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Corruption - Terrorism Nexus and its Effect on Economic Growth: Evidence from Developing Countries

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Abstract: ***Corruption has been increasingly recognized as the major threat to economic development, political stability and peace. It is also acknowledged by the international community as the breeding ground for terrorism. This paper studies the relationship between corruption and terrorism in the long run. Previous studies examining the link between these two phenomena used only time series cointegration tests. In this paper, we consider a dataset for a panel of 32 developed and developing countries over the period 2000 - 2020. We use Pedroni's residual - based panel cointegration test and the error correction model - based panel cointegration test developed by Westerlund. In order to obtain more robust results, two different measures of corruption are utilized which are Corruption Perceptions Index (CPI) and Worldwide Control of Corruption Indicator (CC). The results of both tests reject the null hypothesis of no cointegration. We conclude that corruption and terrorism converge. Our findings corroborate results of previous studies.***

Keywords: corruption, terrorism, panel data, economic growth, developing countries, and cointegration tests

Jel Classification: D73, G14, C23, O4, C49.

1. Introduction

Corruption and terrorism have become a common phenomenon in every society nowadays and the negative effect it has on the political and socio - economic structure of a country can be hard overemphasized.

Corruption and terrorism do not only join forces in conflict - affected countries where criminal activities are likely to flourish. In any country where endemic corruption has made the country itself or its neighbors vulnerable to terrorist activities, terrorist organizations are ready to use it to finance and perpetrate their acts. Like criminals and those ready to take their bribes, terrorist organizations depend on the same legal grey areas and the porosity of the financial sector to channel their financing. As such, no country is totally immune.

Identifying connections between corruption and terrorism, as well as the means to break them, is crucial to fighting their alarming increase in every society nowadays.

Corruption can help terrorism in many ways, particularly when it is done in the name of 'ideology'. It is easy to attract people, particularly the youth, in view of injustice and unemployment existing in the society due to bad governance and they may be asked to revolt against system.

Four main types of connection can be identified:

- Corruption and poor governance hamper countries' ability to fight terrorism
- Corruption facilitates international terror attacks
- Corruption helps cross - border terrorist financing
- Corruption and terrorist financing share methods to hide money

These phenomena have been the subject of many studies because they constitute threats to international security over the last two decades.

Actually, these phenomena are more widespread in developing economies. Indeed, these countries, due to the spread of corruption and misallocation of resources, export terror all over the world.

The link between peace and economic growth is indispensable because economic development cannot occur without peace, and peace and security without growth may not be sustainable. Terrorism has both a direct and indirect effect on economic growth. A country with a high level of terrorism loses the confidence of investors domestically and globally, which decreases domestic and foreign investments. Further, both human and financial resources shift abroad due to terrorist activities, which adversely affect economic growth. Countries affected by terrorism are allocating a considerable amount of financial and human resources to overcome terrorism and are spending less on economic and social infrastructure, which are imperative sources of human and physical capital accumulation. Terrorism is adversely affecting economic growth in these countries.

The main objective of this paper is to empirically investigate the impact of these two phenomena combined on economic growth in a sample of countries in developing countries.

In this paper, we examine the link between these two variables using panel cointegration tests. We will first conduct an overview of the theoretical discourse on corruption and terrorism. Then, we will examine the existence and nature of the Corruption - Terrorism Nexus in 32 countries over the period 2000 - 2020. Finally, we will

proceed with detailed discussion of our most relevant empirical results.

Corruption and terrorism have been increasingly recognized as the major threat to economic development, political stability and peace. It is also acknowledged by the international community as the breeding ground for terrorism.

In fact, corruption and terrorism are more likely to be exposed in the more economically developed countries.

This paper analyzes the effects of terrorism combined to corruption in developing countries representing regions (Latin America,, Middle East and North Africa)

From an economic standpoint, terrorism has been described to have four main effects (see, e. g., US Congress, Joint Economic Committee, 2002). First, the capital stock (human and physical) of a country is reduced as a result of terrorist attacks. Second, the terrorist threat induces higher levels of uncertainty. Third, terrorism promotes increases in counter - terrorism expenditures, drawing resources from productive sectors for use in security. Fourth, terrorism is known to affect negatively economic sectors.

Furthermore, corruption is more likely to be exposed in the more economically developed countries. Paldam and Treisman found that by far the most important determinant of corruption is the economic development, measured by real GDP per capita. Causalityruns from economic development to lower corruption, and from corruption to lower economic development (measured by GDP per capita). However, a specific attention has been paid to the issues of a negative interaction between the level of growth and the level of corruption by organizations such as the World Bank and the International Monetary Fund.

