whereas effect of two

days and three days pre-event dummies on Islamic equity markets is significantly positive at five percent level. In regard to the day dummies for terrorism events, the findings of this study indicated that market do not respond to the terrorist attacks on the event day as the coefficient value on the event day is insignificant for the conventional and Islamic equity markets. These findings are consistent with the previous studies where it was found that equity markets are efficient in absorbing the shocks by the terrorism events (Eldor & Melnick, 2004; Barry Johnston & Nedelescu, 2006).

However, the market reaction is weakly significant at ten percent level two days after the events for conventional equity market whereas, the market reaction is weakly significant at ten percent level day after the event for Islamic equity market returns. It indicates that market do not respond immediately after the event, however, market responds in the subsequent days after the event day. Surprisingly, the market reaction towards the terrorism events is positive in the Pakistani equity market, however, small coefficient value indicates weak reaction magnitude. However, previous studies have reported some instances of positive market reactions after terrorism events. For instance, Chen and Siems (2004) reported positive market reactions to the Oklahoma City bombing, the Korean Air bombing in November 1987, and the Pan Am bombing over Lockerbie, Scotland in December 1988.

Table 4.7
Terrorism Events and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.172255***	0.025635	0.149299***	0.026181
Neg_1	0.001528**	0.000689	0.002138*	0.001153
Neg_2	0.002026***	0.000753	0.002127**	0.000977
Neg_3	0.000083	0.000761	0.000343	0.000922
Event day	0.000701	0.000716	0.000835	0.001082
Pos_1	0.000410	0.000698	0.000574	0.000815
Pos_2	0.001748*	0.000939	0.001493	0.000995
Pos_3	-0.000661	0.000947	-0.001293	0.001117
Variance Equation				
C	0.000008***	0.000001	0.000007***	0.000001
RESID(-1)^2	0.148617***	0.016777	0.144933***	0.009006
GARCH(-1)	0.776349***	0.020033	0.810725***	0.008034
Ret_{t-1}	-0.001515***	0.000150	-0.001487***	0.000137
Neg_1	-0.000011	0.000007	0.000009	0.000018
Neg_2	-0.000001	0.000009	0.000000	0.000013
Neg_3	-0.000005	0.000007	-0.000009	0.000010
Event day	0.000004	0.000007	0.000020	0.000015
Pos_1	0.000001	0.000006	-0.000029**	0.000012
Pos_2	0.000012*	0.000007	0.000023**	0.000011
Pos_3	0.000012	0.000009	0.000003	0.000011

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate one period lagged return, Neg_1 is a dummy variable used to indicate one day before the event day, Neg_2 is a dummy variable used to indicate two days before the event day, Neg_3 is a dummy variable used to indicate three days before the event day, Event day is a dummy variable used to indicate the day event happened, Pos_1 is a dummy variable used to indicates one day after the event, Pos_2 is a dummy variable used to indicates two days after the event, Pos_3 is a dummy variable used to indicates three days after the event and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.3.2 Terrorism Events and Stock Market using GARCH (1,1)

Investors are not only concerned about the returns on their investments but also about the volatility prevalent in the returns. Therefore, to further examine the impact of

terrorism events on the equity markets with regards to the volatility of returns, this study has used the GARCH (1,1) model. The results are obtained to capture the impact of terrorism events on the volatilities of conventional and Islamic equity market returns. The mean and variance equation reported in the Table 4.7 indicates the findings of GARCH (1,1) model. Findings indicate that volatility in conventional equity returns is weakly significant positive at ten percent level two days after the event. However, the conventional equity market returns are not affected by the terrorism events in Pakistan. The equity market is efficient and simultaneously reflects the information.

Regarding the volatility of Islamic equity returns, findings indicate that volatility of Islamic equity returns is significantly negative at five percent level after one day of the event and it becomes significantly positive at five percent level two days after the event. However, the volatility in conventional and Islamic equity returns is insignificant on the event day. The findings indicate that direct impact of terrorism events on the conventional and Islamic equity market returns is insignificant in the aftermath of terrorism events.

4.3.3 Discussion on Terrorism Events and Stock Market

Based on the direct impact of terrorism on the equity markets, the findings indicate an insignificant market response on the event day for conventional and Islamic equity market returns. However, the market response is significantly positive at five percent level two days after the terrorism event for the conventional equity market returns and weakly significantly positive at ten percent level one day after the terrorism event for

Islamic equity market returns. The negative effects of terrorism on the society are well known (Danieli *et al.,* 2005). On contrary, increasing literature also evidenced positive effect of terrorism or trauma on communities. Nonetheless, productive development because of trauma instead of stress, disorder and anxieties due to trauma which survivors faced have been observed through a deficient lens (Quiros, 2010). The positive impact of terrorism events on the equity market has been previously documented by the Chen and Siems (2004). Likewise, Chesney et al. (2011), also reported positive market reactions towards terrorism events and found that impact of terrorism on equity market varies where response of some indices was negative and other indices responded positively.

Furthermore, Ramiah *et al.* (2010) also reported positive equity markets response towards Bali terrorist attacks on some sectors. Likewise, Liargovas and Repousis (2010) examined the impact of international terrorism events on the Greek banks and reported mixed findings where response of Greek bank stocks was negative towards September 9, 2001 attack and positive towards London attacks. In addition, Greek banks stocks were insensitive towards Madrid attacks. Also, Hobbs *et al.* (2016), showed that the mean return with a significantly negative market reaction occurring for some of the events, but with significant positive returns occurring on the day of many other events. However, the market response towards terrorism events observed in this study is very small which indicates that Pakistani equity markets are insensitive to the terrorism events. Likewise, Tahir Suleman (2012) reports that oil and gas industry returns and volatility do not respond to the terrorism events in Pakistan. All these

arguments indicate that terrorism events have become normal for the society, therefore, the magnitude of market reaction towards these events is very small.

The findings of this study have reported very minor reaction magnitude of conventional and Islamic equity markets towards terrorism which indicates that overall equity markets in Pakistan have become desensitized towards terrorist attacks in Pakistan. The reason might be caused by the frequency of terrorism events. Since Pakistan is facing terrorism issue from last many years, so, it might possible that over time, continued terrorist attacks have also significantly changed the individual response towards these events. These results can also be referred to the efficient market hypothesis in that markets are efficient and recover immediately after occurrence of these events. It also indicates that any information regarding terrorist attacks becomes easily available to all market participants and no one can outperform in the equity market based on this information. However, to further examine whether the market reacts differently to different target types of terrorism, this study has examined the reaction of conventional and Islamic equity markets towards different target types of terrorism in the following section.

4.4 Terrorism Target Types and Stock Market

To examine the market reaction towards terrorism events based on the target types of terrorism events, this study has used ordinary least square regression. Furthermore, this study has used GARCH (1,1) to examine the risk of conventional and Islamic equity market returns based on the terrorism target types.

Table 4.8

Terrorism Target Types and Stock Market using OLS Regression

	Conventional			Islamic		
Variable	**VIF**	**Coefficient**	**SE**	**VIF**	**Coefficient**	**SE**
Ret_{t-1}	1.006104	0.116292***	0.031978	1.005971	-0.031605	0.084995
Armed Forces	1.056722	0.003353**	0.001654	1.056398	0.004503**	0.001964
Business	1.030582	-0.018365***	0.006695	1.030511	-0.012373***	0.004209
Educational	1.001032	-0.019347***	0.004996	1.001178	-0.024426***	0.00629
Government	1.000068	0.000701	0.003147	1.00017	0.000578	0.003677
Private Citizen	1.002762	-0.000315	0.001569	1.002804	-0.000101	0.001695
Religious Figures	1.029236	0.002232	0.001832	1.02944	0.002312	0.002186
Other Attacks	1.034121	0.004904*	0.002758	1.034257	0.003336	0.003004
Durbin Watson test DW		2.004262			1.989561	
Breusch–Pagan test prob		0.000			0.0000	
Serial Correlation LM Test prob.		1			1	

Note: $Ret_{t-1,}$ indicate the one period lagged return. Armed Forces is a dummy variable which takes value of 1 for any terrorist attack where target of attack is armed forces zero otherwise, Business is a dummy variable which takes value of 1 for any terrorist attack where target of attack is business places zero otherwise, Educational Institutes is a dummy variable which takes value of 1 for any terrorist attack where target of attack is educational institute zero otherwise, Government is a dummy variable which takes value of 1 for any terrorist attack where target of attack is government offices zero otherwise, Private citizens is a dummy variable which takes value of 1 for any terrorist attack where target of attack is private citizen zero otherwise, Religious figures is a dummy variable which takes value of 1 for any terrorist attack where target of attack is any religious figure or institute zero otherwise, Other attacks is a dummy variable which takes value of 1 for any terrorist attack other than previously mentioned zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.4.1 Terrorism Target Types and Stock Market using OLS Regression

Table 4.8 provides the result for impact of terrorism on equity market returns based on the different target types of terrorism events. The impact of different target types of terrorism events was examined on conventional and Islamic equity market returns. Lagged equity market returns are controlled in the model following the previous studies (Eldor & Melnick, 2004; Drakos, 2010; Tahir Suleman, 2012; Tavor, 2016). Results of Table 4.8 indicates strongly significantly positive impact of lagged returns on the conventional and Islamic equity market returns at one percent level. In addition, there are other seven independent distinct dummy variables reflecting the types of terrorism events including attacks on armed forces, businesses, educational institutes, government, private citizens, religious figures and other attacks as shown in Table 4.8.

The estimated value of Durbin–Watson Statistic is 2.004262 and 1.989561 for conventional and Islamic equity market models which indicates the absence of autocorrelation in the data. Furthermore, the value of F-statistic in Breusch–Pagan test confirms that the independent variables are jointly not insignificant, so it identifies the evidence of heteroscedasticity. Therefore, this study used the white test to solve the heteroscedasticity problem for conventional and Islamic equity return models. The VIF values for conventional and Islamic equity market return models are also within the tolerance level indicating absence of multicollinearity among independent variables. Therefore, these independent variables can be jointly used in the model.

In regard to the impact of different target types of terrorism events, results of Table 4.8 indicate that only attack on business and education institutes are particularly devastating for the equity markets. The coefficients for business and educational institute are negative which means that increase in terrorist attack is associated with reduction in conventional equity market returns significant at one percent level indicating strong significant impact. Furthermore, the results indicated that conventional equity market respond significantly positive to the attacks on the armed forces at five percent level. However, the coefficient value for armed forces is very low indicating very minor change in the equity returns in response to the attacks on armed forces. Likewise, other attacks are also responded positively by the conventional equity market significant at ten percent level.

In regard to Islamic equity market response towards terrorism events based on the target types, the findings indicate that attacks on business places and educational institutes are negatively responded by the Islamic equity market. Furthermore, the market reaction is strongly significant negative at one percent level. The Islamic equity reaction towards terrorist attacks on armed forces shows significantly positive coefficient value at five percent level. However, the coefficient value is very low which indicates very low response magnitude towards attacks on armed forces. Besides, all other types of attacks such as attacks on government, private citizens and religious figures are insignificant which indicates that conventional and Islamic equity market returns do not respond to these types of events.

Table 4.9

Terrorism Target Types and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.119457***	0.045156	-0.00847	0.057292
Armed Forces	0.003291*	0.001982	0.004971***	0.001918
Business	-0.018138***	0.006961	-0.0205	0.022588
Educational Ins.	-0.019636***	0.007207	-0.02693***	0.005596
Government	0.000521	0.006840	0.001024	0.009583
Private Citizen	-0.000119	0.001907	0.002604	0.002255
Religious Figures	0.002131	0.003829	0.000723	0.00327
Other Attacks	0.004694	0.003320	0.00026	0.004512
Variance Equation				
C	0.000070***	0.000020	0.0001130***	0.0000307
RESID(-1)^2	0.119700***	0.046130	0.1089670***	0.0213760
GARCH(-1)	0.552576***	0.124538	0.5606200***	0.1121560
Ret_{t-1}	-0.001268*	0.000672	-0.0015110	0.0009720
Armed Forces	-0.000072***	0.000022	-0.000099***	0.0000377
Business	-0.000031	0.000053	0.0001270	0.0001650
Educational Ins.	-0.000112	0.000222	-0.000251***	0.0000199
Government	-0.000078	0.000065	-0.0001190	0.0000881
Private Citizen	-0.000075***	0.000023	-0.000091***	0.0000539
Religious Figures	-0.000046	0.000040	-0.000156***	0.0000343
Other Attacks	-0.000056*	0.000029	-0.0001030*	0.0000388

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Armed Forces is a dummy variable which takes value of 1 for any terrorist attack where target of attack is armed forces zero otherwise, Business is a dummy variable which takes value of 1 for any terrorist attack where target of attack is business places zero otherwise, Educational Institutes is a dummy variable which takes value of 1 for any terrorist attack where target of attack is educational institute zero otherwise, Government is a dummy variable which takes value of 1 for any terrorist attack where target of attack is government offices zero otherwise, Private citizens is a dummy variable which takes value of 1 for any terrorist attack where target of attack is private citizen zero otherwise, Religious figures is a dummy variable which takes value of 1 for any terrorist attack where target of attack is any religious figure or institute zero otherwise, Other attacks is a dummy variable which takes value of 1 for any terrorist attack other than previously mentioned zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.4.2 Terrorism Target Types and Stock Market using GARCH (1,1)

Table 4.9 shows the results of conventional and Islamic equity market returns in response to the terrorism events based on the target type using GARCH (1,1) model. The mean equation of the Table 4.9 shows the impact of different target types of terrorism events on the equity returns. The conventional equity market returns are strongly significant negative at one percent level in response to the terrorist attacks on business places and educational institutes. However, the conventional equity market reaction is weakly significant positive at ten percent level for the terrorist attacks on the armed forces. Furthermore, the Table 4.9 shows that Islamic equity market returns are also strongly significant negative at one percent level for terrorist attacks on the educational institutes and strongly significant positive at one percent level for the terrorist attacks on the armed forces.

The variance equation in the Table 4.9 shows the volatilities of equity returns in response to the different target types of terrorist attacks. The findings indicate negative volatility in the conventional and Islamic equity market returns based on target types of events. The negative coefficient for conventional equity market returns in the variance equation indicates that volatility reduces after the happening of terrorism events such as attacks on armed forces, private citizens and other attacks. Furthermore, the conventional equity market risk is strongly significant at one percent level in response to the attacks on armed forces and private citizens and weakly significant at ten percent level in response to other attacks. However, the coefficient values are very low for all the types of attacks which indicates very minute change in the conventional equity

market risk in response to these attacks. Furthermore, terrorist attacks on the business places, educational institutes and religious figures indicates that risk in conventional equity market is not affected by these target types.

Table 4.9 also provides the risk and return prevalent in the Islamic equity market returns after the terrorism events based on the target types. The results indicate that Islamic equity market reacts strongly positive to the attacks on armed forces and negatively to the attacks on the educational institutes at one percent level. Regarding the risk, findings indicate that Islamic equity market volatility decreases after the terrorism events. The coefficient value in the variance equation for the armed forces, educational institutes, private citizens, religious figures are strongly significant negative at one percent level implying that volatility of Islamic equity market decreases after terrorist attacks. However, the coefficient value for other attacks is weakly significant negative at ten percent level. Furthermore, insignificant coefficient values of attacks on business and government imply that market risk is not affected by such target types. The coefficient values for all the variables are very low which indicates very low magnitude of risk in response to different target types of terrorist attacks.

4.4.3 Discussion on Terrorism Target Type and Stock Market

In regard to market reaction towards different target types of terrorists, the findings of this study showed different results as compared to the overall effects of terrorism on the conventional and Islamic equity returns. The findings indicate that market reaction is strongly significant negative at one percent level in case of attacks on the educational

institutes and businesses whereas the market reaction is significantly positive at five percent level in case of attacks on the armed forces. However, the equity market does not respond to the attacks on government offices, private citizens and property and religious figures. The reaction of Islamic equity market is identical to the conventional equity market returns by showing positive market reaction to attacks on armed forces and negative response to the attacks on business and educational institutes. The negative market reaction of conventional equity returns towards the terrorist attacks on business places in this study is consistent with the findings of Aslam et al. (2015). According to their results, Dhaka Stock Exchange, Jakarta Stock Exchange, Colombo and Philippines Stock Exchanges response towards terrorist attacks on business is significantly negative. Likewise, this study also examined the market reaction of Islamic equity market towards terrorist attack on business and reported significant negative market reaction.

The negative equity market response towards attacks on businesses implies that the investors in Pakistan demand security to keep their investments safe. Terrorism events on business places may affects the investors by producing distress. Furthermore, the government inability to control these events reduces investor confidence and trust. Therefore, absence of investor confidence compels them to shift their wealth in other safe markets and foreign and local investment moves to the countries that are less prone to terrorism. (Sandler & Enders, 2008). These findings can also be referred to the Prospect theory in several ways. Prospect theory postulates that one event becomes the reference for another similar event (Tversky & Kahneman, 1975; Kahneman & Tversky, 1979; Tversky & Kahneman, 1992). Since, the attacks on business places

implies that investments are not safe which may increase the level of unemployment in the country, increases organizational risk and decreases the rates of returns. Thus, negative equity market response towards attacks on businesses indicates that investors are expecting reduced economic activity in the country. Accordingly, based on prospect theory, investors expect more people are to indulge in these types of activities due to reduced economic activity.

Likewise, the findings of this study indicate that the market reaction is significantly negative towards terrorist attacks on the educational institutes for conventional and Islamic equity markets. Despite being the low literacy rate country in comparison to other countries, the literacy ratio however is improving in Pakistan (Rehman *et al.,* 2015). It indicates that people are becoming more aware about the importance of education (Andrabi *et al.,* 2009), therefore, they might become more sensitive towards the attacks on educational institutes. The previous studies states that unemployment, poverty and education are linked with the terrorism (Sayre, 2009; Poveda, 2011). Furthermore, the growth in formal education in Pakistan has increased since the 9/11 (Andrabi *et al.*, 2009) which also implies that increased inclination towards formal education increased the awareness among people and they became more sensitive towards attacks on educational institutes.

Based on the prospect theory, an approach to justify these findings might be that individuals respond negatively to those events which shapes the general perception that more negative events are likely to happen. These results indicate that investors in Pakistan reacts negatively towards attacks on educational and businesses institutes. The

reasons for this perception might be caused by low education and unemployment. People with less education and low income are more likely to join the militant groups. Hence, these types of attacks create fear among people. On the other side, individuals may become optimistic even for some negative events when they perceive no further terrorist attack will occurred in the future. For instance, the findings of this study have indicated positive equity market reaction towards attacks on armed forces. Furthermore, this study also tested the Islamic equity market reaction towards terrorist attacks on armed forces and found similar results.

The investors become optimistic based on the perception that attacks on military indicate that armed forces are fighting the militant groups. Furthermore, they may perceive that government has initiated antiterrorism policy which may reduce future terrorist attacks. In support of this argument, the results of Afik *et al.* (2016) can be referred to where positive equity market response towards antiterrorism acts by government has been documented. In regard to the market reaction towards terrorist attacks on government, private citizens, and religious figures, this study found insignificant. These results are in line with the results of Aslam *et al.* (2015). This study also tested the Islamic equity market reaction towards terrorism target types and found that the Islamic equity market reaction is similar to the conventional equity market.

4.5 Terrorism Location and Stock Market

To examine the market reaction towards terrorism events happening at different locations, this study has used ordinary least square regression and GARCH (1,1).

Table 4.10

Terrorism Location and Stock Market using OLS Regression

	Conventional			Islamic		
Variable	**VIF**	**Coefficient**	**SE**	**VIF**	**Coefficient**	**SE**
Ret_{t-1}	1.005474	0.113935***	0.031913	1.004373	-0.033029	0.084752
Karachi	1.009002	-0.003071***	0.000804	1.008611	-0.00047	0.001038
Financial City	1.000127	0.005748**	0.002330	1.000068	0.00561***	0.001995
Large City	1.005851	-0.002470	0.002813	1.005711	-0.002136	0.002781
FATA	1.004396	0.004184***	0.001393	1.00358	0.005474***	0.001785
Other Locations	1.014294	-0.000017	0.001745	1.014546	-0.000155	0.001891
Durbin Watson test DW		1.998668			1.989561	
Breusch–Pagan test prob.		.000			.000	
Serial Correlation LM Test prob.		1			1	

Note: Ret_{t-1} indicate the one period lagged return. Karachi is a dummy variable which takes the value of 1 for any terrorist attack happening in Karachi zero otherwise, Financial city is a dummy variable which takes the value of 1 for any terrorist attack happening in financial cities zero otherwise, Large city is a dummy variable which takes the value of 1 for any terrorist attack happening in large cities zero otherwise, FATA is a dummy variable which takes the value of 1 for any terrorist attack happening in FATA zero otherwise, Other cities is a dummy variable which takes value of 1 for any terrorist attack happening in the cities other than previously mentioned zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.5.1 Terrorism Location and Stock Market using OLS Regression

Table 4.10 explains the conventional and Islamic equity market reactions towards terrorist attacks happening at different locations. For this purpose, this study used six distinct location dummy variables including, lagged returns, Karachi, financial city, large city, FATA and other cities. The estimated value of Durbin Watson statistics is 1.998668 for conventional equity market and 1.989561 for Islamic equity market return which indicates absence of autocorrelation. The significant value of F-statistic in Breusch–Pagan test confirms the presence of heteroscedasticity in the data. To solve this problem, this study has used white heteroscedasticity consistent estimates. Furthermore, VIF values for both models, conventional and Islamic equity markets are within the tolerance limit indicating absence of multicollinearity among the independent variables.

The results indicate that lagged returns have strongly significant positive impact on the conventional equity market returns at one percent level. Moreover, these results indicate that terrorist attack is particularly disturbing to equity market if the attack occurred in Karachi. However, terrorist attacks in financial cities are responded significantly positive by the conventional equity market at five percent level. The financial cities in this study represents the cities which had equity markets except the Karachi which has been given separate location category. The market reaction towards the terrorism events happening in the Karachi is strongly significant negative at one percent level implying that investor feel insecure in the aftermath of terrorism events happening in the Karachi. Regarding the market reaction towards the terrorism events happening in FATA, the

conventional equity market returns show strongly significant positive response at one percent level.

