Asongu, Simplice; Nnanna, Joseph; Nting, Rexon T.

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Simplice A. Asongu
African Governance and Development Institute,
P.O Box 8413, Yaoundé, Cameroon.
E-mails: asongusimplice@yahoo.com,
asongus@afridev.org

Joseph Nnanna
The Development Bank of Nigeria, The Clan Place, Plot 1386A
Tigris Crescent, Maitama, Abuja, Nigeria
E-mail: jnnanna@devbankng.com

Rexon T. Nting
The Business School, University of Wales,
Trinity Saint David, Winchester House, 11 Cranmer Road,
London, UK, SW9 6EJ.
E-mail: rexon.nting@uwtsd.ac.uk

Research Department

A bad turn deserves another: linkages between terrorism, capital flight and industrialisation

Simplice A. Asongu, Joseph Nnanna & Rexon T. Nting

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Abstract

This study examines how the association between terrorism and capital flight affects the process of industrialisationin 36 African countries. The empirical evidence is based on Generalised Method of Moments (GMM) and Quantile Regressions (QR). GMM-oriented findings show that capital flight interacts with terrorism to negatively affect industrialisation in 'domestic terrorism'- and 'total terrorism'-oriented regressions. With QR approach, the GMM results are confirmed exclusively in the 25^{th} and 50^{th} quantiles, in regressions pertaining to domestic terrorism, unclear terrorism and total terrorism. It follows that the negative effect from the investigated interaction is driven by bottom quantiles of the industrialisation distribution. This confirms existing literature that developed countries are more likely to limit the negative externalities from terrorism compared to their developing counterparts. Hence, the negative consequence of the association between terrorism and capital flight on industrialisation is a decreasing function of industrialisation.

Keywords: Capital flight, terrorism, industrialisation, Africa
JEL Classification: C50; D74; F23; N40; O55

1. Introduction

The positioning of this inquiry on Africa is motivated by three main strands of contemporary relevance, notably: growing levels of capital flight, increasing terrorism and the lagging position of the continent in terms of industrialisation.

First, Africa has been plagued with growing levels of capital flight over the past decades (Asongu & Nwachukwu, 2017). In line with the narrative, thirty-three countries in Sub-Saharan Africa (SSA) lost approximately eight hundred and fourteen billion US Dollars (in constant of 2010 US Dollars) between 1970 and 2010. On average terms, the amount that is lost to capital flight surpasses other main external inflows like development assistance and foreign direct investment which respectively during the same period, (i.e., 1970-2010) stood at six hundred and fifty-nine billion and three hundred and six billion US Dollars for the same countries. The corresponding absence of finance has been documented to inhibit economic prosperity in the continent (see Bartels et al., 2009; Tuomi, 2011; Boyce & Ndikumana, 2012; Darley, 2012).

Second, according to Clavarino (2014), terrorism is currently mushrooming in Africa because for the most part, Islamic fundamentalists on the continent are taking advantage of a plethora of favourable circumstances, *inter alia*: domestic armed forces that are undertrained and underequipped, vulnerable and corrupt central governments, booming trade in drugs that represents a source of financing and porous borders. Following the overthrow of Muammar Gaddafi's regime in 2011, Islamic militancy has prospered in the Sahel region. Moreover, the French intervention in Mali has dispersed Islamic militants to neighbouring countries. In other parts of the continent, Islamic insurgency is also burgeoning. Notable terrorists' organisations include: (i) the Boko Haram of Nigeria whose sphere of influence has extended to neighbouring countries like Cameroon, Niger and Chad; (ii) the Al-Shaab in East Africa which recently orchestrated a series of bombings in Kenya and (iii)AQIM or Al-Qaeda in the Islamic Maghreb; the Algerian Mokhtar Belmokhtar leading Al-Qaeda-linked Mulathameen Brigade; Tunisia-based Ansar Al-Shariya and Ansar Dine, which is led by Iyad Ag Ghaly who is Gaddafi's former close ally(Asongu & Nwachukwu, 2018).

Third, in relation to other continents in the world, Africa is lagging in terms of industrialisation. Its slow pace towards industrialization has been documented to be caused by *inter alia*: (i) poor investment climate and skills shortages (see Page, 2012; Gui-Diby & Renard, 2015); (ii) lack of investment capital essential to fund the process of

industrialisation (see Darley, 2012; Tuomi, 2011) and (iii) low added value to economic sub-sectors (Asongu et al., 2020; Asongu & Odhiambo, 2021).

The purpose of this study is to assess how the policy syndromes discussed in the first-two strands affect the development outcome engaged in the third strand. In other words, the study aims to assess how terrorism interacts with capital flight to affect industrialisation. Whereas we intuitively expect the interaction to play negatively on industrialisation, it is relevant to substantiate this intuition with empirical validity to consolidate the perspective of policy makers. For this purpose, the modeling approach we adopt, engage both the conditional mean and the conditional distribution of industrialisation in order toprovide more room for more policy implications. The policy interest of assessing the interaction between terrorism and capital flight throughout the distribution of industrialisation is that blanket policies based on mean values of industrialisation may not be effective unless they are contingent on initial levels of industrialisation and tailored differently across countries with low, intermediate, and high levels of industrialisation. Therefore, by accounting for initial levels of industrialisation, we can establish how existing levels of industrialisation affect the investigated relationship. The empirical technique also enables the study to assess conclusions in existing literature which maintain that more industrialised countries are more likely to limit the negative development externalities of terrorism compared to their less industrialised counterparts (Gaibulloev & Sandler, 2009). Such a positioning steers clear of recent capital flight and terrorism literature on Africa.

