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Foreign Direct Investment, Economic Growth and Terrorism Events in Pakistan: A Co-Integration Analysis

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Abstract

The main objective of present study is to examine co-integration and causal relationship between FDI, terrorism and economic growth in Pakistan. The study used annual data for the period 1981-2015.The results show that a negative correlation holds among FDI, elementary school enrollment index (EEI), terrorism and economic growth. Bi-variate Co-integration analysis shows that terrorism events and economic growth are co-integrated. Similarly, terrorism attacks have relationship with EEI and FDI. The Granger causality analysis indicates that terrorism is Granger cause of economic growth. Furthermore, there is unidirectional relationship between FDI and GCF. Similarly, TE have unidirectional relationship with EEI. These findings are also supported by impulse response function analysis. The study suggest that the government should open more schools for children and also should control corruption, unemployment and terrorism to overcome this dilemma. The findings also suggest that foreign investment must be augmented through suitable policies. Improved antiterrorism institutions not only helpful to eliminate terrorism but also have subsequent effect on performance of multinational corporations to get greater benefits of FDI inflow in Pakistan.

Keywords: FDI, Terrorism Events, Economic Growth, Co-integration, Pakistan

Introduction

Economic growth is generally considering as a measuring tool of social welfare. The phenomenon is implicit but exist, by which social welfare increases directly with a positive change in economic growth. This paper focuses on the long run relationship among FDI, terrorism events, human capital and economic growth in Pakistan. This study can be helpful

for the prediction whether terrorism events be harmful for the economic growth, human capital and foreign direct investment.

Furthermore, the relationship between economic growth and FDI has extensive importance in the economic history. To consider FDI as an instrument to growth empirical as well as conceptual rationale are present in literature however, empirical results of terrorism in Pakistan is more ignored area in research domain. A few studies have covered this area; present study fill this gap through empirical justification. Terrorism is the primary source of instability in Pakistan (Ali, 2010). Additionally, Pakistan has been facing the worst type of violence against its army and public, internal law and order situation and economic losses since the last decade (Asad et al., 2015). Pakistan is bearing the effect of terrorism and conflicts of neighbour countries since last two decades and the problem is that a little reach in this area has been done. Present study tried to fill this gap to see terrorism with FDI and economic growth. Here in this situation it is utmost important to see economic as well as psychological consequences of terrorism in Pakistan. The present study covers the economic perspective.

Literature Review

Positive role of FDI is clearly related to host country's circumstances. To gain these positive effects from FDI the prerequisite is good financial system in the host country because a developed system plays a significant role in technologies transfer from investors to the host countries. Which become the milestone for economic growth in the receiving economy (Hermes & Lensink, 2003). Another point of view is that Non-agricultural exports mostly in finished shape are positively affixed with economic growth (Shah et al., 2015). Equally important, it is essential point is to check the investments and terrorism damages. Blomberg, Hess, and Orphanides (2004) explore the cost affix with international terrorism and collaborative spillovers of collective vehemence. Panel data set of 177 countries was empirically tested, the outcomes depict that terrorism events are negatively allied with economic growth of these countries. As FDI is the most consistent and stable component of foreign capital and also important as playing the role in the process of economic growth by providing financial resources, skills and technology know- how through MNCs (Adams, 2009). However, Azeem et al (2012) investigate the factors influencing the external investment (FDI) advanced in Pakistan. It is resulted that GDP growth have a positive while population growth and the distance between host and home country negatively affix with influx of investments in Pakistan. The reason behind this scenario is the higher distance as it become a hurdle for the entry of overseas investment in case of Pakistan. Furthermore, Shahbaz et al (2013) examine whether Pakistan's economic growth is effected by terrorism events over the time period of 1973 to 2010. The fallouts of terrorism on economy of Pakistan in long run has been verified by empirical analysis. The other two important variables trade openness and capital are also allied with growth in long run in the desired country of this study. On the other hand, Azam et al (2014) make a comparison of the influences of FDI on economies of 7 Asian countries. The empirical results of FDI model reveal that GDP per capita income, infrastructure and gross domestic investment have positive impacts on inward FDI over the period of 1990 to 2012. The results of the growth model indicate that FDI, human capital and workers' remittances are positively related to economic growth. Moreover, the research outcomes show that corruption discourage economic growth directly in Malaysia, Singapore and Vietnam and also indirectly, through FDI inflows in Thailand.

