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WORKING PAPER SERIES

223, 2022

The Terrorism-Finance Nexus Contingent on Globalisation and Governance Dynamics in Africa

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Abstract

This study empirically verifies the effect of terrorism on financial development and how globalisation and governance modulate the incidence of terrorism on financial development in Africa. Two terrorism indicators are adopted for this study, namely, the: number of terrorism incidences and the number of terrorism deaths. The methodology involves the pooled data technique from 1996 to2018 for 34 African countries. The results from the POLS, Driscoll-Kraay and the Newey-West standard error corrections show that terrorism is detrimental to financial development. From the interactive regressions, three major tendencies are apparent. First, terrorism dynamics consistently have an unconditional negative effect on financial development. Second, the globalization and government dynamics modulate the terrorism dynamics to broadly induce a negative net effect on financial development. Third, policy thresholds at which the modulating variables reverse the net effect on financial development from negative to positive are (i) 71.61572 trade (% of GDP) and 13.97872 FDI (% of GDP) for the incidence of terror and (ii) 1.16201 trade (% of GDP) for terror deaths. The computed thresholds make economic sense and are worthwhile in terms of policy implications because they are within statistical range. The result is robust to alternative measures of terrorism and financial development. Policy implications are discussed.

Keywords: terrorism, financial development, globalisation, governance, Pooled data

JEL Classification: D74, G28, F65, P37, C52

1. Introduction

Financial development has increasingly become a focus in economics research, as development policy options can no longer escape this concept. There are debates on how governments around the world can develop their financial sectors to the level that is optimum for their economic development needs. Efficient financial systems encourage savings, investments, and economic development (Schumpeter, 1912; McKinnon, 1973; Karikari et al., 2016). A poorly developed financial system could slow down international capital and trade flows, and therefore, hinders long-run economic development. As a result, many developing countries are working hard to adapt their financial systems to international standards, so as to facilitate globalisation through foreign direct investment (FDI) and trade flows (Ahmed, 2016).

Given the importance of financial development in economic development, studies have largely focused on its driving factors. For instance, Law and Habibullah (2009) argue that institutions, trade and financial liberalisation are the principal drivers of financial sector development. Ibrahim and Sare (2018), posit that financial development in the African context is explained by trade openness, and human capital. The financial sector is still very underdeveloped in most African countries although progress is being made (Ndikumana, 2001). Despite increasing interest and efforts, there are factors that directly or indirectly distort actions in this sense. Among these cankerworms is global terrorism. Terrorism could reduce investors' confidence and trade flow thereby, reducing financial development.

Terrorism is becoming an increasing threat on the African continent. In fact, Africa is suffering from major social, economic and security setbacks that have rendered the continent a fertile ground for terrorist activities (Asongu and Nwachukwu, 2017a). These include among others, political instability mostly arising from post-electoral conflicts and separatist activities, corruption, high rates of unemployment and precarious employments among the youths. The negative effect of terrorism is well document in literature. It destroys human capital (both physical and human capital), reduces the inflow of foreign capital, dampens the tourism industry, and increases both

the wage rate and premiums, thereby, the costs of doing business (Sandler and Enders, 2008; Younas, 2015). On the African continent, terrorism has been found to have divesting effects on the economy. Terrorism increases public debt and public spending as most African states seek external financing in the fight against terror acts which are gaining ground on the continent (Abid and Sekrafi, 2020). Besides, terrorism increases capital flight from the continent to other parts of the world, with the level of capital flight exceeding that of foreign direct investment (FDI) and official development assistance, which are the main sources of financing for Africa's development trajectory (Efobi and Asongu, 2016). In this respect, Onanuga et al. (2020) argue that terrorism has reduced financial flows into Africa. Moreover, it has led to a reduction in agricultural productivity which has been the main source of livelihood for most Africans (Noubissi and Njangang, 2020). Despite the apparent negative externalities of the phenomenon on the continent, terrorist threats are rather on the rise in the continent.

In fact, according to Our World in Data (OWID) statistics, 7 African countries featured among the top 10 nations most threatened by terrorism in 2020. Besides, some African countries like Burkina Faso, Mali and Somalia are ranked alongside the highest in terrorism risk with nations like Syria and Afghanistan. At the same time, according to the 2020 financial development ranking by the International Monetary Fund (IMF), no African country features among the top 20 financially developed economies, with most African nations occupying the bottom quarter of the classification. Despite this low performance in the development of the financial sector in the continent characterised by frequent terrorist attacks, studies on the effect of terrorism in Africa have neglected its impact on financial development. In fact, studies have rather focused on its impact on capital flight (Efobi and Asongu, 2016; Asongu and Amankwah-Amoah, 2016); financial flows (Onanuga et al., 2020); governance (Asongu and Nwachukwu, 2017a); public debt (AbidandSekrafi, 2020); FDI (Efobi, Asongu, and Beecroft, 2018; Ukwueze et al., 2019); agriculture (Noubissi and Njangang, 2020); regional integration (Elu and Price, 2014) and trade (Asongu and Leke, 2019). Accordingly, the extant

literature that has established the link between terrorism and financial development in Africa is sparse. This study thus seeks to empirically establish this link and verify how globalisation and governance modulate the link or incidence of terrorism on financial development.

The contribution of this study lies in the fact that, to the best of knowledge, this is the first study to empirically verify the effect of terrorism on financial development in Africa. Secondly, this is the first empirical study to address the channels through which terrorism can be transmitted into financial sector development. The closest study in the literature to the present exposition is Onanuga et al. (2020) which has employed a Pooled Mean Group methodology to conclude that terrorism reduces financial flows into Africa. However, the present study argues that it is not enough to present a direct nexus between terrorism and financial development as apparent in Onanuga et al. (2020) because in the real world, such a nexus can be influenced by other factors, *inter alia*, globalisation and governance. In essence, dynamics of globalisation and governance can influence the terrorism-finance nexus because globalisation (Asongu and Biekpe, 2018) and governance (Asongu et al., 2019a) have been established in the literature to affect terrorism.

