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Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.5, No.12, 2014
www.iiste.org

Electricity Consumption, Institutions and Economic Growth in Nigeria: What Does Evidence Say So Far?

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Abstract
This study applies bound test approach to VAR to investigate the long-run and short run relationship between institutional quality, electricity consumption and economic growth in Nigeria based on annual data for the period 1980-2011. In the first step, we examine the degree of integration between all the variables and find that the variables are mixture of order of integration. In the second step, we investigate the long-run relationship between institutions, electricity consumption and economic growth; the results based on the bounds testing procedure reveal that there exists co integration among the variables used in the model. In the third step, we estimate the long run and short run relationship and test for causality using ARDL and Wald test approach and find a positive direct relationship between institutions, electricity consumption and economic growth. The result of granger non causality test support the existence of both short run and long-run bidirectional relationship between GDP and electricity consumption and a unidirectional causality running from institutions to economic growth. Further, our analyses reveal that causation runs from institutions to electricity consumption and vice versa in both period. Implying policy makers should adopt policies that can ensure total overhauling of our institutions capable of driving investment in infrastructures as well as reorientation of the individuals in term of altitudes, trust, respect for rule of law and accountability, thereby encourage long-term contract, lower risk of doing business and improve human capital that is necessary for growth.
Key words: Institutions, Electricity consumption, Co integration, Growth, Granger causality

1. Introduction

There is a plethora of studies, which investigate the linkage between energy consumption and growth across countries and regions. Consequently, determining the cause of relationship between them attracted attention of many scholars, this is due to the impact of the policy implications of the nature of relationship and causality that exist between the variables. This has led to extensive investigation on the role of energy in economic growth, most especially in developing countries. Some of the related studies conducted on African countries include Ebohon (1996), Chebbi et al (2008). Lee, (2005), Lee et al., (2008), Chali et al., (2000), Olaniyan (2011), Dlamini(2013). Studies on the link between energy consumption and economic growth in Asian economies include those of Adjaye (2000) and Soytas et al (2001). Other studies on developing countries specifically on Nigeria include Omotor, 2008; Olusegun, 2008; Odularo and Okwonkwo, 2009; Oderinde, 2010 and Dantama et al 2012 among others. With all these studies, the direction of causality as well as correctly estimating the relationship between energy consumption and economic growth remained empirically inconclusive across countries including Nigeria.
For examples Chali et al, (2000) and Omotor (2008), established a bi-directional relationship between energy and income. Contrary to the above, Ebohon, (1996), Olusegun, (2008), Orhewere and Machame (2011) Onakoya (2013) result confirmed a unidirectional relationship while the empirical results of Akinlo, 2008 and Oderinde, (2010) validate the neutrality hypothesis.

Thus, economists' interest has been on correctly estimating and forecasting the efficacy of energy-growth nexus in developing countries. Policy makers have also shown increasing appetite for stable energy supply as a prerequisite for conducting effective economic reform. This is believed that the reforms will aid the transition of the economy to a stage in which the share of manufacturing and service industries will constitute the greater share of the total GDP figures and consequently ensuring the achievement of sustainable and inclusive growth in the country. It is no wonder that researchers continue to examine the subject with renewed vigour and have shown that achieving the aforementioned goal will be a necessary condition for Nigeria to join the league of industrialized economies as well as achieving a growth rate that is inclusive and sustainable. It is therefore evident that high-energy consumption/supply per capita is an important indicator of economic modernization and growth (Iwayemi, 2008; Adegbemi et al. 2013).

Table 1: Structure of Output and GDP Per-Capita, Energy Consumption and Institutional Indicators for Nigeria (2006 – 2011)

Year	Electricity Consumption Per Capita	GDPPC Annual% Growth	Manufacturing % of GDP (Value added)	Manufacturing Capacity Utilization	Industry % of GDP (Value added)	*Rule of Law.	*Corruption
2006	111.15	3.44	2.58	53.30	41.92	-1.08	-1.07
2007	138.11	3.65	-	53.38	40.65	-1.07	-0.98
2008	126.46	3.17	-	53.84	-	-1.06	-0.81
2009	119.82	4.09	-	-		-1.16	-0.98
2010	135.40	5.05	2.6	-	40.70	-1.17	-1.00
2011	148.93	4.42				-1.21	-1.10
Regional Average**	-	4.3	8.39	-	22.9	-	-

Source: UNECA (2012); World Development Indicators (2013; CBN Bulletin 2011)
Note: * figures ranges between -2.50 to 2.50.
** Figures are for Sub-Saharan Africa in 2010

With numerous and extensive empirical works confirming the imperatives of energy in economic growth , abundant energy resources in Nigeria coupled with different reforms and policies (oil and electricity subsidies, energy sector reforms) the energy sector has failed to consolidate the activities of other real sectors leading to low capacity utilisation culminating into unsustainable and non – inclusive growth.

For example, the electricity power consumption per capita of 111.1468Kwh in 2006 increased to 135.3973Kwh by 2010. Although it experienced decline during these periods it achieved an average growth rate of 6.714Kwh between 2006 and 20111. The sub sector responded slowly to this development as manufacturing capacity utilization rate increased from 36.1, in 2000 to 42.7, 54.9, and 56.5per cent in 2001, 2002, 2003 respectively but fell to 53.30, in 2006 to 53.38 and 53.84 in 2007and 2008 respectively. On the average between 1975- 2008 the manufacturing capacity utilization growth rate was -0.604 Per cent. What is more, the manufacturing value added to GDP experienced a decline from 3.39% in 2003 to 2.6% in 2010, while the industrial sector also share the same story with a value of 40.7% in 2010 against 43.57% in 2005 all resulting into fluctuating growth rate. A cursory look at the country GDP growth rate reflects the above sad story exhibiting an unsustainable pattern of growth. For example available data reveals a decline in the GDP Per capita annual growth rate of about 5.05% in 2010 to 4.42% in 2011 (see table 1). This is an indication that there may be a missing link in the energy – growth nexus.