On the one hand, the attendant studies on capital flight have oriented towards a plethora of fronts. Mpenya et al. (2016) have focused on the relationship between resources and the flight of capital in the Republic of Cameroon while another group of authors have been concerned with the nexus between fiscal policy and the flight of capital (Mpenya et al., 2016). Ndiaye and Siri (2016) focus on the relationship between capital flight and tax revenue in Burkina Faso, capital flight drivers within the remit of Ethiopia have been studied by Geda and Yimer (2016) while Ramiandrisoa and Rakotomanana (2016) have positioned another study on determinants of capital flight in Madagascar. Kwaramba et al. (2016) investigate the linkage between the flight of capital and misinvoicing of trade in Zimbabwe, Moulemvo, (2016) assess the nexus between the flight of capital and public social pending in the Congo Republic while Ndikumana (2016) examine case study lessons on the causes of capital flight as well as the corresponding consequences of the phenomenon. More recently,

Asongu and Nnanna (2020) have examined the relationship between governance and the capital flight trap.

On the other hand, with regard to African-oriented studies, Straus (2012) has been concerned with geopolitical variations, Barros et al. (2008) focus on poverty and the lack of freedoms within political and economic spheres, Akcinaroglu and Radziszewski (2013) look at how competing military companies engage to facilitate the end of conflict, Price and Elu (2016) assess the connection between global warming and terrorism, Ewi and Aning (2006) engage an exploratory study on the fundamental role of the African Union in fighting terrorism while Asongu et al. (2019) focus on how terrorism leads to the persistence of capital flight in the continent.

The premise of this empirical study is also on the awareness of some risks involved when doing a study that is not founded on an established theoretical underpinning. Hence, the present study is an inductive research because it follows the attendant literature in arguing that applied econometrics is relevant in theory-building (Costantini & Lupi, 2005; Narayan et al., 2011).Such intuitions have been employed in recent capital flight (Asongu, 2014a) and terrorism (Asongu & Nwachukwu, 2018) literature.

The rest of the study is structured as follows. The intuition for the linkages between terrorism, capital flight and industrialisation is provided in Section 2, the data and methodology are engaged in Section 3, while Section 4 presents the empirical results and discussion. Section 5 concludes with implications and future research directions.

2. Intuition for the linkages between terrorism, capital flight and industrialisation

This section is discussed in three main strands, notably: (i) clarification of the concepts of terrorism, capital flight and industrialisation as used in the study; (ii) a discussion on the relationship between terrorism and capital flight and (iii) insights into the nexuses between instability from terrorism, capital flight and industrialisation. These underlying strands are substantiated following the same order as highlighted.

In the first strand on conceptual clarifications, borrowing from recent literature (Naude et al., 2013: Asongu & Odhiambo, 2019; Efobi et al., 2019), while capital flight is defined as unrecorded cash flows from transactions between a specific country and the rest of the world, industrialisation can be understood as a process of socio-economic transformation that is characterised by a rapid evolving manufacturing sector with regard to a multitude of possibilities of production or work that is performed in a country. The

attendant definition is founded on insights from the United Nations Conference on Trade and Development (UNCTAD) because it engenders manufacturing sector added value in a scenario in which the entire economic size is considered. As recently maintained by Gui-Diby and Renard (2015), in a scenario where the development state of the manufacturing sector is relatively high in relation to other economic sub-sectors, there is likely to be a fast industrialisation rate in the country. Moreover, as recently documented by Asongu and Odhiambo (2019), two aspects are relevant in comprehending and boosting the process of industrialisation, namely: (i) the capacity of governments to provide productive incentives to the manufacturing sector and (ii) the likelihood of the production sector to be sustainable in view of meeting requirements at local and international spheres.

Terrorism according to recent terrorism literature (Efobi & Asongu, 2016) denotes the employment of violence by groups and/or individuals to fight non-combatants in view of boosting socio-political goals as well as intimidating a larger targeted audience that is outside the remit of those victims that are immediately affected (Bandyopadhyay et al, 2014).

Regarding the second strand on the linkage between terrorism and capital flight, according to Efobi and Asongu (2016), contrary to a scenario involving political instability, terrorism entails targeting of civilians to constrain a government to concede to some socio-political demands. Given that the prevalence of terrorist actions is not deterministic and hence, difficult to predict, risks and costs of retaining capital in the domestic economy are involved. In a plethora of instances, fundamental and/or strategic economic locations are targeted by terrorists and in scenarios that the governments cannot implement stringent and robust anti-terrorism policies; their domestic economies would experience high capital outflows in the light of the high rate of capital insecurity and/or uncertainty. Accordingly, terrorism can impact movements of capital in the light of attendant literature on the nexuses between, instability, terrorism and negative investment flows (Collier et al, 2001; Ndikumana & Boyce, 2011; Henry, 2012; Bandyopadhyay & Younas, 2014; Ndikumana et al., 2015; Bandyopadhyay et al., 2014, 2015; Asongu & Nnanna, 2020).

In the third strand pertaining to linkages between instability, capital flight and industrialisation, the instability of the politico-economic environment influences loss and/or damages of assets owing to capital flight (Collier et al., 2004; Davies, 2008; Ndikumana et al., 2015; Asongu & Nwachukwu, 2017; Asongu & Odhiambo, 2019). In essence, an environment that is characterised by terrorism is likely to be linked to higher investment

risks and by extension, more capital flight. Accordingly, investments are likely to be transferred from the country affected by terrorism to other nations that are not or less affected by terrorism. Hence, such transfers of capital needed for investment purposes unfavourably affect industrialisation in the countries affected by terrorism and ceteris paribus, favourably influence industrialisation in the countries to which such capital flows are transferred for similar and/or alternative investment purposes (Lensink *et al*., 2000; Le & Zak, 2006; Efobi et al., 2015).