However, the Islamic equity market reaction is insignificant for the terrorism events happening in the Karachi which indicates that Islamic equity market is insensitive towards terrorism events happening in Karachi. Furthermore, Islamic equity market responds strongly significant positive at one percent level towards attacks in financial cities and FATA. However, the coefficient values are very small which indicates that magnitude of the reaction is very small. It implies that conventional and Islamic equity markets are not very much sensitive towards the events happening at different location because of the small magnitude of reactions. Overall, these findings indicate that attacks in FATA and financial city have positive impact on conventional and Islamic equity market returns while terrorism events in Karachi have negative impact on conventional equity market.

Table 4.11
Terrorism Location and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.117696***	0.042899	-0.01552	0.055649
Karachi	-0.00244	0.034097	-0.00088	0.009411
Financial City	0.005707	0.003544	0.004897	0.003321
Large City	-0.002455	0.002371	-0.0016	0.002623
FATA	0.004341**	0.001868	0.006044***	0.001781
Other Cities	0.000233	0.00182	0.001039	0.003946
Variance Equation				
C	0.0000669***	0.0000175	0.000107***	0.000027
RESID(-1)^2	0.1157400***	0.0426290	0.129520***	0.023098
GARCH(-1)	0.5436390***	0.1163630	0.552363***	0.099728
Ret_{t-1}	-0.0017100***	0.0006390	-0.001596*	0.000866
Karachi	-0.0000819*	0.0000436	-0.000221***	0.000031
Financial City	-0.0001090*	0.0000591	-0.000214***	0.000021
Large City	-0.0000121	0.0000329	-0.000092***	0.000032
FATA	-0.0000821***	0.0000132	-0.000163***	0.000009
Other Cities	-0.0000575***	0.0000131	0.000008	0.000029

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Karachi is a dummy variable which takes the value of 1 for any terrorist attack happening in Karachi zero otherwise, Financial city is a dummy variable which takes the value of 1 for any terrorist attack happening in financial cities zero otherwise, Large city is a dummy variable which takes the value of 1 for any terrorist attack happening in large cities zero otherwise, FATA is a dummy variable which takes the value of 1 for any terrorist attack happening in FATA zero otherwise, Other cities is a dummy variable which takes value of 1 for any terrorist attack happening in the cities other than previously mentioned zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.5.2 Terrorism Location and Stock Market using GARCH (1,1)

Table 4.11 shows the results of impact of terrorism on the Islamic equity market returns based on the location of event using GARCH. The mean equation shows the impact of terrorism events on the conventional and Islamic equity market returns based on event location. The variance equation shows the impact of terrorism events on the risk of

conventional and Islamic equity markets based on event location. The mean equation in Table 4.11 indicates that conventional and Islamic equity markets are insensitive to the location of terrorism events with exception of FATA. The conventional and Islamic equity market responses towards terrorist attacks in FATA are significantly positive at five percent and one percent level of significance respectively.

In addition, variance equation in Table 4.11 shows the risk of conventional and Islamic equity market returns in response to the terrorism events based on the location of terrorism events. The results indicate that risk of conventional equity market reduces after the terrorism events based on the location of terrorism events. The conventional equity market risk reduces after the terrorist attacks in Karachi, financial cities, FATA and other cities. The coefficients of lagged returns, FATA and other cities are strongly significant negative at one percent level whereas the coefficients for Karachi and financial cities are weakly significant negative at ten percent level for conventional equity market model.

However, the conventional equity market risk is not affected by the terrorism events in large cities. The impact of terrorism events on the risk of Islamic equity market also reduces after the terrorism events in Karachi, financial cities, large cities and FATA. The coefficients for Karachi, financial cities, large cities and FATA are strongly significant negative at one percent level whereas weakly significant negative at ten percent level for lagged returns in Islamic equity market model. On the other side, the risk of Islamic equity market is not affected by the terrorism events happening in other cities. Overall findings show very small coefficient values for all the cities which

indicates small degree of market reaction by conventional and Islamic reaction towards terrorism events based on their location.

4.5.3 Discussion on Findings of Terrorism Location and Stock Market

The findings of this study indicate mixed results regarding the equity market reaction to terrorism events based on the event location. For instance, the findings of this study indicated that conventional equity market reaction is strongly significant negative at one percent level to the terrorism events happening in Karachi and significantly positive to the terrorism events happened in financial cities at five percent level. Furthermore, the market reaction is strongly significant positive at one percent level to the terrorism events happening in FATA.

Furthermore, the market did not respond to the terrorism events happening at other locations implying that conventional equity market is insensitive to these events. On contrary, Islamic equity market responds only to the events happening in financial cities and FATA. However, the Islamic equity market reaction is insignificant to the terrorist attacks for all other locations. These findings are consistent with the findings of previous studies, which report varying equity market reaction towards terrorism events happening at different locations (Barry Johnston & Nedelescu, 2006; Aslam & Kang, 2013).

Moreover, Karachi is the largest city of Pakistan in terms of its population and business activity. Karachi is among the most important cities in the world due to the

population, economic potential and geo-strategic location (Qureshi, 2010). The negative conventional equity market reaction towards terrorism events happening in Karachi indicates that investors felt unsecured for their investments thus responds negatively to these types of events. However, positive equity market response towards terrorism events in financial cities and FATA shows their insensitivity towards these events.

These findings can be referred to the local bias hypothesis. The prospect theory developed by Kahneman and Tversky (1979) which explain the decision-making under uncertainty has laid down the basis for different behavioral biases which suggests that the investment decision-making process depends on different types of behavioral biases. Terrorism events in Karachi might be responded negatively because these effects might have larger effects on the investor sentiments due to the reason of their feelings that the attacks are extremely apparent and they are under the direct threat. By referring to same hypothesis, this study contends that local bias effect exists for the investors in Pakistani equity markets. Furthermore, the findings support the prospect theory perspective that investor make decisions based on their perception about possible outcomes which they frame based on their reference point instead of the final outcomes.

Likewise, the findings of Urquhart and Hudson (2016), showed that equity market returns were negative one day after the bombings in London whereas returns were positive one day after the bombings at distant places outside the London. They also referred it to the local bias hypothesis in that investors were sensitive towards London bombing only and thus paid more attention towards those attacks. By referring to same

local bias hypothesis, the findings of this study are also justified in that KSE 100 index returns are responding negatively to the attacks in Karachi and positively to attacks in financial cities and FATA. Moreover, the investors do not respond to the attacks at all other places. By referring to local bias hypothesis, this study supports the premise that market response may vary to different locations of terrorism events depending on the sentiment of investors towards these attacks.

However, the Islamic equity market investors do not consider the local bias in response to the terrorism events. Since, Islamic equity market returns are insignificant to the terrorism events in Karachi, therefore, the local bias effect is not supported in the case of Islamic equity market model. The reason might be that Islamic equity market investors attain less diversification benefits as compared to the conventional counterparts due to the investor's shariah based investing. The conventional stock market investors have the option to diversify by also having Islamic equities in their portfolio. For such investors, Islamic financial assets can be a required investments, if they can get a better return or reduce their overall risk through diversification (Umar, 2017). However, the Islamic equity market investors may not have many investment options because they have the option only to invest in Islamic equities, therefore, local bias may not prevail in their case which has showed their irrelevance towards attacks in Karachi.

4.6 Disaster Events and Stock Market Results

The following section provides the results obtained using OLS regression and GARCH (1,1) regarding the impact of disasters on the stock market.

Table 4.12
Disaster Events and Stock Market using OLS Regression

	Conventional			Islamic		
Variable	**VIF**	**Coefficient**	**SE**	**VIF**	**Coefficient**	**SE**
Ret_{t-1}	1.014	0.108824***	0.031930	1.009	-0.036681	0.084897
Neg_1	1.011	0.001081	0.000765	1.009	0.001386	0.001098
Neg_2	1.014	0.002100**	0.001039	1.014	0.002352**	0.001139
Neg_3	1.016	0.002101*	0.001209	1.016	0.002297	0.001399
Event day	1.004	-0.000115	0.001005	1.004	-0.000197	0.001124
Pos_1	1.008	0.003068***	0.000946	1.008	0.002728***	0.000976
Pos_2	1.017	0.001030	0.000837	1.014	0.001834*	0.00103
Pos_3	1.017	-0.000035	0.000782	1.017	0.000721	0.001088
Durbin Watson test DW		2.002821			1.997755	
Breusch–Pagan test prob.		.000			.000	
Serial Correlation LM Test prob.		1.00			1	

Note: Ret_{t-1} indicate one period lagged return, Neg_1 is a dummy variable used to indicate one day before the event day, Neg_2 is a dummy variable used to indicate two days before the event day, Neg_3 is a dummy variable used to indicate three days before the event day, Event day is a dummy variable used to indicate the day event happened, Pos_1 is a dummy variable used to indicates one day after the event, Pos_2 is a dummy variable used to indicates two days after the event, Pos_3 is a dummy variable used to indicates three days after the event and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.6.1 Disaster Events and Stock Market Using OLS Regression

Table 4.12 provides the results for direct impact of disasters on the conventional and Islamic equity market returns. To measure the impact of disaster events on the

conventional and Islamic equity market returns, seven distinct day's dummy variables were used indicating three days, two days and one day before the event, event day and three days, two days one day after the event. The estimated value of Durbin–Watson statistics in the Table 4.12 is 2.002821 for the conventional equity markets model which indicates the absence of autocorrelation in the data. To check the heteroscedasticity, this study used the Breusch–Pagan test. The significant F-statistics of Breusch-Pagan test indicates the evidence of heteroscedasticity where white test has been used as a remedial measure. Regarding the multicollinearity, the VIF values indicate that independent variables are not colinear because all the VIF values are within the tolerance limit.

Furthermore, Durbin Watson value is 1.997755 for the Islamic equity market model, which shows that this data does not contain the autocorrelation problem. To further examine this issue, this study also used serial correlation LM test and results indicates absence of autocorrelation. Regarding heteroscedasticity in the Islamic equity market model, the findings indicates that model encounters the heteroscedasticity issue, therefore, this study used white test as a remedial measure. The variance inflation factor values are also reported for Islamic equity market model which indicates that independent variables are not colinear.

Findings of Table 4.12 show insignificant impact of disasters on the conventional and Islamic equity market returns on the event day indicating that disaster events do not affect the equity market returns in Pakistan. These findings are consistent for conventional and Islamic equity market returns. However, the equity market returns are

significant positive in the aftermath of disaster events. The conventional equity market returns are strongly significant positive at one percent level after one day of the disaster. The coefficient value of post event day one is 0.003068 in case of conventional equity market returns.

Likewise, the impact of disasters on the Islamic equity market returns is also strongly significant positive at one percent level one day after the event. The coefficient value of post event day one is 0.002728 significant at one percent in case of Islamic equity market returns. Also, the market reaction is weakly significant positive on the post event day two of for Islamic equity market with coefficient value of 0.001834 significant at ten percent level. These findings support the previous studies which states the positive economic effects of disasters. However, the post event day three market reaction is insignificant for conventional and Islamic equity markets. The market reaction is significant on post event day one for conventional and significant on post day one and post day two for Islamic equity market. The market becomes normal on post day event three for conventional and Islamic equity market which indicates that conventional and Islamic equity market reaction towards disasters is very short lived.

Table 4.13
Disaster Events and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.1398420***	0.0289690	0.0873310**	0.0396240
Neg_1	0.0007660	0.0010950	0.0023000**	0.0009510
Neg_2	0.0022570*	0.0011900	0.0026420**	0.0013380
Neg_3	0.0008250	0.0013410	0.0020210	0.0013360
Event day	-0.0001960	0.0009740	0.0000236	0.0011250
Pos_1	0.0030470***	0.0006730	0.0019140*	0.0010060
Pos_2	0.0021970***	0.0006730	0.0010810	0.0009130
Pos_3	0.0005990	0.0009040	0.0000227	0.0012930
Variance Equation				
C	0.000052***	0.000007	0.0000762***	0.0000124
RESID(-1)^2	0.134516***	0.022176	0.1844700***	0.0226240
GARCH(-1)	0.392601***	0.070239	0.4592800***	0.0748000
Ret_{t-1}	-0.001428***	0.000299	-0.001192***	0.0004220
Neg_1	-0.000016	0.000016	-0.000050***	0.0000120
Neg_2	-0.000013	0.000015	-0.0000208	0.0000180
Neg_3	0.000031**	0.000015	-0.0000063	0.0000160
Event day	-0.000008	0.000011	-0.0000164	0.0000141
Pos_1	-0.000027***	0.000002	-0.000047***	0.0000123
Pos_2	-0.000029***	0.000006	-0.000044***	0.0000084
Pos_3	-0.000022***	0.000007	-0.0000217	0.0000133

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate one period lagged return, Neg_1 is a dummy variable used to indicate one day before the event day, Neg_2 is a dummy variable used to indicate two days before the event day, Neg_3 is a dummy variable used to indicate three days before the event day, Event day is a dummy variable used to indicate the day event happened, Pos_1 is a dummy variable used to indicates one day after the event, Pos_2 is a dummy variable used to indicates two days after the event, Pos_3 is a dummy variable used to indicates three days after the event and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.6.2 Disaster Events and Stock Market Using GARCH (1,1)

Table 4.13 shows the results of impact of disasters on the equity market returns using GARCH model. The mean equation shows that returns of conventional and Islamic

equity market are not affected by the disaster events in Pakistan on the event day which indicates market insensitivity towards disaster events. However, conventional equity market responds strongly significant positive at one percent level on post event day one and post event day two implying that equity market reaction is positive towards disasters in the aftermath of these events. In contrast, the conventional equity market reaction is insignificant on post event day three.

The Islamic equity markets responds positively one day after disaster events which is also very short lived since market becomes insensitive afterwards. The equity market response on post event day one is significantly positive at a weak level of ten percent. Furthermore, the variance equation in the Table 4.13 shows the impact of disaster events on the risk of conventional and Islamic equity market returns. The first model shows the impact of disasters on the risk of conventional equity market and the second model shows the impact of disaster events on the risk of Islamic equity market returns. The results show volatility in conventional and Islamic equity market returns in the aftermath of disaster events. The coefficient values are strongly significant negative at one percent level in variance equation for conventional and Islamic equity market returns on post event day one and post event day two. However, the coefficient value is strongly significant negative at one percent level for conventional equity market for post day event three, whereas, the coefficient value is insignificant for post event day three for Islamic equity market returns. Moreover, the coefficient values in the variance equation are very small for all the days which indicates very minute change in the conventional and Islamic equity market volatility in response to disaster events.

4.6.3 Discussion on Findings of Disaster Events and Stock Market

The findings of this study indicate that impact of disasters on the conventional and Islamic equity market returns is insignificant on event day. However, the findings also indicate that the impact of disasters events on the conventional and Islamic equity market returns is significantly positive at one percent level one day after the event. Furthermore, the impact of disaster events on the Islamic equity market returns is weakly significantly positive at ten percent level two days after the disaster events. The results of this study show that Pakistani equity market response towards disaster events is very short lived and market becomes insensitive to the disaster events after one or two days of the events. In addition, the equity market response towards disasters is positive.

The positive market response towards disaster events supports the productivity effect. Skidmore and Toya (2002) stated that climate related disasters increase the rate of return of human capital accumulation, capital formation, factor productivity and growth. The productivity effect states that disasters might have positive economic outcomes, through the faster capital and technological replacement in the country (Hallegatte & Dumas, 2009). The positive impact of disasters on the stock market has been previously documented by the Worthington and Valadkhani (2004). According to their findings, equity market responds positively to the bushfires. Likewise, the positive market response has also been reported by the other studies such as Chesney *et al.* (2011).

Although, the negative outcomes of different disasters are also documented in the previous literature (American Psychiatric Association, 2000; Bolton *et al.*, 2000; Yule et al., 2000; Weems *et al.,* 2007), however, studies have also documented the positive effects which supports the findings of this study. The past studies have examined the post traumatic behaviors by taking disasters as a trauma. For instance, post-traumatic stress disorder in the aftermath of disaster was examined by prior researches (Galea et al., 2005; Bromet et al., 2017; Rosellini et al., 2018). These studies indicate that disasters are also a kind of trauma which may also have effects like other types of traumas. Therefore, these findings can be justified by referring to the studies in the field of psychology which have studied the human behaviors in the aftermath of traumas.

For instance, according to Tedeschi and Calhoun (1996) persons facing the traumatic events shows personal change spirituality and appreciation of life as compared to other people. Traumatic event creates the courage to take bold steps which increase their risk-taking ability. Likewise, it may enhance the ability of individuals to make rational decisions by increasing their optimistic behavior. Likewise, Andreasen and Norris (1972) reported that some burn patients explained that trauma make them improved people. It indicates that living through life traumas offers a great deal of information about self-reliance, influencing not only self-evaluations of capability in problematic circumstances but the probability that one will take to deal problems in a firm way and try to avail new opportunities.

Also, the people surviving with a traumatic event often deduce that they are strong (Thomas *et al.,* 1991), a self-confidence which may generalize to all types of

circumstances, as well as coming traumas. Although, these individual need social support after the stressful (Dakof & Taylor, 1990), however, in the aftermath of stressful event they reconstruct and strengthen the positive change in their perception of their self (Tedeschi & Calhoun, 1996). It indicates that individual facing stress and problems may take better decisions either personal or investment. The findings of this study can be justified based on above mentioned arguments in that disasters are also a type of trauma that a society faces in its aftermath. Since, the literature posits that society becomes more strong and optimistic behavior increases in the aftermath of problematic events, therefore, it might possible that individuals in Pakistan become more optimistic in the aftermath of these disasters.

All these arguments support the positive impacts of disasters on the equity market returns because the positive effects of disasters on equity markets may indicates that continuous events have overtime reshaped the behaviors of people in Pakistan. The behavior of individuals with the passage of time became normal to these types of events and event they might become more optimistic in their investment behaviors. The prior literature has evidence of positive effects of different types of disasters and traumas on human behavior which may also be reflected in their investment behaviors.

Similarly, traumatic events create the ability to absorb the shocks and increase their capacity to make decision in difficult situations. Regarding the theoretical support, these findings can be seen under the efficient market hypothesis. Since, the effect of disaster events is very short lived, and market recovers very soon after happening of these events, therefore, it can be implied that equity markets in Pakistan are efficient in

absorbing the disaster related information and markets recover very quickly after happening of these events. To further examine the equity market response towards disaster events, this study has also tested the market response towards disaster events based on event type and location. The following section discusses the impact of different types of disasters on the conventional and Islamic equity markets in Pakistan.

4.7 Disaster Types and Stock Market

This study has examined the impact of disaster on the both type of equity markets by taking different types of disasters. Furthermore, the impact has been examined by using OLS regression and GARCH (1,1). The following two section provides the results of impact of different types of terrorism on the equity markets by OLS regression and GARCH (1,1) analysis.

Table 4.14

Disaster Types and Stock Market using OLS Regression

	Conventional			Islamic		
Variable	**VIF**	**Coefficient**	**SE**	**VIF**	**Coefficient**	**SE**
Ret_{t-1}	1.003	0.114059***	0.031888	1.002	-0.031458	0.084703
Earthquake	1.000	-0.009967**	0.004023	1.000	-0.007861*	0.004401
Storm	1.000	0.013941***	0.000778	1.000	0.01173**	0.00176
Landslide	1.000	0.000671	0.001833	1.000	-0.00001	0.00328
Flood	1.003	0.00097	0.001015	1.003	0.00137	0.00130
Extreme Temperature	1.000	0.00973***	0.00287	1.000	0.01078*	0.00561
Technological Disasters	1.001	-0.00034	0.00146	1.001	-0.00062	0.00168
Durbin Watson test DW		2.002152			1.997175	
Breusch–Pagan test prob.		.000			.000	
Serial Correlation LM Test prob.		1			1	

Note: Ret_{t-1} indicate the one period lagged return. Earthquake is a dummy variable which takes value of 1 for earthquake events zero otherwise, Storm is a dummy variable which takes value of 1 for storm events zero otherwise, Landslide is a dummy variable which takes value of 1 for landslides events zero otherwise, Flood is a dummy variable which takes value of 1 for flood events zero otherwise, Extreme Temperature is a dummy variable which takes value of 1 for extreme temperature events zero otherwise, Technological disasters is a dummy variable which takes value of 1 for technological disaster events zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.7.1 Disaster Types and Stock Market using OLS Regression

Table 4.14 provide the results of disaster events on equity market returns based on type of events using OLS regression. To use the OLS regression, this study tested the assumptions like autocorrelation, heteroskedasticity and multicollinearity. Table 4.14 shows the results of this study along with tests applied to examine the assumptions of ordinary least square regression. For instance, the estimated value of Durbin–Watson statistics reported in the Table 4.14 for conventional equity market returns is 2.002152 which indicates that error terms are not autocorrelated. Likewise, the serial correlation LM test is used to examine the presence of autocorrelation which is insignificant indicating the absence of autocorrelation. Furthermore, to check the heteroscedasticity for the conventional equity market returns, this study used the Breusch–Pagan test. The significant F-statistics of Breusch-Pagan test indicates the evidence of heteroscedasticity and white test was used as a remedial measure. Regarding the multicollinearity, the variance inflation factor values are reported in the table 4.14 which indicates that independent variables are not colinear.

The diagnostics for Islamic equity market return model are also tested and the results indicates Durbin Watson test static of 1.997175 indicating absence of autocorrelation in the data. This has also been confirmed by using serial correction LM test which indicates that data do not contain autocorrelation problem. Furthermore, the heteroskedastic for the Islamic equity market model is tested by using Breusch–Pagan test. The significant value for Breusch–Pagan test indicates the model contains heteroscedasticity issue which has been corrected using white heteroskedasticity

consistent estimates. Furthermore, the VIF values for Islamic equity market returns model indicates that all the values are within the tolerance limit, therefore, model do not have the multicollinearity problem.

