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**Fighting terrorism in Africa when existing terrorism levels matter** [1]

Forthcoming: Behavioral Sciences of Terrorism and Political Aggression

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# Fighting terrorism in Africa when existing terrorism levels matter

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**Abstract**

This study examines policy tools in the fight against terrorism when existing levels of terrorism matter in 53 African countries for the period 1998-2012. The empirical evidence is based on contemporary, non-contemporary and Instrumental Variable Quantile regressions (QR) which enable the investigation throughout the conditional distributions of domestic, transnational and total terrorism dynamics. The following findings are established. First, counterterrorism policy instruments of inclusive human development and military expenditure further fuel terrorim. Second, political stability negatively affects terrorism with a negative threshold effect. Political stability estimates are consistently significant with increasing negative magnitudes throughout the conditional distributions of domestic and total terrorism. Policy implications are discussed.

*JEL Classification*: C52; D74; F42; O16; O38
*Keywords*: Terrorism; Inclusive development; Political stability; Military expenditure; Africa

## 1. Introduction

The study aims to answer the following research question: how do inclusive development, military expenditure and political stability affect terrorism when existing levels of terrorism are taken into account in Africa? Africa has been developing at a fast pace with increase in human development, economic might and military capability. We would expect a proportional decrease in political violence. However, that is not the case. Investigating policy tools in the fight against terrorism by accounting for existing levels of terrorism is motivated by at least six contemporary factors, notably: increasing terrorism in Africa; the continent's poverty tragedy; debates surrounding the effect human development and poverty on terrorism; controversies on the role of political governance on terrorism; debates on the effect of military expenditure on terrorism and shortcomings in the literature. The highlighted factors are engaged in chronological order.

First, terrorism is increasing in Africa because of endemic corruption, failure of states; plundering of resources; ethnic and tribal tensions and; religious fundamentalism (Fazel, 2013; Alfa-Wali et al., 2015; Asongu et al., 2018, 2019). Despite the increasing concern about terrorism on the continent, compared to the Middle East, Africa is not receiving the policy and scholarly attention it deserves (Clavarino, 2014). Notable terrorism organisations that have been disrupting livelihoods include: Al-Shabab in Somalia; Al-Qaeda in the Islamic Maghreb and the Boko Haram in Nigeria. According to the recently published Global Terrorism Index (GTI, 2014), compared to the Islamic State of Iraq and Levant (ISIL) which accounted for 6, 073 deaths, the Boko Haram of Nigeria was the deadliest movement with 6,644 casualties. This study employs four main terrorism variables to assess the rising trends, namely: domestic, transnational, unclear and total terrorism dynamics.

Second, a World Bank report in April 2015 has revealed that extreme poverty has been decreasing in all regions of the world with the exception of Africa, where 45% of states in

sub-Saharan Africa (SSA) are considerably off-track for reaching the Millennium Development Goal (MDG) extreme poverty target (Tchamyou, 2019, 2020; Tchamyou et al., 2019; Asongu & Odhiambo, 2019a, 2019b). Conversely, since the mid 1990s, the continent has been enjoying resurgence in economic growth (Fosu, 2015a, p. 44). The stark contrast between high growth and substantial off-track from the MDG poverty target does not augur well with overly optimistic perspectives about the 'Africa rising' narrative (Leautier, 2012; Pinkivskiy & Sala-i-Martin, 2014). There is a new stream of literature in response to the poverty tragedy of the continent. Some notable works include: (i) an assessment of whether the recent growth resurgence has been a myth or a reality on the one hand and investigating the role of institutions in the underlying growth resurgence, on the other (Fosu, 2015b, 2015c). (ii) A paradigm shift to 'soft economics' (or human development) in order to understand Africa's poverty tragedy (Kuada, 2015; Asongu & Odhiambo, 2019c). The inequality adjusted human development index is used as a policy independent variable in this study.

Third, empirical literature on the impact of human development and poverty on terrorism is mixed at best. Some conflicting conclusions include: no relationship between GDP per capita and terrorism (Krueger & Maleckova, 2003); a negative nexus between GDP per capita and terrorism (Li, 2005); no causality from the human development index to terrorism (Piazza, 2006); the risk of terrorism not more likely in poor countries (Abadie, 2006); political repression (instead of GDP per capita) encouraging transnational terrorism (Krueger & Laitin, 2008); a positive nexus between GDP per capita and terrorism when victims' perspectives are taken into account (Gassenbner & Luechinger, 2011); minority economic discrimination positively affecting domestic terrorism (Piazza, 2011) and a positive nexus between transnational terrorism and GDP per capita (Blomberg et al., 2014). With the

exceptions of Piazza (2011) and Li and Schaub (2004), very little empirical support for the positive relationship between terrorism and poverty has been established.

Fourth, the literature is also very conflicting about the relationship between governance and terrorism (Lee, 2013). On the one hand, there is a strand which argues that good institutions reduce negative sentiments towards a country and hence, mitigate the likelihood of terrorists organisations recruiting more activists (Windsor, 2003; Li, 2005). On the other hand, another strand of the literature contends that good governance is not a useful tool in mitigating terrorism because the interest of terrorists' entities may not be properly represented by democratic political institutions (Gause, 2005). According to the narrative, states with strong political institutions are characterised by exclusive development (Bass, 2014). To put this point into perspective, Western-born and -educated youth are leaving Europe to join the ranks of ISIL partly because they feel socio-economically excluded in countries they consider theirs (Foster, 2014). Terrorism is entertained in states with strong political governance because of a plethora of direct and indirect factors that are linked to a favourable environment and grievances, namely: access and freedom to media; freedom of speech in the expressions of disagreement and dissatisfaction and; civil liberties (Ross, 1993). A political governance indicator is used by this study to assess the governance-terrorism nexus in Africa.

Fifth, conflicting perspectives also exist in the literature on the impact of military expenditure on terrorism. There is consensus in the literature on the fact that military spending does not reduce terrorism (Feridun & Shahbaz, 2010, p.195). The intuition for a negative relationship is not supported by empirical literature because military tools often tend to be counterproductive. Counterterrorism policies, instead of preventing terrorists' attacks, further provoke them (Sandler, 2005) and the lack of internationally recognised common long-run and comprehensive policies in the fight against terrorism also renders counterterrorism

policies ineffective (Omand, 2005). Moreover, measures towards fighting terrorism adopted by the United States are ineffective because they instead increase the likelihood that terrorism may reoccur (Lum et al., 2006). There is unidirectional relationship from terrorism to military spending (Feridun & Shahbaz, 2010). Hence, the intuition that military expenditure can mitigate terrorism still has to be substantiated with empirical validity. We steer clear of the engaged literature by investigating the effect of military expenditure on terrorism while accounting for initial levels of terrorism.

Sixth, noticeably, the above literature leaves room for improvement in three main areas, namely, the need to: (i) focus on Africa which has not received the deserved scholarly attention despite rising levels of terrorism on the continent; (ii) contribute to the debate on the conflicting roles of political governance, inclusive development and military expenditure and (iii) assess the underlying nexuses using an alternative methodology. For the purpose of avoiding repetition, we put only the first and third points into greater perspective.

