



Does Terror Attacks Hinder Growth in Nigeria? Empirics from ARDL and Granger-Causality Approach

BY

Dr. Nuhu Musa¹, Hitlar Inedu², Akpihi, Linus³

^{1,2} Economics Department, Kogi State University, Anyigba, Nigeria

³ Department of Economics, Kogi State College of Education, Ankpa, Nigeria



Article History

Received: 01/05/2023

Accepted: 26/05/2023

Published: 31/05/2023

Vol – 2 Issue – 5

PP: -77-83

Abstract

The main purpose of this paper is to investigate the effect of terrorism on growth and government fiscal behavior in Nigeria. The study employed analytical technique of Autoregressive Distributed-Lag (ARDL) and Granger causality using exploratory research design and sample period 1990-2021. Results from ARDL indicated that terrorism impacted negatively on growth. However, government security spending had positive and significant impact, suggesting that as terrorism increases, government spending on defense also increases. The results of Granger causality test showed evidence of uni-directional causal relationship between terrorism and GDP. Study recommends government expenditure program be directed at improving well-being of the masses through creation of employment opportunities.

Keywords: Terrorism, Insurgency, Government Expenditure, Economic Growth, ARDL

JEL Classification: F51, F52, H12

1. INTRODUCTION

In recent times, the world is ravaged with high level of terrorism which has claimed millions of lives and destruction of property. United Nations (2015) defined terrorism as any activity orchestrated by individuals or group intended to create fear or intimidation and to cause harm to non-combatants through the use of violence with a view to achieving predetermined objectives. It involves the use of illegal force and violence by individuals or group to attain political, economic or religious goals through fear or intimidation.

Although terrorism is a global phenomenon, it is more rampant in Sub-Saharan African countries than other regions like North America and South Asian regions (Global Terrorism Index, 2022). There are several terrorist organizations in the world but the most notable and deadliest groups are the Taliban, Al-Shabaab, Al-Nusrat, Al-Qaida, Islamic State in West-African Province (ISWAP), and Boko Haram insurgency (BOH). These group of terrorist were responsible for the number of fatalities in most countries of the world.

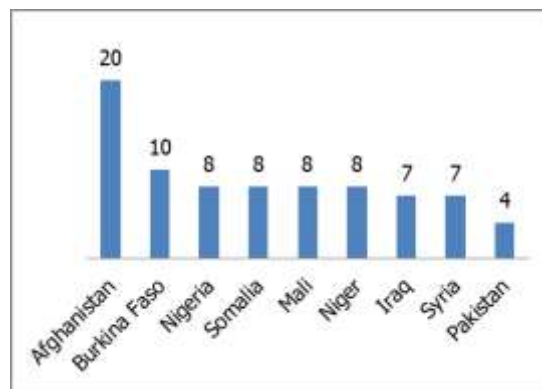


Figure 1: % Number of deaths due to terrorist attacks in 2021 by countries

Source: Global terrorism index, 2021.

Figure 1 shows the number of deaths due to terrorist attacks in nine countries in 2021. Out of these countries, Afghanistan recorded the highest number of fatalities through terrorist attack with 20%, followed by Burkina Faso estimated at 10% and Nigeria recorded 8% occupying the third position.

History of terrorist attacks in Nigeria dates back to 1990s when some militants in Niger Delta came out to challenge the government for being marginalized and they resorted to vandalizing pipes, kidnapping, and bombing. However, in

2002, terrorism has assumed a different dimension in terms of brutality, ably led by Muhammad Yusuf (Aliu, 2021). After the demise of the leader in 2009, Abubakar Shekerou took over and later died in May 2021.

Since the inception of Boko Haram insurgency, a lot of havoc has been committed through bombing of churches, mosques, banks, police stations, airports, and other public gatherings. For instance, on 28th March 2022, terrorists attacked train along Abuja- Kaduna route carrying about 362 passengers, eight (8) persons were killed, and several others abducted (Vanguard, 2022). On 16th January 2021, ISWAP militants group attacked military base in Borno, killed 7 soldiers, and carted away six (6) vehicles and ammunitions. Again, on 17th February 2021, Boko Haram stormed a school in Kagara, Niger State, abducted 27 schoolboys and their teachers. Similarly, on 26th February 2021, the group attacked a school in Jangebe, Zamfara State, abducted over 317 school girls. Similarly, on November, 29th, 2020, Boko Haram attacked rice farmers in Borno State, killed 43 farmers, 30 were beheaded while 70 were seriously injured. In December 2020, more than 300 students in Kankara, Katsina State were abducted by suspected Boko Haram. In 2018, the group also attacked a school in Dapchi, Yobe State, and abducted 110 school girls (Aliu, 2021).

