

DRIVERS OF TERRORISM IN PAKISTAN: An Evidence through Institutional Prism

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Terrorism is a highly debated issue in developing countries like Pakistan. This study aims to relate the phenomenon with institutional framework of any economy. These institutions are actually responsible for behavior of people towards such activities. For this purpose, the role of social institutions through civil rights provision, specifically the political and economic institutions have been explored with respect to number of terrorist activities in Pakistan. Both, the long-run and short-run nexus among the desired variables have been developed because it is believed that institutions mostly show their effect in the long-run. Time span of the data used is 1975-2013. The findings prove that for all types of institutions, there exists both the long-run and long-run-relationship but in short-run social institutions it seems to be more responsible for causing this critical issue. The results show that about 89 per cent convergence towards equilibrium takes place (per annum) through these variables.

I. Introduction

The 21st century encountered a series of debating issues among which terrorism is the most crucial and persistent, ever experienced by humanity. Around the world, terrorism is now considered as a potential threat to the security of any country and every country is making efforts to either eradicate or counter these acts. The term ‘terrorism’ is not easy to define, just in few précised words; due to the complex and controversial nature of its concept. However, efforts to face terrorism are in process. Enders and Sandler (2000) attempted more sophisticatedly in this regard and defined it in very simple words: “it is the use of violence or threat of violence by the community to get a religious, political or ideological goal.” Therefore, mostly social and political injustice is considered the most impulsive reason for such crimes in the society. Many researchers have tried to find possible determinants of terrorism with the help of empirical analysis for different regions during different time periods, but remained inconclusive to reach some generalized opinions. Due to this vulnerability of researchers in the past, the present focus is diverting to tackle this phenomenon, according to ‘particularities’ of the region. Therefore, instead of depending on general solutions the approach of finding the ‘diagnostics’, first and then ‘remedy’ could be followed.

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At present, the South Asia is one of the regions that qualify to conduct research on issues of terrorism in this specific region where Pakistan is the highly victimized nation of such attacks. It's not only the issue of facing terrorism but is also the accusation of providing shelter to terrorists. Therefore, it is the need of time to find actual parameters behind this brutal activity in a nation which has its strategic importance for the whole region. Many studies have tried to relate this phenomenon with a range of social, political and economic factors but ignored the role of institutions which are actually responsible for factors mentioned above. Therefore, the present study attempts to fill this gap by incorporating the role of institutional set up in the empirical model. Keeping in view the institutional constraints faced by the region, this research work will help the policy makers to know as to where, the actual flaw exist in the economic system which does not let reforms to penetrate. This is the reason that all over the world, it is acknowledged that these developing countries have less serious issues related to their policy contents. Rather the problem is becoming acute in the case of implementation process which is related to the 'Governance Structure' of these economies. But, if we talk about these governance issues then we must keep in mind that it is not the cause of improved or poor institutional structure, instead it is the consequence of institutional set up of a country. Hence, the root cause of policy failure or success is those institutional parameters which are involved in decision and law making process. Such crimes are found less in their quantum where law and order situation is strong due to refined and well-integrated institutional networks. Therefore, the main objective of this research work is also to discover as to how much, such activities are motivated by different types of institutions as Pakistan who is facing both the issues simultaneously, i.e., poor institutional structure and the increasing number of terrorist attacks. For this purpose, various types of institutions have explored to see their individual role and its effects. Moreover, both the long-run and short-run dynamics have been analyzed for terrorist incidents, using the method of Johansen co-integration for the period 1975-2013.

The rest of the study is organized as follows. Section II discusses the literature review and Section III provides the hypotheses. Section IV describes the methodology explaining the models and estimations, while Section V conducts the diagnostic test of residuals. Finally Section VI concludes the study and gives recommendations.

II. Literature Review

In this section a brief survey of past studies related to terrorism have been presented. These research studies are mostly theoretical analysis, and only few of them are on empirical evidences. Ehrlich and Liu (2002), used the data of 10 less developed and 7 developed countries and attempted to test the causal relationship between terrorism and socioeconomic, and the demographic factors. The results

showed that demographic, poverty, inequality and the large number of young people who face weak economic outlook are factors that contribute to terrorism.

Krueger and Maleckova (2002) explored that there is no role of economic conditions for the incidence of hate crimes in Israel. Results of this survey showed that among people who are highly qualified and have better standard of life, the support for such violent attacks does not develop. Abadie (2004) analyzed empirically the determinants of domestic terrorism by using OLS and policy IV regression methods. The author proves that the transition from an authoritarian regime to a democracy may be accompanied by temporary increase in terrorism and certain geographical features may also favor the presence of terrorism.