3. Data and methodology

3.1 Data

The inquiry assesses a panel of 36 countries in Africa using data from 1996 to 2010[1]. The three principal sources of data are: (i) Boyce and Ndikumana (2012) for the capital flight measurement; (ii) terrorism incidents from Enders et al. (2011) and Gailbulloev et al. (2012) and (iii) other macroeconomic variables from African Development Indicators of the World Bank. Restrictions to selected countries and sampled periodicity are constrained by issues of data availability.

In accordance with recent literature, industrialisation which is the dependent variable measures the added value in manufacturing in constant prices as a percentage of GDP (see Efobi et al., 2019). This measurement of industrialisation is consistent with the International Standard Industrial Classification (Section D). The variable proxy's for units of manufacturing that are categorized in relation to the principal mission that entails activities which are done manually (encompassing work in the household), factor-related and power-oriented machinery (United Nations, 1990). Moreover, such an industrialisation indicator has been adopted in recent literature, notably, Kang and Lee (2011), UNIDO(2013), Gui-Diby and Renard, (2015) and Shobande and Shodipe (2019).

Following recent literature (Naude et al., 2013; Efobi et al., 2019), the process of industrialisation entails a socio-economic framework of fast transformation in the manufacturing sector with respect to a multitude of production opportunities and activities operating in an economy. With the whole economic size taken into consideration,

[1]The thirty-six countries are: Algeria, Angola, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Congo Democratic Republic, Congo Republic, Côte d'Ivoire, Egypt, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mauritania, Morocco, Mozambique, Nigeria, Rwanda, Sao Tome & Principe, Seychelles, Sierra Leone, Sudan, Swaziland, Tanzania, Tunisia, Uganda, Zambia and Zimbabwe.

industrialisation embodies that added value of the manufacturing sector. As argued by Gui-Diby and Renard (2015), the industrialisation rate of a country is a positive function of the comparatively higher rate of development in the manufacturing sector, relative to other economic sectors. In the light of these clarifications, two insights are worth emphasising for the enhancement of the process of industrialisation, notably: (i) the availability of production incentives in the manufacturing sector and (ii) the sustainability of the corresponding sector of production as far as international and local needs are concerned.

Capital flight is measured as unrecorded capital flows between a nation and the rest of the world (see Weeks, 2015; Efobi & Asongu, 2016). The process of measuring these flows begin from inflows related to foreign exchanges that are considered in the Balance of Payments of a country and the amount of missing currency is appreciated in terms of 'net errors and omissions. The corresponding missing currency is also acknowledged as the difference between recorded inflows and recorded outflows.

The principal shortcoming of this indicator is it cannot be directly compared with other indicators adopted in the study, since the capital flight indicator is defined in terms of constant 2010 US Dollars. We borrow from Asongu (2014a) in tackling the issue in three steps. (i) The GDP is first transformed into constant 2010 terms. (ii) The corresponding value is divided by 1 000 000 to obtain 'GDP constant of 2010 USD (in millions)'. (iii) Capital flight is lastly divided by the 'GDP constant of 2010 USD (in millions)'.After the computations, a capital flight indicator that is comparable with other indicators is obtained (see Appendix 2).

Four terrorism indicators are adopted, namely: domestic terrorism, transnational terrorism, unclear terrorism, and total terrorism. Consistent with Ender and Sandler (2006), terrorism is defined as the actual and threatened use of force by sub-national actors to secure political objectives by means of intimidation. It is measured as the number of yearly incidents of terrorism registered in a country. To avoid mathematical issues that are linked to the (i) log-transformation of zeros and (ii) correction of the positive skew in the data, we are in accordance with recent literature (Asongu & Nwachukwu, 2016a; Choi & Salehyan, 2013; Asongu & Kodila-Tedika, 2017) in taking the natural logarithm of terrorism incidents by adding one to the base.

Terrorism-specific definitions are from Efobi et al. (2015, p. 6). Domestic terrorism "*includes all incidences of terrorist activities that involve 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 concern 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 terrorisms.

To account for bias in omitted variables, five control variables are adopted, namely: domestic credit to the private sector, financial allocation efficiency, population growth, domestic investment or gross fixed capital formation and trade openness. Whereas from an intuitive perspective, positive nexuses should be expected between the adopted control variables and industrialisation, the effects are contingent on market dynamism on the one hand and effective allocation of resources on the other hand. For example the substantially documented issues of surplus liquidity in African financial institutions (see Saxegaard, 2006; Asongu, 2014b) is an indication that the financial allocation efficiency indicator may negatively affect industrialisation. This is essentially because not much mobilised resources that promote industrialisation are transformed into credit for investment purposes.

Furthermore, if a huge proportion of public investment (contained in domestic investment)is siphoned by corrupt officials, the expected incidence on industrialisation may not be appealing or positive. Moreover, if a great share of the portion of public investment that actually gets invested into an economy is invested in some socio-economic sectors (e.g. education and health) that are not directly connected to the process of industrialisation; a positive outcome on industrialisation may not also be expected. It is also relevant to bear in mind that, population growth may not positively affect the industrialisation process if the underlying population growth is associated with export-substitution, owing to incremental demands for foreign commodities from the corresponding population. Appendix 1 provides the definitions of the variables whereas Appendix 2 and Appendix 3 respectively disclose the summary statistics and correlation matrix.