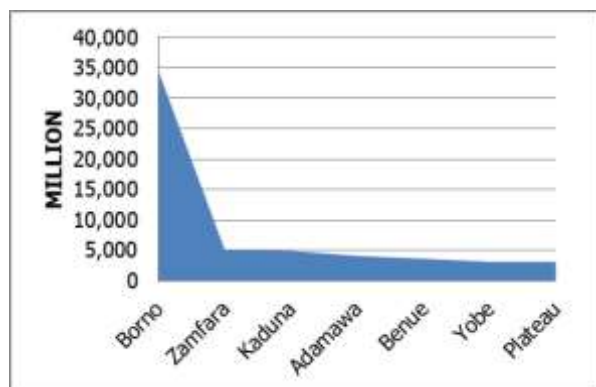


Figure 2: Deaths caused by Boko Haram in Nigeria from 2017 to 2021, by State

Source: National Bureau of Statistics (2022)

Figure 2 shows the alarming rate of terrorist attack caused by Boko Haram by State. From 2017 to 2021; about 34,534 persons were killed in Borno, the centre of Boko Haram. In Zamfara, about 5,155 persons were killed while 4,900 were killed in Kaduna. In Adamawa, 4,086 persons were reported killed while about 3,636 persons were killed in Benue. In Yobe and Plateau, 3,126 and 3,128 persons were killed respectively. This constitutes loss of human capital to the country.

Terrorism has brought a lot of untold economic consequences which according to Julide, Tekin, and Gizem (2019) include economic and social cost. Terror attacks have caused human and capital loss, displacement of hundreds of thousands of people leading to severe food shortages, hunger, and attendant inflationary spiral. Terrorism has adverse effects on investments and capital market (Stelios and Nikolas (2019). Several scholars (Shabir, Naeem & Ihtsham, 2015;

Muhammad, Wen & Haseeb, 2019; Chuku, Dominic & Ima-Abasi, 2019 & Abdulkarim & Saidatulakmal, 2022) attributed the incidence of terrorism to factors such as inequitable distribution of wealth, marginalization, youth unemployment, poverty, bad governance, porosity of borders, importation of dangerous weapons, among others.

Few studies on the effects of terrorism have been carried out. Many scholars (Igbuzor, 2011; Adebayo, 2018; Imuetinyan & Emily, 2019) looked at the impact of insecurity generally with little or no attention given to growth effects. In addition, in most of the studies, the direction of causation among the variables were not established, these constitute the major gaps that the current study intends to bridge which motivated the researcher to undertake this study.

The main purpose of this study is to explore the effect of terrorism on economic growth and fiscal behavior of government in Nigeria, within 1990-2021. Following the introductory part, is section 2 in which related literature is reviewed. Section 3 and 4 discuss the methodology and empirical findings while the last segment deals with concluding remarks.

2. Literature Review

Theoretical underpinning in this paper is social conflict theory propounded by Karl Max in 1847. Marx's theory was based on dynamic struggle in the allocation of scarce resources between the two contending social classes (the bourgeoisie and proletariats). The bourgeoisie are the rich class of people who own and control the means of production, appropriate surplus value through exploitation of the proletariat (i.e. the poor working class). Marx opined that while the proletariats who carry out the actual production process were living in abject poverty and penury, the bourgeoisie who only invest their capital and not labour were living in affluence through appropriation of surplus value.

This theory is relevant to Nigerian setting as it attempts to provide insight into how those at the corridor of power accumulate wealth and use the state apparatus to exploit, oppress and subjugate the poor masses just for their selfish interest. This state of affair tends to ignite violence.