Testas (2004) empirically measured the factors which explained terrorism covering thirty-seven Muslim countries. The results showed that education, civil war and low and high repression are positively related to terrorism while income variable proved to be negative determinant with weak relationship unless seen in the context of civil war. Piazza (2008) empirically tested that failing and failed states pose a danger to international security, as they produce conditions in which transnational terrorist groups flourish with the help of simple descriptive statistics and the time series, cross-country negative binomial analysis for 197 countries over the period of 1973 to 2003. The results indicated those countries which experienced high levels of state failure and are more at risk to transnational terrorist attacks. They excessively contribute to transnational terrorism.

Lisanti (2010) used the standard statistical model for the study of terrorism of the Sub-Saharan Africa between 1996 and 2007. The results showed strongest predictors of terrorism, state repression and military conflicts where repressive conflict-free states do not have high rate of terrorism; while the relationship between failure of state or democracy, and terrorism is ambiguous. Krieger and Meierrieks (2010) examined data for fifteen Western European countries for relationship between the welfare policy and domestic terrorism over the period of 1984-2003 and found that due to improved welfare policies and national socioeconomic conditions, the opportunity cost of terrorism increases.

Kis-Katos, et al. (2011) explored root causes of terror in the cross-country panel approach by linking the characteristics of state to number of terrorist incidents originating from that country. The results showed factors which increase the terrorism and are GDP per capita, the higher polity score, and experience of domestic conflict, anarchy and regime transition. Krieger and Meierrieks (2011) reviewed the evidence from the country studies about determinants of transnational terrorism to provide a global perspective on the roots of terrorism and proved that the nations with autocratic political regime, better economic system and instable political setups have more chances of transnational terrorism.

Nasir, et al. (2011) also explored the determinants of terrorism for South Asia with the help of negative binomial regression and hold these factors responsible

for terrorism i.e., political structures, economic conditions and inflation; while income inequality is a major cause of terrorism with respect to economic front. In addition, deprivation of political rights and civil liberties of some people force them to engage in terrorist activities, as well as, the main reason for terrorism in the region is the high level of literacy.

Khan (2012) examined the relationship between terrorism, economic growth, and education in the suppressed political system of Pakistan using time series data for 1972 to 2008 by applying Johansen method of co-integration. Results show that in the long-run, economic factors are not responsible for terrorism. They proved a positive link between education and terrorism due to two factors; one is the increased public consciousness, and second is the educated people who have more ability to be adaptive to the changing environment. Therefore, terrorists make use of this educated class in such activities.

Recently, Ismail and Amjad (2014) investigated the long-run determinants of terrorism for Pakistan and highlighted the role of socio-economic factors as major cause for this evil in the society. However, our study differs in a way that though the same phenomenon has been tried to revisit but various institutional perspectives have been considered. Evaluation of the past literature has helped us to develop few hypotheses for the present study and know more about this crucial issue mostly faced by developing countries.

III. The Hypotheses

This study attempts to test below, the three hypotheses in case of Pakistan:

- H_1 : There is an existence significant relationship between performance of social institutions and terrorism in Pakistan.
- H_2 : There exists a significant relationship between political environment and terrorism in Pakistan.
- H_3 : There exists a strong relationship between economic institutions and terrorism.

IV. Methodology

The methodology of this study has been designed after reviewing the past research studies on terrorism. For this purpose proper terrorism functions have been formulated for Pakistan using the annual data for the time period 1975 to 2013. Johansen Cointegration technique has been used to find the existence of long-run relationship among the variables, and the short-run relationship has been investigated by applying vector error correction model (VECM). STATA 11 is being used for all estimations. The functional forms of models to be estimated for evaluation of the

hypotheses of the study are given below. Institutions have been divided into three categories i.e., Social, Economical and Political Institutions. Performance of Social Institutions has been measured in terms of the setup of societal characteristics like civil liberties, population trends, education structure (both primary and secondary) and standards of living of people (SOL) proxied by GDP per capita income. If all these conditions are in favor of any economy then it means that there exists a strong social institutional network in the system which is try to provide basic utilities to the society. For Political Institutions, variables like political rights, role of military rulers have been one of the most important characteristics of Pakistani's economy; and the strength of regime measures as to how much the political system is stable or regime switching in any system, durability of system and the role of various types of political systems in Pakistan, like democracy and autocracy. All these variables are prominent features of the political system of Pakistan. Therefore, keeping in view the particularities of the specific system selection of variables have been made. Likewise, for Economic Institutions, role of income distribution in the form of income inequality has been taken along with many other variables like, unemployment, financial institutions and right to own property within the country. The role of financial institutions in terms of capital control has been used as an economic institution to show that how credit provision is being facilitated or restricted to the nationals and what has been the role of such access to credit towards terrorism.

a) The Models

Model 1: Terrorism = f (Social Institutions),

$$TR_t = \alpha_0 + \alpha_1 CIV_t + \alpha_2 SOL_t + \alpha_3 POP_t + \alpha_4 SE_t + \alpha_5 PEDU_t + \alpha_6 INFRA_t + \varepsilon_t \quad (1)$$

