



Economic Deprivation and Terrorism: Further Empirical Evidence from Nigeria

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Abstract

This paper examined the question whether economic deprivation leads to terrorism in Nigeria. The study covered the period 1970 to 2012. It employed the econometric methodology of vector error correction model and testing the results using stationarity test and co-integration. The Ordinary Least Square (OLS) estimation method was used as an essential component of the estimation techniques. The results show that government expenditure has a significant inverse relationship with terrorism while the degree of openness of the economy, GDP per capita, interest rate and macroeconomic policy index have positive relationships with the occurrence of terrorism both in the long run and short run. Some key policy implication of these results are that the rapid economic growth experienced by Nigeria should be made to show improvements in social welfare and macroeconomic policy inconsistencies should be minimized. Similarly, policy reversal should be properly checked for both short and long run effects on the economy.

Keywords: Terrorism economic, Deprivation, Nigeria.



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1. Introduction

Nigeria is a country abundantly blessed with natural resources. For the past fifty years precisely, the country's oil subsector has tremendously grown. Since commercial production in 1958, oil production and exports have both increased tremendously. For example, crude oil production increased from 395.7 million barrels in 1970 to 776.01 million barrels in 1998 (Akinlo, 2012). Actually, 919.3 million barrels increase was experienced in the year 2006. According to Akinlo (2012) the figure declined in 2009 to 777.5 million barrels. Similarly, exports of crude oil rose from 139.5 million barrels in 1966 to 807.7 million barrels in 1979 (Akinlo, 2012). There was a quantity drop of 390.5 million barrels of crude oil exports in 1987 thereafter an increase of 675.3 million barrels in 1998 (Akinlo, 2012). Beyond 2000, this trend persistent. Likewise, oil revenue rose from ₦166.6 million in the year 1970 to ₦1,591,675.00 million and ₦6,530,430.00 million in the year 2000 and 2008 respectively (Akinlo, 2012).

Expenditure and investment increase because of the net wealth provided by huge oil revenues; macroeconomic management complication and oil dependent of the economy as a result of the huge revenue. The economy still grapples with many challenges (for example, high and rising unemployment rate, manufacturing production decline, high and rising level of poverty; insufficient and poor infrastructural development) despite the huge oil rents. The dismal performance of the Nigerian economy in the face of increasing domestic terrorism sparks up the question whether economic deprivation leads to terrorism?

Zumve *et al.* (2013) summarized in their discourse that economic deprivation, marginalization, frustration, and desperation experienced by the greater population of Nigerians is the underlying cause of terrorism in contemporary Nigeria. This views lack strong empirical basis even as it plausibly seems. The objective of this paper is to empirically investigate whether economic deprivation over the period 1970-2012 leads to terrorism in Nigeria. Specifically, the paper examine whether or not cointegrating relationship exists between economic variables such as GDP per capita, inflation rate, trade openness, government total expenditure, interest rate, macroeconomic policy index and terrorism.

The rest sections of this article are structured in this manner. First, Section 2 of this paper provides the trend and dynamics of terrorism and performance of Nigerian economy. A review of related literature is done in Section 3. Specification of model, data source and technique of analysis are addressed in Section 4. Section 5 shows the outcome of regression estimation. The concluding section contains the summary of major findings and offers some policy prescriptions with a view to mitigating terrorism in Nigeria.

2. Nigeria: Economy and Terrorism Overview

2.1. Trends and Dynamics of Terrorism in Nigeria

The historical trends and dynamics of terrorism are older than Nigeria itself. Terrorism predates Nigerian history as one nation. During the pre-colonial Nigeria Oyeniyi (2007) noted that the secret societies were involved in acts of terrorism like killing, looting, armed robbery, assassination, kidnapping, perversion of justice and so on. Most of them were also used by the local chiefs as agents of terror to eliminate opponents and threaten oppositions. In so doing, acts amounting to harassment, intimidation, violence, fear and general insecurity, characteristics of terrorism were established by the local chiefs. Consequently, it was easy for the colonial masters to collaborate with the local chiefs in further committing acts of terrorism on the people (Chinwokwu, 2012).

In the post colonial era, Abubakar (1997) contends that during the years of the first republic (1960-1966) the political system was typified by communal conflicts – such as the Tiv riots, electoral violence epitomized by Western regional crisis of 1965, and the Agbakoya uprising. The tensions and terrorist activities that were carried out against the Igbo ethnic group during this period eventually led to the fall of the first republic and the rise of the 1966 pogrom. The 1966 pogrom saw the real Northern hatred, wickedness and unequivocal display of total acrimonious acts of terrorism perpetrated against the Igbo and Southern minorities. To completely wipe out the Igbo race was the main aim. The actions of the federal government or northern political or military leaders was seen as the worst display of terrorist acts against a nation aside from the Hitler's Jewish six million gas chamber genocide (Chinwokwu, 2012). The display of terrorism has been further demonstrated in all the phases of government in Nigeria.

During the military era, the dynamic nature of terrorism in Nigeria assumed a different political dimension, not only in the weaponry, strategy, intensity and scope but also in the choice of targets and mass destructions. From 1986, when the use of a parcel bomb was introduced and used to kill Dele Giwa during the regime of General Ibrahim Babangida, till present day the dynamics, dimensions, intensity and pervasiveness of terrorism assumed an unprecedented proportion in the history of Nigeria (Chinwokwu, 2012). Both state and non-state terrorism became rampant and alarming with massive human casualties.