Empirical evidence supporting negative consequences of terrorism has been identified by many scholars. Abdulkarim and Saidatulakmal (2022) employed ARDL technique in a study covering 1980 to 2019 and their results revealed that terrorism had strong negative impact on growth. Muhammed and Yunusa (2020) discovered that terrorism has resulted to human capital loss, displacement effect, loss of farmers' income, decrease in employment opportunities, and government revenue. Furthermore, Ndubuisi and Anigbuogu (2019) adopted exploratory research design and found that terrorism hinders growth.

Chuku, Dominic & Ima-Abasi, (2019) used Structural Vector Auto-regressive (SVAR) techniques and found terrorism negatively impacted growth. Callistar (2015) used OLS technique on variables such as GDP, insecurity, terrorism, and government expenditure on security. He discovered that

terrorism impacted negatively on economic development while government expenditure had positive and significant impact.

Similarly, Aminu, Hamza, and Ali (2015) employed OLS estimation technique for the analysis. Per capita GDP growth rate was regressed on variables such as government spending, population, and government revenue. Their findings revealed that terrorism dampened GDP by 24%, indicating that terrorist incidence is inimical to growth. Nwagboso (2012) further ascertain the effect of terror attacks, employed OLS technique using data from 2007- 2011. His finding revealed that insecurity had negative impact.

In Pakistan, Muhammad, Wen, and Haseeb (2019) used generalised method of moments (GMM) from 1972-2014. They discovered that terrorism had a very devastating effect on GDP and suggested that if there is an effective control measure, terrorist activities would be reduced.

Supporting the above view, Cinar (2017) used panel data for 115 countries. His finding based on ARDL model showed that terrorism adversely affected economic growth of the less developed countries (LDCs). Shabir, Naeem, and Ihtsham (2015) employed co-integration and error correction technique and their empirical evidence revealed indirect relationship between terrorism and growth, implying that terrorist activities hinders growth.

3. Methodology

Research design primarily used in this study is exploratory and analytical in nature. The study employed ARDL and granger-causality approach. The ARDL estimation technique is justified because it yields consistent result even at different levels of integration provided the order of integration is not at order 2.

3.1. Model Specification

Following the work of Muhammad, Wen & Haseeb(2019), we modify and re-specify an elaborate model in the following form.

$$GDP = f(TERR, FDI, GOVSP, DINV, HUC) \quad [1]$$

The model in equation [1] can be re-specified in econometric form as follows:

$$GDP = \partial_0 + \partial_1 TERR + \partial_2 FDI + \partial_3 GOVSP + \partial_4 DINV + \partial_5 HUC + \mu_t \quad [2]$$

Based on equation [2], the long-run ARDL model is presented as;

$$\begin{aligned} \Delta GDP_t = & \partial_0 + \sum_k^m \partial_k TERR_t + \sum_l^m \partial_l \Delta LFDI_{t-1} \\ & + \sum_n^m \partial_n \Delta LGOVSP_{t-1} \\ & + \sum_o^m \partial_o \Delta LDINV_{t-1} + \sum_p^p \partial_p \Delta LHUC_{t-1} \\ & + \mu_t \quad [3] \end{aligned}$$

The Short-run dynamic model is specified as follows:

$$\begin{aligned} \Delta \ln GDP_t = & \partial_0 + \sum_{j=1}^p \partial_1 TERR_t + \sum_{j=m}^p \partial_2 \Delta \ln FDI_{t-1} \\ & + \sum_{j=n}^p \partial_3 \Delta \ln GOVSP_{t-j} \\ & + \sum_{j=0}^p \partial_4 \Delta LDINV_{t-1} + \sum_{j=p}^p \partial_5 \Delta LHUC_{t-1} \\ & + \partial_6 \Delta ECT_{t-1} + u_t [4] \end{aligned}$$

where GDP represents per capita GDP. TERR denotes terrorism index. FDI represents foreign direct investment; GOVSP is government spending on security. DINV denotes domestic investment; HUC represents human capital, while μ denotes error term. ∂_0 is the constant term while $\partial_1 - \partial_5$ are estimated coefficients.

3.2. Data Sources, Measurement, and A priori Expectation

The paper utilized secondary data covered 1990 - 2021 fiscal years. Dataset were obtained from Central Bank of Nigeria (CBN) Statistical Bulletin. Terrorism index was used as indicator for terrorist activities. GDP growth rate was used as indicator for economic growth while domestic investment was captured using gross fixed capital formation. Terrorism is expected to dampen per capita GDP growth rate, FDI, and human capital. Therefore the expected signs of these coefficients are negative. On the other hand, a rise in terrorism leads to increase in government spending; therefore a positive sign is expected.