3.2 Methodology

3.2.1 GMM Specification

There are five main factors that motivate the use of a Generalised Method of Moments (GMM) as estimation approach (Tchamyou, 2019, 2020; Vu & Asongu, 2020). The first-two are basic conditions for the employment of the technique whereas the last-three are

advantages related to the empirical approach. First, the N>T condition is met because the number of cross-sections (36) is higher than the number of time series (15) in each cross section. Second, industrialisation is established to be persistent because the correlation between industrialisation and its first lag is 0.961, which is higher than the rule of thumb threshold of 0.800 needed to ascertain persistence in an outcome variable (Tchamyou et al., 2019a). Third, endogeneity is considered in the estimation approach because: (i) the instrumentation process accounts for simultaneity in the regressors and (ii) there is also control for the unobserved by means of time invariant omitted variables. Fourth, apparent small sample biases that are associated with the difference GMM approach are corrected with the system GMM strategy. Fifth, owing to the panel-related empirical approach, cross-country variations are factored-in. The present study adopts the Roodman (2009a, 2009b) extension of Arellano and Bover (1995) which is premised on employing forward orthogonal variations as opposed to differences. This alternative approach has the advantage of limiting over-identification and restricting the proliferation of instruments (Tchamyou & Asongu, 2017; Asongu & Biekpe, 2018). Given that the *one-step* approach is based on homoscedasticity, this study adopts the *two-step* method instead because it is robust or controls for heteroscedasticity (Tchamyou et al., 2019b).

Equation (1) and Equation (2) below summarize the standard GMM estimation procedure, in which capital flight is one lag non-contemporary.

$$Ind_{i,t} = \sigma_0 + \sigma_1 Ind_{i,t-\tau} + \sigma_2 Cap_{i,t-\tau} + \sigma_3 Ter_{i,t} + \sigma_4 CapTer_{i,t} + \sum_{h=1}^{5} \delta_h W_{h,i,t-\tau} + \eta_i + \xi_t + \varepsilon_{i,t} \quad (1)$$

$$\begin{aligned} Ind_{i,t} - Ind_{i,t-\tau} = {} & \sigma_1 (Ind_{i,t-\tau} - Ind_{i,t-2\tau}) + \sigma_2 (Cap_{i,t-\tau} - Cap_{i,t-2\tau}) + \sigma_3 (Ter_{i,t} - Ter_{i,t-\tau}) \\ & + \sigma_4 (CapTer_{i,t} - CapTer_{i,t-\tau}) + \sum_{h=1}^{5} \delta_h (W_{h,i,t-\tau} - W_{h,i,t-2\tau}) + (\xi_t - \xi_{t-\tau}) + (\varepsilon_{i,t} - \varepsilon_{i,t-\tau}) \end{aligned}, \quad (2)$$

where, $Ind_{i,t}$ is industrialisation of country i at period t; $Ind_{i,t-\tau}$ is industrialisation of country i in period $t-\tau$; $Cap_{i,t-\tau}$ is capital flight of country i at period $t-\tau$; $Ter_{i,t}$ is terrorism (domestic, transnational, unclear and total terrorism) of country i in period t; σ_0 is a constant; τ represents the coefficient of auto-regression; W is the vector of control variables (*domestic investment, trade openness, population, domestic credit and bank efficiency*), η_i is the country-specific effect, ξ_t is the time-specific constant and $\varepsilon_{i,t}$ the error term.

3.2.2 Identification, simultaneity and exclusion restrictions

Clarifying identification, simultaneity and exclusion restrictions is worthwhile for a good GMM specification. First, within the framework of identification, all explanatory variables are considered as suspected endogenous or predetermined variables and only time invariant indicators are acknowledged to reflect strict exogeneity. Dewan and Ramaprasad (2014) and Asongu and Nwachukwu (2016b) have adopted a similar identification approach. Moreover, the identification strategy is founded on the idea that it is not very likely for time-invariant variables of exhibit endogeneity after first difference (see Roodman, 2009b)[2].

Second, with regard to simultaneity, lagged regressors are employed as instruments for forward differenced variables. Therefore, Helmet transformations are employed for the regressors in order to remove fixed effects that are likely to affect the assessed nexuses (Asongu, 2020). The engaged transformation entails the use of forward mean-differencing of the indicators, which is contrary to the use of a process in which past observations are subtracted from future observations (see Roodman, 2009b, p. 104). These transformations permit orthogonal or parallel conditions between forward differenced variables and lagged values. Irrespective of the number of lags, data loss is avoided by computing the underlying transformations for all observations with the exception of the last observation in cross sections: "*And because lagged observations do not enter the formula, they are valid as instruments*" (Roodman, 2009b, p. 104).

Third, on the dimension of exclusion restrictions, the chosen time invariant indicators are acknowledged to be strictly exogenous by affecting the dependent variable exclusively via the suspected or predetermined variables. Moreover, the econometrics relevance of the underlying exclusion restriction is assessed with the Difference in Hansen Test (DHT) for the validity of the time invariant omitted variables. In essence, in order for the time invariant variables to explain the outcome variable exclusively through the suspected endogenous variables, the null hypothesis of the test should not be rejected[3]. With the current GMM setting, the information criterion used to investigate whether variables that are time-invariant reflect strict exogeneity is the DHT**.** Hence**,** in the light of the above clarification, in reporting

[2]Hence, the approach for treating *ivstyle* (years) is 'iv(years, eq(diff))' while the *gmmstyle* is used for suspected endogenous variables.