In our context, in order to predict the effects of these two major problem such as corruption and terrorism on economic growth in developing countries, we use panel cointegration tests with indicators of terrorism and indicators of corruption qualified in literature as a determinant of corruption and terrorism in order to test the link between two global scourages: corruption and terrorism and the real and the predicted GDP per capita.

This paper is organized as follows: In the second section, we present literature review. The third section provides the theoretical consideration of development andcorruption - terrorism. Section four is dedicated to the methodology description and will examine the effects of corruption - terrorism in developing countries representing regions (Latin America, Middle East and North Africa) over the period 2000–2020. Finally, we will proceed with discussion of our results.

2. Literature Review

In order to understand the relationship between corruption and terrorism, we must first elucidate the previous research on corruption and its impact on economic growth. Second, we examine the preceding investigations on terrorism and its impact on economic growth and finally, we inspect the earlier studies on the effects of the two combined phenomena namely corruption and terrorism on economic growth.

On the side of studies interested in the phenomenon of corruption, most of them have focused on their cause and consequence. In fact, some authors have found political factors and/or the level of development (income level) to be important determinants of corruption. For instance, Park (2003) employed multiple regression analysis to examine the determinants of corruption across countries. The author discovered that economic freedom, socio - political stability, a tradition of law abidance and national cultures are the major factors explaining corruption in the countries considered in his study. Del Monte and Papagni (2007) evaluated the factors responsible for high levels of corruption in Italy during the 1963–2001 period using statistics on crimes against regional public administration. The empirical evidence illustrated that the main causes of corruption include government consumption, the level of development, party concentration, the presence of voluntary organizations, and absenteeism in national elections. Zhang et al. (2009) investigated the structural determinants of corruption using data from several sources, and their findings suggested that corruption is influenced to a greater extent by social support, the types of government and inequality. Furthermore, many studies have demonstrated that higher levels of democracy lead to lower levels of corruption (see Billger & Goel, 2009; Campbell& Saha, 2013; Emerson, 2006; Goldsmith, 1999; Iwasaki & Suzuki, 2012; Lederman, Loayza, & Soares, 2005; Serra, 2006; Shabbir & Anwar, 2007). Meanwhile, some studies have established that corruption has a damaging impact on political conditions in a country, whereas others have concluded that higher economic development tends to reduce the level of political crisis in a society. For example, Mbaku and Paul (1989) found a positive relationship between rent seeking (corruption) and destabilization of political activities. Habib and Zurawicki (2001) concluded that corruption has an adverse effect on both domestic and foreign investments and found that the degree of openness and political stability of the host country moderates the influence of corruption. Montinola and Jackman (2002) discovered that corruption is lesser in dictatorships than in partially democratized countries. In addition, they found that higher levels of democracy reduce corruption. Other important determinants of corruption include membership in the Oil Producing and Exporting Countries (OPEC) and low wages for public sector employees in low - income countries. Cladero n and Chong (2006) confirmed that democratic regimes have a negative association with rent seeking behavior in Uruguay. Moreover, a number of studies have shown that an improvement in economic development (or a higher growth rate) tends to reduce the political instability in a country (see Bollen & Jack - man, 1985; Gasiorowski, 1998; Gupta, Madhavan & Blee, 1998; Gyimah - Brempong & Traynor, 1999). The impact of corruption and political instability on economic development or growth has also been empirically investigated. Some studies have confirmed a negative impact of corruption on growth (see Gyimah - Brempong, 2002; Mauro, 1995; Ugur & Das - gupta, 2011). For instance, Mauro (1995) examined

the impact of corruption on economic growth across countries using OLS and TSLS estimators. The author found that corruption has a negative impact on economic growth. Gyimah - Brempong (2002) employed a dynamic panel estimator to evaluate the effect of corruption on economic growth and income distribution in African countries. The author discovered that corruption decreases economic growth directly and indirectly via reduced investment in physical capital. Ugur and Dasgupta (2011) employed fixed effects and random effects weighted means to examine the effect of corruption across countries. Their results revealed that corruption has a negative effect on per capita GDP growth. Studies that have also found a negative impact of corruption on economic growth include the works of Mo (2001), Anoruo and Braha (2005), and Farooq etal. (2013). Similarly, others have confirmed a negative association between corruption and economic development (Bentzen, 2012; Blackburn & Forgues - Puccio, 2007; Okafor, Smith, & Ujah, 2014).

