Fuel Exports, Aid and Terrorism

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Abstract

This study employs interactive quantile regressions to assess the conditional role of foreign aid in reducing the potentially negative effect of terrorism on fuel exports in 78 developing countries for the period 1984-2008. Bilateral and multilateral aid indicators are used whereas terrorism includes: domestic, transnational, unclear and total terrorism dynamics. Interactive quantile regressions are used. The following findings are established. *First*, the effects of terrorism are both positive and negative across quantiles and specifications, with the impact most apparent in the highest and lowest quantiles. *Second*, while bilateral aid consistently decreases (increases) fuel exports at the top (bottom) quantiles, multilateral aid regularly decreases fuel exports in the top quantiles. *Third*, for negative thresholds in the 50th quartile and 90th decile, interaction effects between bilateral aid and terrorism dynamics are overwhelmingly not significant. Conversely, for transnational terrorism, the interaction effects between multilateral aid and terrorism dynamics significantly have negative thresholds. The hypothesis of a positive threshold is only confirmed for transnational terrorism and multilateral aid at the 90th decile. Justifications for unexpected signs and implications for fuel export policy and the management of multinational companies are discussed. This study contributes to the literature on the role of external flows in reducing the negative externalities of terrorism on development outcomes.

JEL Classification: F40; F23; F35;Q34 ; O40
Keywords: Exports; Foreign Aid; Terrorism; Natural Resources; Development

1. Introduction

Over the past decades, terrorism and conflicts have substantially affected petrodollar or government revenues in oil-exporting countries. Some notable examples include: Nigeria's oil Delta region with sabotage activities from the Movement for the Emancipation of the Niger Delta (Obi, 2010; Onuoba, 2010; Akpan et al., 2013; Taylor, 2014); recent Al-Qaeda attacks in In Amenas fuel installations of Algeria (Onyeji et al., 2014); massive disruption of Libyan oil production in the post-Gaddafi era (Gaub, 2014) and the Middle East conflict in which the Islamic State of Iraq and Levant (ISIL) now controlling about 90 percent of Syrian oil installations can only trade its piecemeal fuel exploration in black and informal markets (Le Billon, 2015; Celso, 2015).

In light of the above, a growing body of the literature has been focusing on instruments by which conflicts and terrorism can be mitigated. To the best of our knowledge, some of the documented instruments have included: the need for transparency (Bell et al., 2014), the relevance of respecting the rule of law (Choi, 2010), imperative for educational mechanisms (Brockhoff et al., 2014) like bilingualism (Costa et al., 2008), greater publicity and press freedom (Hoffman et al., 2013), behavioural investigations of attitudes towards terrorism (Gardner, 2007) and use of military tactics and strategies (Feridun & Shahbaz, 2010).

Another interesting strand of studies has been oriented towards assessing linkages between terrorism, violence, political instability and macroeconomic factors. As far as we are aware, this stream of the literature has focused on inter alia: (i) the effect of terrorism on foreign direct investment (FDI) (Abadie and Gardeazabal, 2008), (ii) interconnections between terrorism and innovation (Koh, 2007), (iii) the growth-terrorism nexus, with bidirectional causality (Gries et al., 2011; Shahbaz et al., 2013; Shahzad et al., 2015), causality to terrorism from growth (Piazza, 2006; Choi, 2015), causality from terrorism to growth (Gaibulloev & Sandler, 2008, 2009, 2011; Öcal & Yildirim, 2010; Meierrieks & Gries, 2013) and (iv) the relevance of foreign aid in mitigating the potentially negative effect of terrorism on development outcomes like external flows (Bandyopadhyay et al., 2014), conditional on initial levels of external flows (Asongu et al., 2015) or corruption-control levels in the domestic countries (Efobi et al., 2015). The present line of inquiry is closest to the last stream. Accordingly, we aim to investigate the role of development assistance in reducing the potentially negative effect of terrorism on fuel exports.

The literature on the terrorism-trade nexus can be discussed in three main streams, notably: (i) the impact of terrorism on trade, (ii) the effect of trade on terrorism and (iii) issues relating to the empirical modelling of the underlying relationships.

First, as concerns the incidence of terrorism on trade, four studies come to mind. *First,* Richardson (2004) has engaged security measures that were adopted after the September 11th 2011 terrorists' attacks in the United States. The plethora of resulting security initiatives has been partly motivated by the need to prevent the negative consequences of terrorism on world trade. (2) The impact of welfare and terror on trade openness has been investigated by Nitsch and Schumacher (2004). Employing an augmented gravity model on 200 countries for the period 1960-2003, the authors have used bilateral trade, violence and terrorism indicators to conclude that terrorism has a negative effect on trade openness. According to the narrative, a doubling of incidents of terrorism reduces bilateral trade by about 4 percent. (3) De Sousa et al. (2009a) have accessed the interplay between trade and nearness to the source of terror to establish the following key findings. (i) More robust investigations are needed to improve scholarly understanding as to how trade in the source-country and neighbouring countries are affected by terrorists incidents' in the former. (ii) There is need for theoretical underpinnings to enhance clarity on linkages between transnational terrorism, trade and security policy. (4) As an extension of the previous study, De Sousa et al. (2009b) have examined the effect of international terrorism diffusion on trade and security. The empirical underpinnings are based on the assumption that proximity to terrorism is inversely related to the corresponding negative spillovers on trade. Moreover, the intuition for the study is consistent with the hypothesis that terror in a source country has negative effects to both the source-country itself and neighbouring nations simultaneously. On the other hand, countries that are more distantly-located from the 'source-country of terror' could be endowed with positive externalities in terms of incremental trade, related/corresponding to the decreasing trade from the country affected by terror and/or countries in the immediate neighbourhood of the country affected by terror. Overall, three main findings were established. They are: (i) there is a direct negative effect of transnational terrorism on trade, (ii) an indirect negative effect of terrorism from the source-country to neighbouring countries is apparent and (iii) terrorism increases trade in countries that are remote from the 'source-country of terror'.

Second, coming to the impact of trade on terrorism, two studies in the limited literature have caught our attention. These have essentially been focused on the commercialisation of illegal drugs. (1) Piazza (2011) examined the link between the 'drugs trade' and terrorism on

the hypothesis that illicit 'drugs trade' fuels terrorism. The author has concluded that 'cocaine production' and illicit drugs are significant drivers of transnational and domestic terrorism. Conversely, banning drugs and eradicating illicit crop cultivation leads to the opposite outcome. As an extension, Piazza (2012) investigated the connection between the opium trade and terrorism in 34 Afghan provinces for the period 1996-2008 using binomial regressions. The author concluded that provinces where opium is substantially produced are associated with relatively higher rates of terrorist attacks and casualties. Therefore, there is a direction of causality flowing from the production of opium to terrorism.

Third, in the strand on empirical modelling concerns pertaining to the trade-terrorism relationship, Mirza and Verdier (2008) surveyed the literature and documented four main cautions that should be borne in mind by researchers when investigating the underlying association. They comprise the need to: (i) account for omitted indictors that are very likely to be correlated with trade and terrorism, (ii) acknowledge the inter-temporal persistence of terrorism, (iii) distinguish between the effects of country-specific occurrences from the impact of incidents focused on the source-country and (iv) control for endogeneity.

The above literature leaves room for improvement in at least four major areas. They relate to the imperative of: (i) accounting for more dynamics of terrorism, (ii) exploring linkages between foreign policy in the underlying trade-terrorism relationship, (iii) considering specific dimensions of trade openness and (iv) adopting more robust empirical techniques that control for initial trade levels. We may deal with each in turn.

First, building on the caution sustained by Choi (2015) on the imperative of exploring more indicators when assessing the nexus between terrorism and macroeconomic indicators, we involve a plethora of terrorism indicators in order to provide room for more policy implications, notably: domestic, transnational, unclear and total terrorism. Consideration of these measurements of terrorism is in accordance with recent studies on the nexus between terrorism and macroeconomic indicators (Efobi et al., 2015). Moreover, the adoption of more terrorism indicators is partially motivated by the need to augment the engaged literature, which has been focused on few indicators, notably: (i) transnational terrorism in De Sousa et al. (2009ab) and (ii) domestic and transnational terrorism in Piazza (2011).

