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## **The persistence of global terrorism**

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## **The persistence of global terrorism**

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January 2019

### **Abstract**

This study investigates persistence of global terrorism in a panel of 163 countries for the period 2010 to 2015. The empirical evidence is based on Generalised Method of Moments. The following findings are established. First, persistence in terrorism is a decreasing function of income levels because it consistently increases from high income (through upper middle income) to lower middle income countries. Second, compared to Christian-oriented countries, terrorism is more persistent in Islam-oriented nations. Third, landlocked countries also reflect a higher level of persistence relative to their coastal counterparts. Fourth, Latin American countries show higher degrees of persistence when compared with Middle East and North African (MENA) countries. Fifth, the main determinants of the underlying persistence are political instability and weapons import. The results are discussed to provide answers to four main questions which directly pertain to the reported findings. These questions centre on why comparative persistence in terrorism is based on income levels, religious orientation, landlockedness and regions.

*JEL Classification:* C52; D74; F42; K42; O38

**Keywords:** Terrorism; Persistence; Development

## 1. Introduction

This study is motivated by three main factors in policy and scholarly literature, notably: growing evidence of terrorism; the policy imperative of understanding dynamics in the persistence of terrorism and gaps in the attendant literature. These three factors are substantiated in chronological order.

First, in the light of the 2014 Global Terrorism Index (GTI, 2014), terrorism has been rising in scope and scale across the globe. Such a rise has been facilitated by negative externalities from the 2011 Arab Spring. Some stylized facts are worth highlighting to substantiate the perspective (Asongu & Nwachukwu, 2016a). Libya has become a failed State in the post-Gaddafi era because there are many rebel groups vying to: (i) determine the law of the land and (ii) take decisions that will steer the country to a new development course. The situation in Yemen has deteriorated owing to a proxy war between Saudi Arabia and Iran who are supporting opposing factions of the war. The Boko Haram of Nigeria has been extending its activities to neighboring countries like Cameroon, Chad and Niger. The war in Syria has led to fragile political situations in neighboring countries like Lebanon and Iraq on the one hand and on the other, the birth of the Islamic State of Iraq and the Levant (ISIL). The ramifications of ISIL have had far-reaching consequences, notably, the: December 2014 Sydney-Australian hostage crisis; failed Australian attack in February 2015; foiled January 2015 Vervier attacks in Belgium and the 2015 “Charlie Hebdo” attacks in Paris-France.

Second, the policy relevance of the study can be articulated along three strands, namely, the: consequences of terrorism; cost of terrorism and imperative to understand persistence in terrorism. In what follows, the strands are substantiated in the same chronology. (i) Terrorism and conflicts have been substantially affecting development outcomes, notably: activities of sabotage by the Movement for the Emancipation of the Niger Delta in Nigeria’s oil Delta region (Onuoba, 2010; Obi, 2010; Akpan, Essien, & Isihak, 2013; Taylor, 2014); considerable disruptions in Libyan petroleum production after the fall of Colonel Gaddafi (Gaub, 2014); the In Amenas Al-Qaeda attacks in Algeria (Onyeji, Brazilian, & Bronk, 2014) and ISIL’s control of many petroleum installations in Syria (Celso, 2015; Le Billon, 2015). (ii) The global cost of fighting terrorism has been steadily rising. According to the 2015 Global Peace Index (GPI) report, approximately thirteen percent of the global Gross Domestic Product (GDP) is spent on preventing, fighting and mitigating conflicts and terrorism (Anderson, 2015; Asongu & Kodila-Tedika, 2017). According to the authors, this represents the combined annual GDP of the following countries: Brazil, Canada, France, Spain, the United Kingdom, and Germany. The wealth could alternatively be spent on other

development outcomes like the funding to socio-economic projects in the light of challenging sustainable development goals.

(iii) The policy relevance of understanding persistence in terrorism also builds on the fact that understanding persistence in terrorism is relevant in potentially mitigating drivers of such persistence. A possible externality could be less income being spent on fighting terrorism and hopefully more financial resources allocated for other socio-economic investments.

Third, the scholarly importance of this paper is motivated by the scarce literature on persistence in terrorism. As summarized in Table 1, as far as we have reviewed, we still know very little about persistence in terrorism at a global scale because no such study is apparent in the extant literature. The study closest to this paper is Asongu and Nwachukwu (2018) which has assessed timelines for policy harmonization against terrorism in a sample of 78 developing countries for the period 1984-2008. This paper steers clear of the underlying study because it addresses a different problem statement and focuses on 163 countries for the period 2010-2015. Moreover, in order to improve space for policy implications, the empirical analysis articulates some fundamental characteristics of comparative economic development. Hence, the rich dataset is decomposed into: income levels, legal origins, religious domination, regional proximity and landlockedness<sup>1</sup>.

The following findings are established. First, persistence in terrorism is a decreasing function of income levels because it consistently increases from high income (through upper middle income) to lower middle income countries. Second, compared to Christian-oriented countries, terrorism is more persistent in Islam-oriented nations. Third, landlocked countries also reflect a higher level of persistence relative to their coastal counterparts. Fourth, Latin American countries show higher degrees of persistence when compared with Middle East and North African (MENA) countries. Fifth, the main determinants of the underlying persistence are political instability and weapons import. The results are discussed to provide answers to four main questions which directly pertain to the reported findings, notably: (i) *Why does persistence in terrorism decrease as income levels increase*, (ii) *Why is persistence in terrorism more apparent in Islam-oriented countries compared to Christian-oriented countries*, (iii) *Why do Landlocked countries reflect higher levels of persistence in terrorism*

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<sup>1</sup> Another stream of studies has used the same methodology and dataset but focused on different problem statements. This includes studies focusing on: the persistence of incarcerations (Asongu, 2019); contemporary drivers of global tourism (Asongu, Nnanna, Biekpe & Acha-Anyi, 2019a) and the murder or homicide epidemic (Asongu & Acha-Anyi, 2019). This study departs from the attendant studies by focusing on global terrorism.

*relative to coastal countries and (iv) Why is persistence in terrorism more in Latin American countries compared to the MENA countries?*

Global terrorism within the context of the study provides a holistic summary of principal global patterns and tendencies of terrorism (GTI, 2014). It discloses a composite measurement that ranks countries systematically in terms of activities of terrorism, which entail a number of characteristics linked with attacks of terrorism. In the global terrorism index (GTI), terrorism is defined 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*”. This definition acknowledges that terrorism is not exclusively an attack of physical nature but also encompasses long-term psychological impacts on society. According to the narrative, in order for a terrorism incidence to be incorporated into the GTI, it has to be consistent with an international act of threat violence or violence by actors that have non-state status. Moreover, an incident has to fulfill three fundamental criteria in order for it to be considered as an act of terrorism, notably: (i) the occurrence should be incidental or the outcome of a conscious act from the perpetrator; (ii) the incidence must encompass some threat of violence or degree of violence which entails violence against people and (iii) the dataset does not include incidences of state terrorism because only acts from sub-national actors are taken on board.

