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Review

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Terrorism and investment in Africa: Exploring the role of military expenditure[1]

Chimere O. Iheonu[2], Hyacinth E. Ichoku[3]

Abstract: The aim of this study is to investigate the influence of military expenditure on the relationship between terrorism and investment in twenty-four African countries for the period 2001 to 2018. The study utilizes fixed effects regression with Driscoll and Kraay standard error and cushions the effect of simultaneity and reverse causality using the lags of the regressors as instruments. The empirical results reveal the negative effect of terrorism on both domestic investment and foreign direct investment (FDI). The study further reveals a negative net effect of military expenditure on the relationship between terrorism and investment. Furthermore, it was discovered that a threshold of 2% to 5% of military expenditure in GDP is required for military expenditure to offset the negative effect of terrorism on FDI. The study recommends that counterterrorism initiatives be tailored more towards inclusive growth policies, increasing access to education, and improving the quality of governance.

Keywords: terrorism, military expenditure, domestic investment, FDI.

JEL codes: C23, C26, H12, E20.

Introduction

Two research objectives motivate this study. The first is to understand the effect of terrorist activities on economic performance in Africa and the second is to examine whether military expenditure can effectively offset the hypothetical negative effect of terrorism on economic performance in Africa. Two indicators of the economy are evaluated. They include domestic investment and foreign direct investment (FDI).

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[2] University of Nigeria, Department of Economics, Nsukka, University Road, Enugu 410001, Nigeria, corresponding author: iheonuchimere@yahoo.com, ORCID: https://orcid.org/0000-0002-7348-4494.
[3] University of Nigeria, Department of Economics, Nsukka, University Road, Enugu 410001, Nigeria, hichoku@yahoo.com.

On the first objective, terrorism in Africa has become a major concern due to the negative effect it could have on various dimensions of socio-economic development. Asongu and Nwachukwu (2017) acknowledge that terrorism has become a growing issue in Africa, as terrorism has been utilized by non-state actors with severe consequences for civilians. The region has become a fertile ground for the growth of terrorist activities as a result of a myriad of factors, which include inequality, tribal and ethnic tensions, religious fundamentalism, political instability and armed conflict. Iheonu and Ichoku (2021a) have also revealed that unemployment and bad governance are factors influencing terrorist activities in Africa.

Over the last two decades, there has been a significant rise in terrorist attacks in Africa. Insurgent groups such as Boko Haram, the Islamic State of West African Province (ISWAP) and Al-Shabab have been at the forefront of the incidence of terrorism. Domestic conflicts across a number of African countries have resulted in non-state actors utilizing terrorism as a means to achieve an end. According to the Institute for Economics and Peace (IEP, 2020), violent conflict accounted for more than 96% of terrorism-related deaths in 2019. In 2018, as revealed in Figure 1, four African countries were at the top of the list in terms of total terrorism-related deaths. Adding to the raw data presented in Figure 1, it is worth mentioning that most terrorist attacks have been as a result of the incursion of Islamic extremists into Africa. In Burkina Faso, the Islamic State of Greater Sahara (ISGS), Jamaat Nusrat al-Islam wal Muslimin (JMIN) and Ansar al-Islam increased the number of terrorism-related deaths by 590% (IEP, 2020).

Incidents of terrorism can affect economic performance by creating investment pessimism that can linger over time, particularly in developing countries and thereby reducing domestic investment and FDI. This can also affect other dimensions of the economy such as inflation (Akinci, Yuce Akinci, & Yilmaz,
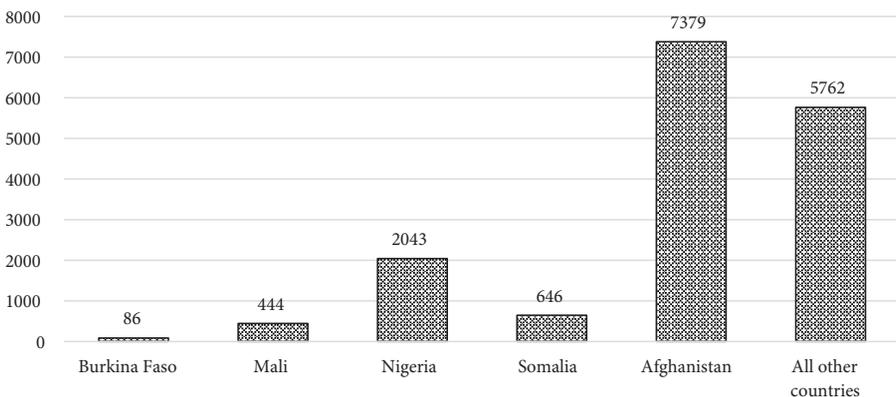
Figure 1. Total deaths from terrorism in the year 2018
Source: (IEP, 2020).

2014) and financial development (Arif & Suleman, 2017) through the stock market. Cinar (2017) acknowledged the negative consequences terrorism can have on the economy, which has also been documented by Filer and Stanisic (2016). According to Zakaria, Jun and Ahmed (2019), the incident of terrorism causes a reduction in the level of domestic investment. The link between terrorism and domestic investment is such that (1) terrorism leads to property damage which reduces the growth rate of new investment and (2) terrorism creates pessimism for investment, which exacerbates the Keynesian animal spirits, thus leading to lower growth rates.