Second, in line with Choi (2015), we attempt to create space for a detailed discussion on policy outcomes, by limiting our investigation to the recent body of literature that has employed foreign aid as a policy variable in mitigating the hypothetically/documented negative effects of terrorism on foreign investment (Bandyopadhyay et al., 2014; Asongu et

al., 2015; Efobi et al., 2015). To this end, we employ two foreign aid variables, namely multilateral and bilateral aid. The motivation for involving this policy indicator is based on the exploratory (Richardson, 2014) and empirical (De Sousa et al., 2009ab) underpinnings which show that terrorism reduces trade openness.

Third, it is imperative to engage trade-specific dimensions for more targeted policy implications. To this end: (i) contrary to previous studies that have used broad trade openness indicators (Richardson, 2004; Nitsch & Schumacher, 2004; De Sousa et al., 2009ab) and (ii) consistent with the stream of literature using export-specific variables (Piazza, 2011, 2012), we confined the analytical scope to fuel exports. The choice of fuel exports has a twofold inspiration, on the one hand, the recent growth resurgence in developing countries has been substantially driven by natural resources, (Amavilah, 2015) especially fuel exports, and (ii) on the other, as we have seen in the first paragraph here, terrorist activities have substantially affected fuel exports in recent decades.

Fourth, motivated by the recommendation of Mirza and Verdier (2008) on the imperative for more robust empirical strategies, we adopt an estimation technique that is robust to outliers. Moreover, the adopted Qauntile regression strategy also enables us to distinguish between initial levels of fuel exports. Accordingly, blanket policies based on the investigated relationships may not be effective unless they are contingent on initial levels of fuel exports and tailored distinctly across high- and low-'fuel exporting' countries.

With the above interesting background, this line of inquiry is positioned on investigating the role of development assistance in dampening the negative effects of terrorism on fuel exports. The empirical evidence is based on 78 developing countries for the period 1984 to 2008. There are at least four reasons for our choice of periodicity and sample. *First*, the starting year is 1984 because institutional data from the International Country Risk Guide (ICRG) is only available from this year. *Second*, the focus on developing countries is in tune with Gaibulloev and Sandler (2009) who have established that negative consequences from terrorism are more apparent in developing countries vis-à-vis advanced nations. This is essentially because; the latter countries have the financial, logical and technological means needed to absorb the negative effects of terrorism without substantial macroeconomic consequences. Third, development assistance is principally channelled from more advanced economies to less developed countries. Hence, the empirical scope on these underdeveloped countries, contingent on a foreign aid variable is naturally justified. Fourth, a motivation for the present study is also to compare findings with those of the available literature that

employed the same sample and periodicity, particularly: Bandyopadhyay et al. (2014), Efobi et al. (2015) and Asongu et al. (2015).

The positioning of this inquiry steers clear of recent literature on international business and strategic management on the relationship between conflicts and development outcomes. In particular, studies on the identification of antecedents for, and consequences of low intensity inter-unit conflict in Multinational Companies (MNCs) (Lauring et al., 2017), the exploration of how and why MNCs proactively address the concern of uncertainty by valuing locational ambidexterity in decision making (Huang & John, 2017), the relevance of political risk (law and order, internal conflict and ethnic tension) in determining foreign direct and indirect investments in developing countries (Al-Khouri, 2015), strategies of MNCs in which terrorism is factored-in as a fundamental threat (Suder & Czinkota, 2005), macroeconomic models of political risk assessments (Alon & Martin, 1998) and the effects of risks (political, economic, default and credit) on the allocative efficiency of global financial markets (Ramcharran, 2003).

The rest of the study is structured as follows. Stylized facts, theoretical underpinnings and international business and strategy are presented in Section 2. Section 3 presents the data and methodology. The empirical results, discussion and policy implications are covered in Section 4. Section 5 concludes with suggestions for future research.

2. Stylized Facts, Theoretical Underpinnings and International Business and Strategy

2. 1 Stylized facts and theoretical underpinnings

According to the Global Peace Index (GPI), over 13 percent of the global Gross Domestic Product (GDP) in 2014 was lost to violence-related expenditure (Anderson, 2015). According to the report, approximately 14.3 trillion USD or 13.4 percent of Global GDP was invested in curtailing violence, crimes, conflicts, political instability and terrorism. The underlying expenditure is equivalent to the combined GDP of Germany, Spain, France, Canada, Brazil and the United Kingdom. Consistent with the report, a substantial amount of the expenditure is skewed towards terrorism-related activities. Projections show that terrorists' activities are likely to increase in the coming years owing to burgeoning terrorism networks which have been proliferating in operational scope, representing about a 61 percent rise in killings as of 2014 compared to 2008.

The 2014 GPI account is supported by the 2014 Global Terrorism Index (GTI, 2014, p. 13), which concluded that in the aftermath of the 2011 Arab Spring, terrorism has

substantially increased. As cases of reference to this point, six main stylized facts are apparent to the best of our knowledge (Asongu et al. 2015). *First*, Libya in the post-Gaddafi era has become a failed state, with widespread anarchy and societal breakdown, characterised by various rebel factions and two rival governments clamouring to dictate the law of the land and run a substantially deteriorated oil-dependent economy. *Second*, the situation in Yemen has severely deteriorated with the inability of the government to honour the terms of its socio-economic contracts with the Yemini citizens after the overthrow of President Ali Abdullah Saleh. As we write this paper, a proxy war is being fought between Iran and Saudi Arabia who are supporting rebels and the government respectively. *Third*, the 2015 Garissa university killings and 2013 Westgate shopping mall attacks by Al-Shabab in Kenya have illustrated that the Somali Al-Quaeda affiliated Al-Shabab can inflict substantial transnational terrorism causalities which have significant disruptive consequences to education and tourism. *Fourth*, in Tunisia after a wave of post-Arab Spring political assassinations, the newly democratically elected government is being seriously confronted with a wave of tourist-targeted attacks, namely the: the Bardo National Museum and Sousse attacks in March and June of 2015 respectively. *Fifth*, the Boko Haram of Nigeria is extending its terrorism sphere to the neighbouring countries of Cameroon, Niger and Chad. *Sixth*, externalities of the Iraq and Syria conflicts have produced a very powerful ISIL that is now exerting substantial geopolitical effects throughout the world, namely the: (i) December 2014 hostage crisis in Sydney-Australia, (ii) January 2015 foiled Verviers-Belgium attacks, (iii) January 2015 the 'Charlie Hebdo' attacks in Paris-France and (iv) the foiled February 2015 Australian attacks, inter alia.

Whereas there are some externalities in the developed world, it is important to note that a substantial number of terrorist activities are perpetrated in the developing world (Anderson, 2015). This has increased poverty-related concerns in policy-making circles, given that the year 2014 registered the highest number of internally displaced persons since the Second World War. This finding by the 2015 GPI report[1] presents a bleak prospect for developing countries when combined with the mid-April 2015 publication by the World Bank of its World Development Indicators. The latter report concluded that many developing countries, especially those in Sub-Saharan Africa have still a long way to go in attaining the Millennium Development Goals (MDGs) extreme poverty target (World Bank, 2015; Caulderwood, 2015). Given that most of the growth needed to alleviate poverty in developing

[1] The 2014 GPI should not be confused with the 2015 GPI report because the latter documents the former.

countries is resource-driven, understanding the role of foreign aid in reducing the potentially negative effect of terrorism on fuel exports is a line of inquiry of considerable policy relevance.

