Chapter Eleven

Natural Resources, Armed Conflicts and Economic Development in Nigeria: Do Institutions Matter?

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Introduction

Contestations for controlling natural resources have featured prominently in the history of armed conflicts around the world. From competition over wild game to merchant capital and imperialist wars over precious minerals, natural resources have motivated and financed the violent activities of many belligerents (Westing, 1986). With the shrill drip in foreign assistance to many governments and rebel groups ensuing from the end of the Cold War, belligerents have become more dependent on pulling private sources to sustain their military and political activities and, as a result, define a new political economy of war (Berdal & Keen, 1997; Le Billon, 2000). Copious examples in recent history illustrate the pernicious role that natural resources play in conflicts. This includes illegal exploitation and trade, fueling tensions, insecurity and armed conflicts, particularly in developing countries. There is near unanimity in the literature that controlling scarce resources significantly contributes to conflicts and their sustenance. Moreover, natural resources play a significant role in post-conflict situations. This includes becoming a peace asset in peace agreements, central to peacebuilding, post-conflict recovery and reconstruction. However, the failure to address the governance of natural resources can delay the return to peace and prompt a relapse into conflict (Kucera *et al.*, 2011).

Nigeria's governance of natural resources faces many repeated challenges, which are offshoots of the mismanagement that has bedevilled the sector. Nigeria is blessed with abundant land mass and population and is among the African countries blessed with various natural resources. However, the potential of harnessing these endowments has been consistently marred by conflicts and restiveness, amongst other factors. Thus, the challenges associated with preventing, managing and resolving natural resource-induced conflicts have become the primary focus of academic research, given the undesirable impacts they exert on the economy of the host countries in particular and the world at large. Hence, the main challenge of

using natural resources for development in resource-rich African economies is the preponderance of weak governance structures and mismanagement, further undermined by political forces (Venables, 2016).

Despite the held existence of a federal structure in Nigeria, one of the structural causes of conflicts in the country is the unsatisfactory distribution of proceeds from the natural resources between the centre and the subnational governments, as well as among the sub-national governments. Therefore, resource control competition has been identified as one of the key triggers for conflicts in the country (Bassey & Onwioduokit, 2011). This uneven allocation of resources tends to brew tension and create violent conflicts among citizens, the subnational government, and the powerful federal government. The outcome of these unrests includes poverty, mortality, hunger, economic stagnation and retardation of economic development. For instance, the Niger Delta alone accounts for an estimated 23% of Nigeria's population. It hosts almost all of Nigeria's oil reserves. Unfortunately, it is one of the most underdeveloped regions in the country. The perception is that it is due mainly to the unfair distribution of resources, mismanagement, corruption, weak institutions, neglect and weak governance (Esu, 2017). It is within this context that the struggle over ownership and control of resources has been a significant source of armed conflicts in south-south Nigeria.

The central argument in the discourse regarding natural resources and armed conflicts points to the harmful nexus between armed conflicts and development in countries where they occur. In Nigeria, incessant uprisings in the oil-rich Niger Delta region and banditry in the natural resource-abundant states of the northern region, like the gold-laden Zamfara state, which is recent in the armed conflict mix aside the Boko Haram insurgency that first appeared in Northern Nigeria in 2002, incessant herders' attacks on farmers in the North Central and across the federation, as well as indigene-settler conflicts. The enormous concerns this has elicited are attributable to the devastating effect of conflicts and their attendant capabilities to fuel severe humanitarian crises acute food insecurity, undermine state institutions and shrink the revenue base of the affected country, thus impeding economic growth and development.

Therefore, this study's objective is to investigate the effect of natural resources and armed conflict on economic development in Nigeria. This will be achieved by investigating the effect of natural resources on armed conflicts, examining the effects of natural resources and armed conflicts on economic development, and examining the passthrough role of institutions in the natural resources-armed conflicts interaction with economic development. The rest of the paper is presented in sections two to five. An abridged literature review is presented in section 2, while the method of study, presentation of results and analysis of

findings are presented in sections three and four, respectively. Section five concludes the study while presenting some recommendations.

2. Review of Literature

There are different considerations of the subjects in the literature, but it is essential to begin with the conceptual perspectives of these subjects. Conflict is an intrinsic, inevitable and integral part of humans (or economic agents) as they interact. However, violent conflict is an incongruity since it is avoidable. Francis (2008) sees conflicts as "the pursuit of incompatible interests and goals by different groups". Armed conflict is the resort to force and armed violence to pursue conflicting and particular interests and goals. This is always a fallout of perpetuated injustice or perceived injustice or, in some cases, greed (Oyeshola, 2005; Sani, 2007). On the other hand, natural resources are found in the natural environment without human input or intervention, except for developing the same for economic value. Common examples of natural resources include air, sunlight, water, soil, stone, plants, animals and fossil fuels. Natural resources provide fundamental life support through consumptive and public-good services (Iyyanki & Manickam, 2017).

Conversely, for its complexity, 'economic development' rarely receives clear-cut definitions but is often conflated with development and economic growth in policy circles and academic research (Maddison, 1970). However, Sen (1999) sees economic development as the expansion of capacities that contribute to the advancement of society by realising individuals', firms' and communities' potentials. It is a sustained increase in prosperity and quality of life realised through innovations, lowered transaction costs and the utilisation of capabilities towards the responsible production and diffusion of goals, goods and services (Feldman *et al*., 2014). The primary argument, therefore, is that sustained and utilised economic growth will lead to economic development since its utilisation will result in expansion in infrastructure, improvement in health and education, improvement in households' expenditure, as well as the improvement in the well-being of the society (Esu & Udonwa, 2015).