It has been a consensus among researchers that a sustainable energy future that can ensure a sustainable and inclusive growth anchored on qualitative and effective institutions among others (Iwayemi, 2008; Olumuyiwa, 2008). Institutions refer to market, firm, state, public and private corporations (Anyanwu, 1997). They also include pattern of behaviour, conduct determining the choice and execution of policies. Put simply, institutions are formal and informal rules that are essential for economic performance outcome. Strong institutions are expected to facilitate ideas and innovation, define property rights and encourage strict enforcement of contracts, lower transaction cost and correct government failure, reducing uncertainty as well as fostering efficiency hence enhance strong economic performance (Ajayi, 2002; North, 1991).

Considering huge capital investment in Electricity Supply Industry (ESI), along with various deliberate policy reforms, the outcome remains to be apparent and perceived inefficiencies in the industry due to absence of weak institutions. This is evident when one look at the stylized facts on institutional indicators. For instance, measure of institutional quality in term of effectiveness of rule of law and control of corruption only experience a marginal improvement between 2006, 2007, and since then remained worsen up to 2011.

Therefore, a proper understanding of the energy, institution and growth nexus is imperative for the implementation of ESI reform, especially with regards to the ongoing transformation agenda. This is germane from the point of view that energy, institutions and output dynamics determine aggregate growth rate, which consequently impact a country's development policy objectives. Adequately estimating the relationship makes it easier for policy makers to predict the impact of economic reform on various macroeconomic aggregates such as unemployment, output, poverty, and welfare.

It is in this regard that this paper will fill this gap by empirically investigating the relationship between electricity consumption, institutions and economic growth in Nigeria. Earlier empirical works with few exceptions had focused mainly on the relationship between electricity consumption and economic growth, thus suffered from omitted variables bias (Chali et al. 2010; Dantama et al. 2012). For the few that have attempted to fill this gap (Oderinde, 2011; Adegbemi,2013) have failed to account for the role of institutions neither in economic growth nor in energy supply constraints on economic growth, despite the theoretical support and call for effective rule of law for efficient energy supply (Iwayemi, 2008, Olumuyiwa, 2008 and Saidu, 2011). No previous paper, to the best of our knowledge has controlled for this.

This paper, therefore, is an attempt to extend the literature on the subject matter by examining the relationship among electricity consumption, institutions and economic growth in Nigeria, using a bound cointegration approach to VAR. The rest of the article is organized into four sections. Following this introduction is section 2 that articulate the analytical framework, section 3 presents the model specification and data estimation procedure, while section 4 provides empirical econometric results and discussion and the study is concluded in Section 5.

2. Theoretical Framework

To start with, we review the theoretical scientific basis of the role of energy in production and hence in the increasing scale of production involved in economic growth. However, institutional phenomena also affect how this role-plays out and therefore the economics view of growth and production and potential role of energy is necessarily more complex than just this scientific understanding (Stern, 2004). However, the limitation inherent in the growth theory by not considering the role of energy and other resource issues has been the subject of strong criticism. In this section, the review of the scientific basis is followed by the review of neoclassical economic theory.

The physical science theory has their bases from the second law of thermodynamics (the efficiency law) which implies that a minimum quantity of energy is required to carry out the transformation of matter. Therefore, there must be limits to the substitution of other factors of production [1]for energy. All economic activities require energy, with the exception of production at micro-level that may not require the direct processing of materials. However at the macro-level all economic processes require the indirect use of materials, in either the maintenance of labour or the production of capital (Stern, 2004) It should be noted that even at micro –level, an individual require energy (Human energy) for any productive effort. Stern (1997) opined that production involves the transformation or movement of matter in some way and all such transformations require energy.

In reviewing the mainstream economic theory of growth, we look at the simple model based on the work of Solow (1956). In this model, a constant-sized labor force using manufactured capital produces output, which is equal to total Gross Domestic Product. The standard neoclassical model assumes that output increases at a decreasing rate as the amount of capital employed rises resulting into diminishing returns to scale. The diminishing returns to capital imply that successive additions of capital generate decreasing increment to future income, and so a falling rate of return on investment. Hence, the incentive to accumulate capital weakens. This simple economy must eventually reach a steady state in which there is no increment to net investment and economic growth must eventually come to halt. The Solow model is therefore, tagged as static model and gives no role to energy and institution in production process. Hence, these in adequacies led to development of exogenous growth theory by Solow-Swan.

It was an extended work of Solow by introducing exogenous factors of production apart from labour and capital; these are population growth and technological progress. They postulate that a right combination of capital and labour with an exogenous factor will result into an optimum level of output. The above theory by Solow- Swan generates lots of criticism because it does not explain how improvements in technology come about; they are just

[1] This section draws heavily from Stern (2004)

assumed to happen exogenously. Due to this shortcoming, the Solow-Swan model has not been able to bring to focus the linkage between energy resources and institutional quality and growth in output, hence, the development of an endogenous growth theory.

