Advance Social Science Archive Journal
Available Online: https://assajournal.com
Vol.2 No.4, Oct-Dec, 2024. Page No. 1013-1029
Print ISSN: 3006-2497 Online ISSN: 3006-2500
Platform & Workflow by: Open Journal Systems

EVALUATING STOCK MARKET PERFORMANCE IN LIGHT OF TERRORISM: AN EMPIRICAL EVIDENCE FROM PAKISTAN

Zeeshan Rasheed	Lecturer Economics, Department of Economics, University of Sargodha
	Email: zeeshan.rasheed@uos.edu.pk
Muhammad Yasir	Ph.D. Scholar, Department of Economics, University of Sargodha
	Email: dastagherahmad@gmail.com

ABSTRACT

This study investigated the effect of terrorism and other key macroeconomic indicators on stock market in Pakistan. Monthly dataset has been utilized for empirical analysis from January 2007 to December 2020. The empirical model consists of Karachi Stock Market 100 Index as outcome variable while terrorism, real effective exchange rate and three months' treasury bills rate as explanatory variables. The study employed a few time series tests such as Augmented Dickey Fuller and Co-integration test as pre-estimation formalities of time series data. Due to different orders of integration, the application of Auto Regressive Distributed Lag approach depicted that terrorism and treasury bills rate have significant and negative influences whereas real effective exchange rate has positive and significant influence on Stock market in the short run as well as in the long run. This study suggests that the negative impacts of terrorism can be minimized by correct use of government policies against terrorism and army operations across the country. Govt. should keep lower rate of returns on short term treasury bills and should consider those measures which can result in higher exchange rate to enhance stock market.

Keywords: Terrorism, Stock market, Co-integration, Treasury bills, Exchange rate
JEL: E44, E58, F31, F52, F21

Introduction

Terrorism was first heard during French revolution in 18th century. That era is known as Reign of Terror from 1793 to 1794. In this era, more than 16000 people were linked with guillotine during revolutionary activities. More than 40000 prisoners were hanged without trial. Due to this era, the world is suffering from many terrorist attacks. In 1920, Wall Street explosions in United States caused of many causalities and injuries (Baker, 1994). During 1940-1956 there was observed a terrorist known as "mad bomber" who placed his explosives in thirty-three most busy places in United States. This "mad bomber" terrorized the people of USA for 16 years by this psychological game. Indonesia explosion series were also major attacks when the suicide bombers killed more than 200 people during 2002 and 2009. Madrid train bombing (2004) was also

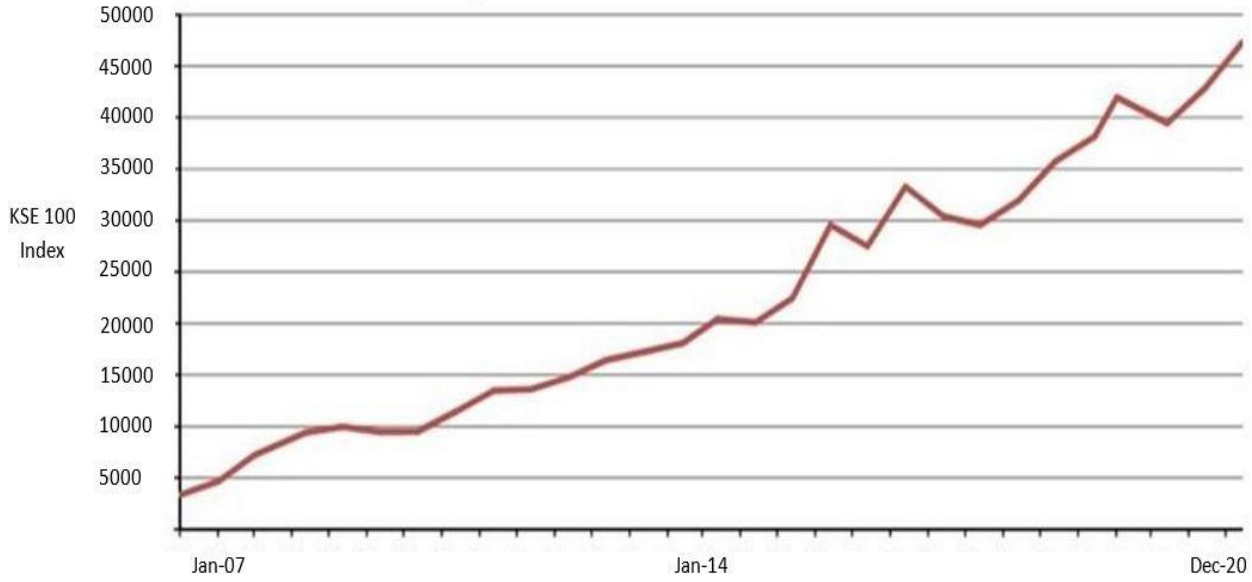
the horrible terrorist attack in which ten explosions on four different train stations shock the Capital of Spain, within only 3 minutes interval (Separovic, 2006). Almost 200 deaths and 1000 injuries were reported in that incident. A most serious attack was recorded on USS Cole against United States Navy. The Ship of United States was harbored of Yemen Port to refuel in 2000. About after one year of Madrid explosions the suicide bombers tried to damage the London train system. Three suicide bombers attacked different train stations within fifty seconds. This attack reported 56 casualties and 700 injuries (Larabee, 2003).