The return of civil rule in 1999 opened up new opportunities for Nigerians to breathe air of freedom from the old order of tyranny and terrorism. It is important to state that instead terrorism assumed an alarming proportion with the introduction of kidnapping, hostage taking, assassinations, armed robbery, murder and soon (Chukwurah, 2007; Okoronkwo, 2007; Sokumbi, 2007). It was so severe and brutish in the Niger Delta and the South – East that oil facilities were destroyed, expatriates abandoned their projects and deserted the zones. Many Nigerians called for state of emergency to be declared in the zones. Even the state governors of the five South-East approached the Presidency, claiming that they lack the resources to contain criminal activities in their states (Adeleye, 2010; Chidozie, 2010; Fabiyi, 2010). See Table 1 (in Appendix) for cases of domestic terrorism arising from bomb explosions in Nigeria from 1986 to 2012. Also, see images of terrorism in Nigeria below.



Christmas Day bombings, including one Picture of a Boko Haram fighter at St. Theresa Catholic Church in captured by the military authorities Madalla, Nigeria. 65 people were reported killed
 Source: Goodspeed (2006), CKN Nigeria (2013)

2.2. Nigeria Economy at a Glance

Categorically, Nigeria is as an emerging market. It is rapidly reaching middle income status, given its abundant supply of natural and human resources, well-developed legal, financial, communications and transport sectors, as well as stock exchange. The Nigerian Stock Exchange happens to be the second largest in Africa. As at 2007, in terms of GDP(PPP), Nigeria was ranked 37th. Nigeria is the United States' largest trading partner in sub-Saharan Africa and supplies a fifth of its oil (11% of oil imports) (Wikipedia, 2009).

Currently, for U.S. goods, Nigeria is reported to be the 50th-largest export market and concerning goods to the U.S., Nigeria is said to be the 14th-largest exporter. Than any country worldwide, it has the seventh-largest trade surplus with the U.S. The United States is the country's largest foreign investor (State.gov., n.d). The bulk of economic activity is centered in four main cities: Lagos, Kaduna, Port Harcourt, and Abuja. Beyond these three economic centers, development is marginal (Wikipedia, 2009).

Many years of military rule, corruption and mismanagement had hindered economic development, previously but the restoration of democracy accompanied with economic reforms have successfully put the country back on the path of achieving its full economic potential as one of Africa's main economies. As the Economist Intelligence Unit and the World Bank reported, the country's GDP(PPP) has almost doubled from \$170.7 billion in the year 2005 to \$292.6 billion in the year 2007 (Economist.com., N.d). The GDP per head has jumped from \$692 per person in 2006 to \$1,754 per person in 2007 (Economist.com., N.d).

Nigeria accumulated a huge foreign debt to finance core infrastructural investments during the 1970s oil boom. The country struggled to keep up with its loan payments as a result of the fall of oil prices during the 1980 period oil glut. It finally defaulted on its principal debt repayments; thus limiting repayment to the interest portion of the loans. The size of the debt increased because of arrears and penalty interest accumulated on the unpaid principal. Nevertheless, in October 2005, following negotiations the Nigeria authorities and its Paris Club creditors reached an agreement such that Nigeria's debt was repurchased at a discount of approximately 60%. Part of the country's oil profits was used to pay the residual 40%, freeing up at least \$1.15 billion annually for poverty reduction programs (Wikipedia, 2009). In April 2006, history was made when Nigeria become the first African Country to completely pay off its debt (estimated \$30 billion) owed to the Paris Club. Some macroeconomic indicators in Nigeria from 2006 to 2010 are show in Table 2.

Table-2. Macroeconomic Indicators (2006 – 2010)

Year	External Reserves (\$million)	Contributions to Real GDP (%)	Oil Production Level at Constant Prices (N billion)	Oil Sector Growth (%)	Inflation Rate (%)	GDP Growth (%)
2006	42,298.11	21.85	130,193.52	-4.51	8.50	6.03
2007	51,333.15	19.60	124,285.12	-4.54	6.60	6.45
2008	53,000.36	17.35	116,594.57	-6.19	15.10	5.98
2009	42,470.00	16.29	117,121.37	0.45	13.90	6.96
2010	32,339.25	15.85	122,957.88	4.98	12.70	7.87

Source: (National Bureau of Statistics, 2010)

3. Literature Review

According to Lacquer (1987), terrorism is not peculiar to the present era. The terms 'terrorism' and 'terrorists' can be traced to 18th century. Most terrorist events were simply localized, before the 1960 period. It was strictly reduced to certain regions or limited to specific geographical area. However, the rapid advances in transportation and communication technology associated with globalization have brought about a shift in the nature and scale of the terrorist threat (Zumve et al., 2013).

Gurr (1970) developed the term "relative deprivation," which links economic disparity with the propensity of individuals to resort to violent political action. Gurr uses relative deprivation to "denote the tension that develops from a discrepancy between the 'ought' and the 'is' of collective value satisfaction, that disposes men to violence" (Piazza, 2006). When a person's expectations of economic or political commodities exceed the actual or real distribution of those commodities, political unrest (violence) is more likely to happen.

Gurr's work provides a theoretical base for a large number of scholars studying political violence, including Huntington (1968), who borrows from the relative deprivation framework to explain the increase in political violence witnessed in the United States and in Southeast Asia during the 1960s and 1970s. To briefly note the studies that make use of the deprivation model: Muller and Seligson (1990) study of eighty-five developing states between 1973

- 1977 found that income inequality, rather than misdistribution of land, is a (slightly) significant predictor of political violence, even when controlling for regime repression and level of national economic development. Through an analysis of fifty-one developing countries between 1968 and 1972, London and Robinson (1989) found a significant relationship between income inequality and political violence that was mainly mediated by the degree to which distribution of wealth in domestic economies had been altered due to penetration by multinational corporations.