Arrow 1962, Sheshinski, Lucas e.t.c were the first to introduce technological progress as an endogenous variables into production,(Jhingan,2010). Arrows model in a simplified form can be written as,

$$Y_i = A(K)F(K^{\alpha}{}_i, L^{\beta}{}_i) \quad (1)$$

Where y stands for output, K_i, for stock of capital, L_i for stock of labour, A and K stands for total factor productivity where K denotes the aggregate stock of capital and A is the technology factor (Jhingan, 2010)

Endogenous growth theorists have been able to show that, under reasonable assumptions, the A term in the expression above is a constant, and so growth can continue indefinitely as capital is accumulated. The key point is that technological knowledge can be thought of as a form of capital. It is accumulated through research and development (R&D) and other knowledge creating processes. The growth of K thus means the growth of a composite stock of capital and disembodied technological knowledge. Therefore, output is able to rise as a constant proportion (A) of the composite capital stock, and is not subject to the diminishing returns because the diminishing returns to manufactured capital will be neutralized by exogenous technology growth.

The growth models we have examined do not include any natural resources including energy. All natural resources are finite in nature though some such as sunlight or deuterium are available in very large quantities. Some environmental resources are non-reproducible; and many renewable resources are potentially exhaustible. Finiteness and exhaustibility of resources make the notion of indefinite economic growth unacceptable as shown by Solow-Swan growth model. The achievement of sustainable economic growth may not be automatic because in a model of more than one input – both capital and natural resources - there are many alternative paths that economic growth can take. The path taken is determined by the institutional arrangements that are assumed. (Stern et al, 2004)

Hence, the standard neoclassical aggregate production framework centers on what conditions permit continuing growth or at least non-declining consumption and utility. They conclude that technical and institutional conditions determine whether continuing growth is possible. Technical conditions have to do with the substitutability of renewable and non-renewable resources, the initial endowments of capital and natural resources, and the ease of substitution among inputs. The institutional condition deals with institutional structures of the economy such as market structure (competition versus central planning) and the system of property rights (private versus common property). Solow (1974) showed that continuing growth was achievable in a model with a finite and non-renewable natural resource with no extraction costs and non-depreciating capital, which was produced using capital and the natural resources.

Stern et al (2004) analyzing the Neoclassical economists growth model is of the opinion that the class of growth models that include resources(energy) can account for mass balance and thermodynamic constraints(the bases of physical science theory) with the "essentiality condition." If elasticity is greater than one, then resources are "non-essential." If elasticity is less than or equal to one, then resources are "essential." Essential in this case means that given positive non-resource inputs, output is only zero when the resource input is zero, and strictly positive otherwise (Perman et al, 2003). The Cobb-Douglas production function, a frequent form used in growth models, has the essentiality condition. Economists argue that this at least accounts for the fact that some amount of energy and materials are required to produce goods and services. This provides a basis for the rejection of neutrality hypothesis as well as testing empirically other strand of arguments on either bidirectional or unidirectional causality hypothesis. Essentiality condition determines the level of substitutability and substitution that is technically possible and this will not occur unless society invests in sufficient capital over time to replace the depleted natural resources and ecosystem services. But how much investment does take place depends on the institutional setting of the economy. Therefore, a standard Cobb-Douglas production function of the form in equation 1 can be extended to include electricity, energy and institutional quality. Following the work of (Stern et al, 2004; Oderinde, 2010), we assumed that the impact of electricity consumption, institutional quality and output will possibly operate through the endogenous factors (i.e A(K)) Thus A(K) is a function of electricity, institution, and other exogenous factors (C).

Mathematically, the above statement can be express as

$$\begin{aligned} A(K) &= f(elect, INST, C) \\ &= f(elect, INST, GCF, LAB, OILP) \quad (3) \end{aligned}$$

Combining equations 1and 2, we get

$$Y = C_t\ ELEC^{\beta}_t, INST^{\delta}_t, GCF^{\theta}_t,\ LAB^{\mu}_t\ OILP^{\eta}_t \quad (4)$$

Where Y is output, ELECT stands for energy consumption in relation to electricity, INST as a measure of institutional quality. GCF represent capital stock, LAB stand for total labour force, while OILP stands for oil price The parameter β, δ, θ, μ, and η are constant elasticity coefficient of output with respect to ELEC, INST, GCF, LAB, OILP. From equation 4 we derived an estimable function in double log form.

$$\log Y_t = C_t + \log elect + \log INST + \log CAP + \log LAB + \log OILP \quad (5)$$

3. Model Specification and Data Estimation Procedure

3.1 Model Specification

Based on the theoretical framework, the above specification of the Neo-Classical growth model in equation 5 written in double log form will be adapted as follows:

$$\log Y_t = \beta_0 + \beta_1 \log elect + \delta_2 \log INST + \theta_4 \log CAP + \mu_5 \log LAB + \eta_6 \log OILP + e_t \quad (6)$$

Where all variables remained as defined earlier.

