

# Terrorism and Foreign Direct Investments in Pakistan: A Cointegration Analysis

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## Abstract

The study is an attempt to explore the long term dynamic relationship between terrorism and foreign direct investment in Pakistan. Monthly time series data from 1995 to 2013 was used for this analysis. After finding all of the time series stationary at first difference, Johansen cointegration approach is applied for finding long run dynamics. Both unidirectional and bidirectional Granger causality are observed between explanatory variables and foreign direct investments. Johanson cointegration approach indicates the presence of long-term dynamic relationship between terrorism and foreign direct investment. The Johanson and Juselius cointegration analysis show two cointegrating equations. Terrorism is found to have negative and significant impact on foreign direct investment in Pakistan. The study also suggests some policy implications.

**Keywords:** Foreign direct investment, Terrorism, Cointegration, Pakistan

JEL Classification: F21,

## 1 Introduction

Terrorism is a horrible act for any economy. It is the preplanned threat of violence by individual or groups for the purpose to obtain social or political objectives. Terrorist activities have different form like hijacking of airplane, abductions, murders, threats, bomb blasts and suicide attacks. These attacks put pressure on government and thus leads to political concessions. Political accommodation encourage terrorists to increase their campaign in the form of more bomb blasts and suicide attacks. Foreign direct investment play important role in economic growth of any economy. FDI reduces poverty and unemployment. FDI plays a significant role in the economic growth of a country (Choe, 2003, Li & Liu, 2005). But terrorism adversely affect the flow of FDI. Terrorism has significant impact on FDI. History of Pakistan is full of such evidences in the shape of ups and down in FDI. Terrorism in Pakistan decreases the flow of foreign direct investment. Terrorism divert FDI, destroy infrastructure, shifting funds to security purposes and restricting trade. Economic growth is reduced by losing enough FDI due to terrorism (Enders and Sandler, 1996).

A sound and significant literature exists about the determinants of the FDI. The different determinants of FDI are defined by researchers, like market size, inflation, corruption, political stability, quality infrastructure, tax rates, exchange rates, and trade openness and many more. Various econometric techniques are used by the researchers to find the significance of these determinants which are directly or indirectly influence the decision of the potential investors. From the study about the determinants of the FDI throughout the world mixed evidences have been attained. The behaviors of these determinants for different countries are different. Some determinants of FDI are significant for one country while the behavior of the same determinants is not identical for another country. Osorio (2008) described the different determinants of FDI, such as trade openness, market size and transparency, ease of doing business, country risk, corruption and locational advantages.

While studying the Pakistan economy with respect of terrorism is very important for different reasons. First, the history of terrorism in Pakistan is very long, so one can study it for a long run, and can do research on its long term effect. Secondly, the effect of terrorism on growth is more in developing countries as compared to developed country, it has decreased the economic growth in the developing countries as compared to developed countries (Bloomberg et al, 2004; Luechinger and Stutzer, 2007). Thirdly the Pakistani economy is remarkably exposed to external shocks with IMF during 1990 – 2007 (IMF, 2010; 2011). Rasheed and Tahir (2012) observed that terrorism not only affects the country's infrastructure but also has impact on the financial market of that country. Due to these terrorist activities, instability and uncertainty in the country take place. Uncertainty and instability decrease the confidence of foreign direct investors in that economy which leads to the decline in the foreign direct investments. Similarly Pakistan is also under the impact of terrorism which causes decrease in the foreign direct investment. Agarwal, (2011) observed significant negative correlation between terrorist events and foreign direct investment inflows.

Agarwal and Ramaswami (1992) studied the interrelationship between the firm's OLI advantages with its choice of entry modes such as sole or joint venture, licensing or exporting. They found that both have

interrelationship, the firms would like to make their presence in the foreign market through direct investment, but the main constraints are the size and abilities of the firms. These results are confirmed by Chandrapalart (2000).

This study explores the long run dynamic relationship between foreign direct investment and terrorism along with other control variables market size, exchange rate, trade openness, inflation and tax for the period January 1995 to December 2013. For this study multivariate cointegration analysis is used. These variables have significant relationship with FDI in developing countries as previous research provide enough evidence.

This study will help the investors and the policy makers to identify the dynamics of terrorism and its impact on foreign direct investment. This study is very important for investors to think about the economy where they sense more profit. For academia this study will be the extension in literature while for policy makers it will provide support to make suitable and better policies to reduce terrorism in order to enhance the flows of foreign direct investment. The paper consists of IV sections. Section II briefly explains the empirical literature on the relationship between terrorism and FDI. Section III explains variable specification, methodology and data description. Section IV is about empirical evidence while conclusion and discussion is explained in section V.