Model 2: Terrorism = f (Political Institutions),

$$TR_t = \alpha_0 + \alpha_1 POL_t + \alpha_2 MIL_t + \alpha_3 Polity_t + \alpha_4 DUR_t + \alpha_5 SYSTEM_t + \varepsilon_t \quad (2)$$

Model 3: Terrorism = f (Economic Institutions),

$$TR_t = \alpha_0 + \alpha_1 GINI_t + \alpha_2 U_t + \alpha_3 FI_t + \alpha_4 PR_t + \varepsilon_t \quad (3)$$

where:

- TR_t = Number of Terrorist Activities,
- PR_t = Ownership of Property Rights,
- SE_t = Secondary Education,
- $INFRA_t$ = Proxied by number of Telephone Lines,
- U_t = Unemployment,
- POP_t = Population,
- SOL_t = Standard of living measured by GDP Per Capita,
- $PEDU_t$ = Primary Education,

$GINI_t$	=	Income Inequality,
$Polity_t$	=	Regime Strength,
DUR_t	=	Durability of Political System,
POL_t	=	Political Rights,
FI_t	=	Financial Institutions,
CIV_t	=	Civil Rights,
MIL_t	=	Military Ruler,
$SYSTEM_t$	=	Democratic or Autocratic (Dummy Variable, 1 = demo, 0 otherwise),
ε_t	=	White Noise.

The data was collected from the World Development Indicators (WDI), World Bank (WB), Freedom House, Polity IV, 2012, and the Global Terrorism Database (GTD). Data for Primary Education (PE), Secondary Education (SE), infrastructure proxied by Telephone Lines (T), Unemployment (U), Population (POP), and SOL proxied by GDP per capita (GDPP) was taken from the WDI. Data for Income Inequality (GINI) has been taken from different years of Economic Surveys of Pakistan, UNDP, and the World Development Indicators (WDI). Data for regime strength (polity), Military (MIL), System (SYSTEM) and Durability (DUR) has been taken from Polity IV and for capital controls (FI) it has been extracted from EFW (Economic Freedom of World). Data for Political Rights (POL) and Civil Liberties (CIV) have been taken from Freedom House, while data for Number of Terrorist Activities (TR) which is dependent variable was taken from GTD data base. There were 5,459 entries in the original data source sheet presenting years, months, and days in which terrorist activities took place. In this study the data was converted into year-wise data by counting number of terrorist activities which occurred in a year. By doing so, 5,459 entries were reduced to 35 for the entire research study time span, i.e., within 1975 to 2013.

b) The Estimations

1. *Stationarity*

Starting estimation by applying Johansen Cointegration approach is the first step to check Stationarity among all variables. It has been observed that all variables are non-stationary since these series contain stochastic elements as proved by Nelson and Plosser (1982) and Stock and Watson (1988) in their studies. For this purpose Augmented Dickey-Fuller test has been applied. Moreover, selection of a specific model has been made after making and observing the graph plots of all variables. Augmented Dickey-Fuller test is specified as:

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \sum_{j=1}^P \beta \Delta Y_{t-1} + \varepsilon_t$$

where, the null hypothesis should be rejected and variable under investigation (Y) has a unit root, It can be rejected when test statistic is calculated negative, as well as, less than the critical value. Moreover, selection of a specific model is made after making graphs of original variable's dataset. For example, if the plot shows a random walk then the selection will be done for 'none'. For random walk with drift model the choice of 'intercept' and, for random walk with drift and with deterministic trend model, selection will be done for 'intercept and trend'¹. By observing the graph plots of all variables, such selection of models have been made.

In Table 1, the calculated test statistic values are given which have been checked against the values for 1 per cent, 5 per cent, and 10 per cent. These results have also been verified by applying Phillips Perron test. With this test no variable is stationary at level and they are all integrated in the same order i.e., I(1). Moreover, all variables seem to be almost highly significant at their stationary levels; but it can also be seen that Regime Durability (DUR) is stationary at level with Phillips Perron test as well as, with the ADF test showing the mixture of I(0) and I(1) variables. Therefore, Johansen [(1998), (1991)] cointegration test is employed.