Consistent with the recommendation of De Sousa et al. (2009a) on the need to clearly articulate theoretical concepts motivating studies investigating the relationship between terrorism and macroeconomic variables, we briefly highlight the theories underpinning the present line of inquiry. In line with the underlying terrorism literature (Efobi et al., 2015; Asongu et al., 2015), two main theories which are documented by Akinwale (2010, p. 125) are used to provide the foundations for the current study, namely: the Conflict Management Model (CMM) of Thomas-Kilman (1992) and the Social Control Theory (SCT) from Black (1990). Under the CMM, intentions of strategic character have a high likelihood of rotating around a two-factor matrix (of assertiveness and cooperation), when combined with collaboration produce five principal styles of conflict management, namely: avoidance, compromise, collaboration, competition and accommodation. On the other hand, according to the SCT, relationships between organisations, individuals and groups influence the exercise of one out of five main channels of social control, involving: negotiation, avoidance, settlement, self-help and tolerance. This theoretical basis is consistent with the conflict management and peace literature (Borg, 1992; Volkema & Bergmann, 1995) and in agreement with the present study because foreign aid is employed as a policy variable in order to provide an enabling environment for the mitigation of terrorism, especially: (i) the improvement of government expenditure according to Gaibulloev and Sandler (2009) and (ii) education and the rule of law (Heyneman, 2002; Beets, 2005; Heyneman, 2008ab; Oreopoulos & Salvanes, 2009), among others.

2.2 International business and strategy

There are various international business approaches that are adopted by managers of MNCs to reduce the effects of terrorism on the cost of doing business internally. Consistent with Mazzarella (2005), this section is organised in two main strands, namely: (i) identifying the cost of terrorism in international business and (ii) managing the risk associated with terrorism.

With respect to the management of the risk that terrorism poses to MNCs, two points are worth emphasising. They are: (i) terrorism management methods and (ii) risk modelling. On the one hand, minimising the cost of terrorism fundamentally depends on risk modelling effectiveness. The standard contemporary practice for most managers consists of estimating

future loses with computer risk modelling which uses physical security analysis as inputs to determine the probability of attacks from terrorists and the potential level of damages. This ultimately informs the managers on the level of terrorism related risk insurance coverage needed for a particular business operation. On the other hand, there are various terrorism risk management methods that are adopted by managers, notably: maintaining good human rights and environmental records within regions in which they operate; using subcontractors to reduce further risk; hiring more security consultants and personnel; hardening of work sites and physical assets and training of personnel to avoid being the target of terrorism.

The potential costs of terrorism in international business can be seen from four main angles, namely: (i) improving the physical security of personnel, plant and equipment, (ii) hiring security consultants, (iii) improving global supply chains by securing the transportation of commodities as well as the risks related to the disruption of global sources of supply, (iii) reducing direct operations and investment in areas of high risk and (iv) political risk insurance.

The above theoretical underpinnings are broadly consistent with the recent international business literature on the strategies of managing the negative externalities of terrorism, namely: planning for potential effects of terrorism (Harvey et al., 2017) the management of people in hostile environments (Barder et al., 2015), especially expatriate personnel (Barder & Berg, 2014a; Bader et al., 2016; Barder & Berg, 2014b) and Corporate Social Responsibility by MNCs as a strategic management tool (Agwu & Taylor, 2015).

3. Data and Methodology

3.1 Data

We examine a panel of 78 developing countries with data for the period 1984-2008 from Bandyopadhyay et al. (2014) and Efobi et al. (2015). The choice of sample and periodicity has already been justified in the introduction[2]. The data entails non-overlapping intervals in terms of three-year averages. The dependent variable is 'fuel exports' while the

[2] The adopted countries include: "Albania, Costa Rica, India, Namibia, Syria, Algeria, Cote d'Ivoire, Indonesia, Nicaragua, Tanzania, Angola, Dominican Republic, Iran, Niger, Thailand, Argentina, Ecuador, Jamaica, Nigeria, Togo, Bahrain, Egypt, Jordan, Pakistan, Trinidad and Tobago, Bangladesh, El Salvador, Kenya, Panama, Tunisia, Bolivia, Ethiopia, Lebanon, Papua New Guinea, Turkey, Botswana, Gabon, Libya, Paraguay, Uganda, Brazil, Gambia, Madagascar, Peru, Uruguay, Burkina Faso, Ghana, Malawi, Philippines, Venezuela, Cameroon, Guatemala, Malaysia, Saudi Arabia, Vietnam, Chile, Guinea, Mali, Senegal, Yemen, China, Guinea-Bissau, Malta, Sierra Leone, Zambia, Colombia, Guyana ,Mexico, South Africa, Zimbabwe, Congo, D. Republic, Haiti, Morocco, Sri Lanka, Congo Republic, Honduras, Mozambique and Sudan".

independent variables of interest are indicators of terrorism, namely: unclear, domestic, transnational and total terrorism dynamics. Two foreign aid variables are employed: multilateral and bilateral aid.

The variables are originally from three principal sources, namely: (i) the incidence of terrorism from Enders et al. (2011) and Gailbulloev et al. (2012), (ii) the Global Terrorism Database and (iii) the World Development Indicators of the World Bank. Three main justifications influence the choice of periodicity and sample. *First,* in accordance with Gaibulloev and Sandler (2009), relative to more advanced economies, the negative consequences of terrorism are visible in developing nations. As we said earlier, this asymmetric effect is essentially because, developing countries do not have the adequate financial, logistical and technological mechanisms that are needed to absorb the negative consequences associated with terrorism. *Second*, foreign aid is logically channelled to developing nations from their more developed counterparts. *Third,* we aim to compare the findings established with a stream of literature that has used the same database, notably Bandyopadhyay et al. (2014) and Efobi et al. (2015).

We define terrorism as the actual and threatened use of force by sub-national actors with the principal mission of using intimidation to secure political ambitions (see Enders & Sandler, 2006). The terrorism indicators measure the number of yearly terrorism incidents registered in a country. In order to reduce mathematical concerns that are linked to log-transforming zeros and correct the positive skew in the data, the study uses the natural logarithm of terrorism incidents by adding one to the base. Such a transformation procedure is consistent with recent terrorism literture (Choi & Salehyan, 2013; Bandyopadhyay et al., 2014; Efobi & Asongu, 2016). Terrorism-specific definitions are from Efobi et al. (2015, p. 6). Domestic terrorism "*includes all incidences of terrorist activities that involve[s] 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[s] 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.

The dependent variable, aid and control covariates are from the World Bank Development Indicators. We also take the natural logarithm of fuel exports. Therefore exports

of value zero are considered as missing data after the log transformation. The three countries without any data on fuel exports are Guinea Bissau, Sierra Leone and the Democratic Republic of Congo. The concern of zeros is more apparent in the count data (i.e. terrorism variables) than in fuel exports. The development assistance data are disbursements of aid from Development Assistance Committee countries.

The control variables comprise: *trade openness*, *exchange rate*, *infrastructure*, *political globalisation, inflation* and *internal conflicts*. The choice of control variables is in accordance with the FDI-terrorism literature (Bandyopadhyay et al., 2014; Efobi et al., 2015). Based on our expectations, infrastructural development, increasing exchange rates and trade openness should have positive effects on fuel exports (Akpan, 2014), while civil/internal conflicts and inflation should exert opposite effects. For example, high exchange rates have been documented to boost exports in developing countries (Rodrik, 2008). Whereas stable and low inflation is conducive for economic prosperity, chaotic inflation may decrease fuel exports owing to a negative economic outlook. This is essentially because investors have been shown to prefer strategies of investment that are void of ambiguity (Le Roux & Kelsey, 2015ab). The expected sign of political globalisation cannot be established *a priori* because it depends to a great extent on leverage in decision making at the international level. The definitions of variables are provided in Appendix 1.

The summary statistics of the variables are provided in Appendix 2. From it, two points are note worthy. On the one hand, the means of the variables are comparable. On the other, based on the variations, we can be confident that reasonable estimated relations would emerge. The objective of the correlation matrix presented in Appendix 3 is to examine and avoid potential concerns of multicollinearity which we have highlighted in bold. We observe from this matrix that terrorism and foreign aid variables are highly correlated among themselves. Hence, we avoid employing more than two foreign aid and terrorism variables in the same specification.