Theoretical Issues

Some theories have established the natural resource-conflict nexus (Auty, 1993; UN, 2023), the natural resources-economic growth nexus(Maddison, 1970), and the conflict-economic development nexus (Collier & Hoeffler, 2003; Collier *et al*., 2009; Holden & Pagel, 2012; Ganegodage & Rambaldi, 2013). These relationships are elaborately elucidated in the theoretical mix, collectively known as the economic theory of conflict. The mix includes the Greedy-Rebellion Theory, the Universal Grievance Theory, Relative Deprivation, the Marxist Theory of Rebellion, Ethnic Mobilization and Conflict Theory, and the Theory of Ethnic

Defection (Macleans, 2021). The interconnectivity of the economy of a conflict zone and the people's well-being postulated in these formulations seems to come down to the same conclusion as the Dutch Disease question and its efficacious effect on the African economies (Collier *et al.,* 2002; Collier, 2003; Collier & Anke, 2004). These theories also explain the concept of profit maximisation flare, greed and originating rebellion with positive intention in a positive environment (Mansoob & Muhammed, 2007; Anirban & Debraj, 2014; Osah *et al.*, 2017). This study gleans extensively from most of these theories.

Empirical Issues

Conclusions have been empirically drawn on the theoretical issues raised in the literature. In the natural resources-economic development argument, scholars have drawn diverse conclusions viz: that natural resources limit development through ecological corruption outcomes (Messer *et al.*, 1998); that natural resources debase the economy, especially at high wages (Ades & Tella, 1999); that natural resources abundance relates negatively with financial development in less developed economies (LDC) (Ajie & Ewubare, 2011; Ewubare & Kakain, 2017), but Collier & Hoeffler (1998) opines that the situation is fueled by conflicts and exacerbated by poor institutional quality. Natural resource abundance has also been found to fuel conflicts and impact the agricultural sector negatively, resulting in food insecurity and other attendant adverse effects (Kimenyi *et al*., 2014). The natural resources-economic growth argument also promotes the Dutch Disease question, arguing that natural capital crowds out foreign and even social capital, leading to sluggish economic growth. Also, institutional quality was a prominent consideration in the mix (Gylfason, 2001; Sachs & Warner. 1995, 2001; Sala-i-Martin & Subramanian, 2003).

Other studies have further stressed that the resource curse argument holds in almost all economies with natural resource abundance, especially in the LDCs, impacting growth, employment, environment, and agriculture, amongst other issues (Levitt &Venkatesh, 2000; Berman *et al*., 2011; Choumert*et al*., 2013). The issue of conflict-economic development has also received significant empirical attention in the literature, with resource control/management at the heart of the cause-and-effect analyses of conflicts. Scholars found natural resources and the impunity around its management and administration as the remote drive for most conflicts, which deter economic development in the short run and the long run (Miguel *et al*., 2004; Ciccone, 2011; Acemoglu & Wolitzky, 2014). However, another strand of argument sees the remote cause of conflict as mainly ethnic and religious (Cederman *et al*., 2010).

While the institutions-natural resources nexus (Robinson *et al*., 2006; Brollo *et al*., 2013; Caselli & Tesei, 2016) and institutions-armed conflict nexus (Miguel *et al*., 2004; Fearon, 2005; Besley & Persson, 2009; Grundel, 2010; Acemoglu & Robinson, 2019) exist, the passthrough effect dimension, to the best of our knowledge, as not received significant attention in the literature. This paper attempts to systematically close the gap while introducing methodological innovations to aid the process.

3. Method of Study

This study is empirical and uses mainly secondary data. Thus, a quasi-experimental design was adopted to establish cause-effect relationships among the variables. The data are mainly from the official publications of the Central Bank of Nigeria (CBN) – Statistical Bulletin, various years, World Bank – World Development Indicators (WDI), 2023 and the International Country Risk Guide (ICRG) Dataset of the PRS Group, Inc. These data are carefully selected, using primary considerations to proxy the variables tested in this study. The data were simulated and estimated using essential mathematical, statistical and econometric tools while sufficiently relying on relevant economic theories for reliable outcomes. The data were government expenditure share on military hardware (as a percentage of GDP), a proxy for armed conflicts. The proxy for economic development was constructed by dividing the sum of education, health and social services expenditures by GDP. Next is natural resources. We constructed this index by finding the horizontal sum of natural resource rents as a percentage of GDP. The rents included oil, gas, minerals, and forest. Lay and Mahmoud (2004) corroborated our construction of natural resources when they also employed a similar approach of several natural resource rents (though their work was on resource curse and for a cross-country assessment).

Other variables, including GDP Per Capita Growth, are fitted into the model to capture economic development effects like changes in elements such as poverty and standard of living. Real GDP Growth, on the other hand, captures the economic growth effects in the model, while inflation proxy for the level of stability in the economy. Real Exchange Rate is constructed as an essential variable in the model. Furthermore, institutions are fitted in the model as joint transmitters. They are expected to play two primary roles: (i) address gaps that may have been institutions-related, which may not have been tracked despite adjustments in other variables, and (ii) transmit the passthrough effects jointly with other variables from armed conflict on natural resources to economic development. The indicators included control of corruption, rule of law, and government accountability.

Modelling Framework

Works like Fearon (2005), Fearon & Laitin (2003), and Buhaung (2010) have attempted the theorising of the natural resources-armed conflict nexus closely. However, the economic development passthrough seems not to have been sufficiently dealt with, especially for Nigeria. We extended the works of Hirshleifer (1995) based on greed and grievance and Nillesen & Bulte (2014) to capture economic development passthrough vis-a-vis natural resources-armed conflict interactions.The underlying argument that natural resource abundance plays a role in fueling conflicts can best be mirrored through a model designed by Hirshleifer (1995) and propagated by Nillesen and Bulte (2014), which contains a simple contest function. Suppose there are two groups in the society, one being the state (government). Each group consists of Ai, i = 1, 2 members. Each group has to take into account how many of its members to allocate to a production task,Wi, and how many of its members are allocated the contesting role for a resource base or flow of resource rents, F . It is as represented in Equation 3.1:

$$A_i = W_i + F_i \qquad \text{Equation 3.1}$$

For uncomplicatedness, assume that the returns to the productive effort are given by a simple linear production function;rf = aWi (where a is a productivity parameter) and that the returns to contest effort are given by T[= p(Fi, FaR. p(.), and represents a contest success function (CSF), j* i. R represents the exogenous value of the resource that is contested. A standard CSF can be stated in Equation 3.2 as:

$$p_1 = \frac{F_1^m}{F_1^m + F_2^m} \qquad \text{Equation 3.2}$$

Where p_1 represents the share of the resource that the group grabs (or the probability that group i wins the contest and grabs everything) so that $p_2 = (1 - p_1)$. The parameter m captures the extent to which an advantage on the battlefield translates into more significant material payoffs. In the extreme case of m = 0, each group obtains half of the resource value, and for m = oo, the p(.) function approaches a winner-takes-all step function. This parameter may represent a measure of "resource pointiness" (as in Wick &...Bulte, 2006)[1]