African-specific literature on the fight against terrorism has been oriented for the most part towards: investigating the influence of poverty and freedoms on terrorism (Barros et al., 2008); exploring the role of multilateral institutions (e.g. the African Union) on terrorism (Ewi & Aning, 2006); examining the influence of competition in military companies on the speed at which conflicts are brought to a swift end (Akcinaroglu & Radziszewski, 2013) and investigating the role of externalities like geopolitical fluctuations (Straus, 2012).

On the methodological front, previous literature on fighting terrorism has focused substantially on employing Ordinary Least Squares (Tavares, 2004; Bravo & Dias, 2006); Negative Binomial and Zero-inflated Negative Binomial Regressions (Drakos & Gofas, 2006; Savun & Phillips, 2009); logistic regression (Kavanagh, 2011; Bhavani, 2011); the multilevel Poisson model (Lee, 2013) and Generalized Method of Moments (Bandyopadhyay et al., 2014). Our empirical approach has two main distinctive features. On the one hand,

contrary to highlighted studies (based on OLS and logistic regressions for example), the study controls for endogeneity by employing non-contemporary and instrumental variable regressions because Krieger and Meierrieks (2015) have recently documented that it is difficult to establish expected signs of policy variables without accounting for endogeneity with an instrumental variable approach. On the other hand, terrorism dynamics are regressed on policy variables throughout the conditional distributions of terrorism dynamics. Hence, comparative emphasis is placed on countries with low, intermediate and high levels of terrorism. The policy relevance of accounting for initial levels of terrorism in the modelling exercise is that blanket policies are unlikely to be effective unless they are contingent on initial levels of terrorism and tailored differently across countries with low, intermediate and high levels of terrorism.

The remainder of the study is organised as follows. Section 2 discusses the extant theoretical and empirical literature. The data and methodology are covered in Section 3. Section 4 presents the empirical results, discussion and policy implications while Section 5 concludes with future directions.

## 2. Theoretical and empirical literature

### 2.1 Linkage between military expenditure and terrorism

There are two principal scenarios on the relationship between military expenditure and terrorism (Feridun & Shahbaz, 2010). On the one hand, from intuition, terrorism increases military spending because more defense budget is allocated in response to increasing terrorism. It follows that if military spending is the variable to be explained, a positive nexus is expected. On the other hand, growing spending in the military is also expected to reduce terrorism, assuming that policies on boosting military spending are motivated by the

imperative of fighting terrorism. Hence, from an intuitive perspective, defense spending and terrorism reflect a negative relationship when the latter is the variable to be explained.

**2. 2 Linkage between political governance/stability and terrorism**

The extant literature substantiating the nexus between political governance and terrorism can be engaged in three main strands, notably, the: relationship between political governance and domestic terrorism; linkage between political governance and transnational terrorism and debate underlying the governance-terrorism relationship (Asongu et al., 2018, 2019).

First, underpinnings on the nexus between political governance and domestic terrorism are motivated by the perspective that citizens of the state have various incentives to use political violence and radical mechanisms against prevailing institutions or established governments, political figures and other nationals (Choi, 2010). According to the narrative, three main scenarios may motivate the resort to violence, namely: (i) grievances from citizens; (ii) evolving desperation and hopelessness with no available peaceful channels by which underlying grievances can be settled and (iii) nationals thinking that the employment of terror tactics is viable as well as legitimate in communicating their grievances, frustrations and anger. Behind this underpinning is the logic that, in so far as citizens have peaceful channels by which conflicts can be resolved at their disposal, options of terrorism are less likely to be considered as means to conflict settlement. This is consistent with some studies which have established that "weakly institutionalized" or "immature" democracies with less institutionalized minority protection and substantial violations in human rights create a favorable environment for terrorism (Gaibulloev et al., 2017). In the light of this postulation, we expect countries with better political governance to be less affected by terrorism because they offer peaceful mechanisms for the settlement of politico-economic scores. It is also

relevant to note that some studies focusing on the nexus between democracy and terrorism have argued that the underlying relationship can be contingent on other characteristics such as territorial conflict and minority discrimination (Chenoweth, 2013; Ghatak et al., 2019).

Second, the connection between political governance and transnational terrorism is based on the view that good political institutions consolidate the legitimacy of democratic systems which provide an enabling environment for the protection of both foreign and domestic citizens. Moreover, societies endowed with better political governance also provide nonviolent channels for the resolution of conflicts (Choi, 2010). Hence, as maintained by Asongu et al. (2018, 2019), the likelihood for transnational terrorism can be curtailed by the availability of political institutions because political governance offers free and fair democratic means for the election and replacement of political leaders. Hence, in an environment of political stability, violence and terrorism as means to the settlement of scores are less likely.

Third, conflicting views have emerged in the literature on the linkage between governance and terrorism. On the one hand, a first stream of studies is more optimistic about the nexus between political governance and terrorism. For example, the political access theory (Eyerman, 1998) postulates that compared to weak democracies, states that enjoy strong democracies are more immune to terrorism. Some institutional facilities that provide strong democracies with comparatively more immunity to terrorism are: respect of the rule of law (Choi, 2010) and judicial independence (Findley & Young, 2011). In a nutshell, democratic institutions endow citizens with channels by and avenues of which their grievances can be voiced and settled nonviolently (Li, 2005).

On the other hand, regime-based differences either between or within states can be exploited for violent opportunities (Hoffman et al., 2013). Whereas autocracies are usually thought to be characterized by less political governance, strong autocracies on the contrary are

endowed with relatively more political stability. Emphasis on stable autocracies is motivated by the view that failing or failed states find it hard to control terrorism. This perspective is in accordance with a broad stream of literature devoted to the subject: Schmid (1992); Eubank and Weinberg (1994); Drakos and Gofas (2006); Piazza (2007); Lai (2007) and Piazza (2008a). According to the narrative, citizens in democracies are endowed with certain features that provide a favorable environment for terrorism and/or resort to violence. This is logical in the perspective that strong democracies endow citizens with liberties to engage politico-economically without much government interference.

In summary, there are two principal competing effects from political institutions on terrorism (Li, 2005; Asongu et al., 2018, 2019). On the one hand, transnational terrorism can be greased by political deadlock in checks and balances as well as constraints in government structures and procedures. On the other hand, participative democracy mitigates the likelihood for transnational terrorism (Asongu et al., 2018, 2019). From an empirical standpoint, there is an abundant supply of literature documenting the positive nexus between terrorism and democracy (Lee, 2013; Weinberg & Eubank, 1998; Eubank & Weinberg, 1994, 2001; Piazza, 2007, 2008b). It is also possible to boost terrorism by means of competition in environments with strong political governance (Chenoweth, 2010).

### 2.3 Linkage between inclusive development and terrorism

Linkages between inclusive development and terrorism can be classified in three main categories. First, the theory of relative deprivation developed by Gurr (1970) documents some interesting insights into the relationship between exclusive development and political violence (Krieger & Meierrieks, 2015; Asongu et al., 2018). Considering that 'relative deprivation' can be defined as "*individuals' expectations of economic or political goods exceed the actual distribution of those goods*" (Piazza, 2006, p.162), the theory "*is grounded in the assumption*

*that people who engage in rebellious political behavior are motivated principally by anger resulting from* […] *relative deprivation*" (Muller & Weede, 1994, p. 40). It follows that capture by the elite of state resources (which is more likely in autocracies) can boost discontent and frustration over exclusive development and hence lead to political violence and aggression. Accordingly, in scenarios of relative deprivation, the marginalized and/or poor can resort to violent means of making their voices heard. Furthermore, microeconomic literature also accords with the perspective that exclusive development factors (e.g. poverty, unemployment and inequality) have provided terrorists' organizations with an opportunity of recruiting more skilled personnel (Bueno de Mesquita, 2005; Benmelech et al., 2012).