The above conceptual clarification of terrorism is also because there is no consensus on the definition of terrorism in the literature. The rest of the paper is organized as follows. The theoretical underpinnings and related literature are covered in Section 2. Section 3 presents the data and methodology while the empirical results and corresponding discussion are disclosed in Section 4. We conclude in Section 5 with implications and future research directions.

## **2. Theoretical underpinnings and literature review**

### **2.1 Theoretical underpinnings**

The theoretical background underpinning this study is consistent with recent literature on persistence in financial (Stephan & Tsapin, 2008; Goddard, Liu, Molyneux, & Wilson, 2011) and inclusive (Asongu & Nwachukwu, 2017a) development. Moreover, the theoretical perspective is founded on studies which have investigated cross-country convergence in income levels within the framework of neoclassical growth models (Baumol, 1986; Barro, 1991; Barro & Sala-i-Martin, 1992, 1995; Mankiw, Romer, & Weil, 1992). We build on the

theoretical underpinnings because they have been extended to other fields of economic development, notably: inclusive development (Mayer-Foulkes, 2010; Asongu, 2014), financial market progress (Narayan, Mishra, & Narayan, 2011; Bruno, De Bonis, & Silvestrini, 2012; Asongu, 2013) and terrorism (Asongu & Nwachukwu, 2018) studies.

It is important to note that the underlying theoretical background falls within the framework of nascent economic growth theories that were developed in the post-Keynesian époque. Such theoretical perspective gained prominence owing to substantial changes in the neoclassical revolution that diminished cross-country differences in income levels. Within the neoclassical framework, notions of market equilibrium were advanced to articulate the relevance of economic growth theories in decreasing differences in per capita income across nations. As emphasized by Mayer-Foulkes (2010), such convergence tendencies are substantially traceable to favorable externalities of “free market competition”. Two principal scholarly strands are apparent in the literature. The first argues that the lack of convergence (or evidence of divergence) in income levels across countries is feasible because of a plethora of reasons, notably: differences in initial endowments and multiple equilibria (Barro, 1991; Pritchett, 1997). Conversely, a second strand in theoretical literature maintains the position that, despite heterogeneities in initial conditions, decreasing cross-country differences in income levels is feasible, essentially because countries can converge to a long-term equilibrium or country-specific steady state (Asongu & Nwachukwu, 2017a).

In the light of the above contending strands, the objective of this study is not to take sides in any school of thought. In essence, our purpose is to build on the common criteria employed by both strands in the literature to accept or reject evidence of convergence. According to this criterion, persistence can be established depending on whether the lagged estimated outcome variable falls within the convergence interval.

## **2.2 Literature review**

It is relevant to first provide some insights into “four waves of terrorism” from a thesis by Rapoport (2001) before discussing the attendant literature. According to the narrative, there are four fundamental waves of terror. The first or anarchist wave is consistent with the position that the history of contemporary terrorism started with a “first wave” in the late 19<sup>th</sup> century in Central and Eastern Europe. During this period of time, Europe and the United States witnessed extensive periods of transformation and development.

The second or “Nationalist-Separatist” wave took place between the 1920s and 1960s. A principal feature in this wave is the progress of movements of separatist and nationalist

character. These movements were against a longstanding domination of European countries which during the 1700s expanded rapidly by acquiring territories in many parts of the world. Such acquisitions were largely no longer welcomed because imperialism and colonization were fought from a multiple of fronts.

The third or revolutionary wave is characterized by the success of guerrilla movements in the war between the United States and Vietnam during the 1970s. During this era, revolutionary movements understood the success of the Vietcong as a measure of hope in the perspective that a revolution of popular nature could be successful against Western opponents.

The fourth or religious wave is characterized by violence that is made in the name of religion. Many examples are used to substantiate this fourth wave, notably: politically-motivated wars that are tailored to defend religious faith. Terror activities are used as the principal means by which to meet political objectives.

Table 1 which is consistent with Asongu, Orim and Nting (2019b), summarizes some extant literature on factors driving or deterring terrorism across the world. The corresponding literature can be discussed in four main strands which articulate: (i) foreign aid and policy, (ii) “democracy, civil liberties and state failure”, (iii) welfare and (iv) “foreign occupation and military expenditure”.

First, on the connection between foreign/policy and terrorism, Savun and Phillips (2009) have investigated why democracies are particularly vulnerable to transnational terrorism to conclude that the relationship is contingent on a country’s behavior. They posit that, irrespective of the type of political regime in place (democracy versus autocracy), unlike regimes that pursue isolationist foreign policy, regimes that are more involved in international politics are also more likely to be targeted by transitional terrorism. Choi and Salehyan (2014) have assessed linkages between refugees, humanitarian aid and terrorism to establish that “no good deed goes unpunished” because the infusion of aid resources provides looting avenues for militant groups and by extension, opportunities for attacking foreign interests. Button (2014) has used the mechanism of “interstate rivalry” to elucidate why aid-for-counterterrorism may work in some contexts and not in others. The authors argue that if recipients receiving US aid are involved in interstate rivalry, these recipients are more likely to use the aid in arming themselves against their rivals instead of using it to fight terrorism. Moreover, these recipients can further play-up the terrorism threat in order to receive more aid.

Button and Carter (2014) have shown that the nexus between foreign aid and transnational terrorism is contingent on whether terrorist activity in the recipient country



threatens the United States directly or not. Hence, the United States is more likely to offer aid to countries in which terrorist activities target her interests. Eng and Urperlainen (2015) build on the premises that: (i) groups with domestic interests in the donor country have the potential for mobilizing support for the implementation of rewards and punishments by donors and (ii) the expectation of the underlying mobilization affects the credibility of promises and threats at the initial contracting stages. The main purpose is to assess how domestic interest groups affect the ability of a donor to credibly commit to implementing promises and threats. The authors find that: (i) for the purpose of credibility, donors for the most part, often promise very generous rewards or warn on very severe sanctions that are largely out of proportion and (ii) donors are unable to simultaneously make promises and credible threats unless both instruments are supported by domestic interest groups. Asongu and Ssozi (2017) have concluded that foreign aid (bilateral, multilateral and total) is effective at mitigating terrorism exclusively in countries where initial levels of transnational terrorism are highest.

In the second strand which focuses on democracy, civil liberties and state failure, Lee (2013) investigate the connection between democracy, civil liberties and hostage-taking terrorism in order to understand types of governments that are more prone to terrorism. The article builds on the argument that hostage-taking terrorism may be more apparent in democratic governments because democracies attribute a lot of value to personal freedom and human value. The empirical evidence supports this argument. Gries, Meierrieks and Redlin (2015) investigate the relationship between economic and military aid from the United States, conditions of human rights and the rise in aid-receiving countries of anti-American transnational terrorism. The authors find that a combination of military/economic dependence on the United States and local repression generates anti-American terrorism. In summary, no evidence is found to support the perspective that foreign assistance by the United States makes the United States safer. Coggins (2015) investigates whether state failure causes terrorism to find that, for the most part, failed and failing states are not predisposed to higher prevalence of terrorism. However, states experiencing political collapse or at war are found to be significantly more associated with the experience and production of terror.