The results regarding the impact of different types of disaster events on the conventional equity returns, the Table 4.14 indicate that earthquakes have significant negative impact on the conventional equity market returns at five percent level. It implies the conventional equity markets respond negatively to the earthquakes. Furthermore, the results indicate strong significant positive reaction of conventional equity market towards storms and extreme temperature events at one percent level. However, the conventional equity market does not respond to the landslide, floods and technological disasters.

Table 4.14 reports the results of OLS regression for the impact of different types of disaster events on the Islamic equity market returns. The results in Table 4.14 of this study indicated that earthquakes have weakly significant negative impact on the Islamic equity market returns at ten percent level. On the other side, the Islamic equity market response towards storms and extreme temperature is significantly positive at five percent level and weakly significant positive at ten percent level respectively. However, the Islamic equity market reaction is insignificant for all other types of disaster such as landslide, floods and technological disasters.

Table 4.15
Disaster Types and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.114106***	0.041122	-0.014180	0.057208
Earthquake	-0.009915***	0.00155	-0.007684**	0.003178
Storm	0.013934	0.021315	0.011540**	0.005581
Landslide	0.000644	0.007856	-0.000303	0.003027
Technological	-0.00011	0.001582	-0.000113	0.002363
Flood	0.001027	0.001966	0.001505	0.003937
Extreme Temperature	0.009726***	0.003185	0.010808**	0.005071
Variance Equation				
C	0.00007	0.00004	0.000111***	0.000026
RESID(-1)^2	0.14941***	0.03945	0.129869***	0.023241
GARCH(-1)	0.59807***	0.08008	0.561222***	0.085066
Ret_{t-1}	-0.000002	0.000004	-0.001167	0.000876
Earthquake	-0.00012***	0.00001	-0.000194***	0.000061
Storm	-0.00012*	0.00006	-0.000260***	0.000048
Landslide	-0.00009	0.00005	-0.000221***	0.000032
Technological	-0.00004***	0.00001	-0.000095***	0.000029
Flood	-0.00009***	0.00001	-0.000163***	0.000028
Extreme Temperature	-0.00011	0.00012	-0.000209	0.000457

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Earthquake is a dummy variable which takes value of 1 for earthquake events zero otherwise, Storm is a dummy variable which takes value of 1 for storm events zero otherwise, Landslide is a dummy variable which takes value of 1 for landslides events zero otherwise, Flood is a dummy variable which takes value of 1 for flood events zero otherwise, Extreme Temperature is a dummy variable which takes value of 1 for extreme temperature events zero otherwise, Technological disasters is a dummy variable which takes value of 1 for technological disaster events zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.7.2 Disaster Types and Stock Market using GARCH (1,1)

Table 4.15 provides the results of impact of disaster events on the conventional and Islamic equity market returns based on the types of events using GARCH model. The mean equation indicates that earthquakes and extreme temperature have strongly significant impact on the conventional equity market returns at one percent level whereas the market responds negatively during earthquakes and positively during extreme temperatures. The findings of Table 4.15 indicate that Islamic equity market response towards earthquake events is significantly negative at five percent level. On contrary, Islamic equity market response is positive towards storms and extreme temperature at five percent level. However, Islamic equity market do not respond to landslide, floods and technological disasters.

The variance equation in Table 4.15 shows the impact of different types of disasters on the volatility of conventional and Islamic equity markets returns. The findings indicate that volatility of both equity market indices reduces after disaster events. The coefficient value for earthquakes, technological disasters and floods are strongly significant negative for conventional equity market returns at one percent level whereas the conventional equity market returns volatility is responding negatively to the storms at ten percent level. However, conventional equity market volatility is not affected by the extreme temperature and landslide events. Overall findings indicate that conventional equity market volatility reduces after different types of disaster events.

Furthermore, the findings indicate that earthquake, storms, landslide, technological disasters and flood have strongly significant negative impact on the Islamic equity market volatility at one percent level. However, the extreme temperature events do not impact the Islamic equity market return volatility. Overall volatility in Islamic equity market reduces in response to different types of disaster events.

4.7.3 Discussion on Findings of Disaster Type and Stock Market

In regard to the types of disasters, the findings of this study have indicated positive and negative market reactions. For instance, this study has found that earthquakes have significant negative market response, and contrarily the market participants react significantly positive towards the storm and extreme temperature when measure using both conventional and Islamic equity markets. These results are consistent with the Worthington and Valadkhani (2004) which states that earthquakes have significant negative impact on the equity markets in Australian equity market.

These findings refer to the prospect theory which states that individuals respond to different events based on certain reference points which they keep in their minds. Since, Pakistan has faced some very serious earthquakes in her history, therefore, the negative market response towards these events might be the result of very severe reference point. For instance, only the earthquake of 2005 in Pakistan has caused death of more than 73000 people and affected almost 2.8 million people ("EM-DAT ", 2016). Thus, the negative market reaction towards earthquakes indicates negative investor sentiment towards these events. On the other side, extreme temperature positively affects the

equity market returns which supports the impression that it increases the risk-taking capacity of individuals. For instance, extreme temperature can create aggression and apathy where low temperature creates aggression and high temperature creates aggression and apathy. The result of aggression could be the increase in risk taking capacity (Cao & Wei, 2005). Thus, the extreme temperature may create aggression which may result in high risk and high market returns.

Similarly, equity market reaction towards storm events is also positive which states that these events may also create aggression which may increases stock prices reflecting positive equity market response. Thus, based on the prospect theory, it can be implied that market reaction to different events may vary depending on the reference point people keep in their minds regarding those events. The market reaction is negative to the events where reference points creates negative sentiment such as earthquakes. On the other hand, market response is positive for the events which creates aggression and increases their risk taking such as extreme temperature and storms.

4.8 Disaster Location and Stock Market

This study has also examined the impact of disaster events on the equity market returns based on disasters happening at different locations. Furthermore, the impact has been examined by using OLS regression and GARCH (1,1). The following two sections provide the results of impact of disasters happening at different locations on the equity market returns by using OLS regression and GARCH (1,1) analysis.;

Table 4.16

Disaster Location and Stock Market using OLS Regression

	Conventional			Islamic		
Variable	**VIF**	**Coefficient**	**SE**	**VIF**	**Coefficient**	**SE**
Ret_{t-1}	1.004092	0.114976***	0.031975	1.003237	-0.031591	0.084798
Karachi	1.015949	-0.000283	0.002697	1.016211	-0.001349	0.003362
Financial City	1.200444	0.001282	0.001755	1.199587	0.000461	0.001976
Large City	1.163629	0.000262	0.002138	1.163324	0.001574	0.002513
FATA	1.119435	0.00302*	0.001691	1.118979	0.002744	0.002293
Other Cities	1.128766	-0.001204	0.001613	1.129424	-0.00089	0.00176
Gilgit	1.092575	0.009732***	0.002025	1.09245	0.014334***	0.002159
Kashmir	1.153538	0.001069	0.001494	1.153437	0.000874	0.001456
Dubin Watson test DW		2.002642			1.997383	
Breusch–Pagan test prob.		0			0	
Serial Correlation LM Test prob.		1			1	

Note: Ret_{t-1} indicate the one period lagged return. Karachi is a dummy variable which takes the value of 1 for any disaster events happening in Karachi zero otherwise, Financial city is a dummy variable which takes the value of 1 for any disaster events happening in financial cities zero otherwise, Large city is a dummy variable which takes the value of 1 for any disaster events happening in large cities zero otherwise, FATA is a dummy variable which takes the value of 1 for any disaster happening in FATA zero otherwise, Gilgit is a dummy variable which takes the value of 1 for any disaster happening in Gilgit zero otherwise, Other cities is a dummy variable which takes value of 1 for any disaster event happening in the cities other than previously mentioned zero otherwise, Kashmir is a dummy variable which takes value of 1 for any disaster event happening in the Kashmir zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.8.1 Disaster Location and Stock Market using OLS Regression

Table 4.16 show the results of disaster events on conventional and Islamic equity market returns based on the location of event by using the OLS regression. The predicted value of Durbin Watson test in Table 4.16 is 2.002642 for conventional equity market and 1.997383 for Islamic equity market which shows that returns are not autocorrelated. Likewise, the insignificant value of serial correlation LM test also indicates the absence of autocorrelation for conventional and Islamic equity market returns. Regarding the heteroscedasticity, the value of F-statistic obtained using Breusch–Pagan test confirms the presence of heteroscedasticity in the conventional and Islamic equity market returns. Therefore, white cross-section regression is used as a remedial measure. Furthermore, the multicollinearity among independent variables is examined using variance inflation factors. The VIF values for conventional equity market and Islamic equity market model are within the tolerance limit which implies that independent variables are not colinear.

Furthermore, the results of Table 4.16 indicate that conventional and Islamic equity market returns are insensitive towards disaster events happening at different locations. The findings show insignificant coefficient values for all the locations of disaster for conventional and Islamic equity markets except Gilgit. Only disaster events happening at Gilgit indicates strong positive reaction of conventional and Islamic equity markets at one percent level. However, the low coefficient values for Gilgit indicate very minute reaction magnitude of conventional and Islamic equity markets.

Table 4.17
Disaster Location and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.116484**	0.049097	-0.02754	0.06875
Karachi	-0.000412	0.002301	-0.00154	0.00261
Financial City	0.001841	0.007869	0.00112	0.01327
Large City	0.000609	0.005527	0.00182	0.00888
FATA	0.00356	0.009986	0.00333	0.02124
Kashmir	0.001468	0.005868	0.00119	0.01144
Gilgit	0.009432	0.020086	0.01389	0.45677
Other	-0.000773	0.002219	-0.00057	0.00310
Variance Equation				
C	0.000072***	0.000028	0.00012***	0.00003
RESID(-1)^2	0.128689**	0.055088	0.14081***	0.03060
GARCH(-1)	0.561889***	0.163425	0.58517***	0.08712
Ret_{t-1}	-0.001470*	0.000754	-0.00065	0.00110
Karachi	-0.000098***	0.000024	-0.00022***	0.00003
Financial City	-0.000038	0.000077	-0.00005	0.00007
Large City	-0.000041	0.000063	-0.00007	0.00012
FATA	-0.000039	0.000075	-0.00007	0.00014
Kashmir	-0.000044	0.000058	-0.00007	0.00011
Gilgit	-0.000085	0.000236	-0.00019	0.00045
Other	-0.000027	0.000030	-0.00005	0.00006

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Karachi is a dummy variable which takes the value of 1 for an disaster events happening in Karachi zero otherwise, Financial city is a dummy variable which takes the value of 1 for any disaster events happening in financial cities zero otherwise, Large city is a dummy variable which takes the value of 1 for any disaster events happening in large cities zero otherwise, FATA is a dummy variable which takes the value of 1 for any disaster happening in FATA zero otherwise, Kashmir is a dummy variable which takes the value of 1 for any disaster happening in Kashmir zero otherwise, Gilgit is a dummy variable which takes the value of 1 for any disaster happening in Gilgit zero otherwise, Other cities is a dummy variable which takes value of 1 for any disaster event happening in the cities other than previously mentioned zero otherwise, Kashmir is a dummy variable which takes value of 1 for any disaster event happening in the Kashmir zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

4.8.2 Disaster Location and Stock Market using GARCH (1,1)

The results of Table 4.17 show the impact of disaster events on the conventional and Islamic equity market returns based on location of events by using the GARCH model. The mean equation and variance equations in the Table 4.17 shows the risk and return for the conventional and Islamic equity market returns happened at different locations. The mean equation indicates insignificant values for impact of disaster events on the conventional and Islamic equity market returns.

The variance equation indicates the risk of conventional and Islamic equity market returns in response to the disaster happening at different locations. The variance equation in the Table 4.17 indicates that risk of conventional equity market return is not affected by the disaster events happening at different locations. However, only for attacks in Karachi, the volatility of returns is very minutely changed in conventional and Islamic equity market returns. The overall findings indicate that the risk of conventional and Islamic equity market returns is irrelevant to the disaster event locations.

4.8.3 Discussion on Findings of Disaster Location and Stock Market

The findings of this study show that conventional and Islamic equity markets do not respond to the location of disaster events with exception of Gilgit. Overall the findings indicate market insensitivity towards disaster locations. The sample of this study indicates that most of the disasters in Pakistan happened in small cities which are far

from the Karachi, financial cities and large cities. Only one third of disasters occurred in Karachi, large cities and financial cities. Furthermore, the human deaths due to these disasters are also mainly from the small cities and distant locations. The past research states that media portrayal of disaster leaves long lasting impacts on the behavior of people (Ali, 2013). It indicates that location of event may not be the main reason behind how people will react to the event and the behavior of people towards disasters may depend on the media coverage to the event. For instance, sometimes the media has different types of news at one point of time which may reduce their focus towards disasters. The past research also stated that disaster are given less coverage as compared to other news (Houston *et al.,* 2012).

Though, media in Pakistani covers the post-disaster phase, however, some vital issues relevant to disasters are ignored and media do not covers them appropriately which may cause lack of information and information asymmetry on the disaster (Zaheer, 2016). Likewise, Moges (2013) contends that issues relevant to disasters are not covered as much as other events are covered by the media. How people infer and react to the disasters and their victims depends on the media coverage of these disasters (Yan & Bissell, 2018). According to the findings of an interview conducted on London street, how the media represents and covers the disasters determine the donations for disaster relief fund by London citizens (Bennett & Kottasz, 2000).

Some disasters immediately become public and world knows these events, such as the 2004 Indian Ocean tsunami, which hit Thailand, Indonesia, India, and surrounding countries and claimed over 350,000 lives. In the same way, the world knows about the

earthquake in Haiti in the year 2010, resulting in the death of more than 300,000 people. On the contrary, some disasters were not as much public such as the 2010 China flood which continued for four months. Although this flood affected more than 230 million people, and resulted in death of more than 4,000 people, still was not as much public as others. Similarly, floods in South Asia in the year 2013 took almost 7,000 lives and affected thousands were also less known (Yan & Bissell, 2018). All these arguments point out that an individual response towards any event is guided by the information he attains whereas disaster related news is not fully covered, and location of event may not get that attention. Therefore, the less attention and detailed coverage of disasters by the media might be one of the reasons behind the irrelevance of conventional and Islamic equity market regarding the location of event. Although, findings of this study indicate significant market reaction towards disasters happening in Gilgit, however, the low coefficient values for Gilgit indicates that weak reaction magnitude showing overall insensitivity of equity markets in Pakistan towards disaster locations.

4.9 Terrorism Events and Stock Market during Different Islamic Calendar Months

Given, the direct impact of terrorism on equity markets, impact of different types and location of terrorism events on equity markets in the previous sections, the following section documented the impact of interaction of terrorism events and Islamic calendar months on the conventional and Islamic equity market returns. Table 4.18 provides the impact of terrorism events on the conventional and Islamic equity market returns for the event day and for one day after the event. Likewise, Table 4.19 indicate the impact

of terrorism on the conventional and Islamic equity market returns for two days after the event and three days after the event.

To analyze the impact of terrorism on the equity markets, this study has used the interactive dummies. The interaction of terrorism event dummies with Islamic calendar months dummies were regressed on the conventional and Islamic equity market returns. Based on the findings in the Table 4.18, it is revealed that during different Islamic calendar months the conventional and Islamic equity market returns vary on the day terrorism event happens. The interaction effect of terrorism on conventional equity market returns are significant on the event day during the months of Sha'aban, Shawwal, Rajab, Rabi' al-thani, Jumada al-awal and Jumada al-thani. Specifically, the market reaction on event day is strongly positive to the terrorism events happening during the month of Shawwal at one percent level of significance whereas the market reaction is significant during the months of Sha'aban, Jumada al-awal and Jumada al-thani at five percent level for conventional equity market. Furthermore, the conventional equity market reaction is weakly significant positive at ten percent level for the months of Rajab and Rabi' al-thani. However, the interaction effect of terrorism events with Islamic calendar months on the conventional equity market returns indicate insignificant market reaction in rest of the months.

Likewise, the interaction effect of terrorism event day with Sha'aban, Shawwal, Rajab, and Jumada al-thani is significant at five percent level for Islamic equity market returns. Furthermore, the interaction effect of Shawwal with terrorism event day on Islamic equity market returns is strongly significant positive at one percent level whereas

interaction of Sha'aban, Rajab, and Jumada al-thani with terrorism event day is significant positive at five percent level. Nonetheless, the interaction effect of terrorism events with the rest of Islamic calendar months on the Islamic equity market returns indicate insignificant market reaction.

The model 2 in the Table 4.18 documented the interaction effect of post event day one and Islamic calendar months on the conventional and Islamic equity market returns. The findings indicate that returns become insignificant one day after the terrorism events implying that impact of terrorism events on conventional and Islamic equity market returns varies during different Islamic calendar months only on the event day whereas market becomes insensitive very next day of event. These findings imply that impact of terrorism events on conventional and Islamic equity market returns becomes irrelevant to the month of occurrence of terrorism events on the days following the event day.

Likewise, Table 4.19 reports the interaction effect of terrorism events with Islamic calendar months on the conventional and Islamic equity market returns for post event day two and post event day three. Based on the market reaction on two days after terrorism events, the findings indicate that conventional equity market reaction is significant only during the months of Safar, Duh al-Qidah and Rabi' al-thani. However, the interaction effect of terrorism and these months on conventional equity market returns is weakly significant positive at ten percent level which implies that market do not react negatively to the terrorism events on post event day two during these months.

However, conventional equity market reaction to terrorism events on post event day two is insignificant for the rest of the months.

On the contrary, the Islamic equity market reaction to terrorism events is insignificant on post event day two during all Islamic calendar months. It indicates that Islamic equity market response to the terrorism events on post event day two is irrelevant to the Islamic months in which terrorism event happens. Regarding market reaction on post event day three, conventional equity market reactions was weakly significant positive at ten percent level during the month of Jumada al-thani. However, the coefficient value for interaction effect of terrorism events with rest of the Islamic calendar months on the conventional equity market returns is insignificant. It implies that the equity market is insensitive to the Islamic calendar months of their occurrence.

On the other side, the Islamic equity market reaction to the terrorism events on post event day three is weakly significant positive for events happening in Safar and Rajab implying that market is insensitive to most of the terrorism events. Regarding the overall results, the findings of Table 4.18 and 4.19 indicates that market reactions towards terrorism events varies during different Islamic calendar months on the event day for conventional and Islamic equity returns. Besides, the conventional and Islamic equity markets reaction towards terrorism is also insensitive to some months.

4.9.1 Discussion on Terrorism Events and Stock Market during Different Islamic Calendar Months

This section discusses the findings of this study regarding terrorism events and stock market during different Islamic calendar months. The prior studies have implied that investor mood varies during different Islamic calendar months (Al-Ississ, 2010; Al-Hajieh *et al.,* 2011; Halari *et al.,* 2015; Shah *et al.,* 2017; Syed & Khan, 2017), therefore, this study also examined the impact of terrorism events happening during different Islamic calendar months on the conventional and Islamic equity returns in order to observe whether the impact of terrorism events on the conventional and Islamic equity returns varies during different Islamic calendar months. Since, terrorism entails many monetary costs involving human and physical capital of any country (Chesney *et al.,* 2011), therefore, it may also affect the investment decisions in that country (Lenain *et al.,* 2002; Nedelescu & Johnston, 2005). The past studies have documented the impacts of terrorism on the investors' confidence (Drakos, 2010) which thereby affects the equity returns (Brown & Cliff, 2005; Schmeling, 2009; Drakos, 2010). Likewise, investor mood varies depending on different calendar months and individuals experience different mental health during different months (Białkowski *et al.,* 2012; Halari *et al.,* 2015). The individuals sentiments are affected by their mental health which may affect their investment decisions (Becker & Mulligan, 1997; Berkowitz & Qiu, 2006; Edwards, 2010; Bogan & Fertig, 2013).

By keeping in view, the abovementioned arguments, the findings of this study can be seen focusing on the investor's response towards terrorism events during different

Islamic calendar months. The overall results of this study indicate that the market reactions towards terrorism events varies during different Islamic calendar months on the event day for conventional and Islamic equity returns. Furthermore, these findings also imply that investor mood varies during different Islamic calendar months, therefore, any negative event happening in different Islamic calendar months are responded differently. Furthermore, the impact of terrorism events diminishes in some Islamic months. It indicates that investor mood in different Islamic month is a factor other than terrorism event which may increase, decreases or neutralize the effect of terrorism events on the equity market returns. The market response towards terrorism events was negative for some months and positive for other months. It implies that equity market reaction towards terrorism events is mixed depending on the Islamic calendar months in which terrorism event happens. However, the impact was very short lived, and it remained only for one or two days and afterwards market becomes normal.

Thus, this study concludes that interaction effect remains for very short period and market become insensitive to these events on one day, two day and three days after the event during most of the Islamic calendar months. These findings support the efficient market hypothesis in that the interaction effect of terrorism and Islamic calendar months on conventional and Islamic equity market is short lived. Since, the market becomes irrelevant to the month in which terrorism event happens, therefore, findings are consistent with the concept of market efficiency. The findings also indicate that behavior of conventional and Islamic equity markets towards terrorism events during different Islamic calendar months is alike.