Some researchers have also found a negative effect of political instability on growth (see Asteriou & Price, 2001; Comeau, 2003; Devereux & Wen, 1998; Butkiewicz & Yanikkaya, 2006). For example, Devereux and Wen (1998) developed a simple model that relates political instability to the share of government spending in GDP and economic growth for a group of 52countries during the 1960 - 1985 period. The authors discovered that political instability dampens economic growth but increases the share of government spending in GDP. Asteriou and Price (2001) employed GARCH - M models to examine the effect of political instability on economic growth in the United Kingdom from 1961 to 1997. The authors found a strong negative effect of political instability on growth. Comeau (2003) tested the hypothesis that socio – political instability has a negative effect on growth in a group of countries selected from the Latin American and East Asian regions. The author discovered that socio- political instability has a negative impact on growth.

Butkiewicz and Yanikkaya (2006) estimated the relationship between economic growth and five measures of democracy using panel data for 100 countries during the 1970 - 1999 period. The results suggested that democratic countries have higher growth rates.

Many studies have found that political instability has a negative effect on economic growth (see Ades & Chua, 1997; Aisen & Veiga, 2013; Alesina et al., 1996; Asteriou & Siriopoulos, 2000; Campos & Karanasos, 2008; Fosu, 2002; Mbaku, 1988). However, Butkiewiczand Yanikkaya (2005) found a weak relationship between socio - political instability and economic growth.

On the other side, the empirical literature focused on terrorism has shown that terrorism is harmful to economic growth (Blomberg, Hess, & Orphanides, 2004, Blomberg, Broussard, & Hess, 2011; Crain &Crain, 2006; Mirza & Verdier, 2008; Naor, 2006; Tavares, 2004; Virgo, 2001).

Gaibulloev and Sandler (2009) illustrate that transnational terrorist attacks seriously limit economic growth. Aslam, Rafique, Salman, Kang, and Mohti (2018) demonstrate that terrorism has adversely affected Asian stock markets. According to Barth, Li, McCarthy, Phumiwasana, and Yago (2006), terrorism can generate inefficient resource allocation and thus impedes output growth and capital formation. Gupta, Clements, Bhattacharya, and Chakravarti (2004) and Ocal and Yildirim (2010) postulate that terrorist activities are important reasons for low economic growth in less developed countries. In turn, Meierrieks and Gries (2012) document that there is nolink between terrorism activities and output growth. Using data for 115 countries forthe period 2000 to 2015, Cinar (2017) has found that terrorism has negatively affected the economic growth of the countries, especially in low - income countries. The study has found that terrorism has affected low - income countries about three times more than high - income countries. Choi (2015) has investigated the impact of economic growth on terrorism using data for 127 countries for 1970 to 2007. It is found that countries with high industrial growth are less likely to experience internal and external terrorism.

Some studies have shown that terrorism has deteriorated economic growth in the country (Hyder, Akram, & Padda, 2015; Khan et al., 2016; Khan & Yusof, 2017; Mehmood, 2014; Shahbaz et al., 2013).

Several studies have examined the determinants of terrorism and concluded that this phenomenon depends strongly on political oppression, the weakness of public institutions, ineffective public governance and ethnic conflict (Krueger & Maleckova, 2003; Abadie, 2006; Basuchoudhary & Shughart, 2010). Freytag, Krüger, Meierrieks, and Schneider (2011) show that the deplorable socio - economic conditions have a considerable effect on terrorism. This situation is specific to developing countries. In fact, unemployed and marginalized young people are disillusioned by the unexplained wealth of corrupt decision - makers. Consequently, they are willing to risk their lives in search of a better future. In fact, bribery and money extortion are rife within public institutions making corruption a breeding ground for terrorism. These young people become easy prey for terrorist organizations who are following the methods of organized crime to finance their operations. Indeed, the main terrorist financing sources come from theft, kidnapping, drug trafficking, gunrunning and illegal immigrants. During the last decade, the international political community calls for anti - corruption action. In 2005, the United Nations, recognizing the danger of transnational terrorism, signed the anti - corruption convention. This initiative followed the strategy of the World Bank for the promotion of good governance and the fight against corruption (GAC) adopted in 2007.

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Among the studies conducted on corruption and terrorism are; Adeniran and Owoeye (2018) conducted a prospective study on logistical perspective towards counterterrorism of Boko Haram Insurgency in Nigeria. Lessons were drawn from the Boko Haram's geographical location, evolution and their mode of operations in previous attacks. Boko Haram group was declared terrorist in the north - east part of Nigeria, and the in the global world because the insurgency grew into one of the largest areas of violence in Africa, and major conflict in global terms. Their study relied on empirical and it lacks statistical backing.