## 2 Literature Review

The current research is important on the behalf of globalization of markets and companies internationalization. Due to increase in liberalization of trade, companies are trying to attract more FDI by going beyond national border. Pakistan is more interested in Arabs FDI than US and Europe because of their secure investments. The ups and downs in FDI to Pakistan is noticed from 1995 to 2013. Since 2007 – 2008 FDI has showed a declining trends. The declining in FDI is due to unfavorable environment for investment in the country. In 2005 – 2006 the FDI in Pakistan was \$ 3.52 billion. In 2007 the FDI grew into \$ 5.41. But due to decline in economic growth and terrorism attacks the FDI level dropped into \$3.72 billion in 2008 – 2009. In 2009 – 2010 the FDI decline into \$1.72 due to intensity of terrorists attacks. The decline was recorded in FDI since December 2013 while increase in terrorism, political instability decline in economic growth. Different studies have been done on terrorism and FDI. Few of the studies are given below,

Shah and Ahmed (2003) used the time series data to examine the determinants of FDI in Pakistan. For their study, they used the PP tests and the co-integration test. Their results suggest that the market size has significant positive impact on the FDI inflows in Pakistan. Bandera & White (1968) and Dunning (1980) and Kok & Ersoy (2009) found the positive impact of market size on FDI. Sharafat (2014) used the time series data to examine the impact of inflation and income inequality on economic growth in Pakistan. He used cointegration analysis to find the long term relationship. He examined the positive impact of FDI on economic growth in Pakistan.

Asiedu (2009) examined the FDI in Africa. He used the panel data for 22 countries for the period of 1984 to 2004. Regional economic cooperation enhanced the FDI not even for the developed countries but also for the less developed countries. According to him REC is important because it brings political stability in country by electing democratic government, eradicating corruption and can enlarge the market size which is the best choice for the attractiveness of more FDI. Market size has lesser impact of FDI in export oriented countries (Coleman & Tetty, 2008). Daunmu & Guney (2009) studied the effect of the outward FDI of India and China. By using the panel data they found that the FDI of China and India is attracted by the countries having large market size, low tax rate, and high volume of imports from china and India. Lv Na and lightfoot (2006) studied the determinant of FDI at regional level in China. They used GDP as a proxy for the market size, and found the positive impact on FDI. They also used trade openness and labor quality as a determinant of FDI and observed the positive impact.

The impact of tax on FDI is mixed. Hartman (1984), Kemsley (1998), and Belington (1999) examined that taxes of the host country have negative impact on FDI. Root and Ahmad (1978), Jackson and Murkowski (1995), and Porcano and Price (1996) have found that there is no significant relationship exist between taxes and FDI. Swenson (1994) has concluded a positive correlation between host country's taxes and FDI.

Erdal and Tatoglu (2002) analyze the locational determinant of FDI in Turkey by using time series data. The authors find that market size, trade openness, and infrastructure abilities have positive but exchange rate and economic stability have negative effect on FDI in Turkey. Rasaan (2013) in his study explain that exchange rate volatility has a positive relationship with GDP, trade openness and FDI by using OLS, correlation matrix and Granger Causality. Accam (1997) found the negative relationship between exchange rate volatility and FDI while studying the 20 least developed countries. He used standard deviation as proxy for exchange rate volatility. Lemi and Asif (2001), Elahi (2011) found the negative impact of exchange rate on FDI, while Osinubi et al (2009), Kiat (2010), and Dakal et al (2010) observed the positive relationship between exchange rate and FDI.

Foreign investors are also effected by the host country's related investment and cost of production. Udoh and Festus (2008) found the negative relation of inflation with FDI. Payasliogu and Pola (2013) found that

there is no effect of inflation on FDI while using the monthly data. Udoh and Egwaikhide (2008) found the impact of inflation uncertainty on FDI. They used inflation as independent variable with other variables including exchange rate, political instability, and some others and the FDI as a dependent variable. They collected the data from 1970 to 2005 and used GSRCH model. The result concluded that inflation uncertainty affect the FDI in Nigeria. Ullah et al (2012) investigate exchange rate and volatility of exchange rate on FDI. They used Pakistan economic data for the period of 1980-2010. They also used inflation as independent variables and found negative impact of inflation on FDI.

There are four major economic costs of terrorism. First losses of tourist revenues, when they want to spend their vacation in the safer country (Edners, Sandler, and Parise 1992). Second, if the aim of attacks on the FDI interests then the inflows to the country will reduce, thus leads to the decline in future stock of capital. Third, when the attack is on the infrastructure which leads to economic disruption. Fourth, resources used to remove terrorist attacks confine opportunity costs.