4. Results and Discussion

4.1. Trend Analysis

The trend of GDP growth rate and FDI inflows in Nigeria are presented in graphical form to show their responses during the period of terrorism.

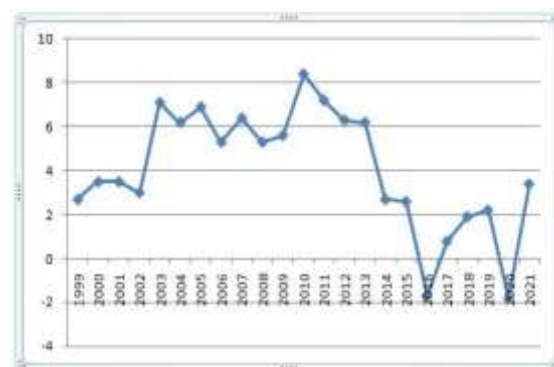


Figure 3: Graphical trend of GDP growth rate, 1999-2021

Source: Own Evaluation using dataset from CBN Statistical Bulletin

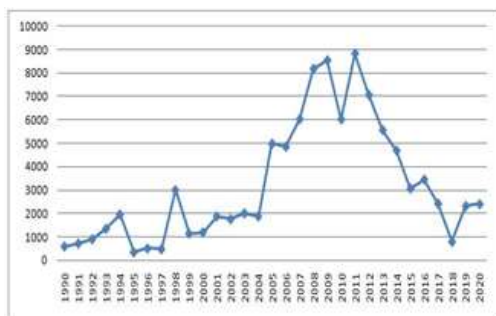


Figure 4: Graphical trend of FDI, 1990-2021

Source: CBN Statistical Bulletin

Figure 3 and 4 present the trend of GDP and FDI inflows. It is evident from the graphs that GDP and FDI inflow to Nigeria were consistently on the decline especially as from 2009. This is represented by the downward trend. This could be attributed to security threat in the country causing foreigners to divert their resources to other friendly countries.

4.2. Stationarity test

Unit root was used to test stationarity properties of the variables. Paper utilized Augmented Dickey-Fuller (ADF) unit root and the results are shown below.

Table 1: Results of Stationarity

	At levels		At 1 st difference			
Variable	ADF Value	ADF critical@ 5%	ADF Value	ADF critical@ 5%	Order of integration	Decision
GDP	-1.762	-2.971	-9.025	-2.971	1(1)	Stationary
FDI	-1.669	-2.963	-6.496	-2.967	1(1)	Stationary
TERR	-3.463	-2.963	NA	NA	1(0)	Stationary
GOVSP	-2.385	-2.963	-5.503	-2.967	1(1)	Stationary
HUC	-2.814	-2.991	-4.786	-2.981	1(1)	Stationary

NA means not applicable

Source: Author's computation (2023)

The analysis indicates that GDP, FDI, GOVSP, and HUC were stationary at first difference 1(1) but TERR was not. This means that the variables exhibit mixed order of integration, thereby supporting the use of ARDL.

4.3. ARDL Bounds Test

Co-integration test was used to ascertain whether a long-run equilibrium relationship exist among variables. Study used bounds test and the results are presented below.

Table 2: Bounds Test Results

Test	Critical val.	Sign. Level	I(0)	I(1)
F-Statistic	6.536812	10%	2.08	3.00
k	5	5%	2.39	3.38
		2.5%	2.70	3.73
		1%	3.06	4.15

Source: Author's computation (2023)

The results of the bounds test indicated that the calculated F-critical value is 3.382397 which is much higher than the upper bounds 5 percent critical value [6.536812 > 3.38]. This concludes a long-run equilibrium relationship exist among the variables as suggested by Pesaran, Shin & Smith (2001).