TABLE 1
Unit Root Tests

Variables	Level	First Difference	Level	First Difference	Decision
TR	-2.053822	-7.605594***	-1.976203	-7.676970***	Stationary
PR	-1.925652	-11.80365***	-3.017739	-11.68926***	Stationary
SE	-1.839930	-8.064656***	-1.935143	-5.033231***	Stationary
INFRA	-1.478141	-4.515053***	-2.100348	-9.796030***	Stationary
U	-2.704755	-8.417231***	-2.740943	-8.479053***	Stationary
POP	-1.769650	-5.609616***	-3.448099	-2.289515***	Stationary
SOL _t	-1.742202	-4.190684***	-1.619728	-4.190684***	Stationary
PEDU	-2.786373	-5.797200***	-2.910340	-7.348556***	Stationary
GINI	-0.280645	-9.228879***	-0.279066	-9.579643***	Stationary
Polity	-2.013076	-5.633910***	-2.265525	-5.633994***	Stationary
DUR	-1.750069*	-6.592808***	-1.730233*	-7.057066***	Stationary
POL	-0.486771	-7.164728***	-0.452425	-7.084698***	Stationary
CIV	-0.287183	-5.244044***	-0.096202	-5.916080***	Stationary
MIL	-1.414214	-5.916080***	-1.475108	-5.916080***	Stationary
SYSTEM	-0.727607	-5.916080***	-0.747837	-5.916080***	Stationary
FI	-0.367509	-7.576879***	-0.435945	-9.157329***	Stationary

***shows significance at 1%, and *shows significance at 10%.

¹ See, Dimitrios (2006).

2. Lag Selection Criteria

The next important step for applying Johansen cointegration technique is the lag selection criteria. The issue of finding the optimal lag length is very important. For this purpose VAR model is estimated for three models of this research study. With trial and error procedure the decision for optimal lag is made by inspection of Schwartz Bayesian Criteria (SBC) and Akieke Information Criteria (AIC). In this study selection of lag length has been made with which values of the model get minimized. In Model 1 for lag 3 SBC as well as AIC value is minimum in all lag selection models. Therefore, on the basis of SBC criteria, lag 3 has been selected. In Model 2 for lag 1 SBC is minimum in all lag selection models; and for lag 3 AIC is also minimum for all lag selection models. Thus, on the basis of SBC criteria, lag 1 has been selected. In Model 3, lag 1 SBC and lag 3 AIC are minimum in lag selection models. Therefore, on the basis of SBC criteria, lag 1 has been selected.

3. Johansen Cointegration Test

After investigating the stationarity properties of series and finding optimal lag length, the next step is the selection of appropriate model which will be done for conducting final estimation. For this purpose, some authors suggested to depend on Pantula Principle² for the joint hypothesis of both rank orders and deterministic components. Using this technique results are found with most restrictive ($r = 0$) hypothesis through the least restrictive ($r = n-1$) hypothesis. For performing formal analysis of the long-run relationship Equation has been used:

$$\Delta X_t = \Gamma_t \Delta X_{t-1} + \dots + \Gamma_{k-1} \Delta X_{t-k+1} + \Pi X_{t-k} + \mu + u_t$$

where, a vector of variables is represented by X_t , a constant vector by μ , $\Delta (1-L)$ is the first-difference operator, coefficient matrix by Π with $r < k$ reduced rank and a vector of innovation by u_t . By using the trace (λ_{trace}) and max Eigen value (λ_{max}) statistics, null hypothesis is tested and that there are at most r cointegrating vectors.

The trace statistic is calculated as:

$$\lambda_{\text{trace}(r)} = -T \sum_{j=r+1}^n \ln(1 - \lambda_j)$$

and the maximum Eigen value statistic is calculated as:

$$\lambda_{\text{max}(r,r+1)} = -T \ln(1 - \lambda_{r+1})$$

² See, Dimitrios (2006).

By comparing the Trace and Max Eigen statistics with critical values at different significance level it can be known that how much Cointegrating equations exist. As long as these statistics are higher these vectors will remain there.

Model 1: Long-Run Relationship between Social Institutions and Terrorism

We now start from the first model and report the results in Table 2.

TABLE 2
Long-run Relationship using λ_{trace} and λ_{max} Statistics

Hypothesized No. of CE(s)	Eigen Value	λ_{trace}	Critical value 0.05	λ_{max}	Critical value 0.05
$r = 0^*$	0.935969	282.9996	95.75366	93.44538	40.07757
$r < 1^*$	0.868696	189.5542	69.81889	69.02811	33.87687
$r < 2^*$	0.839842	120.5261	47.85613	62.27413	27.58434
$r < 3^*$	0.653734	58.25194	29.79707	36.05862	21.13162
$r < 4^*$	0.469748	0.623642	3.841466	21.56968	14.26460

* denotes rejection of the hypothesis at the 0.05 level. MacKinnon-Haug-Michelis (1999) p-values.

Using the trace and Max Eigen statistics at 5 per cent of significance level, '5' cointegration equations have been found which indicates existence of a long-run relationship between social institutional variables and the terrorism. Both statistics Eigen and Trace are quite significant and help to conclude that there is a long-run relationship among variables under consideration.

Model 2: Long-run Relationship between Political Institutions and Terrorism

Similarly, the same process for finding the long-run relationship in case of Model 2 has been performed. Results are given in Table 3.

TABLE 3
Long-run Relationship using λ_{trace} and λ_{max} Statistics

Hypothesized No. of CE(s)	Eigen Value	λ_{trace}	Critical value 0.05	λ_{max}	Critical value 0.05
$r = 0^*$	0.788251	122.5284	95.75366	55.88469	40.07757

* denotes rejection of the hypothesis at the 0.05 level. MacKinnon-Haug-Michelis (1999) p-values.