Terrorism adversely affect the flow of FDI. Kamran (2013) used the time series data to find the impact of terrorism on FDI in Pakistan. He found that terrorism negatively affect flow of FDI. Terrorism deter economic growth (Bloomberg et al, 2004; Luechinger and Stutzer, 2007), due to which the GDP of the country decline and the investors feel fear to invest in such economy.

It is difficult to examine the behavior of investors. For the investors point of view different factors can affect their investment decisions. These factors are prior experience depend on their losses and gains, economic and political risks, conflict and war and recently the terrorism. The literature about the terrorism and foreign direct investment is mixed. There are different result about these two concepts, some argued that the impact is negative or positive while some authors suggest no effect but common sense tells that country with terrorism will lead to decline in economic growth which causes funds outflow. The country where the terrorist attacks raised, the investors will divert their investments toward the economy where there is no security issues and stability is the main concern. But the common sense is not enough evidence to explain the impact of terrorism on economic growth and foreign inflows as well, the long term relationship among the countries, political benefits, and economic purpose also play there role.

Bandyopadhyay, Sandler and Younas (2011) studied the impact of terrorism on economy and the behavior of investors. Terrorism creates direct risk and destruction in the economy which makes the people aware of their expected performance. So due to this cause the investors become aware and believed that investing here is not more than loss. On the other hand if the government takes action to remove terrorist activities to bring peace, increases the cost of the government, and more funds flow for the peace purpose rather than to bring economic growth.

Mirza and Verdier (2007) found that terrorist attacks have impact on the economic activities of any country. When the country with in adverse condition means the terrorist activities are at peak and that would have negative impact on the economic activities of that country, whether these activities are financial or economic growth, foreign investment in the shape of foreign direct investments and trade. Literature determines that most of the countries give much significance to foreign direct investments and contributes more to economic growth of country. Because FDI provide not only capital but also skill, technology, income and market access to these countries.

Blomberg and Mody (2005) observed the quantitative impact of terrorism, revolution and war by using a gravity model of bilateral FDI flows. They took the data of FDI for 12 home countries and 43 host countries from 1981 to 1998. The result shows that the violence in the host countries has significant impact on FDI, while in case of home countries violence causes FDI outflows.

Abadie and Gardeazabal (2005) empirically investigate the impact of terrorism and found that it has negative impact on FDI. The model tells that while increase in the volatility of terrorist attacks caused to decline in FDI by 5% of GDP. According to them per capita GDP decline by 10% due to terrorist conflicts in Bosque Countries.

Bloomberg et al. (2004) empirically investigate the impact of terrorism on 177 countries. They used data from 1968 to 2000. Study observed that there is negative impact of terrorism on economic growth. Further results show that due to terrorism the resources divert from investment spending to government spending. The result is different in different groups of countries, for example in OECD countries the terrorist attacks are more frequent but the impact is less significant than developing countries.

Sandler and Enders (2005) have related views as they parallel the impact of terrorism on developed and developing countries. Study discusses that developed countries have enormous economy and any terrorist action may result in altering of resources among numerous segments of the economy but conversely this is not the case with the developing countries and any major terrorist act may threaten the economic growth. Like their massive economies, developed countries have superior institutions and markets can engross effects of terrorism. They can offer necessary fiscal and monetary spurs to absorb the effects of terrorism while many developing countries lack this ability. Besides, developing countries are more dependent on other countries as compared to

developed ones. Therefore any economic tremor brought by terrorism in other countries can affect their economic growth.

Gaibulloev and Sandler (2009) examined the impact of terrorism on per capita growth in Asia for the period 1970-2004. Study found significant growth limiting impact of terrorism. The impact seems to be stronger in the developing countries as compared to developed one because of the developed countries' flexibility to terrorism due to their vigorous economies. Terrorist activities generated by internal conflicts were found to be twice as effective in reducing growth as compared to those of international conflicts. The main growth reducing impact comes from the crowding in of government expenditure and a loss of investment associated with the increase in terrorist activities.

Gries et al. (2009) explored the causality between terrorism and economic growth for seven western countries for the period 1950 to 2004. The causality may run from economic growth to terrorism as the poor economic performance demonstrated in low opportunity costs of violence, which may in turn, increase the conflicts and thus terrorism. On the other hand terrorism may cause low economic growth because accumulation and allocation of resources may be negatively affected by terrorism. Results indicate that important economic and political events have profound, impact on the pattern of terrorism and also on economic growth.