Table 4.18

Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (Event Day/ POS Day1)

	Event Day Effect				POS Day 1 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.098624***	0.032405	-0.044471	0.085092	0.101629***	0.032654	-0.044194	0.082737
Neg_1	0.001058	0.000946	0.001812*	0.001037	0.000955	0.000935	0.00165	0.00105
Neg_2	0.002212**	0.000952	0.001565	0.001021	0.001971**	0.000965	0.001399	0.000987
Neg_3	-0.00009	0.001129	-0.000365	0.001178	-0.000205	0.001145	-0.00039	0.001189
EVENTDAY	-0.003556*	0.002014	-0.004093*	0.002293	0.000301	0.001058	0.000596	0.001098
Pos_1	0.000433	0.001006	0.002294	0.001643	-0.001183	0.002479	-0.00139	0.003048
Pos_2	0.001107	0.000875	-0.000497	0.001508	0.001092	0.000875	-0.000383	0.00145
Pos_3	-0.00049	0.001056	-0.000405	0.000998	-0.000555	0.001093	-0.00044	0.00102
MUH	0.001594**	0.000689	0.001352*	0.000785	0.001629**	0.000685	0.001545	0.00073
SAF	0.000609	0.00062	0.000828	0.000701	0.000307	0.000645	0.000655	0.000863
SHA	0.000533	0.000685	0.001322*	0.00075	0.000574	0.000683	0.001635	0.000794
SHW	-0.000104	0.000952	-0.000002	0.00099	-0.000228	0.000932	-0.00007	0.000967
RA	0.001396*	0.000756	0.001902*	0.001045	0.001515**	0.000746	0.00211	0.00099
RAJ	0.001099	0.000726	0.000973	0.000774	0.001384*	0.00074	0.001308	0.00077
RAM	0.000911	0.000975	0.001491	0.001009	0.001054	0.000979	0.001479	0.001003
DQ	0.00026	0.000858	0.000281	0.000969	-0.000224	0.000875	-0.000196	0.001006
RTH	0.00006	0.000759	0.000305	0.00077	0.000202	0.000761	0.000382	0.000893
JA	0.000228	0.00074	0.00094	0.000757	0.000427	0.000744	0.001126	0.00097
JTH	0.000797	0.000968	0.000507	0.001936	0.001194	0.00096	0.000107	0.001269

Continue *Table 4.18*

	Event Day Effect				POS Day 1 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
MUH*Day Dummy	0.00435	0.003399	0.006372	0.003872	0.00189	0.004037	0.001948	0.004236
SAF*Day Dummy	-0.001233	0.004765	-0.00107	0.005468	0.00321	0.003455	0.001786	0.003786
SHA*Day Dummy	0.006891**	0.003346	0.00946**	0.004452	0.004358	0.003732	0.002974	0.004396
SHW*Day Dummy	0.009348***	0.003145	0.009811***	0.003739	0.008407	0.005236	0.009037	0.005292
RA*Day Dummy	0.00326	0.002687	0.00334	0.00306	0.00004	0.003328	0.000096	0.003915
RAJ*Day Dummy	0.007724*	0.004381	0.0092**	0.004413	-0.000468	0.003411	0.00097	0.00417
RAM*Day Dummy	0.003663	0.005226	0.002837	0.005585	-0.001431	0.005319	0.001973	0.005768
DQ*Day Dummy	-0.005318	0.005562	-0.00312	0.005492	0.002789	0.005778	0.005971	0.005938
RTH*Day Dummy	0.005331*	0.003195	0.004399	0.003561	0.001527	0.003526	0.002562	0.004192
JA*Day Dummy	0.01139**	0.005365	0.010595	0.006777	-0.004969	0.003356	-0.003771	0.003405
JTH*Day Dummy	0.006965**	0.003115	0.008888**	0.003511	-0.002966	0.004229	0.016384	0.017073
Durbin Watson test	1.999129		2.001964		2.000781		1.985692	
Breusch–Pagan test	.000		.000		.000		.000	
Serial Correlation LM Test prob.	1		0.6677		1		0.0025	

Note: C indicates the intercept term for the equation, Note: Ret_{t-1} indicate one period lagged return, Neg_1 is a dummy variable used to indicate one day before the event day, Neg_2 is a dummy variable used to indicate two days before the event day, Neg_3 is a dummy variable used to indicate three days before the event day, Event day is a dummy variable used to indicate the day event happened, Pos_1 is a dummy variable used to indicates one day after the event, Pos_2 is a dummy variable used to indicates two days after the event, Pos_3 is a dummy variable used to indicates three days after the event, MUH is a dummy variable which takes value of 1 for month of Muḥarram zero otherwise, SAF is a dummy variable which takes value of 1 for month of Safar zero otherwise, SHA is a dummy variable which takes value of 1 for month of Sha'aban zero otherwise, SHW is a dummy variable which takes value of 1 for month of Shawwal zero otherwise, RA is a dummy variable which takes value of 1 for month of Rabi' al-awal zero otherwise, RAJ is a dummy variable which takes value of 1 for month of Rajab zero otherwise, RAM is a dummy variable which takes value of 1 for month of Ramaḍan zero otherwise, DQ is a dummy variable which takes value of 1 for month of Duh al-Qidah zero otherwise, RTH is a dummy variable which takes value of 1 for month of Rabi' al-thani zero otherwise, JA is a dummy variable which takes value of 1 for month of Jumada al-awal zero otherwise, JTH is a dummy variable which takes value of 1 for month of Jumada al-thani zero otherwise, Day dummy indicates four dummy variables for event day, post day one, post day two and post day 3. Day dummy for event day takes value of 1 event day zero otherwise, Day dummy for post day event one takes value of 1 for one day after the event zero otherwise, Day dummy for post day event two takes value of 1 for one day after the event zero otherwise, Day dummy for post day event three takes value of 1 for one day after the event zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance, To deal with the collinearity issue due to dummy variable trap, (m-1) dummies were used for the Islamic months where Duh al-Ḥijjah was taken as reference category.

Table 4.19

Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (POS Day 2/ POS Day3)

	POS Day 2 Effect				POS Day 3 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.102389***	0.032575	-0.035703	0.077959	0.103873***	0.032716	-0.039221	0.085328
Neg_1	0.000946	0.00094	0.001518	0.001024	0.000897	0.00094	0.001553	0.001029
Neg_2	0.002195**	0.000953	0.001472	0.001018	0.002298**	0.000954	0.001621	0.001024
Neg_3	-0.00028	0.001132	-0.000569	0.001184	-0.00010	0.001141	-0.000337	0.001195
EVENTDAY	0.000232	0.001052	0.000423	0.001154	0.000176	0.001031	0.000291	0.001155
Pos_1	0.000329	0.000996	0.00198	0.001621	0.00029	0.000997	0.002044	0.001636
Pos_2	-0.003315	0.00279	-0.002462	0.003049	0.001084	0.000874	-0.000494	0.001512
Pos_3	-0.000461	0.001101	-0.000504	0.001007	-0.000445	0.002846	-0.000781	0.002633
MUH	0.001641**	0.00069	0.001419*	0.000784	0.001592	0.000691**	0.001355*	0.000787
SAF	0.000344	0.000645	0.000502	0.000724	0.000269	0.000637	0.000431	0.000719
SHA	0.000679	0.000683	0.001538**	0.000753	0.000863	0.000673	0.001718*	0.000753
SHW	0.00029	0.00096	0.000225	0.001	0.000039	0.000949	0.000079	0.00099
RA	0.001465*	0.000767	0.001722*	0.001032	0.001479	0.000719**	0.002119**	0.00102
RAJ	0.001289*	0.000742	0.001146	0.000784	0.001477	0.000739**	0.00145*	0.000786
RAM	0.000733	0.000955	0.001292	0.000995	0.000936	0.000982	0.001407	0.001018
DQ	-0.000344	0.000886	-0.000221	0.000974	0.000002	0.000862	0.000026	0.000978
RTH	0.000103	0.000765	0.000226	0.000773	0.00023	0.000767	0.000376	0.000781
JA	0.000356	0.00075	0.001066	0.000764	0.000241	0.00074	0.000947	0.00076
JTH	0.001046	0.000973	0.001641	0.001772	0.000593	0.000955	0.000466	0.001896

Continue Table 4.19

	POS Day 2 Effect				POS Day 3 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
MUH*Day Dummy	0.004371	0.004046	0.003215	0.0042	0.000615	0.003931	0.00236	0.00405
SAF*Day Dummy	0.005474*	0.003077	0.004517	0.003422	0.004234	0.003472	0.006347*	0.003456
SHA*Day Dummy	0.005255	0.004085	0.003877	0.004387	-0.00276	0.004509	-0.00153	0.004412
SHW*Day Dummy	0.002177	0.004284	0.002446	0.004319	0.001218	0.004863	0.002481	0.004699
RA*Day Dummy	0.003497	0.003197	0.003455	0.003723	-0.001375	0.004289	-0.00294	0.003902
RAJ*Day Dummy	0.004352	0.003687	0.003469	0.003966	-0.005303	0.003361	-0.00626*	0.003419
RAM*Day Dummy	0.010055	0.008033	0.006318	0.007464	-0.000895	0.00353	0.000811	0.00344
DQ* Day Dummy	0.008306*	0.004317	0.005692	0.005909	-0.005783	0.007618	-0.0028	0.005018
RTH*Day Dummy	0.005819*	0.003359	0.004054	0.003543	-0.000778	0.003246	-0.00034	0.003003
JA*Day Dummy	0.003397	0.003557	0.000081	0.003603	0.004509	0.006614	0.004238	0.005592
JTH*Day Dummy	0.002807	0.003611	-0.016072	0.015813	0.007544*	0.004375	0.006088	0.004106
Durbin Watson test	1.999818		1.99294		2.005903		2.004417	
Breusch–Pagan test prob	.000		.000		.000		.000	
Serial Correlation LM Test	1		0.1975		0.3164		0.22	

Note: C indicates the intercept term for the equation, Note: Ret_{t-1} indicate one period lagged return, Neg_1 is a dummy variable used to indicate one day before the event day, Neg_2 is a dummy variable used to indicate two days before the event day, Neg_3 is a dummy variable used to indicate three days before the event day, Event day is a dummy variable used to indicate the day event happened, Pos_1 is a dummy variable used to indicates one day after the event, Pos_2 is a dummy variable used to indicates two days after the event, Pos_3 is a dummy variable used to indicates three days after the event, MUH is a dummy variable which takes value of 1 for month of Muḥarram zero otherwise, SAF is a dummy variable which takes value of 1 for month of Safar zero otherwise, SHA is a dummy variable which takes value of 1 for month of Sha'aban zero otherwise, SHW is a dummy variable which takes value of 1 for month of Shawwal zero otherwise, RA is a dummy variable which takes value of 1 for month of Rabi' al-awal zero otherwise, RAJ is a dummy variable which takes value of 1 for month of Rajab zero otherwise, RAM is a dummy variable which takes value of 1 for month of Ramaḍan zero otherwise, DQ is a dummy variable which takes value of 1 for month of Duh al-Qidah zero otherwise, RTH is a dummy variable which takes value of 1 for month of Rabi' al-thani zero otherwise, JA is a dummy variable which takes value of 1 for month of Jumada al-awal zero otherwise, JTH is a dummy variable which takes value of 1 for month of Jumada al-thani zero otherwise, Day dummy indicates four dummy variables for event day, post day one, post day two and post day 3. Day dummy for event day takes value of 1 event day zero otherwise, Day dummy for post day event one takes value of 1 for one day after the event zero otherwise, Day dummy for post day event two takes value of 1 for one day after the event zero otherwise, Day dummy for post day event three takes value of 1 for one day after the event zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance, To deal with the collinearity issue due to dummy variable trap, (m-1) dummies were used for the Islamic months where Duh al-Ḥijjah was taken as reference category.

4.10 Disaster Events and Stock Market During Different Islamic Calendar Months

The Table 4.20 and 4.21 show the results for the market reactions to the disasters happening during different Islamic calendar months. Given, the direct impact of disaster events on equity markets, impact of different types of disaster events on equity markets and location of disaster events on equity markets in the previous sections, this section documents the impact of disaster events on the conventional and Islamic equity market returns during different Islamic calendar months. The Table 4.20 provides the impact of disaster events on the conventional and Islamic equity market returns for the event day and for one day after the event. Likewise, the Table 4.21 reports the impact of disaster on the conventional and Islamic equity market returns for two days after the event and three days after the event.

To analyze the impact of disaster on the equity markets, this study used the interactive dummies. The interaction of disasters event dummies with Islamic calendar months dummies were regressed on the conventional and Islamic equity market returns. Based on findings in the Table 4.20, it is revealed that during different Islamic calendar months the conventional and Islamic equity market returns varies on the day disaster event happens. The interaction effect of disaster event day with Muḥarram, Safar, Rabi' al-awal, Ramaḍan and Rabi' al-thani are significant for conventional equity market returns. Furthermore, the interaction effect of disaster event day with Rabi' al-thani on conventional equity market returns is strongly significant negative at one percent level. Besides, the interaction effect of Muḥarram, Safar and Ramaḍan with disaster event

day on conventional equity market returns is weakly significant positive at ten percent level whereas the interaction effect of Rabi' al-awal with disaster event day on conventional equity market returns in significantly positive at five percent level. However, the market reaction on disaster event day is insignificant during the rest of Islamic calendar months.

The similar type of market reaction is observed for Islamic equity market returns, such as equity market responded strongly significant negative at one percent level to the disaster events happening during the months of Rabi' al-thani on the event day. However, Islamic equity market response towards disaster events is weakly significant positive at ten percent level during the months of Safar, Rabi' al-awal and Ramaḍan on the event day. Furthermore, the Islamic equity market reaction is significantly positive at five percent level to the disaster events happening during the months of Muḥarram.

However, market reaction to disaster becomes significant negative on post event day one during most of the Islamic calendar months. Regarding the conventional equity market returns, the findings of Table 4.20 show that equity returns are strongly significant positive at one percent level in response to the disaster events during the month of Rabi' al-thani on post event day one. Furthermore, the conventional equity market response to disaster events during the month of Ramaḍan is significantly positive at five percent level on post event day one. Likewise, the conventional equity market response towards disaster events during the month of Rabi'al-awal is weakly significant negative at ten percent level on post event day one. Besides, the conventional

market response is insignificant in rest of the Islamic calendar months on post event day one.

Furthermore, the Islamic equity market reaction towards the disaster events on post event day one is significant for the events happening during the months of safar, Sha'aban, Rabi'al-awal Rajab and Ramaḍan. The market reaction was significant negative during these months implying that investor in Islamic equity market responded negatively to the disaster events on post event day one during these months. The market reaction is strongly significant negative at one percent level to the disasters on post event day one during the month of Ramadan.

Likewise, the Islamic equity market reaction is negative at five percent level of significance to disaster on post event day one during months of Safar and Sha'aban whereas market reaction is significantly negative at weak level of ten percent to disaster events on post event day one during the months of Rabi'al-awal and Rajab. Furthermore, the Islamic equity market reaction to the disaster events happening during the months of Muḥarram, Shawwal, Duh al-Qidah, Jumada al-awal and Jumada al-thani is insignificant implying that equity market response to disaster events on post event day one is irrelevant to these months.

The Islamic and conventional equity market reaction to the disasters on the post event day two and post event day three is insignificant during most of the Islamic calendar months. The only exception is the significant positive reaction of conventional Islamic equity market to disaster events during the month of Rabi' al-thani on post event day

two showing weakly significant positive and strongly significant positive returns at ten percent and one percent level respectively. The conventional and Islamic market reaction to disaster events on post event day two is insignificant during the months of Muḥarram, Safar, Rajab, Ramaḍan, Duh al-Qidah, Jumada al-awal, Jumada al-thani Sha'aban, Shawwal and Rabi'al-awal.

Moreover, the interaction effect of most of Islamic calendar months with post event day three of disasters on conventional and Islamic equity market returns is insignificant. The findings of the Table 4.20 and 4.21 indicates that conventional and Islamic equity markets responded positively on the event day and negatively after one day to the disaster events happening during most of Islamic calendar months. However, the market becomes insensitive after two days and three days to the disaster events happening in most of Islamic calendar months. It implies that the market reaction towards disaster events based on Islamic calendar months is very short lived, and market recover very soon after the disasters events. However, these findings also imply that conventional and Islamic equity market response towards disaster events on event day and post event day one varies during different Islamic calendar months.

4.10.1 Discussion on Disaster Events and Stock Market During Different Islamic Calendar Months

This study has examined the direct impact of disasters on the conventional and Islamic equity market returns. Further it has also examined the impact of disasters on the conventional and Islamic equity market returns based on the types of disaster events

and location of disaster events. The equity market returns varies during different Islamic calendar months (Al-Ississ, 2010; Al-Hajieh *et al.,* 2011; Halari *et al.,* 2015; Shah *et al.,* 2017; Syed & Khan, 2017) which indicates that investment behavior of individuals may also vary during different Islamic calendar months. Thus, this study examined the impact of disaster events happening during different Islamic calendar months on the conventional and Islamic equity returns to observe whether the impact of disaster events on the conventional and Islamic equity returns varies during different Islamic calendar months.

The findings of this study show that the interaction effect of disaster and Islamic calendar months on conventional and Islamic equity markets is positive on the event day and negative on post event day one to the disaster events happening during most of Islamic calendar months. However, the market becomes insensitive after two days and three days to the disaster events happening in most of Islamic calendar months. It implies that the market reaction is very short lived, and market recover very soon after the disasters events. The previous studies states that investor optimism increases in certain Islamic calendar months (Białkowski *et al.,* 2012; Ramezani *et al.,* 2013). Furthermore, Chung *et al*. (2012) stated that the return predictability of sentiment should be most pronounced when investors' optimism increases.

Since, different Islamic calendar months entail different types of religious faiths and sentiments, therefore, investor sentiment may also vary during these months. Therefore, this study has reported effect of disaster events happening in certain months may have different type of effects on the conventional and Islamic equity market returns. The

findings of this study indicate that market response towards disaster events vary during different Islamic calendar months. The findings of this study are consistent with the findings of previous studies reporting varying investor behavior during different Islamic calendar months (Białkowski *et al.,* 2012; Ramezani *et al.,* 2013; Al-Khazali, 2014; Halari *et al.,* 2015). Furthermore, the findings of this study imply that investor response towards different trauma or catastrophe varies based on the Islamic calendar months. It indicates that stock markets do not respond to the disaster events similarly in all the months.

This study finds varying equity market behavior during different Islamic calendar months in response to disaster events which refers to those studies favoring number of stock market anomalies. These anomalies also include calendar anomalies which were found in the past studies to have significant predictive ability, which is a clear contradiction of the Efficient Market Hypothesis (EMH). The findings of this study suggest that equity market may respond differently to the disaster events depending on the month in which disasters occur. Since, the investor sentiment is different during different months, therefore, impact of disasters on equity returns may also depend on the Islamic calendar months. However, the findings of this study also show that market response is short lived and impact market recovers very soon. Overall these findings support that market is efficient and becomes desensitized very soon irrespective of the Islamic calendar months.

Table 4.20
Disaster Events and Stock Market during Islamic Calendar Months using OLS Regression (Event Day/ POS Day1)

	Event Day Effect				Post Day 1 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.100143***	0.032192	-0.043147	0.086022	0.106424***	0.032494	-0.040627	0.086446
Neg_1	0.000517	0.000818	0.000635	0.001143	0.000493***	0.000824	0.000562	0.001141
Neg_2	0.001454	0.001032	0.001523	0.001135	0.0016	0.001053	0.001727	0.001158
Neg_3	0.001567	0.001219	0.001607	0.001421	0.001428	0.00124	0.001441	0.001437
EVENTDAY	-0.003593**	0.001766	-0.004543***	0.001681	-0.000735	0.001033	-0.001045	0.001162
Pos_1	0.002505**	0.000981	0.002009**	0.001023	0.006086	0.001663	0.008149***	0.002372
Pos_2	0.000426	0.000868	0.001086	0.001071	0.000459	0.000864	0.001101	0.001066
Pos_3	-0.000558	0.000813	0.000062	0.001127	-0.000527	0.000821	0.000072	0.001136
MUH	0.001248*	0.000679	0.000945	0.000758	0.001522**	0.000682	0.001324*	0.000774
SAF	0.000284	0.00064	0.000463	0.000725	0.000445	0.000642	0.00064	0.00073
SHA	0.000653	0.000681	0.001609**	0.000753	0.000768	0.000682	0.001657**	0.000756
SHW	0.000274	0.000934	0.000312	0.000973	0.000024	0.000959	0.000047	0.001002
RA	0.001143	0.000761	0.001631*	0.00093	0.001357*	0.000765	0.001652*	0.000934
RAJ	0.00143*	0.000754	0.001305	0.000803	0.001326*	0.000745	0.00123	0.000797
RAM	0.000551	0.001062	0.001027	0.001084	0.001089	0.001046	0.001776*	0.001074
DQ	-0.00009	0.000886	-0.0000725	0.000993	-0.000525	0.000886	-0.000442	0.000989
RTH	0.000534	0.000697	0.000687	0.000705	0.000338	0.000706	0.000522	0.000714
JA	0.000367	0.000761	0.000987	0.000779	0.000164	0.000755	0.000915	0.000772
JTH	0.000929	0.000935	0.000747	0.001927	0.001	0.000946	0.000747	0.00195

Continue Table 4.20

	Event Day Effect				Post Day 1 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
MUH*Day dummy	0.0076*	0.003994	0.0099**	0.004814	-0.003726	0.003632	-0.006239	0.004075
SAF* Day dummy	0.005715*	0.003183	0.006759*	0.003762	-0.005046	0.003159	-0.007488**	0.0036
SHA* Day dummy	0.005556	0.003387	0.004731	0.003635	-0.004337	0.002863	-0.00633**	0.003045
SHW* Day dummy	-0.001313	0.005229	-0.000835	0.005466	-0.003344	0.003787	-0.005685	0.004208
RA* Day dummy	0.005587**	0.002289	0.005119*	0.002737	-0.003813*	0.00217	-0.004867*	0.00293
RAJ* Day dummy	-0.000813	0.003348	0.000085	0.003372	-0.005287	0.004626	-0.007989*	0.004764
RAM* Day dummy	0.00499*	0.002586	0.005644*	0.003118	-0.008713**	0.003514	-0.01397***	0.00382
DQ* Day dummy	0.000338	0.00452	0.002082	0.004521	0.002184	0.004333	-0.000324	0.004746
RTH* Day dummy	-0.015477***	0.002027	-0.013541***	0.002059	0.005598***	0.001955	0.000241	0.002911
JA* Day dummy	-0.001044	0.002801	0.000980	0.002899	-0.002516	0.003912	-0.007111	0.004326
JTH* Day dummy	0.005682	0.005431	0.003974	0.006274	-0.00356	0.003505	-0.005795	0.003846
Durbin Watson test	1.996102		1.996914		2.002447		2.001236	
Breusch–Pagan test	.000		.000		.000		.000	
Serial Correlation LM Test prob.	0.6463		0.4609		0.6544		0.733	

Note: C indicates the intercept term for the equation, Note: Ret_{t-1} indicate one period lagged return, Neg_1 is a dummy variable used to indicate one day before the event day, Neg_2 is a dummy variable used to indicate two days before the event day, Neg_3 is a dummy variable used to indicate three days before the event day, Event day is a dummy variable used to indicate the day event happened, Pos_1 is a dummy variable used to indicates one day after the event, Pos_2 is a dummy variable used to indicates two days after the event, Pos_3 is a dummy variable used to indicates three days after the event, MUH is a dummy variable which takes value of 1 for month of Muḥarram zero otherwise, SAF is a dummy variable which takes value of 1 for month of Safar zero otherwise, SHA is a dummy variable which takes value of 1 for month of Sha'aban zero otherwise, SHW is a dummy variable which takes value of 1 for month of Shawwal zero otherwise, RA is a dummy variable which takes value of 1 for month of Rabi' al-awal zero otherwise, RAJ is a dummy variable which takes value of 1 for month of Rajab zero otherwise, RAM is a dummy variable which takes value of 1 for month of Ramaḍan zero otherwise, DQ is a dummy variable which takes value of 1 for month of Duh al-Qidah zero otherwise, RTH is a dummy variable which takes value of 1 for month of Rabi' al-thani zero otherwise, JA is a dummy variable which takes value of 1 for month of Jumada al-awal zero otherwise, JTH is a dummy variable which takes value of 1 for month of Jumada al-thani zero otherwise, Day dummy indicates four dummy variables for event day, post day one, post day two and post day 3. Day dummy for event day takes value of 1 event day zero otherwise, Day dummy for post day event one takes value of 1 for one day after the event zero otherwise, Day dummy for post day event two takes value of 1 for one day after the event zero otherwise, Day dummy for post day event three takes value of 1 for one day after the event zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance, To deal with the collinearity issue due to dummy variable trap, (m-1) dummies were used for the Islamic months where Duh al-Ḥijjah was taken as reference category.