**Table 1: Drivers and Deterrents of Terrorism**

Author(s)	Period	Sample	Methodology	Terrorism Dynamics	Instruments	Effects on terrorism
Tavares (2004)	1987–2001	2725 observations and 1428 attacks	OLS	Domestic and transnational Terrorism	Democracy	The instrument reduces terrorism
Testas (2004)	1968–1991	37 Muslim countries	Poisson Regression Model	Transnational terrorism	University enrollment	The instrument increases terrorism
Bravo and Dias (2006)	1997–2004	60–85 Countries	OLS	Domestic and transnational terrorism	Adult population literacy rate	The instrument reduces terrorism
Drakos and Gofas (2006)	1985–1998	139 Countries	Negative Binomial and Zero-inflated Negative Binomial Regressions	Transnational terrorism	Trade openness and Polity	The instruments reduces terrorism
Kurrild-Klitgaard, Justesen, and Klemmensen (2006)	1996–2002	97–121 Countries	binary logistical regression	Transnational terrorism	political rights and civil liberties	The instruments reduces terrorism
Azam and Thelen (2008)	1990–2004	176 Countries	negative binomial model	Transnational terrorism	Secondary school enrolment	The instrument reduces terrorism
Savun and Phillips (2009)	1968-2001 and 1998-2004	163 Countries	Zero-Inflated Negative Binomial Regression	Domestic and Transnational Terrorism	Democracy and foreign policy behaviour	Isolationist foreign policy and less democracy breed less terrorism
Krieger and Meierrieks (2010)	1980-2003	15 Western European countries	negative binomial count model	Home-grown terrorism	Social spending	Higher spending in some field reduces terror
Kavanagh (2011)	1992–1996	Lebanon	Logit model	Domestic terror (Hezbollah militants)	The role of education and poverty in terrorism participation	poverty increases terrorism participation for individuals with high education
Bhavnani (2011)	2006-2008	Israel and two rival Palestinian factions	Logistic regression	Transnational terrorism	Selective violence based on political control	Selective violence based on Israeli control
Azam and Thelen (2010)	1990–2004	132 Countries	negative binomial model	Transnational terrorism	Secondary school enrolment	The instrument reduces terrorism
Cho (2010)	1984-2004	131 countries	negative binomial maximum likelihood regression, averaged negative binomial regression and rare event logit models	Domestic and international terrorism	Democratic rule of law	The instrument reduce terrorism
Lee (2013)	1978-2005	Hostage events	the multilevel Poisson model	Hostage-taking terrorism	Democratic values (Civil liberties and press freedom)	Democratic values motivate terrorism
Choi and Salehyan (2014)	1970-2007	154 Countries	negative binomial regression and tobit model	Domestic and transnational terrorism	Infusion of aid resources	Countries with more refugees experience more terrorism
Hoffman, Shelton, and Cleven (2013)	1975-1995	Undisclosed. Use of annual costs of attacks	ZINB (zero-inflated negative binomial) regression models	Transnational terrorism	Press freedom and publicity	Demand for press attention fuels terrorism
Bell, Clay, Murdie and Piazza (2014)	1970-2006	144 countries	Negative Binomial Regression	Domestic and transnational terrorism	Lack of transparency (internal & external)	Internal & external transparency increases domestic and transnational terrorism
Asongu and Nwachukwu (2018)	1984-2008	78 developing countries	System GMM (Roodman)	Domestic & Transnational	Catch-up for policy harmonization	13.34-19.92 years for domestic terrorism and 24.67-27.88 years for transnational

						terrorism
Asongu and Ssozi (2017)	1984-2008	78 developing countries	Quantile regressions	domestic, transnational, unclear and total terrorism dynamics	Bilateral, Multilateral and Total aid	Aid is effective in the highest quantile of transnational terrorism
Brockhoff, Kieger and Meierrieks (2015)	1984-2007	133 countries	Two-step cluster analysis	Domestic terrorism	Education	Education decreases terrorism especially when socio-economic conditions are better
Coggins (2015)	1999-2008	155 countries	GEE1 Negative Binomial	Location, perpetrator, domestic, domestic-perpetrator, international-location and international-perpetrator terrorisms.	Stages of failed states	Avoidance of failed states in war or political collapse
Button and Carter (2014)	1970-2007	USA and USA allies	Non-contemporary regressions	Global and transnational terrorisms	USA foreign aid	Effective when USA interest are threatened
Button (2014)	1968-2008	Recipients of USA foreign aid	duration and count models	International terrorism	USA foreign aid	Effective when recipient state do not have conflicting priorities
Collard-Wexler Pischedda and Smith (2014)	1980-2008	74 foreign state occupations	Naïve and Hardening mechanisms models based on Pape's theory of occupation	Suicide attacks in countries experiencing foreign military occupation	Avoidance of foreign military interventions to mitigate suicide attacks in countries experiencing military interventions.	Foreign occupations increases suicide attacks
Enders, Hoover, and Sandler (2014)	1970-2010	Undisclosed	Terrorism Lorenz curve and nonlinear smooth transition regressions	Domestic and transitional terrorism	Real GDP per capita	Terrorism more concentrated in middle-income countries
Choi and Piazza (2017)	1981-2005	138 Countries	negative binomial maximum-likelihood regression model	Suicide attacks in countries experiencing military interventions	Avoidance of foreign military interventions to mitigate suicide attacks in countries experiencing military interventions.	Certain features of pro-government intervention increase suicide attacks in countries experience military interventions
Gries et al. (2015)	1984-2008	126 countries	Negative Binomial Regression and System GMM	Anti-USA terrorism	USA aid dependence	USA aid-dependence fuels Anti-USA terrorism

GMM: Generalised Method of Moments.

Source: Author

The third strand discusses studies which have focused on the relationship between welfare and terrorism. Krieger and Meierrieks (2010) examine terrorism in the world of welfare capitalism. They investigate the influence of social measures on home-grown terrorism to establish that whereas social spending in some sectors (e.g. public housing) has no impact, social spending in some other fields (e.g. active labor market programs, unemployment and health benefits) are linked to a decrease in home-grown terrorism. Enders

et al. (2014) have assessed the changing nonlinear nexus between terrorism and income levels to establish that transnational and domestic attacks are more apparent in middle income countries. The findings of Kavanagh (2011) show that, poverty increases the probability of becoming a Hezbollah militant exclusively in individuals with at least high school level of education.

The fourth strand deals with studies that have focused on linkages between foreign occupation, military interventions and terrorism. Collard-Wexler et al. (2014) investigate whether foreign occupations cause suicide attacks to establish that foreign occupations are associated with a significant and consistent impact on the occurrence of suicide attacks. Choi and Piazza (2017) investigate whether military intervention affects suicide attacks to conclude that exceptionally, foreign interventions with specific characteristics (such as pro-government interventions encompassing a larger number of ground troops) increase suicide attacks in countries where such military interventions are deployed. Asongu and Amankwah-Amoah (2017) investigate whether military expenditure can be used to dampen the effect of terrorism on capital flight. Contingent on terrorist targets, the authors show that a threshold of between 4.224 and 7.363 of military expenditure as a percentage of GDP is needed to crowd-out the negative impact of terrorism on capital flight.

