Defense Expenditure and the Fight Against Insurgency in Nigeria's North-East Region

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Abstract

The fight against insurgency in Nigeria's North East region has enjoyed substantial funding in recent time. This study examines the impact of government defense spending on the fight against insurgency in the country. Using monthly casualty figures from the Nigeria Security Tracker, it examines the impact of public defense spending on the number of incidents by month and total deaths of civilians and state actors between 2015 and 2020. Quantitative analysis was used as the study's estimation method. It carried out its empirical analysis using the Poisson regression. According to the result of the regression analysis, government defense spending has reduced insurgency-related casualties by 71 per cent over the study period. Despite the gains made possible by the government's budgetary commitment to the fight, much work remains to be done in the region to put an end to insurgency. The study recommends, among other things, that funds be allocated to reconstruction, development, and providing gainful employment for the region's growing number of young people in order to deter them from taking up arms.

Keywords: *Defense Expenditure, Insurgency, Boko Haram, Insurgency-related casualties, Poisson.*

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Background to the Study

Conflicts in north-eastern Nigeria and adjoining regions has ravaged the region for more than a decade. Years of damage and violence caused by the Boko Haram and the Islamic State's West Africa Province (ISWAP) have resulted in massive humanitarian, human rights, and development crises, placing millions of people's lives in jeopardy (Avis, 2020). Since 2009, the United Nations Development Programme (UNDP) estimates that north-east Nigeria's war with Islamist insurgents has killed 35,000 people in the BAY (Borno, Adamawa, and Yobe) states as a result of the violence (UNDP, 2020). The true human cost of the war, on the other hand, is substantially higher. Many more people have perished as a result of the conflict's indirect impacts. It is estimated that over 350,000 people have died as a result of the conflict by 2020, with 314,000 of those dying as a result of indirect causes. The conflict has been seen as a threat to Nigeria's statehood, with periods of widespread land loss and the undermining of the military (Brechenmacher, 2019).

The situation is said to have intensified significantly after 2014, resulting in the deaths of millions of people and the displacement of millions more (Avis, 2020). This has only served to exacerbate the north-east's fragile economic development. Infrastructure damage is worth $9.2 billion, resulting in $8.3 billion in lost productivity (World Bank, 2015: 1). The majority of the displaced people have stayed in the BAY states, while the rest have relocated to northern and central Nigeria.

Damage to education and health facilities, as well as attacks on markets and farms, the closing of cattle markets, and restricted access to lands, all of which have a detrimental influence on livelihoods, are thought to have harmed a generation's development. The violence is also seen to have produced a humanitarian crisis, with rising food insecurity and mounting pressure on already overburdened and deteriorating basic social services (Ogbozor, 2016; Council on Foreign Relations, 2018). This has worsened the already existing north-east's socioeconomic gaps. Due to communal, property, and land conflicts, as well as reprisal for conflict-related violence, the war has weakened social cohesion, with social engagement becoming increasingly difficult in an atmosphere of violence (Brechenmacher, 2019).

The conflict's impact on the region's six states has been unequal. Physical destruction and displaced person movements have wreaked havoc on Adamawa, Borno, and Yobe, undermining local businesses and livelihoods. The spillover of internally displaced people (IDPs) into the administrative boundaries of Bauchi, Gombe, and Taraba has imposed a considerable economic strain on the host state (World Bank, 2015). Food production and agricultural output have been significantly impacted by the violence, notably in the hardest-hit areas of the BAY states. Households have been unable to pursue traditional livelihoods as a result of the casualties and population displacements, disrupting commerce and market functioning. In the BAY states, restrictions on food supply and access to farms and markets have resulted in localized food crises and significant food shortages.

The economic impact of the crisis has been estimated to be in the billions of dollars across the north-east (Avis, 2020). Borno, the most impacted state, accounts for two-thirds of the

damages (US$ 5.9 billion); Adamawa and Yobe account for US$ 1.6 billion and US$ 1.2 billion, respectively (Avis, 2020). Agriculture (US$ 3.5 billion) and houses (US$ 3.3 billion) account for three-quarters of the total damages. More than 400,000 dwelling units have been damaged or destroyed as a result of the conflict, with Borno state accounting for 95% of the total (Avis, 2020).