[1]Point iness reflects the degree to which the resource is concentrated (clustered) in space -easy to conquer and defend or diffuse and spread across the landscape .

or a measure of institutional quality that reflects the security of property rights (as in Butler & Gates, 2012). Total group payoffs are defined as $_{Ti} = -r\{" + -rf,$ the optimal allocation of group members across the two activities in an interior equilibrium is given by Equation 3.3 as:

$$F = F_2 = \frac{mR}{4a} \qquad \text{Equation 3.3}$$

The resource is equally divided between the competing groups regarding expected value. The intensity of conflict, measured as the amount of effort allocated to contesting the resource, is increasing in the value of the resource: $aFJaR =$ m/4a > 0. Hence, a positive shock to the resource measure - more abundant natural resources or higher resource prices - causes income-maximizing groups in society to allocate more effort to conflict rationally. Equation 3.3 predicts that resource income and production income have opposite effects on the intensity of conflict. If the productivity of labour allocated to production goes up, the opportunity costs of conflict effort increase so that optimally, less effort is allocated to the contest: $aFJaa = -$ mR/ $4a^2 < 0$. This straightforward model can be extended in many directions, though its obvious shortcoming is the inability to allow for kickbacks (bribes) or include domestic policies and interventions that could alleviate grievances of various social groups; hence, our extension of the model to capture economic development passthrough that this paper proposed.

Following the simple production model discussed so far, in tandem with the proposed objectives of this study, from equation (1), we can represent the model as presented by Equation 3.4 as follows:

$$ED_t = f(P_t + N_t) \qquad \text{Equation 3.4}$$

Where EDt represents economic development in period t, Pt is the amount of resources invested in productive activity in period t, while Nt represents the investment in natural resources-related conflicts in a period t. The model argues that the extent or size of the opportunity cost in terms of Pt or Nt or their simultaneous adjustments, determine the level of economic development in the same period. This implies that given the linear production function EDf = aPtCwhere *a* is a productivity parameter) which is the return to productive effort, $a/\ apt = a\ 0$, showing that the size of the opportunity cost of engaging the natural resources in productive economic activities is relatively smaller, thereby

giving incentives for more productive activities and fewer conflicts, leading to economic development. The implication of the preceding expression is that.a/apt= $a > 0$may intensify armed conflict, *ceteris paribus,* because that would mean that $a/aNt = -a < 0$, thereby acting as an incentive for conflict. The model, as represented, addressed the study's broad objective, which is to examine the effects of natural resources and armed conflicts on economic development in Nigeria.

Econometric Specifications

Drawing from our model represented, we can state the baseline Equation 3.5 as:

$$EDt = a_0 + a_1 ACt + a_2 NRt + a'Zt + Wt \qquad \text{Equation 3.5}$$

Where EDt captures economic development, ACtrepresents armed conflict, NRt represents natural resources and Zt is the vector of other controls incorporated into the model for some robust estimates. Moreover, *wt* captures the error terms and is expected to deem the white noise in the model, while t measures the periods. A priori, though conflicting results awash the literature in terms of economic growth-armed-conflict nexus (for example, Nillesen & Bulte, 2014), the effect of armed conflict (AC) on economic development is expected to be negative. The reason for this expected outcome is not unconnected to the devastating effects of armed conflict, such as death, destruction of viable economic links and infrastructures, draughts, low productivity, dwindling economic activities and depleting standard of living, amongst other things. On the other hand, the theoretical expectation for the impact of natural resources on economic development is expected to be mixed. This agrees with different findings in the literature and aligns with the theoretical debate on resource-curse theory (for example, Esu, 2017).

However, the vector of the control variables Z including GDP per capita growth rate, real GDP growth rate, inflation and real exchange rate, is expected to impact the explained variable based on their theoretical relations. For example, improvement in the GDP per capita in Nigeria is expected to affect economic development positively, *ceteris paribus.* Also, while the effect of improvement in real GDP growth rate may be mixed, *a priori,* inflation is expected to impact economic development negatively. In the same vein, upward exchange rate adjustment will dampen economic development. It is also expected that, on the whole, these variables would transmit the effects of armed conflict vis-a-vis natural resources on economic development. Also, it was part of our objectives to examine the effect of natural resources on armed conflicts -

the natural state of the Hirshleifer (1995) contest theory upon which our model is built. This would result in Equation 3.6 as:

$$ACt = \beta_0 + 0_1 NRt + O'At + \mu t \qquad \text{Equation 3.6}$$

Where ACt and NRt are as earlier described, while At is the vector of controls, including institutional variables: corruption, rule of law, and government accountability. A priori, government accountability is expected to interact negatively with armed conflicts, while corruption is expected to interact positively with armed conflicts. On the other hand, the rule of law is expected to interact negatively with armed conflicts, *ceteris paribus.* Other elements in the vector are described in Zin Equation 3.5.

In the same vein, we intend to interrogate the role of institutions in transmitting the effects of natural resources and armed conflicts on economic development in Nigeria. To achieve that, we estimated the following Equation 3.7:

$$ED_t = \propto_0 + \propto_i \vartheta_i^* + \propto' Q_t + \epsilon_t \qquad \text{Equation 3.7}$$

Where -,91 represents the interactions between institutional variables (corruption, government accountability and rule of law) and the frontline variables (natural resources and armed conflicts). *Q* is the vector of controls identified in the previous equations, and they are expected to capture the effect of other possible exerted influences on the model. The estimates are expected to show, *ceteris paribus,* if the direct interaction of the duo of natural resources and armed conflicts with institutional quality can impact Nigeria's economic development positively or negatively. The theoretical expectation for these interactions is inconclusive. The outcome may go in any direction depending on the direction of influence within the period under assessment, amidst other factors.

