Heterogeneous Determinants of Terrorism:

Econometric Evidences from Cross Countries

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CERTIFICATE

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Abstract

This research attempts to quantify the major factors behind terrorism in the sample of 115 countries for period of 1990 to 2012. In this research we find that the causes behind the terrorism are heterogeneous across the various regions of the world. We used negative binomial model as our data was number of counts for terrorism. There is heterogeneity in structural variables including economic deprivation, demographic changes, socio-economic conditions, government stability, global order, internal conflict, and colonization in all regions of world. This heterogeneity is the main reason behind the fluctuation in number of terrorism incidents. Among all incorporated variables, different variables have not only different impact for all regions but also their significance is varying in nature. The impact of economic deprivation on terrorism in different regions is not appropriate. The negative relation of demographic changes or modernization with terrorism is higher in Sub Saharan region then the impact of socio economic conditions which is more important there. In Middle East, negative impact of modernization and religion in politics are prime factors behind terrorism. Similarly, internal conflict, government stability and religion in politics are major determinants of terrorism in Asian region. There is a positive impact of demographic changes in American and European region. We find that colonization has link with terrorism but it is not strong enough for considering it one of major cause. The religion in politics is significant cause of terrorism in American region. The effect of global order on terrorism is high in American region then in European region and almost equal in other regions. We suggest that regional analysis is very important for policy making as world is global village. We recommend that policies should not be same in all regions of the world for combating terrorism and have to alter region by region according to structural differences.

Chapter 1

Introduction

Over the past few decades terrorism becomes the biggest threat for world. With the attacks of September 11, 2001, the terrorism has grabbed the attention of policy makers of all spheres including politicians, economists, sociologists and psychologists. It has been under consideration of them to explore and put light on the factors behind this evil of threatening. Terrorism is basically considered as a political phenomenon but several studies by different economists and sociologists analysed terrorism by employing theoretical and methodological tools of social science [Kerridge (2014)]. But, with the advancement of inter-disciplinary studies in social sciences have brought terrorism under the umbrella of combining it with individual as well as collective studies of social sciences in general and economics in specific.

According to Sandler and Enders (2004), the nexus of economics and terrorism was brought into account with the study of Landes (1978). Landes (1978), analysed this relationship by implying econometric methods, for the data of skyjackings in United States. From this stepping stone, the unexplored features and aspects of economics and terrorism were in mainstreams with respect to policy perspectives. It is, then, realized that the economic approaches for determining different dimensions as well as the impact of terrorism are also acceptable as the political science approaches are. With the help of advanced methodologies of economics terrorism can be studied in a broader sense [Ozdamar (2008)].

The most prominent causes lie under the category of *structural* theories [Schmid (2011)]. These theories suggest that the determinants of terrorism can be originated

from the economic, political, social, and institutional structure of society[1]. Similarly, Acemoglu et al. (2001) suggest that current economic conditions depend upon the conditions of institutions in past. They argue that colonization has different impact on victim countries because of the intentions of invaders. In colonized countries out comers had two different strategies including extraction of resources and settlement over there. In states where the invaders settled the institutions are better as compare to other states. It is the main factor behind better economic conditions in those states and in consequence the less terrorism. In this research we analysed whether colonization is one of the factor behind terrorism or not.

Different studies explored the determinants of terrorism with the help of econometric techniques. For example, Campos and Gassebner (2009) used the technique to solve the count data to analyses the dynamics of terrorism. But the deep analysis of previous studies suggest that most of the studies are related to specific portion of world or specific country[2] and no one analysed the terrorism on world level and regional analysis. Similarly, incorporation of dynamics of econometric analysis of terrorism in one study is not seen [3] [Azam and Thelen (2008)].

Keeping the several drawbacks of previous studies in view, this study covers the different dynamics of terrorism and doing multi regional analysis. For this purpose we

[1] A considerable discussion exists over the idea of structuralism. It is a way of inquiry. The main feature of this method is that it takes its object for investigation as a system that is, the reciprocal relationships between a set of facts, rather than specific facts considered in isolation; its naive concepts are those of totality, and transformation [Bottomore (1983)]. And social structures refer to patterns visible in social life, regularities observed, and configurations detected. But the nature of patterns can identify in the mass of human experience depends upon one's perspective [Blau (1975)].

[2] Akhmat *et al.* (2013) studied south Asian countries by negative binomial regression. Caruso and Schneider (2011) studied terrorism in Western Europe.

[3] For analysis of terrorism Lai (2007), Piazza (2006) Kis-Katos *et al.* (2010) Blomberg *et al. (2004)* etc. studied terrorism by applying limited econometric techniques.

shall use several econometric techniques which are based on the panel methods of the count data. More clearly, we shall start with simple ordinary least square as a basic technique then we use panel data count models including Poisson regression, negative binomial random effect regression and negative binomial fixed effect regression.

Furthermore, this study is an attempt to make important association between *structural* [4] causes and terrorism. In hindsight of literature, with the help of encompassing technique we sum up almost all the variables suggested in different studies separately[5]. We estimate them on the basis of panel data and use their results for policy recommendation which provides pivotal contribution to the on terrorism.

Similarly, with the help of general to specific modelling, we will reduce the general model[6]which have relatively more variables, to specific model having only significant terms. The decision for final model with less variables is based on *t* test for coefficients and Wald test for overall model. In general model, for all included regions of the world, we have interaction terms of all variables.

Interestingly, several studies analysed different portions of world or group of countries and suggested determinants of the terrorism. Specifically, no one documented that terrorism is a heterogeneous phenomenon with respect to its determinants. However, there is no study available that covers the area comprehensively. However, this area is not well researched according to the best of our knowledge. Therefore, this study comprises the systematic analysis of

[4] Ross (1993), suggested that increase in intensity of structural causes leads to terrorism.
[5] Akhmat *et al.* (2014) suggest GDP per capita, government stability, are significant determinants of terrorism and Blomberg *et al.* (2011) suggest other determinants of terrorism including socioeconomic conditions. So we did not follow only one specific study for specifying the determinants of terrorism rather we incorporate all variables suggested in different studies.
[6] General model characterizes the empirical evidence within theoretical framework. The main aspects of this methodology include theory of reduction; model selection process; model selection criteria; model comparison; encompassing; empirical implementation [Campos *et al.* (2005)].

heterogeneous determinants of terrorism and empirically examines the socio-economic and political background of terrorist. Thereby, we do not inspect individuals, but rather stress is devoted to socio-economic and political situation in those states and regions from which terrorism initiate.

1.1 Objective of Study

The objectives of the study are:

1. To provide the details review on the determinants of terrorism across all regions of the world including socio-economic conditions, government stability, global order, economic deprivation etc.
2. To discuss the heterogeneity in these determinants of terrorism across the different regions of the world on the bases of econometric evidences in that region.

1.2 Significance of Study

It is obvious from the previous studies that some of the main determinants of terrorism are either missed due to some critical aspects of terrorism and its foundations or unavailability of data for terrorism or misreporting of factual harms of any terrorism activity. Moreover, we will check whether colonization is one of the major factor Furthermore, the structural causes have become major features for provoking terrorism, in underdeveloped and developing states. A large number of studies have analysed the impacts of institutional instability, political freedom, social indicators and economic indicators on terrorism. But, still there is not a single study which has explored their combined effect on terrorism. This study includes the data of 115 countries and divided them according to their region over the time period of 1990 to 2012. The data will be estimated through the panel methods of count data.

Therefore, this study will give a good source of reference on the subject for the student of econometrics as well as economics.

Chapter 2

Literature Review

The history of modern terrorism is divided in to three different waves, first) terrorism in the service of national liberation and ethnic separatism, second) left wing terrorism and third) lastly Islamist terrorism which are being discussed categorically. The end of Second World War gave birth to "anti-colonial" era of terrorism which already was in pre-mature epoch during 1920s. Its life span was roughly twenty years during which many countries emerged on the world's map. Correspondingly during 1960s, left wing terrorism emerged due to the opposition of Vietnam War. Radical groups from around the world undertook various terrorism strategies to further the vague political agendas of Marx and Lenin. It ended after the collapse of Soviet Union. The third wave of terrorism was evoked by the Iranian revolution of 1979 [Shughart (2006)]. Similarly, Orr (2015), suggests that terrorism is an act of war not of crime.

2.1 Definition and Determinants of Terrorism

Orr (2015), gives the definition of terrorism as "terrorism is the application of indiscriminate micro intensity coercion for ideological motivation, with or without persuasive attendants". The effect of terrorism is not only the physical but also it increase the worries of people about their lives. Bruck and Muller (2010), analyses the determinants of fear of terrorism and crime. Worries about two mentioned issues are driven by various individual characteristics, and social-structural indicators. Worries about safety are driven by number of household members and education. Older people and women are more prone to show large concern levels regarding crime and global terrorism. A large differences between determinants of concerns about the crime and

terrorism can be get in effect of education through the channel of estimating risks. They finally conclude that by explaining the true risk of global terrorism and crime can be one of steps to take to decrease the costs of these types of insecurity.

A plethora of research postulates that the terrorism is a heterogeneous phenomenon and there are different types of determinants of the terrorism. Kis-Katos *et al.* (2014), argue that the reasons of involving in terrorism for all groups are different than the others. Like, socialists are against inequality and want to remove the nationalism but internationalism (of workers) is not suitable for ethnic groups. Socialists' terrorism is more in countries with more minorities and has fewer rights. Right wing terrorism groups use ethnic purity as the bases for their fight. Religious terrorism increases due to other religions also against groups within one religion. It also increases as the influence of western culture or alignment of a country with US and presence of US troops increase in some specific religious country. With the help of trade openness we can show the increase in religious terrorism.

Countries with democracy also have high terrorism but the role of democracy to decrease terrorism is not clear. Developing countries or poorer countries are more prone to terrorism but at the same time if individuals have more care about the bright future of families then they may involve in terrorism and evidence show that, terrorists are better off. So the role of education is not clear in restricting terrorism but we cannot ignore that the economic development is favourable for avoiding terrorism.

Similarly terrorism has been discussed from various perspectives. First, a number of studies deal theoretically and empirically with terrorism, determining its causes and conditions on aggregate and individual levels [Bernholz (2004); Mesquita (2005)]. Second, a large number of studies empirically investigate the origins and attack

patterns of international and domestic terrorism [Campos and Gassebner (2009); Enders *et al.* (2010)]. Third, various empirical analysis attempted to figure out the economic, social and political costs of terrorism [Berrebi and Klor (2008); Chesney *et al.* (2011); Essaddam and Karagianis (2014); Kollias *et al.* (2013); Procasky and Ujah (2015)]. Fourth, some provides policy recommendations to reduce terrorism [Bernholz (2004); Drakos and Giannakopoulos (2009); Enders *et al.* (2010)]. Llussa and Tavares (2011), organize the existing literature on the economics of terrorism on the bases of themes and methodologies. They divide the papers into various themes and, for each theme, related to its main approach - micro or macroeconomic- and related to methodology – theoretical verses empirical. The division of the literature in such a way can contribute to the correct unnecessary imbalances which stand in way of advancement of knowledge.

2.2 Empirical Evidences for Causes of Terrorism

Many studies suggest various features of terrorism including its causes and impacts using econometric techniques. Similarly, some studies use panel data for their analysis and other use time series data. However, in this section we provide the empirical evidences of determinants of terrorism from different studies. It includes the various macro level and micro level studies which suggest that determinants of terrorism are different across the world.

2.2.1 Panel Data Studies with Macro Data

Specific to causes of terrorism a large number of empirical analyses try to highlight the determinants of it, using aggregate data. Most literature employs large country samples with long time horizons. These studies generally focus on international

terrorism, recognizing its dyadic characteristics with respect to the origins and targets of international and domestic terrorism. Some studies focus on country- or region-specific causes of terrorism to detect its dynamics. 'Aggregate' country-specific variables impact on the terrorists' cost-benefit matrix and consequently their behaviour. Such determinants may high (low) the price and the opportunity cost of terrorism, causing a decrease (increase) in terror activity. Using this idea, the empirical literature examines the significance of economic, political, socio-economic and various other factors to elaborate the production of terrorism [Krieger and Meierrieks (2011)].

There are several channels by which economic variables affect the intensity of terrorism. Blomberg *et al.* (2004), use the panel data of 127 countries from 1968 to 1991 to examine these channels. They utilize the Markov processes[7] for univariate analysis of each variable to check the relationship between terrorism and growth. They conclude that there is a link between economic activity and terrorism. In particular, high income plus democratic states are more prone to higher terrorism. Furthermore, there is a negative relationship between likelihood of terrorists' activities and economic business cycle.

Testas (2004), uses the data of 37 Muslim countries to analyse the factors behind the occurrence of terrorism. He finds that education is a significant determinant of terrorism as higher levels of education give rise to the more international terrorism. Similarly, low and high repression is a positive determinant of terror activities, so nonlinear (U-shaped) relationship holds. The dummy of civil war has also a positive

[7] Morkov processes are type of dynamic processes that detain the observed transitions from time period *t*-1, to either remain in that state at period *t* or to change to another situation at time period *t.*

influence. Furthermore, income has negative effect on terrorism, but it is either slightly significant or insignificant.

For studying terrorism the geopolitical and deprivation scenario of the countries is important as Bravo and Dias (2006) suggest. They use the data from 1997-2004 and apply OLS estimation for cross-country analysis. Their results show that terrorism is negatively relates with level of development, literacy level, and ethnic-fractionalization. Terrorism is positively relates to the mineral reserves, non-democratic regimes and involvement in international organizations.

The dominance of some countries in international politics and world economic order is one of the major causes of terrorism. Volgy *et al.* (1997), study the structural causes of international terrorism. They argue that the hegemony along with effects of key systemic conflicts are important reasons for transnational terrorism. One of the main reason of terrorists to use violence against the civilians is to destabilize existing domestic and international order. Similarly, it leads to disrupt global processes and the structural conditions which may accelerate the likelihood of terror activities. Dreher and Gassebner (2008), focus on the transnational events of terrorism. Their hypothesis explains that those countries who are friends or alliance with U.S. suffer more terrorism than other countries. UK (July 2005) and Spain (March 2004) faced terrorism attacks which can be directly related to their participation in "War on Terror" with U.S. in Iraq. They concluded that terror attacks increase as voting coincidence of a country with U.S. increase in United Nation General Assembly. An upsurge in voting share from 0 to 1 signifies one more terror attack. In contrast, they also conclude that suicide attacks are less frequent in countries who are friends of the U.S.

Over the past few decades religion is considered main cause of terrorism. Feldman and Ruffle (2008), examine the role of religion and religious ideology in terrorism. They focus on domestic terrorism because in last 10 years 90% of attacks are executed by terrorists from same country. They mention the debate of Adam Smith (1776) and Hume (1773) on the heterogeneity and competition in religion. They conclude that religiously motivated groups did lesser attacks as compare to other beliefs (e.g., nationalists and communists) but attacks of Religious groups caused more fatalities as compare to other groups. They finally say that if there is more diversity in religion then religious terrorism will decrease.

Domestic instability is explicitly main cause of international terrorism as suggested by Campos and Gassebner (2009). If this spill over impact or instability is extensive, it will be bigger on domestic than on transnational terrorism. They use various types of political instability to identify the escalation effect and other multiple indicators of international terrorism by using the number of terror incidents and their severity. They select negative binomial regressions for their empirical analysis and use yearly panel data of more than 130 countries since 1968. Their concluding remarks suggest that domestic volatility escalates into international terrorism as it provides the skills (e.g. military, organizational) required for performing international terrorism. They also conclude that political proximity to the U.S. is more important factor than being a rich country for transnational terrorism.