### 3. Data Description and Methodology

Current study is attempt to explain the long run relationship between terrorism and foreign direct investments in Pakistan from 1995 to 2013. The dependent variable in this study is foreign direct investment (FDI) and the independent variables are market size (GDP), inflation measured as consumer price index (CPI), exchange rate, tax, trade openness ( $X + M/GDP$ ) and terrorism. For terrorism the index were used by using certain weightages. Events (EV), fatalities (FA) and injuries (IN) were combined in terrorism index. Terrorism index was measured as  $0.50EV, 0.25FA$  and  $0.25IN$ . The same index was used by Kamran (2013). The specified model is written as:

$$\text{LnFDI} = \beta_0 + \beta_1 \text{Ln GDP} + \beta_2 \text{LnER} + \beta_3 \text{LnTX} + \beta_4 \text{LnCPI} + \beta_5 \text{LnTO} + \beta_6 \text{LnTIND} + \epsilon$$

Various macroeconomic variables are used in this study for which the data is obtained from World Development Indicators (World Development, 2013), State Bank of Pakistan and Transparency International. For terrorism Global Terrorism Database (GTD) is used.

For testing the long term interaction between FDI and Terrorism the following econometric techniques are used.

- Descriptive Statistics
- Correlation
- Johanson Cointegration
- Granger Causality Test
- Impulse response analysis
- Variance decomposition analysis

Descriptive statistics provides summary about all variables used in the study. Mean is used to show the central tendency of data. Skewness tells about the presences of more positive and negative values, which is called as positively skewed values or negatively skewed values. Standard deviation posits light on the volatility of data, higher the volatility is the sign for highly dispersed values. Flatness and Peakness should be judge through kurtosis. Jorque Bera tests the normality of data. Correlation matrix is used to measure the relationship among different variables. It has range from -1 to +1. Correlation is not a reliable technique due to certain limitations.

To check the stationarity of data Unit Root Test is applicable. Before to work through co-integration, it is necessary to check the stationary of the time series data. For cointegration the data should be integrated in same order. For stationary of data different tests are applied. These tests are Augmented Dickey Fuller Test (ADF) and Phillip-Peron Test. This test was proposed by Dickey and Fuller in 1979 for predicting stationary in time series data. It has strict assumptions due to which ADF is regarded as a strict parameter for finding stationary.

ADF test can be written as,  $V_t = \pi V_{t-1} + \epsilon_t$ , where  $V_t$  is variable studied,  $t$  is time period,  $\pi$  is coefficient,  $\epsilon_t$  is the disturbance term. The regression model is explained by the following equation;  $\Delta V_t = (\pi - 1) V_{t-1} + \epsilon_t = \gamma V_{t-1} + \epsilon_t$  Whereas  $\Delta V_t$  is first difference for the underlying variable. The first difference has been taken to make the time series data stationary.

ADF test has strict assumptions so for finding stationary data PP test is used. Both tests has certain differences, as ADF test is dominant on PP test on the behalf of term of size while on the other hand PP test is better in power from ADF. ADF is used for testing first order correlation, while PP test is applied for higher order of serial correlation. Both has the same measures of calculation.

Lag length selection is necessary for co-integration. For the proper lag length selection, Akaike Information Critirion (AIC) and Schwarz Information Criterion (SIC) are used.

In order to find the long term relationship between two or more variables of study co – integration is applied. For co-integration the data should be integrated on same order. The assumptions for co-integration is that, if the two series are non-stationary individually, their linear combination might be stationary. It does not



study co movement between two time series data.

Two approaches are used to apply co-integration.

- JJ Approach (Johenson and Juselius Approach)
- ARDL (Auto Regressive Distribution Lag Approach).

The time series data which are stationary at same order, JJ Approach will be used, on the other for different order of stationarity of data, ARDL approach is applicable.

When there is non-stationarity in series, OLS analysis results into nothing or give spurious results. In such case co-integration is used. This test is divided into two main categories; the first one is residual-based test, which include the Eagle & Granger (1987) test, which is called single equation co-integration or bivariate co-integration. The main advantage of bivariate co-integration model is that, it identify co-integrating vector. The second one is maximum likelihood-based tests, which doesn't identify co-integrating vector and only specify number of co-integration relationship. However, this test includes the Johansen & Juselius (1990) and Johansen (1988, 1991) tests, which are used in multivariate context. Gujarati (Basic Econometrics 4<sup>th</sup> Edition) argues that when series are integrated of order 1(1) or of 1(2) mean at the same order then co-integration is used otherwise ARDL approach is used. The co-integration equation is given as:  $z_t = \alpha_0 + \sum_{j=1}^k \beta_j z_{t-j} + \epsilon_t$ , where  $Z_t = \text{stationary series}$  for which cointegration is to be tested,  $\alpha_0$  is constant,  $k$  is number of la,  $Z_t$  is variable under study, which contain unit root.  $\beta_j$  is coefficient and  $\epsilon_t$  is error term