The terms *a, 8,* and oc are the parameters in Equations 3.5 to 3.7, estimating the coefficients of the variables in the equations. The $a' = 1,2.3, \ldots, n$ represent the parameters of the variables in the vector in Equation 3.5, and is analogous to other vectors in Equations 3.6 to 3.9 respectively. On the other hand, *w,* µ, TI, 8 and A are the stochastic disturbance terms (assuming that all variables are jointly normal with expectation 0), are expected to address the white noise in the analyses, are assumed to be linearly uncorrelated, and are expected to be free from heteroskedasticity.

Estimation Technique

This study adopted the nonlinear autoregressive distributed lag (NARDL) model. As noted by Shin *et al.* (2014), a method for modelling asymmetric

cointegration and dynamic multipliers in an ARDL framework. The approach introduced short- and long-run nonlinearities via positive and negative partial sum decompositions of the explanatory variables. Shin *et al.* (2014) developed a simple and flexible nonlinear dynamic framework capable of simultaneously and coherently modelling asymmetries in the underlying long-run relationship and the patterns of dynamic adjustment. They derive the dynamic error correction representation associated with the asymmetric long-run cointegrating regression, resulting in the nonlinear autoregressive distributed lag (NARDL) model. They follow Pesaran *et al.* (2001) and use a bound testing approach to test for the existence of a stable long-run relationship, which is valid irrespective of whether the underlying regressors are 1(0), **1(1),** or mutually cointegrated. They also derive asymmetric cumulative dynamic multipliers that permit the display of asymmetric adjustment patterns following positive and negative shocks to the explanatory variables.

One of the major advantages of the NARDL approach is that it reveals differences in the responses to positive and negative changes and how they occur in the short and long term. The adoption of the bounds test, therefore, also means that it can capture relationships between stationary and non-stationary variables.The first stage entails considering an asymmetric long-run regression, as shown by Equation 3.8 and Equation 3.9:

$$y_t = \beta^+ x_t + \beta^- x_t + \eta_t \qquad \text{Equation 3.8}$$

$$\Delta x_t = v_t \qquad \text{Equation 3.9}$$

Where Yt and xt are scalar **1(1)** variables, and xt is decomposed as xt = x_0 + Xi + xt, where Xi and xt are partial sum processes of positive and negative changes in xt, so that Equation 3.13:

$$Xi = \sum_{i=1}^{t} xt = \sum_{i=1}^{t} \max(xi, 0), xt = \sum_{i=1}^{t} x1 = \sum_{j=1}^{t} \min(xi, 0) \qquad \text{Equation 3.10}$$

The above provides a simple approach for modelling asymmetric cointegration based on partial sum decompositions. Schorderet (2003) generalises this concept

and defines the following stationary linear combination of the partial sum components as shown in Equation 3.11

$$z_t = \beta_0^+ y_t^+ + \beta_0^- y_t^- + \beta_1^+ x_t^+ + \beta_1^- x_t^- \qquad \text{Equation } 3.11$$

If Zt is stationary, then Yt and xt are said to be 'asymmetrically cointegrated'. It follows that standard linear (symmetric) cointegration is a special case of equation (13), obtained only if 6 = Oand i = 1. Shin *et al.* (2014) consider the case where the following restriction holds: 6 = o = o- In equation (13), this implies that + = - i / $_0$ and - = - 1/ $_0$. Shinet *al.* (2014) use this foundation to propose the following nonlinear ARDL (p,q) model as shown by Equation 3.12:

$$y_t = \sum_{j=1}^{p} \emptyset_j y_{t-j} + \sum_{j=0}^{q} (\theta_j^{+\prime} x_{t-j}^+ + \theta_j^{-\prime} x_{t-j}^-) + \varepsilon_t \qquad \text{Equation } 3.12$$

Where xt is a k x 1 vector of multiple regressors, defined such that xt = x_0 + *Xt* + Xt, 8i is the autoregressive parameter, 8; and 81 are the asymmetrically distributed lag parameters, and Et is an i. i. d. process with zero mean and constant variance, *ur* Shin *et al.* (2014) focus on the case in which xt is decomposed into *Xt* and xt around a threshold of zero, thereby distinguishing between positive and negative changes in the rate of growth of Xt. Following Pesaran *et al.* (2001), we write equation (14) in error correction form as presented in Equation 3.13:as

$$\text{Llyt} = \text{PYt-1} + 0\text{+' Xi-1} + 0\text{-' xt-1} + \sum_{j=1}^{p-1} \text{LlYt-i} + \sum_{j=0}^{q-1} \text{lxt-i} + fJ(\text{Llx;_i})$$

$$= \rho\xi_{t-1} + \sum_{j=1}^{p-1} \gamma_j \Delta y_{t-j} + \sum_{j=0}^{q-1} \left(\vartheta_j^{+\prime} \Delta x_{t-j}^+ + \vartheta_j^{-\prime} \Delta x_{t-j}^-\right) \qquad \text{Equation } 3.13$$

Where p = . p 0 Ip 0 '' 1or j = 1, ... , p - 1, 8+= Iq e;+- e-

I J=l j–i, Yi = - i=J+1 j=O

$$= \sum_{j=0}^{q} \theta_j^-, \vartheta_0^+ = \theta_0^+, \vartheta_j^+ = -\sum_{i=j+1}^{q} \theta_j^+, \text{for } j = 1, \ldots \ldots, q-1, \vartheta_0^- = \theta_0^-, \vartheta_j^-$$

= - L. q 8 for j = 1, ..., p - 1, and t = Yt - + ' xt - - ' xt

i=J+1

the nonlinear error correction term, where + = -e+ / p and - = -0- / p are the associated asymmetric long-run parameters. To deal with the possibility of non-zero contemporaneous correlation between the regressors and the residuals in Equation (16), Shin *et al.* (2014) proposed the following reduced-form data generation process for *tixt* as shown in Equation 3.14:

$$\text{tixt} = \sum_{i=l}^{\alpha-1} \text{Ai tixt-i} + \text{Vt} \qquad \text{Equation 3.14}$$