The concept that terrorism can be emerged only in developing countries is not right as [Kis-Katos *et al.* (2010)] suggest. They apply negative binomial technique on panel of 159 countries with time span of 1970 to 2007 and argue that most of previous studies discussed the origins of only international terrorism although 85% of all terrorism

incidents are domestic. Using data on terrorism from Global Terrorism Database (GTD) they empirically analyse causes of both international and domestic terrorism. They find that domestic terrorism is similar to international. In particular, they showed that terrorism is more likely derive from wealthier countries and monotonically increasing in GDP per capita. States with a higher level of political and civil liberties are more prone to raise terrorism. Domestic terrorism reacts more to transitions and conflicts than transnational terrorism. Higher stability of regimes, mainly of autocratic regimes, reduces terrorism. More steady regimes are more suitable for less terrorism as well. Lastly, they show that there is a high path-dependency in the formation of terrorism – the level of intensity in past terrorism affects strongly the present level. [8] For decreasing the terrorism the interregional inequality must be decrease.

Freytag *et al.* (2010), examine the determinants of terrorism from various regions of world. The results indicate negative impact of higher income on terrorism production[9]. There is negative correlation between investment and terrorism for whole sample of countries, but positive for Islamic region. Government spending shows a significant and negative effect for whole sample including OECD and European states but it is insignificant for Islamic world. A high level of economic freedom, measured by Fraser Economic Freedom Index, should prevent terrorism in free countries but influence is insignificant. This may show trade-off between institutional opportunity and political violence. The low institutional environment of countries may have deprived persons of economic opportunities, consequently rather low opportunity costs of terrorism. They conclude that terrorists will have a large number of

[8]Their results are in line by the failed state hypothesis: Domestic or internal conflicts and lawlessness are hotbeds for domestic and international terrorism alike.

[9] Blomberg and Hess (2008), get same results for income but for Islamic states Piazza (2006), does not find association between economic development and terror.

supporters and volunteers when poverty is high and growth is low. Human capital enhances terrorism considerably in OECD and European states but insignificantly positive for Islamic world. They argue that likelihood of education to discourage terrorism depend on the level of education. Population size is linked to increase in terrorism.

There is threshold of development with reference to macroeconomic performance and below that specific line better performance may increase terrorism. Similarly, Gassebner and Luechinger (2011), explore the relationship of terrorism with various country level variables like democracy, infant mortality rate etc. They utilize extreme bound analysis to capture the different correlates. They conclude that there is no robust association between terrorism and degree of democracy.

Measurement of economic development by using GDP per capita also does not matter for terrorism. They suggest that infant mortality rate and economic freedom are negatively associate with terrorism. Caruso and Schneider (2011), empirically analyse the socio-economic determinants of terror activities and political violence. They use the sample of twelve countries from Western Europe. They conclude that higher current economic opportunities for persons will lead to decrease the likelihood or willingness of them to be involve in terror activities. Current terror activities are positively correlate to the expected future economic escalation. Furthermore, their results also show that GDP per capita is positively associate with terrorist violence[10].

Akhmat *et al.* (2014), explore the root causes of terrorism in South Asia. They employ the panel data techniques for period of 1980 to 2011. They conclude that there is a negative relation between GDP per capita and terrorism, however, population growth

[10] Calculated as number of citizens killed.

rate, unemployment rate, inflation, poverty and government instability exhibits positive link with terrorism in South Asia. In contrast, trade openness does not significantly correlate with terrorism incidence in the region.

There are several studies which suggest that the socio economic conditions are not necessary conditions of terrorism. Gries and Meierrieks (2013), use the Hsiao-Granger method to study the causality between domestic terrorism and economic growth for specific Western European countries. They find that economic performance in causing terrorist violence appears as significant for some countries not for all countries. While, all attacked countries have been prosperous in adjusting to the danger of terror activities. Krieger and Meierrieks (2011), provide an overview of the empirical evidence on determinants of terrorisms by focusing on origins and targets on international terrorism. They assemble various theoretical families that relate the terrorism to, e.g., socioeconomic, political, institutional and demographic factors. They conclude that the socioeconomic and political underdevelopment may connected to terror activities but neither necessarily nor unilaterally. Similarly, Piazza (2006), show that there is no direct relation between poverty, economic conditions and occurrence of terrorism.

Other than traditional studies which use specific variables Gries and Meierrieks (2013), analyse the effect of banking crises on terror activities. They use the data of 146 countries from 1972 to 2006. They conclude that banking crises lead to increase in terrorism. Furthermore, this effect is only appropriate in less developed economies. Similarly, Murdie and Stapley (2014), suggest that specific type of nongovernmental organizations (NGOs), namely those using nonviolent means to advocate for the modifications in the government human rights practices, effect behaviours of the

potential terrorists supporters in ways not liked by terrorists groups. They conclude that advocacy-based human right NGOs increase terror attacks against whole NGO sector by changing dynamics of terrorists-domestic audience relationship in ways that decrease the audience support of terrorist organizations.

One of the main reasons of terrorism is gender imbalance as there will be greater ratio of women then law and order and bureaucracy will be weaker. When countries will not be capable to maintain security then terrorism will increase. Younas and Sandler (2015), show that gender imbalance lead to increase the domestic terrorism in developing countries. They conclude that developing states are more vulnerable to terrorism due to higher feminine proportion and weak bureaucracies to administer. Relative less number of men in institutions faces difficulty to counter domestic terrorism.

2.2.2 Time Series Studies with Macro Data

There are several studies which focus the specific countries for their analysis of terrorism. Shahbaz (2013), investigate the relationship between the inflation, economic growth, and terror activities in Pakistan. They apply ARDL bounds testing technique to cointegration and employ the annual data over the time of 1971-2010 for all variables. They conclude that there is cointegration between three variables. An increase in inflation and economic growth are major contributor to terrorism. Moreover, two way causality is found between inflation and terrorism with the help of VECM Granger–causality approach. Similarly, Saeed *et al.* (2014), present the descriptive analysis of terror activities in Pakistan for past three decades.

The severity of terrorism is found to differ from one region of country to another in result of geopolitical events. They conclude that frequency of terror incidents was high in 1990s but lethality of terrorism was at peak in 2000s. Overall, the terrorist violence has an increasing trend. The composition of terrorism (sectarian, ethnic, non-sectarian religious) has changed over past three decades, with the sectarian terror attacks emerging as more lethal. The tactics have also changed with change in time, with bombing is more common in 2000s as compare to 1990s. Furthermore, the geographical patterns of terror incidents has also changed - national and the provincial capitals were attacked 64% of time in 1980s and 25% of the time now.

Krueger (2008), attempts to highlight the background of all terrorists' who involved in home-grown terrorists' plots starting from the attack on World Trade Centre (1993) because in this attack residents of U.S. involved. According to him, plot should be conceived in U.S. and should have major involvement of U.S. residents is a necessary condition for considering it as home-grown terrorist plot. For his analysis author compared the alleged Islamic terrorists with Muslim residents of U.S. he finds that domestic Islamic terrorists are more educated and younger. The relation between terrorism and education shows that there is high supply of potential terrorists who have more education because they can attack more accurately. He also conclude that the home-grown domestic terrorists are less likely to be citizens of U.S also converts to Islam. They are more likely to born in U.S. than other Muslims in America.

For studying the link between different socioeconomic and political conditions and terrorism Ismail and Amjad (2014) analyse the determinants of terrorism in Pakistan. They conclude that most threatening factors being responsible for society are income inequality and poverty. They also suggest that there exist long run and short run

relationship between economic conditions and terrorism. Furthermore, they there is bi-directional causality in terrorism and inflation. There is unidirectional causality between GDP per capita, unemployment, GDP growth and terrorism.

Education and poverty provoke terrorism as suggested by [Krueger and Maleckova (2003)]. They did a deep analysis of causal connection between them. Their results on the basis of individual level information of terrorists suggested that there is no direct relationship between education, poverty and terror acts. Although there is indirect and weak relationship exists. They concluded that from the supply side of terrorism, educated people are more likely to involve in politics and terrorism is violent form of political engagement. If it is true that terrorism come from the countries which have less civil rights then it is political phenomenon not economic. On the demand side of terrorism, organizations prefer more competent persons as they will be more suited to fit in foreign environment for international terrorism. So the concentration should be on quality and content of education not on quantity and years of schooling. Similarly, Berrebi (2007) explore them on micro level. He uses logistic probability model and chi-square test for empirical testing. He concludes that high level of income and higher education both positively associated with participation in terrorism organizations. Being married is less prone to involvement in terrorist activities.

The states which deny the subsistence rights along with civil as well as political rights make an environment which is conducive to development of terrorism. For testing this argument Callaway and Harrelson-Stephens (2006), investigated the relation between the human rights conditions and terrorists activity in Northern Ireland. They concluded that denial of security rights is the necessary condition for creation and growth of terrorism. Furthermore, the limits on civil and political rights of Catholic

minorities in Northern Ireland play a significant role in creation of terrorism. Moreover, British abuses of the security rights raised the number of Irish citizens who support and participate in terror activity.

There is correlation between poor economic conditions, characteristics of suicide attackers and their targets as Benmelech *et al.* (2012) investigated. Unemployment allows terrorist organizations to get more educated and experienced people for suicide attacks and at the end targets will be more accurate. On the bases of case study of Palestine-Israel conflict they concluded that poor economic conditions give access terrorism organizations to get more educated people. Poor economic conditions drive the heterogeneous quality of terrorism among different Organizations. They also concluded that terrorism groups who provide excludable public goods get more benefit from poor economic conditions in difficult economic times.

Yildirim and Ocal (2012) investigated the causes of provincial terrorism by taking into account the spatial dimension. They included the data from 1990-2006 for Turkey. The econometric technique they applied for assessing the spatial variations is geographically weighted regression (GWR). They concluded that increase in the income and schooling ratio leads to reduce provincial level of terrorism, while an increase in the unemployment enhances it. Furthermore, GWR results show that provincial effects of the per capita income and education are more likely to pronounce for the Eastern and South Eastern regions compared to Western regions due to disparities in overall growth and huge differences in wealth of provinces.

2.2.3 Studies Based on Micro Data

Supreme values are the bundle of aims preferred by group of people upon aims of other groups. According to them human and capital resources should be spent in achieving those aims, it also leads to use of arms to accomplish them. Bernholz (2004) discuss that when the ideologies do not obtain the secular power they have terrorism as the main source which is designed to convey the message and threaten the target. For the true believers of an ideology fighting as a terrorist is not just fight against people but he has supreme values which inspire him to fight against the evil and have to spread the true ideology by hook or by crook. He concluded that victim of terrorism societies cannot compete with developed countries.

The individuals who have low ability or less education are potential volunteers for terror organizations. Mesquita (2005) constructed a model in which he showed the relationship between government, terrorist organization and volunteers for terrorist groups. However the terrorism groups select the volunteers through screening for quality. At the end the actual members will not be poor and less educated. The research further demonstrated that the economic contraction is the reason behind the enhancement in quality of recruitment from terrorism organization.

Terrorism organizations invest in charitable works and in public goods to get support from general public. Suppose terrorist group has concern about two things simultaneously, keep doing attacks in opposition to the government and facilitate general public with doing charitable work. Ly (2007) argue that terrorists invests in attacks and in charity. It seems appropriate to assume that as increase in terror activities will lead to boost up invest in public goods by terrorist group. Charities from violent groups are more difficult and prone to face investigation according to

their levels in ascending order. Moreover, this impacts negatively to their source of fund raising. Furthermore, terrorist division is altruistic, as it cares about overall development program available to the mass. These programs include provision of various private and public goods, it includes credit, education health etc. Terrorist group take gain from its own provision of public goods and from government inconsistency as the general benefit from expansion programs is a public good. Finally, he conclude that charitable work is like a base for terrorists as it likely to facilitate and provide more favourable environment to the attackers and even they use them as place to hide militants and weapons. Similarly, Mesquita (2005) mention that group also concern about popular support for its reason. This comes from individuals in the population who voluntarily give time in support of the group's benefit. Then the whole impact of terrorist group is the amount of its direct attack and support from public.

Club model explains the situation when government and other private sectors would not be able to provide the basic needs to the general public then groups in society come forward and help the people but majority of them have cause behind the help of people. Berman and Laitin (2008) apply club model to elaborate the gentle activities of different groups and their effectiveness in terrorism. They conclude that when different terror groups provide public goods then they use their influence and form efficient militias. Religious organizations use suicide attacks when targets are highly protected and when organizers want potentially great damage. They were of the view that for decreasing the influence of different sects the government should provide all public goods with the help of private sector. Government can disturb the infrastructure of such organizations but sympathizers should be convinced.

Development of such institutions that help in well- functioning of market economy is necessary for combating the terrorism.

The general behaviour of terrorists is very important to study. For this purpose Siqueira and Sandler (2010) analysed argue that there are Global Terrorists Organizations (GTO) like al- Qaida works in different countries on the bases of different local representatives in countries as its sub-groups. There are three stages of all players who involved in terrorism or counterterrorism. Stage 1: the local representatives, supporters of terrorists and under attack governments are country specific. GTO select representatives and supporters in countries for terrorism. GTO simultaneously care about global net gains and maximum support across countries. Utility of representatives and supporters is not the main objective of GTO rather it depends indirectly on the decisions of GTO. Stage 2: In each country local terror groups try to maximize their utility by terror activities irrespective of supporters.

On the other hand local governments try to minimize its losses and costs which occur due to terrorism. Stage 3: supporters of terrorists settle on their level of participation by solving a utility- maximization difficulty with given constraint. Blomberg *et al.* (2011) argued that terrorist groups maximize their objective function subject to different constraints. In each period terrorists use their resources in alternative attack types which may include tactics like, bombing, assassination etc. or target type like government officials, business, etc. to maximize their outcome from terrorism.

The possibility of success for a given type of attack is reliant on three variables: first, the resources dedicated to attack, second the share of international terrorist attacks, and last is environmental considerations. When terrorists allocate more resources to an attack type then chances of success increase at diminishing rate. Terrorist

maximize their payoffs from an attack by allocating given resources to different attack tactics. If the resources of terrorism group increase which show the change in constraint will lead to increase in all type of attacks. Success in any attack type will lead to shift resources to that type of tactic. Transactional terrorism is more risky as compare to domestic that's why marginal probability of success decrease at diminishing rate. Environmental considerations like, trade openness, group ideology etc. may influence positively or negatively to the chances of success.

2.3 Impacts of Terrorism

Similarly terrorism yields terrible costs to the world, Firstly, the loss of life as well as the psychological integrity. Secondly, the terrorism disturbs economic activity as it results in narrowing the economic growth (Blomberg *et al.*., 2004). It decreases foreign direct investments and interrupts trade (Abadie and Gardeazabal, 2008; Nitsch and Schumacher, 2004). It also hurts tourism industry (Drakos and Kutan, 2001), and increases volatility in stock markets (Kollias *et al.*., 2013; Essaddam and Karagianis, 2014). Thirdly, terrorism influences the voting behaviour and affects the political system (Berrebi and Klor, 2008). In short, terror activities are very costly for the victimized societies and at the same time harsh for the rest of the world.