In terms of FDI, Collier, Elliot, Hegre, Reynal-Querol and Sambanis (2003) have also revealed that the incident of terrorism diverts FDI away from countries with high levels of terrorist activity. This has also been supported by Ali, Wang, Ullah and Ali (2017). Lee (2014) reveals that political and violent risks reduce the attractiveness of a host country. Figure 2 shows the percentage share of annual FDI inward flow by world regions. The figure shows the low level of FDI inward flow in Africa when compared to other regions. Almost similar levels of FDI in Africa and Oceania across the time horizon were observed even though Oceania is significantly smaller in population and has a lower market base when compared to Africa. As is depicted in Figure 2, while Asia has an FDI inflow of about twelve times that of Africa, Europe has an FDI inflow of more than eight times that of Africa. The low level of FDI into Africa is a result of the higher risk premium associated with the African region.
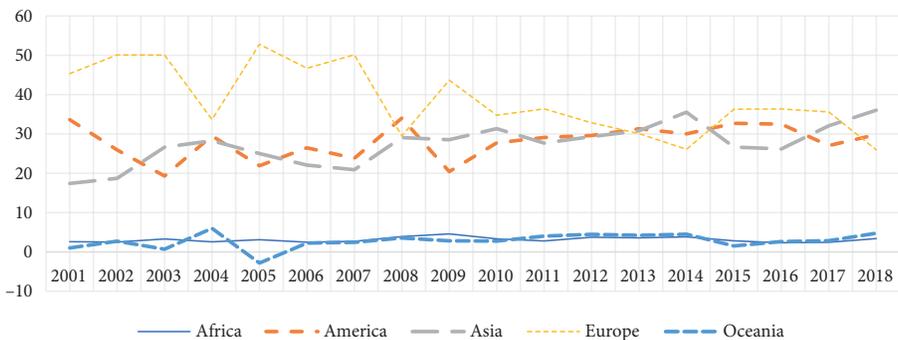
Figure 2. Foreign direct investment (FDI) inward flow (in % of total)
Source: (UNCTAD, 2021).

Various policies and programmes by African governments have been implemented in order to improve economic performance and attract FDI. These policies range from both expansionary fiscal policies and monetary targeting, regional integration such as the recently implemented African Continental Free Trade Area (AfCFTA) and placing more priority on education and health through social intervention programmes. However, political and economic in-

stability as well as the growing incidence of armed conflict and terrorism have continued to dampen the effectiveness of these policies.

On the second objective to offset the effect of terrorism on the economy, military expenditure has continued to rise in various African countries and has become a considerable component of total government expenditure. According to Saba and Ngepah (2019), there has been a consistent rise in military expenditure in Africa. Figure 3 supports this assertion, revealing a significant rise in military spending in 2018 when compared to 2001. It is further revealed in Figure 3 that Africa has the lowest level of military expenditure when compared to other regions.
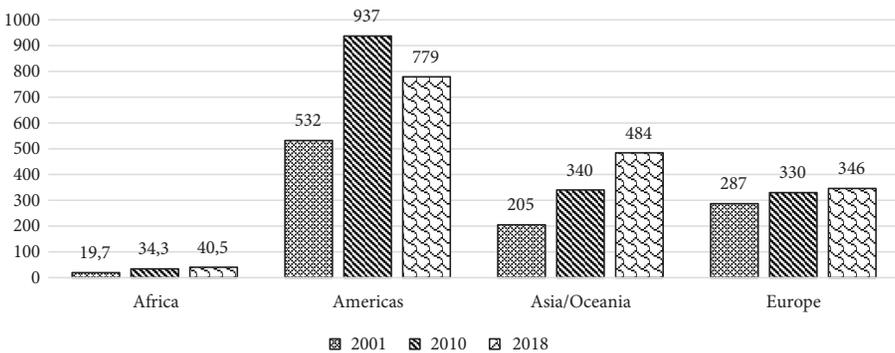
Figure 3. Military expenditure by region (in constant bln US dollars)
Source: (Stockholm International Peace Research Institute, 2021).

While literature has revealed the negative effect of terrorism on key indicators of the economy, the effectiveness of military expenditure in offsetting this negative effect on investment has not been evaluated. There are two ways in which military expenditure can effectively offset the negative effect of terrorism. The first is through the improvement of security through counterterrorism, which reduces uncertainties and the second is through military expenditure, creating new investment and capital, generating employment, which causes positive spillover multipliers.

The purpose of this study is to reveal how terrorism affects investment in Africa as well as to test the hypothesis of understanding whether military expenditure plays an effective role in offsetting the negative effect of terrorism on investment. The value added to literature emanates from the effectiveness of military expenditure in offsetting the negative effect of terrorism on these economic indicators. To the best of the authors' knowledge, this is the first study to provide this empirical verification for the African region. A similar study to this is the study of Iheonu and Ichoku (2021b) who examined the role of military expenditure in the relationship between terrorism and economic growth in Africa. Their results reveal that military expenditure largely dampens the

negative effect of terrorism on economic growth. The present study does not examine economic growth but domestic and foreign investment instead.