Where vt ~ iid(O, *Lv),* with *Lv* being a k x k positive definite covariance matrix. In terms of focus on the conditional modelling, we express Et in Equation 3.14 in terms ofvt as presented by Equation 3.15:

$$\text{Et} = \text{w'vt} + \text{Gt} = w' \left(\text{tixt} - \sum_{i=l}^{\alpha-1} \text{Ai tixt-i} \right) + \text{Gt} \qquad \text{Equation 3.15}$$

Where *CJt* is uncorrelated with *v t* , by construction . If we substitute Equation 3.17 into Equation (15) and rearrange, we obtain a nonlinear conditional ECM as presented by Equation 3.16:

$$\Delta y_t = \rho \xi_{t-1} + \sum_{j}^{p-1} \gamma_j \Delta y_{t-j} + \sum_{j=0}^{q-1} (\psi_j^{+\prime} \Delta_{t-j}^{+} + \psi_j^{-\prime} \Delta_{t-j}^{-}) + \sigma_t \qquad \text{Equation 3.16}$$

Where $\Delta r_t = et + w_1 \Delta o_t = 00 + w_2 \Delta J_t = -a_1 + w_3 1_t$, and $\Delta J_t = -a_1 + w_j A/or$ $j = 1,.. , q - 1$.

It is visible that equation (18) corrects for the weak endogeneity of any nonstationary explanatory variables and that the choice of an appropriate lag structure will free the model from residual correlation. The model can explain both long-run and short-run asymmetries and can equally be estimated using OLS because of its linearity in all the parameters.

4. Presentation of Results and Analysis of Findings

We begin our presentation with the outcome of unit roots analysis of the data used in the study. As presented in Table 4.0, the two test statistics used - Augmented Dicky-Fuller (ADF) and Philip-Perron (PP) - showed similar outcomes, each affirming the other. The ADF results showed stationarity at the first difference **1(1]** only, except for armed conflicts and an inflation rate that was stationary both at the first difference **1(1]** and at levels 1(0], and these were significant at $p<0.01$, except for economic development, corruption and rule of law that were significant at $p<0.1$. On the other hand, the PP test result was not outstandingly different.

The result showed that aside from armed conflicts, GDP per capita, GDP growth rate and natural resources that were at both levels 1(0] and the first difference I(1], the rest of the variables were stationary at the first difference **1(1],** and were significant at $p<0.01$ except for corruption and rule of law that were significant at $p<0.1$. These outcomes further validated the use of the Non-linear Autoregressive Distributed Lag (NARDL) cointegration technique in analysing the data used for this study.

Next was the NARDL estimates, examining the effects of natural resources and armed conflict on Nigeria's economic development; the results are presented in Table 4.1. The Table shows the positive and negative values of the parameter estimates of the different variables in the model in Equation 3.5. The results indicated a symmetric interaction between economic development and armed conflicts. While the positive side of the estimate provided a theoretically meaningful and statistically significant outcome, the negative output could not chum out an economically meaningful estimate.

Table 11.4.0: Augmented Dickey -Fuller (ADF) and Philip -Perron (PP) Unit Root Analysis

	ADF				Philip Perron				
	Levels		First	Difference	Levels		First	Difference	Order of
Variables	T-Statistic	P-Value	T-Statistic	P-Value	T-Statistic	P-Value	T-Statistic	P-Value	Integration
Armed Conflict	-3.23	0.09**	-4.50	0.00*	-4.42	0.00*	-7.98	0.00*	(0,I), (0,I)
GDP/Capita Growth	-2.49	0.32	-10.46	0.00*	-3.80	0.02**	-13.21	0.00*	(-,I), (0,I)
GDP Growth Rate	-2.47	0.33	-10.45	0.00*	-3.77	0.02**	-13.14	0.00*	(-,I), (0,I)
Inflation Rate	-4.08	0.01**	-5.68	0.00*	-2.91	0.17	-10.96	0.00*	(0,I), (0,I)
Exchange Rate	-2.02	0.57	-4.27	0.00*	-2.01	0.57	-5.04	0.00*	(-,I), (-.I)
Econ. Development	-1.71	0.41	-3.02	0.04**	-1.66	074	-4.56	0.00*	(-,I), (-,I)
Natural Resources	-1.95	0.60	-7.39	0.00*	-3.6.7	0.03**	17.16	0.00*	(-,I), (I,I)
Govt. Accountability	-3.20	0.10	-4.81	0.00*	-1.70	0.72	-5.19	0.00*	(-,I), (-,I)
Corruption	-2.15	0.49	-4.11	0.01**	-1.85	0.65	-4.09	0.01**	(-,I), (-,I)
Rule of Law	-2.49	0.32	-3.67	0.03**	-1.61	0.76	-3.51	0.05**	(-,I), (-,I)

Source**:** Author'scomputation using E-views 12; Note:*p<0.01,**p<0.1

The result on the positive side of the estimate (Table 11.4.1, column 1) indicated that a percentage rise in armed conflicts would reduce economic development by about 6.12 per cent, which was significant at a 10 per cent level. This outcome conformed to a priori expectation, implying that a persistent rise in armed conflicts and unrest will encumber economic development. This conclusion is in line with findings by schools like Gleditsch (2012), van der Ploeg and Rohner (2012), Hegre *et al.* (2013), who found that one of the reasons why oil (natural resource) could be a curse to growth, would be oil-related conflicts.

Table 11.4.1: NARDL Estimates: The Effects of Natural Resources and Armed Conflicts on Economic Development

Dependent Variable: Economic Development		
Regressors	**Positives Estimates**	**Negative Estimates**
	Coefficient (1)	**Coefficient (2)**
Constant Term	0.0020 (0.0048)**	-
Armed Conflicts	-0.0612 (0.0545)***	0.0048 (0.1410)
Natural Resources	0.0210 (0.0220)***	0.0036 (0.5719)
GDP Per Capita Growth	0.0151 (0.0045)**	-0.0015 (0.0050)**
Real GDP Growth Rate	0.0015 (0.0047)**	-
Inflation	0.0072 (0.018)***	0.0040 (0.0960)***
Real Exchange Rate	-0.0030 (0.0261)***	-0.0009 (0.0516)***
Adjusted R^2	0.9551	D-W Stat.: 2.0127
F-Statistic	42.4116 (0.0000)*	J-B: 4.6974(0.0955)***
B-G LM Test	1.6559 (0.2220)	RESET Test: 0.0537 (0.8194)
Heteroskedasticity Test	0.6499 (0.8203)	Wald Test: 0.0058(0.0000)*