### **3. Data and methodology**

#### **3.1 Data**

This study examines a panel of 163 countries for the period 2010 to 2015. As summarised in Appendix 1, the data is from a plethora of sources, namely, the: United Nations Office on Drugs and Crime (UNODC) Surveys on Crime Trends; Institute for Economics and Peace (IEP); Operations of Criminal Justice Systems (CTS); Uppsala Conflict Data Program (UCDP) Battle-Related Deaths Dataset; United Nations Committee on Contributions; and a Qualitative assessment by the Economic Intelligence Unit (EIU) analysts' estimates. The selection of the periodicity and number of countries are respectively motivated by the imperative to obtain findings with more updated policy implications and data availability constraints.

The main outcome variable is the Global Terrorism Index (GTI) overall score. In order to prevent mathematical concerns related to the log-transformation of zeros and correction of the positive skew in our data distribution, the study takes the natural logarithm of GTI scores by adding one to the base number. This conversion approach is consistent with recent

literature (Choi & Salehyan, 2013; Bandyopadhyay, Sandler, & Younas, 2014; Asongu & Nwachukwu, 2017b).

The independent variable of interest is the lagged dependent variable whereas control variables include: security officers & police; political instability; weapons imports; weapons export; displaced persons; military expenditure and the United Nations Peace Keeping Force (UNPKF). These indicators in the conditioning information set have been substantially documented in the terrorism and conflicts literature (Kurrild-Klitgaard et al., 2006; Lee, 2013; Bell et al., 2014; Choi & Salehyan, 2014; Asongu & Nwachukwu, 2016b).

Consistent with the motivation of the study on the need to increase room for policy implications, we decompose the rich dataset into fundamental characteristics based on: (i) regions (Latin America; North America; South Asia; Europe & Central Asia; East Asia & the Pacific; sub-Saharan Africa (SSA); Middle East & North Africa (MENA)); (ii) openness to sea (Landlocked and Coastal); (iii) religious orientation (Christian with Catholic domination; Buddhist-oriented countries; Christian with Protestant inclination; Islam-oriented countries and Christian countries in which another Christian religion apart from Catholicism and Protestantism is dominant); and (iv) legal origins (Scandinavian civil law countries, French civil law, German civil law countries, English common law, and Socialists countries). The adopted fundamental characteristics have been used in a great bulk of comparative development literature (D'Amico, 2010; Narayan et al., 2011; Beegle, Christiaensen, Dabalén, & Gaddis, 2016; Mlachila, Tapsoba, & Tapsoba, 2017; Asongu & le Roux, 2017). The information criteria underpinning the choice of the fundamental features are discussed in what follows.

The basis for legal origins is La Porta, Lopez-de-Silanes and Shleifer (2008, p. 289). The World Fact Book (CIA, 2011) of the Central Intelligence Agency (CIA) is used for the categorization of dominant religions while income level classification is consistent with the World Bank's categorization<sup>2</sup>. Coastal countries can be directly observed from a world map. The definitions of variables are provided in Appendix 1 whereas Appendix 2 discloses the summary statistics and sampled countries in Panel A and Panel B respectively. The correlation matrix is presented in Appendix 3.

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<sup>2</sup> There are four main World Bank income groups: (i) high income, \$12,276 or more; (ii) upper middle income, \$3,976-\$12,275; (iii) lower middle income, \$1,006-\$3,975 and (iv) low income, \$1,005 or less.

### 3.2 Methodology

Consistent with recent literature on the persistence of macroeconomic indicators, we employ the Generalised Method of Moments (GMM) as the estimation technique (Asongu & Nwachukwu, 2017a; Doyle, 2017). There are four main justifications to the choice of this strategy. First, given that the number of countries is substantially higher than the number of periods, the  $N(163) > T(6)$  condition needed for the application of the empirical strategy is met. Second, cross-country differences are accounted-for in the estimation approach given that it is panel-oriented. Third, inherent biases in the *difference* estimators are corrected with the *system* estimator. Fourth, the technique accounts for endogeneity by employing instruments to address the concern of simultaneity. Furthermore, the control for time invariant indicators also enhances the control for endogeneity because it accounts for the unobserved heterogeneity.

As opposed to traditional GMM estimation approaches, we prefer the Roodman (2009a, 2009b) extension of Arellano and Bover (1995) because the empirical strategy has been documented to have more control for cross sectional dependence and restrict over-identification or limit instrument proliferation (Love & Zicchino, 2006; Baltagi, 2008; Boateng, Asongu, Akamavi & Tchamyou, 2018; Agoba, Abor, Osei, & Sa-Aadu, 2019; Tchamyou, 2019a, 2019b; Fosu & Abass, 2019).

The following equations in level (1) and first difference (2) summarize the standard *system* GMM estimation procedure.

$$T_{i,t} = \sigma_0 + \sigma_1 T_{i,t-\tau} + \sum_{h=1}^6 \delta_h X_{h,i,t-\tau} + \eta_i + \xi_t + \varepsilon_{i,t} \quad (1)$$

$$T_{i,t} - T_{i,t-\tau} = \sigma_1 (T_{i,t-\tau} - T_{i,t-2\tau}) + \sum_{h=1}^6 \delta_h (X_{h,i,t-\tau} - X_{h,i,t-2\tau}) + (\xi_t - \xi_{t-\tau}) + (\varepsilon_{i,t} - \varepsilon_{i,t-\tau}), \quad (2)$$

where,  $T_{i,t}$  is an indicator of terrorism or Global Terrorism Index score in country  $i$  at period  $t$ ,  $\sigma_0$  is a constant,  $X$  is the vector of control variables (security officers & police; political instability; weapons import; weapons export; displaced persons; military expenditure and the United Nations Peace Keeping Force (UNPKF)),  $\tau$  represents the coefficient of auto-regression which is one for the specification;  $\xi_t$  is the time-specific constant;  $\eta_i$  is the country-specific effect and  $\varepsilon_{i,t}$  the error term.

Consistent with recent literature, we allocate space to emphasize the process of exclusion restrictions which is important for a consistent and robust GMM specification. With

regards to exclusions, we consider all explanatory variables as predetermined or suspected endogenous and acknowledge only time invariant omitted variables to exhibit strict exogeneity. Such an identification strategy is consistent with recent literature (Boateng et al., 2018; Tchamyou & Asongu, 2017; Tchamyou, Erreygers, & Cassimon, 2019). Furthermore, this process of identification is supported by Roodman (2009b) in the perspective that, it is not feasible for time invariant indicators to be endogenous upon first difference<sup>3</sup>.

From the perspective of exclusion restrictions, in the light of the process of identification, terrorism is affected by the strictly exogenous variables exclusively through the proposed mechanisms or endogenous explaining indicators. Hence, for the exclusion restriction assumption to hold, the null hypothesis corresponding to the Difference in Hansen Test (DHT) should not be rejected. This null hypothesis is the position that the time invariant indicators are strictly exogenous because they affect the outcome variable exclusively via the endogenous explaining variables.