As a result of the foregoing, the Nigerian government has been forced to intervene through expenditure programs in order to prosecute the war and provide developmental assistance to the inhabitants of the region. Consequently, money is considered vital in winning wars (Gilbert, 2015). Money is being used in particular to win the hearts and minds of the public, as well as to protect the lives of the military forces. It encourages soldiers to take on more responsibility and facilitates the expenditure of funds on battlefield rehabilitation and development projects. Money is thus considered the most significant ammunition in battles, according to Bronowski and Fisher (2010).

Despite the fact that billions of dollars have been spent over the years to restore peace in Nigeria's volatile north-east area, there have been calls of widespread corruption in the management of the conflict (Council on Foreign Relations, 2022). Nigerians currently believe that the country's national security architecture is not as effective as it should be. This is because Nigeria's military spending is increasing at an exponential rate, growing from $697 million in 2010 to $469.6 billion in 2020 (Friedrich-Ebert-Stiftung, 2020). Furthermore, the statistics revealed that between 2008 and 2018, Nigeria spent $16 billion on defense, accounting for 10.51 percent of the total budget of $153 billion over the same time. In 2019, $4.6 billion was set aside for defense and security, with another $4.6 billion set aside in 2020. In 2020, the total budget for security accounted for 16.8% of the total budget of $27.9 billion. The unfortunate reality is that the total amount of money spent on security in Nigeria is largely unknown. (Council on Foreign Relations, 2022). Despite massive statutory funding for defense, police, civil defense, and paramilitary organizations, state security, the National Security Adviser's office, and Security Votes in the states, the nation's security dilemma persists (Human Rights Watch, 2022). This implies that Nigeria is not receiving good value for the money it continues to spend on defense and security.

A well-funded state defense is expected to have a well-equipped, well-trained, and a well-organized security sector. However, despite government's rising defense expenditure to prosecute the war against insurgency in Nigeria's north-east region, the war has unfortunately persisted. Consequently, this study seeks to assess the impact of government's defense expenditure on the fight against insurgency in Nigeria's north-east region.Specifically, the study assesses the impact of public defense spending on the number of incidents by month and total deaths of civilians and state actors spanning the period of 2015 and 2020.

Literature Review
Conceptual Framework: The concept of State Defense
The State Defense Concept lays forth the core strategic concepts of national defense, as well as mid- and long-term priorities and countermeasures, both in peacetime and in the event that

national security is challenged (National Security Concept) (2019). The fundamental strategic principle of national defense is to reduce the potential for threats to national security by continuing to improve and modernize national defense capabilities. This reduces the risk of external military aggression or the emergence of other national threats, and ensures that, if necessary, effective deterrence measures are in place (Berzins, 2014).

The national defence capacity according to Atmante (2020) rests upon the planned, coherent and coordinated political leadership, as well as the cooperation between state and local authorities, the National Armed Forces (NAF) and society. It is a necessary precondition for preventing and defeating national security threats, as well as dealing with their consequences. The NAF, which is being developed as a defense asset that is professionally trained and equipped with modern technologies, is the foundation for national defense. The quality of the NAF's capabilities is a top priority in assuring national defense. Similarly, a soldier's career, as well as his professional development and motivation, are critical.

The growth of the Land Forces component, which constitutes the foundation of the NAF capabilities, is a critical priority for the NAF capability development and resource allocation, taking into account national and collective defense needs as well as available resources for national defense execution. Support for ground operations and provision of host nation support capabilities are inextricably related to the development of other capabilities (Atmante, 2020). It is critical to establish a long-term national defense funding structure that allows for a progressive increase in national defense expenditures in order to improve national defense performance. This concept of State Defense provides a basis which helps to understand Nigeria's increasing expenditure to national defense in the face of mounting insurgencies, and also provides a basis to access its impact.

Empirical Review

The study reviewed several related studies. Shimawua (2020) assessed the military campaign against Boko Haram insurgency in Nigeria. This study examined the extent to which corruption has affected military operations in the fight. Data was obtained from secondary materials which include books, journals, periodicals, newspapers, and the internet. Data analysis was done using the technique of content analysis. Findings revealed that the fight against Boko Haram insurgency in Nigeria has lasted so long due to corruption that has eaten deep into the fabrics of the military hierarchy, and that this has significantly affected the fortunes of the military in the Boko Haram fight.