The study relies on the competitive model of the conflict management theory proposed by Thomas (1992), which provides a zero-sum game approach to offsetting the negative effect of terrorist activities on the economy. The theoretical framework that emanates from industrial organization has been extended into the field of political economy and has been adopted by Asongu, Efobi, and Beecroft (2018) and Iheonu and Ichoku (2021b). The study utilizes data for twenty-four African countries from 2001 to 2018. The number of countries and time frame were adopted based on data availability and particularly for terrorism data. The fixed effects (FE) model is utilized to account for unobserved heterogeneity. The study also employs the Driscoll and Kraay (1998) standard errors to account for serial correlation, groupwise heteroskedasticity and cross-sectional dependence. In order to account for simultaneity and reverse causality, the study uses the first lags of the regressors in the model as instruments.

The paper is structured as follows: Section 1 presents the literature review. Section 2 is the data and methodology section. Section 3 discusses the empirical results of the study and the last one is the conclusion.

1. Literature review

1.1. Terrorism and investment

There are few studies on the influence of terrorism on domestic investment. However, among the studies available, the negative relationship between terrorism and domestic investment has been established. One of those studies is that of Mehmood and Mehmood (2016), who investigated the influence of terrorism on domestic investment in South Asia, employing data from 1991 to 2013. The study utilized the pooled mean group (PMG) estimation procedure which allows for short-run heterogenous relationships and long-run homogenous relationships. The findings reveal that a negative relationship exists between terrorism and domestic investment. Further findings have shown that terrorism is also detrimental to FDI in South Asia. Similar to these findings is that of Hyder, Akram, and Padda (2015), who evaluated the influence of terrorism on economic development in Pakistan for the period 1981–2012, applying the long-run procedure of Johansen in a time series framework. The findings show that terrorism is detrimental to investment in Pakistan. This finding has also been collaborated upon by Zakaria and others (2019), who utilized data from 1972 to 2014 using the generalized method of moment procedure. Siddique, Liaqat, and Ullah (2017) show similar findings in Pakistan for the period 1980 to 2015. In the South Asian Association for Regional Cooperation (SAARC), Khan and Yu (2020) found that domestic business activities are negatively in-

fluenced by terrorist attacks. Their study encompassed the period from 2001 to 2017, and the findings were based on the fixed and random effects models. The result showed that bombing attacks have a strong negative impact on the logistics performance index as well as on the quality of trading and trade-related infrastructure.

A study by Bezic, Galovic, and Misevic (2016) on the impact of terrorism on FDI in some European Union and European Economic Area countries, employing a dynamic panel estimation technique for twenty-nine countries from 2000 to 2013 revealed that terrorism decreases investors' confidence and security in countries vulnerable to terrorist activities and thereby reducing FDI inflow. This finding in the European Union has also been revealed in other regions and countries. Ali and others (2017) have revealed a similar negative relationship between terrorism and FDI in Pakistan, while Filer and Stanisic (2016) found this negative relationship in a world sample of one hundred and sixty countries for a period of twenty-five years.

1.2. Military expenditure and investment

Most of the studies on military expenditure and economic performance focus on economic growth (Abdel-Khalek, Mazloum & El Zeiny, 2020; Emmanouilidis & Karpetis, 2021). Some of these studies are with reference to the gun and butter hypothesis. However, studies such as Aziz and Khalid (2017) examined the relationship between military expenditure and FDI inflow in sixty developing countries from 1990 to 2013 using the band spectrum regression estimator and the maximal overlap discrete wavelet transform. Their findings reveal that military expenditure in the absence of armed conflict reduces FDI inflow. However, the negative effect is mitigated by increased military expenditure in the presence of armed conflict. FDI inflow in response to higher military expenditure is higher for the country that faces a higher armed conflict risk than for the country that faces a lower armed conflict risk. The study by Oukhallou (2019) on the effect of military expenditure on economic development in seventy-seven countries from different regions and income groups using the FE model, the Poisson pseudo-maximum likelihood model and the instrumental variable model to control for endogeneity shows that there is a negative correlation between military burden and economic development. Findings show that military expenditure has a negative crowding out effect on public investment, particularly among middle and high-income countries.

Ebere, Abolore, Oluyemi, and Mose (2019) studied the impact of security spending on FDI inflow in Nigeria between 1994 and 2017. The study utilized the autoregressive distributed lag (ARDL) bounds testing approach to cointegration with the results revealing that defense spending has a positive and significant impact on FDI. However, internal security spending and FDI have an insignificant positive relationship. On the other hand, the study by Dunne,

Nikolaidou and Smith (2004) on the impact of military expenditure on investment and economic growth in small, industrialized economies using data from 1960 to 1997 for fourteen countries and employing the pooled OLS, the FE model and the random coefficient model revealed a negative impact of military spending on growth and investment. Posma (2021) has also revealed that military expenditure reduces private investment in Indonesia. The study by Iheonu and Ichoku (2021b) has also revealed that military expenditure can significantly dampen the negative effect of terrorism on economic growth. Their study utilized data for twenty-four African countries from 2001 to 2018 and utilized the FE model with Driscoll and Kraay standard errors.