Again, both statistics show highly significant results and prove that in case of Pakistan there also exists the long-run relationship between political institutions and terrorism. The only difference from Model 2 is that now the number of cointegrating factor is reduced to one.

Model 3: Long-Run Relationship between Economic Institutions and Terrorism

Table 4 shows the long-run relationship between economic institutions and terrorism.

TABLE 4
Long-Run Relationship using λ_{trace} Statistics

Hypothesized No. of CE(s)	Eigen Value	λ_{trace}	Critical value 0.05	λ_{max}	Critical value 0.05
$r = 0^*$	0.809632	121.9477	95.75366	59.71671	40.07757

* denotes rejection of the hypothesis at the 0.05 level. MacKinnon-Haug-Michelis (1999) p-values.

The statistics in Table 4 also prove the existence of long-run relationship between the role of economic institutions and terrorist activities. After confirming the existence of long-run relationship for these three models, the next step is to find the short-run relationship among these variables. For this purpose, Vector Error Correction Model has been applied. The results are reported in the following section.

4. Vector Error Correction Model (VECM)

Existence of a stable long-run relationship allows vector error correction model to find short-run relationship between the two time series, which is as follows:

For Model 1

$$\Delta TR_t = \alpha_0 + \alpha_1 ECT_{t-1} + \Delta\alpha_2 TR_{t-1} + \Delta\alpha_3 CIV_{t-1} + \Delta\alpha_4 SOL_{t-1} + \Delta\alpha_5 POP_{t-1} + \Delta\alpha_6 SE_{t-1} + \Delta\alpha_7 PEDU_{t-1} + \Delta\alpha_7 INFRA_{t-1} + \varepsilon_t \quad (4)$$

For Model 2

$$\Delta TR_t = \alpha_0 + \alpha_1 ECT_{t-1} + \Delta\alpha_2 TR_{t-1} + \Delta\alpha_3 POL_{t-1} + \Delta\alpha_4 MIL_{t-1} + \Delta\alpha_5 Polity_{t-1} + \Delta\alpha_6 DUR_{t-1} + \Delta\alpha_7 SYSTEM_{t-1} + \varepsilon_t \quad (5)$$

For Model 3

$$\Delta TR_t = \alpha_0 + \alpha_1 ECT_{t-1} + \Delta\alpha_2 GINI_{t-1} + \Delta\alpha_3 U_{t-1} + \Delta\alpha_4 FI_{t-1} + \Delta\alpha_5 PR_{t-1} + \varepsilon_t \quad (6)$$

In equations [(4), (5), (6)], ECT_{t-1} term shows the speed of adjustment towards long-run equilibrium that affects short-run movement in terrorism. According to the theory, it should be negative and as it is negative the sign shows that all regressors used in the model works together in the short-run to reach the equilibrium. Now, for Model 1, the results are given in Table 5.

Model 1: Short-Run Relationship between Social Institutions and Terrorism

The short-run empirics have been found by employing VECM explained above and using the variables which have been put to describe the role of social institutions.

TABLE 5

VECM for Model 1

ECT	D(CIV)	D(SOL)	D(POP)	D(SE)	D(PEDU)	D(INFRA)
-0.897486	0.000551	-1.260885	29.88456	159.5463	-0.000413	997.2537
(-4.95800)	(0.72330)	(-2.92730)	(1.23158)	(0.37531)	(-1.13159)	(2.53300)

Note: t-statistics in brackets ().

From the results it can be seen that living standards of the society and primary education are convergent towards equilibrium in the long-run while civil liberty, population, and secondary education show divergence from equilibrium. The main concern is the negative sign of error correction term which shows the overall stability of the model. In this model the value is negative and highly significant. The coefficient explains that about 89 per cent adjustments in the long-run take place through these variables.

TABLE 6

Cointegrating Coefficients for other Variables

Variables	Constant	CIV(-1)	SOL(-1)	POP(-1)	SE(-1)	PEDU(-1)	INFRA(-1)
Coefficients	-9254.864	285.1904	0.885422	-3.1905	-0.001486	214.9691	-0.000334
		(5.65977)	(9.32202)	(-4.85107)	(-12.3651)	(1.76851)	(-11.1372)

Note: t-statistics in brackets ().

$$TR_t = -9254.864 - 0.897486 ECT_{t-1} - 285.190CIV_{t-1} - 0.8854SOL_{t-1} + 3.2098 POP_{t-1} + 0.0014SE_{t-1} - 214.9691PEDU_{t-1} + 0.0003INFRA_{t-1} + \varepsilon_t \quad (7)$$

To, analyze the nature of relationship in long-run, co integrating coefficients are reported in Table 6. Therefore, it can be seen that except the primary education all variables show significant results in the long-run. All coefficients also show the expected signs. The level of secondary education, population, and improvement in telephonic infrastructure contribute positively towards terrorism in Pakistan, while level of civil rights and income affect negatively to such incidents which shows poor living standards of people and inadequate rights which force them to get involve in such crimes and acts. The positive sign of secondary education is also in line with Krueger and Maleckova (2002). The negative sign of primary education is indication of the fact that lower level of basic education is also one of the force in boosting this activity in the society. Overall, the impact on lack of civil rights is more in nature as compared to other social institutional factors showing importance of cultural norms and values practiced by the society.