Source: Author's computation using E-views 12; Note: *p<0.01, **p<0.05, ***p<0.1

Also, natural resources related symmetrically with economic development and followed theoretical signs. The parameter estimate on the positive side was 0.0210, indicating that improvement in the stock of natural resources explored would promote economic development by about 2.1 per cent *ceteris paribus*. The implication is that barring armed conflicts and other possible encumbrances, natural resource utilisation will contribute at least a 2% improvement in Nigeria's economic development. Similarly, the negative parameter estimate showed that a percentage depletion in natural resources would reduce economic development by about 0.36 per cent, though not statistically significant. The insignificance of the results further affirms the asymmetric components of the interaction between the two variables of interest. Most of the control variables aligned with theoretical expectations.

For instance, the GDP per capita growth behaved in consonance with theory, both for positive and negative estimates; for the positive estimate, it showed that a percentage improvement in GDP per capita growth rate improved economic development by about 1.51 per cent, at a 5 per cent level of significance. The

implication is that an improved GDP per capita growth would signal an up-look in the nation's economic development, *ceteris paribus*. The negative estimate further affirms the preceding conclusion. It showed that a percentage drop in GDP per capita would eventually signal a drop in the country's economic development, *ceteris paribus*, and was statistically significant at a 5 per cent level. Also, the real GDP growth rate behaved similarly, though indicating a symmetric relationship with economic development, and this aligns with the basic economic argument that properly managed growth will eventually end in development.

On the other hand, the inflation rate and exchange rate reflected an asymmetric relationship with economic development. The result on the positive side showed that a percentage rise in the inflation rate would support economic development by about 0.72 per cent. This conforms to the theory that at a certain level of growth in the inflation rate, the economy can still grow, but above the same, the relationship will be inverse (Bassey & Onwioduokit, 2011). On the negative side, the sign was equally theoretically appropriate. It indicated an improvement in economic development by about 0.40 per cent if there is a percentage fall in the inflation rate.

These results signal economic development possibilities in Nigeria if armed conflicts were reduced to the barest minimum, the skyrocketed inflation rate tamed, and proceeds from natural resources were judiciously managed, *ceteris paribus*. On the other hand, the exchange rate reflected an a priori sign, showing that a percentage rise in the exchange rate would mean a drop in economic development by about 0.30 per cent. On the positive side, this outcome is theoretically in sync and has also been identified in similar research findings, such as Herzer *et al* (2004).

The adjusted R-square of 0.9551 indicated that 95.51 per cent of the changes in economic development in Nigeria could be conveniently explained by the explanatory variables in the model, alluding to the fact that the regression line was a good fit. The F-statistic significance at the 1 per cent level speaks to the general stability of the model. Other post-estimation tests behaved well, as reported in Table 4.1, confirming that the findings emanating from this study are dependable for policydecisions.

We also investigated the effect of natural resources on armed conflicts, and the NARDL estimates are presented in Table 11.4.2. On the positive side, the result showed a parameter estimate of -0.0320 for economic development, though statistically insignificant. This implies that a percentage improvement in the country's economic development would have reduced natural resources-related armed conflicts in Nigeria by about 3.20 per cent. However, the statistical insignificance points to several issues, the first being that the flows from natural resources endowments are predominantly not equitably distributed and channelled to development-enhancing ventures that would have, in turn, engaged the people, thereby reducing the idle time deployed to conflicts and restive activities.

Table 11.4.2: NARDL Estimates: The Effects of NATURAL Resources on Armed Conflicts

Dependent Variable: Armed Conflicts		
Regressors	**Positives Estimates**	**Negative Estimates**
	Coefficient	**Coefficient**
Constant Term	0.0331 (0.0000)*	-
Economic Development	-0.0320 (0.8497)	0.0049 (0.0155)***
Natural Resources	0.0361 (0.0000)*	-0.0124 (0.0152)***
GDP Per Capita Growth	-0.0130 (0.0094)**	0.0012 (0.0222)***
Real GDP Growth Rate	0.0053 (0.0094)**	0.0088 (0.0217)***
Inflation	0.0058 (0.0607)***	-0.0009 (0.7672)
Real Exchange Rate	-0.0064 (0.0000)*	-0.0012 (0.0136)***
Adjusted R^2	0.9752	D-W Stat. =2.1007
F-Statistic	64.1939 (0.0000)*	J-B: 0.3860 (0.8244)
B-G LM Test	2.1308 (0.1615)	RESET Test: 0.2291(0.8223)
H T B-P-G	0.5802 (0.8805)	Wald Test: 2.3157 (0.0634)***

Source: Author's computation using E-views 12; Note: *p<0.01, **p<0.05, ***p<0.1

On the negative side, the result affirms that improving the Nigerian economy's development should negatively impact armed conflicts. With a coefficient of -0.0049, statistically significant at a 10 per cent level, the result indicated a 0.49 per cent drop in armed conflicts even if improvement in the development of the economy is not very significant, *ceteris paribus*. Another interesting output from the estimation is the relation between natural resources and armed conflict. The result showed that natural resources would fuel armed conflicts by 3.61 per cent, which was statistically significant at a 1 per cent level. This means that progress made in the exploration and exploitation of natural resources could also sustain and fund armed conflicts as the people would gain access, illegally, to these resources and get them to the waiting arms of illegal partners in exchange for food, arms, ammunition and money.

Moreover, the GDP per capita growth rate is aligned with theoretical expectations. It indicated that a percentage improvement in GDP per capita would decrease armed conflicts by about 1.30 per cent, which was significant at a 5 per cent level. This was further corroborated by the output from the negative side, which showed that a percentage drop in per capita GDP growth in the economy could enhance armed conflicts by 1.24 per cent and was significant at a 10 per cent level. This result implies that, as the income of the people improves, it serves as a disincentive for crime and criminal tendencies, and it reduces tensions. It enhances the incentives to live, making involvement in illegal arms-bearing less attractive, *ceteris paribus*.