In a study on a related topic—civil war and insurgency— Fearon and Laitin (2003) also found socioeconomic factors to be significant. From 1945 to 1999, during the study of 127 civil wars, Fearon and Laitin showed that poverty comfortably positively predicts violent domestic clashes, in line with general unstable political system, rugged terrain, and large size population levels, due to “bureaucratically and financially poor (weak) states” and encourages insurgents in recruitment. Nevertheless, ethnic or religious diversity within countries was not found to be a significant predictor of civil war, as oppose to the assumptions of most scholars.

The general picture that emerges from the above studies is that economic deprivation leading to terrorism is not conclusive. Nonetheless, the literature showing link between economic deprivation and terrorism is not much discussed with respect to Nigeria, therefore this present paper is devoted for that purpose. It specifically seeks to determine through multiple regression analysis the degree to which economic variables predict terrorism.

4. Specification of Model for Analysis

It is assumed that the occurrence of domestic terrorism in Nigeria depends on economic conditions such as GDP per capita, inflation rate, trade openness, government total expenditure, interest rate and macroeconomic policy index and takes the following form:

$$TERR = \xi_0 + \xi_1 \log GDPC + \xi_2 \log OPEN + \xi_3 \log INFL + \xi_4 \log GOVX + \xi_5 \log INTR + \xi_6 POLX + \Omega_t \dots\dots\dots(1)$$

Where:

TERR = dummy variable which takes the value of 1 if terrorist attack occurs in a year and 0 if otherwise

GDPC = Gross Domestic Product per capita

INFL = rate of inflation

OPEN= an indicator variable for trade openness

GOVX = expenditure of government

INTR = rate of interest on loan

POLX= index of economic policy

Ω_t = White noise (signifying error term)

A priori expectation: $\xi_1 < 0, \xi_2 < 0, \xi_3 > 0, \xi_4 < 0, \xi_5 > 0, \xi_6 < 0$

4.1. Data Source and Technique of Analysis

To investigate the relationship specified in equation 1, data were sourced from secondary sources much include Central Bank publication, relevant textbooks and journals. The study covered the period between 1970 and 2012. The choice of the period is due to availability of data. The net effect of the explanatory variables on the dependent variable can be captured. This is because the data from this period gives a reasonable degree of freedom that is required. The ordinary least square regression analysis was the main analytical tool employed. The method of OLS is extensively used in regression analysis primarily because it is intuitively appealing and mathematically much simpler than any other econometric technique (Gujarati, 2004). The empirical investigation consists of three main steps.

The first step in this analysis involves testing the order of integration of each variable. Among the many procedures for the test of order of integration developed by researchers, Augmented Dickey-Fuller (ADF) test credited to Dickey and Fuller (1979; 1981), and Phillip-Perron (PP) credited to Phillips (1987) and Phillips and Perron (1988) are the most popular ones. Augmented Dickey-Fuller test is based on rejecting a null hypothesis of unit root (i.e., series are non-stationary) for the alternative hypotheses of stationarity. The tests are carried with and without a deterministic trend (t) for each of the variables (series). The general form of Augmented Dickey-Fuller (ADF) test is given as:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{i=1}^n \alpha_i \Delta y_t + e_t \dots\dots\dots(2)$$

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{n=1}^n \alpha_n \Delta y_t + \delta_t + e_t \dots\dots\dots(3)$$

Where y_t is a time series, t is a linear time trend, Δ is the first difference operator, α_0 is a constant, n is the optimum number of lags in the dependent variable and e is the random error term.

The difference between equation (2) and (3) is that the first equation includes just drift. However, the second equation includes both drift and linear time trend pp.

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + e_t \dots\dots\dots(4)$$

Step two of this analysis is testing of the presence or otherwise of cointegration between the variables of the same order of integration. This is done by forming a cointegration equation. The notion behind cointegration is that if in the long-run, two or more variables move closely together, even though the variables themselves are trended, the difference between them is constant. It is wise to see these variables as defining a long-run equilibrium relationship, invariably, the difference between them is stationary (Hall and Henry, 1989). A lack of cointegration implies that such variables do not exhibit long-run relationship (Dickey et al., 1991). The maximum-likelihood test procedure established by Juselins and Johansen (1990) and Johansen (1991) is employed. Specifically, if Y_t is a vector of n stochastic variables, then there exists a p -lag vector auto regression with Gaussian errors of the following form: Johansen’s methodology takes its starting point in the Vector Autoregression (VAR) of order P given by:

$$y_t = \mu + \Delta_1 y_{t-1} + \dots + \Delta_p y_{t-p} + \epsilon_t \dots\dots\dots(5)$$

Where y_t is an $n \times 1$ vector of variables (which are integrated of common denoted (1)order) and the $n \times 1$ vector of innovations is ε_t .