Similarly, Akume and Godswill (2016) analyzed the challenge of managing insurgency in Nigeria spanning 2009 to 2015. The study used documentary research method to examine why government is unable to contain the menace of insurgency. The paper discovered that government agencies' opportunistic behavior accounts for the poor performance of government in wiping out insurgency. The study pointed at large scale corruption as the reason for the poor performance of Nigeria's military forces.

Equally, Usman (2017), assessed the impact of corruption in the military's fight against insurgency in the north eastern region of Nigeria covering 2009-2015. The study employed

secondary data and adopted content and observational method of analysis. It discovered that the failure of the Nigerian military to defeat insurgents in the country was due to corruption perpetrated by highly placed government functionaries, thus advocating for the continued war against corruption.

Furthermore, Duruji, et al. (2018), examined the military's budget against the Boko Haram insurgency in Nigeria covering the period of 2009-2017. The study examined the relationship between defense spending and the fight against Boko Haram insurgency. The study found that there were shortfalls with respect to monies budgeted for the war and what has been achieved so far, stating that the expenditures were not commensurate to what has been achieved in the war, thus advocating for prudence in managing military budget against insurgency in the country.

In addition, Suleiman and Aminu (2015), in their study examined how the cycle of bad governance and corruption have affected the fight against the Boko Haram insurgents in Nigeria. The study examined the cycle of bad governance and corruption particularly in military expenditure in Nigeria's north-east fight against the insurgents. Qualitative data were employed through interviews. The study found that the war has not been fairly fought, concluding that corruption has affected the successes of the Nigerian forces, thereby prolonging the military's campaign against the insurgency. The review shows that very few empirical studies have been carried out in the area. This study is therefore a recent study that uniquely uses the Poisson regression to assess the government's defense expenditure and the fight against insurgency in Nigeria's north-east region.

Methodology
Data and Method of Analysis
This study adopts ex-post facto research design based on the existence of data needed for the analysis. The justification for choosing this research design is that, the study variables are already documented facts which the researcher has no capacity to either change or manipulate. Secondary data was used in this study. It utilized monthly time series data, spanning the period of 2015:M1-2020:M12. The monthly data on defense expenditure was gotten from the 2020 Annual Central Bank of Nigeria (CBN) statistical bulletin, while the monthly casualty figures (number of incidents by month and total deaths of civilians and state actors) was sourced from the Council on Foreign Relation's Nigeria Security Tracker catalog data of 2020.

To determine the impact of public defense spending on the number of incidents by month and total deaths of civilians and state actors in Nigeria's north-east region as a result of the insurgency, a Poisson regression/ Negative Binomial regression model was employed. The Poisson regression named after French mathematician Siméon Denis Poisson, is a generalized linear model form of regression analysis used to model count data and contingency tables (Haight, 1967). Poisson regression assumes that the response variable Y, has a Poisson distribution, and assumes that the logarithm of its expected value can be modeled by a linear combination of unknown parameters. A Poisson regression model is

sometimes known as a log-linear model. It is a technique used to describe count data as a function of a set of predictor variables.

Thus, the Poisson regression model can be represented as given in equation 1:

$$\log(\lambda_i) = \beta_0 + \beta_1 x_i \qquad\qquad 1$$

Where, the observed values $Y_i \sim$ Poisson with $\lambda = \lambda_i$ for a given x_i. For example, each state i can potentially have a different λ depending on the value of x_i, where x_i for this research represents the number of incidents by month and total deaths of civilians and state actors. It should be noted that the Poisson regression model contains no separate error term as seen in linear regression, because λ determines both the mean and the variance of a Poisson random variable.

The major assumption of the Poisson model is;

$$E(y_i \,/\, x_i) = \mu_i = e^{x_i\beta} = Var(y_i \,/\, x_i) \qquad\qquad 2$$

This assumption would be tested later on, if there is over-dispersion. If, $Var(y_i \,/\, x_i) > E(y_i \,/\, x_i)$ then over-dispersion has occurred. If, $Var(y_i \,/\, x_i) < E(y_i / x_i)$ then under-dispersion has occurred. Where either of these occurs, the Negative Binomial regression becomes the appropriate modelling technique, as given below.