2. Theoretical framework, methodology and data

2.1. Theoretical framework

The framework of this study is based on the conflict management theory of Thomas (1992) and has also been adopted by the studies of Asongu and others (2018), Efobi, Asongu, and Beecroft (2015). The conflict management theory describes a negative relationship between conflict and economic outcomes and advances five styles of conflict management that offset the negative effect of conflict on the economy. They include accommodation, avoidance, collaboration, competition and compromise. For this study, the competitive style of conflict management is adopted. This is because the competitive style of conflict management assumes assertive behaviours and reflects a zero-sum game to counter-terrorism where the use of military expenditure is applied to offset the negative effect of terrorism and improve economic outcomes. The competitive conflict management paradigm denotes the use of force in achieving an objective and reflects a win-lose orientation. It reflects situations where countries that invest in counter-terrorism will see a reduction in the frequency of terrorist attacks, which will boost investors' confidence.

The set of testable hypotheses is such that:

H_{01}: Military expenditure does not significantly offset the negative effect of terrorism on domestic investment.

H_{02}: Military expenditure does not significantly offset the negative effect of terrorism on FDI.

2.2. Methodology

The methodological aspect of this study begins with the test for cross-sectional dependence of the variables in the models. This is implemented to avoid biased standard errors in the regression modelling. Baltagi, Kao, and Peng (2016) defined cross-sectional dependence as common shocks among cross-sectional

units that are unidentifiable and interactions within social networks. Not accounting for cross-sectional dependence in an econometric model produces standard errors that are biased and result in conclusions that cannot adequately inform policy. The general null hypothesis of cross-sectional dependence is given as:

$$H_o: \mu_{i,j} = corr(e_{i,t}, e_{j,t}) = 0 \; \forall \; i \neq j \tag{1}$$

In this study, the Pesaran test for cross-sectional dependence is applied. The null hypothesis is such that the error term is weakly cross-sectionally dependent indicating that the correlation of the error term converges to zero at each point in time. The procedure of Pesaran (2015) has the advantage of being used in both balanced and unbalanced panel data. Against the null hypothesis, the alternative hypothesis is such that the error term is strongly cross-sectionally dependent with the error term not converging to zero.

In estimating the econometric models, the study utilizes the FE model with Driscoll and Kraay standard errors, which accounts for serial correlation, heteroskedasticity, and cross-sectional dependence. According to Hoechle (2007), the Driscoll and Kraay procedures have small sample size properties that are considerably better than other alternative covariance estimators in the presence of cross-sectional dependence. The FE equations are given as:

$$di_{i,t} = \beta_o + \beta_1 terrorism_{i,t} + \beta_2 military_{i,t} + \beta_3 terrorism \cdot military_{i,t} + \\ + \beta_4 X_{i,t} + u_i + v_{i,t} \tag{2}$$

$$fdi_{i,t} = \beta_0 + \beta_1 terrorism_{i,t} + \beta_2 military_{i,t} + \beta_3 terrorism \cdot military_{i,t} + \\ + \beta_4 X_{i,t} + u_i + v_{i,t} \tag{3}$$

where, *di*, *fdi* represents domestic investment and FDI, respectively *terrorism* represents two indicators of terrorism, which include the number of terrorism incidents and the number of terrorism fatalities; *military* is military expenditure and *terrorism · military* is an interaction term revealing the influence of military expenditure on the relationship between terrorism and the economic indicators. *X* is composed of control variables that are consistent with the regression models. For the domestic investment model, the study includes the logarithm of *per capita* GDP in constant US dollars, the government effectiveness index, which captures the quality of policy formulation and implementation, public services and government commitment to improving these qualities and is scaled between –2.5 (less effective) and 2.5 (more effective), the logarithm of the official exchange rate of the local currency to the US dollars, the inflation rate, and domestic credit to the private sector (% of GDP). The studies of Iheonu, Asongu, Odo and Ojiem (2020) as well as Iheonu (2019) have employed these control variables. For the FDI model, the study includes GDP in constant US

dollars as a control variable. The study employs GDP as opposed to *per capita* GDP based on the intuition that GDP reflects the size of the economy, while GDP *per capita* is an indicator of the well-being of an economy (Callen, 2008). The study also includes the government effectiveness index, the exchange rate, democracy and natural resources in line with literature.

The first lags of the regressors are used as instruments in the original regression to control for simultaneity and reverse causality. This procedure is consistent with the studies of Asongu and Biekpe (2018) and Iheonu and Ichoku (2021a). The instruments are derived through an OLS regression in the model with their first lags.

$$X_{i,t} = \alpha_0 + \alpha_1 X_{i,t-1} + u_{i,t} \tag{4}$$

The fitted values are then employed as instruments for the original equations.

This study follows contemporary interactive regression literature (Asongu & Odhiambo, 2021) in establishing the net effect of military expenditure on the relationship between terrorism and investment. In line with these studies, and with reference to this study, the net effect of military expenditure on the relationship between terrorism and investment is given as: (mean of policy variable · coefficient of interactive term) + the unconditional effect.

2.3. Data

This section provides a description of each of the variables utilized in the models. The first segment of Table 1 informs the main variables of the study, while the other segments are the control variables in the models. The dependent variables for the domestic investment models utilized in this study are the gross fixed capital formation (% of GDP) and the logarithm of the gross fixed capital formation (constant US dollars). For the FDI model, the study utilizes the FDI net inflow (% of GDP) and the logarithm of FDI (current US dollars).