However, while the real GDP growth rate appeared inconsistent with theoretical expectations, the inflation and exchange rates aligned with theory and

were statistically significant at 10 per cent and 1 per cent levels, respectively. The positive real GDP growth-armed conflicts relation may look awkward to a cursory gaze, but it is not without explanation. GDP is not income in the pocket of the hungry and the angry people of the natural resources-rich regions; thus, if the output in the economy is not managed in a way that will result in equitable distribution of wealth and improvement in the general well-being of the people, it could fuel crisis, especially when its poor management widens poverty gap. On the other hand, the inflation rate estimate, on the positive side, showed that an increase in the rate of inflation will increase the level of armed conflict. The result showed that a percentage rise in inflation would result in a 0.58 per cent rise in armed conflicts, which was significant at a 10 per cent level. This means that as inflation rises, purchasing power and the standard of living continue to drop. Amid such complexities, the people from natural resources-laden areas will begin to feel cheated and oppressed, and such emotions may result in arms-bearing/conflicts.

On the flip side, the result from column 2 corroborated the result from column 1, showing that there could be a fall in the level of armed conflicts to 0.09 per cent if there is a percentage fall in the inflation rate. Moreover, the exchange rate result indicated a fall in armed conflicts to about 0.64 per cent as the exchange rate rose and was statistically significant at a 1 per cent level. This can be attributed to the drop in the value of the local currency (the Naira in this case) as foreign exchange skyrockets. This may slow down the activities of arms bearers as they might need more resources to acquire weapons and other needs, thereby making it more difficult to pull through with their illegal trades/partnerships.

The role of institutions in transmitting the effects of natural resources and armed conflicts on economic development within the period studied was also examined. Three essential institutional variables – control of corruption, government accountability and the rule of law - were selected for their strategic role in the economy to see how their interaction with natural resources and armed conflicts transmit economic development in Nigeria, and the estimates are reported in Table 4.3. The analysis started with inputting the institutional variables into the main equation using a stepwise approach. In column 1 of the table, the coefficient estimates of corruption (-0.02) showed that *ceteris paribus*, a rise in corruption would truncate the possibility for economic development at about 2 per cent rate. This outcome agrees with a priori expectation and concludes that corruption is the Nigerian economy's conundrum. Esu (2017) corroborated this finding by concluding that natural resources would not be a curse ordinarily but partly because of institutional defects.

Table 11.4.3 : ARDL Estimates: The Passthrough Effects of Natural Resources, Armed Conflicts and Institutions on Economic Development

Dependent Variable: Economic Development							
Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Economic Development (-2)	0.57***	0.67*	0.77*	0.69**	1.22**	0.64**	0.78**
GDP Per Capita Growth	0.01***	0.06**	0.01**	0.10***	0.05	0.09**	0.01***
Real GDP Growth	0.04***	0.01**	0.05***	0.24***	0.03	0.09**	0.01***
Inflation	-0.01**	-0.01**	-0.07**	-0.07**	-0.01***	-0.04	-0.07**
Real Exchange Rate	0.07***	0.03	0.02*	-0.02***	0.02***	0.02	0.02*
Real Interest Rate	-0.05***	-0.07**	-0.03*	-0.03***	-0.01***	-0.06***	-0.03*
Natural Resources	0.14**	0.01**	0.02*	0.01***	0.09***	0.10	0.02*
Armed Conflicts	-0.06**	-0.01**	-0.05**	-0.07***	-0.06***	0.01***	-0.05**
Corruption	-0.02**			-0.05***	-0.04**		
Accountability		0.09**		0.01***		0.01***	
Rule of Law			0.04*	0.02***			0.04*
Natural Resources*Corruption					-0.09***		
Natural Resources*Accountability						-0.4**	
Natural Resources*Rule of Law							-0.09
Armed Conflicts*Corruption					-0.01		
Armed Conflicts*Accountability						-0.05	
Armed Conflicts*Rule of Law							-0.02***
Constant	-0.06*	-0.03*	-0.06*	-0.07***	-0.09**	-0.03	-0.06
Adj. ^{2}	0.95	96	98	0.99	0.96	0.97	0.98
F-stat	48.47*	69.50*	94.84*	90.49**	30.86*	70.31*	82.86*
D-W stat	2.01	2.10	2.03	2.10	2.02	2.07	2.05
F-Bounds	4.39*	5.26*	11.74*	70.96*	3.41**	6.16*	9.74*

Source: Author's computation using E-views 12; Note: *p<0.01, **p<0.05, ***p<0.1

However, in column 2 of Table 11.4.4, government accountability showed a positive and significant relation with economic development. It indicated that a percentage improvement in government accountability would lead to economic development in Nigeria at 9 per cent, which was significant at the 5 per cent level. The implication is that a stable and accountable government is likely to create an enabling environment for the growth and development of the economy. This is because government accountability and sincerity will foster the citizens' trust, thereby forestalling most conflicts leading to economic development in the long run. Output for the coefficient of the rule of law in column 3 of the table further corroborated the preceding finding. It indicated the positivity of the rule of law in enhancing economic development. The result indicated that an improvement in the administration of the rule of law (or maintenance of law and order) would result in

economic development by about 4 per cent. This means that *ceteris paribus*, a 4 per cent improvement in the economic development of Nigeria can be explained by the stability recorded through the effective administration of the rule of law and the maintenance of law and order. The estimates' statistical significance affirms the conclusions based on these findings.

The three selected institutional variables were included in the baseline equation to examine their joint effects on economic development. Though not significantly different from some of the earlier findings in this study, the results are of great significance. All the estimates were appropriately signed, following theoretical expectations and were statistically significant at 5 and 10 per cent levels, respectively. For instance, control of corruption indicated that a rise in corrupt practices in the economy would reduce economic development by 5 per cent, *ceteris paribus*. On the other hand, government accountability and the administration of the rule of law showed that a percentage improvement in the duo would enhance economic development by about 1 per cent and 2 per cent, respectively. As expected, GDP growth and GDP per capita positively affected economic development.