There is drastic impact of terrorism on tourism industry. Drakos and Kutan (2001) estimated the impact of terrorism on tourism for three Mediterranean countries including Greece, Israel, and Turkey. They used the data from 1996 to 1999. Tourism is an industry which bear indirect and direct cost due to terrorism. Some major costs are, reduction in tourist arrivals which lead to reduction in Foreign Direct Investment, cost of advertisement for new tourists increase, reconstruction of damaged places, and high security for safety of tourists. Tourism is constituted a big part of GDP in above

mentioned Mediterranean countries but at the same time these are witnessed with terrorism. The findings of this article suggest that in Turkey and Israel tourism is affected by terrorism but for Greece same argument is not true. The results of current research for Greece are contradictory to Enders *et al.* (2010) may be due to different sample periods in both research. The decomposition of rural and urban areas with respect to terrorism acts in Greece showed that the terrorism in urban areas have negative impact on tourism. Despite the insignificance of direct effect of terrorism on Greece there is an indirect impact which is relative increase in tourism market share for Israel. Additionally, they mentioned that the substitutability of market shares affected due to terrorism incidents between Turkey and Israel.

Similarly, the impact of terrorism on international trade is analysed by Nitsch and Schumacher (2004). They applied the gravity model of bilateral trade which incorporate several determinants of terrorism and external conflict. Terrorism is the reason behind insecurity which leads to higher cost for business. Higher security regulations show that trade become more costly. There is high risk of destruction of traded goods due to terrorism. When countries involve in more trade radicals will target industry supply chains and other transport modes of trade to disturb the system. They concluded that volume of trade reduce due to terrorist actions.

To be specific, they also concluded that by doubling the digit of terrorist incidents in one year will lead to fall in bilateral trade by almost 4% in same year. Abadie and Gardeazabal (2008) investigated the large impact of terrorism on the world economy. The used the international data on terrorism and stock of FDI assets and liabilities in conventional macroeconomic model. Their model suggests that, the terrorist attacks decrease expected return to investment. As a result, significant change in the terrorists' attack has an unclear effect on investment but, it may become reason for

shift in capital beyond countries if the economy of world is adequately open. They argued that in an open economy terrorist activity in world may induce the re-allocation of productive capital stock across all countries even if relative degree of terrorist risk remains unchanged transversely. By using cross-sectional analysis they concluded that terrorist risk reduce net foreign direct investment positions of country.

Berrebi and Klor (2008) empirically examined the sensitivity of *Israeli* electorate due to terrorism. There is democratic parliamentary system of country and elections supposed to hold every four years. There are two theories for voting behaviour policy and partisan, in this article the hypothesis of policy theory is tested. They used the falsification approach to avoid the doubt in causal effect of terrorism and spatial variation added to avoid the identification problem. They divided the electorate parties in two blocs right and left. Right bloc includes the parties who are inflexible towards terrorism and left bloc is moderate. They used the daily data of fatalities due to terror attacks also they included the data from other sources on country level. They concluded that electorate in country is highly sensitive to act of terrorism. Furthermore, they concluded that support for right bloc of political parties increase as the terrorism increase in state because they are rigid to terrorism.

There is a strong impact of terrorism on stock markets of world. Chesney *et al.* (2011) find there is significant effect of terrorist attacks on European, Swiss, American and global markets. The results of this study show that on the day of attack American firms experience abnormal volatility. Crosse-sectional investigation of the abnormal volatility suggests that there is different effect of attacks on the volatility of stock according to attributes of the victim country. If the victim firm is located in wealthier or more democratic country the stock return volatility will be high. Kollias *et al.* (2013) analysed the effect of terrorism and war on the volatility of stock market and

oil prices returns and their covariance. They used four major stock market indices for analysis which are American S&P500, the Europeans DAX, CAC and the last is FTSE100.

Many previous studies show war and terrorist attacks not only affect equity markets but also other economic activities. Many studies show that there is negative relation between terrorism and stock market returns. They concluded that two wars in Iraq affected the oil prices-stock market relationship. Two of four stock indices - S&P500 and FTSE100 - show that there is no effect of terrorism on that. Hence, their relation to oil prices is unchanged. Other two indices - CAC and DAX - have volatility due to terrorism and relationship of stock indices with oil prices is also affected.

Procasky and Ujah (2015) use a panel of 102 countries to examine the long-term effect of terrorism on the capital markets. They focus the impact of terrorism on separate sovereign debt ratings of countries to make "base line" for cost of debts. They empirically calculate the effect of terrorism on bond market. They conclude that on 10 point scale, terrorism increase two-points will lead to half cut reduction in country's sovereign credit rating. Similarly specific to developing countries this impact leads to whole cut downgrade in the country's sovereign credit rating.

2.4 Conclusion

This chapter is divided into five different subsections. These are definition & determinants of terrorism, panel data studies with macro data, time series studies with macro data, studies based on micro data and impacts of terrorism. The chief purpose is to cover the different dimensions of the terrorism. Keeping all the discussion in view, we can safely claim that the terrorism has a number of different determinants in

the different parts of the world. Therefore, the present study is an attempt to discover the heterogeneous determinants of the terrorism in the different part of the world.

Chapter 3

Analytical Framework and Estimation Strategy

This chapter is distributed into two main sections. The main task of the first section is to describe the theoretical background of the analysis. That is, this section attempts to present the details how the terrorism is determined by the heterogeneous variables. Then we shall specify an estimable regression based on the theoretical framework. Second, task is to present the econometric strategy to estimate the specified regression.

3.1 Analytical Framework

This section explains the framework for analysing the determinants of terrorism for all regions of world which provoke terrorism. The United Nations General Assembly has described terror activities using following definition of terrorism: "Criminal acts intended or calculated to provoke a state of terror in the general public, a group of persons or particular persons for political purposes are in any circumstance unjustifiable, whatever the considerations of a political, philosophical, ideological, racial, ethnic, religious or any other nature that may be invoked to justify them."

Therefore, a plethora of research incorporated different structural variables for their studies [Freytag *et al.* (2010); Caruso and Schneider (2011)]. Therefore, this study also tries to use all those variables to examine the joint impact of them on terrorism. Therefore, the purpose of this section is to specify a general regression model for the structural causes of terrorism to determine the intensity and amount of terrorism.

Following [Robison *et al.* (2006); Ross (1993)] we assume that the terrorism depends upon structural environment of the country which include the economic deprivation (*EDEP*), socioeconomic conditions (*SEC*), demographic changes (*DMC*), government stability (*GS*), global order (*GO*), institutional inefficiency (*INTIN*), internal conflict (*INTCON*), religious in politics (*RIP*). In following section we will elaborate all above mentioned structural causes separately and at the end we will show them in functional form.

The poor structural economic conditions generate frustration, which in result makes violence more likely. For instance, terrorist should find it easier and less costly to recruit from frustrated volunteers when economic deprivation prevails [Gurr (1970)]. Therefore, [Blomberg and Hess (2008); Azam and Delacroix (2006); Lai (2007); Azam and Thelen (2008)] propose that terrorism is deep rooted in economic deprivation that is in poverty and within-state inequality.

Beside this, many studies linked terrorism with demographic changes. Krueger and Maleckova (2003), Lai (2007), and Freytag *et al.* (2010) find that more populous states are more likely the producers of terrorism. Political instability also causes terrorism as political change make political vacuums which terror organizations use to drive their agendas (Campos and Gassebner 2009). Such vacuums may attractive as major groups are less likely to be challenged from instable governments.

Furthermore, the terrorism is fostered through modernization. It encompasses, economic change, new forms of communication and new ideas (Robinson *et al* 2006). These variables possibly create grievances related with socio economic patterns. For instance, economic development may be associated with the restructuring of labour

market, initiating grievances between 'modernization losers' who turn into unemployed due to economic changes (Robison *et al.* 2006, Ross 1993).

Similarly, the political violence in a country and its potential and actual impact on governance leads to terrorism. Some studies termed this political violence as internal conflict (Sanin 2006). Internal conflict significantly affects growth and ultimately is the one of major reasons of terrorism (Hisamoglu 2014, Sanin 2006). If people are incited by the existing global order that is taken as 'unfair', it should be very easy for terror groups to find support by building upon related grievances in source countries of terrorism. The terrorists or disfranchised parts of the society may use aggression against global modernization and to counter foreign dominance (i.e., Western superiority). External conflict and global order can drastically affect foreign business in several ways, including the restrictions on operations of trade, investment sanctions, and violent change in structure of society. Similarly, it also matters to terrorism, where terrorism driven by global factors is international in nature (Bergesen and Lizardo 2004).

Religious tensions are one of the causes of terrorism and religious groups want to replace the civil law by religious law and seek to exclude other religions from political and social process. Most of the times, the aim of the religious groups is to take over governance and destruction of religious freedom. For showing its own identity, different from the state as a whole religious groups provide public goods and take the sympathy of people who are against the government. Ultimately they use the people in terror activities (Ly 2007). There is a positive relation between institutional inefficiency and terrorism (Krueger and Laitin 2008). Similarly, the better institutional structure leads to decrease the terrorism (Krueger and Maleckova 2003).

All this discussion can be summarized in figure 3.1. The variables in left side of figure like poverty, GDP per capita are indicators of different structural causes which are in centre of figure like economic deprivation. Finally they lead to terrorism so we say all these are major causes of terrorism and in this study we will discuss them.

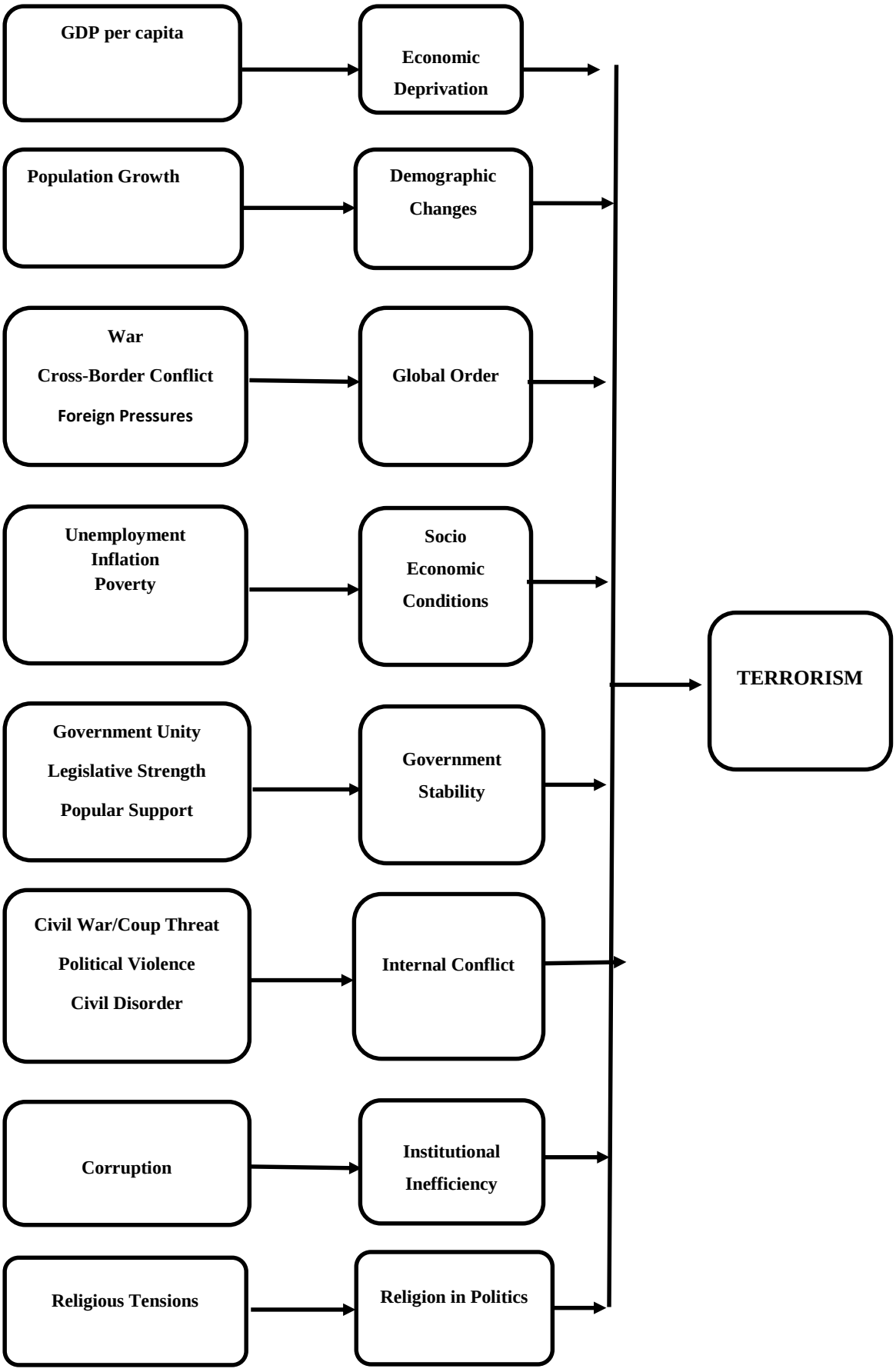

Figure 3.1: Determinants of Terrorism

In addition, we for further analysis whether colonization is one the factor behind terrorism we included the dummy of colonization. Hence, on the basis of all above mentioned causes of terrorism the functional form of terrorism is given as

$$Terr = f(EDEP, SEC, DMC, GS, GO, INTCON, RIP, INTIN, DUMCOLO) \quad (3.1)$$

This study includes the different countries of the world for regional analysis of terrorism and data comprises time series. So, our model has the nature of panel data technique as of various other studies (Blomberg *et al.* 2004). In following section we explain the econometric strategies which we use in this study.

3.2 Econometric Strategies

The equation 3.1 can be estimated through OLS directly if a continuously/ratio data is available on the terrorism. However, unfortunately, the decisions by individuals to become the terrorist and its dependence on different socio economic conditions in a country are not easily observable. Alternatively, we can use country aggregates with respect to terrorism. From GTD data on the single terrorism incidents we constructed the panel dataset of *number of terror incidents* in a certain country during a given year (non-negative integers) for 115 countries and for each year from 1990 to 2012.

Therefore, it leads us that our dependent variable is the count variable. This requires the use of estimation methods which specifically designed to cope with count data. Probability distribution of count data is truncated at zero and the strongly skewed to the right. In particular, this is an over dispersion (variance to mean ratio) phenomenon which leads to application of regression model other than OLS. A main implicit assumption in OLS is that our dependent variable is continuous. This assumption is

violated when the dependent variable is not continuous. In this study our dependent variable is discrete values. Sometimes, the dependent variable is zero in our analysis. If the number of terrorism incidents is large in every period then OLS is possibly safe. Similarly the assumption of normal distribution of general linear model (GLM) also violated as counts are bounded at zero. It does not make sense to predict negative numbers of terrorism incidents. On the other hand, as is the case, number of terrorism incidents are not so high in each period and there is preponderance of 0's so OLS is not acceptable. Thus ultimately we need a model that is better for count data.

Therefore, we shall shift on the count data models. There are two main models designed to analyse the count data Poisson and negative binomial regression. In following section we provide econometric equations for estimating count regression.

3.2.1 Poisson Regression

Poisson regression is the form of regression strategy and used to estimate count data. It assumes that dependent variable has Poisson distribution.

The Poisson probability distribution is given as:

$$\Pr(Y = y|\lambda) = \frac{e^{-\lambda}\lambda^{y}}{y!} \qquad for\ y = 0,1,2,\ldots \tag{3.2}$$

Where λ is expected value of Poisson distribution it is also variance of Poisson distribution. Similarly, Poisson is the one parameter λ (lambda) where $\lambda it = \exp(x_{it}\beta + offset_{it})$.