The control variables of the study are in line with existing studies as initially discussed. GDP *per capita* and GDP are measures of economic growth. Polity2 index captures the political regime authority spectrum and is a conventional measure of democracy, ranging from –10 (full autocracy) to +10 (full democracy). Total resource rent is the sum of oil rents, natural gas rents, coal rents, mineral rents and forest rents.

For the purpose of robustness, two indicators of both domestic investment and FDI are employed as revealed in Table 1. The study utilises a three-year non-overlapping interval to correct for measurement errors and business cycle fluctuations in the unbalanced panel dataset. Countries involved in this study include Algeria, Burundi, Cameroon, Central African Republic, Chad, Cote d'Ivoire, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Libya, Madagascar, Mali, Mozambique, Niger, Nigeria, Rwanda, Senegal, South Africa,

Table 1. Description of variables

Variables	Identifiers and definition	Sources
Terrorism Incidents	The number of terrorism incidents	GTD (2020)
Terrorism Fatalities	The number of terrorism fatalities	GTD (2020)
Domestic Investment	Gross Fixed Capital Formation (% of GDP)	WDI (2020)
Domestic Investment	Logarithm of Gross Fixed Capital Formation (constant US dollars)	WDI (2020)
FDI	Foreign Direct Investment, net inflows (% of GDP)	WDI (2020)
FDI	Logarithm of Foreign Direct Investment (current US dollars)	WDI (2020)
Military Expenditure	Military Expenditure (% of GDP)	WDI (2020)
Domestic Investment Model		
Variables	Identifiers and Definition	Sources
GDP *per capita*	Logarithm of Gross Domestic Product *per capita* (constant 2010 US dollars)	WDI (2020)
Government Effectiveness	Government Effectiveness (estimate)	WGI (2020)
Exchange Rate	Logarithm of Official Exchange rate of the local currency to the US dollar	WDI (2020)
Inflation	Inflation, consumer prices (annual %)	WDI (2020)
Domestic Credit	Domestic Credit to the Private Sector (% of GDP)	WDI (2020)
FDI Model		
Variables	Identifiers and Definition	Sources
GDP	Logarithm of GDP (constant US dollars)	WDI (2020)
Government Effectiveness	Government Effectiveness, estimate	WGI (2020)
Exchange Rate	Logarithm of Official Exchange rate of the local currency to the US dollar	WDI (2020)
Democracy	Polity2	Polity IV: CSP (2020)
Natural Resources	Total Resource Rent (% of GDP)	WDI (2020)

Note: GTD is Global Terrorism Database, WDI is World Development Indicators, WGI is World Governance Indicators, CSP is Centre for Systematic Peace.

Source: Authors' compilation.

Sudan, Tanzania, Tunisia, Uganda and Zimbabwe. The summary statistics of both the domestic investment and FDI model are available in the Appendix (Tables A1 and A2).

3. Presentation and discussion of results

This section begins by analyzing the correlation among the variables in the model (see Table 2 and Table 3). This is a procedure to ensure that the regressors are not in any way highly correlated so as to avoid multicollinearity. The study also utilizes the variance inflation factor (VIF). Table 2 shows no substantial correlation among the regressors in the models apart from the indicators of terrorism, which would be placed in separate models.

Table 2. Correlation matrix (domestic investment model)

	GFCF	LGFCF	TINC	TFAT	MIL	LGDP	GE	LEXC	INF	DC
GFCF	1.0000									
LGFCF	0.3644	1.0000								
TINC	−0.1640	0.3046	1.0000							
TFAT	−0.1506	0.2992	0.7656	1.0000						
MIL	0.1109	−0.0793	−0.0903	−0.1132	1.0000					
LGDP	0.1988	0.8144	0.1989	0.1621	0.0612	1.0000				
GE	0.2362	0.2918	−0.1496	−0.1573	−0.2394	0.5217	1.0000			
LEXC	0.0795	−0.4844	−0.0567	−0.0360	−0.2204	−0.6512	−0.3436	1.0000		
INF	−0.1433	0.1860	0.1378	0.1867	−0.0589	−0.0794	−0.0999	−0.2059	1.0000	
DC	−0.0646	0.3863	−0.0687	−0.0888	−0.1156	−0.5991	0.6478	−0.5230	−0.0474	1.0000

Note: GFCF is gross fixed capital formation (% of GDP), LGFCF is the logarithm of gross fixed capital formation (US dollar). TINC is the number of terrorism incidents, TFAT is the number of terrorism fatalities, MIL is military expenditure, LGDP is logarithm of GDP *per capita* (US dollar), GE is government effectiveness, EXC is the logarithm of exchange rate, INF is inflation and DC is domestic credit.

Source: Authors' computation.

While some level of correlation was found between domestic credit and LGDP and domestic credit and government effectiveness index, as well as the exchange rate and LGDP, VIF shows that multicollinearity is not an issue in the model. Table 3 shows no substantial correlation among the regressors in the model apart from the indicators of terrorism, which will also be placed in separate FDI models. This is an indication that the issue of multicollinearity remains minimal.