The rest of this paper is organised as follows: section 2 presents a summary review of existing literature, section 3 examines the econometric specification, section 4 presents and discusses the main findings of the study, section 5 concludes.

2. Review of Literature

The empirical literature on the terrorism-financial development nexus is rare, if not non-existent. However, there is a broad range of literature on the one hand, on the impact of terrorism on other economic sectors and the other hand, on the impact of other macroeconomic variables on financial development. These constitute the two main strands of this section.

In the first strand of studies focusing on the impact of macroeconomic factors on financial development, Do, and Levchenko (2007) argue that countries that are comparatively advantageous in financially intensive goods are financially more developed than other countries. Again, Law and Habibullah (2009), through a dynamic panel model, argue that institutional quality and per capita growth significantly explain banking sector and capital market developments in the G-7, Europe, East Asia and Latin America. Bhattacharyy and Hodler (2014) argue that natural resource revenues reduce financial development. This is because natural resources revenue may deteriorate contract enforcement if political institutions are weak. However, the case was found to be different in countries with comparatively better political institutions. Pham (2020) empirically investigates the effect of terrorism on trade in financial services through the gravity model. The analyses reveal that terrorism reduces trade in financial services in both the importer and exporter countries.

In Africa, Gupta et al. (2009) investigate the effect of remittances on poverty and financial development in Sub-Saharan Africa. The empirical analyses based on the fixed and random effects estimations reveal that remittances, per capita GDP, and trade openness enhance financial development (financial deposits and money supply). Besides, Asongu (2013) investigates the relationship between mobile phone penetration and financial development in Africa. Thee analyses indicate that mobile phone penetration is negatively related to financial development. Inflation was negatively related to the banking system efficiency while the links with other financial sectors were non-significant. Government expenditure is negatively related to financial system depth; FDI is positively related to economic and financial depth while negatively related to banking system efficiency. The study further highlights the growing role of informal finance in developing countries.

Williams (2016) examines the effect of remittances on financial development in Africa. The results of his analyses through the system Generalized Method of Moments (GMM) indicate that remittances enhance financial development

and that this link does not depend on democratic institutions. Tchamyou and Asongu (2017) through Ordinary Least Squares (OLS) and GMM argue that information-sharing bureaus increase formal financial sector development while reducing the informal financial sector development. Asongu (2017), using the quantile regression methodology posits that financial globalisation enhances both money supply and liquid liabilities, whereas, GDP growth, inflation and foreign aid are detrimental to these financial development indicators.

Furthermore, Dwumfour and Ntow-Gyamfi (2018) argue that the impact of natural resources rent on financial development depends on the type of financial indicator used. In this regard, they posit that when the Z-score (proxying for financial stability) is used as an indicator, a resource curse tendency is apparent except for the North African region. The opposite effect is rather seen when credit was used as an indicator. On their part, Ibrahim and Sare (2018) examine the determinants of financial development in Africa during the period 1980-2015, focusing on the interactive role played by trade openness and human capital. The results of their analyses from system GMM methodology reveal that trade openness, human capital, Gross Fixed Capital Formation (GFCF), and per capita GDP explain financial development in Africa in terms of private and domestic credit. Moreover, inflation negatively affects financial development (private credit) in their study. Apart from these studies that highlight the determining factors of financial development, especially in the African context, there exists extensive literature on the impact of terrorism on the African economy.

In the second strand, Gaibulloev and Sandler (2011) through the fixed effects panel method for Africa posit that transnational terrorism is detrimental to per capita growth while domestic terrorism has no impact. Efobi and Asongu (2016) through the GMM and quantile regression methods for 29 African countries show that terrorism increases capital flight especially when the initial level of capital flight is low. On their part, Asongu and Nwachukwu (2017a) investigate through the GMM methodology the impact of terrorism on governance in Africa and conclude that terrorism negatively impacts

political and economic governance. There was however no effect on institutional governance. Again, Abid and Sekrafi (2020) conclude that terrorism increases public debt. Through the same methodology, Noubissi and Njangang (2020) found that terrorism reduces agricultural activity in Africa. Moreover, Sekrafi et al. (2020) demonstrate that terrorism increases the informal economy in Africa while reducing the formal economy, with the effect of transnational terrorism more severe than that of domestic terrorism. Besides, Onanuga et al. (2020) through the Pooled Mean Group methodology argue that terrorism reduces financial flows into Africa.

The above literature exposes on the one hand, the determining factors of financial development in Africa and on the other hand, the impact of terrorism on the African economy. As argued in the introduction, the engaged studies, especially Onanuga et al. (2020) which is closest to the present study, however neglect the effect of terrorism on financial development, contingent on factors such as globalisation and governance. There is hence, the need to complement the extant literature by assessing the stated nexus when globalisation and governance dynamics matter in the relationship.

3. Econometric technique

3.1 Empirical model specification

Based on the works of Ibrahim and Sare (2018) and that of Asongu (2013), the following empirical model is adopted.

$$FD_{it} = \beta_0 + \beta_1 Terror_{it} + \beta_j X_{it} + \mu_{it} \qquad (1)$$

Where FD is the financial development indicator or a composite index that regroups financial institutions (FI) and financial market (FM). The financial institutions index is made of the financial institutions depth (FID), financial institutions access (FIA) and financial institutions efficiency (FIE). The financial market index is made up of the financial market depth (FMD), financial market access (FMA) and financial market efficiency (FME).

'Terror' is the independent variable of interest that captures terrorism. In this study, terrorism is measured first by the logarithm of the number of terrorism incidents (Terror_incid), and secondly by the logarithm of the number of people killed following an attack (terror_death). Financial markets are efficient in absorbing terrorism shocks if they are characterised by well-functioning management mechanisms put in place (Johnston and Nedelescu. 2006). Besides, terrorism affects both the formal and informal economy (Sekrafi et al., 2020). In this respect, terrorism could be detrimental to financial development due to its negative impact on trade and FDI inflows.