In another form, the VAR is expressed as follows:

$$\Delta y_t = \mu + \eta_{y,t-1} + \sum_{i=1}^{p-1} \pi_i \Delta y_{t-i} + \varepsilon_t \dots \dots \dots (6)$$

where $\Pi = \sum_{i=1}^p A_i - 1$ and $\sum_{j=i+1}^p A_j$

To determine the number of co-integration vectors, Johansen (1991) and Juselins and Johansen (1990) suggested two statistic test, the first one is the trace test (λ trace). Its function is to test the null hypothesis in order to ensure that the number of distinct cointegrating vector is less than or equal to q as opposed to a general unrestricted alternative $q = r$. The test calculated is as follows:

$$\lambda \text{trace}(r) = -T \sum_{i=r+1}^{\infty} \ln(1 - \lambda^i)$$

Where T refers to the number of observations (usable), and the estimated eigenvalue (from the matrix) are the λ_i .

The dynamics of output relation is then specified in an error correction model (ECM), incorporating the one period lagged residual from the static regression. The error correction model is designed to capture the short-run deviations that might have occurred in estimating the long-run co-integrating equation (Engle and Granger, 1987). Thus, equation 1 is re-specified as follows to include an error correction term (ECM)

$$TERR = \xi_0 + \xi_1 \log GDPC + \xi_2 \log OPEN + \xi_3 \log INFL + \xi_4 \log GOVX + \xi_5 \log INTR + \xi_6 POLX + ECM_{t-1} + \Omega_t \dots \dots \dots (7)$$

5. Empirical Outcome and Discussion

From the Pairwise correlation matrix in Table 3 in Appendix, terrorism (TERR) and interest rate showed a highly positive correlation of about 0.71. This is followed by a strongly positive movement between government expenditure (GOVX) and quality of institution (QINS). Other variables exhibited moderately weak correlation in general.

Table 4 in Appendix contains the multivariate regression results of the basic model from equation 1. The results indicate that LOG(INFL) is statistically insignificant. This necessitates the dropping of inflation variable from the model and hence the parsimonious estimation contained in Table 5 which will be the focus of the discussion. In Table 5, some of the presumptive signs were correct apart from the log of GDP per capita, log of openness of the economy to trade, interest rate (LOG(INTR) and quality of institution (QINS), which showed a positive sign instead of a negative sign. The improved results as contained in Table 5 show that individually, all the coefficients of the variables are statistically significant.

Precisely, the coefficient of LOG(GDPC) is found to be statistically significant at 5 percent level as indicated by its probability value 0.0244 but wrongly signed (positive). This, therefore, implies that 1 percent increase in GDP per capita increases terrorism by 24.4 percent. This is not in line with the a priori expectation. The implication is that economic development in Nigeria spurs terrorism. The result also indicates that as GDP per capita increases terrorism rises, as implied in the positively weak correlation between GDP and TERR in Table 8 (see Appendix). A plausible explanation for this result is that Nigeria's economy is struggling to leverage the country's vast wealth in fossil fuels in order to displace the crushing poverty that affects about 57% of its population (DoubleGist.com., 2013). 'Resource curse' is a phrase which economist used to refer to the coexistence of vast wealth in natural resources and extreme personal poverty in developing nations such as Nigeria. Although 'resource curse' is more widely understood to mean an abundance of natural resource this fuels official corruption resulting in a violent competition for the resource by the citizens of the nation, hence terrorism.

In Nigeria, government expenditure has been on the rise owing to the huge receipts from production and sales of crude oil, and the increased demand for public (utilities) goods. With a negative and statistically significant coefficient, the result suggests that the increase in government expenditure reduces terrorism. Unfortunately, the rise in government expenditure has not translated into meaningful growth and development, as Nigeria ranks among the poorest countries in the world (Sevitenyi, 2012). In addition, many Nigerians have continued to wallow in abject poverty, while more than 50 percent live on less than US\$2 per day (Sevitenyi, 2012). In addition to this, are deteriorated infrastructure (roads and power supply precisely) which have resulted to the close down of many industries, accompanied by high level of unemployment and abandoned gigantic projects. As such the result should be taken with caution.

There is a strong believe that trade openness stimulates economic growth through its effect on global economies integration and better markets generation. The positive relationship of LOG(OPEN) suggests that as Nigeria's economy opens to the world, terrorism is attracted. Openness attracts inflow of foreign direct investment. Some foreign nationals having investments in Nigeria have been arrested in connection with terrorist activities. Recently, a terror cell and Lebanon-based Hezbollah armory was uncovered in Bompai, Kano state, according to a report by NijajaGist.com. (2013). Also, illegal aliens from Chad and other neighboring countries armed with weapons have been arrested. They come into Nigeria through the porous borders.

Regarding savings and investment behavior of households as well as enterprises, real interest rate is a vital determinant and also a factor in terms of cyclical development as well as long-term economic growth. The positive relationship of interest rate coefficient suggests that it encourages terrorism. This is because of high lending rate of loans by commercial banks, which small and medium scale industries could not afford because of their limited capital and production base. Thus, the need for the introduction of non-interest banking in Nigeria as stated by the Central Bank of Nigeria (CBN) (Chima, 2011). But this plan has generated a lot of controversies as some religious groups have argued that the move violates the country's secular constitution and that it may cause division in the country.

Finally, the results in Table 5 indicate statistically significant coefficient on policy index variable (POLX) suggesting a positive relationship with terrorism. From 1960, when the nation gained independence, to 2013, Nigeria

experienced about twenty-five years of civilian, as opposed to military rule. The government's policy stance in the macro-economy has been considerable fluctuating and some bad habits e.g., deficit budgeting have been persistent. The implication of the result is that government policy stance ultimately affects the poverty level over the years. Invariably, terrorism in Nigeria is a direct consequence of the people's deep dissatisfaction with their government's macroeconomic policy.