The study further tests for the presence of cross-sectional dependence to validate the utilization of the Driscoll and Kraay standard errors. The null hypothesis of the test is that the errors of the variables are not cross-sectionally dependent. Due to the nature of the study, some of the variables transcend the models, as revealed in Table 4. Cross-sectional dependence for all variables in

Table 3. Correlation matrix (FDI model)

	FDI	LFDI	TINC	TFAT	MIL	LGDP	GE	LEXC	DEMO	RESO-URCE
FDI	1.0000									
LFDI	0.2765	1.0000								
TINC	−0.1339	0.1884	1.0000							
TFAT	−0.0956	0.1747	0.7479	1.0000						
MIL	−0.1779	−0.1679	0.0318	−0.0833	1.0000					
LGDP	−0.1496	0.7588	0.3492	0.3200	0.0011	1.0000				
GE	−0.0027	0.2752	−0.1510	−0.1550	−0.2376	0.3352	1.0000			
LEXC	0.0230	−0.2983	−0.0883	−0.0263	−0.3208	−0.4924	−0.2793	1.0000		
DEMO	−0.0034	0.0286	−0.0488	0.0691	−0.3079	0.0699	0.1601	0.1411	1.0000	
RESO-URCE	0.0385	0.0391	0.0845	0.0380	0.4584	0.0518	−0.4875	−0.0879	−0.2243	1.0000

Note: FDI is FDI, net inflow (% of GDP), LFDI is the logarithm of FDI, net inflow (US dollar). TINC is the number of terrorism incidents, TFAT is the number of terrorism fatalities, MIL is Military Expenditure, LGDP is logarithm of GDP (US dollar), GE is government effectiveness, LEXC is the logarithm of exchange rate, DEMO is democracy, RESOURCE is natural resources.

Source: Authors' computation.

the models at the 5% level of statistical significance is found. The result depicted in Table 4 justifies this modelling procedure, which is also heteroskedastic and autocorrelation consistent (HAC).

In interpreting the results in Table 5, the study follows Brambor, Clark and Golder (2006). The authors note that the elements of the interactive term cannot be interpreted as unconditional effects. In such cases, an element should be interpreted given the absence of the other element and should not be interpreted as linear additive models. The result show in Table 5 that terrorism has a negative effect on domestic investment in the absence of military expenditure. This finding is significant across the models except for the model where the number of terrorism fatalities is the indicator of terrorism and gross fixed capita formation (% of GDP) proxy domestic investment. In the absence of terrorism, military expenditure has a positive and significant influence on domestic investment when the natural log of gross fixed capital formation proxy domestic investment. The negative association of terrorism on domestic investment is consistent with the findings of Zakaria and others (2019). The interactive coefficient is revealed to be negative and significant in the first two models but insignificant in the third and fourth models. The study finds that increasing military expenditure do not curtail the negative effect of terrorism on domestic investment as proxied by gross fixed capital formation (% of GDP). Following Asongu and Odhiambo (2021), the net effect is computed and de-

Table 4. Pesaran (2015) test for cross-sectional dependence

Variables	Test statistics
Gross Fixed Capital Formation (% of GDP)	4.169*** (0.000)
Logarithm of Gross Fixed Capital Formation, US dollar	33.701*** (0.000)
FDI net inflow (% of GDP)	2.346** (0.019)
Logarithm of FDI net inflow, US dollar	39.781*** (0.000)
Terrorism Incidents	15.116*** (0.000)
Terrorism Fatalities	10.742*** (0.000)
Military Expenditure	2.642*** (0.008)
Government Effectiveness	44.701*** (0.000)
Exchange Rate	28.342*** (0.000)
Variables Consistent with Domestic Investment Models	
GDP *per capita*	70.458*** (0.000)
Inflation	11.662*** (0.000)
Domestic Credit	21.756*** (0.000)
Variables Consistent with FDI Models	
GDP	70.481*** (0.000)
Democracy	3.824*** (0.000)
Natural Resources	65.780*** (0.000)

Note: *p*-values are in parentheses. ***, and ** represents statistical significance at 1% and 5%, respectively.

Source: Authors' computation.

rivable only when the coefficients necessary to compute the net effect are significant. As with the interactive effect, a negative net effect is found, implying that the overall effect of military expenditure on the relationship between terrorism and domestic investment is negative.

The result further shows that the relationship between *per capita* GDP and domestic investment depends on the indicator for domestic investment. When

Table 5. Terrorism, military expenditure and domestic investment

Variables	(1)	(2)	(3)	(4)
Terrorism Incidents	−0.0122** (0.015)		−0.0007** (0.028)	
Terrorism Fatalities		−0.0013 (0.183)		−0.0003*** (0.000)
Military Expenditure	0.6922 (0.273)	0.9336 (0.164)	0.0580* (0.066)	0.05854* (0.066)
Terrorism Incidents · Military Expenditure	−0.0026** (0.025)		0.00006 (0.320)	
Terrorism Fatalities · Military Expenditure		−0.0045*** (0.000)		0.00008 (0.214)
GDP *per capita*	−5.3722* (0.093)	−6.2053* (0.066)	2.1321*** (0.000)	2.1532*** (0.000)
Government Effectiveness	11.8526*** (0.000)	12.1727*** (0.000)	0.1134* (0.080)	0.1389** (0.017)
Exchange Rate	7.5069** (0.019)	7.5224** (0.013)	0.3570** (0.022)	0.3595** (0.025)
Inflation	0.4410 (0.618)	−0.0553 (0.951)	−0.1372* (0.061)	−0.1461** (0.042)
Domestic Credit	0.2753*** (0.008)	0.2779*** (0.008)	0.0086** (0.014)	0.0088** (0.022)
Constant	19.2121 (0.105)	28.5972** (0.043)	6.5076*** (0.000)	6.4067*** (0.000)
Net Effect	−0.0171	n.a.	n.a.	n.a.
Thresholds	–	–	–	–
F-statistic	1897.48*** (0.0000)	5299.59*** (0.0000)	298.65*** (0.000)	524.22*** (0.0000)
Within *R*-squared	0.3638	0.4064	0.7367	0.7512
VIF	2.54	2.33	2.58	2.36