Second, as maintained by Asongu et al. (2018), while the absence of inclusive development is directly related to terrorism due to frustration and deprivation, exclusive development could also cause terrorism indirectly by deteriorating social conditions. For instance, limited politico-economic and socio-economic development can further grease terrorism. (1) The perspective of politico-economic participation revolves around the political influence of social groups in shaping institutions for distribution within society and access by social groups to resources (Krieger & Meierrieks, 2015). Within a framework where power is held by a few people, these can mobilize enough resources with which to create and/or consolidate politico-economic institutions that promote and protect their vested interests. In response, unhappy citizens at lower levels of the socio-economic ladder could use violence as means to changing the status quo or existing institutional order. Usage of terror tactics in the demand for greater politico-economic participation is increasingly being documented in the literature (Basuchoudhary & Shughart, 2010; Gassebner & Luechinger, 2011). (2) A number of socio-economic consequences have been established to result from inequality. For instance: Fosu (2008, 2009, 2010a, 2010b, 2010c) has shown that: (i) inequality reduces the accumulation of human capital which eventually affects growth and (ii) the response of

poverty to growth is a decreasing function of socio-economic inequality. Therefore, inequality is a potential cause of terrorism. The socio-economic narrative is in accordance with recent empirical literature maintaining that deteriorating socio-economic conditions fuel the employment of violence by citizens to communicate their grievances (Freytag et al., 2011; Gries et al., 2011; Caruso & Schneider, 2011). It is also worthwhile to note that some studies (e.g. De la Calle & Sánchez-Cuenca, 2012) have established an inverted U-shape nexus between economic prosperity and terrorism.

Third, despite the engaged background, there is still some very conflicting evidence on the relationship between political violence (or terrorism) and exclusive development (Asongu et al., 2018). (1) There is yet no firmly established consensus on the relationship between inequality and civil wars "*Over the past few years, prominent large-N studies of civil war seem to have reached a consensus that inequality does not increase the risk of civil war*" (Østby, 2008, p. 143). Still, some studies maintain that civil wars are more likely in countries that are characterized by high inequality (Cederman et al., 2011; Baten & Mumme, 2013; Krieger & Meierrieks, 2015). (2) As concerns the relationship between terrorism and inequality, empirical evidence is also very conflicting. While a stream of the literature does not establish a clear link between inequality and terrorism (Li, 2005; Abadie, 2006; Piazza, 2006), another stream of studies maintains that inequality strongly causes terrorism (Piazza, 2011; 2013). As to linkages between domestic versus transnational terrorism and inequality, whereas domestic terrorism is substantially influenced by economic grievances (Piazza, 2013), transnational terrorism is fundamentally motivated by grievances pertaining to the foreign policy of rich democracies (Savun & Phillips, 2009).

## 3. Data and Methodology

### 3.1 Data

The study examines a sample of 53 African countries with data for the period 1996-2012. There are three main data sources, notably: (i) the Global Terrorism Database; (ii) World Governance Indicators and African Development Indicators of the World Bank and (iii) updated terrorism dynamics from Enders et al. (2011) and Gailbulloev et al. (2012). The sample's periodicity is motivated by constraints in data availability. We articulate these constraints in three points. The transformation of terrorism variables by Gailbulloev et al. (2012) into domestic, transnational, unclear and total dynamics is up to the year 2012. Macroeconomic indicators from African Development Indicators are not available before the year 2012. 1996 is the starting year because good governance variables from the World Bank are not available before this year. For the purpose of remaining consistent with Asongu et al. (2018), the periodicity starts from the year 1998.

Terrorism is defined in this study as the actual and threatened use of force by subnational actors with the purpose of employing intimidation to meet political objectives (Enders & Sandler, 2006). The study uses four distinct but related dependent variables: domestic, transnational, unclear and total terrorism variables. Terrorism is measured in terms of the number of terrorist incidents registered by a given country yearly. In order to avoid concerns related to the positive skew and log transformation of zeros, the data is improved by adding one to the base before taking natural logarithms of the terrorism incidents. Choi and Salehyan (2013), Bandyopadhyay et al. (2014), Efobi and Asongu (2016) and Asongu and Nwachukwu (2017a) have recently adopted the same transformation procedure.

Terrorism-specific definitions are from Efobi et al. (2015, p. 6). Domestic terrorism "*includes all incidences of terrorist activities that involves the nationals of the venue country: implying that the perpetrators, the victims, the targets and supporters are all from the venue country*" (p.6). Transnational terrorism is " *terrorism including those acts of terrorism that concerns at least two countries. This implies that the perpetrator, supporters and incidence*

*may be from/in one country, but the victim and target is from another*". Unclear terrorism is that, "*which constitutes incidences of terrorism that can neither be defined as domestic nor transnational terrorism*" (p.6). Total terrorism is the sum of domestic, transnational and unclear terrorism dynamics.

Three main independent variables of interest are used, namely: inclusive human development, military expenditure and political stability. Consistent with Asongu et al. (2019), these indicators are expected to negatively affect terrorism. There is a growing stream of the literature maintaining that, adherence to and sympathy for organisations propagating terrorism is fundamentally traceable to a feeling of exclusive development (Bass, 2014). This narrative has been confirmed by Foster (2014) who maintains that a prime motivation of Western-educated youth joining terrorist organisations like ISIL is a feeling of socio-economic exclusion. In essence, Western-born candidates fleeing to the Middle East to join ISIL have the feeling of being treated as foreigners in countries they have considered as theirs from birth. Tonwe and Eke (2013) concur with the narrative on exclusive development by emphasising that a remote cause of the growing Boko Haram in Nigeria is partly because the Northern region is less developed when compared with the more prosperous Southern part of the country. In accordance with recent African development literature (Asongu et al., 2015a), the inequality adjusted human development index (IHDI) is used as the indicator of inclusive development. There is also an interesting stream of literature documenting the importance of military expenditure in fighting terrorism (Sandler, 2005; Lum et al., 2006; Feridum & Shahbaz, 2010). The comparative relevance of political stability in relation to other governance indicators has already been established by Asongu et al. (2018). In essence, the authors have consistently found the political stability variable to be the most significant in deterring dynamics of terrorism.

Three control variables are selected to account for bias in omitted variables, namely: internet penetration, inflation and economic growth. First, the internet has become a viable tool for recruiting and coordinating terrorist activities (Argomaniz, 2015; Holbrook, 2015). Second, high (low) inflation has been established to be linked with the likelihood for more (less) socio-economic protests and political strife (Asongu & Nwachukwu, 2016a, 2018). According to the narrative, chaotic inflation portrays a gloomy economic outlook and decreases the purchasing power of citizens. These may be associated with other factors that are very likely to fuel socio-political unrests, namely: low investment, high unemployment and low economic growth.

Third, there is empirical evidence supporting the view that economic growth could reduce the likelihood for terrorism because it provides: (i) opportunities for jobs and social amenities on the one hand and (ii) financial resources essential for the prevention of and fight against terrorism, on the other. The intuition is supported by Gaibulloev and Sandler (2009) who have shown that low-income countries are less likely to assuage negative economic externalities from terrorists' activities. This is not the case with high-income nations which are endowed with more financial resources needed to absorb terrorism shocks without substantial negative development externalities.