The JJ procedure inspects the long run relationship between the variables. J & J have proposed two likelihood ratio tests to determine the presence of a number of co-integration relationships in a set of non-stationary data. The null hypothesis is that no co-integration is there among the series. The maximal eigen-value test evaluates the  $H_0$  of the existence of "r" co-integrating vectors in contradiction of the alternative ( $H_1$ ) of "r+1" co-integrating vectors. The statistic of max-eigen test is given as:  $\lambda_{\max} = -T \ln(1 - \lambda_r + 1)$ , whereas "T" represents the observations and  $\lambda_{r+1}, \lambda_{r+2} + \lambda_{r+3} \dots, \lambda_n$  represents the n-r smallest squared canonical correlations.

Trace statistics test evaluates the  $H_0$  of the existence of "r" co-integrating vectors in contradiction of the alternative ( $H_1$ ) of "r+1" co-integrating vectors. The statistic test is given as;  $\lambda_{\text{trace}} = -T \sum \ln(1 - \lambda_i)$ .

According to Granger (1988), if series have co-integrating vector then there must exist Granger-causality in at least one direction, which reveals the direction of impact between series. If the current or lagged terms of a variable say,  $Z_x$  predicts the future value of another variable, say  $Z_y$  then Granger-causality relation exists, in which  $Z_y$  is Granger caused by  $Z_x$ , or if past value of  $Z_y$  helps in the prediction of future value of  $Z_x$  then series are said to have bidirectional causality. Granger causality for all series returns can be calculated as,

$$\text{Gprob}(V_{k+n} | \phi_k) = \text{Gprob}(V_{k+n} | \Psi_k)$$

In equation the "Gprob" denotes conditional probability, whereas " $\phi_k$ " denotes the information set at time  $k$  on past values " $V_{k+n}$ "

The impulse response analysis examines the influence of random shock to a variable on other variable of interest. The variance decomposition examines the responses of variables to shocks. If a shock exists through the error term, its impact on other variables is to be observed and as such evidence is obtained on percentage of the error variance as well as on time horizon. The VD analysis also presents the actual division of the variation in the variable value in a given period of time resulting from fluctuations in the same variable in addition to other variables in preceding periods.

## 4. Empirical Results

### 4.1 Descriptive Statistics:

Both the descriptive statistics and correlation matrix of foreign direct investment and terrorism are discussed in table 1. The GDP is positively correlated to FDI. The relation among inflation and exchange rate with FDI is negative. The correlation between trade openness and foreign direct investment is moderate. Correlation results show that tax and terrorism index are weakly correlated with foreign direct investment in Pakistan. The average monthly flows of FDI into Pakistan in terms of percentage are -0.0007%. The maximum flows of FDI 0.3391%. Percentage change in GDP is 0.1022% with average value of 0.01%. Average inflation per month is 0.0044%. The average value of trade openness is recorded as 0.0013%, along with maximum value of 0.1161% and minimum value of -0.0899%. The average decline in the value of currency of Pakistan is -0.0353%. The average terrorism in Pakistan is recorded as 5.64%, which has a range from a minimum of 4.10% to a maximum value of 7.62%. The average monthly volatility in terrorism is 1.018%. The data is positively skewed and are normally distributed.

Table 1: Descriptive Statistics and Correlation Matrix:

	LNFDI	LNGDP	LNCPI	LNER	LNTO	LNTX	TIND
LNFDI	1						
LNGDP	0.1151	1					
LNCPI	-0.1082	-0.1271	1				
LNER	-0.2122	-0.1211	0.94019	1			
LNTO	-0.3738	0.24168	-0.6569	-0.4711	1		
LNTX	-0.0779	-0.3253	0.85237	0.7588	-0.7046	1	
TIND	0.04085	-0.1392	0.68657	0.46716	-0.7668	0.70273	1
Mean	-0.0007	0.01	0.0044	-0.0057	0.0013	-0.0023	5.6486
Maximum	0.3391	0.7967	0.0308	0.0233	0.1161	0.1761	7.6292
Minimum	-0.1895	-0.581	-0.0432	-0.0353	-0.0899	-0.2215	4.1096
Std. Dev.	0.0486	0.1022	0.009	0.0061	0.0194	0.0264	1.0186
Skewnes	1.7054	2.4537	1.477	0.3714	0.8944	-2.5357	0.2189
Kurtosis	18.0376	33.2952	9.0029	8.5807	15.8576	45.9996	2.0283
Jorque-Bera	1614.82	6396.94	304.001	215.265	1144.51	12732.3	7.7141

Figure 1:

The trends of terrorism and foreign direct investment are displayed in figure 1.