Adeniran (2018a) assessed the effort of the Federal Government towards looted assets recovery in Nigeria which is a means of fighting corruption and terrorism and enhancing national development. The study also examined the relationship between corruption and terrorism in Nigeria, it revealed a strong and positive relationship between the low rank of the global peace index and the high rank of corruption perception index in Nigeria. The regression value indicates that 45.3% of the high - rank corruption is explaining low - rank peace. The low rank of peace signifies high rank of terrorism in Nigeria. The study is limited to Nigeria and does not include other African countries, it also adopted the inferential statistical test instead of descriptive statistics because of the data type and sampling technique involved. Santana - Gallego, Rosselló - Nadal, and Fourie (2016) examined the effect of terrorism, crime and corruption on tourism for 171 countries between 1995 and 2013. Their results show that terrorism and crime have a negative effect on tourist arrivals especially those related to leisure activities. Also, corruption has no effect on leisure tourism but affects only business tourism. Nahil and Malik (2016) examined the relationship between corruption and terrorism using a dataset approach for a panel of 123 developed and developing countries over the period 2003 - 2014. Pedroni's residual - based panel co - integration test and the error correction model - based panel co - integration test developed by Westerlund were adopted. In order to obtain more robust results, two different measures of corruption are utilized which are Corruption Perceptions Index (CPI) and Worldwide Control of Corruption Indicator (CC). It was revealed from both tests that the null hypothesis of no co - integration was rejected and concluded that corruption and terrorism converge.

Jorji and Victor (2016) conducted a study on the impact of corruption on economic growth and cultural values in Nigeria focusing on the need for value re - orientation. Trend analysis of the corruption perception index, relative corruption index and corruption rank of Nigeria were displayed on a line graph. The secondary data were gotten from the period of 1999 - 2015. Also, the impact of corruption on economic growth was examined with Auto - Regressive Distributive Lag (ARDL) model. The study does not establish a link between corruption and terrorism and is limited to Nigeria. Institute for Economics and Peace (2015) on the relationship between peace and corruption finds that corruption is highly correlated with peace indicators, and the influence of peace on corruption is not statistically significant which indicates that the relationship between peace and corruption has a one - way nature. Shelley (2005) conducted a study on the unholy trinity considering a transnational crime, corruption, and terrorism. His study finds that terrorism is a result of ethnic and sectarian tensions as well as economic and demographic inequalities. This phenomenon is more widespread in developing economies due to the spread of corruption and misallocation of resources which results in the export of terror all over the world.

Kalbasi Anaraki (2012) opines that recent social upheavals in the Arab World result from economic problems and bad corruption scores.

Also, Long - run relationship between corruption and terrorism using data for 13 Arab countries was examined using Johansen Co - integration tests. It was revealed that corruption and the number of terrorist attacks are convergent over time in most countries.

The results suggest that there is a long - run relationship between these two variables for most Arab countries. Al - Badayneh (2009) examines the relationship between corruption and terrorism incidents in the Arab World over the period 1970 - 2007. The study reveals asignificant negative correlation between corruption and terrorism.

Past studies that conducted the relationship between corruption and terrorism used PearsonMoment correlation, regression, and time series co - integration tests. They all relied on secondary data as shown in this study, but there were time, location, scope, and methodology gaps. This paper examines the relationship between corruption and terrorism in four African countries, which are Nigeria, Niger Republic, Cameroon, and Chad. The four African countries were chosen because there is a record of a high terrorist attack in the northern part of Nigeria and the three countries surrounding northern Nigeria. It is believed that this approach is capable of giving a more plausible result with regard to the examination of the relationship between corruption and terrorism in four African Nations. The hypothesis states that there is no relationship between corruption and terrorism in African Nations.

The effects of terrorism, crime and corruption on economy have been investigated extensively in the academic literature. Terrorism and crime have been acknowledged as negative factors entailing both direct costs (value of damaged structures, lives lost or damaged, injuries sustained, cleanup, …) and indirect costs (higher insurance premiums, higher security costs and lost commerce) (Sandler, 2014; Czabanski, 2008). In the case of corruption, although is generally accepted that corruption negatively affects economic growth, there is some controversy by the fact that some countries achieve rapid growth under widespread corruption (Li & Wu, 2010)

Terrorism, crime and corruption are expected to act as negative attractors of a destination. Terrorist attacks are a form of violent event that we would expect to have a large negative effect on the economic growth.

In the empirical literature a large and expanding number of works have discussed the factors influencing tourists' choice of destination including economic (such as income or price), geographic (such as distance, temperatures or beaches), historical (such as colonial background) or cultural (such as language, religion or ethnicity) (Papatheodorou, 2001; Assaf & Josiassen, 2012). However, many of these factors are time - invariant, and those that do vary do so slowly; few of these factors can explain why the growth rate grows faster in some countries than in others. In this way, the question of how far political and institutional instability in a country reduces economic demand has scarcely been explored in the literature and it is mainly concerned with individual countries or specific violent events.