Table 3: Long-run Estimated Results

Dependent variable is GDPGR

Variab les	Co- efficie nt	Standard Error	T- Statisti c	Prob.val. *
C	321.9931	59.10555	5.447764	0.0000
TERR	-0.042064	0.022785	-1.846135	0.0897
FDI	-0.006660	0.001887	-3.529087	0.0016
GOVSP	2.614077	13.41046	0.194928	0.8470
DINV	4.702446	2.043425	2.301257	0.0300
HUC	1.084653	0.466495	2.325110	0.0327
R ²	0.716167	F-statistic		7.018560
R ² Adjusted	0.661376	Probability (F-statistic)		0.000000
D-W.	1.809762			

Source: Computed by the Author (2023)

The estimated long-run results in Table 3 indicate that TERR has negatively impacted growth. This result shows that a unit change in TERR would decrease GDP growth by approximately 0.04 percent. The finding of this study is in keeping with previous studies by scholars like Aminu, Hamza, and Ali (2015) and Edeme and Nkalu (2019).

Foreign direct investment (FDI) was discovered to have inverse association with GDP. The negative could be due to the incessant terrorist attacks in Nigeria which makes the country unattractive to foreign investors and this tend to stunt growth. This is in agreement with results obtained by several

scholars (Shabir, Naeem & Ihtsham, 2015; Cinar, 2017; & Muhammad, Wen & Haseeb, 2019).

Furthermore, the estimated coefficient of domestic investment showed a negative association with GDP growth rate. Result indicates that one percent increase in domestic investment would decrease economic growth by about 4.702. The implication of this finding is that terrorist activities crowd out foreign and domestic investments thereby retarding growth. Similar result was discovered by Edeme and Nkalu (2019), Chuku et al. (2019), and Abdulkarim and Saidatulakmal (2022). Similarly, human capital showed a negative correlation with GDP growth rate. The possible reason for negative association between HUC and GDP could be attributed to recurring decimal of terrorism in the country which has led to destruction of human capital and consequently affect growth.

R-square of 0.716 indicates that about 71% variations in the GDP were accounted for by changes in the explanatory variables. This indicates a good fit. The value of adjusted counterpart of 0.661 shows the result is robust-statistic is about 7.018 indicating that all the variables are jointly statistically significant. D-W statistic of 1.8 indicates complete absence of serial correlation problem.

Table 4: Short-Run Estimated Results

Dependent variable: GDP growth rate				
Variables	Co-efficient	Standard Error	T-Statistic	Prob. val.
D(GDP(-1))	3.407970	1.719118	1.982395	0.0708
D(TERR(-1))	-0.759953	0.163321	-4.653112	0.0009
D(FDI(-1))	-72.64046	28.09246	-2.585763	0.0271
D(DINV(-1))	-0.034533	0.014746	-2.341867	0.0302
D(GOVSP(-1))	75.16256	15.04906	4.994502	0.0005
D(HUC(-1))	-0.615252	0.326275	-1.885686	0.0765
C	327.2912	802.0869	0.408049	0.6865
ECM(-1)	-0.456482	0.213160	-2.141499	0.0389
R ²	0.860466	F-stat.		27.75024
Adjusted R ²	0.829459	Probability val.		0.000000
D-W stat.	1.714370			

Source: Author's computation (2023)

Results in Table 4 indicate lagged value of TERR is negatively associated with GDP growth rate. The co-efficient of terrorism is -0.759 meaning terrorism decreases GDP by approximately 0.75 percentage point. This suggests that for every 1% increase in TERR, GDPGR is reduced by about 0.75 per cent. This is in keeping with results obtained by several scholars such as Callistar (2015), Chuku, et al (2019), and Muhammad, Wen, and Haseeb (2019).

The result also indicates that DINV impacted negatively on growth. This finding contradicts a priori expectation. Similarly, human capital was discovered to have inverse relationship with GDP. However, impact of government spending was significantly positive. The error correction term

[ECM] is negatively significant implying that about 45% disequilibrium would be restored in a year.

Table 5: Diagnostic Checks

Tests Statistics val.	F-values	Probability
A. Serial-correlation	0.823775	0.8756
B. Heteroscedasticity	1.394544	0.2841
C. Normality Test	5.387526	0.0843
D. Ramsey Test	0.05638	0.9444

Source: Author's computation (2023)

The results indicate that the model passes serial correlation, heteroskedasticity, Ramsey, and normality test. The F statistic and corresponding p- values are greater than 5% indicating that the model is free from autocorrelation, heteroskedasticity, and misspecification bias.

Furthermore, CUSUM and CUSUM-SQ indicate the model passes stability test. The residuals are within the two critical lines.