Model 2: Short-run Relationship between Political Institutions and Terrorism

In this section the same technique has been applied to explore the nature of short-run relationship between political institutional factors and terrorism. Results of VECM (Table 7) shows that about 62 per cent convergence towards equilibrium takes place with the help of these factors. Moreover, this table also reports that variables political rights and military rulers also show convergence towards equilibrium in long-run. The variables like stability of the system, durability and nature of polity have divergent trend from equilibrium in the long-run.

TABLE 7

VECM for Model 2

ECT	D(POL)	D(MIL)	D(Polity)	D(DUR)	D(SYSTEM)
-0.627650	-0.004037	-0.000667	0.006193	0.003512	0.000292
(-2.61784)	(-3.64455)	(-2.12314)	(1.11854)	(0.94791)	(3.02742)

Note: t-statistics in brackets ().

Table 8 shows the co-integrating factors for this model and the results shows that variables political rights, durability of system and role of military rulers have significant negative impact on terrorism; while, the stability and nature of political systems affect positively towards terrorism, in the case of Pakistan. The results for political rights and for system are in line with Kurrild, et al. (2006) and Savun and Phillips (2009), respectively; while the result for regime durability contradict with Brynjar and Katja (2004) in the case of Pakistan.

TABLE 8

Cointegrating Coefficients for the other Variables for Model 2

Variables	Constant	POL(-1)	MIL(-1)	Polity(-1)	DUR(-1)	SYSTEM(-1)
Coefficients	400.0514	131.5075	490.0013	6.590912	38.78518	-80.2724
	-	(6.15487)	(5.63694)	(0.93135)	(-6.39086)	(-10.7457)

Note: t-statistics in brackets ().

$$TR_t = -400.0514 - 0.627650 ECT_{t-1} - 131.5075 POL_{t-1} - 490.0013 MIL_{t-1} - 490.0013 MIL_{t-1} - 6.5909 Polity_{t-1} - 38.7851 DUR_{t-1} + 80.2724 SYSTEM_{t-1} + \varepsilon_t \quad (8)$$

From Equation (8) it can be seen that less political rights, instability of political system and durability show negative relationship with terrorism. As in the case Pakistan, if political system is not stable, the negative signs show that absence of these characteristics in any economic society leads to more terrorism. The interesting facts found in our results are negative relationship observed between military leaders of a country and the terrorist attacks, while it is positive in case of democracy. This shows that military rulers can have restrictive effects on such activities as compared to democracy.

Model 3: Short-Run Relationship between Economic Institutions and Terrorism

After finding the short-run relationship between social and political institutional factors, the results have been found in Table 9 for the role of economic institutional factors and terrorism.

TABLE 9

VECM for Model 3

ECT	D(GINI)	D(U)	D(FI)	D(PR)
-0.849496	8.79005	0.000487	-7.963940	-5538.519
(-3.39005)	(2.43258)	(0.32469)	(-2.14675)	(-2.87874)

Note: t-statistics in brackets ().

From Table 9, it can be seen that variables like credit control and ownership of property rights measuring the role of economic institutions in any society are convergent towards equilibrium in the long-run while unemployment and income inequality shows divergent trend towards equilibrium. The sign of error correction term shows that overall these institutional variables prove stability of the model and conclude that 84 per cent per annum convergence towards equilibrium is taking place due to these specific factors explaining the role of economic institutions.

The co-integrating vectors given in Table 10 show the individual importance and role of these variables in boosting the terrorism activities in Pakistan's economy.

TABLE 10

Co-integrating Coefficients for other Variables for Model 3

Variables	Constant	GINI(-1)	U(-1)	FI(-1)	PR(-1)
Coefficients	-420.8333	-939.9776	-155.6408	0.006046	7.5432
		(-2.21863)	(-10.6002)	(1.02956)	(8.12369)

Note: t-statistics in brackets ().

$$\begin{aligned} \text{TRt} = & -420.8333 - 0.849496\text{ECT}_{t-1} + 939.9776\text{GINI}_{t-1} + \\ & 155.6408\text{U}_{t-1} - 0.0060\text{FI}_{t-1} - 7.5432\text{PR}_{t-1} + \varepsilon_t \end{aligned} \quad (9)$$

From Equation (9) it can be seen that income inequality and unemployment aggravate the terrorist activities by showing positive nature of relationship supporting results found by Lia and Skjøberg (2004), and Falk, et al. (2011); while variables capturing the role of financial markets for provision of credits shows negative influence on terrorism. It means that if attainment of credit money from banks is more restrictive then there will be less chance for such activities. Similarly, the ownership rights also show negative effects on terrorism suggesting that if people have enough rights to survive freely and own their properties then the incidents of such insurgencies will be less. Such rights are indication of access to basic necessities to survive, and if these lack in the nature then they can become a cause of turbulence in economies.