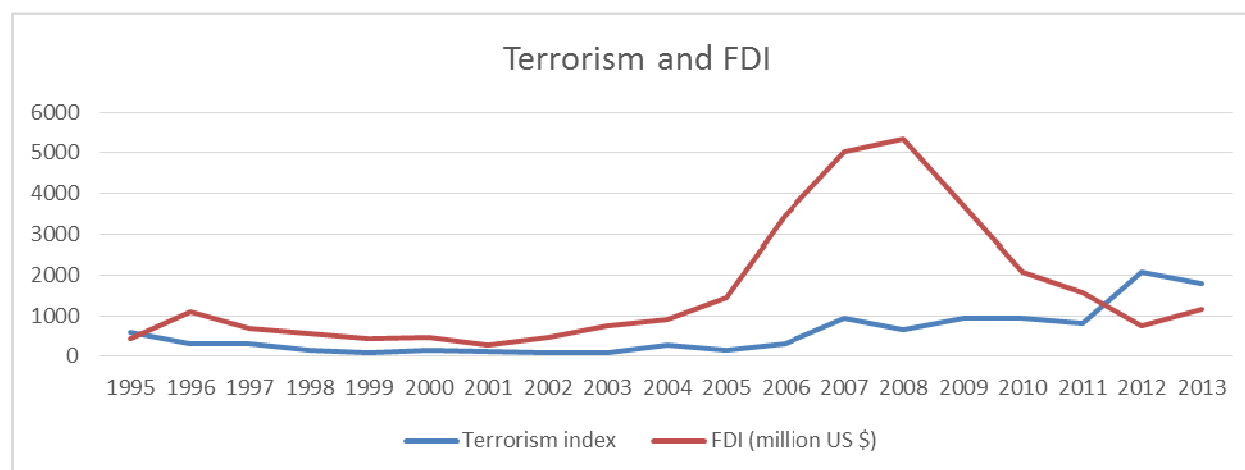


Figure 1: Trends of Terrorism and FDI in Pakistan

#### 4.2 Unit Root Test:

In this study co-integration is used to find the relationship between terrorism and FDI. The assumption of co-integration is that, the data should be stationary and for this investigation of Stationarity unit root test is used. In Unit Root Test, Augmented Dickey Fuller (ADF) and Phillip Peron (PP) test are used. These tests shows that all the variables are non-stationary at level and stationary at first difference. The assumption of ADF test is, the variables should be Independent Identically Distributed (IID), simply it means, variables are not dependent on each other. This is too rigid and strict assumption. However in some cases, this assumption doesn't proved to be valid for certain data, and so we used another test for finding Stationarity in time series data, the Phillips-Peron test. PP test is used to confirm the result of ADF test. It has flexible assumptions, that there exist weak form dependency in variables. Table 2 exhibits the ADF and PP tests for the LnFDI, LnGDP, LnCPI, LnTO, LnTX, LnER and LnTINDX. According to ADF test all the variables are non-stationary at level and stationary at first difference and PP test confirm the results. Thus, we observed that the series is 1(1).

Table 2: Augmented Dickey Fuller (ADF) and Philip Peron (PP) Tests

Variables	ADF Test		PP Test	
	At Level	At first difference	At Level	At first difference
LnFDI	-1.7866	-3.288439	-1.4857	-10.54702
LnGDP	-2.3353	-5.57623	-2.518	-11.48707
LnCPI	-2.2131	-3.67422	-1.2818	-3.043197
LnTX	-1.2265	-15.05504	-1.2264	-15.05504
LnTO	-1.3844	-4.10068	-1.6494	-10.38472
LnER	-0.4586	-3.641329	-1.0126	-8.68565
LnTINDEX	-0.9212	-4.433185	-1.5316	-10.46943
<b>At Critical Level</b>				
<b>1% level</b>	-3.461	-3.46103	-3.4591	-3.459231
<b>5% level</b>	-2.8749	-2.874932	-2.8741	-2.874143
<b>10% level</b>	-2.5745	-2.573985	-2.5735	-2.573563

#### 4.3 Johansen's Cointegration Test:

For selection of lag length criteria we used value of Schwarz Criterion (SC), and it is minimum at lag 2. For the non-stationary data OLS is not a best option because it leads to spurious results. So co-integration is a best option in such cases. For knowing the relationship between different series Johanson and Juselius co-integration is used. Trace test and Maximum Eigenvalue are the two tests used in co-integration analysis. The study is using multivariate approaches of co-integration because of multivariate model.