There are exceptions, though. Neumayer (2004), one of the first to measure the effects of insecurity on economic growth finds a negative association between human rights violations, conflict and other politically motivated violent events. Political violence, he notes, is bad news for a country's growth.

Saha & Yap (2014) find that the effect of political instability on economic growth is more severe than the effects of a one - off terrorist attack. They also find, surprisingly, a non - significant or even marginally positive effect of terrorist attacks in countries with a low level of political instability, but significant inhibition of growth in countries with high levels of political instability. Similarly, Yap and Saha (2013) find that terrorism has a negative effect on economic demand, but that the effect is smaller in countries that have historical and natural attractions questioning previous results that had considered terrorism as an isolated factor. Altindag (2014) analyses the effect of crime on economic growth by using panel data that includes tourism flows to European countries. He finds that violent crime is negatively associated with economic growth, but that the effect is smaller in southern Europe, which is evidence of a trade - off between environmental factors (such as good weather and sandy beaches) and security. Crime may create an externality in the form of a reduction in economic activity.

In a cross - country study of the link between corruption and economic growth, Das and DiRienzo (2010) find a negative association between corruption and economic growth, and they find the association is stronger in developing than developed countries. Using a fixed - effects and Dynamic GMM specifications and a panel dataset of over 100 countries over 16 years, Propawe (2015) finds that a 1 - point increase in the Corruption Perception Index (CPI), i. e. a reduction in corruption results in a 2 to 7% increase in economic growth, ceteris paribus. Saha and Yap (2015) find a negative but non - linear association between corruption and economic growth. They find that whilecorruption generally has a negative association with economic growth, it has a marginally positive association if corruption is minimal.

3. Theoretical Framework

The aim of this paper is to measure corruption and terrorism impacts on economic growth. Among the various economic conditions, we have chosen growth because it provides a foundation for the economic future of any society (see Ferrara, 2014). We argue that not all areas of economic growth have an identical effect on terrorist and corrupt activity.

We have constructed the following hypothesis about economic opportunities:

Hypothesis 1: All other things being equal, as economic growth progresses, more economic opportunities become available, thereby reducing the risk of terrorism.

Hypothesis 2: All other things being equal, as economic growth progresses, more economic opportunities become available, thereby reducing corruption.

We collect pooled panel data for 32 countries during the period from 2000 to 2020, using the country - year as the unit of analysis (Appendix Table A1 shows a list of sample countries).

Measurement

Dependent Variable

a) Economic Growth

The main dependent variable, economic growth, captures an increase in the capacityof an economy to produce goods and services, comparing one period of time toanother. Consistent with existing studies, it is measured as the annual percentage growth rate of GDP per capita.

b) Key Independent Variable

- ***Terrorism***

Considering the ongoing issue surrounding the definition of terrorism, it is understandable that records of terrorist attacks may include, exclude, minimize, or exaggerate events based on political motives. The selection of data sources for political violence can be troublesome (LaFree and Dugan 2007; Olzak 2006).

A more detailed and comprehensive database on incidents of terrorism has recently become available. The Global Terrorism Database (GTD) maintained by the National Consortium for the Study of Terrorism and Responses to Terrorism (START) at the University of Maryland contains information on more than 200, 000incidents from 1970 to 2020.

As a result of this broad yet clear conceptualization of terrorism, the GTD is currently the "most comprehensive unclassified database on terrorist events in the world" (START 2020) and an ideal database for use in this study.

The unit of analysis for the GTD is at the incident level spanning 1970 to 2020. Annual counts for each country were developed in order to extract information for the time frame of this study (2000–2020).

Terrorism has both direct and indirect effects on economic growth. Terrorism impedes economic growth directly by damaging infrastructure, incurring a loss of human capital, reducing school enrolment, reducing short - run commerce, causing internally displaced persons (IDPs), and reallocating resources, among others.

Terrorism also thwarts economic growth indirectly by affecting macroeconomic variables, e. g., by reducing FDI, lessening domestic investment, increasing inflation, increasing non - development government expenditures (law and order), damaging stock markets, and increasing unemployment, among others. Sandler and Enders (2008), Mirza and Verdier (2008), Frey et al. (2007), Eckstein and Tsiddon (2004) and Collier (1999) have explained the channels through which terrorism impedes economic growth. Based on theory, we take three important macroeconomic variables to find the indirect effect of terrorism on output growth. These variables include FDI,

domestic investment and government spending because, in chosen countries, terrorism has highly affected these sectors of those economy.