3.2 Estimation Techniques and Procedures

To empirically analyze the long run relationships and dynamic interactions among growth in output and the explanatory variables chosen, we adopt the following procedure. First, we investigated the times series properties of the variables used in the study in order to determine their order of integration. The augmented Dickey–Fuller (ADF) and Philips–Perron (pp) unit roots tests were considered appropriate in the study. Second, the existence of a cointegraton relationship was investigated following the approach developed by Pesaran et al. (2001). A procedure that has some econometric advantages over traditional approaches such as those of Engle and Granger (1987) Johansen (1988), Johansen, and Juselius (1990) some of these advantages are advantages are: One, the procedure is applicable irrespective of whether the underlying repressors are purely I(0), purely I(1) or mutually co-integrated. Recently Narayan et al. (2004) has argued that the critical bounds provided by pesaran (2001) is inappropriate for small samples, therefore they generates a new set of critical values for data with sample size that falls within the range of 30 to 80 series. Therefore, considering the size of our observation, appropriate critical values will be extracted from the Narayan et al (2004) table. Secondly the above make its statistical properties in small samples more superior compare to other tests of cointegration such that the latter are not robust when subjected to small sample sizes and lastly the use of the ARDL procedures ensures the estimation of the long and short run parameters of a model.

In the present investigation, two steps were followed: First, the Wald (F-test) was conducted to determine the existence of any long run relationship between growth in output and the chosen explanatory variables after which the optimal lags of first differenced variables are selected based on Akaike Information Criterion (AIC) using the general to specific methodology. Second, the long run relationship was estimated, followed by the short run coefficients using the error correction representation of the ARDL specification with a view to establishing the speed of adjustment to equilibrium using equation 7 through 9.

The ARDL model of the specification in Equation 5 is

$$\Delta(Rgdp)_t = \beta_0 + \eta_1 Rgdp\phi_{t-1} + \eta_2 \mathrm{ELEC}_{t-1} + \eta_3 \mathrm{INST}_{t-1} - + \eta_4 \mathrm{GCF}_{t-1} + \eta_5 LAB_{t-1} + \eta_6 OILP_{t-1}$$

$$+ \sum_{t=1}^{a} \psi_3 \Delta(Rgdp)_{t-i} + \sum_{t=0}^{b} \mu_1 \Delta(ELEC)_{t-i} + \sum_{t=0}^{c} \gamma_1 \Delta(INST)_{t-i} + \sum_{t=0}^{d} \Pi_1 \Delta(GCF)_{t-i} +$$

$$\sum_{t=0}^{e} \lambda \Delta(LAB)_{t-1} + \sum_{T=0}^{f} \mu \Delta(OILP)t_{-1} + \varepsilon_{3t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

While the longrun relationship equation is stated as follows

$$\Delta(Rgdp)_t = \beta_0 + \eta_1 Rgdp_{t-1} + \sum_{t=0}^{b} \mu_1 ELEC_{t-i} + \sum_{t=0}^{c} \gamma_2 INST_{t-i} + \sum_{t=0}^{d} \Pi_4 GCF_{t-i} + \sum_{t=0}^{e} \lambda_5 LAB_{t-1} +$$

$$\sum_{T=0}^{f} \mu_6 OILPt_{-1} + \varepsilon_{3t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots(8)$$

To test the long run relationship among the variables, the Wald test (F-statistic) is conducted by imposing restrictions on the estimated long run coefficients. The null and alternative hypotheses are stated as follows:

H0: = $\eta_1 = \eta_2 = \eta_3 = \eta_4 = \eta_5 = \eta_6 = \eta_7 = 0$ against alternative hypothesis

H1: $\neq \eta_1 \neq \eta_2 \neq \eta_3 \neq \eta_4 \neq \eta_5 \neq \eta_7 \neq 0$

Accordingly, the unrestricted error correction model (ECM) which follows the order of ARDL specification of growth equation of the above ARDL model in equation (7) is presented in Equation (9):

$$\Delta(Rgdp)_t = \beta_0 + \sum_{t=1}^{a} \eta \Delta Rgdp \phi_{t-1} + \sum_{t=0}^{b} \psi_2 \Delta ELEC_{t-1} + \sum_{t=0}^{c} \gamma_3 \Delta INST_{t-1} - + \sum_{t=0}^{d} \Pi_4 \Delta GCF_t . + \sum_{t=0}^{e} \lambda_5 \Delta LAB + \sum_{t=0}^{f} \mu_6 \Delta OILP + \phi ect_{t-1} + e_t ....(9) \quad (9)$$

Where, Δ represents the first difference and ε_{3t} is a disturbance error term and ect stands for error correction term.

The study also applied the ECM based Granger Causality test to trace the causal relationship among the variables included in the model**.** The Engel Granger (1987) test reveals whether Granger Causality exists at least in one direction provided that the variables are integrated of the same order. One implication is that applying the Granger Causality test based on the Vector Auto Regressive (VAR) model in the first difference in the long run relationship in equation (8) may yield inconsistent results in the presence of cointegration. Therefore, to capture the long run relationship, an additional variable, the error correction term (ect), is incorporated in the model. Causality test in a multivariate framework of the ρth order is formulated in VECM specifications of the variables employed in the study and presented in seven endogenous variables in matrix form to conserve space as shown below.