Shahzad et al (2016) examine co-integration and causality among three main variables namely, economic affluence, terrorism and FDI in a recent research in 2016. As for as the findings are concerned, a very similar results have to be seen that the above three mentioned variables are co-integrated in long run. It is also an outcome of this study, a bidirectional causality between economic growth and foreign investment is present in Pakistan.

Theoretical Framework

Theoretically, terrorism events effect macroeconomic variables, such as domestic income (GDP), foreign direct investment, inflation and educational standards etc. Furthermore, terrorism events adversely disturbs economic growth and progress of a country by increasing government expenditures on defense (Shahbaz & Shabbir, 2012). The present study has selected economic growth to examine the relation of growth with terrorism in Pakistan. Furthermore, the study starts with the decisive work, neo-classical growth model developed by Solow (1956). Then study takes Solow's aggregate production by incorporating both FDI and TE. The natural logs (ln) has been taken on each sides of the equation below in order to avert the differences in the units of measurements for the variables, it leads to;

$\log GDP = \log\alpha_0 + \alpha_1 \log FDI + \alpha_2 \log TE + \alpha_3 \log EEI + \alpha_4 \log INF + \alpha_5 \log GCF + \varepsilon$

Where: α0, α1, α2, α3, α4, and α5 are parameters to be estimated
GDP = Gross Domestic Product
FDI = Foreign Direct Investment
TE = Terrorism Events
EEI = Elementary school Enrollment Index
INF = Inflation
GCF = Gross Capital Formation
ε = Error Term

Data and Methodology

This study uses an annual time series data for the period of 1981 to 2015. All variables are expressed in logs. The data set was obtained from World bank and global terrorism database (GTD). To check for the stationarity series of all the variables in the model, the unit root test was performed. Augmented Dickey Fuller (ADF) and Phillip Perron tests were performed to identify whether all the variables were stationary and to determine the variables' orders of integration. The johansen co-integration was then employed to see whether there exists a long run relationship among the variables. Finally, the granger causality test was used to examine the causal links between GDP and infrastructure. Granger causality test only indicates the direction of causality; it cannot forecast the sign of correlations. Therefore, correlation tests or impulse response analysis needs to be carried out (Granger et al., 2000). Impulse response function reports the standard deviation change in response variables due to standard deviation change in other.

Empirical Results

Descriptive statistics of data is used to define the basic features of dataset such as mean, median, and mode are the three measures of central tendency of a random variable (Gujarati, 2004). The key aspect of descriptive statistics is to present quantitative descriptions of the data in a manageable form like table. Thus, descriptive statistics are estimated for all the variables included in the model.

Table 1
Descriptive Statistics

	TE	INF	GDP	GCF	FDI	EEI
Mean	-0.183614	-0.044222	0.044273	-0.005741	0.078097	0.01451
Median	-0.14994	-0.044165	0.031065	0.001486	0.152371	0.01365
Maximum	4.465908	0.981962	0.205517	0.140629	0.861598	0.116358
Minimum	-5.043425	-1.04095	-0.101935	-0.129176	-0.844115	-0.129339
Std. Dev.	1.35776	0.395006	0.071533	0.05664	0.468944	0.046635
Skewness	-0.151835	0.385038	0.271015	0.011509	-0.227003	-0.438458
Kurtosis	9.466577	4.511999	2.340183	3.512748	2.090511	4.322853
Jarque-Bera	61.11705	4.198771	1.063352	0.384184	1.506883	3.673429
Probability	0	0.122532	0.587619	0.825231	0.470744	0.15934
Sum	-6.426488	-1.547772	1.549558	-0.200926	2.7334	0.507834
Sum Sq. Dev.	62.6794	5.305	0.173977	0.109074	7.476901	0.073944
Observations	35	35	35	35	35	35

The variable having standard deviations, indicate that violence is highly volatile followed by FDI and inflation. The standard value for Kurtosis of normality is 3 whereas the value of Kurtosis of TE, INF, GCF and EEI are greater than 3 which is a sign that leptokurtic distribution is present in the data. While the values of GDP and FDI are less than 3 which shows Platykurtic distribution.