Table 4.21

Disaster Events and Stock Market during Islamic Calendar Months using OLS Regression (POS Day 2/ POS Day3)

	POS Day 2 Effect				POS Day 3 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.100938***	0.032404	-0.044957	0.086415	0.10277***	0.032294	-0.043044	0.08618
Neg_1	0.000561	0.00082	0.000687	0.001141	0.000494	0.000814	0.000608	0.001136
Neg_2	0.001576	0.001062	0.001659	0.001171	0.001546	0.001066	0.001634	0.001181
Neg_3	0.001553	0.001231	0.001548	0.001437	0.001608	0.001222	0.001573	0.001382
EVENTDAY	-0.000675	0.001043	-0.000878	0.00117	-0.000696	0.001039	-0.000921	0.001168
Pos_1	0.002486**	0.000984	0.001971*	0.001029	0.002508**	0.000988	0.002012*	0.001033
Pos_2	0.001511	0.002117	0.002036	0.00217	0.000499	0.000861	0.001144	0.001073
Pos_3	-0.000555	0.000821	0.000069	0.001138	0.001551	0.002043	0.001137	0.002567
MUH	0.001604**	0.000699	0.001417*	0.000791	0.001388**	0.000694	0.001259	0.000781
SAF	0.000451	0.000641	0.000762	0.000726	0.000358	0.00064	0.000622	0.000732
SHA	0.000646	0.00068	0.001414*	0.000742	0.00079	0.00068	0.001694**	0.000747
SHW	-0.000107	0.000957	-0.0001180	0.000993	-0.00010	0.000981	-0.000046	0.001023
RA	0.001115	0.000758	0.001486	0.000921	0.001416*	0.000764	0.001441*	0.000862
RAJ	0.001311*	0.00076	0.001275	0.00081	0.001225	0.000763	0.001087	0.000809
RAM	0.000804	0.00105	0.001331	0.001079	0.000702	0.001047	0.001249	0.001074
DQ	-0.000218	0.0009	-0.000209	0.001001	-0.00014	0.000903	-0.00011	0.001004
RTH	0.000369	0.000707	0.000507	0.000712	0.000412	0.000708	0.000575	0.000714
JA	0.000229	0.000758	0.000954	0.000772	0.000124	0.00075	0.000948	0.000765
JTH	0.001113	0.000944	0.000848	0.001952	0.001168	0.000933	0.000958	0.001946

Continue Table 4.21

	POS Day 2 Effect				POS Day 3 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
MUH*Day Dummy	-0.00264	0.002754	-0.002828	0.00284	0.000191	0.002939	-0.000176	0.003583
SAF*Day Dummy	-0.002961	0.003494	-0.006039	0.004035	-0.00162	0.003761	-0.002172	0.003988
SHA*Day Dummy	0.002141	0.003368	0.00674	0.004582	-0.003703	0.003578	-0.002674	0.004311
SHW*Day Dummy	0.000812	0.004106	0.001452	0.00442	-0.000337	0.002694	0.00034	0.00299
RA*Day Dummy	0.00157	0.002969	0.002056	0.003452	-0.003081	0.002751	0.002449	0.005868
RAJ*Day Dummy	-0.00233	0.003001	-0.003889	0.002902	-0.001542	0.002708	0.000152	0.003398
RAM*Day Dummy	-0.002875	0.003384	-0.003572	0.004214	-0.00228	0.003309	-0.002338	0.003849
DQ*Day Dummy	-0.001608	0.003583	-0.000090	0.003911	-0.004205	0.003118	-0.002205	0.003547
RTH*Day Dummy	0.003733*	0.002218	0.00759***	0.002106	-0.003622*	0.002162	-0.002445	0.002737
JA*Day Dummy	-0.002217	0.003104	-0.003848	0.003152	0.000526	0.004778	-0.003763	0.005222
JTH*Day Dummy	-0.003762	0.004557	-0.003206	0.004061	-0.006183	0.005553	-0.00599	0.005902
Durbin Watson test	2.002765		2.00148		1.999554		1.999554	
Breusch–Pagan test	.000		.000		.000		.000	
Serial Correlation LM Test prob.	0.5877		0.6698		1		1	

Note: C indicates the intercept term for the equation, Note: Ret_{t-1} indicate one period lagged return, Neg_1 is a dummy variable used to indicate one day before the event day, Neg_2 is a dummy variable used to indicate two days before the event day, Neg_3 is a dummy variable used to indicate three days before the event day, Event day is a dummy variable used to indicate the day event happened, Pos_1 is a dummy variable used to indicates one day after the event, Pos_2 is a dummy variable used to indicates two days after the event, Pos_3 is a dummy variable used to indicates three days after the event, MUH is a dummy variable which takes value of 1 for month of Muḥarram zero otherwise, SAF is a dummy variable which takes value of 1 for month of Safar zero otherwise, SHA is a dummy variable which takes value of 1 for month of Sha'aban zero otherwise, SHW is a dummy variable which takes value of 1 for month of Shawwal zero otherwise, RA is a dummy variable which takes value of 1 for month of Rabi' al-awal zero otherwise, RAJ is a dummy variable which takes value of 1 for month of Rajab zero otherwise, RAM is a dummy variable which takes value of 1 for month of Ramaḍan zero otherwise, DQ is a dummy variable which takes value of 1 for month of Duh al-Qidah zero otherwise, RTH is a dummy variable which takes value of 1 for month of Rabi' al-thani zero otherwise, JA is a dummy variable which takes value of 1 for month of Jumada al-awal zero otherwise, JTH is a dummy variable which takes value of 1 for month of Jumada al-thani zero otherwise, Day dummy indicates four dummy variables for event day, post day one, post day two and post day 3. Day dummy for event day takes value of 1 event day zero otherwise, Day dummy for post day event one takes value of 1 for one day after the event zero otherwise, Day dummy for post day event two takes value of 1 for one day after the event zero otherwise, Day dummy for post day event three takes value of 1 for one day after the event zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance, To deal with the collinearity issue due to dummy variable trap, (m-1) dummies were used for the Islamic months where Duh al-Ḥijjah was taken as reference category.

4.11 Hypothesis Findings

The following Table presents the summary of the acceptance and rejection of the hypothesis of this study;

Table 4.22
Hypothesis Findings

	Hypothesis	Results	Hypothesis Findings
H_1	Terrorist attack events in Pakistan affect the conventional equity market returns in Pakistan	Market responds weekly significant positive only on post event day two whereas market response is insignificant for all other days such as event day, post event day one and post event day three	Partially Supported
H_2	Terrorist attack events in Pakistan affect the Islamic equity market returns in Pakistan.	Market responds weekly significant positive only on post event day one whereas market response is insignificant for all other days such as event day, post event day two and three	Partially Supported
H_3	Effect of terrorist attacks on conventional equity returns in Pakistan varies based on the type of terrorist attack.	***Business (-) ***Educational Institutes (-) **Armed Forces (+) *Other Attacks (+) Insignificant market reaction for other target types such as government, private citizens and religious figures	Supported
H_4	Effect of terrorist attacks on Islamic equity returns in Pakistan varies based on the type of terrorist attack	***Business (-) ***Educational Institutes (-) **Armed Forces (+) Insignificant market reaction for other target types such as government, private citizens, religious figures and other attacks	Supported

*,**,*** indicates ten percent, five percent and one percent level of significance.

Continue Table 4.22

	Hypothesis	Results	Hypothesis Findings
H_5	Effect of terrorist attacks on conventional equity returns in Pakistan varies based on the location of terrorist attack	***Karachi (-) **Financial Cities (+) ***FATA (+) Insignificant market reaction for other locations such as large cities and other locations	Supported
H_6	Effect of terrorist attacks on Islamic equity returns in Pakistan varies based on the location of terrorist attack.	***Financial Cities (+) ***FATA (+) Insignificant market reaction for other locations such as Karachi, large cities and other locations	Supported
H_7	Effect of terrorist attacks on conventional equity returns in Pakistan varies in different Islamic months.	Interaction effect of terrorism on conventional equity market return varies during different Islamic calendar months on event day, post event day one, post event day two and post event day three where results were significant for some months and insignificant for other months	Supported
H_8	Effect of terrorist attacks on Islamic equity returns in Pakistan varies in different Islamic months.	Interaction effect of terrorism on Islamic equity market return varies during different Islamic calendar months on event day, post event day one, post event day two and post event day three where results were significant for some months and insignificant for other months	Supported

*,**,*** indicates ten percent, five percent and one percent level of significance.

Continue Table 4.22

	Hypothesis	Findings	Hypothesis Findings
H_9	Disaster event in Pakistan affect the Islamic equity market returns in Pakistan	***Post day one (+) Insignificant market response for all other days such as event day, post event day two and post event day three	Partially Supported
H_{10}	Disaster event in Pakistan affect the Islamic equity market returns in Pakistan.	***Post day one (+) *Post day two (+) Insignificant market response for event day and post event day three	Partially Supported
H_{11}	Effect of disasters on conventional equity returns in Pakistan varies based on the type of disaster	**Earthquake (-) ***Storm (+) **Extreme Temperature (+) Insignificant market reaction for other disaster types such as landslide, floods and technological disasters	Supported
H_{12}	Effect of disasters on Islamic equity returns in Pakistan varies based on the type of disaster	*Earthquake (-) **Storm (+) *Extreme Temperature (+) Insignificant market reaction for other disaster types such as landslide, floods and technological disasters	Supported

*,**,*** indicates ten percent, five percent and one percent level of significance.

Continue Table 4.22

	Hypothesis	Findings	Hypothesis Findings
H_{13}	Effect of disasters on conventional equity returns in Pakistan varies based on the location of disaster	***Gilgit (+) Insignificant market reaction for other locations such as Karachi, financial cities, large cities, FATA, Kashmir and other locations	Partially Supported
H_{14}	Effect of disasters on Islamic equity returns in Pakistan varies based on the location of disaster	***Gilgit (+) Insignificant market reaction for other locations such as Karachi, financial cities, large cities, FATA, Kashmir and other locations	Partially Supported
H_{15}	Effect of disasters on conventional equity returns in Pakistan varies in different Islamic months	Interaction effect of disasters on conventional equity market return varies during different Islamic calendar months on event day, post event day one, post event day two and post event day three where results were significant for some months and insignificant for other months	Supported
H_{16}	Effect of disasters on Islamic equity returns in Pakistan varies in different Islamic months	Interaction effect of disasters on Islamic equity market return varies during different Islamic calendar months on event day, post event day one, post event day two and post event day three where results were significant for some months and insignificant for other months	Supported

*,**,*** indicates ten percent, five percent and one percent level of significance.

4.12 Chapter Summary

This chapter provides the findings of this study. This study used ordinary least regression and GARCH (1,1) models with dummy variables. The impact of terrorism and disaster was examined on the conventional and Islamic equity market returns. The findings of the current study revealed that the direct impact of terrorism and disasters on the conventional and Islamic equity market returns is not significant on the event days. However, the impact of terrorism events on the conventional and Islamic equity returns is significant on post event day one. Furthermore, the detailed analysis indicated that types of events are more devastating for the equity market as compared to others. It implies that equity markets do not react to every terrorism and disaster events, but it does respond to the events depending on the event type and, event location. Based on the findings of this study, it was observed that events happening in different Islamic months do have different types of market reaction. Since, the market reaction is generally varying during different Islamic months, therefore the impact of terrorism and disaster events may also vary during different types of Islamic months. The interactive dummies have been used to document this sort of varying behavior of equity markets during different Islamic months in the aftermath of terrorism and disaster events.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a review of the current study. The section 5.1 provides the introduction of the chapter 5. The section 5.2 provides the overview of the study, motivation and contribution of the study. The section 5.3 discusses the implications of the current study both theoretical and practical. Furthermore, the section 5.4 and 5.5 discuss the limitations and recommendations for the future research respectively. Finally, the section 5.6 discusses the contribution of this study and at the end it provides the chapter summary.

5.2 Overview of the Study, Motivation and Contribution

The risk arising from terrorism vary from other sources of risk in variety of ways hence calls for more investigation. For instances, terrorism may cause death of large number of people whereas, this number might be lower in other incidents. Moreover, these events also differ from other events in that these events create fear at broader level, terrorism causing threat to national security and failure to recover from disaster and prevention measures as disgrace to country (Viscusi, 2009).

The risk arising from terrorism may affect the public. It affects the public by creating the fear among them which reduces their confidence on the government. The past research has shown the evidences that inability of the government to control these

disasters and the inability to provide the public post disaster recovery may threaten the government continuity. The lower investor trust on governments to control such type of events threaten the investor and they flew to other safe markets. The higher the risk of government instability the lower would be equity returns. For instance, Irshad (2017) reported negative relationship between political instability and equity returns. The ability of the state to provide security to their public might vary in the developed and developing countries. Therefore, the market reaction towards these events in the aftermath of terrorism and disaster events may also vary in the developed and developing countries.

Likewise, the similarity between terrorism and disaster events has been emphasized by some previous studies stating that these two types of events may create similar types of market response (Berrebi & Ostwald, 2011; Chesney *et al.,* 2011; Berrebi & Ostwald, 2013). Furthermore, the previous studies indicate that catastrophes are followed by terrorism events (Billon & Waizenegger, 2007; Renner & Chafe, 2007; Berrebi & Ostwald, 2011; Chesney *et al.,* 2011; Berrebi & Ostwald, 2013) because government remains busy during the time of disaster and terrorist groups exploit such situations (Berrebi & Ostwald, 2011). Furthermore, the equity market response towards disaster has also been documented by previous studies (Bosch *et al.,* 1998; Worthington & Valadkhani, 2004; Worthington, 2008; Capelle-Blancard & Laguna, 2010; Chesney *et al.,* 2011; Hood *et al.,* 2013; Wang & Kutan, 2013; Bourdeau-Brien & Kryzanowski, 2016), therefore, this study examined the market reaction towards disaster events as well.

The previous studies have examined the impact of terrorism events and disasters on the equity returns and provided mixed results (Worthington & Valadkhani, 2005; Worthington, 2008; Chesney *et al.,* 2011; Bourdeau-Brien & Kryzanowski, 2016; Apergis & Apergis, 2017). However, most of these studies have examined the impact of terrorism and disaster events on the conventional equity returns and unheeded the impact of terrorism and disaster events on the Islamic equity market returns.

On the other hand, the prior studies compared the performance of conventional and Islamic equity markets and reported that both equity markets perform in a different way during same time period (Yusof *et al.,* 2007; Al-Khazali *et al.,* 2014; Ho *et al.,* 2014; Jawadi *et al.,* 2014; Alam *et al.,* 2016). It implies that conventional and Islamic equity market investor responded differently during matching time frame. Given that, this thesis intended to examine whether this performance difference occurs in the aftermath of terrorism and disaster events. For this purpose, this study tested the impact of terrorism and disaster events on the conventional and Islamic equity market returns.

Furthermore, this study is the pioneer in highlighting the conventional and Islamic equity market reaction towards the terrorism and disaster events based on the event type and location. The previous studies have examined the impact of terrorism events on the equity returns based on the event type and event location (Eldor & Melnick, 2004; Aslam & Kang, 2013; Aslam *et al.,* 2015). However, the impact of disaster on the equity returns in Pakistan based on the disaster types and location was overlooked. Therefore, this study examined the impact of disasters on the equity market in Pakistan based on the disaster types and location. Likewise, the impact of terrorism and disaster events on

the Islamic equity market returns was unheeded. Hence, this study focused upon the impact of terrorism and disasters on Islamic equity market returns as well.

Moreover, up to the knowledge of researcher, this study is the first to document the interaction effect of terrorism and disaster with Islamic calendar months on the conventional and Islamic equity market returns. Since, the behavior of equity market vary during different Islamic calendar months due to different behavior of individual investors during different Islamic months, therefore, (Al-Ississ, 2010; Al-Hajieh *et al.,* 2011; Almudhaf, 2012; Al-Ississ, 2015; Halari *et al.,* 2015; Shah *et al.,* 2017; Syed & Khan, 2017) market response towards terrorism and disaster events may also vary during different Islamic calendar months. Thus, this study is among the first of those studies examining the market reaction towards terrorism and disaster events during different Islamic calendar months.

5.3 Implications of Findings

Based on the findings of this study the following section describes theoretical and practical implications.

5.3.1 Theoretical Implications

The concept of market efficiency indicates that the share prices are adjusted in response to the relevant available information. The concept of market efficiency is divided into three sub hypotheses such as weak, semi strong and strong form of efficient market hypotheses. Many studies have examined the existence of the weak form of EMH in

the past (Chakraborty, 2006; Guidi *et al.,* 2011; Irshad & Sarwar, 2013; Nawaz *et al.,* 2013; Omar *et al.,* 2013; Mobarek & Fiorante, 2014; Ryaly *et al.,* 2017), however, the findings of these studies were mixed. The semi strong form of EMH has been tested and mixed findings were reported (Ali *et al.,* 2001; Hussin *et al.,* 2010; Khan & Ikram, 2010). Likewise, the previous research has tested the strong form of efficient market hypothesis (Finnerty, 1976; Rozeff & Zaman, 1988). However, the later studies have indicated many anomalous evidences regarding the efficient market hypothesis. Market anomaly happens when investors are able to generate abnormal returns by having market knowledge superior to others (Stulz & Williamson, 2003; Cao & Wei, 2005; Al-Hajieh et al., 2011; Białkowski *et al.,* 2013).

One of the most discussed area regarding anomalies is the calendar anomalies (Al-Ississ, 2015; Easterday & Sen, 2016; Jebran & Chen, 2017). The previous studies have documented many anomalous evidences regarding the stock market efficiency such as January effect (Seyhun, 1993), day of the week effect (Wingender & Groff, 1989), Monday effect (Jaffe & Westerfield, 1985; Cho *et al.,* 2007), wandering weekend effect (Doyle & Chen, 2009). Recently, studies have found the irrational behavior of security prices during the Islamic calendar months such as Ramadan effect (Białkowski *et al.,* 2012). Besides, the evidence on existence of other calendar anomalies such as month of the year effect (Norvaisiene *et al.,* 2015; Seif *et al.,* 2017), holiday (Seif *et al.,* 2017), holy day effect (Frieder & Subrahmanyam, 2004; Oğuzsoy & Güven, 2004; Al-Ississ, 2015; Ali *et al.,* 2017) is also documented in previous research. However, this study is among the first of those studies which have provided the conventional and Islamic

equity response towards the terrorism and disaster events happening during these months.

5.3.2 Practical Implications

The current research has significant implications for stockholders and portfolio managers in the stock markets. The previous studies indicate that investors are influenced by the emotions and sentiments, therefore, their investment decisions are directed by their moods resulting in irrational investing. The current study has revealed how investors behave in response to the terrorism and disaster events. Furthermore, it also shows the behavior of conventional and Islamic equity market investor in response to the terrorism and disaster events based on the event types and location. Moreover, it may help the stockholders and portfolio managers to understand the investors' behavior towards terrorism and disaster events happening during different Islamic calendar months.

Furthermore, this study can assist the government in devising relevant policies in the aftermath of terrorist and disaster events. This study highlighted that attacks on business places and education institutes are negatively responded by the equity market investors. Likewise, the findings of this study also highlight earthquakes are responded negatively by the equity markets. Moreover, the findings of this study show that terrorism events happening at Karachi are devastating for the conventional equity market returns. However, the equity markets are insensitive towards the disaster locations. Although, the negative equity negative equity market response has been documented in many

previous studies, the findings of this study on the impact of terrorism on armed forces provides some new insights in this field. The positive equity market response towards attacks on armed forces indicate that when terrorist groups are confronted with the armed forces, the equity market reacts positively as they expect government to counter these terrorist events. For instance, most recently, Afik *et al.* (2016) studied the market response towards the antiterrorism events. Since, the antiterrorism is the inverse of the terrorism therefore the market response towards these events was positive. Thus, the findings of this study support this assumption.