Table 3 fails to reject the null hypothesis of no co-integration between Terrorism and FDI for the period of 1/1/1995 to 30/12/2013. The trace test shows the existence of 2 co-integration equation at 5% significant level. Thus the results shows the presence of long term relationship between terrorism and FDI. After normalizing the first co-integration vector on FDI, normalized co-integration coefficient were estimated as reported in Table 4.3.6.

Table 3: Trace Statistics of Multivariate Co-integration

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.1503	136.5	125.6154	0.0091
At most 1 *	0.13618	99.8537	95.75366	0.0253
At most 2	0.09213	66.917	69.81889	0.0833
At most 3	0.08045	45.1701	47.85613	0.0875
At most 4	0.06409	26.2995	29.79707	0.12
At most 5	0.04379	11.3972	15.49471	0.1882
At most 6	0.00586	1.3215	3.841466	0.2503

The trace test indicates two Cointegration equation at the 0.05 % level

The first normalized equation shows that in the long run market size has positive impact on foreign direct investment, the results are in the line with the empirical evidence of Shah and Ahmad (2009), and Bandera & White (1968) and Dunning (1980). In this study, inflation has long term relationship with FDI, the relation is positive and significant, which is against the study of Udoh and Egwaikhide (2008). Trade openness in this study has significant negative impact on foreign direct investment. The relation is negative because of more imports than exports, and the results is different for the results of Lv Na and lightfoot (2006), Erdal and Tatoglu (2002). Tax has no long run relationship with FDI. On the other hand exchange rate bear negative sign and affect foreign direct investments significantly and negatively that support the study Erdal and Tatoglu (2002). In the long run, terrorism has significant negative relationship with FDI. The evidence behind this is that terrorism affect the sentiment of the foreign investors, they compel to shift their investment to safer economy. And according to locational factor of Dunning theory investors have a desire to invest in a location where they have easy approach to valuable resources. In case of Pakistan due to terrorist attacks investors feel fear to have approach to such resources, and hence they think to search for the safer economy. When the terrorism increases the flow of FDI into a country will decreases and hence abetted the results of Abadie and Gardeazabal (2005).

Table 4: Normalized Cointegration Coefficients: 1 Cointegration Equation Dependent Variable: LnFDI

Variables	Coefficient	Standard Error	t-Statistics
LnGDP	1.725828*	0.40738	3.08871
LnCPI	-8.73469*	3.12065	2.55352
LnTO	3.615504*	1.43798	-2.51429
LnTX	-2.283366	2.73637	-0.83447
LnER	-9.131475*	3.23278	-2.82565
LnTIND	1.775639*	0.41442	-4.28461

Note: \* Significant at 5% significance level.

Table 5: Granger Causality Test

Null Hypothesis:	Obs.	F-Statistic	Prob.
RGDP does not Granger Cause RFDI	226	4.94923*	0.0079
RFDI does not Granger Cause RGDP		0.78990	0.4552
RCPI does not Granger Cause RFDI	226	3.62106**	0.0284
RFDI does not Granger Cause RCPI		6.33972*	0.0021
RTO does not Granger Cause RFDI	226	1.62631	0.199
RFDI does not Granger Cause RTO		3.18837**	0.0431
RTX does not Granger Cause RFDI	226	2.60785***	0.076
RFDI does not Granger Cause RTX		0.44476	0.6415
RER does not Granger Cause RFDI	226	0.34311	0.7099
RFDI does not Granger Cause RER		0.31130	0.7328
RTIND does not Granger Cause RFDI	226	0.43668	0.6467
RFDI does not Granger Cause RIND		1.05448	0.3501

Note: \*(\*\*) Significant at 1%(5%) significance level.\*\*\*Significant at 0.10 level.