3.2 Methodology

In accordance with the underlying literature on conditional macroeconomic determinants (Billger & Goel, 2009; Asongu et al., 2015), in order to examine if initial levels of fuel exports matter in how the independent variables interplay in influencing fuel exports, we employ a quantile regression (QR) estimation strategy. It entails, investigating the

determinants of fuel exports throughout the conditional distributions of fuel exports (Keonker & Hallock, 2001).

Previous literature on linkages between terrorism and macroeconomic variables has reported parameters estimates at the conditional mean of macroeconomic indicators (Bandyopadhyay et al., 2014; Efobi et al., 2015). Whereas mean impacts are certainly relevant, we extend the underlying stream of terrorism studies by employing QR which distinguishes between initial export levels. For instance, while Ordinary Least Squares (OLS) is based on the supposition that error terms and the dependent variable are normally distributed, the QR approach is not founded on the hypothesis of normally distributed error terms. Hence, this strategy enables us to examine the impacts on the dependent variable with particular emphasis on low- medium- and high-fuel exporting countries. Accordingly, with QR, parameter estimates are derived at multiple points on the conditional distributions of fuel exports (Keonker & Hallock, 2001). The QR technique is increasingly being employed in development literature, notably in: corruption (Billger & Goel, 2009; Okada & Samreth, 2012; Asongu, 2013) and financial development (Asongu et al., 2017; Asongu & Nwachukwu, 2017) studies.

The θ^{th} quantile estimator of fuel exports is obtained by solving for the optimization problem in Eq. (1), which is presented without subscripts for ease of presentation and of simplicity.

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

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 instance the 25$^{\text{th}}$ or 75$^{\text{th}}$ quartiles (with θ=0.25 or 0.75 respectively) by approximately weighing the residuals. The conditional quantile of fuel exports or y_i given x_i is:

$$Q_y(\theta / x_i) = x_{i'}\beta_\theta, \quad (2)$$

where unique slope parameters are modelled for each θ^{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 fuel exports. For the model in Eq. (2) the dependent variable y_i is the fuel exports indicator while x_i contains a constant term, *trade*

openness, *inflation*, *infrastructure*, *exchange rates*, *political globalisation* and *civil/internal conflicts*. The specifications in Eq. (1) are tailored to mitigate the multicollinearity concerns highlighted in Appendix 3.

Considering that the strategy of estimation we have adopted involves interactive regressions, we briefly engage Brambor et al. (2006) on the pitfalls of interactive regressions. For the estimation output to have economic meaning, the corresponding estimated interactive coefficients should be interpreted as conditional marginal effects. Moreover, the modifying or foreign aid indicator should be within the range provided by the summary statistics for the overall marginal effect to have economic meaning.

4. Empirical Analysis

4.1 Presentation of results

Table 1 and Table 2 present results corresponding to bilateral aid and multilateral aid regressions respectively. All the tables entail four-sets of specifications. They are: (i) domestic and transnational terrorism modelling in Panel A and (ii) unclear and total terrorism estimations in Panel B. More specifically, the left-hand-side (LHS) of Panel A (B) display findings for domestic (unclear) terrorism whereas the right-hand-side (RHS) of Panel A (B) show results for transnational (total) terrorism. For either table, we consistently notice that the QR estimates are different from the OLS estimates in terms of signs and significance. This further justifies the relevance of the QR strategy.

The following findings can be established with respect to Table 1 on linkages between fuel exports, bilateral aid and terrorism dynamics. *First*, with the exception of domestic terrorism which is not significant across fuel export distributions, the effects of terrorism are consistently significant in the 50^{th} quartile and 90^{th} decile. While these underlying effects are positive for unclear terrorism, the impact in the 50^{th} quartile and 90^{th} decile are respectively positive and negative for transnational and total terrorism. *Second*, bilateral aid consistently increases (decreases) fuel exports at the bottom (top) quantiles. *Third*, interaction effects between bilateral aid and terrorism dynamics are overwhelmingly not significant, but for the 50^{th} quartile and 90^{th} decile on the LHS of Panel B in unclear terrorism regressions for which the effects are negative. The corresponding modifying bilateral aid thresholds are within the range (0.765 to 8.362) provided by the summary statistics, notably: (i) 5.702 (0.211/0.037) for the 50^{th} quartiles and (ii) 4.750 (0.133/0.028) for the 90^{th} decile. *Fourth*, most of the control variables are significant with the expected signs. Infrastructural development and political

globalisation are positively associated with resource exports (Apkan, 2014). The sparsely positive effect of civil/internal conflict is consistent with the effects of terrorism while the scantily positive impact of inflation may be traceable to stable consumer prices (with a mean value of 2.414).

Table 1: Fuel Exports, Bilateral Aid, Terrorism

Dependent Variable: Fuel Exports (Ln)

Panel A: Domestic Terrorism and Transnational Terrorism

	Domestic Terrorism (Domter)						**Transnational Terrorism (Tranater)**					
	OLS	**Q.10**	**Q.25**	**Q.50**	**Q.75**	**Q.90**	**OLS**	**Q.10**	**Q.25**	**Q.50**	**Q.75**	**Q.90**
Constant	**-5.63****	**-13.41****	**-8.511****	**-6.925****	1.394	**2.826****	**-5.873****	**-14.76****	**-7.634***	**-8.09*****	0.779	**2.975****
	(0.035)	**(0.013)**	**(0.012)**	**(0.034)**	(0.616)	**(0.052)**	**(0.029)**	**(0.016)**	**(0.055)**	**(0.007)**	(0.775)	**(0.010)**
Domter	0.005	0.004	-0.0007	0.026	0.004	-0.006	---	---	---	---	---	---
	(0.636)	(0.835)	(0.950)	(0.104)	(0.663)	(0.127)						
Tranater	---	---	---	---	---	---	0.107	-0.010	0.152	**0.187***	0.096	**-0.075***
							(0.148)	(0.952)	(0.275)	**(0.092)**	(0.280)	**(0.068)**
LnBilaid	0.112	**0.586****	0.372	0.233	-0.234	**-0.195*****	0.136	**0.530***	**0.369****	**0.367****	-0.232	**-0.200*****
	(0.403)	**(0.020)**	(0.320)	(0.137)	(0.116)	**(0.00)**	(0.318)	**(0.061)**	**(0.049)**	**(0.010)**	(0.114)	**(0.000)**
Domter* LnBilaid	-0.001	0.0004	-0.0004	-0.004	-0.001	0.0004	---	---	---	---	---	---
	(0.568)	(0.915)	(0.838)	(0.150)	(0.429)	(0.573)						
Tranater* LnBilaid	---	---	---	---	---	---	-0.018	0.005	-0.024	-0.029	-0.022	0.011
							(0.180)	(0.885)	(0.311)	(0.143)	(0.182)	(0.190)
LnTrade	-0.296	**-1.051***	-0.568	-0.137	0.236	0.166	-0.252	-1.170	-0.589	-0.028	0.249	0.190
	(0.283)	**(0.099)**	(0.131)	(0.695)	(0.380)	(0.190)	(0.359)	(0.101)	(0.182)	(0.928)	(0.353)	(0.066)
LnInflation	-0.031	-0.065	-0.080	-0.058	0.175	0.085	-0.044	-0.047	-0.105	-0.082	0.128	**0.084***
	(0.742)	(0.750)	(0.520)	(0.654)	(0.116)	(0.107)	(0.638)	(0.836)	(0.469)	(0.484)	(0.274)	**(0.053)**
LnInfrastructure	**0.422*****	**0.689***	**0.409***	0.506	0.215	0.049	**0.408****	0.663	**0.433***	**0.513*****	0.238	0.032
	(0.008)	**(0.075)**	**(0.064)**	(0.012)	(0.231)	(0.552)	**(0.011)**	(0.125)	**(0.088)**	**(0.005)**	(0.173)	(0.649)
LnXrate (Exchange rate)	-0.028	0.005	-0.071	-0.017	0.023	0.013	-0.030	-0.011	-0.067	-0.029	0 .016	0.012
	(0.506)	(0.959)	(0.169)	(0.713)	(0.618)	(0.433)	(0.474)	(0.926)	(0.257)	(0.496)	(0.719)	(0.521)
Ln (Political globalisation)	**1.612*****	**2.720****	**1.998*****	**1.631****	0.283	0.302	**1.607*****	**3.248****	**1.798****	**1.635*****	0.447	0.265
	(0.006)	**(0.016)**	**(0.005)**	**(0.018)**	(0.646)	(0.313)	**(0.006)**	**(0.010)**	**(0.028)**	**(0.008)**	(0.451)	(0.274)
Civil Conflicts	0.104	-0.059	0.074	0.035	0.177	**0.138*****	0.088	-0.0009	0.082	0.011	0.151	**0.109*****
	(0.257)	(0.780)	(0.512)	(0.733)	(0.044)	**(0.000)**	(0.325)	(0.997)	(0.531)	(0.896)	(0.101)	**(0.002)**
Pseudo R^2/R^2	0.063	0.120	0.072	0.040	0.038	0.050	0.065	0.118	0.072	0.043	0.035	0.046
Fisher	**3.21*****						**3.45*****					
Observations	448	448	448	448	448	448	448	448	448	448	448	448