It indicates that armed forces attempt to control and reduce the terrorism do have positive equity market response. The findings of this study have shown that attacks on armed forces are also responded positively by the equity markets which indicate that investors appreciate the government policy to counter terrorism in the country. The possible reason for this positive market response might be the perception that the investor may hold that attacks on military increases the probability of increase in antiterrorism acts by the government. These findings indicate that government may restore the investor confidence by initiating counterterrorism policies.

5.4 Limitations of the Study

The following are the limitations of current study.

i. This study examined the impact of terrorism and disaster events on the conventional and Islamic equity market returns based on event type, event

location. Furthermore, this study examined the impact of interaction of terrorism event and Islamic calendar months on conventional and Islamic equity returns. In addition, this study examined the impact of interaction of disaster event and Islamic calendar months on conventional and Islamic equity returns. However, the impact of terrorism and disaster events on sectoral indices and on individual companies share prices may yield different types of results. Furthermore, the impact of terrorism events and disaster events on the small and medium enterprises and other non-listed firms can also yield different types of results.

ii. The number of terrorism events and disaster events happening in Pakistan are greater in number as compared to other countries. This study has used dummy variables regression and GARCH (1,1) models to examine the conventional and Islamic equity market reaction towards terrorism and disaster events. However, using different types of analysis methods may generate different results.

iii. Since, the Islamic equity market index was introduced in Pakistan in the year 2009, therefore, this study has used the data from year 2009 to 2016. However, using more data and comparing the conventional and Islamic equity market reactions towards the terrorism and disaster events may generate different results.

5.5 Recommendations for Future Research

This study offers the following recommendations for future researcher.

i. This study is among the first of those studies which have examined the Islamic equity markets reaction towards terrorism events in Pakistan. Therefore, further studies may examine this sort of market reaction in other developing and developed countries.

ii. This study is among the first of those studies which have examined the Islamic equity markets reaction towards disaster events in Pakistan. Therefore, further studies may examine this sort of market reaction in other developing and developed countries.

iii. This study used the secondary data and used dummy variable regression to examine the impact of terrorism and disaster on the conventional and Islamic equity market returns. However, the future research may use both primary and secondary data. The primary data can be used by taking the responses from the investors regarding their reactions in the aftermath of terrorism and disaster events.

iv. Likewise, future researcher may conduct survey studies by interviews from the corporate managers about type of strategies they choose to manage their risk in response to the terrorism and disaster events. Furthermore, future survey

studies may also investigate on how the corporate managers, stock brokers, investment bank mangers respond towards these shocking events and what are their views regarding the impact of these events on the equity markets.

iv. This study examined the impact of terrorism and disaster events on the conventional and Islamic equity market returns based on event type and event location. Furthermore, this study examined the impact of interaction of terrorism event and Islamic calendar months on conventional and Islamic equity returns. In addition, this study examined the impact of interaction of disaster event and Islamic calendar months on conventional and Islamic equity returns. However, the impact of terrorism and disaster events on sector indices and on individual companies share prices may yield different types of results.

v. Furthermore, the impact of terrorism events and disaster events on the small and medium enterprises and other non-listed firms can be explored in the future research studies.

vi. This study has tested the impacts of interaction of terrorism and disaster with the Islamic calendar months on the equity markets. Future studies may examine the impact of this sort of interactions on the economic growth, foreign direct investment and inflation.

5.6 Contribution of Study

This study has made the following contributions in the existing literature regarding the impact of terrorism and disasters on the equity markets.

i. The performance of conventional and Islamic equity market has been compared in many previous studies, however, the market reaction towards terrorism and disaster events has been studied only by taking conventional equity market indices. Up to best of the author's knowledge, this study is the first exploratory study which examined the impact of terrorism and disasters on the Islamic equity market returns.

ii. The impact of terrorism and disaster events on Islamic equity market returns based on terrorism target type and disaster types has not been tested in the previous studies. Therefore, up to best of the author's knowledge, this study is the first exploratory study that examined the impact of terrorism and disaster events on Islamic equity market returns based on the target/event type. Thus, this study contributes to the existing literature by reporting that market reaction towards terrorism and disaster events may vary depending on the terrorism and disaster events target/event type where some market may respond positively to some events and negatively to others.

iii. Similarly, the impact of terrorism and disaster events on Islamic equity market returns based on event location has not been tested in the previous studies.

Therefore, up to best of the author's knowledge, this study is first exploratory study that investigated the impact of terrorism and disaster events on Islamic equity market returns based on the terrorism and disaster event locations. Thus, another contribution of this study is to provide that impact of terrorism and disaster events on conventional and Islamic equity markets may vary depending on the terrorism and disaster events locations.

iv. According to Efficient market hypothesis share prices absorb all available information quickly and no one can outperform the market (Fama *et al.,* 1969). Many of the later studies documented the validity of efficient market hypothesis (see, for example, Barber & Odean, 2000; Malkiel, 2003, 2005), however, many still questions its validity. For instance, prior studies documented the abnormal behaviour of equity market returns during different months (Wingender & Groff, 1989; Seyhun, 1993; Dahlquist & Sellin, 1996; Cho et al., 2007). Similarly, abnormal behaviour of equity market have been documented during different Islamic calendar months (Husain, 1998; Al-Ississ, 2010; Almudhaf, 2012; Al-Ississ, 2015; Halari et al., 2015; Majeed et al., 2015; Syed & Khan, 2017). Besides, different studies have reported the equity market response towards terrorism events (Chen & Siems, 2004; Drakos, 2009; Chesney et al., 2011; Aslam et al., 2015). However, the interaction effect of terrorism events and Islamic calendar months on conventional and Islamic equity market returns has not been tested in the previous studies. Therefore, up to best of the author's knowledge, this study is among the first studies that initiate in measuring interaction effect of terrorism

events and Islamic calendar months on conventional and Islamic equity market returns and concludes that the effect of terrorism events may vary during different calendar Islamic months.

v. Similarly, the prior studies have reported the equity market response towards disaster events (Chesney et al., 2011; Ho et al., 2013; Bourdeau-Brien & Kryzanowski, 2016) ,(Chen & Siems, 2004; Chesney et al., 2011; Ho et al., 2013; Bourdeau-Brien & Kryzanowski, 2016), however, the interaction effect of disaster events and Islamic calendar months on conventional and Islamic equity market returns has not been tested in the previous studies. Therefore, up to best of the author's knowledge, this study is among the first attempts to examine the impact of interaction effect of disaster events and Islamic calendar months on the conventional and Islamic equity market returns and claims that impact of disasters on conventional and Islamic equity market returns vary during different Islamic calendar months.

5.7 Chapter Summary

This chapter provide an overview and the motivation of study followed by the summary of the findings of this study about the conventional and Islamic equity market reaction towards terrorism and disaster events are discussed. Next, the theoretical and practical implications of this study have been presented. Moreover, the limitation of this thesis and recommendations for future research have also been given. Finally, the

contributions of this thesis have been discussed in the last section to understand the equity market response towards terrorism and disaster events.

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APPENDICES

The current study has tested the market reaction towards terrorism by taking four different samples of terrorism events. Following Table shows the four different samples tested in this study where last samples are reported in the appendices.

Table 6.1 Total number of Terrorism Events During Selected Time

Sr. No.	Sample Description	Criteria	No. of Events
1	Terrorism Events	All events with at least 20 killings	109
2	Terrorism Events	All events with at least 10 killings	285
3	Terrorism Events	All events with at least 07 killings	438
4	Terrorism Events	All events with at least 03 killings	1206

The data includes days where more than one events happened on the same date. This study has considered those events as one which occurred on the similar day. Thus, the following Tables indicates the number of terrorism events that were finally assumed in the data analysis.

Table 6.2 Sample of Terrorism Events

Sr. No.	Sample Description	Criteria	No. of Events
1	Terrorism Events	All events with at least 20 killings	93
2	Terrorism Events	All events with at least 10 killings	234
3	Terrorism Events	All events with at least 07 killings	344
4	Terrorism Events	All events with at least 03 killings	735

Terrorism Events with at least 3 Causalities

The following Tables provides the impact of terrorism events on the conventional and Islamic equity market returns based on the sample of events with at least 3 causalities.

Table 6.3: Terrorism Events and Stock Market using OLS Regression

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.105423***	0.032111	-0.039060	0.084031
Neg1	0.000116	0.00043	0.000033	0.000515
Neg2	0.000803*	0.000424	0.001220**	0.000548
Neg3	0.000637	0.000444	0.000889*	0.00053
Event day	-0.00035	0.000444	-0.000474	0.00052
Pos1	0.000182	0.000434	0.000475	0.000536
Pos2	0.000284	0.000436	0.000002	0.000554
Pos3	0.000313	0.000424	0.000150	0.000508
Durbin Watson test DW	2.003767		1.998384	
Breusch–Pagan test prob.	0		0	
Serial Correlation LM Test prob.	0.4857		1	

Note: Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the event, Pos_3 indicates three days after the event and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.4: Terrorism Events and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.15457000***	0.025153	0.133263***	0.026101
Neg1	0.00041600	0.000338	0.000406	0.000369
Neg2	0.00061000*	0.000343	0.000662*	0.000348
Neg3	0.00062300*	0.000364	0.000555	0.000403
Event day	0.00012200	0.000365	0.000262	0.00039
Pos1	-0.00004750	0.000355	0.00033	0.000368
Pos2	0.00010200	0.00035	0.000151	0.000376
Pos3	-0.00013100	0.000354	-0.00061*	0.000359
Variance Equation				
C	0.0000070***	0.000001	0.000008***	0.000001
RESID(-1)^2	0.1460490***	0.017024	0.143694***	0.010000
GARCH(-1)	0.7913090***	0.018337	0.815214***	0.008490
Ret_{t-1}	-0.0012750***	0.000135	-0.001341***	0.000145
Neg1	-0.0000112***	0.000004	-0.000007	0.000005
Neg2	-0.0000006	0.000004	-0.000012**	0.000005
Neg3	0.0000007	0.000003	0.000010**	0.000004
Event day	0.0000254***	0.000004	0.000022***	0.000005
Pos1	-0.0000201***	0.000005	-0.000016***	0.000005
Pos2	0.0000121***	0.000004	0.000012**	0.000005
Pos3	-0.0000052	0.000003	-0.000012***	0.000004

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the event, Pos_3 indicates three days after the event and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.5: Terrorism Target Types and Stock Market using OLS Regression

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.11040***	0.03230	-0.034926	0.084517
Armed Forces	0.00051	0.00053	0.00014	0.000683
Business	-0.00230	0.00142	-0.000115	0.001678
Educational Ins.	-0.00445	0.00312	-0.005804*	0.003351
Government	0.00071	0.00118	0.001751	0.001267
Private Citizen	0.00094	0.00064	0.001472*	0.000736
Religious Figures	0.00142	0.00131	-0.000207	0.001604
Other Attacks	0.00005	0.00072	-0.000177	0.000795
Durbin Watson test DW	2.009514		2.009402	
Breusch–Pagan test prob.	0		0	
Serial Correlation LM Test prob.	1		1	

Note: C indicates the intercept term for the equation, $Ret_{t-1,}$ indicate the one period lagged return. Armed Forces is a dummy variable which takes value of 1 for any terrorist attack where target of attack is armed forces zero otherwise, Business is a dummy variable which takes value of 1 for any terrorist attack where target of attack is business places zero otherwise, Educational Institutes is a dummy variable which takes value of 1 for any terrorist attack where target of attack is educational institute zero otherwise, Government is a dummy variable which takes value of 1 for any terrorist attack where target of attack is government offices zero otherwise, Private citizens is a dummy variable which takes value of 1 for any terrorist attack where target of attack is private citizen zero otherwise, Religious figures is a dummy variable which takes value of 1 for any terrorist attack where target of attack is any religious figure or institute zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.6: Terrorism Target Types and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.177451***	0.025436	0.15433***	0.02657
Armed Forces	0.000702*	0.000415	0.00089*	0.00052
Business	-0.00109	0.001166	-0.00052	0.00119
Educational Ins.	-0.00629**	0.002611	-0.00674**	0.00342
Government	0.00098	0.000858	0.00081	0.00089
Private Citizen	0.000933**	0.000478	0.00112**	0.00055
Religious Figures	0.00117	0.001171	0.00034	0.00114
Other Attacks	0.000216	0.000584	-0.00009	0.00062
Variance Equation				
C	0.00001***	0.00000	0.00001***	0.00000
RESID(-1)^2	0.15778***	0.01818	0.15970***	0.01060
GARCH(-1)	0.76525***	0.01967	0.79620***	0.00809
Ret_{t-1}	-0.00148***	0.00015	-0.00157***	0.00014
Armed Forces	0.00000	0.00000	0.00000	0.00000
Business	0.00000	0.00001	0.00000	0.00001
Educational Ins.	0.00002	0.00002	0.00001	0.00002
Government	0.00000	0.00001	0.00000	0.00001
Private Citizen	0.00000	0.00000	0.00001	0.00000
Religious Figures	0.00001**	0.00001	0.00001*	0.00001
Other Attacks	0.00000	0.00000	0.00000	0.00000

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Armed Forces is a dummy variable which takes value of 1 for any terrorist attack where target of attack is armed forces zero otherwise, Business is a dummy variable which takes value of 1 for any terrorist attack where target of attack is business places zero otherwise, Educational Institutes is a dummy variable which takes value of 1 for any terrorist attack where target of attack is educational institute zero otherwise, Government is a dummy variable which takes value of 1 for any terrorist attack where target of attack is government offices zero otherwise, Private citizens is a dummy variable which takes value of 1 for any terrorist attack where target of attack is private citizen zero otherwise, Religious figures is a dummy variable which takes value of 1 for any terrorist attack where target of attack is any religious figure or institute zero otherwise, Other attacks is a dummy variable which takes value of 1 for any terrorist attack other than previously mentioned zero otherwise, and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.7: Terrorism Location and Stock Market using OLS Regression

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.11306***	0.03221	-0.033681	0.084734
Karachi	0.00070	0.00095	0.000367	0.000903
Financial City	0.00190	0.00201	0.003087*	0.001714
Large City	-0.00054	0.00082	-0.000158	0.000989
FATA	0.00089	0.00065	0.001327*	0.000801
Gilgit	0.00015	0.00124	-0.005077*	0.00307
Kashmir	0.00152	0.00351	0.003273*	0.001968
Other Locations	0.00020	0.00051	0.000034	0.000657
Durbin Watson test DW	2.004806		2.000262	
Breusch–Pagan test prob.	0		0	
Serial Correlation LM Test prob.	1		1	

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Karachi is a dummy variable which takes the value of 1 for any terrorist attack happening in Karachi zero otherwise, Financial city is a dummy variable which takes the value of 1 for any terrorist attack happening in financial cities zero otherwise, Large city is a dummy variable which takes the value of 1 for any terrorist attack happening in large cities zero otherwise, FATA is a dummy variable which takes the value of 1 for any terrorist attack happening in FATA zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.8: Terrorism Location and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.180083***	0.025632	-0.01285	0.05151
Karachi	0.000641	0.000627	-0.00015	0.001395
Financial City	0.00186	0.004076	0.001694	0.002822
Large City	-0.00045	0.00059	0.000171	0.00121
FATA	0.000731	0.000474	0.001212	0.001154
Gilgit	-0.00035	0.011496	-0.00153	0.00368
Kashmir	0.002936	0.010497	0.001233	0.005076
Other Locations	0.000742*	0.000411	0.000755	0.001026
Variance Equation				
C	0.00000835***	0.00000135	0.0001100	0.0000214***
RESID(-1)^2	0.16549800***	0.02054900	0.1301850	0.0191330***
GARCH(-1)	0.74906700***	0.02607500	0.5437510	0.0810570***
Ret_{t-1}	-0.00163800***	0.00017900	-0.0006900	0.0005850
Karachi	0.00000788*	0.00000413	-0.0000477	0.0000170***
Financial City	0.00004070***	0.00001500	-0.0000953	0.0000375**
Large City	0.00000262	0.00000383	-0.0000420	0.0000154***
FATA	0.00000258	0.00000297	-0.0000213	0.0000143
Gilgit	-0.00003520	0.00002860	-0.0001790	0.0000272***
Kashmir	0.00001820	0.00007270	-0.0002010	0.0000237***
Other Locations	0.00000007	0.00000210	-0.0000391	0.0000125***

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Karachi is a dummy variable which takes the value of 1 for any terrorist attack happening in Karachi zero otherwise, Financial city is a dummy variable which takes the value of 1 for any terrorist attack happening in financial cities zero otherwise, Large city is a dummy variable which takes the value of 1 for any terrorist attack happening in large cities zero otherwise, FATA is a dummy variable which takes the value of 1 for any terrorist attack happening in FATA zero otherwise, Other cities is a dummy variable which takes value of 1 for any terrorist attack happening in the cities other than previously mentioned zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.9: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (Event Day/ POS Day1)

	Event Day Effect				POS Day 1 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.101611***	0.032363	-0.045386	0.085428	0.101752***	0.032475	-0.0417	0.083714
NEG1	0.000052	0.000449	-0.000104	0.000534	-0.000012	0.000445	-0.00022	0.000534
NEG2	0.000741*	0.000442	0.001055*	0.000556	0.000723	0.000444	0.001045*	0.00056
NEG3	0.000594	0.000459	0.000742	0.000555	0.000505	0.000452	0.000654	0.00055
EVENTDAY	-0.001318	0.001132	-0.001420	0.001273	-0.000470	0.000459	-0.00073	0.000557
POS1	0.000123	0.000450	0.000349	0.000546	0.000730	0.000998	0.000526	0.001081
POS2	0.000185	0.000453	-0.000206	0.000562	0.000142	0.000448	-0.00027	0.000566
POS3	0.000278	0.000443	0.000020	0.000534	0.000182	0.000439	-0.00012	0.000535
MUH	0.000896	0.000931	0.000824	0.001044	0.001331*	0.000807	0.001285	0.000935
SAF	0.000119	0.000909	0.000168	0.001018	-0.000296	0.000922	0.000018	0.001071
SHA	0.000100	0.000965	0.001329	0.001070	0.000219	0.000974	0.001570	0.001161
SHW	-0.000137	0.001074	-0.000292	0.001165	-0.000436	0.001087	0.000130	0.001186
RA	0.001434	0.001018	0.002711**	0.001065	0.001070	0.001044	0.002752**	0.001303
RAJ	0.001153	0.000852	0.001203	0.000894	0.001736*	0.000924	0.001892*	0.001006
RAM	-0.000087	0.001227	-0.000106	0.001247	0.001019	0.001383	0.001234	0.001481
DQ	-0.000258	0.001099	0.000071	0.001207	0.000050	0.001102	0.000340	0.001260
RTH	-0.000620	0.000972	-0.000318	0.001020	-0.000343	0.001001	-0.000012	0.001053
JA	-0.000255	0.000941	0.000034	0.001046	0.000250	0.000960	0.001459	0.001116
JTH	0.000306	0.001361	0.001881	0.002703	0.000500	0.001240	-0.000660	0.002542

Continue *Table 6.9: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (Event Day/ POS Day1)*

	Event Day Effect				POS Day 1 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
MUH*Day Dummy	0.002109	0.001688	0.002137	0.001885	-0.000294	0.001722	0.000335	0.001918
SAF*Day Dummy	0.000364	0.001725	0.000942	0.001950	0.000211	0.001609	0.000834	0.001793
SHA*Day Dummy	0.001093	0.001727	0.000678	0.001913	-0.000304	0.001640	-0.000296	0.001778
SHW*Day Dummy	0.000765	0.002329	0.001763	0.002429	0.000474	0.002223	0.000044	0.002301
RA*Day Dummy	0.000052	0.001681	-0.001600	0.002232	-0.000245	0.001609	-0.002204	0.002011
RAJ*Day Dummy	0.000180	0.002022	0.000068	0.002211	-0.002475	0.001836	-0.002203	0.001968
RAM*Day Dummy	0.002208	0.002262	0.003626	0.002392	-0.001532	0.002111	0.000103	0.002204
DQ*Day Dummy	0.000071	0.002159	-0.000293	0.002435	-0.001919	0.002069	-0.001487	0.002222
RTH*Day Dummy	0.001747	0.001833	0.001696	0.001934	-0.000023	0.001736	0.000548	0.001784
JA*Day Dummy	0.000994	0.001881	0.002249	0.001950	-0.001435	0.001819	-0.001815	0.001817
JTH*Day Dummy	0.001281	0.002082	-0.002553	0.003871	-0.000289	0.002083	0.002841	0.003506
Durbin Watson test DW	2.004009		1.996369		2.001322		1.99955	
Breusch–Pagan test prob	0		0		0		0	
Serial Correlation LM Test prob.	0.4217		0.3884		0.7608		1	

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the event, Pos_3 indicates three days after the event, MUH is a dummy variable which takes value of 1 for month of Muḥarram zero otherwise, SAF is a dummy variable which takes value of 1 for month of Safar zero otherwise, SHA is a dummy variable which takes value of 1 for month of Sha'aban zero otherwise, SHW is a dummy variable which takes value of 1 for month of Shawwal zero otherwise, RA is a dummy variable which takes value of 1 for month of Rabi' al-awal zero otherwise, RAJ is a dummy variable which takes value of 1 for month of Rajab zero otherwise, RAM is a dummy variable which takes value of 1 for month of Ramaḍan zero otherwise, DQ is a dummy variable which

takes value of 1 for month of Duh al-Qidah zero otherwise, RTH is a dummy variable which takes value of 1 for month of Rabi' al-thani zero otherwise, JA is a dummy variable which takes value of 1 for month of Jumada al-awal zero otherwise, JTH is a dummy variable which takes value of 1 for month of Jumada al-thani zero otherwise, Day dummy indicates four dummy variables for event day, post day one, post day two and post day 3. Day dummy for event day takes value of 1 event day zero otherwise, Day dummy for post day event one takes value of 1 for one day after the event zero otherwise, Day dummy for post day event two takes value of 1 for one day after the event zero otherwise, Day dummy for post day event three takes value of 1 for one day after the event zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.10: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (POS Day 2/ POS Day3)