The most terrible attack was made on 9 September 2001 when hijackers took control over planes into the twin towers of World Trade Center and Washington D.C within 45 minutes. After this sorrowful event the stock market was closed for 4 days. After 9/11 Pakistan announced war on terror. Exact after this announcement, Pakistan suffered lots of terrorist attacks such as suicide bombings, hostage taking and political personality's assassinations. All these activities of terrorism are destroying the social, political and economic structure of Pakistan's society. It is a great threat for law-and-order situation in Pakistan. All these types of attacks interrupt not only our domestic life but they also disturb the social life of the country. It influences the trading behavior of the country and raises the cost of production. It results in a prominent hindrance in completing the exports order around the world. By showing this inefficiency, Pakistani goods lose their market share in the international market with the competitors. Furthermore, terrorism generates uncertainty, condenses confidence which increases threat sensitivity. All these situations lead to low investment, consequently the employment rate goes down. Owing to unemployment, the living standards become immensely reduced, which causes poverty and low GDP of the country and finally the economy goes down rapidly. Owing to security threat and uncertain political situations, the foreign financiers quickly cease the investment projects in Pakistan. Consequently, Pakistani businessmen prefer to save money or to transfer their money in foreign countries such as United Kingdom, United States of America, and United Arab Emirates. So, all the money which was to be invested in Pakistan is being invested to the foreign countries. Due to the lowest future flow of investment, growth of the economy almost stops in that vicinity in which terrorism occurs. With the economic cost of terrorism, no sector remains unaffected through terrorism. Law and order situation is threatening for the government. It increased the expenses of military, police and other official institutions. Owing to war on terror on Afghanistan border, 3 million Internally Displaced People (IDP) have increased the expenditure of administration because of rehabilitation. Fiscal development has been affected by bearing expenditure on building up society and introduced the development programs for growth. It causes low standards of living, deprived health, inadequate education facilities and extensive aspects of susceptibility (Silke, 2008).

To reduce market fragmentation and to generate strong strategic partnerships for offering technological assistance and proficiency, all stock exchanges were converted into a single Pakistan Stock Exchange on January 11, 2016. The Securities and Exchange Commission of Pakistan approved this emergence through

Demutualization and Integration Act 2012. According to experts, this act will lead to more economic progress with a rising stock exchange. It will pave the way for foreign financial investment towards Pakistan. The process of demutualization is not new. Before this action in Pakistan, many large stock exchanges were demutualized and integrated to achieve rising and strong economy. Most of developed economies merged their stock exchanges such as Malaysia, Hong Kong, Singapore and India. During last financial years, Pakistan Stock Market grew exponentially. It can be seen in the figure 1.1 that the Stock Exchange has rising trend. The root cause of this rapid growth is foreign investment. China is investing 40 percent in Pakistan Stock Exchange through Pak China consortium.

Figure 1.1 Trends in KSE 100 Index



Regional changes after instability in Afghanistan due to 9/11 affected adversely to Pakistan economy. After nine-eleven there was a sudden increase in attacks. due to instability in Pakistan many foreign investors stop investing on existing projects because foreign investors have serious threat of terrorism for their investment. So, they think Pakistan is unsafe for investing money. Because of bad image of Pakistan around the globe, Pakistani exports restrained. Domestic as well as foreign investors start investing in other developed and safe countries. All the money, which was being invested in Pakistan, goes out that spoil the economy. Due to sudden pause of the existing projects, many people became jobless and have no contribution to Gross National Production. Resultantly, Gross Domestic Production became low. Pakistan also suffered loss in terms of compensation to affected entities, renovation of physical infrastructure, mental health stability and cost of uncertainty. In the table 1.1 estimated losses are explained after 9/11 where the estimated loss is dramatically increasing after 2001. It reached thousands of billions from 2009 to 2012.

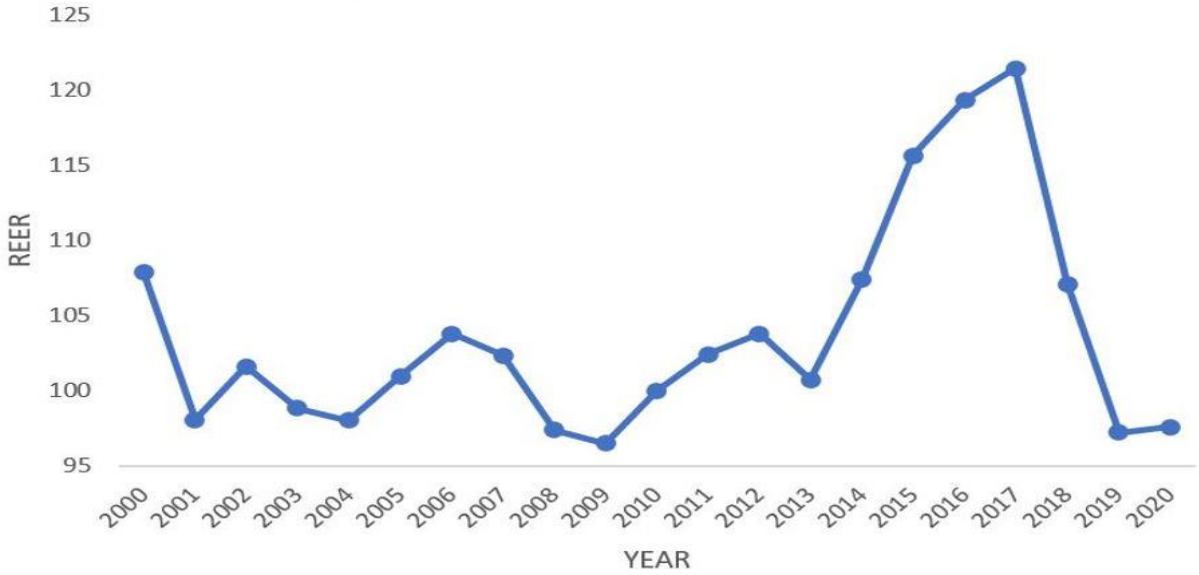
Table 1.1: Estimated Losses during 2001-2016			
Years	**Billion$**	**Billion RS**	**%Change**
2001-02	2.67	163.90	-
2002-03	2.75	160.80	3.0
2003-04	2.93	168.80	6.7
2004-05	3.41	202.40	16.3
2005-06	3.99	238.60	16.9
2006-07	4.67	283.20	17.2
2007-08	6.94	434.10	48.6
2008-09	9.18	720.60	32.3
2009-10	13.56	1136.40	47.7
2010-11	23.77	2037.33	75.3
2011-12	11.98	1052.77	-49.6
2012-13	9.97	964.24	-16.8
2013-14	7.70	791.52	-22.8
2014-15	9.24	936.30	20.0
2015-16	5.55	578.20	-39.9
Total	118.32	9869.16	-8

Real Effective Exchange Rate is a method of weighted average of a county's currency relative to other country's currency, taking into consideration of inflation. Figure 1.2 represents the real exchange rate in the specific period. The Real exchange rate comes down to its lowest level in 2009. There are three possible relationships of the stock market index and Real Exchange Rate. Stock market index grows with the increase of Real Effective Exchange Rate. When the exchange rate goes up, the domestic currency depreciates. Due to currency depreciation, the local markets have become more competitive. This market competitiveness leads to an increase in exports. Even exports go up, this leads to high stock prices. When the exchange rate goes down, the domestic currency appreciates. Due to appreciation, the foreign products become cheaper. So, foreign products are easy to approach, which leads to an increase in imports. Because of less exports stock prices become low. The third possible relationship is weak or there is no association between the stock market index and exchange rate. Any factor or news which affects today's exchange rate can be different from that factor which causes a change in stock prices. In this scenario, there exists no relationship between these two variables (Muhammad et al., 2002).