Panel B: Unclear Terrorism and Total Terrorism

	Unclear Terrorism (Unclter)						**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	**-5.457****	**-14.7*****	**-7.904****	**-6.934***	1.539	**2.846****	**-5.650****	**-14.24*****	**-8.166****	**-7.437****	1.440	**2.923****
	(0.042)	**(0.008)**	**(0.019)**	**(0.057)**	(0.510)	**(0.028)**	**(0.034)**	**(0.005)**	**(0.012)**	**(0.013)**	(0.646)	**(0.012)**
Unclter	0.073	0.074	-0.009	**0.211***	0.042	**0.133*****	---	---	---	---	---	---
	(0.450)	(0.618)	(0.914)	**(0.096)**	(0.482)	**(0.000)**						
Totter	---	---	---	---	---	---	0.006	0.005	-0.0007	**0.022***	0.004	**-0.005****
							(0.541)	(0.735)	(0.935)	**(0.065)**	(0.587)	**(0.043)**
LnBilaid	0.114	**0.692****	**0.365****	0.275	**-0.221***	**-0.177****	0.117	**0.648****	**0.388****	**0.252***	-0.234	**-0.192*****
	(0.388)	**(0.012)**	**(0.021)**	(0.110)	**(0.095)**	**(0.010)**	(0.386)	**(0.015)**	**(0.012)**	**(0.081)**	(0.165)	**(0.001)**
Unclter * LnBilaid	-0.014	-0.011	-0.001	**-0.037***	-0.012	**-0.028*****	---	---	---	---	---	---
	(0.370)	(0.698)	(0.943)	**(0.095)**	(0.213)	**(0.000)**						
Totter* LnBilaid	---	---	---	---	---	---	-0.001	-0.0002	-0.0002	-0.003	-0.001	0.0004
							(0.474)	(0.941)	(0.872)	(0.102)	(0.385)	(0.409)
LnTrade	-0.326	**-1.146***	-0.571	-0.288	0.207	0.184	-0.298	**-1.093***	-0.560	-0.134	0.229	0.157
	(0.241)	**(0.079)**	(0.193)	(0.465)	(0.375)	(0.119)	(0.282)	**(0.074)**	(0.128)	(0.678)	(0.454)	(0.144)
LnInflation	-0.038	0.002	-0.091	-0.036	0.145	**0.074***	-0.032	-0.021	-0.079	-0.056	0.173	**0.086****
	(0.676)	(0.991)	(0.462)	(0.802)	(0.149)	**(0.087)**	(0.733)	(0.913)	(0.526)	(0.639)	(0.168)	**(0.046)**

LnInfrastructure	**0.419*** **	**0.726***	**0.417***	**0.536** **	0.233	0.012	**0.422*** **	**0.749***	**0.423** **	**0.479** **	0.221	0.052
	(0.009)	**(0.082)**	**(0.055)**	**(0.017)**	(0.131)	(0.887)	**(0.008)**	**(0.058)**	**(0.046)**	**(0.010)**	(0.278)	(0.460)
LnXrate (Exchange rate)	-0.029	0.028	-0.078	0.002	0.019	0.005	-0.028	0.021	-0.073	-0.024	0.022	0.014
	(0.496)	(0.802)	(0.128)	(0.964)	(0.634)	(0.764)	(0.502)	(0.843)	(0.135)	(0.589)	(0.678)	(0.340)
Ln (Political globalisation)	**1.604*** **	**2.940*** **	**1.868*** **	**1.676** **	0.272	0.289	**1.614*** **	**2.819*** **	**1.883*** **	**1.734*** **	0.281	0.283
	(0.006)	**(0.009)**	**(0.007)**	**(0.027)**	(0.601)	(0.300)	**(0.006)**	**(0.008)**	**(0.005)**	**(0.006)**	(0.687)	(0.246)
Civil Conflicts	0.109	0.024	0.060	0.059	**0.169** **	**0.101*** **	0. 106	-0.056	0.064	0.039	**0.178***	**0.139*** **
	(0.176)	(0.897)	(0.564)	(0.577)	**(0.020)**	**(0.000)**	(0.251)	(0.786)	0.552)	(0.675)	**(0.077)**	**(0.000)**
Pseudo R^2/R^2	0.065	0.118	0.073	0.041	0.041	0.053	0.0638	0.119	0.073	0.041	0.039	0.050
Fisher	**3.31*** **					**3.21*** **						
Observations	448	448	448	448	448	448	448	448	448	448	448	448

*,**,***: significance levels of 10%, 5% and 1% respectively. Bilaid: Bilateral aid. 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 Fuel Exports is least.