	POS Day 2 Effect				POS Day 3 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.102997***	0.032304	-0.042146	0.084995	0.104439***	0.032184	-0.041770	0.085266
NEG1	0.00011	0.000444	-0.000116	0.000529	0.000013	0.000444	-0.000200	0.000529
NEG2	0.000763*	0.000444	0.001057**	0.000560	0.000687	0.000442	0.001002*	0.000555
NEG3	0.000548	0.000452	0.000671	0.000548	0.000532	0.000456	0.000670	0.000556
EVENTDAY	-0.00046	0.000455	-0.000715	0.000550	-0.000536	0.000457	-0.000780	0.000547
POS1	0.000101	0.000444	0.000233	0.000545	0.000097	0.000445	0.000261	0.000538
POS2	-0.00118	0.001097	-0.000949	0.001133	0.000082	0.000451	-0.000272	0.000581
POS3	0.000249	0.000441	-0.000069	0.000553	0.001090	0.001031	0.000701	0.001063
MUH	0.002045**	0.000829	0.001989**	0.000986	0.001897**	0.000903	0.001534	0.000991
SAF	0.000294	0.000878	0.000612	0.001050	0.000376	0.000889	0.000832	0.001027
SHA	-0.00065	0.001027	0.000613	0.001176	0.000581	0.000983	0.001808	0.001127
SHW	0.000713	0.000992	0.000773	0.001134	-0.001217	0.001183	-0.001350	0.001230
RA	0.000921	0.001096	0.002277*	0.001281	0.001612	0.000981	0.002118*	0.001182
RAJ	0.000544	0.000922	0.000731	0.001023	0.001123	0.000935	0.001006	0.000978
RAM	-0.0008	0.001366	-0.000323	0.001456	0.001031	0.001462	0.001517	0.001501
DQ	-0.0002	0.001244	0.000367	0.001325	-0.000540	0.001133	-0.000056	0.001265
RTH	-0.00091	0.001075	0.000316	0.001129	0.001370	0.001056	0.001720	0.001107
JA	0.000134	0.001057	0.000751	0.001096	-0.000271	0.001094	0.000561	0.001092
JTH	0.000269	0.001224	0.000404	0.002374	-0.000246	0.001259	0.001050	0.002617

Continue *Table 6.10: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (POS Day 2/ POS Day3)*

	POS Day 2 Effect				POS Day 3 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
MUH*Day Dummy	-0.00054	0.001782	-0.000789	0.001915	-0.002006	0.001647	-0.000851	0.001830
SAF*Day Dummy	0.000459	0.001686	0.000193	0.001822	-0.001600	0.001643	-0.001638	0.001756
SHA*Day Dummy	0.003226*	0.001675	0.002529	0.001788	-0.001241	0.001678	-0.001299	0.001808
SHW*Day Dummy	-0.00114	0.002356	-0.001012	0.002367	0.002345	0.002047	0.003529*	0.002115
RA*Day Dummy	0.001772	0.001627	-0.000281	0.002031	-0.001703	0.001642	-0.001196	0.002037
RAJ*Day Dummy	0.002359	0.001872	0.001660	0.001942	-0.001024	0.001857	-0.000349	0.001968
RAM*Day Dummy	0.004497**	0.002161	0.004597**	0.002207	-0.001755	0.002026	-0.001084	0.002155
DQ* Day Dummy	0.000447	0.001981	-0.000782	0.002221	-0.000465	0.002066	-0.000901	0.002199
RTH*Day Dummy	0.00288	0.00176	0.000628	0.001795	-0.00381**	0.001723	-0.00360**	0.001746
JA*Day Dummy	0.000553	0.001808	0.000768	0.001875	-0.000306	0.001749	-0.000064	0.001817
JTH*Day Dummy	0.00192	0.002133	0.001102	0.003884	0.001377	0.002077	-0.001715	0.003782
Durbin Watson test DW	1.996118		1.998189		2.001405		1.99921	
Breusch–Pagan test prob	0		0		0		0	
Serial Correlation LM Test prob.	0.6633		0.7122		0.7698		0.8847	

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the

event, Pos_3 indicates three days after the event, MUH is a dummy variable which takes value of 1 for month of Muḥarram zero otherwise, SAF is a dummy variable which takes value of 1 for month of Safar zero otherwise, SHA is a dummy variable which takes value of 1 for month of Sha'aban zero otherwise, SHW is a dummy variable which takes value of 1 for month of Shawwal zero otherwise, RA is a dummy variable which takes value of 1 for month of Rabi' al-awal zero otherwise, RAJ is a dummy variable which takes value of 1 for month of Rajab zero otherwise, RAM is a dummy variable which takes value of 1 for month of Ramaḍan zero otherwise, DQ is a dummy variable which takes value of 1 for month of Duh al-Qidah zero otherwise, RTH is a dummy variable which takes value of 1 for month of Rabi' al-thani zero otherwise, JA is a dummy variable which takes value of 1 for month of Jumada al-awal zero otherwise, JTH is a dummy variable which takes value of 1 for month of Jumada al-thani zero otherwise, Day dummy indicates four dummy variables for event day, post day one, post day two and post day 3. Day dummy for event day takes value of 1 event day zero otherwise, Day dummy for post day event one takes value of 1 for one day after the event zero otherwise, Day dummy for post day event two takes value of 1 for one day after the event zero otherwise, Day dummy for post day event three takes value of 1 for one day after the event zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Terrorism Events with at least 7 Causalities

The following Tables provides the impact of terrorism events on the conventional and Islamic equity market returns based on the sample of events with at least 7 causalities.

Table 6.11: Terrorism Events and Stock Market using OLS Regression

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.10738***	0.03212	-0.03688	0.084345
Neg1	0.00083	0.00054	0.000767	0.000605
Neg2	0.00085	0.00052	0.000282	0.000686
Neg3	0.00066	0.00056	0.001184*	0.000702
Event day	-0.00017	0.00057	-0.00017	0.000659
Pos1	0.00024	0.00055	0.001098	0.000695
Pos2	0.00081	0.00054	0.000309	0.00067
Pos3	0.00013	0.00052	0.000451	0.000578
Durbin Watson test DW	2.002544		1.998683	
Breusch–Pagan test prob.	0		0	
Serial Correlation LM Test prob.	1		1	

Note: Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the event, Pos_3 indicates three days after the event and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.12: Terrorism Events and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.169336***	0.025781	-0.01644	0.04185
Neg1	0.000583	0.00045	0.00000	0.00076
Neg2	0.000686	0.000433	0.00160**	0.00080
Neg3	0.000507	0.000426	-0.00026	0.00080
Event day	0.00068	0.000466	-0.00048	0.00079
Pos1	-0.00034	0.000404	0.00233***	0.00084
Pos2	0.00106**	0.000462	0.00042	0.00074
Pos3	-0.00046	0.000448	0.00020	0.00082
Variance Equation				
C	0.000008***	0.000001	0.00010***	0.00000
RESID(-1)^2	0.161768***	0.018010	0.15245***	0.01915
GARCH(-1)	0.771416***	0.020171	0.53776***	0.00768
Ret_{t-1}	-0.001442***	0.000146	-0.00150***	0.00047
Neg1	0.000001	0.000005	-0.00002*	0.00001
Neg2	-0.000002	0.000005	-0.00003***	0.00001
Neg3	-0.000002	0.000004	-0.00002**	0.00001
Event day	0.000009	0.000006	-0.00001	0.00001
Pos1	-0.000014***	0.000005	0.00001	0.00001
Pos2	0.000015***	0.000005	-0.00004***	0.00001
Pos3	-0.000002	0.000004	-0.00002***	0.00001

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the event, Pos_3 indicates three days after the event and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.13: Terrorism Target Types and Stock Market using OLS Regression

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.111359***	0.032529	-0.033839	0.084926
Armed Forces	0.000581	0.000743	0.000523	0.000909
Business	-0.005334**	0.002707	-0.004279**	0.002102
Educational Ins.	-0.006905	0.006039	-0.011095*	0.005936
Government	0.000143	0.00175	0.000742	0.001943
Private Citizen	0.001734*	0.000971	0.002268**	0.001065
Religious Figures	0.000896	0.001628	-0.00039	0.002611
Other Attacks	-0.000361	0.00134	-0.0003	0.001422
Durbin Watson test DW	2.013794		2.007267	
Breusch–Pagan test prob.	0		0	
Serial Correlation LM Test prob.	1		1	

Note: C indicates the intercept term for the equation, $Ret_{t-1,}$ indicate the one period lagged return. Armed Forces is a dummy variable which takes value of 1 for any terrorist attack where target of attack is armed forces zero otherwise, Business is a dummy variable which takes value of 1 for any terrorist attack where target of attack is business places zero otherwise, Educational Institutes is a dummy variable which takes value of 1 for any terrorist attack where target of attack is educational institute zero otherwise, Government is a dummy variable which takes value of 1 for any terrorist attack where target of attack is government offices zero otherwise, Private citizens is a dummy variable which takes value of 1 for any terrorist attack where target of attack is private citizen zero otherwise, Religious figures is a dummy variable which takes value of 1 for any terrorist attack where target of attack is any religious figure or institute zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.14: Terrorism Target Types and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.175699***	0.025283	0.172304***	0.028254
Armed Forces	0.000928	0.000661	0.000821	0.000631
Business	-0.00065	0.001653	0.001729	0.011149
Educational Ins.	-0.01236**	0.005936	-0.01702***	0.00645
Government	0.00196	0.001387	0.001898	0.0015
Private Citizen	0.00192**	0.000788	0.002557***	0.000946
Religious Figures	-0.0006	0.001897	-0.00105	0.001769
Other Attacks	-0.00032	0.000942	-0.00018	0.000979
Variance Equation				
C	0.000008***	0.000001	0.00003***	0.00000
RESID(-1)^2	0.147840***	0.016876	0.26269***	0.01861
GARCH(-1)	0.781168***	0.019415	0.50731***	0.03556
Ret_{t-1}	-0.001484***	0.000153	-0.00263***	0.00029
Armed Forces	-0.000001	0.000003	-0.00002***	0.00001
Business	-0.000008	0.000014	0.00043***	0.00009
Educational Ins.	0.000053	0.000060	0.00007	0.00016
Government	-0.000007	0.000008	0.00000	0.00002
Private Citizen	0.000001	0.000005	0.00001	0.00001
Religious Figures	0.000019**	0.000009	0.00003	0.00002
Other Attacks	0.000008	0.000005	0.00000	0.00001

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Armed Forces is a dummy variable which takes value of 1 for any terrorist attack where target of attack is armed forces zero otherwise, Business is a dummy variable which takes value of 1 for any terrorist attack where target of attack is business places zero otherwise, Educational Institutes is a dummy variable which takes value of 1 for any terrorist attack where target of attack is educational institute zero otherwise, Government is a dummy variable which takes value of 1 for any terrorist attack where target of attack is government offices zero otherwise, Private citizens is a dummy variable which takes value of 1 for any terrorist attack where target of attack is private citizen zero otherwise, Religious figures is a dummy variable which takes value of 1 for any terrorist attack where target of attack is any religious figure or institute zero otherwise, Other attacks is a dummy variable which takes value of 1 for any terrorist attack other than previously mentioned zero otherwise, and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.15: Terrorism Location and Stock Market using OLS Regression

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.113609***	0.032367	-0.03260	0.08490
Karachi	0.001878	0.002391	0.00344	0.00224
Financial City	-0.000444	0.003002	0.00119	0.00220
Large City	-0.001413	0.001225	-0.00236	0.00154
FATA	0.001116	0.000921	0.00090	0.00120
Kashmir	-0.004554*	0.002411	-0.00228	0.00240
Gilgit	0.003531***	0.000232	0.00022	0.00050
Other Locations	0.000779	0.000736	0.00121	0.00079
Durbin Watson test DW	2.006181		2.001158	
Breusch–Pagan test prob.	0		0	
Serial Correlation LM Test prob.	1		1	

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Karachi is a dummy variable which takes the value of 1 for any terrorist attack happening in Karachi zero otherwise, Financial city is a dummy variable which takes the value of 1 for any terrorist attack happening in financial cities zero otherwise, Large city is a dummy variable which takes the value of 1 for any terrorist attack happening in large cities zero otherwise, FATA is a dummy variable which takes the value of 1 for any terrorist attack happening in FATA zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.16: Terrorism Location and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.11647***	0.04313	-0.01289	0.05220
Karachi	0.00203	0.00220	0.00280	0.00255
Financial City	-0.00060	0.00282	-0.00009	0.00180
Large City	-0.00022	0.00148	-0.00129	0.00167
FATA	0.00083	0.00122	0.00174	0.00151
Kashmir	-0.00474	1433.32	-0.00194	20.98422
Gilgit	0.00354	9.72047	0.00031	7.30820
Other	0.00122	0.00113	0.00169	0.00156
Variance Equation				
C	0.000070***	0.000015	0.00011***	0.00002
RESID(-1)^2	0.126251***	0.041666	0.12624***	0.02110
GARCH(-1)	0.552458***	0.099687	0.55293***	0.07228
Ret_{t-1}	-0.001264**	0.000545	-0.00106	0.00075
Karachi	-0.000030	0.000027	-0.00011***	0.00001
Financial City	-0.000058*	0.000031	-0.00016***	0.00002
Large City	-0.000036**	0.000016	-0.00008***	0.00002
FATA	-0.000044***	0.000010	-0.00008***	0.00001
Kashmir	-0.000134	0.000527	-0.00015	0.00091
Gilgit	-0.000045	0.000214	-0.00020	0.00034
Other	-0.000034**	0.000013	-0.00003	0.00002

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Karachi is a dummy variable which takes the value of 1 for any terrorist attack happening in Karachi zero otherwise, Financial city is a dummy variable which takes the value of 1 for any terrorist attack happening in financial cities zero otherwise, Large city is a dummy variable which takes the value of 1 for any terrorist attack happening in large cities zero otherwise, FATA is a dummy variable which takes the value of 1 for any terrorist attack happening in FATA zero otherwise, Other cities is a dummy variable which takes value of 1 for any terrorist attack happening in the cities other than previously mentioned zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.17: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (Event Day/ POS Day1)

	Event Day Effect				POS Day 1 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.09738***	0.03194	-0.04620	0.08524	0.09846***	0.03254	-0.04318	0.08012
NEG1	0.00061	0.00055	0.00048	0.00063	0.00058	0.00055	0.00045	0.00062
NEG2	0.00060*	0.00053	-0.00016	0.00070	0.00065	0.00053	0.00002	0.00070
NEG3	0.00046	0.00057	0.00083	0.00071	0.00043	0.00057	0.00082	0.00079
EVENTDAY	-0.00159	0.00142	-0.00233	0.00164	-0.00039	0.00059	-0.00056	0.00069
POS1	0.00000	0.00056	0.00079	0.00071	-0.00009	0.00139	-0.00029	0.00149
POS2	0.00056	0.00055	-0.00012	0.00068	0.00055	0.00055	-0.00010	0.00070
POS3	-0.00011	0.00054	0.00005	0.00061	-0.00016	0.00054	0.00010	0.00064
MUH	0.00149**	0.00075	0.00129	0.00084	0.00170**	0.00076	0.00170**	0.00075
SAF	0.00057	0.00065	0.00076	0.00074	-0.00003	0.00070	0.00029	0.00092
SHA	0.00058	0.00076	0.00155*	0.00083	0.00069	0.00079	0.00194*	0.00099
SHW	-0.00047	0.00102	-0.00058	0.00106	-0.00103	0.00105	-0.00074	0.00108
RA	0.00116	0.00083	0.00237**	0.00101	0.00167**	0.00079	0.00228**	0.00109
RAJ	0.00092	0.00081	0.00084	0.00086	0.00138*	0.00080	0.00133*	0.00075
RAM	0.00104	0.00113	0.00143	0.00115	0.00141	0.00114	0.00192	0.00120
DQ	0.00065	0.00089	0.00084	0.00098	-0.00012	0.00093	-0.00003	0.00118
RTH	-0.00021	0.00085	0.00014	0.00086	0.00038	0.00084	0.00063	0.00091
JA	-0.00042	0.00081	0.00026	0.00082	-0.00015	0.00083	0.00063	0.00098
JTH	0.00082	0.00110	0.00074	0.00236	0.00064	0.00106	-0.00040	0.00158

Continue *Table 6.17: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (Event Day/ POS Day1)*

	Event Day Effect				POS Day 1 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
MUH*Day Dummy	0.00205	0.00219	0.00338	0.00257	-0.00047	0.00209	-0.00035	0.00216
SAF*Day Dummy	-0.00051	0.00246	0.00061	0.00279	0.00194	0.00214	0.00244	0.00206
SHA*Day Dummy	0.00093	0.00222	0.00169	0.00250	-0.00059	0.00206	-0.00075	0.00209
SHW*Day Dummy	0.00392	0.00285	0.00589	0.00294	0.00556**	0.00243	0.00564	0.00251
RA*Day Dummy	0.00223	0.00195	-0.00038	0.00285	-0.00133	0.00217	-0.00091	0.00231
RAJ*Day Dummy	0.00298	0.00230	0.00398	0.00246	-0.00090	0.00247	0.00000	0.00258
RAM*Day Dummy	-0.00009	0.00262	0.00156	0.00284	-0.00326	0.00242	-0.00198	0.00296
DQ* Day Dummy	-0.00453	0.00318	-0.00404	0.00356	-0.00083	0.00298	0.00045	0.00332
RTH*Day Dummy	0.00239	0.00215	0.00263	0.00234	-0.00105	0.00216	-0.00028	0.00228
JA*Day Dummy	0.00512**	0.00245	0.00616	0.00261	0.00215	0.00227	0.00267	0.00213
JTH*Day Dummy	0.00108	0.00254	0.00151	0.00355	0.00098	0.00275	0.00638	0.00568
Durbin Watson test DW	2.002245		1.999413		1.992372		1.990193	
Breusch–Pagan test prob	0		0		0		0	
Serial Correlation LM Test prob.	0.7833		1		0.2738		0.0346	

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the event, Pos_3 indicates three days after the event, MUH is a dummy variable which takes value of 1 for month of Muḥarram zero otherwise, SAF is a dummy variable which takes

value of 1 for month of Safar zero otherwise, SHA is a dummy variable which takes value of 1 for month of Sha'aban zero otherwise, SHW is a dummy variable which takes value of 1 for month of Shawwal zero otherwise, RA is a dummy variable which takes value of 1 for month of Rabi' al-awal zero otherwise, RAJ is a dummy variable which takes value of 1 for month of Rajab zero otherwise, RAM is a dummy variable which takes value of 1 for month of Ramaḍan zero otherwise, DQ is a dummy variable which takes value of 1 for month of Duh al-Qidah zero otherwise, RTH is a dummy variable which takes value of 1 for month of Rabi' al-thani zero otherwise, JA is a dummy variable which takes value of 1 for month of Jumada al-awal zero otherwise, JTH is a dummy variable which takes value of 1 for month of Jumada al-thani zero otherwise, Day dummy indicates four dummy variables for event day, post day one, post day two and post day 3. Day dummy for event day takes value of 1 event day zero otherwise, Day dummy for post day event one takes value of 1 for one day after the event zero otherwise, Day dummy for post day event two takes value of 1 for one day after the event zero otherwise, Day dummy for post day event three takes value of 1 for one day after the event zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.18: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (POS Day 2/ POS Day3)

	POS Day 2 Effect				POS Day 3 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.09846***	0.03254	-0.03707	0.08419	0.10727***	0.03250	-0.03855	0.08501
NEG1	0.00058	0.00055	0.00035	0.00064	0.00065	0.00055	0.00041	0.00064
NEG2	0.00065	0.00053	-0.00010	0.00070	0.00062	0.00053	-0.00008	0.00070
NEG3	0.00043	0.00057	0.00072	0.00072	0.00027	0.00057	0.00080	0.00071
EVENTDAY	-0.00039	0.00059	-0.00056	0.00069	-0.00028	0.00059	-0.00055	0.00069
POS1	-0.00009	0.00139	0.00071	0.00071	-0.00002	0.00056	0.00072	0.00070
POS2	0.00055	0.00055	0.00065	0.00172	0.00051	0.00175	-0.00005	0.00069
POS3	-0.00016	0.00054	0.00005	0.00062	-0.00016	0.00054	0.00089	0.00141
MUH	0.00170***	0.00076	0.00140	0.00086	0.00163**	0.00076	0.00145*	0.00086
SAF	-0.00003	0.00070	0.00034	0.00080	0.00011	0.00070	0.00092	0.00078
SHA	0.00069	0.00079	0.00122	0.00090	0.00028	0.00081	0.00159*	0.00087
SHW	-0.00103	0.00105	0.00115	0.00100	0.00126	0.00092	-0.00072	0.00110
RA	0.00167**	0.00079	0.00171	0.00109	0.00124	0.00085	0.00203*	0.00095
RAJ	0.00138*	0.00080	0.00147*	0.00084	0.00139*	0.00080	0.00114	0.00086
RAM	0.00141	0.00114	0.00092	0.00114	0.00030	0.00111	0.00157	0.00116
DQ	-0.00012	0.00093	-0.00027	0.00111	-0.00048	0.00102	0.00006	0.00108
RTH	0.00038	0.00084	0.00064	0.00090	0.00032	0.00089	0.00102	0.00087
JA	-0.00015	0.00083	0.00078	0.00081	0.00017	0.00081	0.00083	0.00084
JTH	0.00064	0.00106	0.00131	0.00213	0.00033	0.00111	0.00021	0.00231

Continue *Table 6.18: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (POS Day 2/ POS Day3)*

	POS Day 2 Effect				POS Day 3 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
MUH*Day Dummy	-0.00047	0.00209	0.00009	0.00246	-0.00010	0.00240	-0.00048	0.00228
SAF*Day Dummy	0.00194	0.00214	0.00096	0.00231	0.00116	0.00228	-0.00333	0.00238
SHA*Day Dummy	-0.00059	0.00206	0.00076	0.00225	0.00106	0.00220	-0.00116	0.00222
SHW*Day Dummy	0.00556**	0.00243	-0.00530	0.00337	-0.00602*	0.00337	0.00352	0.00256
RA*Day Dummy	-0.00133	0.00217	0.00041	0.00239	0.00067	0.00213	-0.00138	0.00297
RAJ*Day Dummy	-0.00090	0.00247	-0.00226	0.00269	-0.00105	0.00264	-0.00069	0.00249
RAM*Day Dummy	-0.00326	0.00242	0.00174	0.00302	0.00235	0.00298	-0.00185	0.00260
DQ* Day Dummy	-0.00083	0.00298	0.00052	0.00264	0.00133	0.00237	-0.00183	0.00270
RTH*Day Dummy	-0.00105	0.00216	-0.00173	0.00223	-0.00088	0.00226	-0.00354*	0.00209
JA*Day Dummy	0.00215	0.00227	0.00024	0.00283	-0.00004	0.00273	-0.00045	0.00239
JTH*Day Dummy	0.00098	0.00275	-0.00375	0.00507	0.00252	0.00253	0.00157	0.00314
Durbin Watson test DW	1.992372		1.993191		1.994639		2.000036	
Breusch–Pagan test prob	0		0		0		0	
Serial Correlation LM Test prob.	0.2738		0.0864		0.4656		1	

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the event, Pos_3 indicates three days after the event, MUH is a dummy variable which takes value of 1 for month of Muḥarram zero otherwise, SAF is a dummy variable which takes

value of 1 for month of Safar zero otherwise, SHA is a dummy variable which takes value of 1 for month of Sha'aban zero otherwise, SHW is a dummy variable which takes value of 1 for month of Shawwal zero otherwise, RA is a dummy variable which takes value of 1 for month of Rabi' al-awal zero otherwise, RAJ is a dummy variable which takes value of 1 for month of Rajab zero otherwise, RAM is a dummy variable which takes value of 1 for month of Ramaḍan zero otherwise, DQ is a dummy variable which takes value of 1 for month of Duh al-Qidah zero otherwise, RTH is a dummy variable which takes value of 1 for month of Rabi' al-thani zero otherwise, JA is a dummy variable which takes value of 1 for month of Jumada al-awal zero otherwise, JTH is a dummy variable which takes value of 1 for month of Jumada al-thani zero otherwise, Day dummy indicates four dummy variables for event day, post day one, post day two and post day 3. Day dummy for event day takes value of 1 event day zero otherwise, Day dummy for post day event one takes value of 1 for one day after the event zero otherwise, Day dummy for post day event two takes value of 1 for one day after the event zero otherwise, Day dummy for post day event three takes value of 1 for one day after the event zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Terrorism Events with at least 10 Causalities

The following Tables provides the impact of terrorism events on the conventional and Islamic equity market returns based on the sample of events with at least 10 causalities.