The $0.805794R^2$ value implies that 80.58 percent of total variation in terrorism is explained by the regression equation. Coincidentally, the goodness of fit of the regression remained high after adjusting for the degrees of freedom as indicated by the adjusted R^2 (0.779550 or 77.96%). The 30.70F-statistic value which is a measure of the joint significance of the explanatory variables, is found to be statistically significant at 1 percent as indicated by the corresponding probability value (0.000000). As a result of the observed 1.41 D.W statistic is low to rule out autocorrelation, decision was taken to analyze it further by conducting LM test for autocorrelation up to the first-order. As depicted in Table 6, the statistic labeled "Obs*R-squared" is the LM test statistic for the null hypothesis of no serial correlation. The 0.040551 probability value indicates the presence of some level of serial correlation in the residuals.

Furthermore, there is evidence of autoregressive conditional heteroskedasticity (ARCH) in the residuals as shown by the probability value of 0.072136 on the statistic labeled "Obs*R-squared" in Table 7. White's heteroskedasticity test was also carried out as shown in Table 8. White's test statistic is asymptotically distributed as a χ^2 with degrees of freedom equal to the number of slope coefficients, excluding the constant, in the test regression (five in this case). Thus the critical χ^2 value is calculated as 11.0704976935. Since "Obs*R-squared" value of 28.62386 is greater than the 5% critical χ^2 value of 11.0704976935, the null hypothesis of no heteroskedasticity can be rejected. The presence of serial correlation, heteroskedasticity and ARCH indicate the need for further analysis. Thus, the unit root test was carried out as shown in Table 9 (see Appendix). The results reported indicate that all the variables are non-stationary in their respective levels. By taking first differences, all the variables become stationary as the ADF statistic for each time series shows at the 1% significance level with the exception of GDP per capita at 5% significance level. In other words, the time series data of all the variables are integrated of order one I(1).

Given the unit root properties of the variables, the study proceeded to establish whether or not there is a long-run cointegrating relationship among the variables by using the Johansen cointegrating test. The trace and maximum eigenvalue figures reported are displayed in Table 10 of the Appendix. The trace test indicates 6 cointegrating equation(s) at the 5% level while the maximum eigenvalue statistic indicates no cointegration at both 5% and 1% levels. According to Juselius and Johansen (1990) as cited in Owoye and Onafowora (2007), the use of trace statistics is recommended when the two statistics exhibit conflict. This is because the trace statistics takes into consideration all eigenvalues of the smallest figure; it shows addition power than the max eigenvalue statistic. Since the trace statistic was accepted that there is cointegration then there is need to further subject the variables to error correction test. The error correction term (ECM) is stationary at level and statistically significant at 1% level (see Table 10 in Appendix). In addition, the ECM shows a long run relationship between regressors and regressand in the model. The absolute value of the coefficient of the error-correction term indicates that about 33 per cent of the disequilibrium in the terrorism (TERR) is offset by short-run adjustment in each year. The error correction term is correctly signed (negative) (see Table 11 in Appendix). Furthermore; the goodness-of-fit of the estimated model indicates that the model is reasonably accurate in prediction.

5.1. Robustness Test of the Estimation

To determine whether the results of the primary variables are robust to the inclusion of other control variables, unemployment was introduced. The significance of parameter estimates of the primary variables tend not to fluctuate over the sample period but the coefficient of the unemployment variable was statistically insignificant (see Table 12 in Appendix) at conventional test levels. In other words, the magnitude of the coefficients did not change considerably compared with the results in Table II and the signs remained the same even after the unemployment variable was introduced in the regression.

The test of equation stability and of estimated values was done using the most used tests of stability: CUSUM Tests; CUSUM of Squares Tests; Recursive Coefficients. The cumulative sum of the equation errors in regression is what CUSUM test is premised on. Figure 1 shows the cumulative sum of errors together with critical lines of 5%. The equation parameters are not considered stable if the whole sum of recursive errors gets outside the two critical lines. From the graph CUSUM stays within the 5 per cent critical line, indicating parameter constancy throughout the sample period.

CUSUM of Squares test is similarly calculated and interpreted as CUSUM test, with the difference that instead of recursive errors, the recursive doubled errors is used. For the analyzed equation, according to this test, the values of the equation are stable for the study period as shown by the CUSUM test staying within the 5% critical line (Figure 2, see Appendix). Recursive Coefficients shows the equations figures computed regressively. The figures are said to be stable if, together with the improvement of the pattern, their figure is not changed. For calculating recursive coefficients we start with the first observation $k + 1$ where k represents the number of coefficient of the regression equation. We proceed similarly until we estimate coefficients for the whole pattern of available data. Then recursive coefficients are graphically represented. For the analyzed equation, recursive coefficients are represented in Figure 3 (see Appendix). After having analyzed the multiple linear regression model the general conclusion is that it is valid.

6. Summary of Findings, Conclusion and Policy Implication

The paper examined whether economic deprivation leads to terrorism in Nigeria. The study spanned a period of 1970 through 2012. It employed the econometric methodology of vector error correction model and testing the results using stationarity test and co-integration. The Ordinary Least Square (OLS) estimation method was used as an

essential component of the estimation techniques. The findings reveal that government expenditure has a significant inverse relationship with terrorism, whereas per capita GDP, the degree of openness of the economy to international trade, interest rate and macroeconomic policy index have positive relationships with terrorism both in the long run and short run.