[1]

[1] **Source**: Statistical Bulletin of State Bank of Pakistan

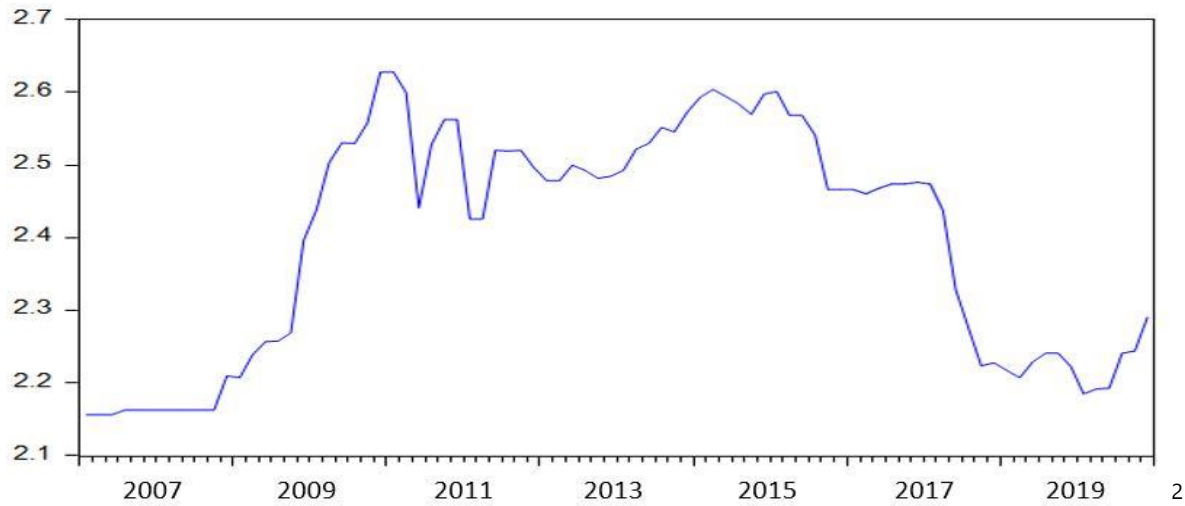
Figure 1.2 Real Effective Exchange Rate (2000-2020)



Treasury bills are short-term investment instruments, issued by the State Bank of any Government which is a risk-free investment. Whenever the government wants to control the money supply, it sells short term securities through Open Market Operation (OMO), named Treasury Bills. It has a specific rate of return.

At maturity period, the government must pay a fixed amount of return/profit on it. Owing to risk-free investment, these are to be secured by the government, even if they are going bankrupt, or bound to pay a precise amount of profit. The figure 1.3 shows the trend of three months treasury bills rate. The treasury bills rate reaches its peak in 2008.

Figure 1.3 Three Months Treasury Bills Rate (2007-2020)



There are many other factors which must be taken under observation. It includes reimbursement of distressed parties, demolished private transportation and expenses, cost of displacement of inhabitants, into link with psychological cost in case of trauma,

[2] **Source**: Statistical Bulletin of State Bank of Pakistan

loss of beloved ones, and mental sickness. Due to terrorism, Pakistan's economy is suffering from heavy loss. The impacts of terrorism on the stock exchange market are expected to be worse. Owing to terrorist activities, market shares start falling and people avoid investing in the share market because of political instability and uncertainty. So, it is worth investigating the influence of terrorism on the stock market index. The purpose of this study is to explore the effects of Terrorism and other key determinants like real effective exchange rate and treasury bills rate on Stock Market in Pakistan. There exists a lack of literature which exposes the relationship between the stock market and terrorism. Furthermore, complete study of literature shows that there are no studies which show the nexus of stock market, terrorism and major macroeconomic variables. This study will be helpful in making an exclusive contribution to literature with reference to stock market, terrorism and macroeconomic variables.

Literature Review

Laborda and Olmo (2021) assessed the effect of terrorist activities on the return of Spanish stock market. An index for a daily terror was developed that can reflect domestic as well as international terrorist activities associated with Islamic extremism. The estimates uncovered the truth that there are spillover effects between domestic and international terrorist activities and, both have adverse impact over the stock market returns. Arif and Suleman (2017) accessed the impact of terrorist activities on stock market prices in Karachi Stock Exchange (KSE). In the case of different sectors of the economy, the results provided evidence of mixed positive and negative effect on stock market prices. The results uncovered the long run relationship between financial flaws and terrorism. Hassan and Hashmi (2015) highlighted the relationship between terrorism and the response of investors at Capital Market of Pakistan. When any type of terrorist activity occurred in the country, an extensive wave of political instability found there, which caused less confidence level of investors in capital market. Owing to lack of confidence, national and international investors invested a smaller amount or stopped investing in the stock market. Hyder et al. (2015) examined the impact of terrorism on economic development in Pakistan. The objectives of that study were to see the effects of terrorism as an outcome of Afghan War. After Afghan war many conflicts evolved in the society, like sectarian, ethnic, spiritual and linguistic conflicts. This study showed that how all these conflicts affected the socio-economic structure of Pakistan. The results of this study showed that in long run, population growth rate and terrorism were negatively associated with the economic growth of Pakistan. Ahmed et al. (2014) investigated the risk of terrorism on the Pakistani industrial and non-financial companies of KSE from January 2001 to December 2010. The study concludes the negatively significant impact for eleven out of twenty-seven non-financial companies. But transportation, tobacco and automobiles were the most affected companies in Pakistani industry by terrorist activities. Farooq and Khan (2014) examined the impact of terrorism on foreign direct investment (FDI) and other key indicators of development of Pakistan. The results showed that the cost

of terrorism was much higher than expected. America used Pakistan for his so-called nationwide advantage, but Pakistan economy faced massive losses such as low small farming production, no right of entry to European market for Pakistani products, dying manufacturing sector, high ratio of public debt, no solution of Kashmir Dispute, human loss in terrorist activities, less power of law enforcing agencies and also low standard of living in society. Fatima et al. (2014) assessed the impacts of terrorism on economic growth in Pakistan and India. The results showed that the terrorist activities affected the real GDP growth rate of the country negatively. In case of India, the terrorist attacks didn't have significant effect on real GDP growth of the country because it was a middle-income country. This study revealed that the developing countries having high income didn't have significant effect of terrorist activities on real GDP growth.