The correlation matrix, summary statistics and definitions (with sources) of variables are disclosed respectively in Appendix 3, Appendix 2 and Appendix 1. Two points are worth emphasizing from the summary statistics: (i) mean values are comparable and (ii) from corresponding standard deviations, we can be confident that reasonable estimated linkages would emerge. The objective of the correlation matrix is to control for potential concerns of multicollinearity. An initial assessment reveals that underlying issues about high degrees of substitution are exclusively noticeable among terrorism indicators. These concerns are less

likely to bias estimations because terrorism indicators are employed essentially as dependent variables in distinct specifications.

### 3.2 Methodology

In order to examine whether existing levels of terrorism matter in the fight against terrorism, the study is consistent with the literature on conditional determinants by employing a quantile regressions (QR) approach which investigates factors that fuel and/or mitigate a given dependent variable (Keonker & Hallock, 2001; Billger & Goel, 2009; Okada & Samreth, 2012; Asongu, 2013). In essence, the QR method consists of examining the determinants of terrorism throughout the conditional distributions of terrorism (Asongu and Nwachukwu, 2016b).

To the best of our knowledge, the existing terrorism literature has focused on examining the determinations of the dependent variable at the conditional mean of terrorism (Bandyopadhyay et al., 2014). Whereas mean impacts are important, we extend the underlying literature by employing an estimation technique that accounts for existing levels of terrorism. Moreover, terrorism studies emphasising mean effects by Ordinary Least Squares (OLS) are based on the assumption that the error terms are normally distributed (Tavares, 2004; Bravo & Dias, 2006). This assumption does not hold for the QR approach because the technique is not based on the assumption of normally distributed error terms (Asongu & Odhiambo, 2019d). Therefore, the approach enables this study to assess determinants of terrorism with specific emphasis on countries with low, intermediate and high levels of terrorism. This technique which is robust in the presence of outliers enables the assessment of parameter estimates are multiple points of the conditional distribution of terrorism (Koenker & Bassett, 1978).

As far as we have reviewed, the scarce terrorism literature employing QR (see Asongu et al., 2015b) has failed to account for endogeneity. We address the concern by extending baseline contemporary QR with non-contemporary QR and instrumental variable QR (IVQR). Accordingly, inclusive human development, military expenditure and political stability are instrumented respectively with Eq. (1), Eq. (2) and Eq. (3) below.

$$H_{i,t} = \alpha + \delta_j\left(H_{i,t-1}\right) + \zeta_t + \varepsilon_{i,t} \quad (1)$$

$$M_{i,t} = \alpha + \delta_j\left(M_{i,t-1}\right) + \zeta_t + \varepsilon_{i,t} \quad (2)$$

$$P_{i,t} = \alpha + \delta_j\left(P_{i,t-1}\right) + \zeta_t + \varepsilon_{i,t} \quad (3)$$

Where: $H_{i,t}$, is the inclusive human development indicator of country $i$ in period $t$, $M_{i,t}$ denotes military expenditure, $P_{i,t}$ is political stability, $\alpha$ is a constant, $\zeta_t$ is time specific constant, $\varepsilon_{i,t}$ the error term, $H_{i,t-1}$, represents inclusive human development of country $i$ in period $t-1$ term, $M_{i,t-1}$, denotes military expenditure of country $i$ in period $t-1$, $P_{i,t-1}$, represents political stability of country $i$ in period $t-1$. The instrumentation procedure consists of regressing the independent variables of interest on their first lags and then saving the fitted values that are subsequently used as the main independent variables in Eq. (4). The specifications are Heteroscedasticity and Autocorrelation Consistent (HAC) in standard errors. The instrumentation procedure is consistent with recent literature (Asongu & Nwachukwu, 2017b). The $\theta^{th}$ quantile estimator of terrorism is obtained by solving for the following optimization problem, which is presented without subscripts for simplicity in Eq. (4)

$$\min_{\beta \in R^k}\left[\sum_{i \in \{i: y_i \geq x_i'\beta\}} \theta\left|y_i - x_i'\beta\right| + \sum_{i \in \{i: y_i < x_i'\beta\}} (1-\theta)\left|y_i - x_i'\beta\right|\right], \quad (4)$$

where $\theta \in (0,1)$. As opposed to OLS which is fundamentally based on minimizing the sum of squared residuals, with QR, the weighted sum of absolute deviations are minimised. For example, the 25th or 75th quantiles (with $\theta$=0.25 or 0.75 respectively) are assessed by approximately weighing the residuals. The conditional quantile of terrorism or $y_i$ given $x_i$ is:

$$Q_y(\theta / x_i) = x_{i'}\beta_\theta \ , \qquad (5)$$

where unique slope parameters are modelled for each $\theta^{th}$ specific quantile. This formulation is analogous to $E(y / x) = x_{i'}\beta$ in the OLS slope where parameters are investigated only at the mean of the conditional distribution of terrorism. For the model in Eq. (5), the dependent variable $y_i$ is a terrorism indicator while $x_i$ contains a constant term, *inclusive development, military expenditure*, *political stability*, *economic growth, inflation* and *internet penetration.*

## 4. Empirical results

### 4.1 Presentation of results

Table 1, Table 2 and Table 3 respectively present findings on domestic terrorism, transnational terrorism and total terrorism. Each of the tables is presented in three distinct sections, namely: contemporary, non-contemporary and instrumental variable regressions. Irrespective of tables, we notice substantial differences in terms of sign and magnitude of estimates from OLS and various quantiles. This justifies the choice of the estimation technique in the perspective that determinants of terrorism or policy tools for the fight against terrorism are contingent on initial levels of terrorism.

The following findings can be established from Table 1 on domestic terrorism. (1) Inclusive development consistently has a positive effect on terrorism. (2) The impact of military expenditure is also positive with the significance most apparent in the top quantiles of the distributions. (3) Political stability negatively affects terrorism with a negative threshold effect. A negative threshold effect is established when there is a negative effect with

consistent increasing negative magnitude throughout the conditional distribution of terrorism or a positive effect with consistent decreasing positive magnitude throughout the conditional distribution of terrorism. (4) Most of the significant control variables have expected signs. With a slight exception at the 50$^{th}$ quantile of instrumental variable regressions in Table 2 on transnational terrorism, where the effect of military expenditure displays a negative sign, the findings in Tables 2-3 are consistent with those in Table 1.

*"Insert Tables 1-3 here"*

**4.2 Further discussion and policy implications**

*4.2.1 Nexus with the literture*

The positive and insignificant effects of military expenditure are in accordance with the stream of the literature documenting that exclusive military measures are insufficient in fighting terrorism. Moreover, military counterterrorism initiatives may further fuel terrorism (see Sandler, 2005; Lum et al., 2006; Feridun & Shahbaz, 2010).

The insignficant and positive relationships betweeen inclusive human development and terrorism accord with the strand of the literature maintaining that economic and human developments either do not significantly affect terrorism or impact it negatively. This consists of literaure that has established: (i) no nexus between terrorism (and/or civil wars) and economic development (Piazza, 2006; Krueger & Maleckova, 2003; Østby, 2008, p. 143) and (ii) a positive relationship between terrorism and economic development (Gassenbner & Luechinger, 2011; Blomberg et al., 2014). In addition, the results are also not consistent with the stream of literature documenting the absence of a nexus between terrorism and inclusive development (Li, 2005; Abadie, 2006; Piazza, 2006).