Table-1. Cases of Domestic Terrorism arising from Bomb Explosions in Nigeria 1986-2012

Date	Place	State	Terrorist Group	Casualty
19/10/1986	Parcel bomb, Lagos	Lagos	Nil	1
31/5/1995	Venue of launching of family support Ilorin	Kwara	Nil	No record
18/01/96	Durbar Hotel Kaduna	Kaduna	Nil	1
19/1/1996	Aminu Kano Airport, Kano	Kano	Nil	No record
11/4/1996	Ikeja cantonment	Lagos	Nil	No record
25/4/1996	Airforce base	Lagos	Nil	No record
14/11/1996	MMIA	Lagos	Nil	2
16/12/1996	Col. Marwa convey	Lagos	Nil	No record
18/12/96	Task force(Lagos state) onenvironment (bus) operating inLagos	Lagos	Nil	No record
7/1/1997	Military bus at Ojuelegba, Lagos	Lagos	Nil	No record
12/2/1997	Military vehicle Fakka D608 on Ikorodurd, Lagos	Lagos	Nil	No record
7/5/1997	Nigerian army 25 seater bus at Yaba, Lagos	Lagos	Nil	No record
12/5/1997	Eleiyele, Ibadan	Oyo	Nil	No record
16/5/1997	Onitsha	Anambra	Nil	5
6/8/1997	Port Harcourt	Rivers	Nil	1
2/9/1997	Col. InuaBawa convey, Akure	Ekiti	Nil	No record
18/12/1997	Gen. O. Diya in Abuja airport	Abuja	Nil	1
22/4/1998	Evan square	Lagos	Nil	3
23/4/1998	Ile-Ife	Osun	Nil	5
6/1/ 2012	Attack on some Southerners in Mubi	Adamawa	Boko haram	13
21/1/ 2012	Multiple bomb blasts rocked Kano city	Kano	Boko haram	Over 185 people killed
29/1/ 2012	Bombing of a Police Station at Naibawa area of Yakatabo	Kano	Boko haram	No record
8/2/ 2012	Bomb blast rocked Army Headquarters	Kaduna	Boko haram	No record
15/2/ 2012	Attack on KotonKarfe Prison which 119 prisoners were freed	Kogi	Boko haram	1 Warder killed
19/2/ 2012	Bomb blast near Christ Embassy Church, in Suleija	Niger	Boko haram	5 people injured
26/2/ 2012	Bombing of Church of Christ in Nigeria, Jos	Plateau	Boko haram	2 people killed and 38 injured
11/2/ 2012	Bombing of St. Finbarr's Catholic Church Rayfield, Jos	Plateau	Boko haram	11 people killed and many injured
29/2/ 2012	Attack on Bayero University	Kano	Boko haram	16 people killed and many injured
30/2/ 2012	Bomb explosion in Jalingo	Taraba	Boko haram	11 people killed and several others Wounded

Source: Chinwokwu (2012), Ajayi (2012)

Budget surplus in relation to GDP, rate of inflation and trade openness are some of the major indicators of macroeconomic policy. The three policy variables are used to construct policy index instead in this paper dummy was constructed to reflect government's policy stance in the macro economy during the 32 years of rule in the country. It takes the value 1 for civilian and 0 for military. Also, due to data limitation on the number of terrorist attacks per year or the number of victims per incident through the study period a binary was developed for the dependent variable. It was done from a chronology of terrorist attacks over the years. All this factors could have affected the results of the study. As such further studies based on alternative approaches are necessary to shed more light on the connection between economic deprivation and terrorism in Nigeria. Nonetheless, the results in this paper suggest that economic deprivation encourages the occurrence of terrorism confirming the need for policy efforts in mitigating the associated risk. Therefore, the paper suggests that border trade should be monitored. This calls for serious and sustained surveillance and supervisory efforts of law enforcement agencies to curb activities of illegal aliens and unpatriotic Nigerians who assist them. Since the analysis showed that government total expenditure has negative effect on terrorism, more favorable attention in the allocation of government expenditures should be done to ensure that capital expenditure and recurrent expenditure are properly managed in a manner that it will raise the nation's production capacity and accelerate economic growth. As a prerequisite for generating economic growth, government must embark on growth-enhancing reforms and be sensitive to the behavior of interest rates in the country. Thus the monetary authority must formulate and implement financial policies that enhance investment-friendly rate of interest and take into consideration those other factors which negatively affect investment in the country. This will definitely enhance policy formulation for development of private sector as a catalyst for general economic growth of the country. The rapid economic growth experienced by Nigeria should be made to show

improvements in social welfare. As such poverty reduction and job creation must be made to keep pace with population growth of the country. This can be made possible when public funds are judiciously utilized. In other words, every public fund should be spent to maximize social welfare. A large portion of government income should be used for development projects and in import sectors of the economy (i.e., agricultural and manufacturing sectors).

Finally, the government should ensure that macroeconomic policy inconsistencies are minimized and policy reversals are properly checked for both short and long run effects on the economy.