Cognizant of the above insights, in the results that are reported in the section that follows, the hypothesis of exclusion restriction holds exclusively if the DHT associated with the time invariant instrumental variables (IV) (i.e. years, eq(diff)) is not rejected. Accordingly, this criterion is not dissimilar to the standard IV approach for exclusion restriction which requires that the null hypothesis of the Sargan Overidentifying Restrictions (OIR) test is not rejected, in order for the instrumental variables to account for the variations in the outcome variable exclusively through suggested channels (Beck, Demirgüç-Kunt, & Levine, 2003).

## 4. Empirical results

### 4.1 Presentation of results

Tables 2-3 present the results. While Table 2 shows findings articulating income levels, landlockedness and religious domination, Table 3 discloses results reflecting legal origins and regional proximity. The last column of both tables depicts the findings of the full sample. Four principal information criteria are employed to examine the validity of the GMM models<sup>4</sup>. In the light of these criteria, one model is not valid because of presence of

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<sup>3</sup> Hence, the procedure for treating *ivstyle* (years) is ‘iv (years, eq(diff))’ whereas the *gmmstyle* is employed for predetermined variables.

<sup>4</sup> “First, the null hypothesis of the second-order Arellano and Bond autocorrelation test (AR(2)) in difference for the absence of autocorrelation in the residuals should not be rejected. Second the Sargan and Hansen overidentification restrictions (OIR) tests should not be significant because their null hypotheses are the positions that instruments are valid or not correlated with the error terms. In essence, while the Sargan OIR test is not robust but not weakened by instruments, the Hansen OIR is robust but weakened by instruments. In order to restrict identification or limit the proliferation of instruments, we have ensured that instruments are lower than the number of cross-sections in most specifications. Third, the Difference in

autocorrelation in the residuals (see third column of Table 3) while other models are not valid owing to limited degrees of freedom and by extension, post-estimation instrument proliferation (see eighth and tenth columns of Table 2). Apart from these few exceptions, the models are overwhelmingly valid.

The validity of models is a necessary but not a sufficient condition for persistence to be established. The complementary condition for the establishment of persistence is that the estimated lagged dependent variable should be significant on the one hand and on the other, it should be within an interval of zero and one. This information criterion and interval is consistent with recent convergence literature (Fung, 2009, p. 58; Prochniak & Witkowski, 2012a, p. 20; Prochniak & Witkowski, 2012b, p. 23; Asongu & Nwachukwu, 2016b, p. 459; Asongu, 2013, p. 192).

It is important to clarify the comparative dimension of the criterion before discussing the findings in detail. When two or more estimated lagged coefficients are being compared, the sub-sample corresponding to the estimated value with a greater magnitude (in the estimated lagged coefficient) reflects more persistence in terrorism. The relevance of the magnitude builds on the perspective that a higher magnitude implies that past values of terrorism have a more proportionate impact on future values of terrorism.

The following findings can be established from Tables 1-2. First, persistence in terrorism is a decreasing function of income levels because it consistently increases from high income, upper middle income to lower middle income countries. Second, compared to Christian-oriented countries, terrorism is more persistent in Islam-oriented nations. Third, landlocked countries also reflect a higher level of persistence relative to their coastal counterparts. Fourth, Latin American countries show higher degrees of persistence when compared with MENA countries. Fifth, the main determinants of the underlying persistence are political instability and weapons import.

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*Hansen Test (DHT) for exogeneity of instruments is also employed to assess the validity of results from the Hansen OIR test. Fourth, a Fisher test for the joint validity of estimated coefficients is also provided” (Asongu & De Moor, 2017, p.200).*



**Table 2: Persistence in Global terrorism with income levels, religious domination and landlockedness**

	Dependent Variable: Global terrorism (GTI)											
	Income Levels				Religious Domination					Openness to sea		Full Sample
	HI	UMI	LMI	LI	CC	CP	CO	Islam	Bhu	LL	NLL	
Constant	-0.060 (0.733)	-0.116 (0.215)	-0.091 (0.195)	-0.193 (0.325)	0.015 (0.915)	0.227 (0.288)	0.086 (0.935)	-0.081 (0.587)	0.764 (0.601)	-0.089 (0.500)	-0.143 (0.187)	-0.032 (0.745)
Global terrorism (-1)	<b>0.822***</b>	<b>0.950***</b>	<b>0.973***</b>	<b>1.042***</b>	<b>0.888***</b>	<b>0.577***</b>	<b>0.967***</b>	<b>0.949***</b>	1.583	<b>0.973**</b> *	<b>0.956**</b> *	<b>0.901***</b>
Security Officers & Police	-0.006 (0.848)	0.006 (0.781)	0.038 (0.177)	-0.004 (0.906)	-0.028 (0.504)	-0.117 (0.163)	-0.110 (0.524)	0.014 (0.582)	0.237 (0.659)	-0.044 (0.227)	0.035 (0.292)	0.037 (0.309)
Political Instability	-0.035 (0.236)	<b>0.099***</b> (0.009)	<b>0.086***</b> (0.001)	0.011 (0.658)	0.013 (0.747)	0.033 (0.617)	<b>0.741**</b> (0.037)	<b>0.076**</b> (0.019)	0.414 (0.652)	<b>0.082**</b> *	<b>0.038</b> (0.004)	<b>0.071**</b> (0.459)
Weapons Imports	-0.018 (0.212)	0.009 (0.763)	-0.054 (0.256)	-0.011 (0.927)	-0.011 (0.707)	<b>0.188**</b> (0.015)	<b>0.876*</b> (0.094)	-0.054 (0.123)	-0.501 (0.489)	0.043 (0.568)	-0.020 (0.427)	-0.038 (0.259)
Weapons Exports	<b>-0.037***</b>	<b>0.022**</b>	-0.012	<b>0.037**</b>	-0.004	<b>-0.036*</b>	0.110	<b>-0.051**</b>	-0.400	-	0.009	-0.020
Displaced Persons	<b>(0.007)</b> <b>0.163*</b>	<b>(0.024)</b> -	(0.339) -	<b>(0.027)</b> -0.008	(0.728) 0.003	<b>(0.054)</b> 0.111	(0.227) 0.603	<b>(0.016)</b> 0.044	(0.613) -0.082	<b>(0.006)</b> -	(0.422) 0.016	(0.129) 0.031
Military Expenditure	<b>(0.076)</b> <b>0.160***</b>	<b>(0.000)</b> 0.011	<b>(0.002)</b> -0.0008	(0.501) 0.028	(0.941) 0.043	(0.222) -0.045	(0.243) -2.495	(0.299) -0.031	(0.830) -0.408	<b>(0.000)</b> 0.033	(0.670) -0.015	(0.485) -0.032
UNPKF	0.002 (0.927)	-0.016 (0.132)	-0.018 (0.230)	<b>0.047***</b> <b>(0.001)</b>	0.018 (0.245)	0.013 (0.647)	0.112 (0.426)	0.004 (0.857)	0.181 (0.641)	0.013 (0.586)	0.014 (0.385)	-0.0002 (0.991)
AR(1)	(0.001)	(0.001)	(0.002)	(0.016)	(0.001)	(0.031)	<b>(0.180)</b>	(0.001)	<b>(0.545)</b>	(0.021)	(0.000)	(0.000)
AR(2)	<b>(0.177)</b>	<b>(0.560)</b>	<b>(0.627)</b>	<b>(0.267)</b>	<b>(0.851)</b>	<b>(0.051)</b>	<b>(0.255)</b>	<b>(0.258)</b>	<b>(0.513)</b>	<b>(0.177)</b>	<b>(0.200)</b>	<b>(0.115)</b>
Sargan OIR	(0.043)	<b>(0.136)</b>	<b>(0.868)</b>	<b>(0.539)</b>	<b>(0.681)</b>	<b>(0.107)</b>	<b>(0.409)</b>	<b>(0.398)</b>	<b>(0.230)</b>	<b>(0.406)</b>	(0.074)	<b>(0.327)</b>
Hansen OIR	<b>(0.484)</b>	<b>(0.361)</b>	<b>(0.343)</b>	<b>(0.657)</b>	<b>(0.611)</b>	<b>(0.991)</b>	<b>(1.000)</b>	<b>(0.560)</b>	<b>(1.000)</b>	<b>(0.700)</b>	<b>(0.189)</b>	<b>(0.371)</b>
DHT for instruments												
(a) Instruments in levels												
H excluding group	<b>(0.866)</b>	<b>(0.109)</b>	<b>(0.185)</b>	<b>(0.346)</b>	<b>(0.800)</b>	<b>(0.653)</b>	<b>(1.000)</b>	<b>(0.668)</b>	<b>(1.000)</b>	<b>(0.495)</b>	<b>(0.152)</b>	<b>(0.965)</b>
Dif(null, H=exogenous)	<b>(0.242)</b>	<b>(0.681)</b>	<b>(0.524)</b>	<b>(0.755)</b>	<b>(0.400)</b>	<b>(0.997)</b>	<b>(1.000)</b>	<b>(0.421)</b>	<b>(1.000)</b>	<b>(0.701)</b>	<b>(0.324)</b>	<b>(0.117)</b>
(b) IV (years, eq (diff))	<b>(0.303)</b>	<b>(0.277)</b>	<b>(0.435)</b>	<b>(0.667)</b>	<b>(0.570)</b>	<b>(0.926)</b>	<b>(1.000)</b>	<b>(0.658)</b>	<b>(1.000)</b>	<b>(0.652)</b>	<b>(0.172)</b>	<b>(0.664)</b>
H excluding group												
Dif(null, H=exogenous)	<b>(0.901)</b>	<b>(0.612)</b>	<b>(0.217)</b>	<b>(0.420)</b>	<b>(0.519)</b>	<b>(1.000)</b>	<b>(1.000)</b>	<b>(0.257)</b>	<b>(1.000)</b>	<b>(0.567)</b>	<b>(0.390)</b>	<b>(0.072)</b>
Fisher	<b>324.9***</b>	<b>10041**</b>	<b>401.1***</b>	<b>1341***</b>	<b>441.34**</b>	<b>885.46**</b>	<b>49.96***</b>	<b>0.949***</b>	<b>19.07***</b>	<b>12055**</b>	<b>80.23**</b>	<b>52.44***</b>
Instruments	35	35	35	35	35	35	35	35	35	35	35	35
Countries	43	36	46	38	54	26	14	49	13	34	129	163
Observations	215	180	229	190	269	130	70	245	65	169	645	814