Kinyanjui (2014) examined the impact of terrorism on Foreign Direct Investment (FDI) in Kenya. The results conclude that there was a negative relationship between terrorism and FDI. Mehmood et al. (2014) tried to explore the impact of terrorist attacks on Karachi Stock Exchange Pakistan. The objective of the study was to find the impacts of three major terrorist attacks on Karachi Stock Exchange (KSE) during the decade (2001- 2010). These attacks were the Benazir Bhutto's assassination, Marriot Hotel Attack and Darra Adam Khel Attack. The Marriott hotel attacks and Benazir Bhutto assassination attack showed the decline in KSE followed by the recovery of 2 or 3 days while, Dura Adam Khel attack had slightly negative impact on Karachi Stock Exchange.

Anwar and Mughal (2013) investigated the relationship of foreign financial flows and terrorism in developing countries. The research study concluded that there exists a negative relationship between financial flows and terrorism. The results also unveiled that the Foreign Direct Investment (FDI) falls significantly in response of terrorist activities. Portfolio investment and exports showed a little bit of change. On the contrary, the migrant remittances demonstrate a noteworthy boost. These differences occurred based on regions and countries.

Kollias et al. (2013) explored the relationship between the terrorist attacks and the stock markets. The results for that study showed that the size and maturity of the terrorist attacks was a possible determinant for the reaction of stock market whether that was small or large. Kumar and liu (2013) explored the effects of terrorist activities on global capital markets. To understand the impact of terrorist attacks on the global economy, this study indicated top 20 trading partners, and the others were classified as non-trading partners. When a trading partner of the country faced attack, the stock market adversely responded. If a non-trading partner of a country faced attack, the stock market didn't respond adversely. This study revealed the spillover effects of terrorism on global stock markets. Ahmad and Majeed (2013) discovered the effect of terrorism on the world geography, especially on Pakistan. The terrorism in major cities had negatively and significantly impact on Net Foreign Direct Investment (NFDI) of Pakistan. While the terrorist

attacks in the remote and medium areas had no significant impact on Net Foreign Direct Investment (NFDI) of Pakistan.

Aurangzeb et al. (2012) investigated the effect of terrorism on stock returns. The estimation through regression analysis revealed the negative relationship between stock returns and terrorist activities. Qaiser et al. (2012) explored the impact of terrorism on financial market of Pakistan. The results showed stock market prices along with the exchange rate are negatively and significantly affected. Suleman (2012) explored the reaction of stock market due to terrorist attacks. The results showed the negative impacts on the stock markets due to the terrorist attacks. Blomberg et al. (2011) explored the relationship between terrorism and the economics of trust. The result showed that terrorism has significant negative effects on society. War and terrorism affect negatively the individual income of different countries.

Brounrn and Derwall (2010) conducted a study to check the impact of terrorist attacks on international stock markets. The results showed that the stock market price reaction because of terrorism was strongest for the local markets and for industries. Chasney et al. (2010) assessed the impact of terrorism on financial markets. This study suggested many strategies for avoiding the problems regarding the terrorist activities. If there was a threat of terrorist attacks, the financier must hold the asset instead of investing on bonds. Christofis et al (2010) examined the effect of different terrorist actions on Istanbul Stock Market Turkey. The attack of 1990 had a negative effect on the returns of all the indices of capital market except different sectors like banks, industry and trade. Bomb blasts in 2003 had an overwhelming effect on the Istanbul Stock Exchange Market. In the attacks of 2008, there was no significant effect on the Istanbul Stock Exchange.

Karolyi and Martell (2010) examined the impact of terrorism on the stock market. This study utilized the period covering from 1995 to 2003. This period was known as the most terrorism affected era in which terrorism related firms were publicly affected in the world. The results revealed that the stock price reaction depended on the country which was attacked. The more affluent countries had severe and prolonged negative stock price reactions. In short, the evidence of a statistically negative impact was found on the stock market. Hussain et al. (2010) analyzed the relationship between the terrorist attacks on three financial markets, stock exchange, interbank market and FOREX market. There existed negatively significant effect of terrorism on Foreign Exchange market (FOREX) and Karachi Inter Bank Offer Rate (KIBOR). Nikkinen and Vahamaa (2010) explored the relationship between terrorism and stock market sentiment. The results showed that terrorism had a significantly negative effect on stock market volatility. It shifted the expected value of stock prices downward in reaction of terrorist activities. Enonmoto et al (2009) analyzed the impacts of terrorism on the stock exchange returns specifically in Karachi Stock Exchange and Tehran Stock Exchange. The results showed negatively significant effect on Karachi Stock Exchange regarding USS Cole, the

World Trade Center attack, London attacks and Iraq war. The empirical result showed that Stock Markets were negatively affected by the terrorist actions.

Sohail and Hussain (2009) explored the short-run and long-run relationship between macroeconomic variables and stock prices of Lahore Stock Exchange in Pakistan. The empirical results showed that consumer price index and three months treasury bills affected negatively to the stock prices in Pakistan. Furthermore, the industrial production index, the real effective exchange rate and money supply affected positively to stock prices. Spilerman and Stecklov (2009) assessed the impact of terrorism on civilian society in Western Europe after September 9, 2001. That descriptive study showed the results that a very different formulation was required for the case of chronic terrorism for the one-time attack.