With respect to political instability, the finding aligns with the stream of literature supportive of the appealing role of good governance in mitigating negative sentiments that

motivate terrorist organisations to recruit more workers and activities (see Windsor, 2003; Li, 2005). Therefore, the political access theory is confirmed, notably: on the comparative immunity of strong democracies to terrorism. Accordingly, political stability is likely to be strongly associated with variables from which similar relationships have been established in the literature, namely: judicial independence (Findley & Young, 2011) and the rule of law (Choi, 2010).

*4.2.2 Practical implications*

Practical contributions are discussed on the unexpected signs. First, we have observed that whereas military expenditure is not significant in bottom quantiles, it is positively significant in top quantiles. This implies that military spending devoted to countering terrorism is not effective when existing levels of terrorism are low. Conversely, when existing levels of terrorism are high, employing a military means to combating terrorism is counterproductive because it only fuels terrorism.

The positive impact of inclusive development could imply that despite sampled countries' efforts towards improving the equitable distribution of fruits from economic development, the effects may be counterproductive due to frustrations from some circles that are not sympathetic with policies of equitable distribution of wealth because such policies negatively affect some vested interest. Under this scenario, discontent and grievances over unequal distribution of national wealth is not from poor segments of the population, but from the elite situated in the middle- and upper-income strata, for the most part. Accordingly, the elite may be infuriated and concerned that more equitable income distribution is affecting them negatively. Within this framework, they can mobilise resources to fund violent activites which creates instability and opportunities for the elite to eventually reinvent and tailor existing institutions to the protection of their interests and rents.

The above practical implication pertaining to inclusive human development is broadly consistent with the narratives of the African middle class which is an embodiment of an elite which is unsympathetic to demands for inclusive human development because of preferences to specific markets and dependence on state resources (see Poulton, 2014). Furthermore, the corresponding stream of literature maintains that a middle class in Africa is likely to skillfully hamper socio-economic transformations by employing tactics of external (e.g. terrorism) and internal (e.g. civil unrest/war) violence in order to retain a tight grip on governing institutions (see Poulton, 2014: Resnick, 2015). It follows from the discourse that the elite and middle class could coordinate activites that bring temporal unrest and chaos in order to reinvent and tailor institutions to their tastes. The inference is contingent on the view that such frustrations from the middle class are for the most part linked to the elite with political connections, contrary to the elite and middle class which are improving their income and status from level-playing activities like innovation, the market economy and free entreprising. The discussion is also consistent with the skepticism on the role the middle class in the continent might by playing in governance transformations (Rodrik, 2015).

*4.2.3 Threshold effect from political stability*

It is important to devote space to discussing the effect of political stability in more depth because it is the only variable of interest with the expected sign. Accordingly, we have established that politiical stability negatively affects terrorism with a negative threshold effect. The political stability estimates are consistently significant with increasing negative magnitudes throughout the conditional distributions of domestic and total terrorism dynamics. In other words, the negative responsiveness of terrorism to political stability is a decreasing function of terrorism.

There are a number of stylized facts that can elucidate the negative threshold from political stability. Political instability on the continent has been the main factor fueling the development of extremism and terrorism (see Clavarino, 2014). Terror movements are growing in scale and scope across the continent because of cross-border political instability for the most part. For instance, since the 2011 collapse of Muammar Gaddafi's regime in Libya, Islamic militancy and insurgencey have been growing steadily in the Sahel region. Moreover, the spectacular growth of Al-Shabaab in East Africa over the past decades was due to a failed central government of Somalia.

## 5. Conclusion, caveats and further research directions

This study has examined policy tools in the fight against terrorism when existing levels of terrorism matter in 53 African countries for the period 1998-2012. The empirical evidence is based on contemporary, non-contemporary and Instrumental Variable Quantile regressions (QR) which enable the investigation throughout the conditional distributions of domestic, transnational and total terrorism dyanmics. The policy relevance of the QR approach builds on the motivation that blanket policies in the fight against terrorism may not be effective unless they are contigent on existing levels of terrorism and tailored differently across countries with low, intermediate and high levels of terrorism. The following findings are established. First, counterterrorism policy instruments of inclusive human development and military expenditure further fuel terrorim. Second, political stability negatively affects terrorism with a negative threshold effect. Political stability estimates are consistently significant with increasing negative magnitudes throughout the conditional distributions of domestic and total terrorism dynamics. In other words, the negative responsiveness of terrorism to political stability is a decreasing function of terrorism. Unexpected signs are elucidated and policy implications discussed.

The evidence that inclusive human development and military expenditure have unexpected signs implies that they may be necessary but not sufficient for the battle against terrorism. Moreover, their effectiveness may be contingent on their interaction with other macroeconomic and institutional variables. In the light of these considerations, future research could focus on investigating factors that can be complemented with military expenditure and inclusive human development in order to establish expected negative effects on terrorism. Moreover, due to data availability constraints, not all variables employed in the conflict literature are involved in the conditioning information set. Hence, it is worthwhile for further studies to include other variables such as population, discrimination/deprivation, regime type, intervention (for transnational terrorism) and civil conflict.

A caveat to this study is that the conclusions can be viewed as simplifying what is a rather complex phenomenon. Whereas the quantitative approach offers us a generalised view about terrorism and counter-terrorism policies in and towards Africa, what it does not offer is a nuanced perspective that some of the sampled countries are likely to present. For instance, while the study concludes that military expenditure fuels terrorism because of the overwhelming positive "military expenditure"-terrorism nexus, in some sparse quantiles, the opposite nexus is apparent. Hence, knowing why military expenditure may have a positive impact on domestic terrorism and a negative impact on transnational terrorism owing to initial conditions of terrorism could be the object of future research given the complexity of the phenomenon. Hence, the generalized view points of terrorism and counter-terrorism policies in and toward Africa could be examined further in future studies, in the light of the attendant caveats.

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## Table 1: Conditional effects on Domestic terrorism