X is a vector of control variables that contribute in explaining financial development in Africa. It includes trade openness (trade), foreign direct investment inflow (FDI), inflation (CPI), per capita growth (GDP_K), human capital (HC), gross domestic savings (SAVE) and governance (INST_QUAL).

Opening the domestic markets to the international trade necessitates the expansion of the financial sector to ease transaction with international partners. In this respect, Ibrahim and Sare (2018) posit of a positive link between trade openness and financial development in Africa. While FDI inflows may increase funds in the financial sector, such inflows can at the same time be in competition with the domestic financial market by providing external financing under better economic conditions (Levine, 1997; Desbordes and Wei, 2014; Bayar and Gavriletea, 2018). This variable is thus expected to have a negative or positive sign on financial development. Kagochi (2019) posits that for Sub-Saharan African countries to benefit from a deeper and robust financial sector development, the rate of inflation must be maintained low. Tchamyou and Asongu (2017) have established a similar result. A negative sign is thus expected on this variable. Chien et al. (2020) and Asongu et al. (2019b) argue that growth enhances financial development and further suggest that this positive link between the two variables is as from the 75th percentile. We expect a positive sign associated to per capita growth. Ibrahim and Sare (2018) argue that GFCF, savings and human capital are enhancing on financial development in Africa. According

to these authors, higher education can be associated with higher savings which demand provision of better and quality financial services thus, the development of the domestic financial sector. This is seen in the sense that, education stimulates more banking patronage and financial intermediation. A similar situation is expected in this study. GFCF, SAVE and HC are thus expected to have a positive sign in this study. Law and Azman-Saini (2012) argued that high institutional quality is important in explaining the development of the financial sector for developing countries. A positive sign is expected to be associated to INST_QUAL.

From the above arguments, we hypothesise that trade openness, FDI and governance are the main transmission channels through which terrorism can affect financial development. Introducing a multiplicative interactive term of these variables on terrorism in (1) yields.

$$FD_{it} = \beta_0 + \beta_1 Terror_{it} + \beta_j X_{it} + \pi_1 (TRADE_{it} \text{ x } Terror_{it}) + \pi_2 (FDI_{it} \text{ x } Terror_{it}) + \pi_3 (INST\_QUAL_{it} \text{ x } Terror_{it}) + \mu_{it} \quad (2)$$

Where β is the coefficient of the variables that captures the direct explaining factors of financial development, π is the coefficient of the variables that captures the indirect effect of financial development determinants.

If (2) is partially differentiated with respect to "terror", the following relations are obtained.

$$\partial FD_{it} / \partial terror_{it} = \beta_1 + \pi_1 TRADE_{it} + \pi_2 FDI_{it} + \pi_3 INST\_QUAL_{it} \quad (3)$$

Where $\boldsymbol{\partial}$ is the partial derivative operator. Equation (3) shows that the change in financial development following a terrorist attack depends on the sign and magnitude of trade openness, FDI, and$INST_QUAL$.

3.2. Data

The data in this study for the terrorism variables are collected from the Global Terrorism Database (GTD); that for human capital is collected from the Penn World Table version 10.0; $INST\_QUAL$ is from the World Governance Indicators

(WGI) of the World Bank and represents the average of the six governance indicators of Kaufmann[1], while the rest of the variables are from the World Development Indicators (WDI) of the World Bank. The data are collected from 34 African countries between 1996 and 2018 based on the availability of data on all the variables retained. The list of countries and sources of data are presented in Appendix 1 and Appendix 2, respectively. Appendix 3 discloses a summary statistics of these variables.

4. Estimation method and results

4.1. Estimation method

Traditional panel models could be fixed effects (FE), random effects (RE) or pooled ordinary least squares (POLS). In the RE and FE models, the effect of the time and individual dimensions are taken into consideration, whereas, this is not the case with POLS. In our case, we are disposed of a dataset wherein the time dimension is not uniform for all the countries. This is a pooled panel data. However, to conclude on this, the best model structure is chosen through the following procedure (Çinar, 2017). Firstly, Chow F-homogeneity test is used to decide between POLS and FE. If the null hypothesis is rejected, then the FE model is selected. The result (see Appendix 4) shows that the FE is the best model. Secondly, the Hausman test is used to select between fixed and random effects model under the null hypothesis that the preferred model is RE. Results of the test (see Appendix 4) reveal that the RE is the most appropriate model (Probability of chi2 > 10%). Finally, the Breusch and Pagan Lagrangian multiplier test for random effects is used to choose between RE and POLS. If the null hypothesis is rejected, then the POLS is the best model. The results (see Appendix 4) indicate that the POLS is the best model in this case. This simply comes to confirm the nature of our data. Given that the time dimension of the data is not regular across the cross-section, the POLS is thus adopted in the accordance with attendant literature (Çinar, 2017).

$$Y_{it} = \alpha + \Omega X_{it} + \mu_{it}$$

[1]Ngouhouo et al. (2021) measured institutional through this method.

Where Y is the dependent variable (financial development in this case), X is the vector of explanatory variables, a is a constant common effect term, Ω is the common effects slope parameter, and μ is the error term which is independently and identically distributed.