Table 2: Fuel Exports, Multilateral aid, Terrorism

	Dependent Variable: Fuel Exports											
	Panel A: Domestic Terrorism and Transnational Terrorism											
	Domestic Terrorism (Domter)						**Transnational Terrorism (Tranater)**					
	OLS	**Q.10**	**Q.25**	**Q.50**	**Q.75**	**Q.90**	**OLS**	**Q.10**	**Q.25**	**Q.50**	**Q.75**	**Q.90**
Constant	**-5.567** **	**-15.35*** **	**-9.75*** **	**-7.24*** **	1.028	1.290	**-5.586** **	**-16.24*** **	**-11.26*** **	**-7.181*** **	2.533	1.184
	(0.032)	**(0.004)**	**(0.003)**	**(0.004)**	(0.722)	(0.404)	**(0.032)**	**(0.005)**	**(0.002)**	**(0.002)**	(0.417)	(0.451)
Domter	**0.006** **	0.011	0.009	0.008	-0.001	**0.004*** **	---	---	---	---	---	---
	(0.044)	(0.303)	(0.122)	(0.158)	(0.779)	**(0.006)**						
Tranater	---	---	---	---	---	---	**0.039***	0.042	0.067	0.046	-0.005	**-0.046*** **
							(0.086)	(0.672)	(0.142)	(0.190)	(0.908)	**(0.000)**
LnMulaid	-0.173	-0.136	-0.093	-0.179	**-0.324** **	**-0.202*** **	-0.173	-0.169	-0.135	**-0.215** **	**-0.353** **	**-0.231*** **
	(0.147)	(0.677)	(0.556)	(0.100)	**(0.010)**	**(0.000)**	(0.171)	(0.618)	(0.447)	**(0.035)**	**(0.011)**	**(0.000)**
Domter* LnMulaid	**-0.001** **	-0.001	-0.002	**-0.002***	-0.0008	**-0.002*** **	---	---	---	---	---	---
	(0.029)	(0.715)	(0.156)	**(0.069)**	(0.526)	**(0.000)**						
Tranater* LnMulaid	---	---	---	---	---	---	**-0.011***	-0.003	-0.014	-0.012	-0.007	**0.010***
							(0.086)	(0.822)	(0.225)	(0.206)	(0.527)	**(0.063)**
LnTrade	-0.363	-0.930	**-0.728***	-0.219	0.232	**0.373** **	-0.337	-1.013	-0.531	-0.183	0.133	**0.357** **
	(0.193)	(0.216)	**(0.062)**	(0.414)	(0.402)	**(0.010)**	(0.227)	(0.201)	(0.230)	(0.464)	(0.659)	**(0.013)**
LnInflation	-0.038	**-0.435***	-0.094	-0.028	0.141	**0.109***	-0.036	-0.347	-0.061	-0.002	0.078	0.107
	(0.696)	**(0.077)**	(0.458)	(0.780)	(0.267)	**(0.081)**	(0.704)	(0.176)	(0.667)	(0.977)	(0.568)	(0.071)
LnInfrastructure	0.221	0.313	0.084	**0.327***	0.091	0.009	0.213	0.255	0.042	0.192	0.086	-0.015
	(0.216)	(0.530)	(0.725)	**(0.052)**	(0.650)	(0.934)	(0.232)	(0.613)	(0.871)	(0.214)	(0.696)	(0.887)
LnXrate (Exchange rate)	-0.005	-0.080	-0.058	0.048	0.060	0.019	-0.005	-0.077	-0.066	0.033	0.082	0.028
	(0.908)	(0.549)	(0.269)	(0.211)	(0.228)	(0.315)	(0.905)	(0.566)	(0.279)	(0.363)	(0.139)	(0.272)
Ln (Political globalisation)	**2.052*** **	**4.332*** **	**3.142*** **	**2.270*** **	0.448	0.419	**2.033*** **	**4.670*** **	**3.346*** **	**2.319*** **	0.235	0.488
	(0.001)	**(0.001)**	**(0.000)**	**(0.000)**	(0.488)	(0.241)	**(0.001)**	**(0.001)**	**(0.000)**	**(0.000)**	(0.735)	(0.167)
Civil Conflicts	0.135	0.099	0.124	**0.207** **	0.079	**0.180*** **	0.118	0.125	0.124	0.106	0.070	**0.109** **
	(0.144)	(0.676)	(0.259)	**(0.010)**	(0.401)	**(0.000)**	(0.178)	(0.623)	(0.319)	(0.134)	(0.490)	**(0.018)**
Pseudo R^2/R^2	0.074	0.114	0.074	0.047	0.056	0.062	0.073	0.110	0.073	0.046	0.054	0.054
Fisher	**5.38*** **						**4.73*** **					
Observations	444	444	444	444	444	444	444	444	444	444	444	444

Panel B: Unclear Terrorism and Total Terrorism

	Unclear Terrorism (Unclter)						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	**-5.485****	**-17.04*****	**-10.07*****	**-7.43*****	3.233	1.546	**-5.547****	**-15.25*****	**-9.86*****	**-7.510*****	1.071	1.248
	(0.036)	**(0.003)**	**(0.001)**	**(0.004)**	(0.240)	(0.295)	**(0.033)**	**(0.004)**	**(0.002)**	**(0.002)**	(0.706)	(0.420)
Unclter	**0.053****	**0.142***	**0.084****	0.055	-0.013	0.0006	---	---	---	---	---	---
	(0.020)	**(0.055)**	**(0.014)**	(0.174)	(0.786)	(0.961)						
Totter	---	---	---	---	---	---	**0.005****	0.009	0.007	0.006	0.0001	**0.003*****
							(0.037)	(0.248)	(0.070)	(0.129)	(0.966)	**(0.003)**
LnMulaid	-0.176	-0.086	-0.121	**-0.181***	**-0.331*****	**-0.210*****	-0.170	-0.138	-0.112	**-0.171***	**-0.324*****	**-0.206*****
	(0.128)	(0.788)	(0.391)	**(0.095)**	**(0.004)**	**(0.000)**	(0.155)	(0.672)	(0.475)	**(0.099)**	**(0.009)**	**(0.000)**
Unclter * LnMulaid	**-0.011*****	-0.022	**-0.017*****	-0.011	-0.002	**-0.006*****	---	---	---	---	---	---
	(0.001)	(0.111)	**(0.008)**	(0.120)	(0.747)	**(0.000)**						
Totter* LnMulaid	---	---	---	---	---	---	**-0.001****	-0.0007	**-0.001***	**-0.002***	-0.001	**-0.002*****
							(0.018)	(0.703)	**(0.099)**	**(0.053)**	(0.372)	**(0.000)**
LnTrade	-0.363	-1.009	**-0.740****	-0.217	0.073	**0.371*****	-0.367	-0.922	**-0.730***	-0.230	0.216	**0.374*****
	(0.192)	(0.196)	**(0.034)**	(0.431)	(0.781)	**(0.005)**	(0.190)	(0.222)	**(0.060)**	(0.374)	(0.432)	**(0.008)**
LnInflation	-0.045	-0.268	-0.084	-0.011	0.062	**0.098***	-0.039	**-0.452***	-0.082	-0.018	0.125	**0.107***
	(0.633)	(0.286)	(0.489)	(0.914)	(0.592)	**(0.054)**	(0.688)	**(0.068)**	(0.512)	(0.853)	(0.314)	**(0.090)**
LnInfrastructure	0.208	0.383	0.037	0.198	0.128	0.001	0.221	0.295	0.036	**0.285***	0.099	0.005
	(0.244)	(0.455)	(0.864)	(0.247)	(0.503)	(0.987)	(0.215)	(0.537)	(0.875)	**(0.077)**	(0.615)	(0.962)
LnXrate (Exchange rate)	**-0.003*****	-0.049	-0.063	0.024	0.071	0.028	-0.005	-0.087	-0.056	0.034	0.062	0.020
	(0.000)	(0.714)	(0.195)	(0.532)	(0.129)	(0.237)	(0.904)	(0.514)	(0.281)	(0.354)	(0.207)	(0.470)
Ln (Political globalisation)	**2.043*****	**4.671*****	**3.279*****	**2.382*****	0.096	0.364	**2.049*****	**4.317*****	**3.199*****	**2.361*****	0.456	0.433
	(0.001)	**(0.001)**	**(0.000)**	**(0.000)**	(0.875)	(0.254)	**(0.001)**	**(0.001)**	**(0.000)**	**(0.000)**	(0.471)	(0.212)
Civil Conflicts	0.103	0.055	0.090	0.042	0.067	**0.122*****	0.134	0.090	0.127	**0.163****	0.085	**0.183*****
	(0.185)	(0.792)	(0.315)	(0.558)	(0.420)	**(0.000)**	(0.144)	(0.704)	(0.258)	**(0.033)**	(0.367)	**(0.000)**
Pseudo R^2/R^2	0.075	0.116	0.077	0.0482	0.054	0.058	0.074	0.114	0.074	0.048	0.057	0.062
Fisher	**7.25*****						**5.60*****					
Observations	444	444	444	444	444	444	444	444	444	444	444	444

*,**,***: significance levels of 10%, 5% and 1% respectively. Mulaid: Multilateral aid. 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 Fuel Exports is least.