Effect of terrorism on foreign direct investment

Terrorism affects FDI in many ways. Terrorism increases insecurity and uncertainty in the country, which causes a loss of confidence in foreign investors, causing them to divert their resources from the host country to other, peaceful countries (Abadie & Gardeazabal, 2003, Abadie & Gardeazabal, 2008; Agrawal, 2011; Blomberg & Mody, 2005; Enders & Sandler, 1996; Kang & Lee, 2007; Kinyanjui, 2014). Terrorism also makes foreign investors more concerned about their expected returns from their investment. If foreign investors do not see any increase in their expected returns in the presence of high levels of terrorism, then they will shift their resources from the host country to other, safe countries. An uncertain environment makes an investor to deem it an unproductive investment since costly security measures decrease the returns on FDI. Terrorism also damages local infrastructure such as roads, bridges, and telecommunications. It discourages foreign investment by increasing the cost of doing business. Bandyopadhyay et al. (2014) document that all forms of terrorism discourage FDI. Filer and Stanisic (2016) document that terrorism reduces FDI and that, in comparison to portfolio investments and external debt, FDI is more susceptible to terrorism. Thus, foreign investment decreases with the increase in terrorism in the host country.

Effect of terrorism on foreign investment

Foreign investment is also an important channel through which terrorism affects output growth. Terrorism also decreases domestic investment because it becomes difficult for domestic investors to invest in a terror - stricken environment.

Further, public investment is also severely damaged because government projects such as the construction of roads, highways, canals, dams, bridges, highway, hospitals, and schools are also brought to an end in the presence of terrorist activities (Eckstein & Tsiddon, 2004; Lluss_a & Tavares, 2011; Persitz, 2007). Moreover, terrorism severely damages investment in vulnerable sectors of the economy such as tourism. Terrorist activities induce public expenditures on defence and security issues, which can crowd out public and private investments (Blomberg, Hess, & Orphanides, 2004; Gaibulloev & Sandler, 2008).

Effect of terrorism on government spending

Terrorism increases government expenditure because the government must spend more on security issues to maintain law and order in the country (Blomberg, Hess, & Orphanides, 2004). This reallocation of government resources decreases expenditure on social sector development such as health and education (Collier et al., 2003). It will decrease economic growth. In turn, high government expenditure on security offsets terrorism by improving the law and order situation, which will increase both domestic and foreign investments. It will increase economic growth.

- ***Corruption***

In a review of the three most popular corruption indexes in the literature, Donchev and Ujhelyi (2011) found that these indexes measured the *perception* of corruption within a state better than they measured the level of *actual*, or experienced, corruption. The use of these three measures of corruption is consistent with the literature (Egger and Winner 2006; Foster, Horowitz, and Mendez 2012; Koyuncu and Yilmaz 2008; You and Khagram 2005). However, researchers caution about the difficulty involved in measuring corruption and the limits of current measures of corruption (Knack 2007). Ideally, indexes should rely on both firm - level and systemic household surveys for measuring corruption.

Unfortunately, the latter often proves extremely difficult. On the other hand, results indicate that elite perceptions match well with the mass public (Canache and Allison 2008). Regretfully, only one of the three corruption indexes, Political Risk Services' *International Country Risk Guide (*ICRG) reaches back beyond 1995. As a result, it is the only index used in the present analysis.

The ICRG contains twenty - two components that measure political, financial, and economic risk, and has been published since 1984 (PRS Group 2011). Within the political risk factors, PRS includes a measure for corruption that takes into account both financial corruption in the form of demands for special payments and "excessive patronage, nepotism. . . and suspiciously close ties between politics and business" (O'Leary 2004: 31). The resulting score falls on a scale of 0 to 6, where 0 indicates high corruption and 6 indicates low corruption. In order to facilitate interpretation, this scoring was inverted such that indicates low levels of perceived corruption and 6 indicates high levels. Corruption data on the period of the present study covers between 110 and 134 countries.

Effect of corruption on infrastructure

Corruption can have detrimental effects on infrastructure development in many ways, such as distorting spending structure and project design; inflating prices; and contributing to delayed, low quality, or unfinished provision (Kenny 2006; Mauro 1997).

Corruption's Effect on investment

Corruption's effect on investments varies significantly across regions: corruption has a negative and significant effect on investment growth for firms in Transition countries but has no significant impact for firms in Latin America and Sub - Saharan Africa. Furthermore, for Transition countries, corruption is the most important determinant of investment.

Effect of corruption on government Spending

Blackburn et al. (2008) found out that corruption positively affects the rate of inflation. The author found out that corruption has indirect effect on growth through public finance channels. Corruption drives public finance composition toward more seigniorage and, therefore, lowers growth.

Corruption limits budgetary balance, lowers efficiency of government spending and disturbs the budget allocation

among individual budgetary functions (Delavallade, 2006). These negatives present transmission mechanisms of unfavorable effects of corruption on economic growth.