\*\*\*, \*\*, \*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Wald statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. HI: High Income countries. UMI: Upper Middle Income countries. LMI: Little Middle Income countries. LI: Low Income countries. CC: Christian countries with Catholic domination. CP: Christian countries with Protestant domination. CO: Christian countries in which another Christian religion apart from Catholicism and Protestantism is dominant. Islam: Islam-oriented countries. Bhu: Buddhism dominated countries. LL: Landlocked countries. NLL: Not Landlocked countries.

**Table 3: Persistence in Global terrorism with regions and legal origin dynamics**

	Dependent variable: Global terrorism (GTI)												
	SA	ECA	EAP	Regions				Legal origins				Full Sample	
	na			MENA	SSA	LA	NA	Eng.	Frch.	Ger.	Scand.	Social.	
Constant	na	<b>0.691*</b> (0.077)	0.373 (0.560)	-0.042 (0.953)	-0.079 (0.432)	<b>1.232**</b> (0.038)	na	<b>-0.159**</b> (0.022)	-0.036 (0.768)	0.524 (0.407)	na	na	-0.032 (0.745)
Global terrorism (-1)		<b>0.666***</b> (0.000)	<b>0.996***</b> (0.000)	<b>0.683***</b> (0.000)	<b>1.019***</b> (0.000)	<b>0.718***</b> (0.000)		<b>1.102***</b> (0.000)	<b>0.880***</b> (0.000)	<b>0.555***</b> (0.004)			<b>0.901***</b> (0.000)
Security Officers & Police		-0.028 (0.707)	-0.030 (0.792)	0.209 (0.282)	0.021 (0.472)	- (0.000)		0.007 (0.758)	<b>0.068*</b> (0.087)	0.012 (0.889)			0.037 (0.309)
Political Instability		-0.051 (0.333)	0.012 (0.939)	-0.041 (0.565)	<b>0.042*</b> (0.078)	-0.169 (0.236)		<b>0.057***</b> (0.000)	0.016 (0.709)	0.320 (0.243)			<b>0.071**</b> (0.040)
Weapons Imports		<b>0.121**</b> (0.030)	-0.0008 (0.995)	-0.084 (0.302)	-0.020 (0.168)	-0.012 (0.943)		<b>0.069***</b> (0.008)	-0.017 (0.555)	0.054 (0.655)			-0.038 (0.259)
Weapons Exports		-0.003 (0.855)	<b>0.047***</b> (0.006)	0.0008 (0.983)	-0.012 (0.361)	0.018 (0.411)		-0.003 (0.806)	0.009 (0.426)	-0.101 (0.172)			-0.020 (0.129)
Displaced Persons		-0.089 (0.164)	-0.029 (0.963)	0.081 (0.534)	0.001 (0.920)	0.093 (0.319)		<b>-0.079***</b> (0.000)	0.024 (0.324)	-0.523 (0.355)			0.031 (0.485)
Military Expenditure		-0.172 (0.135)	-0.092 (0.384)	0.050 (0.401)	-0.035 (0.341)	-0.031 (0.801)		-0.027 (0.279)	-0.015 (0.631)	-0.118 (0.680)			-0.032 (0.403)
UNPKF		-0.039 (0.385)	-0.050 (0.314)	-0.125 (0.312)	0.012 (0.401)	0.054 (0.377)		-0.014 (0.412)	-0.009 (0.623)	-0.003 (0.965)			-0.0002 (0.991)
AR(1)		(0.002)	<b>(0.138)</b>	(0.056)	(0.005)	(0.020)		(0.003)	(0.000)	(0.047)			(0.000)
AR(2)		(0.080)	<b>(0.400)</b>	<b>(0.470)</b>	<b>(0.313)</b>	<b>(0.835)</b>		<b>(0.614)</b>	<b>(0.336)</b>	<b>(0.733)</b>			<b>(0.115)</b>
Sargan OIR		(0.039)	(0.095)	(0.065)	<b>(0.412)</b>	<b>(0.674)</b>		<b>(0.508)</b>	<b>(0.166)</b>	<b>(0.131)</b>			<b>(0.327)</b>
Hansen OIR		<b>(0.251)</b>	<b>(1.000)</b>	<b>(0.979)</b>	<b>(0.380)</b>	<b>(0.994)</b>		<b>(0.698)</b>	<b>(0.267)</b>	<b>(0.999)</b>			<b>(0.371)</b>
DHT for instruments													
(a) Instruments in levels													
H excluding group		<b>(0.237)</b>	<b>(0.613)</b>	<b>(0.395)</b>	<b>(0.852)</b>	<b>(0.110)</b>		<b>(0.593)</b>	<b>(0.693)</b>	<b>(0.560)</b>			<b>(0.965)</b>
Dif(null, H=exogenous)		<b>(0.330)</b>	<b>(1.000)</b>	<b>(0.999)</b>	<b>(0.170)</b>	<b>(1.000)</b>		<b>(0.634)</b>	<b>(0.140)</b>	<b>(1.000)</b>			<b>(0.117)</b>
(b) IV (years, eq (diff)) H excluding group		<b>(0.186)</b>	<b>(1.000)</b>	<b>(1.000)</b>	<b>(0.228)</b>	<b>(0.851)</b>		<b>(0.584)</b>	<b>(0.387)</b>	<b>(0.930)</b>			<b>(0.664)</b>
Dif(null, H=exogenous)		<b>(0.574)</b>	<b>(0.980)</b>	<b>(0.181)</b>	<b>(0.861)</b>	<b>(1.000)</b>		<b>(0.733)</b>	<b>(0.161)</b>	<b>(1.000)</b>			<b>(0.072)</b>
Fisher		<b>130.04***</b>	<b>66.89***</b>	<b>199.05***</b>	<b>1705***</b>	<b>51.43***</b>		<b>732.96***</b>	<b>45.67***</b>	<b>51.65***</b>			<b>52.44***</b>
Instruments		35	35	35	35	35		35	35	35			35
Countries		48	18	20	44	23		50	87	20			163
Observations		240	90	100	219	115		249	435	100			814