[3]It is important to take note of the fact that in a standard Instrumental Variable (IV) approach, failure to reject the null hypothesis of the Sargan Overidentifying Restrictions (OIR) test implies that the instruments do not elucidate the outcome variable beyond predetermined variables (see Beck et al., 2003; Asongu & Nwachukwu, 2016c).

findings in the next section, the assumption on exclusion restriction is valid when the null hypothesis linked to the DHT related with IV(year, eq(diff)) is not rejected.

3.2.3 Extended analysis with Quantile regressions

The GMM estimation approach above is based on mean values of the outcome variable. Unfortunately, as motivated in the introduction, the investigated relationship based on mean values of the dependent variable results in blanked policies, which may not be effective unless they are contingent on initial levels of the dependent variable. In order to address this shortcoming, the empirical investigation is extended with Quantile regressions (QR). The QR enables the assessement of estimated linkages throughout the conditional distribution of industrialisation (see Keonker & Hallock, 2001; Billger & Goel, 2009).

It is important to note that, while mean effects are important, some approaches like Ordinary Least Squares (OLS) assumethat the outcome variable and error terms are normally distibuted. The QR is not based on such a hypothesis of normally distributed error terms. Hence, the estimation approache enables this study to examine the incidences of terrorism and capital flight with specific emphasis on nations with low, intermediate and high levels of industrialisation. In essence, with the QR strategy, estimated parameters are derived at various points of the conditional distribution of industrialisation (Keonker & Hallock, 2001). QR is growingly being used in the economic development literature (Billger & Goel, 2009; Okada & Samreth, 2012; Asongu, 2013).

The θ^{th} quantile estimator focusing on industrialisation is resolved by engaging an optimization problem that is disclosed in the absence of subscripts in Equation (3) in order to enhance presentation and simplicity.

$$\min_{\beta \in R^k} \left[\sum_{i \in \{i: y_i \geq x_{i'}\beta\}} \theta \left| y_i - x_{i'}\beta \right| + \sum_{i \in \{i: y_i < x_{i'}\beta\}} (1-\theta) \left| y_i - x_{i'}\beta \right| \right], \qquad (3)$$

where $\theta \in (0,1)$.Contrary to OLS which is fundamentally premised on reducing the sum of squared residuals, the QR technique consists of minimising the weighted sum of absolute deviations. As cases in point, the 10$^{\text{th}}$ or 90$^{\text{th}}$ quantiles (with, respectively, θ=0.10 or 0.90) are obtained by approximately weighing the residuals. Hence, the conditional quantile of industrialisation or y_i given x_i is:

$$Q_y(\theta / x_i) = x_{i'}\beta_\theta, \qquad (4)$$

where specific parameters of slope are estimated for each θ^{th} specific quantile. This formulation is analogous to $E(y/x) = x_{i'}\beta$ in the corresponding OLS slope in which parameters are assessed exclusively at the average of the conditional distribution of industrialisation. Looking at Equation (4) for instance, the outcome variable y_i is the variable of industrialisation while x_i contains a constant term**,** *domestic investment, trade openness, population, domestic credit* and *bank efficiency***.**

4. Presentation of results

Table 1 and Table 2 respectively present the findings corresponding to the GMM and QR approaches. Four main criteria are employed to assess the validity of the GMM model based forward orthogonal deviations[4]. Based on the criterion, all the estimated models are valid. From the findings, the intuition that capital flight interacts with terrorism to negatively affect industrialisation is confirmed in 'domestic terrorism'- and 'total terrorism'-oriented regressions. Most of the significant control variables have the expected signs.

Four main specification sets are provided in Table 2. The first consists of transnational and domestic modelling disclosed in Panel A while the second represents estimations focusing on total and unclear terrorism dynamics in Panel B. In other words, the left-hand side of Panel A shows findings related to domestic terrorism while the left-hand side of Panel B reveals corresponding results focusing unclear terrorism. In the same vein, the right-hand side of Panel A shows findings for transnational terrorism while the corresponding Panel B reveals findings for total terrorism. For both tables, it is consistently apparent that signs of the QR estimates vary with respect of significance and signs. The consistent variations in signs further validate the relevance of choosing the QR strategy.

In Table 2, the negative effect on industrialisation from the interaction between capital flight and terrorism established in the GMM results is confirmed from 'domestic terrorism'-, 'unclear terrorism'- and 'total terrorism'-oriented regressions, exclusively in the 25th and 50th quantiles. It follows from the findings that the negative effect from the

[4]"*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 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).

underlying interaction established in the GMM results is driven by the bottom quantile of the industrialisation distribution. Most of the significant control variables have the expected signs.