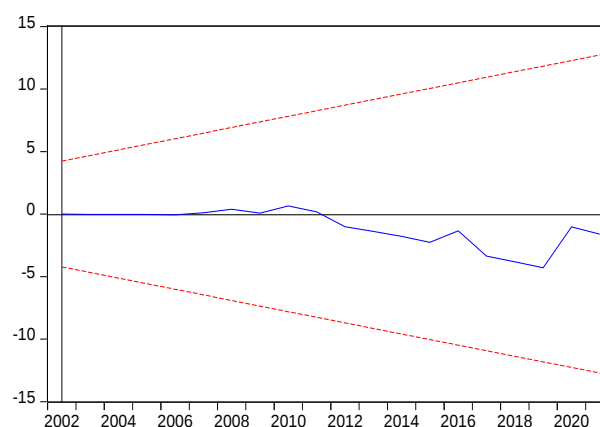


Figure 5a: CUSUM

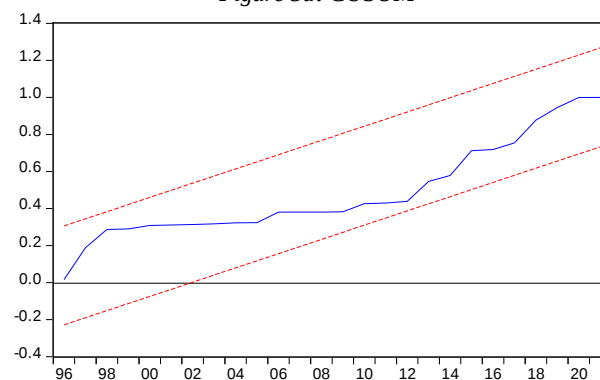


Figure 5b: CUSUM-SQ

Table 6: Granger Causality Test

Null Hypothesis (H ₀)	Obs	F-Statistic	Prob.
GDP does not Granger-Cause TERR	29	2.03995	0.1520

TERR does not Granger-Cause GDP		6.09230	0.0072
FDI does not Granger-Cause TERR	29	2.91412	0.0736
TERR does not Granger-Cause FDI		4.29514	0.0254
GOVSP does not Granger-Cause TERR	29	0.02409	0.9762
TERR does not Granger Cause GOVSP		2.91412	0.0736
DINV does not Granger-Cause TERR	29	0.37200	0.6933
TERR does not Granger-Cause DINV		4.22022	0.0269
HUC does not Granger-Cause TERR	29	1.35146	0.2779
TERR does not Granger-Cause HUC		7.07697	0.0038

Source: Authors' computation (2023)

The results of granger-causality indicate uni-directional causality runs from TERR to GDP and this is significant at 5%. Similarly, the result also indicates evidence of a unidirectional causality running from TERR to FDI. Similar result was established between terrorism and domestic investment, meaning that terrorism granger causes domestic investment to shrink. This finding suggests that terrorism exhibits crowd-out effect on both domestic and foreign investment. Further evidence of unidirectional causation was also established between terrorism (TERR) and government spending (GOVSP). This implies terrorism induces government spending. The results also provide evidence of uni-directional causation running from terrorism (TERR) to human capital (HUC), confirming that terrorism leads to loss of human capital. Similar result was obtained by Gries and Meierrieks (2009).

5. Conclusion and Policy Implications

This paper investigated the effect of terrorism on growth prospects in Nigeria using data set from 1990 to 2021 using ARDL and granger causality approach. Results indicated that terrorism negatively and significantly impacted growth. It was also discovered that terrorism increased the defence component of government spending and also crowd out domestic and foreign investments.

The finding of this work has some significant policy implications; first, the negative correlates between terrorism and growth is an indication that terrorism retards growth prospect of Nigeria. Second, it is an invitation to policymakers to adopt policy measures to curb the incidence. Based on the outcome, paper recommends government expenditure program be directed at improving well-being of the masses through employment creation, and expenditure on security be increased with close monitoring to avoid diversion or misappropriation.

Declaration of Conflicts of interest

The authors declare that there is no conflict of interest that could influence this work.

Funding Sources:

This article received no financial support for the research, authorship, and/or publication from any funding agency in the public or commercial sectors.