\*\*\*, \*\*, \*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Wald statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. Eng: English Common Law countries. Frch: French Civil Law countries. Ger: German Civil law countries. Scand: Scandinavian Civil law countries. Social: Socialists countries. ECA: Europe & Central Asia. EAP: East Asia & the Pacific. MENA: Middle East & North Africa. SSA: sub-Saharan Africa. LA: Latin America. NA: North America.

## 4.2 Further discussion of results

This section provides some justifications for the findings observed in the preceding section. It is structured to address four main questions which directly result from the reported findings, notably: (i) *Why does persistence in terrorism decrease as income levels increase*, (ii) *Why is persistence in terrorism more apparent in Islam-oriented countries compared to Christian-oriented countries*, (iii) *Why do Landlocked countries reflect higher levels of persistence in terrorism relative to coastal countries* and (iv) *Why is persistence in terrorism more in Latin American countries compared to the MENA countries?*

First, the fact that terrorism is more persistent in low income countries is logical because high income countries have financial and logistical resources with which to prevent and mitigate the effects of terrorism. It is in this vein that recent literature has focused on the role of foreign aid in modulating the effect of terrorism on development outcomes in

developing countries (Bandyopadhyay et al., 2014). Such literature is motivated by the fact that, developed countries can more easily prevent terrorism and even when attacked, avoid negative macroeconomic externalities (Asongu & Ssozi, 2017).

Second, the fact that terrorism is more persistent in Islam-oriented countries is consistent with stylized facts because most terrorists are inspired by religiously-motivated political violence. This is consistent with a dominant strand of contemporary literature on the relationship between religion and terrorism (Ben-Dor & Pedahzur, 2003; Jackson, 2007; Ellis, 2017). Third, the higher comparative persistence in landlocked countries may be traceable to the institutional cost associated with landlockedness which could entail political instability and violence. The narrative on the high institutional cost of landlockedness is consistent with the relevant literature (Arvis, 2007).

Fourth, the comparative regional importance of Latin America in sticky terrorism can be fundamentally traceable to the relative higher evidence of “access to weapons” and homicides in the region. It is important to note that the Global Terrorism Index (GTI) score consists of four main components: terrorism incidents, terrorism injuries, terrorism fatalities and terrorism-related property damage. These factors are closely associated with violence and homicides which characterize most Latin American countries. Consistent with Muggah and de Carvalho (2017), every 15 minutes, a young Latin American youth is murdered. The report by the authors maintains that Latin America is in the driver’s seat when it comes to homicides in the world because it has registered more than 2.5 million homicides since the year 2000. According to the authors, the continent is host to 23 of the 25 most murderous cities and 44 of the 50 most homicidal countries. Furthermore, as the global rate of homicide drops, the continent has instead been experiencing a rise in homicidal rate. This perspective is worth substantiating with some stylized facts. (i) In 2035, the annual murder rate in the continent is projected to rise to 35/100 000 from the current rate of 22/100 000 and (ii) seven countries (Venezuela, Mexico, Honduras, Guatemala, El Salvador, Colombia and Brazil) in the continent make-up about 25% of murders in the world (Muggah & de Carvalho, 2017).

It is also important to note that while MENA countries are Islam-oriented and Latin American countries are Christian-oriented, Latin American countries can exhibit higher levels of persistence in terrorism for two main reasons: (i) Non-MENA countries among Islam-oriented countries account for much of the persistence in the Islam-oriented fundamental characteristic and (ii) Latin American countries relative to MENA countries are more sensitive to factors in the conditioning information set. This latter explanation essentially builds on the fact that in the light of the theoretical underpinnings, conditional persistence is

contingent on the adopted elements in the conditioning information set. A brief comparative analysis shows that among these variables, “security officers & police” is significant in the Latin American sub-sample whereas it is no significant in the MENA sub-sample.

## **5. Concluding implications and future research directions**

This study has investigated persistence of global terrorism in a panel of 163 countries for the period 2010 to 2015. The empirical evidence is based on Generalised Method of Moments. In order to increase room for policy implications, the dataset has been decomposed into fundamentals based on income levels, legal origins, religious domination, landlockedness and regional proximity. The following findings have been established. First, persistence in terrorism is a decreasing function of income levels because it consistently increases from high income (through upper middle income) to lower middle income countries. Second, compared to Christian-oriented countries, terrorism is more persistent in Islam-oriented nations. Third, landlocked countries also reflect a higher level of persistence relative to their coastal counterparts. Fourth, Latin American countries show higher degrees of persistence when compared with Middle East and North African (MENA) countries. Fifth, the main determinants of the underlying persistence are political instability and weapons import. Justifications for the established tendencies have been discussed. In what follows, we provide some consequences and implications for public spending, foreign aid, foreign investment and tourism.