3.2.2 Negative Binomial Regression (NBR)

Negative binomial model is generalization of Poisson model because it relax the restrictive assumption of Poisson distribution that variance is equal to mean. The

Negative Binomial distribution is based on Poisson gamma mixture distribution. This model is popular as it takes the Poisson heterogeneity with gamma distribution. The negative binomial distribution is the alternative model for count data with over dispersion.

The probability distribution of negative binomial distribution is given as:

$$Pr(Y = y|\lambda, \alpha) = \frac{\Gamma(y + \alpha^{-1})}{y!\,\Gamma(\alpha^{-1})}\left(\frac{\alpha^{-1}}{\alpha^{-1}+\lambda}\right)^{\alpha^{-1}}\left(\frac{\lambda}{\alpha^{-1}+\lambda}\right)^{y} \quad (3.3)$$

The negative binomial distribution has two parameters: λ *and* α. λ is mean value of distribution. And α is over dispersion parameter and when $\alpha = 0$ then negative binomial distribution will be same as the Poisson distribution.

The negative binomial distribution is able to account for the variance that is greater than mean (over dispersion). In contrast, the Poisson distribution is where mean is restricted to equal to the variance. The use of negative binomial regression has become the standard estimation strategy in empirical analysis of terrorism (Kis-Katos *et al.*, 2010). Similarly, we use conditional fixed-effects negative binomial (FENB) in contrast to pooled negative binomial model which include the constant over dispersion parameter δ. It does not allow for the individually different dispersion parameters and more restrictive than FENB panel regression technique.

3.2.3 Panel Negative Binomial Regression

In panel negative binomial regression we have two choices random effect and fixed effect with over dispersion. Let y_{it} is the count of t_{th} value in i_{th} group. We start as $y_{it}|\gamma_{it} \sim Poisson(\gamma_{it})$, where $\gamma_{it}|\delta_i \sim \text{gamma}\,(\lambda_{it}, \delta_i)$ with $\lambda it = \exp(x_{it}\beta + \text{offset}_{it})$ and δ_i is dispersion parameter. It forms the model as

$$\Pr(Y_{it} = y_{it}|x_{it}, \delta_i) = \frac{\Gamma(\lambda_{it} + y_{it})}{\Gamma(\lambda_{it})\Gamma(y_{it} + 1)} \left(\frac{1}{1 + \delta_i}\right)^{\lambda_{it}} \left(\frac{\delta_i}{1 + \delta_i}\right)^{y_{it}} \quad (3.4)$$

Looking within-panel effect, we find that the above specification gives a negative binomial model for i_{th} group with the dispersion (variance divided by mean) equal to $(1 + \delta_i)$. It shows the constant dispersion within group.

3.2.4 Random Effect Negative binomial Regression (RENBR)

Specifically, for random effect over dispersion model, we let δ_i to fluctuate randomly across the groups; as we assume $\frac{1}{1+\delta_i} \sim Beta\ (r, s)$. The joint probability of counts for i_{th} group is:

$$\Pr(Y_{i1} = y_{i1}, \dots, Y_{in_i} = y_{in_i}|X_i) = \int_0^\infty \prod_{t=1}^{n_i} \Pr(Y_{it} = y_{it}|x_{it}, \delta_i) f(\delta_i) d\delta_i$$

$$= \frac{\Gamma(\mathrm{r} + \mathrm{s})\Gamma(r + \sum_{t=1}^{n_i} \lambda_{it})\Gamma(\mathrm{s} + \sum_{t=1}^{n_i} y_{it})}{\Gamma(\mathrm{r})\Gamma(\mathrm{s})\Gamma\left(r + s + \sum_{t=1}^{n_i} \lambda_{it} + \sum_{t=1}^{n_i} y_{it}\right)} \prod_{t=1}^{n_i} \frac{\Gamma(\lambda_{it} + y_{it})}{\Gamma(\lambda_{it})\Gamma(y_{it} + 1)} \quad (3.5)$$

For $X_i = \left(x_{i1}, \dots, x_{in_i}\right)$ and f is probability density function for δ_i.

3.2.5 Fixed Effect Negative binomial Regression (FENBR)

Similarly, for fixed effect over dispersion, we condition joint probability of counts individually for each group on sum of the counts for group (that is, observed $\sum_{t=1}^{n_i} y_{it}$). Specifically, the conditional fixed-effects negative binomial (FENB) model, as we use in this paper, is given by:

$$\Pr(Y_{i1} = y_{i1}, \dots, Y_{in_i} = y_{in_i} \left| X_i, \sum_{t=1}^{n_i} Y_{it} = \sum_{t=1}^{n_i} y_{it} \right.)$$

$$= \frac{\Gamma(\sum_{t=1}^{n_i} \succ_{it})\Gamma(\sum_{t=1}^{n_i} y_{it} + 1)}{\Gamma(\sum_{t=1}^{n_i} \succ_{it} + \sum_{t=1}^{n_i} y_{it})} \prod_{t=1}^{n_i} \frac{\Gamma(\succ_{it} + y_{it})}{\Gamma(\succ_{it})\Gamma(y_{it} + 1)} \qquad (3.6)$$

Letting $y_{it} \in \{0,1,2, \dots\}$ denote the total number of terrorism incidents in a country $i \in \{1, \dots, N\}$ at time $t \in \{1, \dots, T\}$ forms our dependent variable. This variable acts as the dependent variable in all subsequent regressions. The expected number of terror activities depends upon the vector of explanatory variables x_{it} and country specific fixed effects α_i, i.e. $E(y_{it}/x_{it}) = \exp(\alpha_i + x'_{it}\beta)$ with β as vector of regression coefficients to be estimated. This expected outcome is assumed to be associated with negative binomial distribution. With parameter δ_i denote dispersion parameters. In this case, dispersion (variance to mean ratio) $1 + \delta_i$ is constant within the each cross-section unit. The fixed- effects method is favoured over random-effects as it is less restrictive by letting a random correlation between country specific effect δ_i and independent variables.

See Hausman *et al.* (1984); Cameron and Trivedi (2013); Greene (2003). The fixed-effects negative binomial model is not the "true" fixed-effects model in the sense that time invariant individual regressors are taken by fixed-effects (Allison and Waterman, 2002; Guimaraes, 2008). It models individually the different dispersion parameters (which effects means and variances), but unlike traditional fixed effect model, it allows to estimate time invariant individual parameters. One main property of FENB is, however, that it drops the countries from sample that do not have positive counts (of terror incidents) in time period covered as individual dispersion parameter cannot be calculated. The FENB model is flexible by permitting separately different

dispersion parameters. We applied the negative binomial regression (nbreg) as proposed by Hausman *et al.* (1984) and performed in Stata.[11]

3.2.6 Hausman Test

The distinction between the fixed and random effect model is important, as random effect estimator is inconsistent if actually the data is generated by individual-specific effect model. Let β_1 is the subcomponent of β (i.e. coefficient of time-varying regressors), or subset of it. Similarly, $\widehat{\beta_{1,RE}}$ and $\widehat{\beta_{1,FE}}$ show, respectively, the RE and FE estimators.

Finally, the Hausman test statistic is:

$$H = \left(\widehat{\beta_{1,RE}} - \widehat{\beta_{1,FE}}\right)' \left[\hat{V}\left[\widehat{\beta_{1,FE}} - \widehat{\beta_{1,RE}}\right]\right]^{-1} \left(\widehat{\beta_{1,RE}} - \widehat{\beta_{1,FE}}\right) \quad (3.7)$$

If $H < \chi^2_{\alpha}(\dim(\beta_1))$ then at the significance level α will not reject the hypothesis that individual effects are uncorrelated with the regressors. In this case there will be no need of fixed effect model otherwise we use fixed effect model.

3.3 Conclusion

This chapter gives a detail description of the theoretical background of the specified regression. Several points are mentioned to theoretically justify the proposed model. Then we, in the second section of this chapter, document the selected estimation strategy. We discussed how OLS will be not a better choice to estimate the equation 3.1. Then we discuss the alternative econometric strategies. Among all these, we prefer negative binomial regression in the panel data framework to all other estimation methods.

[11] See also Cameron and Trivedi (1998) for count data regression

Chapter 4

Data and Variable Construction

As mentioned earlier, the major task of the study is to investigate the heterogeneous determinants of the terrorism. The meanings of this statement are that there are different determinants of the terrorism. To accomplish this task, we have to go through across the different regions, different samples and different measurements. Therefore, this chapter describes the region of analysis, period of analysis, data source, and variable description. Theoretical reasoning behind studying association between terrorism and various structural variables is the main issue that this chapter seeks to explain.

4.1 Region of the Analysis

The main focus of this study is to explore the heterogeneity in determinants of terrorism in five regions of world including America, Asia, Europe, Middle East & North Africa, and Sub-Saharan Africa. There are various studies which analyse the different determinants of terrorism for different regions of world. For example, Bravo and Dias (2006) analyse the determinants of terrorism for countries of Eurasia region (West Europe, East Europe, Middle East-Persian Gulf and South Asia). They divide these regions in to two main parts in context of geopolitics and deprivation. Their results indicate that determinants of terrorism vary in two geopolitical areas. Similarly, Dreher and Gassebner (2008) suggest that there is major impact of political closeness of a country to the United States on the happening and severity of terrorism in that country. It suggests that the influence of United States in countries is not same and in the consequence the occurrence of terrorism also differ country to country.

Ezcurra and palacios (2016) examine the relation between interregional inequality and incidence of domestic terrorism. They document that increase in interregional inequality leads to increase in number of terrorism events. Similarly, Kis-Katos *et al.* (2010) empirically examined the determinants of terrorism for developing and developed countries. Their results show that determinants of terrorism are not same for both type of countries.

The socio economic conditions in a country may increase terrorism but it does not mean that only weak conditions matter as Freytag *et al.* (2010) empirically investigated the causes of terrorism in different regions of world by examining the conditions in those states from which terrorism emerged. In richer countries, the threat of terrorism is higher than in poorer countries[12]. They found that trade openness, proxy for globalization, affect positively to terrorism. GDP per capita and terrorism is positively correlated except for Islamic world where that is not significant[13].

As we mentioned few studies which analyse the determinants of terrorism for specific regions and suggested that they are not same. However, literature has inconclusive discussion for specific determinants of terrorism for various regions of world. Yet, the researches disagree on all key determinants for terrorism, i.e., the part of poverty, democracy and state instability for the occurrence of terrorism. This controversy may give a source of motivation to do regional analysis of terrorism. In this regard we take 115 countries which comprises the five regions of world. The rational for this approach is availability of data for countries on different variables for analysis.

[12] This finding contradicts to the finding of Blomberg and Hess (2008).
[13] Blomberg *et al.* (2004) also found same in his research.

4.2 Period of the Analysis

The phenomenal differences among the socio economic conditions and other determinants of terrorism and for better policy making against terrorism over the past few decades simulated the renewed interest in analysing the causes of terrorism. The attention of researchers has increased for studying the determinants of terrorism after the cold war and attack of World Trade Centre (1993) because the frequency of attacks has increased after that. More specifically, after the attack of 9/11 the terrorism has become the main target to stop. This probably explains why the growing body of empirical as well as theoretical research has shifted towards study of terrorism after 1990s. Realising the importance of these issues and considering them as major points we use the data from 1990 to 2012 for measuring the determinants of terrorism across the regions of world. The rational for selecting data from 1990 is availability of the balanced panel for all countries.

4.3 Nature of the Data

As we have said earlier that we are interested to measure the various determinants of terrorism for 115 countries. The researchers suggest that using time series data is the best strategy because time series take all the historical patterns of countries. However, availability of a longer time series data for all these countries is the major limitation in this regard. Therefore, the panel data would be a better choice in this regard. Because, with the help of panel data technique, we can solve the problem of low number of observations. In panel data approach we can pool cross sectional units with time series observations.

Panel data has many advantages as compare to other form of data. For example Baltagi (2006) documented that 1) panel data can easily tackle this problem of heterogeneous and differences among individual units through dummy variable or

individual effect. 2) Panel data is the combination of time series and cross sectional observation; therefore it is more informative than others. It gives more variability, less collinearity among variables, more degree of freedom and more efficiency of parameters. Keeping these arguments in the mind we shall use panel data for 115 countries over the period of 1990 to 2012 for doing the regional analysis of terrorism.

4.4 Data Source

In order to analyse the heterogeneous impact of different structural variables on terrorism in different regions of the world the data have been derived from the global terrorism database 2015 (GTD) on terrorism. According to Global Terrorism Database (GTD), the terrorism is defined as:

"A terrorist attack as the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation".

The data for different independent variables is collected from world development indicators (WDI), and international country risk guide (ICRG)[14].

4.5 Variable Construction

Analysing the determinants of terrorism from different regions of the world is the main focus of the study. The regression analysis requires the clear cut definitions of the dependent and independent variables. In the present study, the terrorism is the dependent variable (denoted by *TERR*).

On the other hand, there are number of independent variables which will be used in this analysis. For example, economic deprivation (denoted by *EDEP*); demographic

[14] The detailed information on the source of all variables is mentioned in appendix.

changes (denoted by *DMC*); socio-economic conditions (denoted by *SEC*); government stability (denoted by GS); religion in politics (denoted by *RIP*); global order (denoted by *GO*); Internal conflict (denoted by *INTCON*) and institutional inefficiency (denoted by *INTIN*). The details of the constructions of the all variables are given below.

4.5.1 Terrorism *(TERR)*

The global terrorism data (GTD) base contains various measures relating to terrorism. However, to analyse the peculiar traits of terrorism we use one variable from this dataset. The dependent variable indicates whether a given state has been the victim of terrorist attack in a given period. As such, our analysis attempts to sketch the profile of countries that are more or less likely to be victims of terror attacks, and we do so by keeping focus on the states in which terrorism is occurred which will lead to regional analysis of terrorism.

A number of measures have been adapted to asses and quantify the extent of terrorism by which countries are affected. In this study, we examine whether a terror attack occurred or not in a given state during the time period we are investigating. As a consequence, we incorporate one of standard measures of terrorism which is the *number of terror incidents*.

However, there are some limitations for this measure including, the number of terror incidents and accurate number of deaths and casualties are mostly not easy to establish exactly-mainly in less-developed states and non-democracies (Kurrild-Klitgaard *et al.* (2006)). Since only few subset of all terror incidents are reported by media and figure in the official statistics. This makes measures of both terror incidents and casualties vulnerable to bias in reporting of terrorism. Similarly, it may be not

easy to establish - and mostly depends upon subjective opinion - whether a state experiencing few terror activities causing many fatalities is more plagued by terrorism than a state suffering with several terror activities causing fewer casualties. For instance, even though the United States by the measure of number of terror incidents was not heavily affected country in 2001, by the measure of deaths by terrorism – and economic costs thereof – it clearly was [Shughart (2006)]. Finally and possibly most importantly, it is obvious that number of casualties in terror incidents frequently is random and unrelated to economic and institutional factors.

4.5.2 Economic deprivation (*EDEP*)

Various studies show that terrorism is deep rooted in economic deprivation (EDEP). For example, Azam and Thelen (2008), the economic deprivation appeared due to the difference between expected and actual outcomes due to the economic distributive process. For checking the economic deprivation there are various measures including inequality, poverty, and GDP per capita. The indicator of economic deprivation (EDEP) which we use in this study is GDP per capita at constant US dollar.