| | Dependent variable: Domestic Terrorism | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Contemporary | | | | | | Non Contemporary | | | | | | Instrumental Variable | | | | | |
| | **OLS** | **0.10** | **0.25** | **0.50** | **0.75** | **0.90** | **OLS** | **0.10** | **0.25** | **0.50** | **0.75** | **0.90** | **OLS** | **0.10** | **0.25** | **0.50** | **0.75** | **0.90** |
| Constant | 0.046 | **-0.015*** ** | **-0.012*** ** | **-0.038*** ** | 0.026 | **0.796*** ** | 0.014 | na | na | **-0.023*** ** | 0.040 | 0.270 | 0.106 | **-0.014*** ** | **-0.012*** ** | -0.008 | -0.018 | **0.559*** ** |
| | (0.583) | **(0.000)** | **(0.000)** | **(0.000)** | (0.795) | **(0.000)** | (0.868) | | | **(0.000)** | (0.696) | (0.131) | (0.239) | **(0.000)** | **(0.000)** | (0.433) | (0.815) | **(0.000)** |
| IHDI | **0.036*** ** | **0.024*** ** | 0.024 | **0.053*** ** | **0.051*** ** | **0.034*** ** | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **(0.000)** | **(0.000)** | (0.680) | **(0.000)** | **(0.000)** | **(0.000)** | | | | | | | | | | | | |
| IHDI (-1) | --- | --- | --- | --- | --- | --- | 0.016 | --- | --- | **0.027*** ** | **0.039*** ** | **0.028*** ** | --- | --- | --- | --- | --- | --- |
| | | | | | | | (0.176) | | | **(0.000)** | **(0.000)** | **(0.000)** | | | | | | |
| IHDI (IV) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | **0.028*** ** | **0.024*** ** | **0.024*** ** | **0.030*** ** | **0.043*** ** | **0.029*** ** |
| | | | | | | | | | | | | | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** |
| Military | 0.015 | 0.00006 | -0.00006 | **0.005** ** | **0.122*** ** | **0.122*** ** | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | (0.656) | (0.667) | (0.680) | **(0.031)** | **(0.000)** | **(0.001)** | | | | | | | | | | | | |
| Military (-1) | --- | --- | --- | --- | --- | --- | -0.008 | --- | --- | -0.00009 | **0.093*** ** | **0.133** ** | --- | --- | --- | --- | --- | --- |
| | | | | | | | (0.796) | | | (0.919) | **(0.007)** | **(0.022)** | | | | | | |
| Military(IV) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | -0.022 | -0.0003 | -0.0001 | -0.002 | **0.105*** ** | **0.150*** ** |
| | | | | | | | | | | | | | (0.532) | (0.114) | (0.483) | (0.479) | **(0.000)** | **(0.002)** |
| PolSta | **-0.572*** ** | **-0.002*** ** | **-0.002*** ** | **-0.057*** ** | **-0.609*** ** | **1.050*** ** | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | | | | | | | | | | | | |
| PolSta(-1) | --- | --- | --- | --- | --- | --- | **0.024*** ** | --- | --- | **-0.020*** ** | **-0.627*** ** | **-0.965*** ** | --- | --- | --- | --- | --- | --- |
| | | | | | | | **(0.024)** | | | **(0.000)** | **(0.000)** | **(0.000)** | | | | | | |
| PolSta(IV) | --- | --- | --- | --- | --- | --- | | | | | | | **-0.592*** ** | **-0.002*** ** | **-0.002*** ** | **-0.074*** ** | **-0.614*** ** | **1.009*** ** |
| | | | | | | | | | | | | | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** |
| Internet (1) or (-1) | **0.018*** ** | **-0.00008*** ** | **-0.0001*** ** | **0.001*** ** | **0.022*** ** | **0.036*** ** | **0.024*** ** | --- | --- | **0.0003** ** | **0.035*** ** | **0.069*** ** | **0.021*** ** | **-0.00009*** ** | **-0.0001*** ** | **0.001*** ** | **0.033*** ** | **0.050*** ** |
| | **(0.003)** | **(0.000)** | **(0.000)** | **(0.003)** | **(0.000)** | **(0.000)** | **(0.002)** | | | **(0.026)** | **(0.000)** | **(0.000)** | **(0.002)** | **(0.000)** | **(0.000)** | **(0.001)** | **(0.000)** | **(0.000)** |
| GDPg (1) or (-1) | -0.0002 | 0.00007 | 0.000005 | 0.0004 | 0.006 | **-0.037*** ** | 0.009 | --- | --- | **0.0007*** ** | 0.004 | 0.015 | -0.005 | 0.00008 | 0.00005 | 0.001 | 0.006 | **-0.030*** |
| | (0.982) | (0.146) | (0.929) | (0.626) | (0.542) | **(0.003)** | (0.350) | | | **(0.007)** | (0.625) | (0.264) | (0.566) | (0.130) | (0.448) | (0.225) | (0.364) | **(0.063)** |
| Inflation (1) or (-1) | **-0.002*** ** | **0.000006*** | -0.000 | **0.001*** ** | **-0.002*** ** | **-0.006*** ** | **-0.001*** | --- | --- | **0.001*** ** | **-0.001*** | **-0.003*** ** | **-0.003*** ** | 0.000005 | -0.0000 | **-0.0003*** ** | **-0.003*** ** | **-0.006*** ** |
| | **(0.000)** | **(0.050)** | (0.794) | **(0.000)** | **(0.0000)** | **(0.000)** | **(0.063)** | | | **(0.000)** | **(0.092)** | **(0.000)** | **(0.000)** | (0.155) | (0.949) | **(0.000)** | **(0.000)** | **(0.000)** |
| Pseudo $R^2$/$R^2$ | 0.307 | 0.011 | 0.014 | 0.022 | 0.257 | 0.358 | 0.291 | --- | --- | 0.003 | 0.245 | 0.365 | 0.326 | 0.009 | 0.012 | 0.018 | 0.272 | 0.375 |
| Fisher | **23.08*** ** | | | | | | **18.37*** ** | | | | | | **20.69*** ** | | | | | |
| Countries | | | | | | | | | | | | | | | | | | |
| Observations | 471 | 471 | 471 | 471 | 471 | 471 | 431 | | | 431 | 431 | 431 | 402 | 402 | 402 | 402 | 402 | 402 |

Notes. Dependent variable is Domestic terrorism. *,**,***, denote significance levels of 10%, 5% and 1% respectively. Lower quantiles (e.g., Q 0.1) signify nations where the Domestic terrorism is least. OLS: Ordinary Least Squares. Pseudo $R^2$($R^2$) for Quantile regressions (OLS). na: not applicable because convergence is not achieved.