After the regression of the POLS, first order autocorrelation and heteroscedasticity are tested through the Woodridge test and the Breusch-Pagan / Cook-Weisberg tests, respectively. The Woodridge test is under the null hypothesis that there is absence of autocorrelation of order 1, while the Breusch-Pagan / Cook-Weisberg test is under the null hypothesis that the error variance are all equal (homoscedastic). The results in Appendix 4 indicate that the null hypothesis is rejected in both cases. There is thus the presence of first order autocorrelation of residuals and the presence of heteroscedasticity in the model. In this case Newey and West (1987) developed an estimator that corrects autocorrelation and heteroscedasticity up to a certain lag. Despite correcting for autocorrelation and heteroscedasticity, the Newey and West (1987) standard error does not take into account cross-sectional dependence across series. For this reason, Driscoll and Kraay (1998) proposed an estimator for standard errors that correct heteroscedasticity, autocorrelation of residuals, and cross-sectional as well as temporal dependence. Both of these methods of correcting standard errors have options applicable to POLS. However, we could not test for cross-sectional dependence after regression because the option is only available after FE and RE regressions, whereas, our model is the POLS. We thus present the results of both methods for robustness purposes. However, our subsequent estimations use the Driscoll/ Kraay standard error because of its advantages as explained above.

4.2 Presentation of results

Table 1 presents the direct effect of terrorism on financial development, while Table 2 presents the transmission channels. Tables 3 and 4 present results for robustness analyses. Appendix 5 and 6 present the results with alternative measures of governance. The results from Table 1 indicate that terrorism negatively and significant affects financial development as expected. Trade

openness and domestic savings equally have negative significant effects, whereas, human capital, economic growth, FDI and governance positively affect financial development. However, the positive affect of FDI is only significant when terrorism is captured through the number of deaths resulting from terrorist attacks.

Table 2 indicates that the negative effect of terrorism on financial development indirectly passes through globalisation and governance. While the pass through effect through trade is significant in all estimations, the pass through FDI and governance is only effective through terrorism incidence and terrorism death, respectively.

Consistent with the attendant contemporary literature on interactive regressions (Tchamyou, 2019; Tchamyou et al., 2019), the net effects of terrorism on financial development are computed on the bases of average values of the policy or moderating variables, notably: the average values of trade, FDI and Governance are respectively, 56.69311, 4.146356 and 1.535099. These average values are apparent in the summary statistics in Appendix 3. It is also important to note that for some instances, net effects and/or thresholds cannot be computed for two apparent reasons: (i)"na" or "not applicable" is assigned to the corresponding space(s) because at least one estimated coefficient needed for the computation of net effects and/or thresholds is not significant and (ii) "nsa": "not specifically applicable" is also assigned because synergy effects are apparent instead. Accordingly, synergy effects are apparent when both the unconditional and conditional estimates reflect the same signs. Hence, the computation of a threshold is technically not feasible (Asongu and Acha-Anyi, 2017; Asongu and Nwachukwu, 2017b).

In order to enhance readability and flow, an example of how net effects are computed is worth articulating. For instance, in the second column of Table 2, the net effect of terror incidence on financial development contingent on the modulating role of trade openness is -0.003417 ([0.000229 × 56.69311] + [-0.0164]). In the underlying computation, -0.0164 is the unconditional effect of

terror incidence on financial development, 56.69311 is the average value of trade openness while 0.000229 is the conditional effect linked to the interaction between terror incidence and trade openness.

For most of the computed negative net effects, the corresponding conditional effects are positive, indicating that the adopted modulating variables of governance and globalization can reverse the positive incidence of terrorism dynamics on financial development when certain thresholds of the attendant modulating variables are attained. These thresholds are computed accordingly. For instance, in the second column of Table 2, the trade openness threshold at which the negative net effect is nullified is 71.61572 (0.0164/0.000229). It follows that when trade openness is 71.61572 as a percentage of GDP, the corresponding net effect is 0.00000([0.000229 × 71.61572] + [-0.0164]). Hence, when trade is above 71.61572 (% of GDP), the overall effect of terror incidence on financial development becomes positive.

Building on the above, the following summary of results is apparent in Table 2. First, terrorism dynamics consistently have an unconditional negative effect on financial development. Second, the globalization and government dynamics modulate the terrorism dynamics to broadly induce a negative net effect on financial development. Third, policy thresholds at which the modulating variables reverse the net effect on financial development from negative to positive are (i) 71.61572 trade (% of GDP) and 13.97872 FDI (% of GDP) for the incidence of terror and (ii) 1.16201 trade (% of GDP) for terror deaths. The computed thresholds make economic sense and worthwhile in terms of policy implications because they are within statistical range, notably: (i) 5.250688 to 179.121 (% of GDP) for trade and (ii)
-8.58943 to 111.578 (% of GDP) for FDI.

Two emphases merit clarification. On the one hand, the trade threshold corresponding to terror deaths is low as compared to terror incidence because the overall net effect of the former is positive. On the other hand, while the net effect from the modulating role governance is negative, a

threshold cannot be computed because the associated conditional effect is also negative. This implies, governance standards should be improved by policy makers in order to anticipate the expected positive conditional effect from which the corresponding threshold can be computed.

Table 1. Effect of terrorism on financial development

	(1) POLS	(2) Driscoll/Kraay	(3) Newey-West	(4) POLS	(5) Driscoll/Kraay	(6) Newey-West
VARIABLES	Dependent variable: Financial development					
Terror incidence	-0.00499*	-0.00499*	-0.00499*			
	(0.00259)	(0.00251)	(0.00256)			
GDP per capita	0.109***	0.109***	0.109***	0.116***	0.116***	0.116***
	(0.00534)	(0.00390)	(0.00941)	(0.00529)	(0.00436)	(0.0163)
Governance	0.00341***	0.00341***	0.00341***	0.00358***	0.00358***	0.00358***
	(0.00123)	(0.000560)	(0.000812)	(0.00123)	(0.000279)	(0.000899)
FDI	0.000279	0.000279	0.000279	0.00162*	0.00162***	0.00162*
	(0.000524)	(0.000167)	(0.000515)	(0.000828)	(0.000359)	(0.000893)
Domestic saving	-0.00278***	-0.00278***	-0.00278***	-0.00288***	-0.00288***	-0.00288***
	(0.000280)	(0.000116)	(0.000326)	(0.000305)	(0.000124)	(0.000574)
Inflation	-0.00331	-0.00331	-0.00331	-0.00271	-0.00271	-0.00271
	(0.00386)	(0.00431)	(0.00342)	(0.00385)	(0.00378)	(0.00466)
Trade	-0.00106***	-0.00106***	-0.00106***	-0.00111***	-0.00111***	-0.00111***
	(0.000171)	(0.000101)	(0.000178)	(0.000173)	(9.54e-05)	(0.000267)
Human capital	0.00317	0.00317***	0.00317***	0.00299	0.00299***	0.00299**
	(0.00203)	(0.000630)	(0.00107)	(0.00202)	(0.000570)	(0.00122)
Terror death				-0.00519***	-0.00519**	-0.00519**
				(0.00167)	(0.00210)	(0.00252)
Constant	-0.490***	-0.490***	-0.490***	-0.523***	-0.523***	-0.523***
	(0.0325)	(0.0185)	(0.0507)	(0.0332)	(0.0150)	(0.0929)
Observations	361	361	361	337	337	337
R-squared	0.569	0.569		0.611	0.611	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
FDI is the foreign direct investment inflow and FD is the financial development indicator.