Table 2
Correlation

	TE	INF	GDP	GCF	FDI	EEI
TE	1					
INF	-0.202400635	1				
GDP	-0.023543094	0.239458817	1			
GCF	0.16040927	0.032039305	0.168857255	1		
FDI	-0.059163056	0.40933018	0.196224144	0.109559789	1	
EEI	-0.057583861	0.223244183	-0.233955087	-0.214748547	0.078535859	1

Results of the table 2, indicate the relationship of the series with one another. Terrorism events have negative relationship with the gross domestic product, FDI, inflation and elementary school enrollment index which is used as a proxy of human capital. It implies that increase in terrorism has negatively influenced the economic growth, FDI and inflation.

Furthermore, increase in terrorism events has also negative influence over the elementary school enrollment index.

Unit Root Tests

The study used co-integration analysis in order to determine the long run relationship of terrorism in Pakistan with the economic growth, FDI, capital formation and human capital. In order to run the co-integration analysis, the assumption of data stationary should be fulfilled. For this purpose, unit root analysis has been conducted. Identical and independently distribution in data is the basic assumption of Augmented Dickey Fuller Tests. Another assumption is that the value of variance should be constant. Furthermore, Stationarity have been checked at level but the outcome was non- stationary, after taking first difference the required results for stationarity have achieved. The hallmark assumption of johansen co-integration about data of being stationary at same level have fulfilled in the present study. The main test for stationarity ADF is considered as a strict test was the main reason to avail an opportunity to use Phillip Peron Test as a substitute. The results showed that at first different the data has vanished its non- stationarity and become stationary.

Table 3
Unit root test statistics

Series	ADF level	ADF first diff	PP level	PP first diff
EEI	-2.051418	-5.244427	-2.89196	-5.254769
GDP	0.838745	-5.36398	0.913194	-5.36495
GCF	-1.368381	-5.937436	-1.406188	-5.93809
FDI	-1.559769	-4.950717	-1.590408	-4.950717
INF	-4.229312	-5.334422	-2.316921	-5.338812
TE	-2.30965	-6.427856	-2.122939	-2.122939
Critical value				
1%	-3.6329	-3.639407	-3.6329	-3.639407
5%	-2.948404	-2.951125	-2.948404	-2.951125
10%	-2.612874	-2.6143	-2.612874	-2.6143

Co-integration Analysis

Co-integration analysis is inherently multivariate, as a single time series cannot be co-integrated subsequently, consider a set of integrated variables. However, co-integration does not say anything about the direction of causality (Hendry & Juselius, 2001).

Table 4
Co-integration: Unrestricted Co integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	5 % Critical Value	Prob.**	
None *	0.716369	123.5564	95.75366	0.0002	Co-integration
At most 1 *	0.653881	80.71366	69.81889	0.0053	Co-integration
At most 2	0.532658	44.64063	47.85613	0.0972	No Co-integration
At most 3	0.272101	18.77701	29.79707	0.509	No Co-integration
At most 4	0.190961	7.978833	15.49471	0.4677	No Co-integration
At most 5	0.022507	0.773975	3.841466	0.379	No Co-integration