- ***Control Variables***

Level of education
Education level was measured at both the primary and tertiary levels using the Barro–Lee Education Attainment data set (Barro and Lee 2013). The Barro–Lee data report the percentage of total population over age fifteen having completed primary and tertiary education from 1950 to 2010 in five - year intervals with interpolated data for intervening years. It is anticipated that the relationship between a country's level of education and terrorist events will be negative, reflecting the results of prior research that improved socioeconomic conditions (including higher levels of education) correlate to a reduction in the proliferation of political violence (Caruso and Schneider 2011; Freytag et al.2011). Most recently, Nasir, Ali, and Rehman (2011) add a measure for human capital in the form of level of education to the expanded model.

4. Data overview and estimation of the model

The study has followed the extension of Solow (1956) growth model's production function formulated by Mauro (2004).

The extended variables in production function are corruption and terrorism that affects the growth path.

This study investigates both the direct and indirect effects of terrorism on economic growth. To observe the direct effect of terrorism and terrorism on growth, we estimate the following reduced form equation:

$$Y_t = \beta_0 + \beta_1 TR_t + \beta_2 CORR_t + \beta_3 FDI_t + \beta_4 G_t + \beta_5 Edu + \varepsilon_t \quad (1)$$

This study investigates, firstly, both the direct and indirect effects of terrorism and corruption on economic growth in32 countries during the period from 2000 to 2020.

The mathematical representation of the structural model is as follows:

$$Y_t = \beta_0 + \beta_1 FDI_t + \beta_2 G_t + \varepsilon_t \quad (2)$$

$$FDI_t = \alpha_0 + \alpha_1 TR_t + \alpha_2 CORR_t + \varepsilon_t \quad (3)$$

$$G_t = \sigma_0 + \sigma_1 TR_t + \sigma_2 CORR_t + \varphi_t \quad (4)$$

All variables, except growth (Yt), are expressed in natural log form, and the variables are defined as follows:

Yt = Real GDP growth rate
FDIt = Foreign direct investment
Gt = Government spending
TRt = Terrorism
CORRt = Corruption
Edu= Level of education

Data overview
For empirical analysis, annual data is used for the period 2000–2020. Terrorism is the total number of deaths, and its data is taken from the Global Terrorism Database (GTD) and the South Asia Terrorism Portal (SATP). Economic growth is the real GDP growth rate. FDI, government spending are taken as a percentage of GDP.

Human capital is measured by human capital per person, which is related to the average years of schooling and the return on education, and the data is collected from the Penn World Table (PWT). The data for corruption is collected from International Country Risk Guide (ICRG). The resulting score falls on a scale of 0 to 6, where 0 indicates high corruption and 6 indicates low corruption.

All three measures of dispersion, i. e., standard deviation, quartile deviation and interquartile range, indicate that terrorism has the highest deviation. Government spending, and foreign investments conflicts also have high deviations. A similar interpretation holds for all other variables.

Estimation of a single equation model
Under the extended Solow growth model, the functional equation of the model is given as:

Growth = (FDI +G +TR+*CORR*+ Edu)

To study the direct effect of terrorism and corruption on economic growth, Equation (1) is estimated.

The results in column 3 reveal that terrorism has a negative effect on economic growth and that the coefficient is statistically significant. Economically speaking, a one per cent increase in terrorism will decrease economic growth by 0.33 per cent. This result is in accordance with the existing empirical literature showing that terrorism decreases economic growth (Crain & Crain, 2006; Mirza & Verdier, 2008; Naor, 2006). Other variables have theoretically expected effect on economic growth.

Corruption has a significant effect on economic growth. We find that a one percent increase in corruption will increase economic growth by 0.25 percent. Human capital has significant positive effect on growth. A one per cent increase in human capital will increase output growth by 0.32 per cent. Foreign investments have statistically significant positive effects on growth. A one per cent increase in foreign investment will increase economic growth by 0.152 per cent.

Economic growth also increases with the increase in government spending, as the coefficient of government spending is positive and statistically significant. A one per cent increase in government spending will increase economic growth by 0.253 per cent. The intuition is that government expenditures on security measures improve law and order condition in the country, which boosts economic activity in the country.

High R - squared and adjusted R - squared values indicate that the model fits the data well. The R - squared (adjusted R - squared) value implies that 82.3% (82.3%) of the variation in the dependent variable is explained by all independent variables in column 3.

Human capital, foreign investments, and government spending have statistically significant positive effect on economic growth, as was theoretically expected. The estimated results are in accordance with the existing literature (Eckstein & Tsiddon, 2004; Frey et al., 2007; Sandler & Enders, 2008).