Gaibulloev and Sandler (2008) explored the relationship of terrorism and conflicts on growth of Asia. Through estimation the results showed that the developed Asian countries were not much affected by the terrorist activities. In case of developing Asian countries, there was less ability to bear the shocks of terrorism without having adverse effect on the economy. Charles and Darne (2006) explored the relationship between the large shocks and the September 11 terrorist attacks on international stock market. The results showed that the international stock markets bear large shocks that could be permanent or temporary. These events mostly affected the macroeconomic variables. Johnston and Nedelescu (2005) explored the effect of terrorism on financial markets of the world. This study analyzed the indirect economic cost of terrorism. The indirect cost included the destruction of consumer and investor confidence over the companies. It affected the whole economy through less confidence of investors. The results showed that the financial markets of the developed countries were strong enough to absorb the shocks of terrorist attacks. The location of attacks in major areas caused a widespread disaster to the economy's financial market. On the other hand, the financial markets of the less developed countries caused more economic losses. Eldor and Melnick (2004) explored the relationship between financial markets and terrorism. After intensified terrorist attacks on Palestine on September 27, 2000, the negative effect was seen on stock market but not on foreign market. Economic liberalization policies were not affected by these terrorist activities. Suicide attacks had significantly negative effects on stock markets of the country. Location of the terrorist attack had no effect on stock market. In short, the financial markets didn't allow the performance of the economic functions with full competence. Chaudhuri and Sensarma (2001) explored the impact of terrorist attacks on September 11, 2001, in USA. The objective of this study was to check the impact of U.S terrorist attack on financial markets, foreign exchange markets, commodity markets and many other macroeconomic variables. By using slope dummy and intercept dummy, the regression results revealed that the effect of the terrorist attack on stock prices are short term while the effect on exchange rates are continual. Stock returns were negatively significant for all countries' stock market. This study also unveiled that the exchange rate behaves more severely for developing economies instead of developed countries. This

literature concludes that financial flows and terrorism are negatively related in Pakistan. Stock market index and Foreign Direct Investment (FDI) are most affected variables due to terrorism and political instability.

Data and Methodology

This study utilized the monthly data covering a period from Jan-2007 to Dec-2020. Karachi Stock market 100 index appeared as dependent variable whereas Real Effective Exchange Rate (REER), three months Treasury Bills Rate (TTBR) and Dummy for Terrorism (TERR) appeared as independent variables. Dummy Variable captures the most affected duration of this period in which the economy faced the shock of terrorism. The study used Global Terrorism Database, Monthly Statistical Bulletins of State Bank of Pakistan and Stock Market Index as data collection sources. The depiction of variables used for this study is mentioned below:

$$LKSE100_t = \beta_0 + \beta_1 LREER_t + \beta_3 LTTBR_t + \beta_4 TERR_t + \varepsilon_t$$

Where:

$LKSE100_t$= Log of KSE 100 Index

TERR= dummy variable for terrorism (For Terrorism=1, otherwise=0)

$LREER_t$= Log of Real Effective Rate of Exchange

$LTTBR_t$= Log of Treasury Bills Rate

The study employed Augmented Dickey Fuller test to examine the unit root problem. After analyzing the order of integration, the study employed Auto Regressive Distributed lag and Co-integration test to find out the long run as well as short run association among variables.

An ARDL model is a type of regression that consists of lagged dependent and independent variables. Both these factors contain distinctive lags. ARDL is presented with different signs, for example, ARDL (p,q_1,q_2,……,q_k)

Where:

p = lags of outcome variable

q_1 = lags of first explanatory variable.

q_k = quantity of lags of Kth explanatory variables.

An ARDL Model can be composed as;

$$LKSE100_t = \alpha + \sum_{i=1}^{\rho} \gamma_i \; LKSE100_{t-i} + \sum_{i=0}^{\rho} ב_i \; LREER_{t-i} + \sum_{i=0}^{\rho} א_i \; LTTBR_{t-i} + \sum_{i=0}^{\rho} \varphi_i \; TERR_{t-i} + \; \varepsilon_t \qquad (1.1)$$

To determine an ARDL model, we need to determine the lags of every incorporated variable into the model. An ARDL Model can be evaluated through Standard Akaike, Schwarz and Hannan-Quinn information criteria. Even, study can utilize the Adjusted R^2 for different Ordinary Least Square regression. All the common techniques for evaluating co-integrating relationships are utilized for integration analysis, for example, Engle – Granger (1987), Johansen's Strategy (1991, 1995), Single Equation Methods, which completely incorporated altered OLS or dynamic OLS. These all-co-integrating techniques impose conditions of all variables to be integrated of order zero

but these methodologies do not suit if order of integration of two or more variables is different. To resolve this issue, Pesaran and Shin (1999) introduced a bound testing approach of an ARDL model. Co-integrating regression structure of an ARDL model can be acquired by changing over the equation (1.1) into error correction model as followed in equation (1.2):

$$\Delta LKSE100_t = \alpha + \sum_{i=1}^{\rho} \gamma_i \Delta LKSE100_{t-i} + \sum_{i=0}^{\rho} \theta_i \Delta LREER_{t-i} + \sum_{i=0}^{\rho} \pi_i \Delta LTTBR_{t-i} + \sum_{i=0}^{\rho} \tau_i \Delta TERR_{t-i} + \omega ECT_{t-1} + \varepsilon_t \quad (1.2)$$

Where:

$$ECT_{t-1} = LKSE100_{t-1} - \alpha - ב\, LREER_{t-1} - א LTTBR_{t-1} - \varphi TERR_{t-1}$$

Pesaran, Shin and Smith (2001) clarified a developed new methodology in which an ARDL model comprises of a long-run association among outcome and explanatory variables. Bounds test change by (1.3) in following.

$$\Delta LKSE100_t = \alpha + \sum_{i=1}^{\rho} \gamma_i \Delta LKSE100_{t-i} + \sum_{i=0}^{\rho} \theta_i \Delta LREER_{t-i} + \sum_{i=0}^{\rho} \pi_i \Delta LTTBR_{t-i} + \sum_{i=0}^{\rho} \tau_i \Delta TERR_{t-i} - \omega(LKSE100_{t-1} - \alpha - ב\, LREER_{t-1} - א LTTBR_{t-1} - \varphi TERR_{t-1}) + \varepsilon_t \quad (1.3)$$

To check the presence of long–run association among all variables, an ARDL demonstrates an easy test;

$$\omega = 0$$
$$ב = א = \varphi = 0$$

It indicates null hypothesis which shows absence of co-integration among the variables. The alternative hypothesis shows there exists co-integration. Anyhow, an F-test is used to check the presence or absence of co-integration. In ARDL Bounds testing, two or three basic bound values are presented, which indicate diverse values at various levels of significance. If the calculated F statistic remains greater than critical value of upper bound, it represents that there is co-integration. In other words, we can reject the null hypothesis. If the calculated F statistic is lower than lower critical bound value, it determines that there is no existence of co-integration. In other words, we can accept the null hypothesis. While, if the calculated F statistic lies between lower and upper bound critical values, it proves that the results are indecisive.