## Table 2: Conditional effects on Transnational terrorism

| | Dependent variable: Transnational Terrorism | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Contemporary | | | | | | Non Contemporary | | | | | | Instrumental Variable | | | | | |
| | **OLS** | **0.10** | **0.25** | **0.50** | **0.75** | **0.90** | **OLS** | **0.10** | **0.25** | **0.50** | **0.75** | **0.90** | **OLS** | **0.10** | **0.25** | **0.50** | **0.75** | **0.90** |
| Constant | 0.013 | na | na | na | 0.004 | **0.322*** ** | 0.027 | na | na | **-0.014*** ** | -0.012 | **0.405*** ** | **0.099*** | na | na | **-0.006*** ** | 0.102 | **0.358*** ** |
| | (0.785) | | | | (0.940) | **(0.000)** | (0.635) | | | **(0.000)** | (0.882) | **(0.007)** | **(0.059)** | | | **(0.000)** | (0.141) | **(0.000)** |
| IHDI | 0.006 | --- | --- | --- | **0.019*** ** | **0.010*** ** | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | (0.219) | | | | **(0.000)** | **(0.000)** | | | | | | | | | | | | |
| IHDI (-1) | --- | --- | --- | --- | --- | --- | 0.006 | --- | --- | **0.011*** ** | **0.018*** ** | **0.009*** | --- | --- | --- | --- | --- | --- |
| | | | | | | | (0.243) | | | **(0.000)** | **(0.000)** | **(0.068)** | | | | | | |
| IHDI (IV) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 0.009 | --- | --- | **0.015*** ** | **0.019*** ** | **0.011*** ** |
| | | | | | | | | | | | | | (0.117) | | | **(0.000)** | **(0.000)** | **(0.000)** |
| Military | -0.010 | --- | --- | --- | **0.044** ** | **0.047*** | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | (0.621) | | | | **(0.035)** | **(0.081)** | | | | | | | | | | | | |
| Military (-1) | --- | --- | --- | --- | --- | --- | -0.017 | --- | --- | 0.0004 | 0.032 | 0.030 | --- | --- | --- | --- | --- | --- |
| | | | | | | | (0.451) | | | (0.357) | (0.232) | (0.588) | | | | | | |
| Military(IV) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | **-0.044** ** | --- | --- | **-0.0001*** | 0.003 | 0.039 |
| | | | | | | | | | | | | | **(0.044)** | | | **(0.079)** | (0.886) | (0.213) |
| PolSta | **-0.305*** ** | --- | --- | --- | **-0.331*** ** | **-0.560*** ** | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **(0.000)** | | | | **(0.000)** | **(0.000)** | | | | | | | | | | | | |
| PolSta(-1) | --- | --- | --- | --- | --- | --- | **-0.291*** ** | --- | --- | **-0.005*** ** | **-0.312*** ** | **-0.569*** ** | --- | --- | --- | --- | --- | --- |
| | | | | | | | **(0.000)** | | | **(0.000)** | **(0.000)** | **(0.000)** | | | | | | |
| PolSta(IV) | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | **-0.319*** ** | --- | --- | **-0.001*** ** | **-0.349*** ** | **-0.545*** ** |
| | | | | | | | | | | | | | **(0.000)** | | | **(0.000)** | **(0.000)** | **(0.000)** |
| Internet(1) or (-1) | **0.007*** ** | --- | --- | --- | **0.007*** ** | **0.019*** ** | **0.008** ** | --- | --- | 0.00003 | **0.008** ** | **0.019** ** | **0.007*** ** | --- | --- | **-0.00009*** ** | **0.009*** ** | **0.022*** ** |
| | **(0.005)** | | | | **(0.001)** | **(0.000)** | **(0.011)** | | | (0.653) | **(0.016)** | **(0.019)** | **(0.008)** | | | **(0.000)** | **(0.001)** | **(0.000)** |
| GDPg (1) or (-1) | 0.002 | --- | --- | --- | 0.002 | -0.006 | 0.007 | --- | --- | 0.0002 | 0.012 | -0.006 | -0.0001 | --- | --- | **0.00005** ** | 0.001 | **-0.011*** |
| | (0.605) | | | | (0.631) | (0.237) | (0.228) | | | (0.140) | (0.205) | (0.659) | (0.974) | | | **(0.049)** | (0.775) | **(0.077)** |
| Inflation (1) or (-1) | 0.0008 | --- | --- | --- | **0.002*** ** | 0.0006 | 0.0006 | --- | --- | **0.001*** ** | **0.0009*** | -0.001 | **-0.001*** ** | --- | --- | **-0.000002*** | **-0.001*** ** | **-0.003*** ** |
| | (0.564) | | | | **(0.000)** | (0.165) | (0.228) | | | **(0.000)** | **(0.072)** | (0.102) | **(0.000)** | | | **(0.078)** | **(0.000)** | **(0.000)** |
| Pseudo $R^2$/$R^2$ | 0.266 | | | | 0.188 | 0.349 | 0.228 | --- | --- | 0.0001 | 0.167 | 0.290 | 0.270 | --- | --- | 0.004 | 0.178 | 0.353 |
| Fisher | **16.22*** ** | | | | | | **14.68*** ** | | | | | | **13.86*** ** | | | | | |
| Countries | | | | | | | | | | | | | | | | | | |
| Observations | 471 | | | | 471 | 471 | 431 | | | 431 | 431 | 431 | 402 | | | 402 | 402 | 402 |

Notes. Dependent variable is Transnational terrorism. *,**,***, denote significance levels of 10%, 5% and 1% respectively. Lower quantiles (e.g., Q 0.1) signify nations where the Transnational terrorism is least. OLS: Ordinary Least Squares. Pseudo $R^2$($R^2$) for Quantile regressions (OLS). na: not applicable because convergence is not achieved.

## Table 3: Conditional effects on Total terrorism

| | Dependent variable: Total Terrorism | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Contemporary | | | | | | Non Contemporary | | | | | | Instrumental Variable | | | | | |
| | **OLS** | **0.10** | **0.25** | **0.50** | **0.75** | **0.90** | **OLS** | **0.10** | **0.25** | **0.50** | **0.75** | **0.90** | **OLS** | **0.10** | **0.25** | **0.50** | **0.75** | **0.90** |
| Constant | 0.073 | **-0.015*** ** | **-0.013*** ** | **-0.120*** ** | **0.252*** | **0.888*** ** | 0.059 | na | na | **-0.110**** | 0.170 | **0.854*** ** | **0.173*** | **-0.014*** ** | **-0.012*** ** | -0.011 | **0.319**** | **0.728*** ** |
| | (0.423) | **(0.000)** | **(0.000)** | **(0.009)** | **(0.053)** | **(0.000)** | (0.548) | --- | --- | **(0.034)** | (0.265) | **(0.000)** | **(0.080)** | **(0.000)** | **(0.000)** | (0.826) | **(0.013)** | **(0.000)** |
| IHDI | **0.042*** ** | **0.024*** * | **0.024*** * | **0.053*** * | **0.069*** ** | **0.054*** ** | --- | | | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **(0.001)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | | | | | | | | | | | | |
| IHDI (-1) | --- | --- | --- | --- | --- | --- | 0.018 | --- | --- | **0.041*** ** | **0.046*** * | **0.032*** ** | --- | --- | --- | --- | --- | --- |
| | | | | | | | (0.212) | | | **(0.000)** | **(0.000)** | **(0.000)** | | | | | | |
| IHDI (IV) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | **0.029*** ** | **0.024*** ** | **0.024*** ** | **0.029*** ** | **0.043*** ** | **0.028*** ** |
| | | | | | | | | | | | | | **(0.001)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** |
| Military | 0.021 | 0.00008 | 0.0001 | **0.062*** ** | **0.084*** | **0.099*** | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | (0.540) | (0.596) | (0.333) | **(0.000)** | **(0.055)** | **(0.051)** | | | | | | | | | | | | |
| Military (-1) | --- | --- | --- | --- | --- | --- | 0.003 | --- | --- | **0.047*** ** | **0.101**** | 0.050 | --- | --- | --- | --- | --- | --- |
| | | | | | | | (0.934) | | | **(0.004)** | **(0.045)** | (0.393) | | | | | | |
| Military(IV) | --- | --- | --- | --- | --- | --- | | --- | --- | | | | -0.029 | 0.00002 | -0.0001 | 0.019 | 0.037 | **0.108*** |
| | | | | | | | | | | | | | (0.436) | (0.918) | (0.623) | (0.276) | (0.388) | **(0.086)** |
| PolSta | **-0.686*** ** | **-0.002*** ** | **-0.003*** ** | **-0.401*** ** | **-0.814*** ** | **-1.170*** ** | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | | | | | | | | | | | | |
| PolSta(-1) | --- | --- | --- | --- | --- | --- | **-0.690*** ** | --- | --- | **-0.440*** ** | **-0.835*** ** | **-1.201*** ** | --- | --- | --- | --- | --- | --- |
| | | | | | | | **(0.000)** | | | **(0.000)** | **(0.000)** | **(0.000)** | | | | | | |
| PolSta(IV) | --- | --- | --- | --- | --- | --- | --- | --- | --- | | | | **-0.708*** ** | **-0.002*** ** | **-0.003*** ** | **-0.453*** ** | **-0.827*** ** | **-1.086*** ** |
| | | | | | | | | | | | | | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** |
| Internet (1) or (-1) | **0.019*** ** | **-0.00008*** ** | **-0.0001*** ** | **0.008*** * | **0.021*** ** | **0.037*** ** | **0.024*** * | --- | --- | **0.011*** ** | **0.030*** * | **0.048*** ** | **0.022*** ** | **-0.00008*** ** | **-0.0001*** ** | **0.010*** ** | **0.032*** ** | **0.066*** ** |
| | **(0.002)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.001)** | --- | --- | **(0.000)** | **(0.000)** | **(0.000)** | **(0.001)** | **(0.001)** | **(0.000)** | **(0.000)** | **(0.000)** | **(0.000)** |
| GDPg (1) or (-1) | 0.0004 | 0.00007 | 0.00003 | **0.009*** | -0.008 | **-0.033*** ** | 0.009 | | | **0.012**** | 0.014 | -0.012 | -0.005 | 0.00007 | 0.00007 | **0.009*** | -0.011 | **-0.038**** |
| | (0.966) | (0.248) | (0.604) | **(0.055)** | (0.504) | **(0.001)** | (0.371) | --- | --- | **(0.019)** | (0.328) | (0.335) | (0.598) | (0.286) | (0.351) | **(0.070)** | (0.354) | **(0.034)** |
| Inflation (1) or (-1) | -0.0009 | 0.000005 | **0.00003*** ** | **0.002*** * | -0.0003 | **-0.003*** ** | -0.0006 | | | **0.001*** ** | -0.001 | **-0.004*** ** | **-0.003*** ** | 0.000004 | -0.000002 | **-0.002*** ** | **-0.005*** ** | **-0.007*** ** |
| | (0.559) | (0.248) | **(0.000)** | **(0.000)** | (0.737) | **(0.000)** | (0.306) | --- | --- | **(0.002)** | (0.137) | **(0.000)** | **(0.000)** | (0.267) | (0.376) | **(0.000)** | **(0.000)** | **(0.000)** |
| Pseudo $R^2$/$R^2$ | 0.366 | 0.009 | 0.012 | 0.113 | 0.312 | 0.382 | 0.351 | --- | --- | 0.093 | 0.301 | 327 | 0.381 | 0.007 | 0.010 | 0.114 | 0.326 | 0.402 |
| Fisher | **29.02*** ** | | | | | | **29.61*** * | | | | | | **26.21*** ** | | | | | |
| Countries | | | | | | | | | | | | | | | | | | |
| Observations | 471 | 471 | 471 | 471 | 471 | 471 | 431 | | | 431 | 431 | 431 | 402 | 402 | 402 | 402 | 402 | 402 |