4.5.3 Demographic Changes (*DMC*)

According to some important research studies, for example Lai (2007), one of the reasons behind emergence of terrorism is demographic changes. It encompass the different dynamics of population which are not easy to capture in empirical analysis. Therefore, researchers often use the specific demographic (e.g., population growth, size, age structure, urbanization) factors to show the impact of demographic changes on terrorism. In this study the main indicator of demographic changes which will be used is population growth for showing the dynamics of population.

The indicators which measure the stability of the state are taken from the international country risk guide (ICRG)[15]. These indicators are government Stability (denoted by GS), Socioeconomic Conditions (denoted by SEC), Internal Conflict (denoted by INTCON), Global order (denoted by GO), Religion in politics (denoted by RIP) and Institutional inefficiency (denoted by INTIN). The details of the variables are given below.

4.5.4 Government Stability (*GS*)

The government stability may be an important determinant of the terrorism. For example, Piazza (2008) points out the government stability may determine the level of terrorism in the different regions of the world. This study also considers the *GS* as one of the important determinants of the terrorism. For this purpose we use the ICRG data base. In ICRG data base, it is an assessment of the government's ability to implement its declared programs, and its ability to stay in the office. For the 12 points risk rating variable of government stability assigned to a country has three subcomponents, each with the maximum score of 4 and minimum score of zero points. A score of 4 equates to very low risk and the score of 0 to very high risk. This index is generated through the ranking of the three subcomponents of government stability. These three subcomponents are

- Government Unity
- Legislative Strength
- Popular Support

[15] Please visit http://www.prsgroup.com/wp-content/uploads/2012/11/icrgmethodology.pdf for the complete methodology of ICRG.

4.5.5 Socioeconomic Conditions (SEC)

According to Freytag *et al*. (2010) the socioeconomic conditions is also an important determinants of the terrorism in the different regions of the world. This is an assessment of socioeconomic pressures at work in a society that could constrain government's action or fuel the social dissatisfaction. More specifically, the important studies consider socioeconomic conditions in their regression model. We also follow the standard practice and use ICRG data base. This index is generated through the ranking of the three subcomponents of socioeconomic conditions. There are three subcomponents with 4 points for each for building the 12 points risk rating variable of socioeconomic conditions. These subcomponents are,

- Unemployment
- Inflation
- Poverty

4.5.6 Internal Conflict (INTCON)

Testas (2004) clearly document that the internal conflicts may aggravates the situation in the countries and can be a sever cause of increasing the level of terrorism. Therefore, the present studies the controls the regression through internal conflict as well. The data is taken from ICRG. ICRG generates this index through the ranking of the three subcomponents of internal conflict. In 12 point risk rating variable the highest rating is assigned to those states where there is not armed or civil opposition of government. Similarly lowest rating is for country involved in an on-going civil war. There are three subcomponents, each with 4 points. A score of 4 equates to the very low risk and 0 to very high risk. These subcomponents are:

- Civil War/Coup Threat

- Political Violence
- Civil Disorder

4.5.7 Global Order (GO)

The researchers use the external conflict along with the internal conflict as one of the major determinants of the terrorism. The external conflicts also known as the global order in the literature of the subject. More specifically, the global order or external conflict variable is a measure of external pressure on government, ranging from non-violent foreign pressure (trade restrictions, sanctions, diplomatic pressures etc.) to violent pressure (cross- border disputes to all-out war). We also use global order as one of the determinants of the terrorism by following the standard studies like Kurrild-Klitgaard *et al.* (2006).

Three subcomponents of this variable are:

- War
- Cross-Border Conflict
- Foreign Pressures

4.5.8 Religion in politics (*RIP*)

Various religious groups not all for the sake of their existence want to engage the governments and give tough time to them for achieving their agendas. Further they use arms and use terrorism as a strategy for achieving their goals. The risk involved in mentioned situations range from the inexperienced persons imposing incorrect policies through civil opposition to civil war. Therefore, Shughart (2010) documents that the religion in politics may also change the level and/or rate of terrorism. Therefore, the present study uses the RIP as one of the determinant keeping the

literature in view. This variable is 6 points rating variable with highest point is assigned to those states where religious tensions are less.

4.5.9 Institutional inefficiency (INTIN)

Strong Institutional infrastructure of the country leads to lessen the terrorism and higher growth (Basuchoudhary and Shughart 2010).But on the other hand institutional inefficiency leads to distort the economic and financial environment and reduces the efficiency of government. It ultimately introduces an instability into the political system and institutions become vulnerable against terrorism. The indicator of Institutional Inefficiency is corruption (CORR). This variable is 6 points rating variable with highest point is assigned to those states where corruption is less.

4.5.10 Dummy of Colonization (DUMCOLO)

There is possibility that colonization is the major factor behind terrorism because it is the major factor behind economic conditions of various countries. For this purpose we included the dummy of colonization which has the value of one for states who has remained the part of colonization otherwise zero.

4.6 Conclusion

The present chapter discusses the regions, time period and variables which are used in the study. More specifically, the chapter documents that there are different determinants of the terrorism in the different regions of the world. Therefore, we discussed the several important variables in this context.

Chapter 5

Empirical Results

As discussed in the literature of heterogeneity in determinants of terrorism, now by using the data described in data and variable section, we present results in order to assess the heterogeneity in determinants of terrorism across the five regions of world[16]. For this purpose we encompassed all the determinants of terrorism and after that we show the heterogeneity in determinants for all regions of world.

The natural start of estimating any regression is to estimate through the Ordinary Least Square (OLS) method. Therefore, we follow the same pattern to estimate the equation 3.1. First of all, we applied the simple OLS for each selected region. We have mentioned that our dependent variable is number of terror incidents which is count variable. If we use OLS for study of count data it will yield inconsistent results[17]. Therefore, we do not present the OLS results in the main text. However, the results are presented in appendices to facilitate the reader (see table A.4 in appendix). It is evident from the table that the results are super consistent with the main stream of the literature.

In this backdrop, the other option is to estimate the equation 3.2 through Poisson regression model. However, Poisson regression is based on a very strong assumption that the mean and variance of the count variable should be same. In the technical term, the Poisson distribution carries only one parameter. However, the summary statistics including mean, standard deviation, minimum and maximum that are mentioned in appendix (see table A.3), are clearly showing that Poisson is not good

[16] The details of regions and criteria of the selection of regions is presented in Chapter 4.
[17] The reasons are discussed in Chapter 3.

choice. Anyhow, we estimated the Poisson model and reported in table A.5 in appendix which validate our argument.

Next, we estimate the panel negative binomial model which is appropriate for our analysis. For this purpose, we estimated two models for each region. First, the baseline model and second, the model with specific interaction terms separate for each region. For baseline model we run the panel negative binomial regression with random effect (see table A.6 in appendix) and fixed effect (see table A.7 in appendix). With the help of Hausman test, we select the appropriate model from random effect and fixed effect models. The results of Hausman test are mentioned in appendix table A.8. The Hausman test suggests that only for Middle East region the random effect is appropriate choice as we cannot reject the null hypothesis of random effect for this region. For all other regions we use the fixed effect model.

On the bases of results from Hausman test, we use the final base line models for five regions of world shown in table 5.1. It is clearly mentioned in the table that dependent variable is number of terror incidents which is same for all models. The first column is showing the core independent variables.

Table 5.1: Final Base Line Models					
Dependent variable is number of terror incidents					
Regressors	**Asia**	**America**	**Europe**	**Middle East & North Africa**	**Sub Saharan Africa**
EDEP	-0.0016	0.0001***	0.0000	0.0000	-0.0002***
	(0.006)	(0.0009)	(0.0000)	(0.0000)	(0.0001)
DMC	-0.1100	0.8100***	0.2700***	-0.1524***	-0.1095*
	(0.1172)	(0.1456)	(0.1126)	(0.0595)	(0.0643)
GS	-0.0800***	-0.1000***	0.0352	-0.0586*	0.0159
	(0.0297)	(0.0344)	(0.0288)	(0.0316)	(0.0293)
SEC	-0.0900**	0.0861*	-0.1070**	-0.0300	0.0320
	(0.0424)	(0.0469)	(0.0468)	(0.0564)	(0.0437)
RIP	-0.1500***	-0.1208	0.3200***	-0.4000***	-0.0170
	(0.0552)	(0.1099)	(0.0901)	(0.0638)	(0.0589)
INTCON	-0.0800**	-0.2700***	-0.1100**	0.0008	-0.1050***
	(0.0340)	(0.0426)	(0.0533)	(0.0398)	(0.0432)
GO	0.0785*	0.0800	0.1760***	-0.0192	-0.0950***
	(0.0417)	(0.0501)	(0.0569)	(0.0404)	(0.0385)
Diagnostics					
Number of Countries	15	23	28	18	31
Wald chi2	52.0700	188.4500	43.7800	72.5100	70.7100
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000
Note: the standard errors of all parameters are written in parenthesis, under the coefficients. The first coefficient is indicator of economic deprivation (EDEP). The second coefficient is indicator of demographic changes (DMC). Similarly, the other coefficients are for government stability (GS), socio economic conditions (SEC) religion in politics (RIP), and internal conflict (INTCON) and global order (GO), respectively.					

The results clearly explain that we have different results for different regions of world. The indicators of terrorism are different as well as the magnitude of variables is not same. The first variable is *EDEP* which is significant with positive sign in the regression model of America and Sub-Saharan regions. More clearly, the results show that there is positive relation between GDP per capita and terrorism. Though the sign of the parameters is positive but close to zero. Therefore, the relationship between the two variables is quite weak. The findings of past studies give mix results about the relation between terrorism and economic deprivation. Freytag *et al* (2010), show the positive link between terrorism and GDP per capita. The results of Krueger and Laitin (2008) document the weak connection between terror activities and economic development. For Sub-Saharan region there is negative relation between economic deprivation and terrorism. Many authors including [Azam and Delacroix (2006); Blomberg and Hess (2008)] indicate that significant economic development reduces the terrorism. In our analysis there is very low link between terrorism and economic deprivation. The argument that economic deprivation is not a very strong determinant of terrorism is also proved in various studies including [Berrebi (2007); Crenshaw (1981)].

Accordingly, the second parameter, which is the indicator of demographic changes with the name of demographic changes significant for all regions except Asia. For the region of America one percent increase in demographic changes lead to increase the terrorism by 0.81 percent; for Europe one percent increase in demographic changes will lead to increase terror activities by 0.26 percent. Populous states are more likely the origin and producers of terror activities [Lai (2007)]. Such finding may suggest that demographic changes raises conflict as demographic changes comes with greater

demographic pressure, so terrorism cost are decreased [Krieger and Meierrieks (2011)].

On the other hand, in Middle East region the one unit increase in demographic changes will decrease the terrorism by 0.15 unit; in Sub-Saharan region one unit increase in demographic changes will decrease the terrorism by 0.10 unit. In regions, where the relation between terrorism and demographic changes is negative means that as population increase terrorism should decrease. But Tavares (2004) explains a terror- enhancing impact of youth burden in populous states and it means that population should not become burden and there should be increase in opportunities for labour especially youth.

The third variable, government stability (GS), is significant for Asia, America, and Middle East and insignificant for other two regions. With negative sign government stability in Asian region show that one unit increase in stability of government will decrease the occurrence of terrorism by 0.08 unit. In American region the one unit increase in government stability will lead to decrease the terrorism by 0.10 unit. Similarly, in Middle East regions the increase in government stability will lead to 0.05 unit decrease in terrorism. Krieger and Meierrieks (2011) suggest that terrorism also emerge in highly populated, politically open but instable states. The findings of Piazza (2006) suggest that terror attacks are more common in countries where governments are instable. So the government stability is very important indicator for decreasing terrorism.

The effect of socio economic condition in this analysis is significant for Asian, American and European region and insignificant for Middle East and Sub-Saharan regions. The one unit increase or improvement in socio economic conditions in Asia will lead to decrease the terrorism by .09 unit; in America one unit increase in socio

economic conditions will lead to increase terrorism by .08; one unit increase in socio economic conditions will lead to decrease terrorism by .10 unit in Europe. Freytag *et al* (2010) find the significant impact of better socio economic conditions for decreasing terrorism.

Religious sub optimality and its misuse for political purposes play a significant role for occurrence of terrorism in Asia, Europe and Middle East. As one unit increase in religion in politics variable in Asia, which show the less involvement of religious groups in government, will lead to decrease the terrorism activities by 0.15; in Europe the less involvement of religious groups in government will lead increase terrorism by 0.32 unit; in Middle East the decrease in religion in politics will lead to decrease the terrorism by 0.40 unit. Only in European region the variable has positive relation with terrorism. By decreasing the involvement of radical religious groups in politics the intensity of terrorism can be reduced [Siqueira and Sandler (2010)].

Internal conflict variable is insignificant for Middle East region and significant for all other regions. As one unit improvement in internal conflict will decrease the terrorism by 0.07 unit in Asia; one unit improvement will lead to decrease terrorism by 0.27 unit in America; one unit improvement will lead to decrease the terrorism by 0.11 unit in Europe; one unit improvement in internal conflict will lessen the terrorism by 0.10 in Sub Saharan region. It means that when the countries solve the problems of radical groups the internal conflict will decrease ultimately terrorism will decrease [Sambanis (2008)].

Global order which is the proxy for global order is almost significant for four regions and insignificant for Middle East. In Asia, the decrease in global order by one unit will increase terrorism by 0.07 unit; in American region the decrease in global order will lead to increase the terrorism by 0.08 unit; in Europe the decrease in global order

will lead to increase terrorism by 0.17. But in Sub-Saharan region with decrease in global order or involvement in international politics will lead to decrease the terrorism by 0.09 unit. The global order which is measured by global order matters to terrorism. As Blomberg and Hess (2008) suggest that the involvement of a country in international politics leads to increase the international terrorism. Similarly, the alliance with United States is also the major factor behind the occurrence of terror activities [Dreher and Gassebner (2008)].

In the end of table the diagnostics for the models of different regions show that all models are significant. Wald test statistic is showing that we reject the null hypothesis of insignificance of overall models separately. More precisely, all models pass through the diagnostic test.

5.1 General-to-Specific Modelling

In previous lines we have shown the base line model and explained the results of tables. Further, we will add some interaction (product) terms of two independent variables in our models as an extra variable to check their impact apart from standard variables[18]. Due to addition of extra terms the magnitude of variable will change although the results are not better than previous model as expected. The slope of interaction term shows the interaction effect of two independent variables. Moreover, by adding the interaction term in the model we can enhance understanding of relationship between variables. In particular, the significant interaction term capture the effect of increase or decrease in one specific independent variable on the slope of other specific variable.

[18] Interactions refer to relationship between an explanatory variable, and dependent variable, moderated by a third variable.

Similarly, with the help of general to specific modelling, we will reduce the general model[19]which have relatively more interaction terms, to specific model having only significant interaction terms. The decision for final model with less interaction terms is based on *t* test for coefficients and Wald test for overall model. In general model, for all included regions of the world, we have interaction terms of all variables. In table 5.2 we have suggested five different models for five regions with only significant interaction terms on the bases of *t* test and Wald test. The magnitude of variable has changed due to inclusion of interaction terms. Similarly, after selecting the final models, we select the final model on the bases of Hausman test. For this purpose we estimated the panel negative binomial model with fixed effect and reported in table A.9 in appendix. After the estimation of fixed effect we run the random effect model and the results are in table A.10 in appendix. For finalizing the better model form fixed and random effects we took the help of Hausman test again. The results of Hausman test suggest that we should use random effect model for only American region as the probability value is greater than .05 and we cannot reject the null hypothesis of random effect. The table A.11 in appendix is showing the results for Hausman test. The table 5.2 include the final models for regional analysis of terrorism in Asian, European, Middle East & N-African and Sub Saharan Regions with fixed effect and random effect of American region.