Results and Discussions

Although, ARDL methodology can be applied to both order of integration either I (0) or I (1) for data series, it is compulsory to verify that second order of integration doesn't exist in this data series. Before proceeding to the estimation, the study employed Augmented Dicky-Fuller test to check the unit root. The results of ADF test are presented in table (1.2).

Table 1.2: Unit Root Test (ADF test)						
	Level			First Difference		
Variables	Trend	Trend and Intercept	Without Trend and Intercept	Trend	Trend and Intercept	Without Trend and Intercept
LKSE100	-0.019	-1.005	1.089	-7.619*	-7.7663*	-7.567*
LREER	-1.628	-1.988	0.231	-8.941*	-8.895*	-8.994*
LTTBR	-1.554	-1.375	0.261	-7.401*	-7.574*	-7.437*
TERR	-2.036	-2.393	-1.888	-6.690*	-6.414*	-6.652*[3]

The result shows that all variables are not stationary at level, but these all are stationary at first difference with trend, with trend and intercept, and without trend and intercept. It implies that the order of integration is one I (1). Moreover, the result also shows the complete non-existence of second order of integration or greater than it. The above results of order of integration confirm that ARDL approach is useful for estimation. The ARDL Model also offers the best lagged length for the variables of model which gives appropriate results by following Akaike information criteria:

Figure 1.4 Akaike Information Criteria (Top 20 Models)

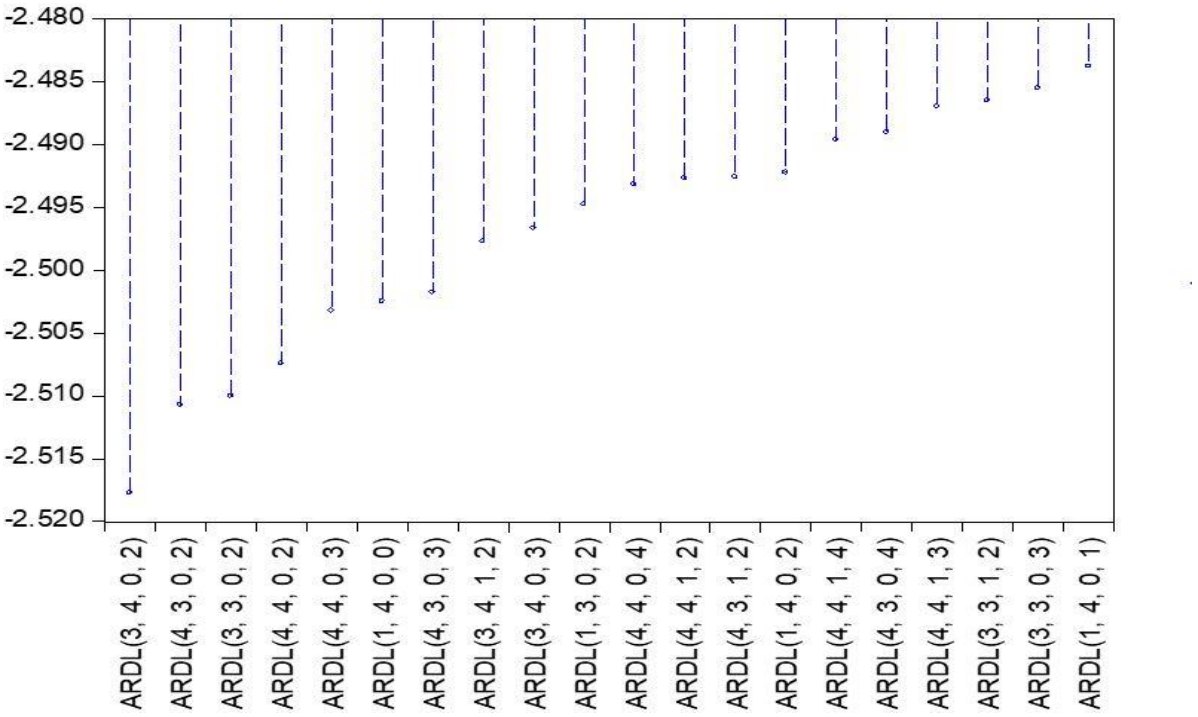


Figure 1.4 shows that ARDL (3, 4, 0, 2) is the best lagged model for this estimation. So, ARDL approach automatically selects the best optimal lagged model. Furthermore, ARDL process requires estimating equation in order to find the co-integration among

[3] Note: * represents 1% level of significance

KSE 100 Index, real effective exchange rate, three months treasury bills rate and the terrorism dummy. The results of ARDL bound testing are displayed in table 1.3.

Table 1.3: Bounds Testing Co-integration						
Panel A						
Independent Variables			F-Statistic With no trend			
LREER, LTTBR, TERR			10.89			
Panel B						
Confidence level	90 %		95 %		99 %	
Lower and Upper bounds	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Critical Values	2.72	3.77	3.23	4.35	4.29	5.61

The bounds testing results of co-integration validated the existence of co-integration when real effective exchange rate, three months treasury bills rate and terrorism are used as independent variables. The value of F-Statistic is greater than upper bound critical value at any level of significance. This shows that the alternative hypothesis cannot be rejected, and it authenticates that co-integration exists. After testing co-integration, the ARDL long run estimates are shown in table 1.4.