Table 2. Transmission channels through which terrorism affects financial development

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Dependent variable: Financial development					
Terror incidence	-0.0164***	-0.00657***	-0.00488**			
	(0.00334)	(0.00194)	(0.00201)			

GDP per capital	0.111***	0.111***	0.109***	0.117***	0.116***	0.116***
	(0.00610)	(0.00335)	(0.00367)	(0.00513)	(0.00473)	(0.00434)
Governance	0.00404***	0.00257***	0.00372***	0.00394***	0.00336***	0.00554***
	(0.000800)	(0.000644)	(0.00131)	(0.000182)	(0.000691)	(0.00112)
FDI	0.000202	0.000297*	0.000230	0.00154***	0.00135**	0.00165***
	(0.000457)	(0.000172)	(0.000217)	(0.000342)	(0.000506)	(0.000363)
Domestic saving	-0.00302***	-0.00282***	-0.00279***	-0.00297***	-0.00289***	-0.00289***
	(0.000213)	(9.95e-05)	(9.65e-05)	(0.000139)	(0.000140)	(0.000124)
Inflation	-0.00315	-0.00392	-0.00322	-0.00349	-0.00305	-0.00243
	(0.00442)	(0.00357)	(0.00377)	(0.00343)	(0.00460)	(0.00385)
Trade	-0.00134***	-0.00112***	-0.00105***	-0.00143***	-0.00112***	-0.00111***
	(0.000168)	(6.98e-05)	(7.81e-05)	(0.000237)	(0.000125)	(9.52e-05)
Human capital	0.00231**	0.00435***	0.00278*	0.00247***	0.00331***	0.000870
	(0.00101)	(0.000735)	(0.00151)	(0.000389)	(0.00117)	(0.00153)
Trade xterror incidence	0.000229***					
	(3.26e-05)					
FDI xterror incidence		0.000470**				
		(0.000176)				
Governance xterror incidence			-0.00040			
			(9.73e-05)			
Terror death				-0.0104**	-0.00551*	-0.00509**
				(0.00398)	(0.00272)	(0.00202)
Trade xTerror death				0.00895**		
				(4.04e-05)		
FDIxTerror death					0.000109	
					(0.000201)	
Governance xterror death						-0.000182**
						(8.67e-05)
Constant	-0.482***	-0.496***	-0.489***	-0.505***	-0.522***	-0.522***
	(0.0394)	(0.0179)	(0.0179)	(0.0153)	(0.0143)	(0.0159)
Net effect with trade	-0.003417			0.49700		
Net effect with FDI		-0.004621			na	
Net effect with governance			na	1.16201		-0.005369
Threshold (-/+)	71.61572	13.97872	na		na	nsa
Observations	361	361	361	337	337	337
R-squared	0.576	0.570	0.569	0.614	0.611	0.612

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

FDI is the foreign direct investment inflow and FD is the financial development indicator. The average value of Trade, FDI and Governance are respectively, 56.69311, 4.146356 and 1.535099. "na", not applicable because at least one estimated coefficient needed for the computation of net effect and/or threshold is not significant. nsa: not specifically applicable because synergy effects are apparent instead.

Table 3. Robustness analyses using alternative financial development indicators to assess the effect of terror incidence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: Financial development							
VARIABLES	FI	FM	FID	FIA	FIE	FMD	FMA	DOMESTI_CREDIT
Terror incidence	-0.00112	-0.00890***	-0.00950***	-0.00266	0.0131***	-0.0122***	-0.00515**	-0.0235
	(0.00330)	(0.00151)	(0.00311)	(0.00223)	(0.00463)	(0.00388)	(0.00225)	(0.0241)
GDP per capita	0.114***	0.113***	0.144***	0.0828***	0.0819***	0.121***	0.0990***	0.788***
	(0.00387)	(0.00580)	(0.00582)	(0.0123)	(0.00794)	(0.00392)	(0.0112)	(0.0847)
Governance	0.00384***	0.00409***	0.00476***	0.00362***	0.000539	0.00730***	0.00196***	0.0200***
	(0.000370)	(0.000575)	(0.000454)	(0.000676)	(0.00164)	(0.000601)	(0.000646)	(0.00614)
FDI	0.000884***	0.00233***	0.00217***	-0.000279	0.000464	0.00174**	0.00288***	-0.00953
	(0.000288)	(0.000826)	(0.000654)	(0.000447)	(0.000817)	(0.000805)	(0.000869)	(0.00640)
Domestic saving	-0.00328***	-0.00235***	-0.00462***	-0.00228***	-0.00187	-0.00337***	-0.000302	-0.0291***
	(0.000426)	(0.000366)	(0.000375)	(0.000355)	(0.00117)	(0.000245)	(0.00125)	(0.00817)
Inflation	-0.0136***	0.00869	-0.00245	-0.00569*	-0.0364***	0.00240	0.0143***	-0.250***
	(0.00430)	(0.00548)	(0.00633)	(0.00301)	(0.00473)	(0.00692)	(0.00257)	(0.0386)
Trade	-0.000739***	-0.00143***	-0.000958***	-8.77e-05	-0.00113***	-0.000573*	-0.00230***	-0.00148
	(6.68e-05)	(0.000218)	(0.000139)	(7.09e-05)	(7.93e-05)	(0.000314)	(6.56e-05)	(0.00161)
Human capital	0.00161**	0.00465***	0.00253***	0.00194***	-0.00301*	0.00757***	0.00249	-0.00460
	(0.000707)	(0.000854)	(0.000622)	(0.000267)	(0.00174)	(0.000865)	(0.00155)	(0.00442)
Constant	-0.439***	-0.587***	-0.728***	-0.437***	0.0878	-0.636***	-0.495***	-1.565**
	(0.0136)	(0.0329)	(0.0392)	(0.0577)	(0.0594)	(0.0319)	(0.0700)	(0.676)
Observations	337	337	337	337	337	337	337	324
R-squared	0.599	0.506	0.441	0.606	0.481	0.520	0.321	0.646