$$(1-L)\begin{pmatrix} Rgdp_t \\ Elect_t \\ INST_t \\ Gcf_t \\ Lab_t \\ Oilp_t \end{pmatrix} = \begin{pmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ \beta_5 \\ \beta_6 \end{pmatrix} + \sum_{t=1}^{a}(1-L)\begin{pmatrix} \mu_{11i} & \mu_{12i} & \mu_{13i} & \mu_{14i} & \mu_{15i} & \mu_{16i} \\ \mu_{21i} & \mu_{22i} & \mu_{23i} & \mu_{24i} & \mu_{25i} & \mu_{26i} \\ \mu_{31i} & \mu_{32i} & \mu_{33i} & \mu_{34i} & \mu_{35i} & \mu_{36i} \\ \mu_{41i} & \mu_{42i} & \mu_{43i} & \mu_{44i} & \mu_{45i} & \mu_{46i} \\ \mu_{51i} & \mu_{52i} & \mu_{53i} & \mu_{54i} & \mu_{65i} & \mu_{56i} \\ \mu_{61i} & \mu_{62i} & \mu_{63i} & \mu_{64i} & \mu_{65i} & \mu_{66i} \end{pmatrix}$$

$$\begin{pmatrix} Rgdp_{t-i} \\ Elect_{t-i} \\ INST_{t-i} \\ Gcf_{t-i} \\ Lab_{t-i} \\ Oilp_{t-i} \end{pmatrix} + . \begin{pmatrix} \mu_{11k} & \mu_{12k} & \mu_{13k} & \mu_{14k} & \mu_{15k} & \mu_{16k} \\ \mu_{21k} & \mu_{22k} & \mu_{23k} & \mu_{24k} & \mu_{25k} & \mu_{26k} \\ \mu_{31k} & \mu_{32k} & \mu_{33k} & \mu_{34k} & \mu_{35k} & \mu_{36k} \\ \mu_{41k} & \mu_{42k} & \mu_{43k} & \mu_{44k} & \mu_{45k} & \mu_{46k} \\ \mu_{51k} & \mu_{52k} & \mu_{53k} & \mu_{54k} & \mu_{65k} & \mu_{56k} \\ \mu_{61k} & \mu_{62k} & \mu_{63k} & \mu_{64k} & \mu_{65k} & \mu_{66k} \end{pmatrix} \begin{pmatrix} Rgdp_{t-k} \\ Elect_{t-k} \\ INST_{t-k} \\ Gcf_{t-k} \\ Lab_{t-k} \\ Oilp_{t-k} \end{pmatrix} \begin{pmatrix} \delta_1 \\ \delta_2 \\ \delta_3 \\ \delta_4 \\ \delta_5 \\ \delta_6 \end{pmatrix} EC_{t-1} +$$

$$\begin{pmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ e_{4t} \\ e_{5t} \\ e_{6t} \end{pmatrix} . (10).$$

3.3 Sources of Data

Times series data covering the period 1980 – 2011 is used. The choice of this period hinges on the fact that, the period covers the era of deteriorating energy consumption due to poor energy supply as well as pronounced institutional decay in the country (Mordi et al., 2010). The data for this research work will be mainly secondary data obtained from World Bank Development Indicators, CBN, NPC and other relevant publications.

3.4 Variable Definition and Measurement

Apart from the traditional proxies for our dependent variable (Real Gross Domestic Product) as a scale variable for real output, the remaining explanatory variables are measured as follows.

ELEC: Its represent total energy consumption in production with respect to electricity proxy by annual electric power consumption in Kilowatt per hour. Based on the theoretical expectation, it is expected that there should be a positive relationship between Output and Electricity consumption.

GCF: Gross fixed capital formation represents the value of aggregate stock of capital available for production.

LAB: Total labour force is proxy by the total annual number of working population in the country

OILP: OILP was proxy by crude oil price in Nigeria The choice of the Oil price as a control variable is underscored on its role in determination of total annual growth as well as the importance of the fossil fuel energy in production activities in Nigeria, as evidenced by the level of voltage interruption over the period of study.

INST: This refers to institutional quality in term of regulatory quality/rule of law, level of trust and contract enforcement right. It includes pattern of behaviour, conduct determining the choice and execution of policies as well as formal and informal rules that are essential for economic performance outcome (Ajayi, 2002; Garba, 2012). The effectiveness of the private sector in economic activities as well as public expenditure on energy will be affected by factors such as low level of trust, poor regulation or an ineffective court system (Maureen, 2006; Yaqub, 2012). To capture this institutional quality (Rule of law, contract enforcement right and trust) we have used recently developed indices, the Contract Intensive Money (hereafter CIM) developed by Clague et al. (1996, 1999)as used by (Kiyotaki et al. 2005; Asekunowo,2010; Dantama, et al. 2013) for the measure of institutional quality.

CIM is calculated as

$$CIM = f\left((m2 - c)/M2 \right) ....equatiion, \quad (11)$$

Where:

M2 = a broad definition of the money supply

C = currency held outside the banking system.

The benefit of using CIM as a proxy for level of trust and rule of law is that the data is available for many countries over a long period (from 1948 in some cases) as well as more objective because it avoids the problem of ordinality and perception inherent in other indices of institutional quality . Higher values of CIM (1) indicate a greater reliance on or preference for long-term contracts and high degree of trust in the economy while a lower value of CIM (0) indicates absolute lack of trust in the economy.