[19] General model characterizes the empirical evidence within theoretical framework. The main aspects of this methodology include theory of reduction; model selection process; model selection criteria; model comparison; encompassing; empirical implementation [Campos *et al.* (2005)].

Table 5.2: Final Base Line Models with Interaction Terms					
Dependent Variable is number of Terror incidents					
Regressors	**Asia**	**America**	**Middle East & N-Africa**	**Europe**	**Sub-Saharan Africa**
EDEP	-0.00002*	0.00006***	0.00002	-0.00001	-0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)
DMC	-0.1520	0.7320***	-0.1350***	0.2262*	-0.1503**
	(0.1214)	(0.1408)	(0.0597)	(0.1158)	(0.0691)
GS	-0.0600***	-0.1000***	-0.0522	0.0403	0.0375
	(0.0305)	(0.0339)	(0.0323)	(0.0290)	(0.0296)
CORR	n/a	n/a	n/a	-1.200***	-0.1586
	n/a	n/a	n/a	(0.4714)	(0.1404)
SEC	-0.0834**	0.0870*	-0.0216	-.0721*	-0.2988***
	(0.0425)	(0.0471)	(0.0574)	(0.0476)	(0.0912)
RIP	-0.5000***	-1.8500***	-0.6600***	0.2500***	-0.0525
	(0.1745)	(0.6597)	(0.1661)	(0.0915)	(0.0607)
INTCON	-0.2000***	-0.2800***	-0.0081	-0.1000***	-0.1000***
	(0.0755)	(0.0419)	(0.0415)	(0.0533)	(0.0434)
GO	0.0800**	-0.7900***	-0.1130*	-0.3480*	-0.0840**
	(0.0443)	(0.3329)	(0.0647)	(0.1804)	(0.0386)
RIP*INTCON	0.0400***	n/a	n/a	n/a	n/a
	(0.0198)	n/a	n/a	n/a	n/a
RIP*GO	n/a	0.1600***	0.0340*	n/a	n/a
	n/a	(0.0650)	(0.0193)	n/a	n/a
CORR*GO	n/a	n/a	n/a	0.1200***	n/a
	n/a	n/a	n/a	(0.0426)	n/a
SEC*CORR	n/a	n/a	n/a	n/a	0.1170***
	n/a	n/a	n/a	n/a	(0.0328)
Diagnostics					
Wald chi2	64.4900	205.1500	73.0400	60.4900	97.5800
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000
Note: The standard errors of all parameters are written under the coefficients. The variable RIPINTCON (religion in politics * internal conflict) is interaction term. The terms RIPGO (religion in politics* global order), CORRGO (corruption * global order), SECCORR (socioeconomic conditions * corruption) are also interaction terms.					

The first column in 5.2 table is showing the list of independent variables including interaction terms which is extension in baseline models with interaction terms of different independent variables. We incorporated best fit models for different regions on the bases of significance which include base line variables plus significant interaction terms according to specific regions.

The second column is showing the results for Asian region in which the main indicators of terrorism are economic deprivation, government stability, socio economic conditions, religious tensions, internal conflict, global order and interaction term of religion in politics and internal conflict. Economic deprivation has a very weak relation with terrorism. Similarly, demographic changes has negative sign but statistically insignificant. The deep analysis of results suggest that one unit increase in economic deprivation will lead to decrease the terrorism by 002 unit point which is a very small amount apparently because this is regional analysis. In Government stability one unit increase will lead to decrease the terrorism by .06 unit. Socioeconomic conditions are also has negative relation with terrorism as one unit increase in socio economic conditions leads to decrease the terrorism by .08 unit. Religious in politics play a vital role in occurrence of terrorism and one unit improvement will lead to decrease the terrorism by .52 unit. Internal conflict is also a significant factor behind the terrorism in Asian region and one unit improvement will lead to decrease the terrorism by .23 unit. The coefficient of interaction term of religion in politics and internal conflict is significant and positive (i.e. .044) while both coefficients are negative and significant. The significance of this interaction term shows that the more negative value of internal conflict is, the more negative effect of religion in politics on terrorism appears. In other

words the improvement in internal conflict will lead to the higher negative impact of religion in politics variable on terrorism[20]. If we rank the variables by their importance for decrease in terrorism in Asian region then socio religious tensions, and internal conflict are on top.

In third column, the results are showing the determinants of terrorism from American region including economic deprivation, demographic changes, government stability, socio economic conditions, religion in politics, internal & global order and the interaction term of religion in politics and global order. One unit increase in demographic changes will lead to increase terrorism by .73 unit. Eventually, this positive relation confirmed by Freytag *et al.* (2010) as they conclude the positive relation between terrorism and youth unemployment. One unit increase in government stability will lead to decrease the terrorism by .10 unit; one unit increase in socio economic conditions will decrease the terrorism by .08 unit; one unit increase in religion in politics will decrease the terrorism by 1.85 unit; one unit stability in internal conflict will decrease the terrorism by .28 unit; decrease in global order by one unit will decrease the terrorism by .79 unit. When countries involve more international politics and external conflict radicals target industry supply chains to disturb the system for achieving their targets [Nitsch and Schumacher (2004)].

The interaction term of religion in politics and global order is positive (i.e. 0.16) and statistically significant. The main coefficients have negative signs and significance of interaction term explains that greater negative value of global order variable will lead to more negative effect of religion in politics indicator on terrorism.

[20] It means that higher impact of less involvement of religion in politics on terrorism.

The fourth column is showing that in the region of Middle East & North Africa demographic changes, government stability, religious tensions, global order and interaction term of religion in politics and global order are significant. When there is one unit increase in the variable of demographic changes the terrorism will decrease by 0.13 unit. Government stability is significant and one unit increase in this variable will decrease the terrorism by 0.05 unit. It seems quiet relevant to theory that income disparity in countries easily translate into political instability (see among others Dutt and Mitra, 2008; Murshed and Gates, 2005; Alesina and Perotti, 1996).The decrease of one unit in religion in politics leads to decrease the possibility of terrorism by 0.66 unit in Middle East. The terrorism will decrease by .11 unit when global order will be improved by one unit. The interaction term of religion in politics and global order is significant (i.e. 0.034). The main coefficients of these terms are significant with negative signs. This term explains that more negative global order variable leads to higher negative effect of religion in politics on terror activities.

The fifth column is for the region of Europe and showing that demographic changes, corruption, religion in politics, internal conflict, global order and the interaction term of corruption and global order are important variables. Religion in politics variable has not expected sign. The one unit increase in demographic changes leads to increase the terrorism by 0.22 unit. The improvement in institutional efficiency which is shown by the variable of corruption or decrease in corruption will lead to decrease the terrorism by 1.22 unit. If the internal conflict variable decrease by one unit then the chances of terrorism will decrease by 0.12 unit. Similarly, the decrease in global order will lower the probability of occurrence of terrorism by 0.34 unit. The interaction variable of corruption

and global order is significant (i.e. 0.123). The main coefficients are negative and this term explains that more negative term of global order variable leads to higher negative impact of corruption.

The last column is for Sub Saharan Africa region and relevant variables are demographic changes, socio-economic conditions, internal & global order and the interaction term of socio economic conditions and corruption. The chances of terrorism will be lower by 0.15 unit when the demographic changes increase by one unit. One unit improvement in socio economic conditions leads to decrease the terrorism in Sub Saharan region by 0.29 unit. One unit decrease in internal conflict leads to decrease the terrorism by 0.10 unit. Similar to internal conflict if there is decrease in global order by one unit the chances of terror activity will be lower by 0.08 unit. The interaction term of socio economic conditions and corruption is statistically important (i.e. 0.117). The main coefficients are negative but the coefficient of corruption is insignificant. There is not direct impact of corruption in this region but the interaction term elaborates that more negative term of socio economic conditions leads to increase in negative impact of corruption.

After deep analysis of results in formal way, we discuss the heterogeneity in determinants of terrorism for different regions of world by the magnitude of variables. On the basis of magnitude, economic deprivation is not important for terrorism for all regions. Demographic change is important in European region then in American region with alternative sign at the end in Sub Saharan and Middle East regions. Demographic change is not significant determinant of terrorism in Asia. In American and Asian region, government stability is more important than Middle East and Sub Saharan region. In European region government stability is not an important determinant of terrorism. Socio

economic conditions are important in Sub Saharan region, then in American and Asian region. It is not an important determinant in European and Middle East region. Religion in politics is important variable for American region then in Asian, Middle East and European regions. Religion in politics is not statistically significant indicator of terrorism in Sub Saharan region. The impact of internal conflict is higher in American than in Asian, European and Sub Saharan regions. In Middle East region, the variable internal conflict is not significant. Global order variable is very important in American region relative to European region, Middle East and Asian region and is least for Sub Saharan region.

If we compare the parameters on the basis of different region, then in table 5.2 the model for American region indicates that socioeconomic conditions has positive relation with terrorism. Although their impact in Asian region was negative. The other variables which has negative impact on terrorism in American region include government stability, religion in politics, internal conflict, and global order. The demographic changes, and global order are extra indicators in this region as compare to Asia. The demographic changes has positive impact on terrorism. The impact of economic deprivation is positive in American and European region but negative in all other regions including Asia, Middle East and Sub Saharan Africa.

The results from European region suggest that demographic changes, corruption, religion in politics, internal conflict and global order are significant indicators. In comparison to the other regions, the impact of demographic changes is positive in European region as in American region but negative in Middle East, Asia and Sub Saharan Africa. The impact

of corruption is significant and negative in this region. Similarly, the impact of religion in politics, internal conflict and global order are negative.

The results seems quite relevant to theory as Krieger and Meierrieks (2011) suggest that terrorism also emerge in countries where population is high; countries are economically successful and politically open; but instable.

The estimated results of the model for the region of Asia show that the main determinants of terrorism are Economic deprivation (EDEP), government stability (GS), socio economic conditions (SEC), religion in politics (RIP), and internal conflict (INTCON). There is negative relation between all mentioned variables and terrorism in Asian region. The variable demographic changes is not important in this region but relevant in all other four regions. The impact of government stability is very low in Asian region. For global order our findings of positive relation with terrorism is supported by the findings of [Drakos and Giannakopoulos (2009)]. The findings of Piazza (2006) show that the weak and instable states are more vulnerable to terror attacks

The results of Middle East region show that the indicators which has negative impact on terrorism are demographic changes, government stability, religion in politics and global order. The sign of demographic changes is negative which is opposite to the impact of this variable in American, and European region but similar to Sub Saharan region. The socio economic conditions are not significant in Middle East and European region but significant in other regions. The extra variable is demographic changes in Middle East region as compare to Asia.

The indicators of Sub Saharan region show that economic deprivation, demographic changes, socio economic conditions, internal conflict and global order has negative impact on terrorism in this region. The impact of global order is not appropriate in this region as compare to others. The impact of socio economic conditions is high in this region as compare to American and Asian region.

5.2 Colonization

In this section we included two new models for all regions. The first one has only dummy of colonization with other main variables. In second model we added various interaction terms with dummy of colonization. Similarly, we added the full sample of all 115 countries in this section.

The table 5.3 suggest that only for region Middle East the dummy of colonization is statistically significant. In all other regions the results of dummy are not appropriate. Similarly, for full sample the results show that colonization has the relation with terrorism. However, in all regions as well as for full sample except Asian region the relationship suggest that if a country is colonized then the terrorism incidents will decrease. For Asian region the dummy is insignificant. Our analysis has support from the argument that most of the colonized countries in analysis are those where invaders settled and institutions are good in those states.

Table 5.3: Models with Augmented Colonization Dummy						
Dependent variable is number of terror incidents						
Regressors	**Asia**	**America**	**Europe**	**Middle East & North Africa**	**Sub Saharan Africa**	**Full Sample**
EDEP	0.0000*	0.0001***	0.0000	0.0000	-0.0002**	0.000***
	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
DMC	-0.1791	0.8065***	0.2999***	-0.1401**	-0.1036*	-.097***
	0.1297	0.1464	0.1196	0.0601	0.0634	0.0296
GS	-0.0922***	-0.1071***	0.0367	-0.0455	0.0181	-.054***
	0.0303	0.0345	0.0290	0.0325	0.0294	0.0136
SEC	-0.0813*	0.0791*	-0.1061***	-0.0313	0.0293	0.0068
	0.0443	0.0475	0.0468	0.0570	0.0440	0.0195
RIP	-0.1398***	-0.1631	0.3128***	-0.416***	-0.0354	-0.20***
	0.0572	0.1165	0.0906	0.0658	0.0602	0.0266
INTCON	-0.0720**	-0.2624***	-0.1145**	-0.0005	-0.113***	-0.10***
	0.0347	0.0439	0.0533	0.0400	0.0434	0.0185
GO	0.0856**	0.0814	0.1780***	0.0252	-0.088***	0.0392**
	0.0424	0.0505	0.0568	0.0442	0.0388	0.0199
DUMCOLO	0.2694	-0.2629	-0.1793	-0.607***	-0.3223	-0.28***
	0.2533	0.2506	0.2497	0.2363	0.2230	0.0913
Number of Countries	15	23	28	18	31	115
Diagnostics:						
Wald chi2	53.4	188.8	44.6	67.4	72.9	191.4
Prob > chi2	0.0	0.0	0.0	0.0	0.0	0.0

Note: the standard errors of all parameters are written in parenthesis, under the coefficients. The first coefficient is indicator of economic deprivation (EDEP). The second coefficient is indicator of demographic changes (DMC). Similarly, the other coefficients are government stability (GS), socio economic conditions (SEC), religion in politics (RIP), internal conflict (INTCON) global order (GO) and dummy of colonization (DUMCOLO) respectively.

In table 5.4 we added different interaction terms as we did in table 5.2. In this table the results are quite interesting due to moderation effect. In Asian region, the colonized countries who has internal conflict is the major factor behind terrorism. In American and Middle East regions, the decrease in religious tensions in colonized counties is important.