Note: Probability values are in parenthesis. ***, ** and * represents statistical significance at 1%, 5% and 10% respectively. VIF is Variance Inflation Factor. Dependent variable: (1) and (2), gross fixed capital formation (% of GDP), (3) and (4), logarithm of gross fixed capital formation (constant US dollars). n.a. denotes not available.

Source: Authors' computation.

the gross fixed capital formation (% of GDP) acts as the proxy for domestic investment a negative relationship is found. However, when the logarithm of gross fixed capital formation in US dollars act as the proxy, a positive relationship is found which is consistent with the study of Iheonu (2019). Further, the negative and significant relationship between inflation and domestic investment is in line with economic intuition where an increase in price level raises the cost of production, which translates to lower production levels and lower levels of domestic investment. On the other hand, government effectiveness, currency depreciation, and domestic credit to the private sector are seen to improve domestic investment significantly. The study of Miao, Borojo, Yushi and Desalegn (2021) has also revealed the importance of government effectiveness in improving domestic investment. The positive impact of the exchange rate on domestic investment could result from the intuition that imports become more expensive and thus make domestic goods relatively cheaper thus, increasing local demand, which improves domestic investment subsequently. The positive and significant influence of domestic credit on the private sector on domestic investment is in line with the study of Iheonu and others (2020).

In Table 6, it is shown that in the absence of military expenditure, the number of terrorism incidents and the number of terrorism fatalities have a significant detrimental effect on FDI. This is also true for military expenditure, which is significantly detrimental to FDI. The negative association between terrorism and military expenditure depicted in Table 6 is consistent with the conclusions of Bezic and others (2016), Filer and Stanisic (2016) and Ali and others (2017). The interactive coefficient reveals that the increase in military expenditure can counteract the negative effect of terrorism on FDI. However, the computation of the net effect is revealed to be negative. A positive interactive effect and a negative net effect simply indicate the presence of a threshold (critical mass) that when exceeded, will bring about a positive net effect. Following Asongu and Odhiambo (2021) on threshold computation using absolute values, thresholds for military expenditure are calculated for all the models except model 2, because the interaction term for model 2 is insignificant. The threshold for model 1 is 3.86, the threshold for model 3 is 5.00 and the threshold for model 4 is 2.00. Above these thresholds for military expenditure (% of GDP), the net effect becomes positive.

These results reveal the fact that military expenditure is not an efficient policy variable targeted at offsetting the negative effect of terrorism on investment and the need for further complimentary policies remain paramount. Also, the results from the study reveal that an increase in GDP significantly reduces FDI inflow into Africa when FDI (% of GDP) is the measure for FDI. However, a positive relationship is found when the logarithm of FDI is the dependent variable, indicating the sensitivity of the influence of GDP on FDI to the proxy for FDI. The study reveals a positive and significant influence of government effectiveness on FDI revealing the importance of improving governance quality. This finding is supported by the study of Nidhal and Wajdi (2019). A mixed result

Table 6. Terrorism, military expenditure and FDI

Variables	(1)	(2)	(3)	(4)
Terrorism Incidents	−0.0027*** (0.008)		−0.0025*** (0.000)	
Terrorism Fatalities		−0.0007** (0.012)		−0.0008*** (0.001)
Military Expenditure	−1.5561*** (0.001)	−1.1769** (0.014)	−0.5928*** (0.000)	−0.3673** (0.010)
Terrorism Incidents · Military Expenditure	0.0007* (0.076)		0.0005*** (0.004)	
Terrorism Fatalities · Military Expenditure		−0.00003 (0.906)		0.0004* (0.097)
GDP	−5.6603*** (0.000)	−2.6044** (0.019)	2.5291*** (0.000)	2.2621*** (0.000)
Government Effectiveness	4.8747*** (0.000)	3.8903*** (0.000)	0.8328*** (0.001)	1.0696*** (0.000)
Exchange Rate	3.1103* (0.080)	0.0929 (0.160)	−0.6846** (0.029)	0.1606*** (0.000)
Democracy	0.0554 (0.583)	0.0710 (0.397)	0.0345 (0.517)	0.0443 (0.116)
Natural Resources	−0.1398*** (0.000)	−0.1768 (0.146)	0.0061 (0.612)	0.0151 (0.235)
Constant	131.7784*** (0.000)	72.7722** (0.010)	−35.7071*** (0.000)	−33.8820*** (0.004)
Net Effect	−0.0014	n.a.	−0.0015	−0.00003
Thresholds	3.86	n.a.	5.00	2.00
F-statistic	1882.91*** (0.000)	785.23*** (0.000)	962.29*** (0.000)	1034.75*** (0.000)
Within *R*-squared	0.3955	0.2139	0.4107	0.4578
VIF	1.77	1.97	1.75	1.96

Note: Probability values are in parenthesis. ***, ** denotes statistical significance at 1% and 5% respectively. VIF is Variance Inflation Factor. Dependent Variable: (1) and (2), FDI (% of GDP), (3) and (4), logarithm of FDI (current $US). na denotes not available.