Accordingly, the established comparative evidences on the persistence of terrorism hold some implications for policy. We first discuss some consequences of terrorism on economic activity before providing corresponding implications. First, foreign direct investment location decisions are substantially contingent on the risks associated with the underlying investment. The GPI used in this study entails risks factors that can discourage foreign direct investment, for the most part. Accordingly, whereas terrorism can be an incentive for the “security and weaponry” industry, it is not the case for sectors such as the tourism industry that substantially involves the traffic of people. Second, tourists’ arrivals to a given destinations are very likely to be determined by human causalities as well as risks of potential causalities associated with terrorism. In summary the consequences pertaining to tourism and foreign direct investment are consistent with the “wound culture theory” which maintains that high risk probability and probability/perception of murder affect a multitude of foreign interests in a country, *inter alia*: increased risks to public travel and investment and decreased opportunities for refreshments, dining and acquisition of souvenirs. Addressing the

concerns would require more spending to address terrorism-related issues. Third, more public spending is needed to prevent and mitigate the underlying issues because, lost in productivity (and unproductivity) related to terrorism are not exclusively foreign-related. Panic from domestic investors could also push them to transfer their investments to more secured regions/countries. Fourth, given that developing countries are logically associated with less financial, technical and logistical resources with which to attenuate and prevent the consequences of terrorism, development assistance from developed countries can address some negative gaps in public spending. More efficient management of existing spending to prevent (instead of fighting terrorism) is recommended. Foreign aid is a valuable mechanism by which, *inter alia*: counterterrorism techniques can be learnt and applied; security and police officers can be trained and rendered more effective and; research on solutions to terrorism can be funded so that policy makers apply more measures that are robust to empirical validity. It is important to note that in the disbursements of the suggested development assistance, priority should be given to fundamental characteristics associated with the highest levels of persistence in global terrorism index scores.

Future studies can improve the extant literature by focusing on country-specific studies in order to articulate country-specific policy implications. Country-specific cases are worthwhile because, for instance, the violent undertaking of drug criminals in Colombia may not be thoroughly elucidated by the same factors in African, the Middle East and European countries. Hence, a corresponding caveat to this research is that future studies need to engage alternative control variables in the conditioning information set that are country-specific. Moreover, modeling the future of global terrorism in the light of current trends will complement the suggested policy implications for public spending and foreign aid.

## Appendices

### Appendix 1: Definitions of variables

Variables	Definitions and sources of variables
Global Terrorism Index (GTI)	Logarithm (1+base) Global Terrorism Index overall score
Security Officers & Police	Number of internal security officers and police per 100,000 people UNODC; EIU estimates
Political instability	Political instability Qualitative assessment by EIU analysts
Weapon imports	Volume of transfers of major conventional weapons as recipient (imports) per 100,000 people Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database
Weapon exports	Volume of transfers of major conventional weapons as supplier (exports) per 100,000 people SIPRI Arms Transfers Database
Displaced people	Number of refugees and internally displaced people as a percentage of the population Office of the High Commissioner for Refugees (UNHCR) Mid-Year Trends; Internal Displacement Monitoring Centre (IDMC)
Military expenditure	Military expenditure as a percentage of GDP The Military Balance, IISS
United Nations Peacekeeping Funding.	Financial contribution to UN peacekeeping missions United Nations Committee on Contributions; IEP

UNODC: United Nations Office on Drugs and Crime. EIU: Economic Intelligence Unit. UNHCR: United Nations High Commissioner for Refugees. GDP: Gross Domestic Product. IISS: The International Institute for Strategic Studies. UN: United Nations. IEP: Institute for Economics and Peace.

### Appendix 2: Summary Statistics and Presentation of countries

Panel A: Summary Statistics					
Variables	Mean	Standard dev.	Minimum	Maximum	Obsers
Global Terrorism Index (GTI)(Ln)	0.835	0.763	0.000	2.397	977
Security Officers & Police	2.728	0.911	1.081	5.000	978
Political instability	2.545	1.030	1.000	5.000	978
Weapon imports	1.489	0.868	1.000	5.000	978
Weapon exports	1.342	0.932	1.000	5.000	978
Displaced people	1.348	0.872	1.000	5.000	978
Military expenditure	1.966	0.824	1.000	5.000	978
United Nations Peacekeeping Funding.	2.291	1.164	1.000	5.000	978

#### Panel B: Presentation of countries

Afghanistan; Albania; Algeria; Angola; Argentina; Armenia; Australia; Austria; Azerbaijan; Bahrain; Bangladesh; Belarus; Belgium; Benin; Bhutan; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Bulgaria; Burkina Faso; Burundi; Cambodia; Cameroon; Canada; Central African Republic; Chad; Chile; China; Colombia; Costa Rica; Cote d' Ivoire; Croatia; Cuba; Cyprus; Czech Republic; Democratic Republic of the Congo; Denmark; Djibouti; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Eritrea; Estonia; Ethiopia; Finland; France; Gabon; Georgia; Germany; Ghana; Greece; Guatemala; Guinea; Guinea-Bissau; Guyana; Haiti; Honduras; Hungary; Iceland; India; Indonesia; Iran; Iraq; Ireland; Israel; Italy; Jamaica; Japan; Jordan; Kazakhstan; Kenya; Kosovo; Kuwait; Kyrgyz Republic; Laos; Latvia; Lebanon; Lesotho; Liberia; Libya; Lithuania; Macedonia (FYR); Madagascar; Malawi; Malaysia; Mali; Mauritania; Mauritius; Mexico; Moldova; Mongolia; Montenegro; Morocco; Mozambique; Myanmar; Namibia; Nepal; Netherlands; New

Zealand; Nicaragua; Niger; Nigeria; North Korea; Norway; Oman; Pakistan; Palestine; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Poland; Portugal; Qatar; Republic of the Congo; Romania; Russia; Rwanda; Saudi Arabia; Senegal; Serbia; Sierra Leone; Singapore; Slovakia; Slovenia; Somalia; South Africa; South Korea; South Sudan; Spain; Sri Lanka; Sudan; Swaziland; Sweden; Switzerland; Syria; Taiwan; Tajikistan; Tanzania; Thailand; The Gambia; Timor-Leste; Togo; Trinidad and Tobago; Tunisia; Turkey; Turkmenistan; Uganda; Ukraine; United Arab Emirates; United Kingdom; United States of America; Uruguay; Uzbekistan; Venezuela; Vietnam; Yemen; Zambia and Zimbabwe.

Standard dev: Standard deviation. Obsers: Observations.

### Appendix 3: Correlation Matrix (uniform sample size: 977)

S O & P	Pol. Insta.	W. Imports	W. Exports	D. People	Military	UNPKF	GTI	
1.000	0.043	0.140	-0.011	0.036	0.215	0.0001	-0.063	S O & P
	1.000	-0.238	-0.285	0.336	0.336	0.403	0.306	Pol. Insta.
		1.000	0.125	-0.058	0.237	-0.181	-0.042	W. Imports
			1.000	-0.114	0.026	-0.211	0.104	W. Exports
				1.000	0.292	0.120	0.340	D. People
					1.000	-0.011	0.236	Military
						1.000	0.027	UNPKF
							1.000	GTI

SO & P: Security Officers & Police. Pol. Insta: Political Instability. W. Imports: Weapons Imports. W. Exports: Weapons Exports. D. People: Displaced People. Military: Military Expenditure. UNPKF: United Nations Peacekeeping Funding. GTI: Global Terrorism Index.

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