Table 5.4: Augmented Colonization Dummy and Interaction Terms						
Dependent Variable is number of Terror incidents						
Regressors	**Asia**	**America**	**Middle East & N-Africa**	**Europe**	**Sub-Saharan Africa**	**Full Sample**
EDEP	0.000***	0.000***	0.0000	0.0000	-0.00***	0.0000
	0.0000	0.0000	0.00	0.0000	0.0001	0.0000
DMC	-0.1892	0.66***	-.14***	0.23*	-0.17***	-0.1***
	0.1307	0.1498	0.0606	0.1251	0.0694	0.0299
GS	-0.08***	-0.08***	-0.0327	0.0406	0.0171	-.04***
	0.0319	0.0331	0.0339	0.0292	0.0297	0.0136
CORR	-0.0196	0.44***	0.03	-1.2***	0.25***	0.23***
	0.0803	0.0793	0.0778	0.4846	0.0760	0.0310
SEC	-0.08**	0.0548	-0.0316	-0.0737	-0.0383	-0.0022
	0.0421	0.0469	0.0568	0.0496	0.0480	0.0194
RIP	-0.94***	-0.49***	-0.5***	0.25***	-0.0716	-0.3***
	0.2222	0.1303	0.0867	0.0934	0.0614	0.0328
INTCON	-0.46***	-0.24***	-0.04	-0.1***	-0.12***	-.12***
	0.1071	0.0425	0.0412	0.0538	0.0427	0.0180
GO	0.0971**	0.0063	0.034	-0.3*	-0.15***	0.0122
	0.0440	0.050	0.0486	0.1931	0.0518	0.0197
DUMCOLO	-1.63***	-6.74***	-1.581	0.1923	-1.30***	-.66***
	0.6947	1.7694	0.5115	1.3326	0.5280	0.2192
RIPINTCON	0.09***	n/a	n/a	n/a	n/a	n/a
	0.0247	n/a	n/a	n/a	n/a	n/a
INTCONDUMCOLO	0.214***	n/a	n/a	n/a	n/a	n/a
	0.0746	n/a	n/a	n/a	n/a	n/a
RIPDUMCOLO	n/a	1.2347***	0.29***	n/a	n/a	0.09**
	n/a	0.3419	0.1335	n/a	n/a	0.0494
CORRGO	n/a	n/a	n/a	0.12***	n/a	n/a
	n/a	n/a	n/a	0.0440	n/a	n/a
GODUMCOLO	n/a	n/a	n/a	-0.0222	0.11**	n/a
	n/a	n/a	n/a	0.1299	0.0549	n/a
CORRDUMCOLO	n/a	n/a	n/a	0.0017	n/a	n/a
	n/a	n/a	n/a	0.1531	n/a	n/a
Diagnostics						
Wald chi2	78.5	220.3	74.9	60.6	92.0	262.1
Prob > chi2	0.0	0.0	0.0	0.0	0.0	0.0

Note: The standard errors of all parameters are written under the coefficients. The variable RIPINTCON (religion in politics * internal conflict), INTCONDUMCOLO (internal conflict*dummy of colonization), RIPDUMCOLO (religion in politics*dummy of colonization), CORRGO (corruption*colonization), GODUMCOLO (global order*dummy of colonization), CORRDUMCOLO (corruption*dummy of colonization), are interaction terms.

In Europe, the impact of colonization is not clear. In African region, the decrease in global order or external conflict in colonized states will be helpful. At the end, the analysis of full sample suggests that religious in politics in colonized countries is one of the prominent factor which should be considered.

Chapter 6

Conclusion

In this contribution to the literature, we encompassed the different structural determinants of terrorism by using large country level samples. However, there are many studies which investigate the issue through different econometric methods. Therefore, the most important purpose of this study is to provide the global perspective on the roots of terrorism through the econometric method. In order to achieve our goal, we used the panel data of 115 countries over the time period of 1990 to 2012. We have classified the countries by different regions of world including Asia, America, Europe, Middle East and North Africa and Sub-Saharan Africa. The criterion for dividing them in regions is adopted from Global Terrorism database. To investigate the heterogeneity in determinants of terrorism, we estimate the model through the well-established econometric technique for analysis of terrorism, that is, fixed effect negative binomial regression as well as random effect negative binomial and further, Hausman test is performed for model selection. The results of this study suggest that the terrorism is a heterogeneous phenomenon. The colonization is not major factor behind terrorism although the settlement process helped for lessening it.

We conclude that impact of economic deprivation on terrorism in different regions is not appropriate. Similarly, the negative impact of demographic changes is higher in Sub Saharan region as compare to Middle East region but the positive impact of this variable is higher in American region as compare to European region. The impact of government stability is higher in Asian and American region. The impact of corruption is only

significant in European region. The impact of socio economic conditions is more significant in Sub Saharan region as compare to Asian, Middle East and European Region. Religion in politics is a more significant indicator of terrorism in Asian and American region then in Middle East and Europe. Similarly, internal conflict is most important in Asian region. Finally, the effect of global order on terrorism is high in American region then in European region and almost equal in other regions.

Terrorism is not the problem of one specific country or region and the effects of terrorism have been spread all over the world. Similarly, the amount of spending for restricting terrorist activities has increased especially after the incident of 9/11. The different determinants of terrorism in various regions of world suggest that type of terrorism in all regions of world is not same. It is obvious from large divergence in determinants of terrorism across the regions that there is no unique solution to terrorism. Rather, tailored solutions are required to take into account the certain context, specifically, grievances which give rise to terrorism, the extent to which they can be lessened and structural limits of the respective terror groups and thus their alternative reactions to certain counter-terror policies. To make an overall carrot-and-stick attitude may be too basic.

For instance, policies for combating terrorism in countries of one specific region should be according to the determinants of terrorism in that region. Similarly, the approaches that have proven successful for a specific region of countries with certain socio economic conditions should not apply in other region without taking into account the determinants of terrorism in that region. Similar to heterogeneity in determinants of terrorism in different regions the counter terror activities should also be different in different regions.

In Asian region the countries should decrease the intensity of internal conflict with other factors like enhancing the socio economic conditions. In American region countries are more likely to involve in international politics and have more enemies than others. For combating the terror activities the involvement in international politics should be lessen. The major variables which should be concerned in European region are religious tensions and global order. The main and important variables in Middle East are religious tensions. By decreasing the involvement of radical religious groups in politics the intensity of terrorism can be reduced. The main factors in Sub Saharan region are socio economic conditions, and demographic changes. In this region the countries are not stable internally so the chances of terrorism by deprived groups are possible. If there is betterment in socio economic conditions and increase skilled labour and the opportunities for them then the chances of terrorism can be decreased. These were some guidelines for combating terrorism on regional bases but it does not mean that we should leave the other variables which are important for decreasing the terrorism as discussed in results section.

6.1 Policy implications

It is obvious from large divergence in determinants of terrorism across the regions that there is no unique solution to terrorism. Rather, tailored solutions are required to take into account the certain context, specifically, grievances which give rise to terrorism, the extent to which they can be lessened and structural limits of the respective terror groups and thus their alternative reactions to certain counter-terrorism policies. To make an overall carrot-and-stick attitude may be too basic.

- In Asian region, the countries should decrease the intensity of internal conflict.

- In American region, countries have to decrease the involvement in international politics.
- The major variables which should be concerned in European region are religious tensions and global order.
- In Middle East, by decreasing the involvement of radical religious groups in politics, the intensity of terrorism can be reduced.
- In Sub Saharan region, the countries are not stable internally. So by internal stability, the chance of terrorism from deprived groups can be reduced.

6.2 Scope for Future Research

For future research the analysis can be done by incorporating the other measures of terrorism including, number of causalities, and fatalities. We can further analyse the different dimension of terrorism by dividing regions further in developing and developed states. However, by dividing the terrorism groups of world according to their ideology and exploring its determinants can be a major contribution.

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Appendixes

Table A.1: Studies Related to Variables Selected

Variable	Evidence
Economic deprivation (EDEP)	Blomberg *et al.* (2004); Lai (2007); Azam & Thelen (2008); Kis-Katos *et al.* (2010); Freytag *et al.* (2010); Ismail & Amjad (2014).
Socio-Economic Pattern (SEP)	Azam & Thelen (2008); Freytag *et al.* (2010); Ismail & Amjad (2014).
Demographic Changes (DMC)	Piazza (2006); Lai (2007); Sambanis (2008); Dreher & Gassebner (2008); Campos & Gassebner (2009); Kis-Katos *et al.* (2010); Freytag *et al.* (2010).
Global Order (GO)	Kurrild-Klitgaard *et al.* (2006); Lai (2007); Campos & Azam & Thelen (2008); Dreher & Gassebner (2008);Gassebner (2009);; Kis-Katos *et al.* (2010).
Political instability (PI)	Lai (2007); Campos & Gassebner (2009); Freytag *et al.* (2010); Kis-Katos *et al.* (2010); Ismail & Amjad (2014).
Institutional inefficiency (INTIN)	Kurrild-Klitgaard *et al.* (2006); Piazza (2006); Lai (2007); Sambanis (2008); Campos & Gassebner (2009); Freytag *et al.* (2010); Ismail & Amjad (2014).

Table A.2: Data Source and Indicators

Constructs	Data Source	Indicator Name
Terrorism (TERR)	Global Terrorism Database (GTD)	Number of incidents
Economic deprivation (EDEP)	World Development Indicator (WDI)	GDP per capita
Socio-economic conditions (SEC)	International Country Risk Guide (ICRG)	Unemployment Inflation Poverty
Demographic changes (DMC)	WDI	Population growth
Government Stability (GS)	ICRG	Government unity Legislative strength Popular support
Internal conflict (INTCON)	ICRG	Civil war Political violence Civil Disorder
Global order (GO)	ICRG	War Cross-border conflict Foreign pressure
Religion in politics (RIP)	ICRG	Religious tensions
Institutional inefficiency (INTIN)	ICRG	Corruption (CORR)

Table A.3: Descriptive Statistics

Region	Variables	Mean	Std. Dev.	Min	Max
ASIA	***TERR***	61.551	154.956	0.000	1651.000
	EDEP	9459.07	12055.96	301.31	37118.30
	DMC	1.462	0.865	-1.610	5.322
	GS	8.206	2.166	1.000	12.000
	SEC	6.439	2.222	2.000	11.000
	CORR	2.882	1.066	0.083	5.000
	RIP	3.879	1.588	1.000	6.000
	INTCON	9.154	2.482	0.000	12.000
	GO	9.996	1.576	4.000	12.000
AMERICA	***TERR***	18.912	68.336	0.000	658.000
	EDEP	7329.90	10051.50	685.89	45420.10
	DMC	1.371	0.645	-0.823	2.825
	GS	7.680	1.831	1.833	11.000
	SEC	5.584	1.653	1.000	11.000
	CORR	2.928	1.073	0.000	6.000
	RIP	5.377	0.647	4.000	6.000
	INTCON	9.084	1.890	1.000	12.000
	GO	10.342	1.262	5.167	12.000
EUROPE	***TERR***	12.272	34.268	0.000	274.000
	EDEP	27963.41	18488.86	1094.27	87772.69
	DMC	0.396	0.675	-1.911	2.891
	GS	8.028	1.715	2.917	11.500
	SEC	7.382	2.014	1.333	11.000
	CORR	4.223	1.279	1.000	6.000
	RIP	5.330	0.726	2.000	6.000
	INTCON	10.771	1.249	6.000	12.000
	GO	10.983	1.128	6.250	12.000
MIDDLE EAST	***TERR***	43.068	159.631	0.000	1438.000
	EDEP	10735.11	13987.86	656.94	62138.66
	DMC	2.870	2.452	-2.544	17.625
	GS	8.599	1.927	1.833	11.500
	SEC	5.796	1.945	0.500	11.000
	CORR	2.505	0.880	1.000	5.000
	RIP	3.398	1.154	0.000	5.500

	INTCON	8.620	2.289	1.250	12.000
	GO	9.189	1.849	0.000	12.000
SUB SAHARAN AFRICA	***TERR***	7.825	34.415	0.000	616.000
	EDEP	1128.08	1744.53	69.57	8280.27
	DMC	2.670	0.890	-1.826	7.836
	GS	7.735	2.353	0.667	11.583
	SEC	3.679	1.629	0.000	7.750
	CORR	2.290	1.020	0.000	5.000
	RIP	4.178	1.286	0.000	6.000
	INTCON	7.802	2.402	0.000	12.000
	GO	9.264	2.109	2.000	12.000

Table A.4: Results from OLS

Table : Determinants of Terrorism (OLS Estimates)					
Dependent Variable is number of Terror incidents					
	Asia	**America**	**Europe**	**Middle East and North Africa**	**Sub Saharan Africa**
Regressors	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**
EDEP	-0.0001	0.0014***	0.000	0.003***	0.002**
	(0.9160)	(0.0000)	(0.9410)	(0.0040)	(0.0220)
DMC	-2.3031	-0.0944	4.7112*	5.6153	-1.0621
	(0.7420)	(0.9820)	(0.0580)	(0.1470)	(0.4450)
GS	-15.2781***	-4.2473***	1.4551*	-3.6448	0.0586
	(0.0000)	(0.0050)	(0.0700)	(0.3970)	(0.9200)
SEC	3.6531	-0.1061	-2.4079**	-48.3827***	0.4313
	(0.4450)	(0.9580)	(0.0190)	(0.0000)	(0.5990)
RIP	-36.1548***	-13.9766***	8.8124***	-41.6791***	-3.2308***
	(0.0000)	(0.0020)	(0.0000)	(0.0000)	(0.0020)
INTCON	-7.6254	-18.2816***	-12.3069***	1.0448	-1.6621**
	(0.0840)	(0.0000)	(0.0000)	(0.8230)	(0.0390)
GO	0.1221	4.2449*	3.4957**	7.7558*	0.7414
	(0.9810)	(0.0730)	(0.0130)	(0.0930)	(0.3360)
_cons	377.8947***	239.3032***	63.6053***	374.3752***	24.5649***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0010)
R-squared	0.2605	0.2643	0.1703	0.3070	0.0386
Note: Probability values of parameters are written under coefficients in parenthesis.					

Table A.5: Poisson Regression Results

Table : Determinants of Terrorism (Poisson Estimates)					
Dependent Variable is number of Terror incidents					
	Asia	**America**	**Europe**	**Middle East and N-Africa**	**Sub Saharan Africa**
Regressors	**Coefficient**	**coefficient**	**coefficient**	**Coefficient**	**Coefficient**
EDEP	0.0001***	0.0000***	-0.0001***	0.0000*	0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0800)	(0.0090)
DMC	-0.6532***	2.3597***	0.4009***	-0.3631***	0.0282
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.3540)
GS	-0.1924***	-0.1887***	0.0332***	-0.0941***	-0.0166*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0930)
SEC	-0.0664***	-0.1405***	0.0259**	0.0398***	0.0393***
	(0.0000)	(0.0000)	(0.0330)	(0.0000)	(0.0010)
RIP	-0.3786***	-0.3131***	0.2672***	-0.7794***	-0.0880***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0030)
INTCON	-0.0904***	-0.1609***	-0.2223***	-0.0076	-0.1873***
	(0.0000)	(0.0000)	(0.0000)	(0.2390)	(0.0000)
GO	0.2493***	-0.0183	0.1008***	0.2079***	-0.0596***
	(0.0000)	(0.1330)	(0.0000)	(0.0000)	(0.0000)
Note: Probability values of parameters are written under coefficients in parenthesis.					

Table A.6: Random Effect Baseline Model Results

Determinants of Terrorism (Negative Binomial Random Effects Estimates)					
Dependent Variable is number of Terror incidents					
	Asia	**America**	**Europe**	**Middle East & N-Africa**	**Sub Saharan Africa**
Regressors	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**
EDEP	0.0000*	0.0001***	0.0000	0.0000	-0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)
DMC	-0.1724	0.7322***	0.2694***	-0.1524***	-0.1053*
	(0.1116)	(0.1408)	(0.1117)	(0.0595)	(0.0628)
GS	-0.0948***	-0.1085***	0.0343	-0.0586*	0.0188**
	(0.0296)	(0.0340)	(0.0288)	(0.0316)	(0.0291)
SEC	-0.1015***	0.0865*	-0.1026**	-0.0311	0.0243
	(0.0420)	(0.0468)	(0.0460)	(0.0564)	(0.0432)
RIP	-0.1607***	-0.1460	0.3170***	-0.4025***	-0.0300
	(0.0545)	(0.1084)	(0.0896)	(0.0638)	(0.0575)
INTCON	-0.0773**	-0.2908***	-0.1257***	0.0008	-0.1091***
	(0.0335)	(0.0422)	(0.0529)	(0.0398)	(0.0426)
GO	0.0748*	0.0734	0.1732***	-0.0192	-0.0967***
	(0.0413)	(0.0496)	(0.0567)	(0.0404)	(0.0380)
Diagnostics					
Wald Test	61.39	195.61	43.95	72.51	78.82
p value	0	0	0	0	0
Note: The standard errors of all parameters are written under the coefficients in parenthesis.					