Table 5
Unrestricted Co integration Rank Test (Maximum Eigen value

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	5 % Critical Value	Prob.**	
None *	0.716369	42.8427	40.07757	0.0238	Co-integration
At most 1 *	0.653881	36.07303	33.87687	0.0269	Co-integration
At most 2	0.532658	25.86362	27.58434	0.0817	No Co-integration
At most 3	0.272101	10.79818	21.13162	0.6674	No Co-integration
At most 4	0.190961	7.204858	14.2646	0.4652	No Co-integration
At most 5	0.022507	0.773975	3.841466	0.379	No Co-integration

Table 5 reports the result for multivariate co-integration analysis for all the series. The results of present study depict that a long run relationship among gross domestic product, terrorism, capital formation and elementary school enrollment index and foreign direct investment can be seen. According to the result linear combination of all these series shows long run relationship.

Table 6
Bi-variate Co-integration

	Eigen value	Trace Statistic	5 % Critical Value	
EEI GDP	0.2268	8.7698	15.4947	No
	0.0007	0.0235	3.8415	Co-integration
EEI GCF	0.1744	8.6559	15.4947	No
	0.0610	2.1396	3.8415	Co-integration
EEI FDI	0.3578	18.4253	15.4947	Co-integration
	0.0944	3.3695	3.8415	
EEI INF	0.1412	9.8137	15.4947	No
	0.1275	4.6389	3.8415	Co-integration
EEI TE	0.3102	15.8230	15.4947	Co-integration
	0.0898	3.1975	3.8415	
GDP GCF	0.3111	13.5518	15.4947	No
	0.0255	0.8792	3.8415	Co-integration
GDP FDI	0.1967	7.4502	15.4947	No
	0.0001	0.0047	3.8415	Co-integration
GDP INF	0.1358	8.2035	15.4947	No
	0.0910	3.2430	3.8415	Co-integration
GDP TE	0.3383	15.4243	15.4047	Co-integration
	0.0399	1.3837	3.8415	
GCF FDI	0.2051	8.8834	15.4947	No
	0.0312	1.0781	3.8415	Co-integration
GCF INF	0.2537	14.9685	15.4947	No
	0.1372	5.0185	3.8415	Co-integration
GCF TE	0.2428	11.1251	15.4947	No
	0.0479	1.6687	3.8415	Co-integration
FDI INF	0.1880	9.4851	15.4947	No
	0.0682	2.4033	3.8415	Co-integration
FDI TE	0.2709	12.8872	15.4947	No
	0.0612	2.1459	3.8415	Co-integration
INF TE	0.1271	8.3980	15.4947	No
	0.1052	3.7781	3.8415	Co-integration
EEI GDP	0.2268	8.7698	15.4947	No
	0.0007	0.0235	3.8415	Co-integration
EEI GCF	0.1744	8.6559	15.4947	No
	0.0610	2.1396	3.8415	Co-integration

Table 6 shows the result for Bi-variate relationship of terrorism with gross domestic product, foreign direct investment, capital formation and elementary school enrollment index. For the Bi-variate relationship between terrorism and gross domestic product, the trace statistic value is higher than the critical value implying that terrorism and economic growth are integrated in the long run.

Similarly, the trace statistic value is higher than the critical value in the Bi-variate relationship of elementary enrollment index and foreign direct investment implying that elementary enrollment index and foreign direct investment are integrated in the long run. In the same way, result for Bi-variate relationship of terrorism with elementary enrolment index have the trace value more than critical value showing that both are long run integrated. However, the results depict that terrorism is not integrated with the capital formation and inflation.