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Foreign direct investment inflows (FDI), financial institutions index (FI), financial market index (FM), financial institutions depth (FID), financial institutions access (FIA), financial institutions efficiency (FIE), financial market depth (FMD), financial market access (FMA) and domestic credit to private sector (DOMESTI_CREDIT).

Table 4.Robustness analyses using alternative financial development indicators to assess the effect of terror deaths

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: Financial development							
VARIABLES	FI	FM	FID	FIA	FIE	FMD	FMA	DOMESTI_CREDIT
Terror deaths	-0.00209	-0.00738**	-0.0132**	-0.00381*	0.0164**	-0.0148***	0.00176	-0.0205
	(0.00484)	(0.00262)	(0.00496)	(0.00201)	(0.00644)	(0.00401)	(0.00583)	(0.0167)
GDP per capita	0.108***	0.105***	0.137***	0.0791***	0.0792***	0.114***	0.0875***	0.762***
	(0.00498)	(0.00497)	(0.00482)	(0.00833)	(0.00604)	(0.00437)	(0.00613)	(0.0545)
Governance	0.00384***	0.00365***	0.00471***	0.00361***	0.000693	0.00672***	0.00137***	0.0216***
	(0.000497)	(0.000789)	(0.000671)	(0.000825)	(0.00100)	(0.00149)	(0.000384)	(0.00507)
FDI	-0.000129	0.000568***	0.000417	-0.000533	-0.000154	0.000182	0.00113***	-0.00859**
	(0.000180)	(0.000192)	(0.000267)	(0.000363)	(0.000286)	(0.000313)	(0.000167)	(0.00340)
Domestic savings	-0.00304***	-0.00240***	-0.00461***	-0.00192***	-0.00155	-0.00333***	-0.000654	-0.0269***
	(0.000348)	(0.000322)	(0.000261)	(0.000330)	(0.00108)	(0.000204)	(0.000970)	(0.00494)
Inflation	-0.0129**	0.00688*	-0.00557	-0.00613*	-0.0291***	-0.000191	0.0120***	-0.238***
	(0.00483)	(0.00382)	(0.00724)	(0.00306)	(0.00407)	(0.00730)	(0.00308)	(0.0231)
Trade	-0.000789***	-0.00127***	-0.000955***	-0.000245	-0.00111***	-0.000607*	-0.00183***	-0.00310***
	(9.75e-05)	(0.000140)	(0.000177)	(0.000163)	(0.000137)	(0.000348)	(0.000142)	(0.000806)
Human capital	0.00148***	0.00528***	0.00257**	0.00178*	-0.00344***	0.00843***	0.00322***	-0.00939**
	(0.000429)	(0.00117)	(0.000935)	(0.000961)	(0.00115)	(0.00223)	(0.000613)	(0.00339)
Constant	-0.405***	-0.555***	-0.682***	-0.412***	0.106**	-0.604***	-0.455***	-1.417***
	(0.0151)	(0.0285)	(0.0387)	(0.0414)	(0.0508)	(0.0351)	(0.0376)	(0.457)
Observations	361	361	361	361	361	361	361	347
R-squared	0.575	0.445	0.423	0.571	0.475	0.501	0.290	0.627

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Foreign direct investment inflows (FDI), financial institutions index (FI), financial market index (FM), financial institutions depth (FID), financial institutions access (FIA), financial institutions efficiency (FIE), financial market depth (FMD), financial market access (FMA) and domestic credit to private sector (DOMESTI_CREDIT).

Onanuga et al. (2020) earlier argued that terrorism discourages financial flows into Africa. The negative effect of terrorism on financial development can be explained by the fact that terrorism reduces trade and FDI inflows as the security of properties and persons are not guaranteed. Terrorism attacks increase the cost of doing business, augment security spending and lead to the destruction of trading infrastructures. In fact, according to the 2020 global terrorism data, 41% of terrorism-related deaths were exclusively from Sub-Saharan Africa. Besides, Africa recorded 748 deaths due to terrorist attacks in February 2020, up from 715. At the same time, following the 2020 SIPRI statistics, military spending in Africa increased by 1.5% for the first time since 5 years. Moreover, World Bank (2019) states that external debt has outpaced economic growth in sub-Saharan Africa. An increase external debt and military spending due to terrorism reduces investment in other sectors (especially the financial sector) which can stimulate economic development. African countries mostly opt for external debt to fund the fight against terrorism, while people are internally displaced. Government efforts are geared towards humanitarian needs and the security of goods and persons, mostly funded through external debt.