V. Diagnostic Test of Residuals

Some diagnostic analysis of residuals has been performed to check whether the model is perfect in nature or not. To check the presence of serial correlation in residuals, the LM tests have been performed. It shows that there is no serial correlation in residuals; even beyond the selected lags in the model. Moreover, a Portmanteau test for autocorrelations has also been applied to check autocorrelation in residuals. Q-statistics shows that this test is valid up to the chosen lag which means the tests suggests that in fact there is no serial autocorrelation left behind. Then, the test for normality was performed using Urzua residual covariance test. The null hypothesis of this test states that residuals are multivariate normal. The results (Table 11) shows that error terms are almost normally distributed.

TABLE 11

Normality Test

Normality Test Residual Covariance (Urzua)	Model 1	Model 2	Model 3
Jarque Berra (prob.)	44.01979 (0.4357)	11.10858 (0.4651)	18.45249 (0.8947)

TABLE 12

Heteroskedasticity Test

Heteroskedasticity Test	Model 1	Model 2	Model 3
Chi-Sq (prob.)	521.6718 (0.2839)	470.2632 (0.4453)	535.0343 (0.1638)

For Heteroskedasticity test, for residuals is also applied. Results are given in Table 12. The Joint tests shows that there is no problem of Heteroskedasticity in residuals. All this proves that our VECM estimation is satisfactory.

VI. Conclusions and Recommendations

This study carried out an analysis for finding driving forces in the case of terrorism through social, political and economic institutional perspective during the period 1975-2013 for Pakistan. Both, short-run and long-run relationships are tried to observe by employing Johansen cointegration technique. The results show the existence of co-integrating vectors among all variables used for explaining various institutions. Moreover, Vector Error Correction Model in case of all dimensions of institutions shows that these institutional factors are also drivers towards terrorism in short-run as well, confirming rejection of all the three null hypotheses of the study. The error correction terms of all three models proved the supremacy of social institutions in this nexus because results show that about 89 per cent convergence towards long-run equilibrium take place through these institutional factors. In case of social institutional model the role of civil rights has been observed important for such type of activities. In case of political institutions the role of military leaders appeared more restrictive factor for terrorism in Pakistan. From the perspective of economic institutions the impact of unemployment and income inequality is quite strong and positive in nature, for causing this evil in the society. Keeping in mind all these conclusions from the empirical evidence, few policy recommendations are suggested to eradicate or at least reduce the intensity of such criminal and destruc-

tive activities. First of all, it is now clear that people are induced towards terrorism because they lack opportunities for their survival in the society. Therefore, steps should be taken to improve the working of social institutions which can provide better chances for fulfilling the social needs of the society. Moreover, our education sector should carefully check the contents being delivered. Technical education should be explored further. This will change minds and thinking of educated people who will finally become healthy part of the economy, and with their social appraisal they will not play any role in generating terrorism. Political institutions of Pakistan are weak. There should be freedom of political rights for people and steps should be taken to stabilize political regime. It would strengthen the political institutions and will grow the possibility for economy to overcome insurgencies. Economic problems of people should be addressed well by opening avenues for job opportunities which can be helpful to reduce poverty and ultimately bring down the income distribution differences among various segments of the society. This will bring peace and sense of security among Pakistani nationals and they will remain reluctant to get involved in any anti-national activity.