Granger Causality

Table 7

Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
INF does not Granger Cause TE	34	0.08098	0.7779
TE does not Granger Cause INF		0.00119	0.9727
GDP does not Granger Cause TE	34	0.01602	0.9001
TE does not Granger Cause GDP		3.18306	0.0842
GCF does not Granger Cause TE	34	0.00019	0.989
TE does not Granger Cause GCF		0.74022	0.3962
FDI does not Granger Cause TE	34	0.00366	0.9522
TE does not Granger Cause FDI		0.31838	0.5766
EEI does not Granger Cause TE	34	2.66078	0.113
TE does not Granger Cause EEI		4.66515	0.0386
GDP does not Granger Cause INF	34	0.04251	0.838
INF does not Granger Cause GDP		1.29485	0.2639
GCF does not Granger Cause INF	34	0.01058	0.9187
INF does not Granger Cause GCF		1.49523	0.2306
FDI does not Granger Cause INF	34	0.21789	0.6439
INF does not Granger Cause FDI		0.19214	0.6642
EEI does not Granger Cause INF	34	1.24101	0.2738
INF does not Granger Cause EEI		0.05167	0.8217
GCF does not Granger Cause GDP	34	0.92204	0.3444
GDP does not Granger Cause GCF		4.49029	0.0422
FDI does not Granger Cause GDP	34	2.06779	0.1605
GDP does not Granger Cause FDI		0.01866	0.8922
EEI does not Granger Cause GDP	34	0.2372	0.6297
GDP does not Granger Cause EEI		1.18726	0.2843
FDI does not Granger Cause GCF	34	6.24027	0.018
GCF does not Granger Cause FDI		2.14193	0.1534
EEI does not Granger Cause GCF	34	0.5707	0.4557
GCF does not Granger Cause EEI		4.17383	0.0496
EEI does not Granger Cause FDI	34	0.266	0.6097
FDI does not Granger Cause EEI		0.52452	0.4744

In the above table the earliest column displays the null hypothesis for possible rejection at different significance level. Whereas second shows F statistic and third columns indicate probability value. According to the probability values reported in table the statement having a probability value less than or equal to 0.10 may be rejected as the null hypothesis. Based on probability value, we can reject null hypothesis, i.e. the value of terrorism event does not Granger cause GDP is 0.08. It depicts that terrorism events granger cause economic growth. There is unidirectional relationship between terrorism and GDP. Similarly, terrorism events have unidirectional relationship with elementary school enrolment index. The probability value for the null hypothesis, i.e. Terrorism events does not Granger Cause EEI is 0.03 suggesting that terrorism events have a substantial effect on EEI. Because terrorism badly affected the educational institute in the form of threat may cause decrease the value of EEI. Null hypothesis as FDI does not Granger Cause capital formation has probability 0.01 implying that FDI has impact on capital formation. Furthermore, Capital formation is positively related to foreign direct investment.