References

1. Aliu, O.S. (2021). Expounding state response to terrorism in Northern Nigeria: the expediency of reintegrative approach for repentant Boko Haram combatants. *African Journal on Terrorism*, 11 (2), 11-26
2. Abdulkarim, Y. & Saidatulakmal, M. (2022). Growth and fiscal effects of insecurity on the Nigerian economy. *The European Journal of Development Research*, 501-522
3. Adebayo A.(2018). National security, social cohesion, and sustainable development: Panacea to conflicts, violence, and xenophobia. *Sociology International Journal*, 2(6).593-601
4. Aminu, U. Hamza, A.& Ali, D.(2015).The impact of insecurity and poverty on sustainable economic development in Nigeria. *International Journal of Humanities Social Sciences and Education (IJHSSE)*, 2 (2), 32-48
5. Central Bank of Nigeria (2021). Central Bank of Nigeria Statistical Bulletin, Abuja, Nigeria
6. Callistar K.O. (2015).Challenges of insecurity and terrorism in Nigeria: Implication for national development. *International Journal on Sustainable Development* 8(2),12-20
7. Chuku, C., Dominic, A., & Ima-Abasi, I. (2019). Growth and fiscal consequences of terrorism in Nigeria. *Defence and Peace Economics* 30 (5), 549–569.
8. Cinar, M. (2017). The effects of terrorism on economic growth: Panel data approach. *Proceedings of Rijeka School of Economics*, 35(1), 97–120.
9. Edeme, R.K., & Nkalu.C.C (2019). Growth and fiscal effects of terrorism in Nigeria. *Afro-Asian Perspectives* 3 (1), 297–310.
10. Global Terrorism Index Report. (GTI, 2021). Measuring and understanding the impact of terrorism, Institute for Economics and Peace. Retrieved from <https://reliefweb.int/report/world/global-terrorismindex->
11. Gries, T., & Meierrieks, D. (2009). Causal linkages between domestic terrorism and economic growth. *Working Papers Series No. 2009-02*, Center for International Economics, USA
12. Igbuzor, O. (2011).Peace and security education: A critical factor for sustainable peace and national development. *International Journal of Peace and Development Studies*, 2(1),1-7.
13. Imuetinyan O. & Emily, O. (2019).Insecurity crisis in Nigeria: The law enforcement agents a panacea?*Journal of Sociology and Social Work* , 7(1), 44-51
14. Julide, Y. Tekin, K. & Gizem, T. (2019). The effects of terror attacks on happiness: Evidence from Turkey. *Economics of Peace and Security Journal*, 14 (2),5-20. DOI: 10.15355/epsj.14.2.5
15. Muhammed, S.J. & Yunusa ,Y.(2020). Impact of insurgency on cattle trade in selected cattle markets

- in Yobe State of Nigeria. *Confluence Journal of Economics and Allied Sciences* 3(1),208-229.
16. Muhammad, Z., Wen, J.& Haseeb, A.(2019). Effect of terrorism on economic growth in Pakistan. An empirical analysis. *Economic Research*, 31 (1), 1794-1812
 17. Ndubuisi, O. P & Anigbuogu, T. (2019).Insecurity in Nigeria: The implications for industrialization and sustainable development. *International Journal of Research in Business Studies and Management*, 6 (5), 7-16
 18. Nwagboso, C. I. (2012). Security challenges and economy of the Nigerian state (2007- 2011). *American International Journal of Contemporary Research* 2(6), 244-258.
 19. National Bureau of Statistics (2021), Annual Abstract of Statistics, Abuja.
 20. Pesaran, M. Shin, Y. & Smith, J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16, 289–326.
 21. Shabir,H.,Naeem, A. & Ihtsham, U. (2015). Impact of terrorism on economic development in Pakistan. *Pakistan Business Review*, 704-721
 22. Stelios,M & Nikolas, N. (2019). The impact of terror attacks on global sectoral capital markets: An empirical study. *Economics of Peace and Security Journal*,14 (1), 46-59.DOI: 10.15355/epsj.14.1.46
 23. United Nations (2015) Action to counter-terrorism: International legal instruments. www.org/en/counterterrorism. Retrieved from internet.
 24. Vanguard, Train attack, Abuja-Kaduna route, 30, March 2022 www.vanguard.com