The Negative Binomial Model- Negative Binomial Regression is a popular generalization of Poisson regression because it loosens the highly restrictive assumption that the variance is equal to the mean made by the Poisson model. The traditional negative binomial regression model is based on the Poisson-gamma mixture distribution. This model is popular because it models the Poisson heterogeneity with a gamma distribution.

Model Specification
Using a simple linear Poisson regression analysis, the study models the number of incidents by month and total deaths of civilians and state actors in north-east Nigeria as a function of public defense spending in the country. Consequently, the functional and econometric forms of the model are given in equations 3 and 4;

$$Casualty = f(Dexp) \qquad\qquad 3$$
$$Casualty = \alpha_0 + \alpha_1 D\exp_t + \varepsilon_t \qquad\qquad 4$$

A priori **Expectation**: *Dexp < 0* (negative relationship)

Where, Casualty represents the number of incidents by month and total deaths of civilians and state actors, while *DEXP* represents the national defense expenditure; α_0 represents the intercept, while α_1 is the coefficients of the variables, ε_t is the stochastic term.

Estimation Procedure

These estimation procedures were followed in carrying out the analysis:

Unit Root Test- This was done using the Kwaiatkowski, Phillips, Schmidt and Shin (KPSS) unit root tests. The KPSS test is used to compare the null hypothesis that an observable time series is stationary around a deterministic trend, to the alternative hypothesis that it is stationary around a unit root.

Poisson Regression- As earlier stated the Poisson regression assumes the response variable Y has a Poisson distribution, and assumes the logarithm of its expected value can be modeled by a linear combination of unknown parameters. The Poisson model for this study was estimated, and the model was tested for equi-dispersion using the Wooldridge (1997) test. A model is said to have met the equi-dispersion condition where it has an insignificant t value, otherwise the Poisson model is rejected and a Negative Binomial model is carried out as given in section below.

Negative Binomial Regression: The Negative binomial regression is a generalization of the Poisson regression which loosens the restrictive assumption that the variance is equal to the mean made by the Poisson model. The traditional negative binomial regression model follows the Poisson-gamma mixture distribution.

Diagnostic Tests

The following diagnostic tests was carried out to validate the results of the Poisson regression/ Negative Binomial regression:

Over-dispersion Test- The standard Poisson, models the (conditional) mean $E[y] = \mu$ with the assumption that it is equal to the variance $Var[y] = \mu$. However, in real-life data, this assumption rarely holds and therefore, over-dispersion test is used to test this assumption of equi-dispersion against the alternative that the variance is of the form:

$$Var[y] = \mu + \alpha \times (\mu) \hspace{4cm} 5$$

According to this test, if $\alpha>0$ that is a proof of over-dispersion, and when $\alpha<0$ then an under-dispersion case is present. The coefficient alpha can be estimated by using OLS regression and tested with the corresponding $t(orz)$ statistic which is asymptotically standard normal under the null hypothesis. The simple principle behind this is that in a Poisson model, the mean, $E(Y) = \mu$, and the variance, $Var(y) = \mu$, are equal. The test simply tests this assumption as a null hypothesis against an alternative where $Var(y) = \mu + c \times f(\mu)$, where the constant $c<0$ means under-dispersion and $c>0$ means over-dispersion. The test statistic used is a t statistic which is asymptotically standard normal under the null.

Likelihood Ratio Test- A simple test on the overall fit of the model, as an analogue to the F-test in the classical regression model is a Likelihood Ratio test on the slopes. The likelihood-ratio test assesses the goodness of fit of two competing statistical models based on the ratio of

their likelihoods, specifically one (Log likelihood) found by maximization over the entire parameter space and another (Restricted log likelihood) found after imposing certain constraints. If the constraint, i.e., the null hypothesis, is supported by the observed data, the two likelihoods should not differ by more than sampling error.

Presentation and Analysis of Result
Unit Root Test
The study carried out a unit root testing using the Kwaiatkowski, Phillips, Schmidt, and Shin (KPSS) test. The result of the unit root test on Table 1 shows the orders of integration. Here, the KPSS test was used for testing a null hypothesis that an observable time series is stationary around a deterministic trend against the alternative of a unit root. The KPSS result on Table 1 revealed that both datasets were stationary at first difference (1(1)).