Source: Authors' computation.

on the effect of natural resources on FDI is found and the effect of exchange rate on FDI. The study also reveals an insignificant positive relationship between democracy and FDI into Africa.

Conclusions

This study has investigated how military expenditure affects the relationship between terrorism and investment in twenty-four African countries for the period 2001 to 2018. Findings from the study have revealed the detrimental effect of terrorism on the African economy. Furthermore, the study reveals that military expenditure does not curtail the negative effect of terrorism on domestic investment. The findings show that the net effect of military expenditure on terrorism and domestic investment is negative indicating that military expenditure is not the right policy variable to offset the negative effect of terrorism on domestic investment. Additionally, results reveal that terrorism is detrimental to FDI in Africa. However, it was further revealed that the interactive effect of military expenditure on the relationship between terrorism and FDI is positive while the net effect is negative. Given a positive interactive coefficient, the study finds that the military expenditure threshold is between 2.00 and 5.00 depending on the associated parameters in the modelling exercise. Terrorism will have an overall negative impact on foreign direct investment if military spending is less than 5% of GDP. This means that the study fails to reject the null hypothesis that military expenditure does not significantly offset the negative effect of terrorism on domestic investment. However, the study rejects the null hypothesis that military expenditure does not significantly offsets the negative effect of terrorism on FDI. Nonetheless, this is based on the 2% to 5% thresholds. Based on these findings, the study recommends that counter-terrorism strategies independent of military expenditure be employed to offset the negative effect of terrorism on domestic investment. In particular, inclusive growth policies that reduce ethnic tensions remain important in reducing grievances that can breed terrorist activity. Improving the quality of governance in Africa can also help offset the negative effect of terrorism on investment. This would increase the opportunity cost of terrorism. Furthermore, the study recommends complementary policies for FDI in Africa. The application of the compromise mode of conflict management, where negotiations can aid in reducing terrorist activities and improve economic outcomes, can be effective in improving FDI into Africa. The limitation of this study is that the channels through which military expenditure influences the relationship between terrorism and investment are not extensively determined in this study, which could be a valuable addition to subsequent studies. Additional research could focus on the relationship between armed conflict and investment as well as how terrorism is influencing government spending in Africa.

Appendix

Table A1. Summary statistics (domestic investment model)

Variables	Obser-vations	Mean	Standard deviation	Minimum	Maximum
GFCF	138	20.6087	7.5920	3.1109	48.3011
LGFCF	123	22.3318	1.5395	19.11	25.1663
TINC	127	54.4587	83.7508	19.9059	469.9522
TFAT	127	168.2905	330.7326	67.6791	2860.35
MIL	138	1.9142	1.3543	0.4282	8.8777
LGDP	144	6.9610	0.9669	5.3604	9.3582
GE	144	−0.7785	0.5286	−1.7644	0.6346
LEXC	141	4.9395	2.5239	−2.8237	12.4251
INF	133	6.8933	2.3544	4.5595	32.3919
DC	137	23.4346	28.8066	1.2096	150.7484

Note: GFCF is gross fixed capital formation (% of GDP), LGFCF is the logarithm of gross fixed capital formation (US dollar). TINC is the number of terrorism incidents, TFAT is the number of terrorism fatalities, MIL is military expenditure, LGDP is logarithm of GDP *per capita* (US dollar), GE is government effectiveness, EXC is the logarithm of exchange rate, INF is inflation and DC is domestic credit.

Source: Author's computation.

Table A2. Summary statistics (FDI model)

Variables	Obser-vations	Mean	Standard deviation	Minimum	Maximum
FDI	144	3.2749	4.6395	−0.0013	33.1460
LFDI	142	19.8042	1.9954	11.4490	22.9244
TINC	127	54.4587	83.7508	19.9059	469.9522
TFAT	127	168.2905	330.7326	67.6791	2860.35
MIL	138	1.9142	1.3543	0.4282	8.8777
LGDP	144	6.9610	0.9669	5.3604	9.3582
GE	144	−0.7785	0.5286	−1.7644	0.6346
LEXC	141	4.9395	2.5239	−2.8237	12.4251
DEMO	136	1.7810	4.2596	−6.2649	8.6758
RESOURCE	144	12.6666	11.0267	1.9670	62.0302

Note: FDI is FDI net inflow (% of GDP), LFDI is the logarithm of FDI net inflow (US dollar). TINC is the number of terrorism incidents, TFAT is the number of terrorism fatalities, MIL is military expenditure, LGDP is logarithm of GDP (US dollar), GE is government effectiveness, LEXC is the logarithm of exchange rate, DEMO is democracy, RESOURCE is natural resources.

Source: Authors' computation.

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