Table 6.19: Terrorism Events and Stock Market using OLS Regression

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.10819***	0.03209	-0.03669	0.084448
Neg1	0.00096	0.00061	0.001346	0.000668
Neg2	0.00097	0.00059	0.00029	0.00085
Neg3	0.00046	0.00069	0.001009	0.000879
Event day	-0.00003	0.00063	0.00031	0.000711
Pos1	0.00036	0.00065	0.001254	0.000862
Pos2	0.00095	0.00065	0.00027	0.00085
Pos3	0.00076	0.00060	0.000837	0.000625
Durbin Watson test DW	2.004348		1.999591	
Breusch–Pagan test prob.	0		0	
Serial Correlation LM Test prob.	1		1	

Note: Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the event, Pos_3 indicates three days after the event and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.20: Terrorism Events and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.164909***	0.025182	-0.03406	0.052406
Neg1	0.000799	0.000538	0.00147	0.001063
Neg2	0.000880*	0.000523	0.000644	0.001071
Neg3	0.000299	0.000559	0.000512	0.001192
Event day	0.000953*	0.000532	0.000706	0.001139
Pos1	0.000104	0.000474	0.001556	0.00113
Pos2	0.000917*	0.000533	0.000867	0.001014
Pos3	0.000088	0.000615	0.001021	0.001158
Variance Equation				
C	0.000008***	0.000001	0.00012***	0.00002
RESID(-1)^2	0.147411***	0.016900	0.14487***	0.02486
GARCH(-1)	0.776525***	0.020860	0.58412***	0.05620
Ret_{t-1}	-0.001461***	0.000144	-0.00136*	0.00074
Neg1	-0.000001	0.000007	-0.00003**	0.00001
Neg2	-0.000008	0.000006	-0.00004***	0.00001
Neg3	0.000002	0.000005	-0.00003	0.00002
Event day	0.000004	0.000006	-0.00002	0.00002
Pos1	-0.000007	0.000005	-0.00001	0.00001
Pos2	0.000015***	0.000005	-0.00004***	0.00001
Pos3	0.000005	0.000006	-0.00004*	0.00002

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the event, Pos_3 indicates three days after the event and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.21: Terrorism Target Types and Stock Market using OLS Regression

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.111938***	0.032191	-0.033929	0.084933
Armed Forces	0.002023**	0.000875	0.002748***	0.001023
Business	-0.001783	0.00241	-0.001845	0.002139
Educational Ins.	-0.01331***	0.003516	-0.016543***	0.004536
Government	-0.000236	0.002161	0.000238	0.002411
Private Citizen	0.001113	0.001084	0.001141	0.001147
Religious Figures	0.00114	0.001752	0.001876	0.001876
Other Attacks	-0.000416	0.00182	-0.000366	0.001886
Durbin Watson test DW	2.015462		2.007574	
Breusch–Pagan test prob.	0		0	
Serial Correlation LM Test prob.	1		1	

Note: C indicates the intercept term for the equation, $Ret_{t-1,}$ indicate the one period lagged return. Armed Forces is a dummy variable which takes value of 1 for any terrorist attack where target of attack is armed forces zero otherwise, Business is a dummy variable which takes value of 1 for any terrorist attack where target of attack is business places zero otherwise, Educational Institutes is a dummy variable which takes value of 1 for any terrorist attack where target of attack is educational institute zero otherwise, Government is a dummy variable which takes value of 1 for any terrorist attack where target of attack is government offices zero otherwise, Private citizens is a dummy variable which takes value of 1 for any terrorist attack where target of attack is private citizen zero otherwise, Religious figures is a dummy variable which takes value of 1 for any terrorist attack where target of attack is any religious figure or institute zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.22: Terrorism Target Types and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.177199***	0.024886	0.156210***	0.026040
Armed Forces	0.001786**	0.000908	0.002427**	0.001041
Business	0.001027	0.001862	0.001615	0.001904
Educational Ins.	-0.01513***	0.005865	-0.016767***	0.005871
Government	0.002124	0.001694	0.001364	0.001938
Private Citizen	0.001703	0.001277	0.001663	0.001198
Religious Figures	-0.0004	0.002394	0.000330	0.002031
Other Attacks	-0.00017	0.0011	0.000077	0.001036
Variance Equation				
C	0.000008***	0.000001	0.000008***	0.000001
RESID(-1)^2	0.140393***	0.016375	0.144341***	0.009833
GARCH(-1)	0.782639***	0.020067	0.809187***	0.008257
Ret_{t-1}	-0.001521***	0.000154	-0.001539***	0.000144
Armed Forces	0.000001	0.000004	0.000004	0.000005
Business	-0.000009	0.000014	-0.000018	0.000013
Educational Ins.	0.000031	0.000050	0.000068	0.000063
Government	-0.000001	0.000011	0.000003	0.000012
Private Citizen	0.000002	0.000006	-0.000004	0.000006
Religious Figures	0.000032***	0.000012	0.000028**	0.000012
Other Attacks	0.000007	0.000008	-0.000010	0.000007

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Armed Forces is a dummy variable which takes value of 1 for any terrorist attack where target of attack is armed forces zero otherwise, Business is a dummy variable which takes value of 1 for any terrorist attack where target of attack is business places zero otherwise, Educational Institutes is a dummy variable which takes value of 1 for any terrorist attack where target of attack is educational institute zero otherwise, Government is a dummy variable which takes value of 1 for any terrorist attack where target of attack is government offices zero otherwise, Private citizens is a dummy variable which takes value of 1 for any terrorist attack where target of attack is private citizen zero otherwise, Religious figures is a dummy variable which takes value of 1 for any terrorist attack where target of attack is any religious figure or institute zero otherwise, Other attacks is a dummy variable which takes value of 1 for any terrorist attack other than previously mentioned zero otherwise, and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.23: Terrorism Location and Stock Market using OLS Regression

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.111471***	0.032258	-0.034821	0.084965
Karachi	0.002276	0.003362	0.00334	0.002911
Financial City	-0.000045	0.002718	0.001241	0.00243
Large City	-0.001584	0.001375	-0.001757	0.001517
FATA	0.002728***	0.001042	0.003215**	0.001276
Kashmir	-0.004926	0.003359	-0.002144	0.002936
Other Locations	0.001120	0.000850	0.001548*	0.000919
Durbin Watson test DW	2.006953		2.003403	
Breusch–Pagan test prob.	0		0	
Serial Correlation LM Test prob.	1		1	

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Karachi is a dummy variable which takes the value of 1 for any terrorist attack happening in Karachi zero otherwise, Financial city is a dummy variable which takes the value of 1 for any terrorist attack happening in financial cities zero otherwise, Large city is a dummy variable which takes the value of 1 for any terrorist attack happening in large cities zero otherwise, FATA is a dummy variable which takes the value of 1 for any terrorist attack happening in FATA zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.24: Terrorism Location and Stock Market using GARCH (1,1)

	Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**
Mean Equation				
Ret_{t-1}	0.114684***	0.043449	-0.02707	0.062074
Karachi	0.003015	0.005268	0.003687	0.007936
Financial City	0.000466	0.002761	0.001154	0.004069
Large City	-0.00079	0.001807	-0.00135	0.002475
FATA	0.003339*	0.00173	0.003383	0.002837
Kashmir	-0.00506	0.18666	-0.00232	0.86275
Other	0.00154	0.001352	0.001952	0.002582
Variance Equation				
C	0.00007***	0.00002	0.000118***	0.000027
RESID(-1)^2	0.12410***	0.04422	0.137603***	0.028733
GARCH(-1)	0.54902***	0.12578	0.576617***	0.089136
Ret_{t-1}	-0.00119**	0.00059	-0.000850	0.001032
Karachi	-0.00005	0.00006	-0.000127**	0.000063
Financial City	-0.00007*	0.00004	-0.000172***	0.000042
Large City	-0.00003	0.00002	-0.000096***	0.000036
FATA	-0.00004***	0.00001	-0.000095***	0.000026
Kashmir	-0.00011	0.00045	-0.000168	0.000807
Other	-0.00004**	0.00002	-0.000019	0.000031

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return. Karachi is a dummy variable which takes the value of 1 for any terrorist attack happening in Karachi zero otherwise, Financial city is a dummy variable which takes the value of 1 for any terrorist attack happening in financial cities zero otherwise, Large city is a dummy variable which takes the value of 1 for any terrorist attack happening in large cities zero otherwise, FATA is a dummy variable which takes the value of 1 for any terrorist attack happening in FATA zero otherwise, Other cities is a dummy variable which takes value of 1 for any terrorist attack happening in the cities other than previously mentioned zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.25: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (Event Day/ POS Day1)

	Event Day Effect				POS Day 1 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.09710***	0.03232	-0.045573	0.085624	0.09875***	0.03252	-0.04211	0.07984
NEG1	0.00068	0.00063	0.000930	0.000700	0.00067	0.00062	0.00102	0.00070
NEG2	0.00069	0.00062	-0.000165	0.000866	0.00070	0.00062	0.00001	0.00084
NEG3	0.00021	0.00071	0.000597	0.000885	0.00021	0.00071	0.00068	0.00099
EVENTDAY	-0.00117	0.00196	-0.001833	0.002537	-0.00027	0.00067	-0.00009	0.00072
POS1	0.00006	0.00067	0.000828	0.000875	-0.00103	0.00176	-0.00230	0.00207
POS2	0.00069	0.00066	-0.000151	0.000866	0.00067	0.00065	-0.00017	0.00084
POS3	0.00050	0.00062	0.000394	0.000664	0.00046	0.00063	0.00049	0.00069
MUH	0.00151**	0.00072	0.001341*	0.000810	0.00161**	0.00072	0.00155**	0.00076
SAF	0.00038	0.00065	0.000686	0.000736	0.00036	0.00066	0.00061	0.00087
SHA	0.00055	0.00071	0.001433*	0.000791	0.00038	0.00072	0.00156*	0.00087
SHW	-0.00036	0.00104	-0.000358	0.001072	-0.00060	0.00103	-0.00049	0.00102
RA	0.00110	0.00079	0.001668	0.001105	0.00162**	0.00075	0.00208**	0.00106
RAJ	0.00103	0.00077	0.000987	0.000819	0.00111	0.00079	0.00099	0.00077
RAM	0.00110	0.00111	0.001457	0.001137	0.00123	0.00109	0.00179	0.00118
DQ	0.00038	0.00089	0.000502	0.001010	-0.00023	0.00092	-0.00029	0.00110
RTH	-0.00023	0.00084	0.000119	0.000841	0.00013	0.00081	0.00035	0.00092
JA	-0.00011	0.00078	0.000580	0.000796	-0.00002	0.00080	0.00071	0.00098
JTH	0.00098	0.00101	0.000842	0.002098	0.00077	0.00098	-0.00040	0.00142

Continue *Table 6.25: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (Event Day/ POS Day1)*

	Event Day Effect				POS Day 1 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
MUH*Day Dummy	0.00198	0.00263	0.003209	0.003271	0.00108	0.00260	0.00198	0.00284
SAF*Day Dummy	0.00026	0.00312	0.000433	0.003800	0.00069	0.00277	0.00199	0.00265
SHA*Day Dummy	0.00071	0.00288	0.002033	0.003437	0.00200	0.00260	0.00221	0.00261
SHW*Day Dummy	0.00374	0.00270	0.005701*	0.003218	0.00550**	0.00279	0.00721*	0.00295
RA*Day Dummy	0.00241	0.00251	0.002845	0.003119	-0.00091	0.00279	0.00094	0.00312
RAJ*Day Dummy	0.00254	0.00304	0.003189	0.003453	0.00195	0.00256	0.00401	0.00296
RAM*Day Dummy	-0.00113	0.00298	0.000756	0.003495	-0.00201	0.00286	-0.00070	0.00352
DQ*Day Dummy	-0.00489	0.00386	-0.004059	0.004247	0.00074	0.00353	0.00404	0.00388
RTH*Day Dummy	0.00205	0.00260	0.002138	0.003100	0.00042	0.00261	0.00196	0.00295
JA*Day Dummy	0.00357	0.00314	0.004646	0.003516	0.00292	0.00257	0.00425	0.00273
JTH*Day Dummy	-0.00030	0.00324	0.000187	0.004440	0.00152	0.00357	0.01042	0.00754
Durbin Watson test DW	2.006967		2.000505		1.994821		1.989313	
Breusch–Pagan test prob	0		0		0		0	
Serial Correlation LM Test prob.	0.2487		1		0.4518		0.0229	

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the

event, Pos_3 indicates three days after the event, MUH is a dummy variable which takes value of 1 for month of Muḥarram zero otherwise, SAF is a dummy variable which takes value of 1 for month of Safar zero otherwise, SHA is a dummy variable which takes value of 1 for month of Sha'aban zero otherwise, SHW is a dummy variable which takes value of 1 for month of Shawwal zero otherwise, RA is a dummy variable which takes value of 1 for month of Rabi' al-awal zero otherwise, RAJ is a dummy variable which takes value of 1 for month of Rajab zero otherwise, RAM is a dummy variable which takes value of 1 for month of Ramaḍan zero otherwise, DQ is a dummy variable which takes value of 1 for month of Duh al-Qidah zero otherwise, RTH is a dummy variable which takes value of 1 for month of Rabi' al-thani zero otherwise, JA is a dummy variable which takes value of 1 for month of Jumada al-awal zero otherwise, JTH is a dummy variable which takes value of 1 for month of Jumada al-thani zero otherwise, Day dummy indicates four dummy variables for event day, post day one, post day two and post day 3. Day dummy for event day takes value of 1 event day zero otherwise, Day dummy for post day event one takes value of 1 for one day after the event zero otherwise, Day dummy for post day event two takes value of 1 for one day after the event zero otherwise, Day dummy for post day event three takes value of 1 for one day after the event zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance.

Table 6.26: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (POS Day 2/ POS Day3)

	POS Day 2 Effect				POS Day 3 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Ret_{t-1}	0.10572***	0.03241	-0.03758	0.08307	0.104079***	0.032284	-0.038308	0.085043
NEG1	0.00064	0.00062	0.00079	0.00070	0.000773	0.000621	0.001007	0.000696
NEG2	0.00067	0.00063	-0.00018	0.00087	0.000700	0.000616	-0.000144	0.000873
NEG3	0.00004	0.00071	0.00055	0.00089	0.000119	0.000704	0.000550	0.000887
EVENTDAY	-0.00029	0.00066	-0.00018	0.00075	-0.000298	0.000655	-0.000133	0.000745
POS1	0.00011	0.00067	0.00088	0.00088	0.000105	0.000667	0.000830	0.000868
POS2	-0.00243	0.00230	-0.00215	0.00226	0.000616	0.000652	-0.000165	0.000862
POS3	0.00054	0.00063	0.00052	0.00067	0.003453*	0.002029	0.002592	0.001899
MUH	0.00172**	0.00071	0.00161**	0.00081	0.001798**	0.000720	0.001512*	0.000803
SAF	0.00015	0.00067	0.00028	0.00076	0.000478	0.000673	0.000617	0.000757
SHA	0.00037	0.00073	0.00121	0.00081	0.000710	0.000719	0.001697**	0.000802
SHW	0.00077	0.00093	0.00068	0.00099	-0.000741	0.001048	-0.000670	0.001092
RA	0.00135*	0.00081	0.00166	0.00110	0.001553	0.000761	0.002345**	0.001084
RAJ	0.00150**	0.00079	0.00138	0.00082	0.001197	0.000764	0.001195	0.000817
RAM	0.00016	0.00106	0.00072	0.00110	0.000928	0.001101	0.001407	0.001127
DQ	-0.00058	0.00095	-0.00047	0.00105	-0.000034	0.000916	-0.000008	0.001036
RTH	0.00038	0.00086	0.00048	0.00087	0.000181	0.000853	0.000422	0.000865
JA	0.00011	0.00079	0.00071	0.00079	0.000183	0.000804	0.000801	0.000811
JTH	0.00042	0.00103	0.00114	0.00192	0.000316	0.001009	0.000082	0.002080

Continue *Table 6.26: Terrorism Events and Stock Market during Islamic Calendar Months using OLS Regression (POS Day 2/ POS Day3)*

	POS Day 2 Effect				POS Day 3 Effect			
	Conventional		Islamic		Conventional		Islamic	
Variable	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
MUH*Day Dummy	0.002098	0.003175	0.00076	0.00315	-0.004735*	0.002735	-0.002605	0.003036
SAF*Day Dummy	0.004982*	0.002992	0.00482	0.00306	-0.005029*	0.002604	-0.003239	0.002877
SHA*Day Dummy	0.004172	0.002826	0.00377	0.00291	-0.004198	0.002857	-0.003703	0.002875
SHW*Day Dummy	-0.00194	0.004055	-0.00168	0.00404	0.001526	0.002844	0.002643	0.002699
RA*Day Dummy	0.003073	0.002638	0.00320	0.00288	-0.004386	0.002847	-0.005515	0.002759
RAJ*Day Dummy	0.000703	0.00307	-0.00001	0.00321	-0.002951	0.003255	-0.00274**	0.003214
RAM*Day Dummy	0.007382**	0.003683	0.00604	0.00371	-0.004316	0.002777	-0.003194	0.003008
DQ* Day Dummy	0.006368**	0.002944	0.00543	0.00345	-0.005305	0.003698	-0.003598	0.003474
RTH*Day Dummy	0.001264	0.002744	0.00066	0.00271	-0.003909	0.002590	-0.003352	0.002448
JA*Day Dummy	0.003571	0.003385	0.00343	0.00347	-0.003220	0.002900	-0.001712	0.002900
JTH*Day Dummy	0.006428**	0.003043	-0.00197	0.00710	0.001042	0.003091	0.002122	0.003650
Durbin Watson test DW	2.000242		1.993087		2.002381		2.001565	
Breusch–Pagan test prob	0		0				0	
Serial Correlation LM Test prob.	1		0.1095		0.6771		0.6757	

Note: C indicates the intercept term for the equation, Ret_{t-1} indicate the one period lagged return, Neg_1 indicates the one day before the event day, Neg_2 indicates two days before the event day, Neg_3 indicates three days before the event, Event day indicates the day event happened, Pos_1 indicates one day after the event, Pos_2 indicates two days after the event, Pos_3 indicates three days after the event, MUH is a dummy variable which takes value of 1 for month of Muḥarram zero otherwise, SAF is a dummy variable which takes

value of 1 for month of Safar zero otherwise, SHA is a dummy variable which takes value of 1 for month of Sha'aban zero otherwise, SHW is a dummy variable which takes value of 1 for month of Shawwal zero otherwise, RA is a dummy variable which takes value of 1 for month of Rabi' al-awal zero otherwise, RAJ is a dummy variable which takes value of 1 for month of Rajab zero otherwise, RAM is a dummy variable which takes value of 1 for month of Ramaḍan zero otherwise, DQ is a dummy variable which takes value of 1 for month of Duh al-Qidah zero otherwise, RTH is a dummy variable which takes value of 1 for month of Rabi' al-thani zero otherwise, JA is a dummy variable which takes value of 1 for month of Jumada al-awal zero otherwise, JTH is a dummy variable which takes value of 1 for month of Jumada al-thani zero otherwise, Day dummy indicates four dummy variables for event day, post day one, post day two and post day 3. Day dummy for event day takes value of 1 event day zero otherwise, Day dummy for post day event one takes value of 1 for one day after the event zero otherwise, Day dummy for post day event two takes value of 1 for one day after the event zero otherwise, Day dummy for post day event three takes value of 1 for one day after the event zero otherwise and *,**,*** indicates ten percent, five percent and one percent level of significance