Table A.7: Fixed Effect Baseline Model Results

Determinants of Terrorism (Negative Binomial Fixed Effects Estimates)					
Dependent Variable is number of Terror incidents					
	Asia	**America**	**Europe**	**Middle East & N-Africa**	**Sub Saharan Africa**
Regressors	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**
EDEP	0.0000	0.0001***	0.0000	0.0000	-0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)
DMC	-0.1132	0.8166***	0.2690***	-0.1412***	-0.1095*
	(0.1172)	(0.1456)	(0.1126)	(0.0599)	(0.0643)
GS	-0.0849***	-0.1054***	0.0352	-0.0582*	0.0159
	(0.0297)	(0.0344)	(0.0288)	(0.0319)	(0.0293)
SEC	-0.0937**	0.0861*	-0.1069***	-0.0288	0.0319
	(0.0424)	(0.0469)	(0.0468)	(0.0572)	(0.0437)
RIP	-0.1502***	-0.1208	0.3236***	-0.3885***	-0.0178
	(0.0552)	(0.1099)	(0.0901)	(0.0651)	(0.0589)
INTCON	-0.0786***	-0.2735***	-0.1122**	0.0028	-0.1052***
	(0.0340)	(0.0426)	(0.0533)	(0.0402)	(0.0432)
GO	0.0785*	0.0818	0.1760***	-0.0176	-0.0955***
	(0.0417)	(0.0501)	(0.0569)	(0.0408)	(0.0385)
Number of Countries	15	23	28	18	31
Diagnostics					
Wald Test	52.07	188.45	43.78	63.4	70.71
p value	0	0	0	0	0
Note: The standard errors of all parameters are written under the coefficients in parenthesis.					

Table A.8: Hausman Test Result for Baseline Model

The Hausman Test for Base Line Model				
ASIA	**Regressors**	**Fix**	**Ran**	**Diff**
	EDEP	0.0000	0.0000	0.0000
	DMC	-0.1132	-0.1724	0.0592
	GS	-0.0849	-0.0948	0.0099
	SEC	-0.0937	-0.1015	0.0078
	RIP	-0.1502	-0.1607	0.0106
	INTCON	-0.0786	-0.0773	-0.0012
	GO	0.0785	0.0748	0.0037
	chi square	19.12		
	p value	0.004		
AMERICA	**Regressors**	**Fix**	**Ran**	**Diff**
	EDEP	0.0001	0.0001	0.0000
	DMC	0.8166	0.7322	0.0844
	GS	-0.1054	-0.1085	0.0031
	SEC	0.0861	0.0865	-0.0004
	RIP	-0.1208	-0.1460	0.0252
	INTCON	-0.2735	-0.2908	0.0173
	GO	0.0818	0.0734	0.0083
	chi square	27.21		
	p value	0.0001		
EUROPE	**Regressors**	**Fix**	**Ran**	**Diff**
	EDEP	0.0000	0.0000	0.0000
	DMC	0.2690	0.2694	0.0005
	GS	0.0352	0.0343	-0.0009
	SEC	-0.1069	-0.1026	0.0042
	RIP	0.3236	0.3170	-0.0066
	INTCON	-0.1122	-0.1257	-0.0135
	GO	0.1760	0.1732	-0.0028
	chi square	28		
	p value	0.0001		
MIDDLE EAST	**Regressors**	**Fix**	**Ran**	**Diff**
	EDEP	0.0000	0.0000	0.0000
	DMC	-0.1412	-0.1524	0.0112
	GS	-0.0582	-0.0586	0.0004
	SEC	-0.0288	-0.0311	0.0023
	RIP	-0.3885	-0.4025	0.0140
	INTCON	0.0028	0.0008	0.0020

	GO	-0.0176	-0.0192	0.0016
	chi square	10.16		
	p value	0.1796		
SUB SAHARAN AFRICA	**Regressors**	**Fix**	**Ran**	**Diff**
	EDEP	-0.0002	-0.0002	0.0000
	DMC	-0.1095	-0.1053	-0.0042
	GS	0.0159	0.0188	-0.0029
	SEC	0.0319	0.0243	0.0076
	RIP	-0.0178	-0.0300	0.0122
	INTCON	-0.1052	-0.1091	0.0039
	GO	-0.0955	-0.0967	0.0012
	chi square	567.08		
	p value	0		
Note: reject the null hypothesis of random effect which is (Ho: difference in coefficients not systematic) when p value is less than .05.				

Table A.9: Fixed Effect Model Results with Interaction Terms

Table 2: Negative Binomial Fixed Effect Model with Interaction Terms					
Dependent Variable is number of Terror incidents					
	Asia	**America**	**Middle East & N-Africa**	**Europe**	**Sub Saharan Africa**
Regressors	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**
EDEP	0.0000*	0.0001***	0.0000	0.0000	-0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)
DMC	-0.1520	0.8078***	-0.1350***	0.2262*	-0.1503**
	(0.1214)	(0.1453)	(0.0597)	(0.1158)	(0.0691)
GS	-0.0697***	-0.1043***	-0.0522	0.0403	0.0375
	(0.0305)	(0.0342)	(0.0323)	(0.0290)	(0.0296)
CORR	n/a	n/a	n/a	-1.2268***	-0.1586
	n/a	n/a	n/a	(0.4714)	(0.1404)
SEC	-0.0834**	0.0856*	-0.0216	-0.0721	-0.2988***
	(0.0425)	(0.0472)	(0.0574)	(0.0476)	(0.0912)
RIP	-0.5271***	-2.0193***	-0.6666***	0.2509***	-0.0525
	(0.1745)	(0.6599)	(0.1661)	(0.0915)	(0.0607)
INTCON	-0.2345***	-0.2701***	-0.0081	-0.1207***	-0.1099***
	(0.0755)	(0.0423)	(0.0415)	(0.0533)	(0.0434)
GO	0.0886**	-0.8805***	-0.1130*	-0.3483*	-0.0840**
	(0.0443)	(0.3332)	(0.0647)	(0.1804)	(0.0386)
RIPINTCON	0.0449***	n/a	n/a	n/a	n/a
	(0.0198)	n/a	n/a	n/a	n/a
RIPGO	n/a	0.1885***	0.0347*	n/a	n/a
	n/a	(0.0649)	(0.0193)	n/a	n/a
CORRGO	n/a	n/a	n/a	0.1237***	n/a
	n/a	n/a	n/a	(0.0426)	n/a
SECCORR	n/a	n/a	n/a	n/a	0.1175***
	n/a	n/a	n/a	n/a	(0.0328)
Diagnostics					
Wald chi2	64.49	199.3	73.04	60.49	97.58
Prob > chi2	0	0	0	0	0
Note: the *standard errors* of all coefficients are written under the coefficients in parenthesis.					

Table A.10: Random Effect Model Results with Interaction Terms

Negative Binomial Random Effect Model with Interaction Terms					
Dependent Variable is number of Terror incidents					
	Asia	**America**	**Middle East & N-Africa**	**Europe**	**Sub Saharan Africa**
Regressors	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**
EDEP	0.0000***	0.0001***	0.0000	0.0000	-0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)
DMC	-0.2120*	0.7322***	-0.1440***	0.2292*	-0.1410**
	(0.1154)	(0.1408)	(0.0593)	(0.1151)	(0.0674)
GS	-0.0792***	-0.1078***	-0.0524	0.0385	0.0391
	(0.0304)	0.0339)	(0.0320)	(0.0290)	(0.0294)
CORR	n/a	n/a	n/a	-1.2434***	-0.1666
	n/a	n/a	n/a	(0.4662)	(0.1390)
SEC	-0.0908**	0.0870*	-0.0245	-0.0687	-0.3050***
	(0.0422)	(0.0471)	(0.0566)	(0.0469)	(0.0906)
RIP	-0.5352***	-1.8557***	-0.6735***	0.2471***	-0.0646
	(0.1712)	(0.6597)	(0.1619)	(0.0910)	(0.0592)
INTCON	-0.2323***	-0.2864***	-0.0106	-0.1341***	-0.1131***
	(0.0740)	(0.0419)	(0.0411)	(0.0528)	(0.0427)
GO	0.0842*	-0.7927***	-0.1101*	-0.3531*	-0.0850**
	(0.0439)	(0.3329)	(0.0625)	(0.1779)	(0.0380)
RIPINTCON	0.0446**	n/a	n/a	n/a	n/a
	(0.0194)	n/a	n/a	n/a	n/a
RIPGO	n/a	0.1699***	0.0337*	n/a	n/a
		(0.0650)	(0.0187)	n/a	n/a
CORRGO	n/a	n/a	n/a	0.1245***	n/a
	n/a	n/a	n/a	(0.0421)	
SECCORR	n/a	n/a	n/a	n/a	0.1170***
	n/a	n/a	n/a	n/a	(0.0325)
Diagnostics					
Wald Test	74.76	205.15	83.25	60.19	104.53
p value	0	0	0	0	0

Table A.11: Hausman Test Result for Interaction Test

The Hausman test for the model with interaction terms Baseline Model				
ASIA	**Regressors**	Fix	Ran	Diff
	EDEP	0.0000	0.0000	0.0000
	DMC	-0.1520	-0.2120	0.0600
	GS	-0.0697	-0.0792	0.0095
	CORR	-0.0834	-0.0909	0.0074
	SEC	-0.5271	-0.5352	0.0081
	RIP	-0.2345	-0.2323	-0.0022
	INTCON	0.0886	0.0842	0.0044
	GO	n/a	n/a	n/a
	RIPINTCON	0.0449	0.0446	0.0003
	RIPGO	n/a	n/a	n/a
	CORRGO	n/a	n/a	n/a
	SECCORR	n/a	n/a	n/a
	chi square	21.44		
	p value	0.0032		
AMERICA	**Regressors**	Fix	Ran	Diff
	EDEP	0.0001	0.0001	0.0000
	DMC	-0.8078	0.7322	-0.0756
	GS	-0.1043	-0.1078	-0.0036
	CORR	0.0856	0.0870	0.0015
	SEC	-2.0193	-1.8557	0.1636
	RIP	-0.2701	-0.2864	-0.0163
	INTCON	-0.8805	-0.7927	0.0877
	GO	n/a	n/a	n/a
	RIPINTCON	n/a	n/a	n/a
	RIPGO	0.1885	0.1699	-0.0185
	CORRGO	n/a	n/a	n/a
	SECCORR	n/a	n/a	n/a
	chi square	3.61		
	p value	0.8231		
EUROPE	**Regressors**	Fix	Ran	Diff
	EDEP	0.0000	0.0000	0.0000
	DMC	-0.1350	-0.1440	0.0091
	GS	-0.0522	-0.0524	0.0001
	CORR	-0.0216	-0.0245	0.0029
	SEC	-0.6666	-0.6735	0.0069
	RIP	-0.0081	-0.0106	0.0025
	INTCON	-0.1101	-0.0030	-0.3483

	GO	n/a	n/a	n/a
	RIPINTCON	n/a	n/a	n/a
	RIPGO	0.0347	0.0337	0.0009
	CORRGO	n/a	n/a	n/a
	SECCORR	n/a	n/a	n/a
	chi square	70.64		
	p value	0		
MIDDLE EAST	**Regressors**	Fix	Ran	Diff
	EDEP	0.0000	0.0000	0.0000
	DMC	0.2262	0.2292	0.0030
	GS	0.0403	0.0385	-0.0018
	CORR	-0.0721	-0.0687	0.0034
	SEC	0.2509	0.2471	-0.0038
	RIP	-0.1207	-0.1341	-0.0134
	INTCON	-0.3531	-0.0049	-0.0840
	GO	-1.2268	-1.2434	-0.0166
	RIPINTCON	n/a	n/a	n/a
	RIPGO	n/a	n/a	n/a
	CORRGO	0.1237	0.1245	0.0008
	SECCORR	n/a	n/a	n/a
	chi square	24.29		
	p value	0.002		
SUB SAHARAN AFRICA	**Regressors**	Fix	Ran	Diff
	EDEP	-0.0002	-0.0002	0.0000
	DMC	-0.1503	-0.1410	0.0093
	GS	0.0375	0.0391	0.0016
	CORR	-0.2989	-0.3050	-0.0061
	SEC	-0.0525	-0.0646	-0.0121
	RIP	-0.1099	-0.1131	-0.0032
	INTCON	-0.0850	-0.0010	
	GO	-0.1586	-0.1666	-0.0080
	RIPINTCON	n/a	n/a	n/a
	RIPGO	n/a	n/a	n/a
	CORRGO	n/a	n/a	n/a
	SECCORR	0.1175	0.1170	-0.0005
	chi square	49.45		
	p value	0		

Table A.12: Name of Countries used for Regional Analysis

Table: Name of all countries used in the study according to their region				
Asian	**American**	**European**	**Middle East & N-Africa**	**Sub-Saharan Africa**
Bangladesh	Argentina	Albania	Algeria	Angola
Brunei	Bahamas	Austria	Bahrain	Botswana
China	Bolivia	Belgium	Egypt	Burkina Faso
Hong Kong	Brazil	Bulgaria	Iran	Cameroon
India	Canada	Cyprus	Iraq	Congo
Indonesia	Chile	Czech Republic	Israel	Congo, DR
Japan	Colombia	Denmark	Jordan	Ethiopia
Malaysia	Costa Rica	Finland	Kuwait	Gabon
Pakistan	Cuba	France	Lebanon	Gambia
Philippines	Dominican Republic	Germany	Libya	Ghana
Singapore	Ecuador	Greece	Morocco	Guinea
South Korea	El Salvador	Hungary	Qatar	Guinea-Bissau
Sri Lanka	Guatemala	Iceland	Saudi Arabia	Kenya
Thailand	Guyana	Ireland	Syria	Liberia
Vietnam	Honduras	Italy	Tunisia	Madagascar
-	Jamaica	Luxembourg	Turkey	Malawi
-	Mexico	Malta	UAE	Mali
-	Nicaragua	Netherlands	Yemen	Mozambique
-	Panama	Norway	-	Namibia
-	Peru	Poland	-	Niger
-	Uruguay	Portugal	-	Nigeria
-	USA	Romania	-	Senegal
-	Venezuela	Russia	-	Sierra Leone
-	-	Slovakia	-	Somalia
-	-	Spain	-	South Africa
-	-	Sweden	-	Sudan
-	-	Switzerland	-	Tanzania
-	-	United Kingdom	-	Togo
-	-	-	-	Uganda
-	-	-	-	Zambia
-	-	-	-	Zimbabwe

List of Countries those have remained the part of colonization				
ASIA	**AMERICA**	**EUROPE**	**MIDDLE EAST**	**AFRICA**
Bangladesh	Argentina	Cyprus	Algeria	Angola
Hong Kong	Bahamas	Finland	Egypt	Botswana
India	Canada	Iceland	Libya	Burkina Faso
Pakistan	Cuba	Ireland	Morocco	Ethiopia
Philippines	Dominican Republic	Malta	Syria	Ghana
–	Honduras	Poland	Tunisia	Guinea-Bissau
_	Jamaica	_	Yemen	Liberia
_	Nicaragua	_	_	Malawi
_	_	_	_	Mali
_	_	_	_	Namibia
_	_	_	_	Somalia
_	_	_	_	Tanzania
_	_	_	_	Zambia
_	_	_	_	Zimbabwe