Table 1: KPSS Unit Root Test Results

Variable	Order	KPSS Stat.	Order of Integration
Casualty	Levels	0.164089	
		(0.146000)	
	1st Difference	0.126657	1(1)
		(0.146000)	
Dexp	Levels	0.194449	
		(0.146000)	
	1st Difference	0.054453	1(1)
		(0.146000)	

Source: Author's Computation using E-views
Figures in parenthesis represents the critical values at the 5% level.

Correlation Analysis
The result on Table 2 presents the correlation result of the variables in the model. The result shows that an inverse and significant relationship exists between defense expenditure and casualty figures. This result points to the fact that government expenditures in fighting the war in Nigeria's north-east region has significantly reduced the casualty figures of the war.

Table 2: Correlation Matrix

Covariance Probability	*CASUALTY*	DEXP
CASUALTY	58.57388	

DEXP	-0.689910	0.005847
	(0.0139)	-----

Source: Author's Computation using E-views
Figures in parenthesis represents the critical values at the 5% level.

Poisson Regression Model / Negative Binomial Model Analysis

To determine the impact of public defense spending on the number of incidents by month and total deaths of civilians and state actors in Nigeria's north-east region as result of the insurgency, the Poisson model is subjected to a test of over-dispersion as presented on Table 3. This test is important because a unique feature of the Poisson distribution is that the mean and the variance of a Poisson-distributed variable are the same. This property of the Poisson model is known as *Equi-dispersion*. To carry out this test, the study employed the Wooldridge (1997) test of over-dispersion. A model is said to have met the equi-dispersion condition where it has an insignificant *t* value, otherwise the Poisson model is rejected and a Negative Binomial model is carried out.

Poisson Over-dispersion Test

Table 3: Over-dispersion Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CASUALTY	0.030782	0.009224		

Source: Author's Computation using E-views
Computed at the 5% level

The result of the over-dispersion test on Table 3 has a statistically significant *t* value. Furthermore, the slope coefficient in this regression is positive and statistically significant, indicating that the reported standard errors are not reliable, stating that they underestimate the true standard error. Thus, the study rejects the Poisson assumption of equi-dispersion and proceed to conduct the Negative Binomial Regression on Table 4.

Negative Binomial Regression (Model 1)

Before reporting the result of the Negative Binomial Regression on Table 4, the model has to have a good fit. For this test, the likelihood ratio (LR) test was employed. Here, the LR statistics which is 11493.46 is highly statistically significant because its *p* value, or exact level of significance is practically zero. Thus, this suggest that the explanatory variables are collectively important in explaining the conditional mean of financial reporting lag.

The result of the Negative Binomial Regression shows that defense expenditure had a negative and significant impact on the causality figures in Nigeria's North-east region. The coefficient value follows apriori expectation and it shows that defense expenditure reduced the casualty figures by 71 per cent. This result is supported by the result of the correlation analysis.

Table 4: Negative Binomial Regression

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.612459	0.546106	2.952649	0.0032
DEXP	-0.712594	0.293156	-2.430762	0.0151
Restr. log likelihood	-5990.314	LR statistic		11493.46
Avg. log likelihood	-3.383121	Prob(LR statistic)		0.000000

Source: Author's Computation using E-views

In contrast to the study by Duruji, et al. (2018), the finding from this result reveals that public defense spending reduced the number of violent incidents by month and total deaths of civilians and state actors between 2015 and 2020. The implication of this finding follows that by prudently devoting more funds to the fight against insurgency in Nigeria's north-east region, this would significantly reduce the casualty figures in the war.

Conclusion and Recommendations
Conclusion
This study concludes that government's defense expenditure has a negative and significant impact on the insurgency-related causality figures of the war in Nigeria's North-east region. It concludes that government defense expenditure reduced insurgency-related casualties by 71 per cent. This finding is in contrast to studies such as Duruji, et al. (2018).

Recommendation
Despite the gains made possible by the government's budgetary commitment to the fight, much work remains to be done in the region to put an end to insurgency. The study recommends a much more prudent allocation and usage of funds in prosecuting the war, and at the same time carrying out allocation and reconstruction, development, and providing gainful employment for the region's growing number of young people in order to deter them from taking up arms.

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