The following findings can be established from Table 2 on linkages between fuel exports, multilateral aid and terrorism dynamics. *First*, the effects of terrorism are consistently significant in the highest and lowest quintiles, especially with: (i) positive effects in the 90th deciles for total terrorism and domestic terrorism; (ii) a negative impact in the 90th decile for transnational terrorism and (iii) positive impacts in the 10th decile and 25th quartile for unclear terrorism. *Second*, multilateral aid steadily decreases fuel exports at the top quantiles (50th to 90th) for the most part. *Third*, interaction effects between multilateral aid and terrorism dynamics are significantly negative, but for transnational terrorism in the RHS of Panel A. Moreover, the corresponding modifying thresholds of multilateral aid are within the range provided by the summary statistics, particularly: -1.249 to 7.105. Accordingly, there is: (i) a negative threshold of 2.000 (0.004/0.002) for domestic terrorism in the 90th decile; (ii) a positive threshold of 4.600 (0.046/0.010) for transnational terrorism in the 90th decile; (iii) a negative threshold of 4.941 (0.084/0.017) for unclear terrorism in the 25th quartile and (iv)

a negative threshold of 1.500 (0.003/0.002) for total terrorism in the 90th decile. *Fourth*, the discourse on the significant control variables is consistent with that on Table 1.

4.2 Further discussion and policy implications

We discuss the findings in more depth along three main lines: (i) the dynamic impact of terrorism, (ii) the effects of foreign aid dynamics and (iii) the diverging thresholds from interactive effects between foreign aid and terrorism on fuel exports.

First, the effects of terrorism are both positive and negative across quintiles and specifications, with the impact most apparent in the highest and lowest quantiles. This implies that terrorism affects fuel exports in countries with the highest and lowest initial levels of fuel exports. While the effect of total terrorism is mixed because it is negative (positive) in bilateral (multilateral) aid regressions, the impact of unclear, domestic and transnational terrorism is not definite in sign, albeit, at differing quantiles across bilateral and multilateral aid regressions. Evidence of causality flowing from terrorism to fuel exports is broadly in accordance with a stream of the engaged literature, particularly Nitsch and Schumacher (2004); Richardson (2004) and De Sousa et al. (2009ab).

Second, while bilateral aid persistently decreases (increases) fuel exports at the top (bottom) quantiles, multilateral aid consistently decreases fuel exports at the top quantiles. It follows that foreign aid decreases fuel exports in countries with initially very high exports of fuel while bilateral aid increases it in countries where initial export levels are relatively low. Two puzzling concerns boldly standout: (i) the issue of why bilateral aid is positively significant in bottom quantiles as opposed to multilateral aid and (ii) the concern of why foreign aid in high fuel exporting countries has a negative outcome on the dependent variable. (1) With the first concern, the relative effectiveness of bilateral aid vis-à-vis multilateral aid is consistent with the narratives of Asongu et al. (2015) on the political economy of development assistance. According to this study, the strings tied to bilateral aid entail relatively less conflicting interests. Conversely, with multilateral aid, there are more contradictory objectives between donors at play. Hence, the corresponding difficulty in consensus-building among donors may eventually lead to less appealing significant effects on development outcomes. Whereas a recent survey of the literature has been inconclusive on significant differences in terms of development outcomes for bilateral aid vis-à-vis multilateral aid (Biscaye et al., 2015), the basis for our interpretation is deeply rooted in the documented evidence that former colonial powers preserve various strategic interests in

former colonies and hence can more effectively allocate development assistance towards fighting terrorism and boosting natural resource exports[3]. Contemporary examples include the recent military intervention of France in the Central African Republic and Mali on the one hand and the exploitation of uranium in Niger following the latest presidential elections (Melly & Darracq, 2013). As a policy implication, relative to multilateral aid, bilateral aid more positively influences fuel exports in low-fuel exporting countries.

(2) On the concern as to why foreign aid generally reduces fuel exports in high-exporting countries, we think that sampled countries within the high-end of the distribution may find it strategically relevant to decrease their volume of fuel exports, given that government revenue and other needed finance may already have been boosted by foreign aid external flows. As a policy implication, while bilateral aid should be encouraged in stimulating fuel exports in low-exporting countries, the use and composition of multilateral aid flows should also be changed in order to reverse their negative effect on fuel exports in high-exporting countries.

Third, we have established that, but for negative thresholds in the 50th quartile and 90th decile, interaction effects between bilateral aid and terrorism dynamics are overwhelmingly not significant. Conversely, but for transnational terrorism, the interaction effects between multilateral aid and terrorism dynamics significantly have negative thresholds. It follows that a positive threshold is only confirmed for transnational terrorism and multilateral aid at the 90th decile. The overwhelming negative interaction effect may be traceable to the negative effect of foreign aid on the dependent variable, especially in high-fuel exporting countries. As a policy implication, it is important to first establish the nexus between foreign aid and fuel exports before employing the former to mitigate the potentially negative effect of terrorism on the latter.

Consistent with the motivation of this study which has been partially based on the need to compare results with previous studies that have employed the same periodicity and sample, we briefly engage in how our findings improve the existing literature on linkages between macroeconomic indicators and terrorism. *First*, it is important to note that (i)

[3] The stance on conflicting donor interest is in line with the conclusions of Asongu (2014d) "*Aid is the outcome of bargaining in a kind of political market made up of donor aid bureaucracies, multilateral aid agencies and recipient government officials. Indeed donors pursue multiple goals and these vary over time. For instance, economic gains seem important in Japanese aid, global welfare improvement in Nordic aid and political goals in French aid. Hence, few would object to the inference that our findings may also be explained by a motivation of the French to maintain their colonial legacies and influence in Africa*" (p. 472).

Bandyopadhyay et al (2014) and Efobi et al (2015) have used the Generalised Method of Moments (GMM) and (ii) Asongu et al. (2015) have used a QR strategy to assess how foreign aid could be used to mitigate the negative effect of terrorism on FDI. While Efobi et al. (2015) have extended Bandyopadhyay et al. (2014) using a more robust GMM technique and conditioning the nexuses on corruption-control levels in recipient countries, Asongu et al. (2015) have extended the two underlying studies by using QR to assess the relationships throughout the conditional distributions of FDI.

It should be noted that the results of latter studies have not been in support of Bandyopadhyay et al. (2014), especially, on (i) an exclusively negative terrorism-FDI nexus and (ii) a positive impact on FDI from aid-terrorism interactions. Results of the present study have improved existing knowledge in this stream of literature by: (i) employing fuel exports as the dependent variable; (ii) partially validating the results of Bandyopadhyay et al. (2014) on the impact of aid, terrorism and corresponding interactions on macroeconomic indicators and (iii) partially confirming the positions of Efobi et al. (2015) and Asongu et al. (2015) that the underlying effects of the independent indicators of interest on macroeconomic variables cannot be *a priori* established from intuition because they depend on, among others, the dependent variable, methodology and distribution of the dependent variable.

4. 3 Managerial implications for multinational companies

It is apparent from intuition that terrorism increases the cost of the risk of doing business, regardless of the nature of the business. Conversely, we have established in the study that (i) terrorism could both positively and negatively affect fuel exports and (ii) the potentially instrumental role of foreign aid in mitigating the effect of terrorism on fuel exports does not withstand empirical scrutiny.

While the negative effects of terrorism on fuel exports are consistent with the intuition motivating the study, we have also established that terrorism has a positive influence on fuel exports in some quantiles. This tendency is supported by the findings of De Sousa et al. (2009b) who established that remote terrorism positively affects some dynamics of trade. Moreover, on a more substantive note, the intuition for the positive effect has basis in the assumption that some investors in natural resources may be inclined to invest more in the fuel industry if they anticipate higher returns in the short-, medium- and long-terms, relative to the present risk of terrorism. More contemporary examples with which to substantiate this proposition include: (i) growing investments from China in the Nigerian Delta region despite

evolving threats from the Movement for the Emancipation of the Niger Delta (MEND) (Obi, 2008) and (ii) China's unrelenting presence in South Sudan, in spite of growing violence, essentially because crude oil from South Sudan accounts for about 5 percent of fuel imports into China (Aguirre, 2014). This interpretation follows from Elu and Price (2010) on China's long-term strategy, which entails an oil diplomacy requiring continuous engagement with countries that are characterised by violence, internal/civil conflicts and political strife.