Appendix

Table-3. Correlation Matrix (Pairwise)

	INFL	GDP	GOVX	OPEN	INTR	TERR	POLX
INFL	1.00						
GDP	-0.24	1.00					
GOVX	-0.22	0.49	1.00				
OPEN	0.03	-0.02	0.43	1.00			
INTR	0.34	-0.09	0.19	0.35	1.00		
TERR	0.20	0.15	0.35	0.36	0.71	1.00	
POLX	-0.21	0.47	0.64	0.17	0.29	0.49	1.00

Source: Researchers' computation, 2013, adapted from regression result using E-view 4.1

Table-4. Estimates of Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.616363	0.598483	-1.029875	0.3099
LOG(INFL)	-0.014902	0.041387	-0.360071	0.7209
LOG(GDP)	0.172628	0.073634	2.344397	0.0247
LOG(GOVX)	-0.113963	0.043641	-2.611361	0.0131
LOG(OPEN)	0.071738	0.034837	2.059220	0.0468
LOG(INTR)	0.657786	0.101564	6.476560	0.0000
POLX	0.227890	0.094308	2.416438	0.0209
R-squared	0.806491	Mean dependent var		0.767442
Adjusted R-squared	0.774240	S.D. dependent var		0.427463
S.E. of regression	0.203106	Akaike info criterion		-0.202282
Sum squared resid	1.485067	Schwarz criterion		0.084425
Log likelihood	11.34906	F-statistic		25.00635
Durbin-Watson stat	1.445299	Prob(F-statistic)		0.000000

Source: Computational results using Eviews 4.1

Table-5. Parsimonious Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.665862	0.575589	-1.156834	0.2548
LOG(GDP)	0.167195	0.071219	2.347612	0.0244
LOG(GOVX)	-0.108547	0.040482	-2.681342	0.0109
LOG(OPEN)	0.067505	0.032406	2.083096	0.0442
LOG(INTR)	0.651310	0.098776	6.593788	0.0000
POLX	0.229565	0.093079	2.466343	0.0184
R-squared	0.805794	Mean dependent var		0.767442
Adjusted R-squared	0.779550	S.D. dependent var		0.427463
S.E. of regression	0.200703	Akaike info criterion		-0.245198
Sum squared resid	1.490416	Schwarz criterion		0.000551
Log likelihood	11.27176	F-statistic		30.70394
Durbin-Watson stat	1.408547	Prob(F-statistic)		0.000000

Source: Researchers' computation, 2013, adapted from regression result using E-view 4.1

Table-6. Serial Correlation LM Test: Breusch-Godfrey

F-statistic	3.891456	Probability	0.056250
Obs*R-squared	4.194698	Probability	0.040551

Source: Computational results using Eviews 4.1

Table-7. ARCH Test

F-statistic	1.384540	Probability	0.246284
Obs*R-squared	1.405131	Probability	0.235866

Source: Computational results using Eviews 4.1

Table-8. White Heteroskedasticity Test

F-statistic	2.410239	Probability	0.023128
Obs*R-squared	28.62386	Probability	0.072136

Source: Computational results using Eviews 4.1

Table-9.Unit Root Test

Augmented Dickey-Fuller					
variables	levels	1 st difference	2 nd difference	Lag length	Order of integration
INFL	-3.502597	-6.330409*		9	I(1)
GDPC	-2.502918	-3.542123**		9	I(1)
GOVX	0.954130	6.061500		9	I(1)
OPEN	-2.232916	-7.139956*		9	I(1)
INTR	-1.747155	-10.31167*		9	I(1)
TERR	-1.840175	-6.403124*		9	I(1)
POLX	-2.282445	-7.695598*		9	I(1)
ECM	-4.757667*			9	I(0)

Source: Authors' computation from computer output.

Note: * significant at 1%; ** significant at 5%; and ***significant at 10%

Table-10. Unrestricted Cointegration Rank Test

Hypothesized		Trace	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.537180	102.5062	94.15	103.18
At most 1 *	0.399611	70.91915	68.52	76.07
At most 2 *	0.371117	50.00190	47.21	54.46
At most 3 *	0.301093	30.98568	29.68	35.65
At most 4 *	0.251351	16.29797	15.41	20.04
At most 5 *	0.102396	4.429068	3.76	6.65
*(**) denotes rejection of the hypothesis at the 5%(1%) level				
Trace test indicates 6 cointegrating equation(s) at the 5% level				
Trace test indicates no cointegration at the 1% level				
Hypothesized		Max-Eigen	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None	0.537180	31.58708	39.37	45.10
At most 1	0.399611	20.91725	33.46	38.77
At most 2	0.371117	19.01622	27.07	32.24
At most 3	0.301093	14.68771	20.97	25.52
At most 4	0.251351	11.86890	14.07	18.63
At most 5 *	0.102396	4.429068	3.76	6.65
*(**) denotes rejection of the hypothesis at the 5%(1%) level				
Max-eigenvalue test indicates no cointegration at both 5% and 1% levels				

Source: Researchers' computation, 2013, adapted from regression result using E-view 4.1

Table-11.Error Correction Model Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.472115	0.570480	-0.827576	0.4135
LOG(GDPC)	0.147372	0.072297	2.038430	0.0491
LOG(GOVX)	-0.102344	0.041005	-2.495909	0.0174
LOG(OPEN)	0.070241	0.033035	2.126235	0.0406
LOG(INTR)	0.585034	0.102283	5.719735	0.0000
POLX	0.240609	0.091067	2.642103	0.0122
ECM(-1)	-0.334137	-0.170726	-1.957157	0.0583
R-squared	0.810114	Mean dependent var		0.785714
Adjusted R-squared	0.777562	S.D. dependent var		0.415300
S.E. of regression	0.195869	Akaike info criterion		-0.271726
Sum squared resid	1.342768	Schwarz criterion		0.017886
Log likelihood	12.70625	F-statistic		24.88679
Durbin-Watson stat	2.066517	Prob(F-statistic)		0.000000

Source: Researchers' computation, 2013, adapted from regression result using E-view 4.1