Table 1: GMM regressions

	Dependent variable: Industrialisation							
	Domestic Terrorism		Transnational Terrorism		Unclear Terrorism		Total Terrorism	
Industrialisation(-1)	**0.784*** (0.000)**	**0.773*** (0.000)**	**0.748*** (0.000)**	**0.758*** (0.000)**	**0.740*** (0.000)**	**0.709*** (0.000)**	**0.748*** (0.000)**	**0.766*** (0.000)**
Constant	1.592 (0.517)	**3.063* (0.063)**	**4.823* (0.093)**	**5.218*** (0.002)**	3.453 (0.272)	2.290 (0.153)	3.372 (0.299)	**5.129** (0.012)**
Domestic Terrorism (Domter)	**0.243*** (0.008)**	**0.358*** (0.000)**	---	---	---	---	---	---
Transnational Terrorism (Transter)	---	---	-0.102 (0.551)	0.105 (0.220)	---	---	---	---
Unclear Terrorism (Unter)	---	---	---	---	**-0.191* (0.052)**	**-0.364** (0.041)**	---	---
Total Terrorism (Totter)	---	---	---	---	---	---	**0.198* (0.080)**	**0.379*** (0.000)**
Capital Flight (-1)(CapFlight)	-0.023 (0.920)	-0.181 (0.187)	-0.252 (0.323)	**-0.332** (0.041)**	-0.136 (0.601)	0.057 (0.754)	-0.167 (0.541)	**-0.390** (0.039)**
Domter ×CapFlight	**-0.017** (0.027)**	**-0.018*** (0.000)**	---	---	---	---	---	---
Transter×CapFlight	---	---	-0.010 (0.357)	-0.001 (0.869)	---	---	---	---
Unter×CapFlight	---	---	---	---	0.018 (0.189)	-0.002 (0.881)	---	---
Totter×CapFlight	---	---	---	---	---	---	-0.015 (0.106)	**-0.017*** (0.005)**
Trade	**0.027* (0.086)**	**0.032*** (0.001)**	**0.019 (0.236)**	**0.028*** (0.001)**	**0.028** (0.015)**	**0.026*** (0.004)**	**0.027* (0.098)**	**0.032*** (0.002)**
Domestic Investment	**-0.041** (0.018)**	**-0.029*** (0.004)**	**-0.032* (0.068)**	**-0.024** (0.020)**	**-0.046** (0.011)**	**-0.017** (0.045)**	**-0.035*** (0.009)**	-0.019 (0.111)
Population	---	-0.007 (0.134)	---	-0.009 (0.171)	---	**-0.015** (0.026)**	---	-0.006 (0.221)
Bank Efficiency	---	**-0.014*** (0.000)**	---	**-0.019*** (0.000)**	---	**-0.022*** (0.000)**	---	**-0.017*** (0.000)**
Private credit	---	**0.037*** (0.000)**	---	**0.043*** (0.000)**	---	**0.041*** (0.000)**	---	**0.034*** (0.000)**
AR(1)	**(0.239)**	(0.037)	**(0.242)**	(0.033)	**(0.233)**	(0.025)	**(0.246)**	(0.030)
AR(2)	**(0.351)**	**(0.269)**	**(0.365)**	**(0.320)**	**(0.357)**	**(0.193)**	**(0.359)**	**(0.412)**
Sargan OIR	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)
Hansen OIR	**(0.636)**	**(0.961)**	**(0.857)**	**(0.781)**	**(0.779)**	**(0.938)**	**(0.830)**	**(0.921)**
DHT for instruments								
(a)Instruments in levels								
H excluding group	**(0.304)**	**(0.674)**	**(0.390)**	**(0.878)**	**(0.812)**	**(0.949)**	**(0.325)**	**(0.662)**
Dif(null, H=exogenous)	**(0.759)**	**(0.960)**	**(0.933)**	**(0.555)**	**(0.602)**	**(0.775)**	**(0.938)**	**(0.907)**
(b) IV (years, eq(diff))								
H excluding group	**(0.663)**	**(0.537)**	**(0.721)**	**(0.589)**	**(0.830)**	**(0.428)**	**(0.815)**	**(0.501)**
Dif(null, H=exogenous)	**(0.439)**	**(1.000)**	**(0.792)**	**(0.890)**	**(0.463)**	**(1.000)**	**(0.589)**	**(1.000)**
Fisher	**64.77***	**1039.23***	**93.67***	**328.08***	**51.89***	**688.42***	**48.86***	**548.40***
Instruments	29	41	29	41	29	41	29	41
Countries	35	35	35	35	35	35	35	35
Observations	405	385	405	385	405	385	405	385

*,**,***: significance levels of 10%, 5% and 1% 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 Fisher 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.

Table 2: Quantile regressions

	Dependent Variable: Industrialisation											
	Panel A: Domestic Terrorism and Transnational Terrorism											
	Domestic Terrorism (Domter)						**Transnational Terrorism (Tranter)**					
	OLS	**Q.10**	**Q.25**	**Q.50**	**Q.75**	**Q.90**	**OLS**	**Q.10**	**Q.25**	**Q.50**	**Q.75**	**Q.90**
Constant	0.036	0.240	-1.072	1.847	-6.227	-1.398	-0.518	1.346	1.063	-1.348	-7.772	-3.043
	(0.993)	(0.952)	(0.741)	(0.478)	(0.144)	(0.746)	(0.903)	(0.734)	(0.787)	(0.564)	(0.146)	(0.700)
Domestic Terrorism (Domter)	0.082	0.108	**0.510***	-0.120	0.327	-0.257	--	---	---	---	---	---
	(0.846)	(0.738)	**(0.092)**	(0.638)	(0.496)	(0.617)						
Transnational Terrorism (Tranter)	---	---	---	---	---	---	**-1.00***	-0.098	-0.507	**-1.163*****	-0.950	-0.620
							(0.061)	(0.843)	(0.365)	**(0.001)**	(0.256)	(0.545)
Capital Flight (-1)(CapFlight)	**1.306*****	**0.904****	**1.715*****	**1.548*****	**2.302*****	**1.658*****	**1.338*****	**0.835****	**1.372*****	**1.732*****	**2.422*****	**1.909****
	(0.002)	**(0.011)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.001)**	**(0.001)**	**(0.021)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.020)**
Domter × CapFlight	-0.050	-0.027	**-0.112*****	**-0.060****	-0.046	**0.092***	---	---	---	---	---	---
	(0.225)	(0.414)	**(0.000)**	**(0.017)**	(0.304)	**(0.097)**						
Transter× CapFlight	---	---	---	---	---	---	-0.030	-0.042	-0.084	-0.013	0.077	0.123
							(0.586)	(0.471)	(0.120)	(0.683)	(0.313)	(0.157)
Trade	**0.058*****	**-0.028*****	**-0.011***	**0.017*****	**0.051*****	**0.179*****	**0.059*****	**-0.035*****	-0.008	**0.013*****	**0.058*****	**0.180*****
	(0.000)	**(0.000)**	**(0.091)**	**(0.005)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	(0.292)	**(0.000)**	**(0.000)**	**(0.000)**
Domestic Investment	**-0.337*****	**-0.144*****	**-0.379*****	**-0.354*****	**-0.278*****	**-0.522*****	**-0.337*****	**-0.129*****	**-0.355*****	**-0.367*****	**-0.312*****	**-0.477*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Population	**-0.066*****	**-0.041*****	**-0.063*****	**-0.067*****	**-0.101*****	**-0.120*****	**-0.059*****	**-0.039*****	**-0.050*****	**-0.054*****	**-0.094*****	**-0.121*****
	(0.000)	**(0.004)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.007)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Bank Efficiency	**0.028****	**0.023****	-0.001	-0.010	0.005	**0.077*****	**0.031****	**0.019***	0.0003	-0.0008	0.011	**0.046****
	(0.028)	**(0.038)**	(0.861)	(0.171)	(0.681)	**(0.000)**	**(0.016)**	**(0.067)**	(0.972)	(0.896)	(0.458)	**(0.018)**
Private credit	**0.117*****	**0.082*****	**0.176*****	**0.167*****	**0.154*****	**0.095*****	**0.111*****	**0.083*****	**0.181*****	**0.152*****	**0.147*****	**0.108*****
	(0.000)	**(0.002)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.001)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.004)**
Pseudo R^2/R^2	0.284	0.141	0.207	0.242	0.202	0.238	0.287	0.140	0.202	0.241	0.202	0.233
Fisher	**27.51*****						**26.33*****					
Observations	386	386	386	386	386	386	386	386	386	386	386	386