Table 1.4: Estimated Long Run Coefficients				
ARDL (3, 4, 0, 2) Dependent Variable (LKSE100)				
Variables	Coefficients	Standard Error	t-statistics	P-values
LREER	0.693*	1.637	2.866	0.005
LTTBR	-1.777*	0.41	-4.329	0.000
TERR	-0.828***	0.452	-1.83	0.071
C	-7.647	7.604	-1.005	0.318[4]

Table 1.4 shows the long-run static solution of estimated ARDL model. The coefficient of the Real Effective Exchange Rate is positive and significant, showing that if there is one percent increase in Real Effective Exchange Rate, the KSE 100 index will go up by 0.69 percent. It also validates the economic theory that as exchange rate rises, stock market index also rises (Muhammad et al, 2002; Sohail & Hussain, 2009; Kasman, 2003). Three months Treasury Bills also shows a significant and negative co-efficient represents that if there is a one percent increase in Treasury Bills, the KSE 100 index will reduce by 1.77 percent. Three months Treasury Bills Rate has significant negative impact on stock market index. So, as rate of three months treasury bills increases the stock market index goes down as suggested by previous study (Sohail & Hussain, 2009). In case of dummy variable representing Terrorism, if the terrorist activities take place in the country, the stock market index will go down by 0.83 percent. Due to political instability in Pakistan many foreign investors stop investing on present projects because foreign investors have to face serious threat of terrorism for their investment. So, they think that Pakistan is unsafe for investing the money. Domestic as

[4] Note: * and *** represent 1% and 10% level of significance respectively

well as foreign investors start investing in other developed and safe countries. All the money, which was being invested in Pakistan, will be withdrawn rapidly and leads to bearish behavior of the stock market index, it is also concluded by some other studies (Hassan et al, 2014; Brounrn & Derwall, 2010; Kollias et al. 2013; Aurangzeb & Dilawar, 2012; Sohail & Hussain, 2009). The short run results are estimated through the ARDL Approach. The results are shown below in table 1.5.

Table 1.5: Estimated Error Correction Model

ARDL (3, 4, 0, 2) Dependent Variable (KSE index)

Variable	Co-efficient	Standard Error	T-statistic	P. Value
$\Delta \mathbf{LKSE100}_{t-1}$	-0.036	0.111	-0.323	0.747
$\Delta \mathbf{LKSE100}_{t-2}$	-0.250**	0.110	-2.272	0.026
$\Delta \mathbf{LREER}_{t}$	1.404*	0.532	2.638	0.010
$\Delta \mathbf{LREER}_{t-1}$	-0.084	0.771	-0.110	0.912
$\Delta \mathbf{LREER}_{t-2}$	-0.534	0.762	-0.700	0.486
$\Delta \mathbf{LREER}_{t-3}$	-0.862	0.577	-1.492	0.140
$\Delta \mathbf{LTTBR}_{t}$	-0.236*	0.080	-2.942	0.004
$\Delta \mathbf{TERR}_{t}$	-0.046	0.053	-0.858	0.393
$\Delta \mathbf{TERR}_{t-1}$	0.139**	0.057	2.435	0.017
$\boldsymbol{ECT}_{t-1}$	-0.132*	0.046	-2.847	0.005
R squared		0.969	AIC	-2.517
Adjusted R squared		0.963	SIC	-2.130
F-Statistic		175.8	HIC	-2.362
Prob(F-statistic)		0.000	DW Statistic	2.120[5]

In the short run results, the real effective exchange rate has positive and significant impact on the Karachi stock market index as it was in the long run whereas the three months treasury bills rate and terrorism have negative and significant co-efficients which show that both current three months treasury bills rate and lagged terrorism affect Karachi stock market index adversely. The short run and long run estimates infer that real effective exchange rate has positive impact whereas terrorism and three months treasury bills rate have negative effects on Karachi stock market index. The co-efficient of Error correction term shows the speed of adjustment to renovate stability in the dynamic model. It shows how rapidly the model will converge back to the long run equilibrium due to short run dynamics. It must be negative and significant. Bannerjee et al. (1998) holds that a significant error correction term is further evidence of the existence of a stable long run relationship. In the case of this study, the co-efficient of error correction term is -0.132 recommending a comparatively slow speed of the adjustment back to equilibrium point. The results exclusively demonstrate that

[5] Note: AIC, SIC, HIC and DW are abbreviated as Akaike information criteria, Schwarz information criteria, Hannan-Quinn information criteria and Durbin Watson respectively.

the deviation from economic stability is corrected with the speed of 13 percent in the given time duration. Finally, this study applied some diagnostic tests on the estimated ARDL model. The results are displayed below in table 1.6.

Table 1.6: Diagnostic Tests Based on ARDL Methodology

Diagnostic	Lagrange Multiplier Statistic		F-Version	
	Statistic's Value	p-value	Statistic's Value	p-value
Serial Correlation	4.422	0.901	1.901	0.157
Heteroscedasticity	10.785	0.547	0.870	0.580
Normality	52.048	0.000	NA	NA[6]

Three diagnostic tests have been utilized in this study for detecting auto correlation, heteroscedasticity and normality Test. Although it has proved that no autocorrelation exists in the data with Durbin Watson Test in ARDL estimations but one of the drawbacks of Durbin Watson test is, it is not applicable when the model has lagged dependent variable. So, Breusch-Godfrey test has been applied for screening autocorrelation in the residuals of regression analysis. It is also known as Lagrange Multiplier (LM) test for serial correlation. The null hypothesis for Breusch-Godfrey test and heteroscedasticity test is absence of autocorrelation and absence of heteroscedasticity respectively so probability value for both tests is higher by following LM statistic and F statistic which show there is neither problem of serial correlation nor heteroscedasticity. Finally, Normality test has been used to check the normal distribution of data. The null hypothesis for this test is problem of normality so probability value is zero which shows that null hypothesis is rejected, and data satisfied the normality assumption.