Natural resources and armed conflicts (the core variables of interest) also followed theoretical expectations. While natural resources positively affected economic development by about 1 per cent, armed conflicts could negate economic development in Nigeria by about 7 percentage points. Similarly, inflation indicated that a percentage rise could deplete economic development by 7 per cent, *ceteris paribus*. Interest and exchange rates went in the same direction and were not deviant. Both indicated a drop in economic development in Nigeria to about 2 per cent and 3 per cent, respectively, given a rise in both variables in the economy within the period studied. These conclusions corroborate the earlier findings by Miguel*et al.* (2004), Achimugu*et al*. (2013), Kimenyi *et al*.(2014), and Abul-Azad*et al*. (2018), who arrived at similar conclusions for Asia, Europe, America and Sub-Saharan Africa, highlighting the urgent need for policy interventions.

Columns 5 to 7 of Table 11.4.4 report the estimates from the iterations assessing both the natural resources-institutions and armed conflicts-institutions pass-throughs. Column 5 reports that the passthrough effect of natural resources through control of corruption is negative and statistically significant at the 10 per cent level. The result indicated that irrespective of the viability of the available natural resources, a percentage rise in corruption depletes economic development by about 9 per cent. The implication is that, with the continuous practice of corruption unabated, a rise in corrupt practices will transmit adverse effects on economic development, no matter how vast the number of natural resources at the country's disposal. This finding corroborates the resource-curse question and the systemic misnomer that gives credence to it (Satti*et al.*, 2014).

Moreover, the coefficients of natural resource pass-throughs through government accountability and the rule of law were equally negative, though statistically insignificant in the case of natural resource rule of law passthrough. As seen in column 6, the estimated coefficient of the natural resources-government accountability passthrough indicated that the effect of natural resources is transmitted negatively to economic development through government accountability, which is significant at a 5 per cent level. The result showed that the passthrough effect would reduce economic growth by 4 per cent. This outcome negates the theoretical expectation of a positive effect. It is unconnected to the lack of transparency and accountability that seems to remain endemic in Nigeria's political space and governing systems. Therefore, economic development could be far from reach, irrespective of the abundance of natural resources, if transparency and accountability in governance are not taken seriously and given attention promptly.

On the other hand, the passthrough effect on economic development in terms of natural resources of law interaction reflected a similar result as the preceding. The estimated coefficient showed that the passthrough effect on economic development was negative, though insignificant. The result indicated that the effect would deplete economic development by 9 per cent. The implication is that ineffective administration of the rule of law and lack of conscientious maintenance of law and order will most likely truncate economic development as it may fuel instability, conflicts, unrest, and, in extreme cases, anarchy. This outcome may turn the benefits of natural resources that should have accrued to the people, leading to economic development, into a curse. The statistical insignificance of the estimate may be mainly attributed to data defects occasioned partly by the inherent imperfections in the time series and the differences associated with the sources of the data sets used in time series econometric analysis.

Finally, the passthrough effects of armed conflicts through the three institutional variables were also examined, and the outcome was in line with a priori expectations. As seen in columns 5 to 7 of Table 4.4, in the three iterations, the passthrough effect of armed conflicts through control of corruption, government accountability and rule of law was negative on economic development. Though the first two were statistically insignificant, the trio showed that a conflict-ridden economy might not thrive or develop, *ceteris paribus*, even in the face of viable institutions. It can, therefore, be deduced from the findings, as reflected by the results, that for meaningful progress in economic development to be achieved, the economy must deal with every source of armed conflicts to ensure that the gains of natural resources abundance are harnessed for the general wellbeing of the citizens and the development of the Nigerian economy in general.

Other vitals reported in Table 11.4.4 are the post-estimation statistics, which all appeared good-for example, the adjusted coefficient of determination (Adj. R^2)reflected a good fit for the seven iterations, showing that 95, 96, 98, 99, 96, 97 and 98 per cent of Nigeria's economic development changes are jointly explained by the variables in each of the models. F-statistics for the seven iterations were robust and were statistically significant at a 1 per cent level, except for the F-statistic in column 4, which was significant at 5 per cent. Overall, the F-statistic results indicated that the relationships among variables in the models are generally significant, and the entire equations are generally stable, affirming the results' reliability for policy fine-tuning and instilling confidence in the research.

Moreover, the Durbin-Watson statistic for the seven iterations indicated that the models were free from serial correlation. The bounds tests for all the models showed that the calculated F-statistics for the bounds tests were higher than the critical bounds - both the lower and upper bound- limits at a 1 per cent level of significance. These results established the cointegration (long-run relationship) of the variables in the series, thereby further confirming stability and the reliability of the outcome of the analyses for policy suggestions cum decisions.

5. Conclusion

This study examined the effect of natural resources and armed conflicts on Nigeria's economic development. This included investigating the effect of natural resources - armed conflict interaction on the Nigerian economy's development and examining the institutions' role in such passthrough relations. The empirical evidence showed, amongst other things, that natural resources affect economic development positively. However, this positive relation and its effects are comparatively minute and do not seem to promote tangible economic development due to armed conflicts and unrest resulting primarily from the systemic mismanagement of the available natural resources and their proceeds. The findings further asserted that institutions may not make any significant positive difference in changing the outcome due to the inherent rot in Nigeria's institutional structures. The study, therefore, concluded that with armed conflicts and other natural resources-related violence, coupled with deteriorating institutions (viz: corruption, poor administration of the rule of law and lack of transparency /accountability on the side of government) rampaging unabated, economic development would be a tall order if the trend continues uninterrupted.

The government, through its relevant agencies, must ensure that all facets of armed conflicts and any form of arm-bearing by nonstate actors are nipped in the bud. The government should manage the natural resources and the accruing proceeds for the general well-being of the citizenry through equitable and efficient distribution and redistribution of the flow from the natural resources, as this will lead to economic development in the medium and long terms, *ceteris paribus*. The flows from natural resources should be judiciously deployed to create an enabling environment for employment creation, leading to improvement in the income level of the citizenry and a drastic reduction in poverty. This is expected to improve the general well-being of the people and serve as a disincentive for violent crimes such as arms-bearing as the incentives for living continue to grow. The institutions should be strengthened, restructured and stabilised to play their regulatory and stabilising role in balancing the different levels of interactions by the economic agents for a stable and reasonably developed economy, *ceteris paribus*.

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