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Bibliography

- Abadie, A., 2004, Poverty political freedom and the roots of terrorism, (w10859), National Bureau of Economic Research.
- Beck, T., G. Clarke, A. Groff, A.P. Keefer, and P. Walsh, 2001, New tools in comparative political economy: The database of political institutions, *World Bank Economic Review*, 15(1): 165-176.
- Dimitriou, A., and S.G. Hall, 2006, *Applied econometrics: A modern approach using Eviews and Microfit.*, New York: Palgrave Macmillan.
- Ehrlich, P.R., and J. Liu, 2002, Some roots of terrorism, population and environment, 24(2): 183-192.
- Enders, W., and T. Sandler, 2000, Is transnational terrorism becoming more threatening? A time-series investigation, *Journal of Conflict Resolution*, 44(3): 307-332.
- Esping-Andersen, G., 1990, *The three worlds of welfare capitalism*, 6, Cambridge: Polity press.
- Falk, A., A. Kuhn, and J. Zweimüller, 2011, Unemployment and right-wing extremist crime, *The Scandinavian Journal of Economics*, 113(2): 260-285.
- Freedom House, 2013, Freedom House country ratings and status, Available online: www.freedomhouse.org/report-types/freedom-world.
- Gurr, R.T., K. Jagers, and G.M. Marshall, Polity IV project, 2012, *Political Regime Characteristics and Transitions*.
- Jamal, H., 2006, Does inequality matter for poverty reduction? Evidence from Pakistan's poverty trends, *The Pakistan Development Review* 45(3): 439-459.
- Ismail, A., and S. Amjad, 2014, Determinants of terrorism in Pakistan, An empirical investigation, *Economic Modelling*, 37: 320-331.
- Johansen, S., 1988, Statistical analysis of cointegration vectors, *Journal of Economic Dynamics and Control*, 12(2): 231-254.
- Johansen, S., 1991, The power function of the likelihood ratio test for cointegration, *econometric decision models: New methods of modelling and applications*,: 323-335.
- Johansen, S., 1995, *Likelihood-based inference in cointegrated vector autoregressive models*, New York.
- Khan, H., 2012, *Determinants of terrorism in Pakistan: A time series analysis*, (Doctoral dissertation, Umeå University).
- Kis-Katos, K., H. Liebert, and G.G. Schulze, 2011, On the origin of domestic and international terrorism, *European Journal of Political Economy*, 27: S17-S36.
- Krieger, T., and D. Meierrieks, 2010, Terrorism in the worlds of welfare capitalism, *Journal of Conflict Resolution*, 54(6): 902-939.
- Krieger, T., and D. Meierrieks, 2011, What causes terrorism?. *Public Choice*, 147(1-2): 3-27.

- Krueger, A.B., and J. Maleckova, 2002, Education, poverty, political violence and terrorism: Is there a casual connection?, w9074, National Bureau of Economic Research.
- Lia, B., and K. Skjølberg, 2004, Causes of terrorism: An expanded and updated review of the literature?, FFI/RAPPORT-2004/04307, Kjeller: Norwegian Defence Research Establishment.
- Lisanti, D., 2010, Do failed states really breed terrorists?: An examination of terrorism in Sub-Saharan Africa comparing statistical approaches with a fuzzy set qualitative comparative analysis, NYU working papers.
- Nasir, M., A. Ali, and F.U. Rehman, 2011, Determinants of terrorism: A panel data analysis of selected Asian countries, *The Singapore Economic Review*, 56(2): 175–187.
- National Consortium for the Study of Terrorism and Responses to Terrorism (START), 2012, Global terrorism database, Retrieved from <http://www.start.umd.edu/gtd>.
- Nelson, C.R., and C.R. Plosser, 1982, Trends and random walks in macroeconomic time series: Some evidence and implications, *Journal of Monetary Economics*, 10(2): 139-162.
- Piazza, J.A., 2008, Incubators of terror: Do failed and failing states promote transnational terrorism?, *International Studies Quarterly*, 52(3): 469-488.
- Stock, J.H., and M.W. Watson, 1988, Testing for common trends, *Journal of the American Statistical Association*, 83(404):1097-1107.
- Summers, R., and A. Heston, 1991, The penn world table (Mark 5): An expanded set of international comparisons, 1990, *Quarterly Journal of Economics*, 106: 327–368.
- Testas, A., 2004, Determinants of terrorism in the Muslim world: An empirical cross-sectional analysis, *Terrorism and Political Violence*, 16(2): 253-273.
- World Bank, 2013, World Development Indicators, Washington, DC.

APPENDIX

Variables	Years	Sources
Number of Terrorist Activities	1975 to 2013	Global Terrorism Database (GTD)
Ownership of Property Rights	1975 to 2013	Economic Freedom of World (EFW)
Secondary Education	1975 to 2013	World Development Indicators (WDI).
Infrastructure	1975 to 2013	World Development Indicators (WDI).
Unemployment	1975 to 2013	World Development Indicators (WDI).
Population	1975 to 2013	World Development Indicators (WDI).
Standard of Living measured by GDP Per Capita	1975 to 2013	World Development Indicators (WDI).
Primary Education	1975 to 2013	World Development Indicators (WDI).
Income Inequality	1975 to 2013	World Development Indicators (WDI) & Economic Surveys of Pakistan, UNDP
Regime Strength	1975 to 2013	Polity IV data series
Durability of Political System	1975 to 2013	Polity IV data series
Political Rights	1975 to 2013	Freedom House
Financial Institutions	1975 to 2013	Economic Freedom of World (EFW)
Civil Rights	1975 to 2013	Freedom House
Military Ruler	1975 to 2013	Polity IV data series
SYSTEM _i Democratic or Autocratic (Dummy Variable, 1 = demo, 0 otherwise)	1975 to 2013	Polity IV data series