Conclusion and Policy Implications

This research explored the effects of some macro-economic variables and terrorism on Karachi stock market 100 Index. The study used Global Terrorism Database, Monthly Statistical Bulletins of State Bank of Pakistan and Pakistan Stock Market as data collection sources. The Auto Regressive Distributed Lag and Vector Error Correction approaches have been used to find out the short run and long run association among the variables. In long-run relationship, real effective exchange rate has positive impact on Stock Market Index, while three months treasury bills rate and terrorism have shown negative impact on stock market index. In the short run, Error Correction Model (ECM) analysis illustrates the positive and significant impact of real effective exchange rate on Karachi stock market index whereas three months treasury bills rate and lagged terrorism have negative and significant impact on Karachi stock market index. This study recommends that government should consider all those measures which can reduce terrorist activities across country so that there should be an incentive for investors to invest in a politically stable economy. The higher yield on three months

[6] NA stands for not applicable

treasury bills by the Govt. is a hindrance in stock market investment because investment by people in three months treasury bills is risk free so monetary authorities should keep treasury bill rates at possible minimum rate so that people could make risky investments in stock markets. Monetary and fiscal authorities mutually should keep exchange rate at higher level in order to have bullish in stock market.

References

Ahmad, N., & Majeed, M. T. (2013). Does Political Globalization Impede Terrorism? A Regional Perspective. *Annual General Meeting*, (pp. 1-20). Islamabad.

Anwar, A. I., & Mughal, M. Y. (2013). "Foreign Financial Flows and Terrorism In Developing Countries," *Working Papers 2013-2014_1*, CATT - UPPA - Université de Pau et des Pays de l'Adour, revised Sep 2013.

Arif, I., & Suleman, T. (2017). Terrorism and Stock Market Linkages: An Empirical Study from a Front-line State, *Global Business Review, 18*(2), 1-14.

Aurangzeb, D., & Dilawar, T. (2012). Impact of Terrorism on Stock Returns; An Evidence from Pakistan, *Universal Journal of Management and Sciences, 2*(8), 73-85.

Baker, S. G. (1994). Comparing the 1993 U.S Airstrike on Iraq to the 1986 Bombing of Libya: The new Interpretation of Article 51, *Georgia Journal of International and Comparative Law, 24*(99), 99-116.

Bannerjee, A., Dolado, J., & Mestre, R. (1998). Error-correction mechanism tests for cointegration in single equation framework*, Journal of Time Series Analysis, 19*(3)*,* 267-283.

Blomberg, S. B., Hess, G. D., & Tan, D.Y. (2011). Terrorism and The Economics of Trust, *Journal of Peace Research, 48*(3), 383-398.

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

Charles, A., & Darné, O. (2006). Large shocks and the September 11th terrorist attacks on international stock markets. *Economic Modelling, 23*(4), 683-698.

Eldor, R., & Melnick, R. (2004). Financial markets and terrorism*. European Journal of Political Economy, 20*(2), 367-386.

Farooq, M., & Khan, Z. (2014). Impact of Terrorism on Foreign Direct Investment and Key Indicators of Development in Pakistan. *City University Research Journal, 4*(1), 53-68.

Fatima, M., Latif, M., Chugtai, S.F., & Hussain, N. (2014). Terrorism and its Impact on Economic Growth: Evidence from Pakistan and India. *Middle- East Journal of Scientific Research, 22*(7), 1033-1043

GOP (2016). *Pakistan Economic Survey, 2015-16*. Government of Pakistan. Finance Division. Islamabad.

Hassan, S. A., & Hashmi, M. S. (2015). Terrorism and the Response of Investors at Capital Market: A Case of Pakistan. *Pakistan Journal of Commerce and Social Sciences, 9*(1), 218-227.

Hassan, S. A., Mahmood, A., Ahmed, A., & Abbas, S.F. (2014). Impact of Terrorism on Karachi Stock Exchange: Pakistan, *Journal of Basic and Applied Scientific Research, 4*(7), 182-191.

Hyder S., Akram N., Padda I. U. H. (2015). Impact of Terrorism on Economic Development of Pakistan, *Pakistan Business Review, 16*(4), 704-722.

K.M. Baker (ed.), *The French Revolution and the Creation of Modern Political Culture*, (4), The Terror (Oxford: Pergamon Press, 1994).

Karolyi, G. A., & Martell, R. (2010). Terrorism and the stock market. *International Review of Applied Financial Issues and Economics, 2*(2), 285-314.

Kasman, S. (2003). "The Relationship Between Exchange Rates and Stock Prices: A Causality Analysis", *DokuzEylul Institute for Social Sciences, 5*(2) 70-79.

Kinyanjui, S. (2014). The impact of terrorism on foreign direct investment in Kenya. *International Journal of Business Administration, 5*(3), 148-157.

Kollias, C., Kyrtsou, C., & Papadamou, S. (2013). The effects of terrorism and war on the oil price–stock index relationship. *Energy Economics, 40*(C), 743-752.

Kumar, S., & Liu, J. (2013). Impact of Terrorism on International Stock Markets, *Journal of Applied Business and Economics, 14*(4) 42-60.

Laborda, R. & Olmo, J. (2021) An Empirical Analysis of Terrorism and Stock Market Spillovers: The Case of Spain, *Defence and Peace Economics, 32*(1), 68-86.

Muhammad, N., & Rasheed, A. (2002). Stock Prices and Exchange rates: Are they Related? Evidence from South Asian Countries, *The Pakistan Development Review, 41*(4) 535-550.

Pesaran, H. M., & Shin, Y. (1999). Autoregressive distributed lag modelling approach to cointegration analysis, in: S. Storm (Ed.) *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, chapter 11 (Cambridge: Cambridge University Press).

Pesaran, M.H., Shin, Y.C. and Smith, R. (2001). Bound Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics, 16*(3), 289-326.

Separovic, Z. P. (2006). "International Terrorism: Large-Scale Victimization Terrorism." In Uwe Ewald and Ksenija Turković eds. *Large-Scale Victimisation as a Potential Source of Terrorist Activities.* IOS Press.

Silke, A. (2008). Research on Terrorism: A Review of the Impact of 9/11 and the Global War on Terrorism, *Terrorism Informatics: Knowledge Management and Data Mining for Homeland Security* (pp.27-50). London, Springer.

Sohail, N., & Hussain, Z. (2009). Long-Run and Short-Run Relationship between Macroeconomic Variables and Stock Prices in Pakistan: The Case of Lahore Stock Exchange, *Pakistan Economic and Social Review, 47*(2) 183-198.