	Panel B: Unclear Terrorism and Total Terrorism											
	Unclear Terrorism (Unter)						Total Terrorism (Totter)					
	OLS	Q.10	Q.25	Q.50	Q.75	Q.90	OLS	Q.10	Q.25	Q.50	Q.75	Q.90
Constant	-0.343	-0.579	-1.432	0.210	-6.973	-6.488	-0.121	0.568	0.074	1.400	-6.921	-2.589
	(0.933)	(0.890)	(0.635)	(0.941)	(0.122)	(0.297)	(0.977)	(0.883)	(0.984)	(0.596)	(0.118)	(0.621)
Unclear Terrorism (Unter)	-1.517	0.064	-0.680	-1.029	-0.998	-1.769	---	---	---	---	---	---
	(0.109)	(0.940)	(0.309)	(0.115)	(0.285)	(0.291)						
Total Terrorism (Totter)	---	---	---	---	---	---	-0.140	0.258	0.403	-0.143	0.316	-0.521
							(0.758)	(0.424)	(0.295)	(0.606)	(0.566)	(0.386)
Capital Flight (-1)(CapFlight)	**1.343*****	**0.958****	**1.772*****	**1.700*****	**2.358*****	**2.061*****	**1.335*****	**0.905****	**1.576*****	**1.709*****	**2.347*****	**1.683*****
	(0.001)	**(0.015)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.002)**	**(0.001)**	**(0.010)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.004)**
Unter × CapFlight	-0.040	-0.063	**-0.151*****	**-0.140*****	-0.054	0.032	---	---	---	---	---	---
	(0.523)	(0.371)	**(0.002)**	**(0.005)**	(0.470)	(0.795)						
Totter× CapFlight	---	---	---	---	---	---	-0.041	-0.036	**-0.112*****	**-0.063****	-0.052	**0.108***
							(0.356)	(0.298)	**(0.003)**	**(0.018)**	(0.313)	**(0.084)**
Trade	**0.058*****	**-0.029*****	**-0.019*****	**0.019*****	**0.062*****	**0.172*****	**0.057*****	**-0.032*****	**-0.017****	**0.015****	**0.058*****	**0.180*****
	(0.000)	**(0.001)**	**(0.003)**	**(0.003)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.027)**	**(0.014)**	**(0.000)**	**(0.000)**
Domestic Investment	**-0.340*****	**-0.159*****	**-0.367*****	**-0.140*****	**-0.300*****	**-0.440*****	**-0.337*****	**-0.143*****	**-0.351*****	**-0.375*****	**-0.290*****	**-0.481*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.005)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Population	**-0.064*****	**-0.044*****	**-0.060*****	**-0.062*****	**-0.093*****	**-0.120*****	**-0.063*****	**-0.043*****	**-0.057*****	**-0.069*****	**-0.096*****	**-0.118*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.002)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Bank Efficiency	**0.027****	**0.025****	-0.002	-0.008	0.003	**0.082*****	**0.027****	**0.023****	-0.001	**-0.017****	0.007	**0.069*****
	(0.028)	**(0.022)**	(0.792)	(0.282)	(0.802)	**(0.000)**	**(0.028)**	**(0.039)**	(0.924)	**(0.020)**	(0.560)	**(0.000)**
Private credit	**0.116*****	**0.108*****	**0.183*****	**0.166*****	**0.151*****	**0.086****	**0.114*****	**0.082*****	**0.178*****	**0.173*****	**0.146*****	**0.106*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.017)**	**(0.000)**	**(0.001)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Pseudo R^2/R^2	0.289	0.141	0.212	0.248	0.208	0.232	0.285	0.142	0.211	0.244	0.202	0.236
Fisher	**26.92*****						**28.09*****					
Observations	386	386	386	386	386	386	386	386	386	386	386	386

*,**,***: significance levels of 10%, 5% and 1% respectively. OLS: Ordinary Least Squares. R^2 for OLS and Pseudo R^2 for quantile regression. Lower quantiles (e.g., Q 0.1) signify nations where industrialisationis least.