Estimation of the structural equations model

To investigate the indirect effect of terrorism and corruption on economic growth, we estimate a structural growth model represented by the system of Equation (2), which comprises one growth equation and two channel variable equations, i. e., FDI and government expenditures.

The results of growth equation closely resemble the existing findings in the empirical growth literature (see, e. g., Barro, 1990, 1991; Barro & Sala - i - Martin, 2004; Levine & Renelt, 1992). All channel variables, i. e., FDI and government spending, have statistically significant positive effect on economic growth. Further, economic growth also increases with the increase in human capital, as the latter has statistically significant positive effect on economic growth. The magnitudes of the coefficients show that human capital increases economic growth more than any other variable. Our estimated results are in accordance with the prevailing literature (Abadie & Gardeazabal, 2003; Blomberg, Hess, & Orphanides, 2004, Blomberg, Hess, & Weerapana, 2004; Mirza & Verdier, 2008).

Table 1summarises the channel effects of terrorism and corruption on economic growth. The impact of terrorism on each channel variable is presented in column - 3, whith the effect of each channel variable on economic growth is presented in the same column 3. These results are in accordance with the previous literature (Abadie &Gardeazabal, 2003, Abadie & Gardeazabal, 2008; Bandyopadhyay et al., 2014; Blomberg, Hess, & Orphanides, 2004; Gaibulloev & Sandler, 2008).

Table 1: The contribution of effect of terrorism and corruption on GDP growth

Variables	Panel data Fixed Effects	Panel data Random Effects	Panel data Corrected Random Effects
Constant	- 0.042 (- 0.58)	- 0.78 (- 9.62) ***	- 0.747 (-12.32) ***
TRt = Terrorism	- 0.14 (- 0.27)	0.212- (- 3.28) ***	0.33- (-3.09) ***
CORRt = Corruption	0.025 (0.45)	0.127 (6.86) ***	0.25 (8.42) ***
FDIt = Foreign direct investment	0.123 (1.43)	0.127 (5.91) ***	0.152 (3.43) ***
Gt = Government spending	0.107 (2.12)	0.115 (3.93) ***	0.253 (4.22) ***
Level of education	0.021 (0.76)	0.092 (5.21) ***	0.32 (3.11) ***
Countries X years	674	674	674
(NXT)			
R^2	0.5063	0.823	0.823
Test of Hausman		(86.5) ***	
B - Pagan χ^2 (.) Pr > χ^2		2.56 0.115	
Test of Breush - Godf Pr >F		7.732 0.0256	

Notes: t - statistics are in brackets and estimations in this case are run using 2SLS technique. MEF: Fixed Effects Model; MEA: Random Effects Model; MEFC: Corrected Fixed Effects Model. *, **, *** indicate the level of significance at 10 %, 5 % and 1 % respectively

5. Conclusion

The impact of economic growth on terrorist activity combined with corruption is an understudied area, and the previous empirical results are mixed and inconsistent. This study sheds new light on the literature of economic growth and terrorism combined to corruption. Given its potentially enormous impact on terrorist activity combined to the effect of corruption activities on the economic growth in 32 countries between 2000 - 2021.

Whereas previous studies focus onone type of terrorism or corruption, I investigate the effects of terrorism combined to corruption on economic growth for 32 countries between 2000 - 2020.

In addition, we identified the effect of these problems on foreign investment and on the government spending considering the level of education in panel countries.

After the panel analysis, we find that the effects of corruption and terrorism are negative on economic growth of these countries. However, the direct investment and the government spending combined to the level of education affect positively the economic growth.

What can a government learn from these findings? Unfortunately, the findings are not alloptimistic because to have a well - functioning market economy, it is necessary to have solutions to corruption and for growing terrorist threats. If a government seeks to an economic growth, it should take into consideration what forms of terrorism it needs to counter and limits all corruption activities. If the goal is the economic growth, the solution is to control all sources of terrorist threats and all sources of corruption in one side. In the other side, government should promote investments, increase government's spending and encourage for a high - level education.

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Annexes

Table A1: A list of 32 countries

No	Countries	No	Countries
1	United Arab Emirates	17	Sudan
2	Qatar	18	Yemen
3	Jordan	19	Syria
4	Saudi Arabia	20	Somalia
5	Morocco	21	Switzerland
6	Tunisia	22	Germany
7	Kuwait	23	Spain
8	Bahrain	24	Finland
9	Algeria	25	France
10	Egypt	26	United Kingdom
11	Djibouti	27	Italy
12	Lebanon	28	Sweden
13	Comoros	29	Ghana
14	Mauritania	30	Madagascar
15	Iraq	31	Nigeria
16	Libya	32	Zimbabwe