Apriori we expect all parameter to satisfy the following sign restrictions: $\beta1>0$, $\beta2>0$, $\beta3>0$, $\beta4>0$, $\beta5>0$

4. Results and Discussion

The bound cointegration test approach to modelling relies on the assumption that the variables are stationary at levels or at first difference i.e (1(0) or 1(1).This notwithstanding, the times series properties of the variable used in the model will still be examined to ensure that none of the variables is integrated of order two. Therefore, the times series properties of the variables used in the model were investigated using Augmented Dickey Fuller, and Philip Peron. The results of the ADF and the PP tests for the variables under investigation are presented in Table 2

Table 2: Unit root test results

	Level				**Ist Difference**				
Variables	PP†	ADF†	PP‡	ADF‡	PP†	ADF†	PP‡	ADF‡	Order of Integration
Rgdp	1.8355	2.4385	-3.3019	-1.4831	5.2156*	-5.0946*	-5.5898*	-5.48265*	1(1)
Elect	-0.1898	-0.6233	-3.0957	-2.9453	-8.4686*	-8.2836*	-8.2952*	-8.12688*	1(1)
INST	-0.6177	-2.2459	-0.8129	-0.3988	-3.7180*	-3.5198**	-3.7357**	-3.4944***	1(1)
Gcf	0.5315	-0.8757	-7.7390*	-3.2850***	-6.9417*	-4.4972*	-6.48398*	-3.46259*	1(0)
Lab	-0.5732	-4.7749*	-2.7009	-8.8878*	-1.83114	-4.1016*	-1.1767	-3.22478	1(0)
Oilp	-1.3287	-1.2901	-1.0626	-1.4184	-5.4833*	-3.9119*	-15.2437*	-5.3247*	1(1)

ADF† and PP† = unit root tests with constant.
ADF‡ and PP‡ = unit root tests with constant and trend.
*,** and *** indicates statistical significance level at 1%, 5% and 10% respectively

Source: Author's Computation using E-view 7.1

From table (3) it has been confirmed that all the variables are integrated of order 1(1) with the exception of GCF and LAB that are integrated of order 1(0) going by the result of Augmented Dickey Fuller and PP. This further lends support to the use of ARDL bound test approach. Employing ARDL bound test, we firstly applied OLS to Equation (4) to test the existence of a cointegrating long run relationship based on the Wald test for the joint significance of the variables. This required the use of optimal lag thus, the optimal lag length for estimating the long term coefficients equation is selected using the Schwarz Bayesian criterion (SBC) To select the optimal lag length for the model, we fit an autoregressive model of order 2 (AR 2), generating the results of the Akaike information criterion (AIC) and the SBC. However, the study utilizes the results of the SBC in the choice of optimal lag length for the estimated model. The results of the selection are presented in Table (3)

Table 3: Lag selection results

Variables	AIC lag length			SBC lag length			Lag length selected	
	0	1	2	0	1	2	AIC	SBC
Rgdp	-0.73859	-5.38917	-5.39172*	-0.69189	-5.29576*	-5.25160	2	1
Elect	-0.58256	-2.59412	-2.64982*	-0.53586	-2.50070	-2.50971*	2	2
INST	-0.58257	-2.59412	-2.649828	-0.53586	-2.50070	-2.50971*	2	2
Gcf	2.55267	-1.68721*	-1.69438	2.59938	-1.59379*	-1.55425	1	1
Lab	-7.13658	-10.8923	-14.8022*	-7.08989	-10.79890	-14.66210*	2	2
Oilp	-0.22365	-1.49273	-1.42613*	-9.17694	-1.39932*	-1.28260	1	1

Notes:* Denotes minimum AIC and SBC.

Source: Authors' Computation using E-view 7.1

As shown in table (3) for all the variables in the model the result of the test for optimal lag gives support to adoption of ARDL model of the order (122121). Consequently, a co integration test was carried out using the Bound test developed by Pesaran (2001), the result is shown in table 4

Table 4: Bounds Test Results for Co integration

	Computed Wald (F-statistic): 6.95*			
	0.05		0.01	
K=6	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Pesaran F*	2.45	3.61	3.15	4.45
Narayan (F*)	2.95	4.44	4.20	6.12

Notes: K is the number of regressors in the ARDL model. *, **, and *** denotes significance at 1%, 5% and 10% respectively.

Source: Authors' Computation using E-view 7.1

Based on the principles underlying the ARDL approach to cointegration, the lower bound critical values assume that the explanatory variables are integrated of order zero, or I(0), while the upper bound critical values assume that the explanatory variables are integrated of order one, or I(1). Hence, if the computed F-statistic is less than the lower bound value, the null hypothesis is not rejected. On the other hand, if the computed F-statistic is greater than the upper bound values the null hypothesis is rejected. However, if the computed F-statistic falls between the lower and upper bound values, the results are inconclusive.

Results in Table (3) suggest that the application of the bounds F-test using ARDL modelling approach indicates the existence of a long run relationship between economic growth, elec, INS, OILP, GCF and LAB. The results show that the null hypothesis of no long run relationship is rejected at the 1% significance level. The Wald test (F-statistic) of 6.95 is greater than the upper critical bound values of 4.43 and 6.12 for both Pesaran (2001) and Narayan (2004) respectively. Therefore, the null hypothesis of no co integration cannot be accepted at the 1% significance level and hence, there is a cointegration relationship between RGDP, elec, INS, OILP, GCF and LAB.

Having confirming a long run relationship between economic growth and all other variables in the model we proceeded to estimation of both ;long run and short run parameters of equation through the application of ARDL model.The result is presented table (5).