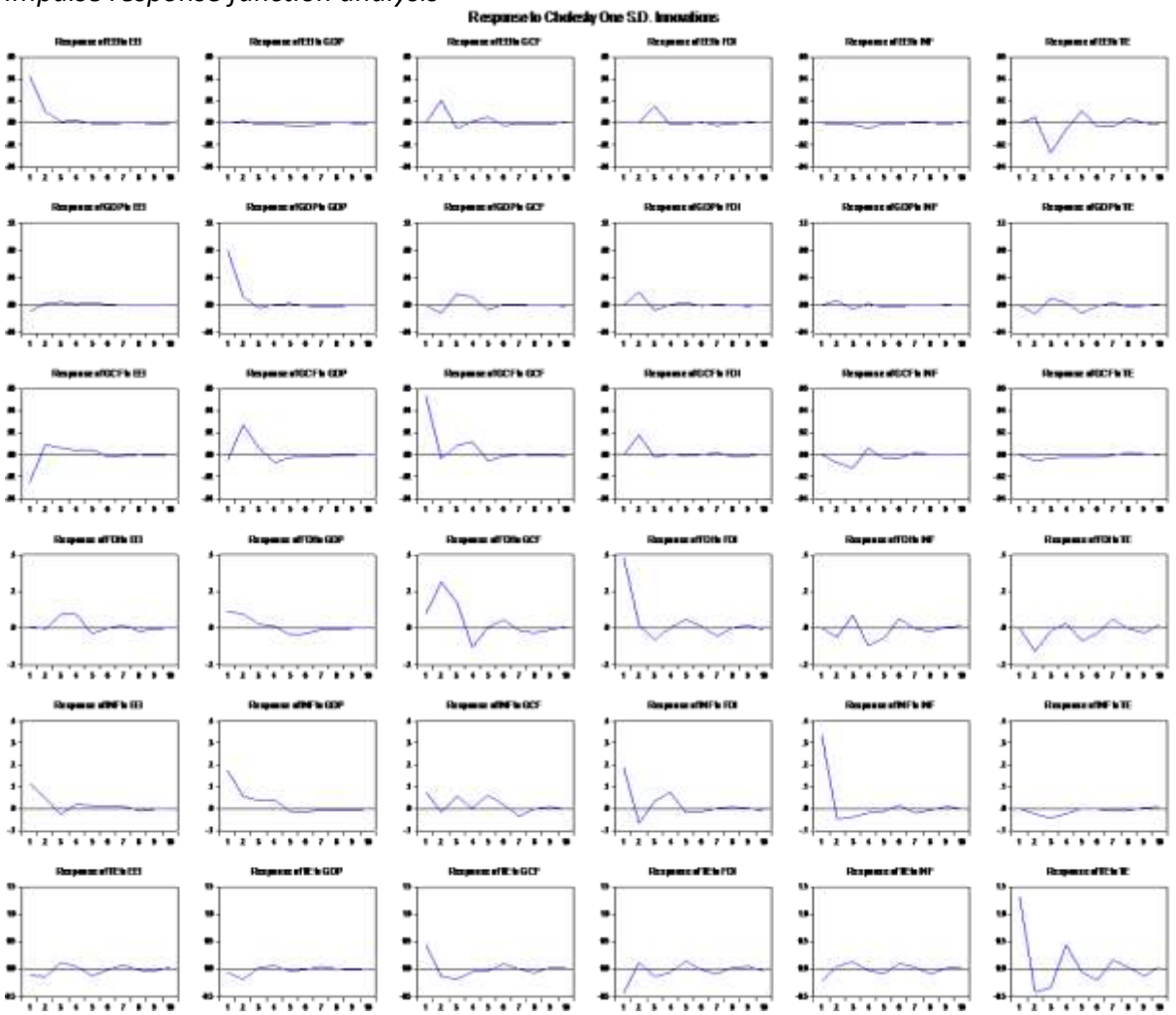
A part of additional FDI inflows is used for capital formation, e.g., in a sale contract the main component is privatization with a capital formation (Krkoska, 2002). Similarly, there is also a unidirectional relationship between capital formation and EEI.

Impulse Response Function

Results of impulse response function shows that education level shows positive deviation in response of gross capital formation and negative deviation in response of terrorism events. Gross domestic product shows positive shocks to gross capital formation and negative shocks to terrorism events.

Response of gross capital formation is negative to inflation and terrorism; whereas, positive to gross domestic product and foreign direct investment. Similarly, gross capital formation is negatively deviated by inflation and terrorism; whereas, positive to education, gross domestic product and foreign direct investment. Moreover, response of inflation is also negative to terrorism events while terrorism shows negative response to all other variables.

Table 8
Impulse response function analysis



Conclusion

This paper aims to investigate the causal relationship between FDI, terrorism events and economic growth by incorporating capital formation and elementary enrollment index as potential variables in the period of 1980–2015. Pakistan has suffered huge losses in terms of human losses and economic losses due to terrorism in the recent past. Most of the studies focusing on the foreign direct investment, education and gross domestic product has analysed their relationship by ignoring the economic consequences of terrorism. This study fills this gap by incorporating the role of terrorism in the economic indicators of Pakistan. Results show that all of these indicators are negatively associated with the gross domestic product, capital formation, and foreign direct investment in Pakistan. In addition, education level also showed negative association to the terrorism events. These results highlight that mere investigation of economic indicator may not suffice to provide the evidence on current economic situation. There are numerous studies reporting the economic outcomes of terrorism events, moreover, future research may focus on the impact of terrorism on other economic indicators like fiscal policy, monetary policy, health budget, housing markets etc.

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