Table 5 shows both the unidirectional and bidirectional relationship between foreign direct investments and control variables. Between FDI and GDP unidirectional relationship exist. GDP Granger Causes FDI. Inflation and FDI has bidirectional relationship. CPI Granger Causes FDI and FDI Granger Causes CPI. Similarly tax Granger causing FDI, and the relation is unidirectional. There is no lead lag relationship between FDI and terrorism, and exchange rate and FDI

Response to Cholesky One S.D Innovations

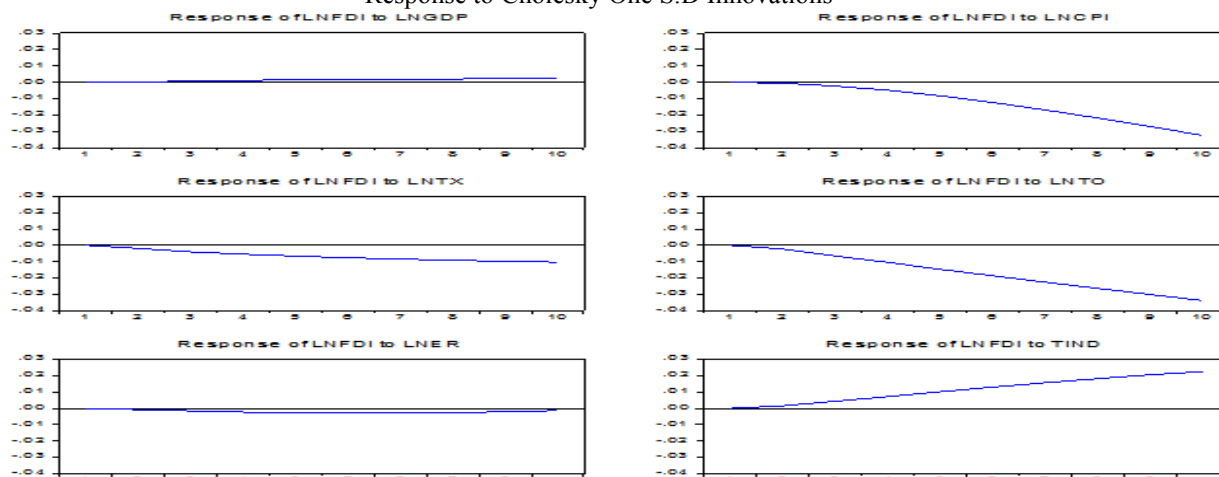


Figure 2: Impulse Response Analysis



Table 6: Variance Decomposition Analysis

Period	S.E.	LNFDI	LNGDP	LNCPI	LNTX	LNT0	LNER	LTIND
1	0.05848	100	0	0	0	0	0	0
2	0.09491	99.8653	0.00023	0.00266	0.04075	0.05742	0.0077	0.02599
3	0.13292	99.4408	0.00426	0.0316	0.11503	0.27218	0.01784	0.11826
4	0.16824	98.8787	0.00753	0.10209	0.17627	0.55466	0.02975	0.25101
5	0.20195	98.1386	0.01105	0.24034	0.23062	0.91546	0.03968	0.42423
6	0.23392	97.2638	0.0137	0.45776	0.27782	1.31884	0.04641	0.62165
7	0.26453	96.2519	0.01587	0.76769	0.31937	1.76043	0.04917	0.8356
8	0.29398	95.1168	0.0177	1.17451	0.35592	2.22991	0.04825	1.05695
9	0.3225	93.8635	0.01948	1.68023	0.38803	2.72455	0.04452	1.27966
10	0.35029	92.5009	0.02147	2.28199	0.41609	3.24161	0.03926	1.49868

Table 6 exhibits the decomposition of forecast error variance for the foreign direct investments that is explained by terrorism and monetary variables. The result shows that 99% volatility in FDI is due to its own internal dynamics, while the other variables have a little bit contribution in the volatility of FDI. The terrorism contribute to the volatility of FDI, and it has a range from 1.27% to 1.50%. The main variables which contribute to the volatility of FDI are trade openness and terrorism.

## 5. Conclusion and discussion

This study was conducted to examine the long run relationship between terrorism and foreign direct investments in Pakistan. The monthly time series data were used. For terrorism, terrorism index was used by combining number of events, fatalities and injuries. Johanson Cointegration test was employed to observe to find the log run relationship between terrorism and FDI. The study examined negative relationship between terrorism and FDI in Pakistan. The evidence behind this is that terrorism affect the sentiment of the investors. Due to terrorism they are compelled to shift their investments into secure economies. So when terrorism increases the flow of FDI into Pakistan will decreases the results are in the line with the results of Abadie and Gardeazabel, (2005) who also found the negative impact of terrorism on FDI.

FDI is very important for the growth and economic development of a country. This study found the effect of terrorist activities on FDI. Terrorism leads to decline in FDI. So there should be policy implications for minimizing the terrorist activities. Thus the policy should use terrorism as a determinant of FDI.

This study fund the long run relationship between terrorism and FDI but there also exist certain limitations. This study only incorporates the effect of terrorism on FDI. There are also a number of factors exist that can affect the FDI, like corruption, rules regulation, political instability, and democratic and military regime may have influence flow of FDI.

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