5. Concluding implications and future research directions

Terrorism is becoming an increasing thread in the global economy, especially in Africa. 7 African countries feature among the top 10 terrorism threat nations in 2020, with African countries like Burkina Faso, Mali and Somalia ranked alongside top terrorism risk nations like Syria and Afghanistan. At the same time, according to the 2020 financial development ranking by the IMF, no African country features among the top 20 financially developed economies, with most African nations occupying the bottom quarter of the classification. This has been the point of departure for the present study. This study has thus empirically verified the effect of terrorism on financial development and how globalisation and governance modulate the incidence of terrorism on financial development in Africa. Two terrorism indicators were adopted for this study; the number of terrorism incidence and

number of terrorism deaths. On the other hand, the financial development indicators used include: The composite financial development index (FD); it sub-components that regroup financial institutions (FI) and financial market (FM); financial institutions depth (FID), financial institutions access (FIA) and financial institutions efficiency (FIE); financial market depth (FMD), financial market access (FMA), and finally domestic credit provided by the private sector. The methodology involves the pooled data techniques for data for the period 1996 to 2018.

The results from the POLS, Driscoll-Kraay and the Newey-West standard error corrections show that terrorism is detrimental to financial development. From the interactive regressions, three major tendencies are apparent. First, terrorism dynamics consistently have an unconditional negative effect on financial development. Second, the globalization and government dynamics modulate the terrorism dynamics to broadly induce a negative net effect on financial development. Third, policy thresholds at which the modulating variables reverse the net effect on financial development from negative to positive are: (i) 71.61572 trade (% of GDP) and 13.97872 FDI (% of GDP) for the incidence of terror and (ii) 1.16201 trade (% of GDP) for terror deaths. The computed thresholds make economic sense and worthwhile in terms of policy implications because they are within statistical range. This result was robust to alternative measures of terrorism and financial development.

As a policy implication, the different governments in Africa should not neglect the fight against terrorism when implementing financial development policies. In this respect, peaceful negotiations should be held with rebel groups rather than the use of fire arms. Moreover, the role play by globalisation and governance in the process should not be neglected in the process: attendant actionable policy thresholds have been computed and provided to policy makers in this study. Moreover, there is need to increase the quality of governance in the continent in order to anticipate favourable modulating effects given that a negative synergy has been established from the modulating role of governance in this study. *Inter alia*, more good

governance can be achieved through conflict resolutions, intensifying the fight against corruption, guaranteeing the security of property and persons, ensuring the independence of the judiciary in adhering to law and justice and enhancing the efficiency of the different governments in elaborating and implementing policies related to the financial development. There is a further need for the training of human capital that can integrate the financial market, which has shown an enhancing effect on financial development.

The findings in this study obviously leave space for future research especially within the remit of assessing how the established findings withstand empirical scrutiny within panel-based settings as well as country-specific frameworks, contingent on data availability. Accordingly, owing to data availability constraints, only pooled data has been used in this study. Hence, as the relevant data become available, reconsidering the analysis within a panel setting is worthwhile. Moreover, country-specific expositions should inform more robust country-specific policy implications.

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Appendix

Appendix 1. List of countries under study (34)

Algeria, Angola, Burkina Faso, Burundi, Cameroon, Central African Republic, Comoros, Democratic republic of Congo, Republic of Congo, Cote D'Ivoire, Egypt, Ethiopia, Gabon, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Morocco, Niger, Nigeria, Rwanda, Senegal, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda.

Appendix 2. Variables and data sources

Variables	abbreviation	Source
Compositefinancial development index	Fd	IMF
terrorismincidence	Terror_incid	GTD
terrorismdeath	Terror_death	GTD
GDP per capita (consatant 2010 USD)	GDP_K	WDI
Foreign direct investment inflows (%GDP)	FDI	WDI
Gross domestic savings (current US$)	SAVE	WDI
Inflation, consumer prices (annual %)	Inflation	WDI
Trade (% of GDP)	Trade	WDI
Human capital index	HC	Penn World Table version 10.00
Governance	Inst_qual	Authors from WGI data
control_corruption	control_corruption	WGI
Government effectiveness	Government_eff	WGI

Political stability and absence of violence	political_stab	WGI
Regulatory quality	reg_qual	WGI
Rule of law	rule_law	WGI
Voice and accountibity	voice_acc	WGI
Financial institutions index	FI	IMF
financial market index	FM	IMF
financial institutions depth	FID	IMF
financial institutions access	FIA	IMF
financial institutions efficiency	FIE	IMF
financial market depth	FMD	IMF
financial market access	FMA	IMF
domestic credit to private sector	Domestic credit.	WDI

Appendix 3. Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
FD	429	0.142044	0.101184	0.018751	0.648437
terror incidence	429	1.828664	1.648062	0	6.570883
terror death	393	3.981175	2.488509	0	10.95014
GDP per capita	427	6.682114	1.31003	0.78785	9.378119
FDI	425	4.146356	8.742719	-8.58943	111.578
Domestic saving	398	13.92614	16.62823	-90.8346	57.49363
Inflation	401	3.169872	2.167484	-0.69024	15.96622
Trade	397	56.69311	28.47484	5.250688	179.121
Human capita	413	3.085599	8.272829	1.099297	61.9796
Governance	429	1.535099	14.47583	-2.02967	1.96655
Control of corruption	429	13.81111	86.78066	-2.37078	1.6056
Governmenteffectiveness	429	-0.85976	0.662439	-1.7623	1.020496
Political stability	429	-1.21244	0.924222	-1.52657	1.070716
Regulatory quality	429	-0.78788	0.668439	-2.32498	0.655617
Rule of law	429	-0.88939	0.674905	-2.03542	0.270558
Voice and accountability	429	-0.85105	0.704256	-2.4622	0.846978
FI	429	0.214972	0.106655	0.034276	0.735649
FM	429	0.066276	0.113951	0	0.5834
FID	429	0.096176	0.145039	0.001043	0.883483
FIA	429	0.0657	0.079085	0.003221	0.430138
FIE	429	0.519458	0.172702	0.005925	0.812637

FMD	429	0.089772	0.15754	0	0.830843
FMA	429	0.05712	0.139688	0	0.507732
Domestic credit.	407	20.42112	26.91322	0	160.1248

NB: Foreign direct investment inflows (FDI), financial development index(FD) financial institutions index (FI), financial market index (FM), financial institutions depth (FID), financial institutions access (FIA), financial institutions efficiency (FIE), financial market depth (FMD), financial market access (FMA) and domestic credit to private sector (DOMESTI_CREDIT).