As a policy implication, terrorism may induce positive effects on some commodity exports. Managers of MNCs should therefore be aware of the fact that terrorism may either positively or negatively influence fuel exports and in situations where the effect is negative, development assistance may not be so much of an instrumental policy tool in dampening the perilous effects on fuel exports. Hence, it is up to these MNCs to take the necessary measures to decrease the negative effects of terrorism on their business operations. Given that MNCs are often the target of terrorism, especially in oil-rich countries, engaging in corporate practices that are friendly to human rights and environmental protection could send a positive signal to the population that the MNCs have inclusive and sustainable development plans for local communities. Improving Corporate Social Responsibility standards is a step in this direction.

Whereas terrorism may not unequivocally disrupt fuel exports as has been established in this study, MNCs need to take preventive steps in order to reduce potentially damaging effects on their cost of doing business. Five main preventive measures may be exploited. *First*, the amelioration of physical security embodies equipment, plant and personnel, especially in places of higher risks. *Second*, security consultants often provide very valuable insights into politico-economic risks associated with areas in which MNCs are operating. Such insights are important for informed decision-making. *Third*, since the global supply chains of MNCs may be exposed to attacks, improving security in transportation networks is vital, though very difficult. *Fourth*, a measure by which MNCs can mitigate cost could be to reduce and/or avoid investment in areas that are likely to be heavily affected by terrorism. *Fifth*, uncertainty associated with politically-risky investment environments can be mitigated by subscribing to insurance schemes.

5. Conclusion and Further Research

This study has employed quantile regressions to assess the conditional role of foreign aid in reducing the potentially negative effect of terrorism on fuel exports in 78 developing

counties for the period 1984-2008. Bilateral and multilateral aid indicators have been used whereas terrorism has included: domestic, transnational, unclear and total terrorism dynamics. The following findings have been established. *First*, the effects of terrorism are both positive and negative across quantiles and specifications, with the impact most apparent in the highest and lowest quantiles. *Second*, while bilateral aid consistently decreases (increases) fuel exports at the top (bottom) quantiles, multilateral aid consistently decreases fuel exports in the top quantiles. *Third*, but for negative thresholds in the 50^{th} quartile and 90^{th} decile, interaction effects between bilateral aid and terrorism dynamics are overwhelmingly not significant. Conversely, but for transnational terrorism, the interaction effects between multilateral aid and terrorism dynamics significantly have negative thresholds. The hypothesis of a positive threshold is only confirmed for transnational terrorism and multilateral aid at the 90^{th} decile. Justifications for unexpected signs have been discussed.

Four main inferences have been established: (i) terrorism may induce positive effects on some commodity exports, (ii) relative to multilateral, bilateral aid more positively influences fuel exports in low-fuel exporting countries, (iii) while bilateral aid should be encouraged in stimulating fuel exports in low-exporting countries, the composition and use of multilateral foreign aid should also be re-structured in order to reverse its negative effect on fuel exports in high-exporting countries and (iv) it is important to first establish the connection between foreign aid and fuel exports before employing the former to mitigate the potentially negative effect of terrorism on the latter.

The resulting managerial implications which are consistent with Oh and Oetzel (2016) can be summarised in the following. Since, terrorism augments social unrest and imposes additional costs to the doing of business; managers of Multinational Companies (MNCs) can more effectively lessen the potentially damaging effects on their operations by leveraging on the experience of host governments in the mitigation of negative externalities of terrorism on development outcomes. One approach by which host governments could fight terrorism is by reliance on foreign aid flows. In the absence of robust evidence that such foreign aid can be instrumental for the purpose of reducing terrorism, MNCs need to consolidate preventive measures.

There is obviously room for further research in (i) assessing channels through which terrorism negatively and positively influences fuel exports and (ii) distinguishing development assistance by sectors in order to improve the extant of knowledge on how aid-specific categories influence the established interconnections.

Appendices

Appendix 1: Definition and source of variables

Variables	Signs	Definitions	Sources
Fuel Export	FuelExp	Ln. Fuel Export (as a % of Merchandise Export)	
Trade Openness	LnTrade	Ln. of Exports plus Imports of Commodities (% of GDP)	
Infrastructure	LnTel	Ln. of Number of Telephone lines (per 100 people)	
Inflation	LnInflation	Ln. of Consumer Price Index (% of annual)	
Exchange rate	LnXrate	Ln. of Exchange rate (local currency per USD)	
Bilateral Aid	LnBilaid	Ln. of Bilateral aid, net disbursement (million USD)	
Multilateral Aid	LnMulaid	Ln. of Multilateral aid, net disbursement (million USD)	
Domestic terrorism	Domter	Number of Domestic terrorism incidents	Bandyopadhyay et al. (2014) and Efobi et al. (2015)
Transnational terrorism	Tranater	Number of Transnational terrorism incidents	
Unclear terrorism	Unclter	Number of terrorism incidents whose category is unclear	
Total terrorism	Totter	Total number of terrorism incidents	
Political globalisation	LnPolglob	Ln. of Index of political globalisation	
Internal conflicts	Civcon	Index of internal civil conflicts	

GDP: Gross Domestic Product. WDI: World Development Indicators.

Appendix 2: Summary statistics

	Mean	S.D	Minimum	Maximum	Obs
Fuel Export (ln)	1.007	2.785	-11.366	4.585	503
Trade Openness (ln)	4.118	0.534	2.519	5.546	612
Infrastructure (ln)	1.475	1.017	0.091	4.031	616
Inflation (ln)	2.414	1.384	-3.434	9.136	581
Exchange rate (ln)	2.908	3.870	-22.121	21.529	618
Bilateral Aid (ln)	5.181	1.286	0.765	8.362	602
Multilateral Aid (ln)	4.163	1.518	-1.249	7.105	600
Domestic terrorism	14.292	45.179	0	419.33	624
Transnational terrorism	2.316	6.127	0	63	624
Unclear terrorism	1.972	7.479	0	86	624
Total terrorism	18.581	55.595	0	477.66	624
Political globalisation (ln)	4.036	0.301	2.861	4.530	624
Internal conflicts	0.965	1.906	0	10	615

S.D: Standard Deviation. Obs: Observations.

Appendix 3: Correlation Matrix

LnFuelExp	LnTrade	LnTel	LnInflation	LnXrate	LnBilad	LnMulaid	Domter	Tranater	Unclter	Totter	LnPolglob	Civcon	
1.000	-0.106	0.095	0.016	-0.002	0.230	-0.090	0.044	0.066	0.013	0.044	0.207	0.043	LnFuelExp
	1.000	0.296	-0.230	0.043	-0.267	-0.289	-0.236	-0.206	-0.240	-0.246	-0.122	-0.299	LnTrade
		1.000	-0.121	-0.191	-0.376	-0.514	0.023	0.072	-0.003	0.026	0.268	-0.183	LnTel
			1.000	-0.284	-0.047	-0.023	0.171	0.164	0.091	0.169	-0.150	0.185	LnInflation
				1.000	0.114	0.183	-0.081	-0.001	-0.050	-0.073	0.089	-0.120	LnXrate
					1.000	**0.721**	0.116	0.088	0.093	0.117	0.233	0.259	LnBilaid
						1.000	0.014	-0.039	0.069	0.016	0.167	0.194	LnMulaid
							1.000	**0.743**	**0.733**	**0.993**	0.127	0.428	Domter
								1.000	0.528	**0.785**	0.120	0.418	Tranater
									1.000	**0.789**	0.072	0.347	Unclter
										1.000	0.126	0.441	Totter
											1.000	-0.024	LnPolglob
												1.000	Civcon

LnFuelExp: Fuel Export. LnTrade: Trade Openness. LnTel: Number of Telephone lines. LnXrate: Exchange rate. LnBilaid: Bilateral aid. LnMulaid: Multilater aid. LnTotaid: Total aid. Domter: Number of Domestic terrorism incidents. Tranater: Number of Transnational terrorism incidents. Unclter: Number of terrorism incidents whose category in unclear. Totter: Total number of terrorism incidents. LnPolglob: Index of political globalisation. Civcon: Index of internal civil conflicts.

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