Table 5: Long run and short run estimates

Panel A: Long run estimates using ARDL based on SBC				
Dependent variable: ΔLog(RGDP)				
Variables	Coefficient	Std. error	t-Statistics	Probability
Constant	-1.7554	3.661353	-0.4794	o.6364
RGDP(-1)	-0.6519	0.112970	-5.7705	0.0000
ELECT	0.1371	0.034061	4.0253	0.0006
INS	0.32615	0.074598	4.3721	0.0002
GCF	0.0458	0.027878	1.6425	0.1147
OILP	0.0464	0.024141	1.9215	0.0677
LAB(-1)	-34.7131	9.2276	-3.7619	0.0011
OILP(-1)	0.0578	0.027340	2.1149	0.0460
LAB	38.6711	10.97337	3.5241	0.0019
Diagnostics R^2 = 0.85; **Adj.** R^2 = 0.80; **F-statistic** = 16.39338(0.0000); **SER** = 0.009745; **BG**[$\chi^2(2)$] = 2.362259(0.1200); **JB** = 2.550130(0.279413); **ARCH**[$\chi^2(1)$] = 0.439934(0.5126); **RESET** = 1.331698(0.1972). **D.W** = 1.90				

Panel B: Short run estimates using ARDL based on SBC				
Dependent variable: ΔLog(RGDP)				
Variables	Coefficient	Std. error	t-Statistics	Probability
Constant	-0.0022	0.003138	-0.7129	0.4851
Δ RGDP(-1)	0.5239	0.130902	4.0029	0.0008
Δ ELECT	0.1503	0.032789	4.5829	0.0002
Δ INS	0.1973	0.112423	1.7547	0.0963
Δ GCF	0.0445	0.022089	2.0131	0.0593
Δ OILP(-1)	0.0683	0.018061	3.7798	0.0014
Δ LAB	15.0832	6.654617	2.2666	0.0360
Δ LAB(-2)	-12.1011	0.196423	-2.4098	0.0269
Δ ELECT	0.0669	0.034258	1.9549	0.0663
Ecm(-1)	-0.9726	0.196423	-4.5829	0.0002
Diagnostics R^2 = 0.83; **Adj.** R^2 = 0.75; **F-statistic** = 10.04171(0.000022); **SER** = 0.008607; **BG[F-Stat.(2)]** = 1.172009(0.3350); **JB** = 1.0629(0.587765); **ARCH[F- Stat(1)]** = 0.156434(0.6958); **RESET** = 0.239428(0.8136). **D.W** = 1.99				

* , ** and *** indicate statistically significant levels at 1%, 5% and 10%
. SER: Standard error of regression.
ARCH: Engle's autoregressive conditional heteroskedasticity.
BG: Breusch–Godfrey LM test for serial correlation.
JB: Jarque–Bera test for normality of residuals.
RESET: Ramsey's regression equation specification error test.
Source: Authors' Computation using E-view 7.1

4.1. Long run estimates

The estimated Long run equation result is presented in panel A of table (5). The entire coefficients are correctly signed, with the exception of RGDP and lagged value of Labour force. There is a negative and statistically significant relationship between RGDP and its past value during the period of study. The statistically significant of the income elasticity implies that in the long run previous year income will negatively affect the present year growth. This is not surprising in an economy where government recurrent expenditure makes up the larger percent of the total annual budget, rent seeking behaviour strive among public officials, and all boom come and gone without any concrete investment. From the result one can concludes that, though initial income/output may have a positive influence on present economic growth efforts but in the long run it may turn to be negative due to absence of strong and qualitative institutions. The above may be an explanation as to the insignificance of the coefficient of GCF. Although it is directly related to RGDP with coefficient of 0.045787 satisfying priori expectation, but in the present study it remains to be insignificant explanatory variables. Economic theory posit that rate of gross fixed capital formation depend greatly on the rate at which the worn out capital due to depreciation are been replaced through investment which is low in Nigeria, a rate to say the least, is disappointing.

The coefficient of OILP is significant and positively linked to economic growth indicating that in the long run a 1% increase in the value of OILP will results into 0.06% in the rate of growth. The coefficient of the INST is also significant and correctly signed that a 1% increase in the level of institutional quality will yield an increase in growth rate by 0.326146% in the long run. This is not surprising, because institutions are expected to facilitate the generation of ideas, ensure strict enforcement of contracts rights, lower the cost of doing business and risk, correct government failure and enhance strong economic performance.

The result of the long run elasticity of ELEC on the RGDP in Nigeria is positive. Studies have found that changes in electricity consumption level do predict changes in the growth rate. The long run impact of electricity consumption on RGDP is around 0.14 and statistically significant at 1 % level, meaning that a 1% increase in electricity consumption will result into in 0.14% in RGDP. This is the case for West African economies, which are all categorised as developing countries. Consequently, the drive for development is expected to lead to increases in the demand for energy associated with production and other economic activities. The coefficient of LAB also indicates a positive influence on economic growth and is consistence with priori expectation while its lagged value indicates a significant negative impact on growth process in Nigeria.

The diagnostic test statistics for the long run estimates are satisfactory. The adjusted R2 is 0.60%, implying that 60% of variation in the rate of growth is explained by lagged values of IMRt−1, GHEXPt−1, INSt−1, INST, GEEDU, UPOP UPOPt-1 and LAB. Consequently, the coefficient of determination that measures the goodness-of-fit of the estimated model shows that the model has high predictive capability as high as 86%. The F-statistic value of 16.3934 is indicative of the overall statistical significance of the model at the 1% level as shown by the p-value. Thus, all the explanatory variables used in the model simultaneously explain the variations in the level of economic growth in Nigeria in Nigeria. The JB statistic 2.550 and its associated p-value of 0.279413 indicate that the null hypothesis of normally distributed error term cannot be rejected. The autoregressive conditional heteroskedasticity (ARCH) statistic shows absence of heteroscedasticity with F-statistic value of 0.43994 and it associated p- value of 0.5126. The Breusch–Godfrey serial correlation LM test has an F- value of 2.362259 and p-value of 0.1200 implying rejection of null hypothesis of the autocorrelation. Finally, the RESET statistic is not statistically significant, implying the rejection of the null hypothesis of model misspecification as shown in table 4 panel A.