Appendix 4. Model selection Tests

Chow F-homogeneity	Hausman	Breusch and Pagan Lagrangian multiplier test for random effects	Wooldridge test AR(1)	Breusch-Pagan / Cook-Weisberg test for heteroscedasticity
Prop>F	Prob>chi2	Prob> chibar2	Prob> F	Prob> chi2
0.0000	0.8147	0.0000	0.0002	0.0000

NB: Fisher test (F), first order autocorrelation (AR (1)),

Appendix 5. Alternative measures of governance

VARIABLES	(1) fd	(2) Fd	(3) fd	(4) fd	(5) fd	(6) fd
Terror incidence	-0.00498*	-0.000463	0.000108	-0.00109	-0.00103	-0.00282
	(0.00250)	(0.00310)	(0.00338)	(0.00176)	(0.00195)	(0.00247)
GDP per capita	0.109***	0.0881***	0.0993***	0.0929***	0.0915***	0.0934***
	(0.00397)	(0.00486)	(0.00496)	(0.00218)	(0.00281)	(0.00357)
control_corruption	0.000407**					
	(0.000160)					
FDI	0.000450**	0.000710**	0.000742**	0.000777***	0.000634***	0.000748***
	(0.000207)	(0.000266)	(0.000325)	(0.000150)	(0.000151)	(0.000183)
Domestic saving	-0.00279***	-0.00226***	-0.00251***	-0.00224***	-0.00217***	-0.00208***
	(0.000117)	(0.000176)	(0.000207)	(0.000185)	(0.000104)	(0.000141)
Inflation	-0.00206	0.00183	0.000435	0.00314**	0.00264	0.00239*
	(0.00213)	(0.00231)	(0.00297)	(0.00146)	(0.00225)	(0.00125)
Trade	-0.00108***	-0.000843***	-0.00106***	-0.000879***	-0.000860***	-0.00104***
	(9.08e-05)	(0.000124)	(0.000145)	(5.72e-05)	(6.86e-05)	(8.84e-05)
Human capital	0.00475***	0.00693***	0.00754***	0.00709***	0.00704***	0.00727***
	(0.00121)	(0.000416)	(0.000445)	(0.000239)	(0.000421)	(0.000433)
Government_eff		0.0401***				
		(0.00797)				
Political stability			0.0190***			
			(0.00219)			

Rregulatory quality				0.0378***		
				(0.0117)		
Rule of law					0.0402***	
					(0.00372)	
voice_account						0.0428***
						(0.00612)
Constant	-0.496***	-0.363***	-0.431***	-0.402***	-0.386***	-0.386***
	(0.0182)	(0.0363)	(0.0313)	(0.0200)	(0.0143)	(0.0235)
Observations	361	361	361	361	361	361
R-squared	0.564	0.597	0.577	0.592	0.601	0.619

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

NB: financial development index (FD), foreign direct investment inflows (FDI), government effectiveness (Government_eff), voice and accountability (voice_account).

Table 6.Alternative measures of governance with terrorism alternative

	(1)	(2)	(3)	(4)	(5)	(6)
	eq1	eq2	eq3	eq4	eq5	eq6
VARIABLES	fd	Fd	fd	fd	fd	fd
Terror death	-0.00527**	-0.00265*	-0.00224	-0.00240*	-0.00270	-0.00324
	(0.00207)	(0.00153)	(0.00210)	(0.00116)	(0.00170)	(0.00218)
GDP per capita	0.116***	0.0984***	0.108***	0.102***	0.101***	0.0999***
	(0.00441)	(0.00333)	(0.00454)	(0.00256)	(0.00440)	(0.00312)
control of corruption	0.000454***					
	(5.35e-05)					
FDI	0.00180***	0.00175***	0.00204***	0.00190***	0.00179***	0.00196***
	(0.000383)	(0.000436)	(0.000563)	(0.000511)	(0.000435)	(0.000382)
Domestic saving	-0.00290***	-0.00247***	-0.00273***	-0.00246***	-0.00238***	-0.00223***
	(0.000126)	(9.03e-05)	(0.000126)	(0.000158)	(9.91e-05)	(0.000144)
Inflation	-0.00181	0.00132	0.000462	0.00256*	0.00256	0.00285***
	(0.00185)	(0.00134)	(0.00201)	(0.00146)	(0.00169)	(0.000896)
Trade	-0.00113***	-0.000961***	-0.00116***	-0.000976***	-0.000964***	-0.00109***
	(9.35e-05)	(8.39e-05)	(0.000114)	(7.84e-05)	(9.60e-05)	(9.91e-05)
Human capital	0.00439***	0.00737***	0.00782***	0.00746***	0.00737***	0.00735***
	(0.000278)	(0.000334)	(0.000388)	(0.000293)	(0.000435)	(0.000328)
Government_eff		0.0328***				
		(0.00537)				
Politicalstability			0.0174***			
			(0.00111)			
regulatory quality				0.0319***		
				(0.00904)		
Rule of law					0.0359***	
					(0.00199)	
Voice_account						0.0435***
						(0.00630)
Constant	-0.529***	-0.420***	-0.481***	-0.453***	-0.437***	-0.421***

	(0.0150)	(0.0107)	(0.0134)	(0.0100)	(0.0165)	(0.0128)
Observations	337	337	337	337	337	337
R-squared	0.606	0.625	0.616	0.623	0.632	0.660

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

NB: financial development index (FD), foreign direct investment inflows (FDI), government effectiveness (Government_eff), voice and accountability (voice_account).