5. Concluding implications and future research directions

This study has examined how the association between terrorism and capital flight affects the process of industrialisation in 36 African countries for the period 1996-2010. The empirical evidence is based on Generalised Method of Moments (GMM) and Quantile Regressions (QR). GMM-oriented findings revealed capital flight interacts with terrorism to negatively affect industrialisation in 'domestic terrorism'- and 'total terrorism'-oriented regressions. When the association is examined throughout the conditional distribution of industrialisation using the QR approach, the GMM results are confirmed from 'domestic terrorism'-, 'unclear terrorism'- and 'total terrorism'-oriented regressions, exclusively in the 25^{th} and 50^{th}quantiles. It follows that the negative effect from the investigated interaction is driven by bottom quantiles of the industrialisation distribution.

In the light of above findings, countries with below-median levels of industrialisation are more likely to experience negative consequences of the interaction between capital flight and terrorism compared to their counterparts with above-median levels of industrialisation. This leads us to conclude that the negative consequences of terrorism and capital flight on industrialisation is a decreasing function of industrialisation. This broadly confirms findings of Gaibulloev and Sandler (2009) that the negative impact of terrorism on macroeconomic indicators is more pronounced in less developed countries, relative to their more developed counterparts. This is essentially because less developed countries do not have the logistical, technological and financial resources with which to hedge the attendant economic shock without substantial unfavourable externalities. These findings justify the need for more industrialised countries to help less industrialised nations with development assistance in the fight against terrorism, capital flight and their corresponding negative development externalities. This study can be extended by assessing if the established findings withstand empirical scrutiny within the context of other macroeconomic indicators.

Appendices

Appendix 1: Definitions of Variables

Variables	Signs	Definitions of variables (Measurement)	Sources
Industrialisation	Industria	Manufacturing (ISICD)	World Bank (WDI)
Capital flight	Capf.	Ln of Capital Flight (constant of 2010)	Ndikumana& Boyce (2012a)
Domestic Terrorism	Domter	Number of Domestic terrorism incidents (in Ln)	Enders et al. (2011).
Transnational Terrorism	Tranter	Number of Transnational terrorism incidents (in Ln)	Enders et al. (2011).
Unclear Terrorism	Unter	Number of Unclear terrorism incidents (in Ln)	Enders et al. (2011).
Total Terrorism	Totter	Number of Total terrorism incidents (in Ln)	Enders et al. (2011).
Bank Efficiency	BcBd	Bank credit to bank deposits (%)	World Bank (WDI)
Domestic Credit	Domcred	Domestic credit to private sector (% of GDP)	World Bank (WDI)
Trade	Trade	Exports and Imports of goods and services (% of GDP)	World Bank (WDI)
Domestic Investment	GFCF	Gross fixed capital formation (including Acquisitions less disposals of valuables) (% of GDP)	World Bank (WDI)
Population	Pop	Population (in millions)	World Bank (WDI)

WDI: World Bank Development Indicators.PCA: Principal Component Analysis.

Appendix 2: Summary statistics (1996-2010)

	Mean	SD	Minimum	Maximum	Observations
Industrialisation	11.355	6.699	2.207	36.858	528
Capital flight	9.934	0.784	6.816	12.333	417
Domestic Terrorism	0.441	0.863	0.000	4.488	540
Transnational Terrorism	0.243	0.539	0.000	3.332	540
Unclear Terrorism	0.106	0.399	0.000	4.488	540
Total Terrorism	0.594	0.989	0.000	4.844	540
Bank Efficiency	67.069	28.572	13.753	164.618	517
Domestic Credit	16.596	15.036	0.198	103.632	511
Trade Openness	69.974	39.783	0.000	225.043	540
Gross Fixed Capital Formation	21.031	9.398	2.000	63.698	528
Population	20.97	26.681	0.077	159.424	540

S.D: Standard Deviation.

Appendix 3: Correlation matrix (uniform sample size: 369)

Control variables					Terrorism variables						
Pop	GFCF	Trade	Domcred	BcBd	Domter	Tranter	Unter	Totter	Capfl.	Industria	
1.000	-0.096	-0.320	-0.441	-0.107	0.104	0.170	0.022	0.114	0.121	-0.245	Pop
	1.000	0.287	0.169	-0.169	-0.139	-0.210	-0.116	-0.186	-0.016	-0.105	GFCF
		1.000	0.004	-0.107	-0.169	-0.111	-0.091	-0.174	-0.102	0.236	Trade
			1.000	0.393	-0.114	-0.095	-0.063	-0.123	0.042	0.242	Domcred
				1.000	-0.154	-0.023	-0.120	-0.144	-0.145	0.242	BcBd
					1.000	0.525	0.340	0.913	0.181	-0.155	Domter
						1.000	0.491	0.756	0.251	-0.189	Tranter
							1.000	0.561	0.183	-0.146	Unter
								1.000	0.249	-0.189	Totter
									1.000	-0.057	Capfl.
										1.000	Industria

Pop: Population. GFCF: Gross Fixed Capital Formation. Domcred: Domestic credit to the private sector. BcBd: Bank Credit to Bank Deposits.Domter: Domestic Terrorism. Tranter: Transnational Terrorism. Unter: Unclear Terrorism. Totter: Total Terrorism. Capfl: Capital Flight. Industria: Industralisation.

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