Notes. Dependent variable is Total terrorism. *,**,***, denote significance levels of 10%, 5% and 1% respectively. Lower quantiles (e.g., Q 0.1) signify nations where the Total terrorism is least. OLS: Ordinary Least Squares. Pseudo $R^2$($R^2$) for Quantile regressions (OLS). na: not applicable because convergence is not achieved. IHDI: Inequality Adjusted Human Development Index. MilitaryE: Military Expenditure. PolSta: Political Stability. (-1): non contemporary. (IV): instrumental variable.

## Appendices

### Appendix 1: Definitions of variables

| Variables | Signs | Definitions of variables (Measurement) | Sources |
|---|---|---|---|
| Political Stability | PS | "Political stability/no violence (estimate): measured as the perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional and violent means, including domestic violence and terrorism" | World Bank (WDI) |
| Domestic terrorism | Domter | Number of Domestic terrorism incidents (in Ln) | Ender et al. (2011) and Gailbulloev et al. (2012) |
| Transnational terrorism | Tranter | Number of Transnational terrorism incidents (in Ln) | |
| Uuclear terrorism | Unclter | Number of terrorism incidents whose category in unclear (in Ln) | |
| Total terrorism | Totter | Total number of terrorism incidents (in Ln) | |
| Internet | Internet | Internet penetration (per 100 people) | World Bank (WDI) |
| Inclusive development | IHDI | Inequality Adjusted Human Development Index | UNDP |
| Growth | GDPg | Gross Domestic Product (GDP) growth rates (annual %) | World Bank (WDI) |
| Inflation | Inflation | Consumer Price Index (annual %) | World Bank (WDI) |
| Military Expense | Milit | Military Expenditure (% of GDP) | World Bank (WDI) |

WDI: World Bank Development Indicators. PCA: Principal Component Analysis. UNDP: United Nations Development Program. Ln: Natural logarithm.

### Appendix 2: Summary statistics (1996-2012)

| | Mean | SD | Minimum | Maximum | Observations |
|---|---|---|---|---|---|
| Political Stability | -0.550 | 0.948 | -3.220 | 1.188 | 742 |
| Domestic terrorism | 0.414 | 0.892 | 0.000 | 6.234 | 901 |
| Transnational terrorism | 0.221 | 0.541 | 0.000 | 3.332 | 901 |
| Unclear terrorism | 0.097 | 0.389 | 0.000 | 4.888 | 901 |
| Total terrorism | 0.540 | 1.002 | 0.000 | 6.300 | 901 |
| Internet penetration | 4.243 | 7.773 | 0.000 | 55.416 | 874 |
| Inclusive development | 0.912 | 4.448 | 0.127 | 45.325 | 687 |
| GDP growth | 5.080 | 9.317 | -62.075 | 149.973 | 875 |
| Inflation | 16.586 | 150.256 | -9.797 | 4145.108 | 803 |
| Military Expenditure | 2.278 | 3.034 | 0.145 | 39.606 | 722 |

S.D: Standard Deviation

### Appendix 3: Correlation analysis (uniform sample size: 471)

| PS | Internet | IHDI | GDPg | Inflation | Milit | Domter | Tranter | Unclter | Totter | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 0.205 | 0.028 | 0.005 | -0.191 | -0.238 | -0.492 | -0.492 | -0.265 | -0.554 | PS |
| | 1.000 | 0.002 | -0.053 | -0.057 | -0.067 | 0.076 | 0.025 | 0.041 | 0.053 | Internet |
| | | 1.000 | -0.045 | -0.011 | -0.026 | 0.142 | 0.036 | 0.174 | 0.149 | IHDI |
| | | | 1.000 | -0.143 | -0.101 | -0.010 | 0.003 | -0.072 | -0.016 | GDPg |
| | | | | 1.000 | -0.081 | 0.006 | 0.146 | 0.087 | 0.068 | Inflation |
| | | | | | 1.000 | 0.141 | 0.081 | 0.081 | 0.155 | Milit |
| | | | | | | 1.000 | 0.580 | 0.625 | 0.957 | Domter |
| | | | | | | | 1.000 | 0.461 | 0.743 | Tranter |
| | | | | | | | | 1.000 | 0.664 | Unclter |
| | | | | | | | | | 1.000 | Totter |

PS: Political Stability/Non violence. Internet: Internet Penetration. IHDI: Inequality Adjusted Human Development Index. GDPg: Gross Domestic Product Growth. Milit: Military Expenditure. Domter: Domestic Terrorism. Tranter: Transnational Terrorism. Unclter: Unclear Terrorism. Totter: Total Terrorism.