Table-12. Test of Robustness of Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.476808	0.600756	-0.793680	0.4329
LOG(GDPC)	0.148157	0.078129	1.896312	0.0664
LOG(GOVX)	-0.102874	0.045392	-2.266368	0.0299
LOG(OPEN)	0.070518	0.034835	2.024338	0.0508
LOG(INTR)	0.586184	0.111019	5.280054	0.0000
LOG(UNEM)	0.002022	0.069331	0.029162	0.9769
POLX	0.239577	0.098932	2.421626	0.0209
ECM(-1)	-0.332837	0.178862	-1.860858	0.0714
R-squared	0.810118	Mean dependent var		0.785714
Adjusted R-squared	0.771025	S.D. dependent var		0.415300
S.E. of regression	0.198726	Akaike info criterion		-0.224132
Sum squared resid	1.342734	Schwarz criterion		0.106853
Log likelihood	12.70677	F-statistic		20.72270
Durbin-Watson stat	2.065951	Prob(F-statistic)		0.000000

Source: Researchers' computation, 2013, adapted from regression result using E-view 4.1

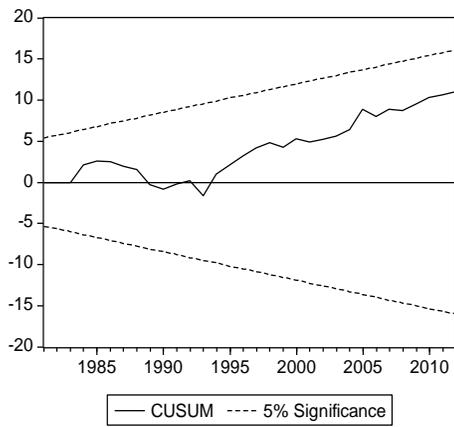


Figure-1. CUSUM Test

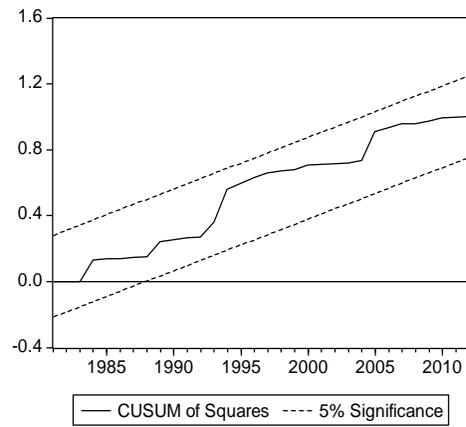


Figure-2. CUSUM of Squares Test

Source: Researchers' computation, 2013, adapted from regression resultusing E-view 4.1

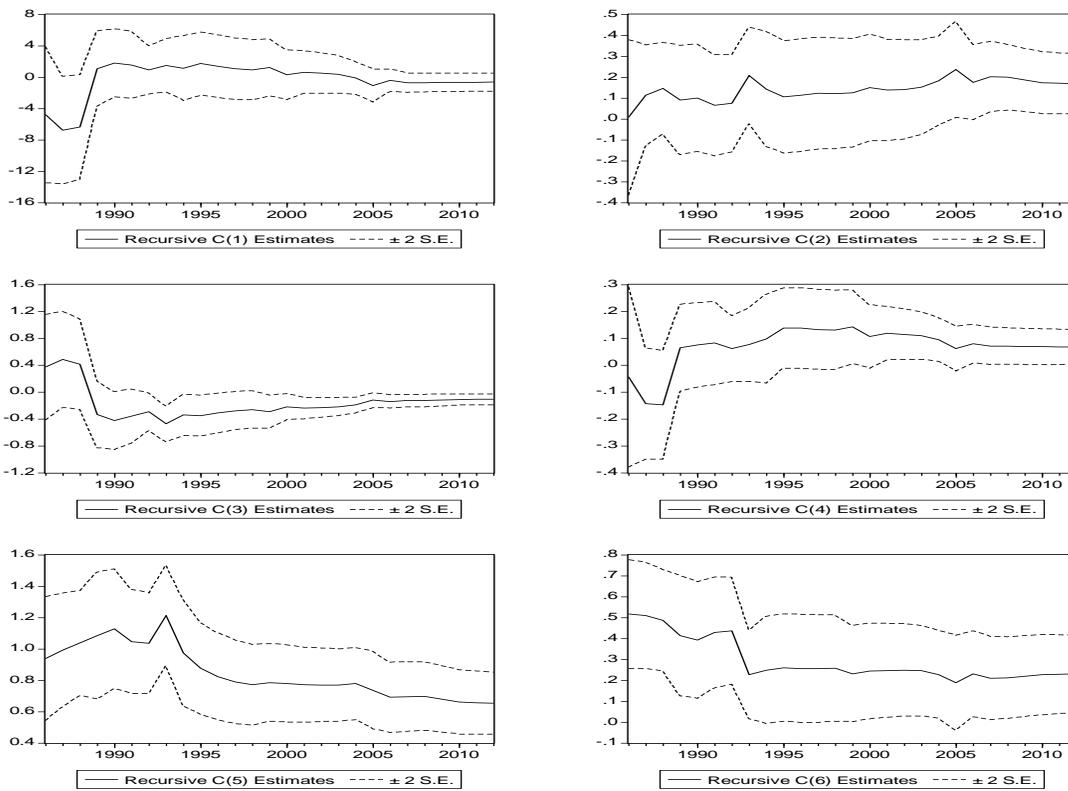


Figure-3. Recursive Coefficients Test

Source: Researchers' computation, 2013, adapted from regression resultusing E-view 4.1

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