4.2. Short run estimates

The results of short run estimated growth function are presented in Panel B of Table (4).The coefficients of INST is correctly signed and statistically significant at 10%. Good institution is thus a significant determinant of sustainable economic growth in Nigeria. This implies that an improvement in the quality of institution in Nigeria will result into increase in the level of economic growth by 19%, ceteris paribus. This further gives an empirical support to literature that has linked institutions to be germane for a sustainable growth, and the missing link in the growth process of most West African countries**.** (Ajayi 2002; Sidddiqui and Ahmed, 2009; Valeriani and Peluso, 2011; Osabuohien and Ike, 2011; Garba, P. K. (2012).

As established in the long run result, the ELECT (at 1 Lags) is also statistically significant at 1% satisfying the priori expectations. The electricity consumption coefficient is 0.16 which is less than unity in consistent with the physical science theory based on mass balance and thermodynamic constraints as well as the “essentiality condition.” If elasticity is greater than one, then resources are "non-essential." If elasticity is less than or equal to one, then resources are "essential." Essential in this case means that given positive non-resource inputs, output is only zero when the energy input is zero, and strictly positive otherwise (Perman et al, 2003) consequently, the estimated energy elasticity is supportive of the imperative role energy plays in production activities. The positive relationship between energy use and economic growth is also in consistence with findings from other studies (Dantama et al, 2012**;** Onakoya et al., 2013 ; Saibu, 2011; Stern, 2000; Odularu, 2009) which also confirmed a strong positive relationship between energy consumption and economic growth.

OILP and GCF are also both positive and significant at 1% and 5% respectively. As for the coefficient of the GCF the result is in line with the economic theory indicating that availability of capital is germane to large scale production that brings along with it economies of scale thus resulting in economic growth. This is in contrast with the work of Saibu (2001) that reveals a negative relationship between investment and growth but in support of Onakoya (2013) and Odularu (2009). The role OILP plays in growth process does not have any definite pattern as this depend in part to the rate of exchange of the domestic currency to dollars as well as the side of the market at which a country operates (i.e importer or exporter). The significant positive relationship of last year OILP coefficient in the growth equation is not surprising considering the fact that Nigeria is a major oil exporter not only that crude oil is the major source of finance for most of its developmental project.

It is also important to note that the coefficient of LAB evidently shows a direct relationship with growth in output, however, it becomes negative at both lag 1 and 2 respectively. The coefficient of 15.08 indicates an elasticity that is greater than unity gives explanation to the concept of elasticity of substitution in the standard growth model showing the ease at which labour force can be substituted with other factors of production (capital). In the contrary, the coefficient of LAB at 2 lags is negatively related to economic growth in Nigeria. What does one expect in a country where the level institutional quality has deteriorated (leading to high figure of human capital with poor work ethics), poor investment in research and training resulting in application of obsolete skills in production process. Moreover, the poor condition of service and insecurity of life and property have resulted into exodus of the best hands to foreign countries (Brain drain) (see Ajayi, 2002). Above all that as it may be, the initial RGDP is positive and significantly correlated with growth at 1%. This support the notion that in growth fundamentals initial condition also matter as this provides a foundation upon which future economic plan is built. This is only the case in the short run, while in the long run the reverse may be the case most especially in a country that is characterize with weak institutions like Nigeria.

The statistically significant of the negatively signed ECM, further lend credence to the cointegration among the variables under investigation. The error correction mechanism coefficient is about –0.972630 and suggests that about 97% of last year disequilibrium is corrected in the current year. Hence, when growth rate is above or below its equilibrium level, it adjusts by approximately 97% within the first year to ensure full convergence to its equilibrium level. The speed of adjustment is thus very high. Overall, the results indicate that in the short run, change in institutional quality and ELECT have significant impact on the rate of economic growth in Nigeria. Above all, the model passes through all the diagnostic test normality, misspecification, heteroskedasticity and auto correlation with Durbin Watson statistics of 1.99.

4.3. Stability of energy consumption, institutions and economic growth function

In the final stage, the stability of the long-run coefficients is examined by using the CUSUM and CUSUM squares tests. The graphical presentation of these tests is presented in the figure (1) and (2). To complement the CUSUM and CUSUMSQ test the Chow breakpoint test is also conducted, thus two tests of stability were carried out, the results of which do not reject the null hypothesis of stability. It can be concluded that the results are suggestive that the, Institutions, energy and economic growth function for Nigeria is stable over the study period.

For the Chow test, a breakpoint (1998) was chosen. The reason for choosing this point is based on the facts that 1999 mark the beginning of the era of intensification of economic reforms effort in the economy by all regimes of democratic government, on a scale previously unknown in the country. The Chow F-statistic is 2.280035 and is not statistically significant as indicated by its p-value of 0.1277. It is concluded that the institutions, energy consumption and economic growth nexus in Nigeria has not undergone structural change over the period of 1980 to 2011.

To further strengthens the stability of the model, and correct the disadvantage of the Chow test, which assumes knowledge of the exact breakpoint, the CUSUM and CUSUMSQ tests were applied to the residuals generated from Equation (4). The CUSUM and CUSUMSQ plots do not cross the 5% critical lines, implying that the stability of the institutions energy consumption and economic growth function exists over the entire sample period. The CUSUM and CUSUMSQ tests are shown in Figures 1 and 2.

Figure :1

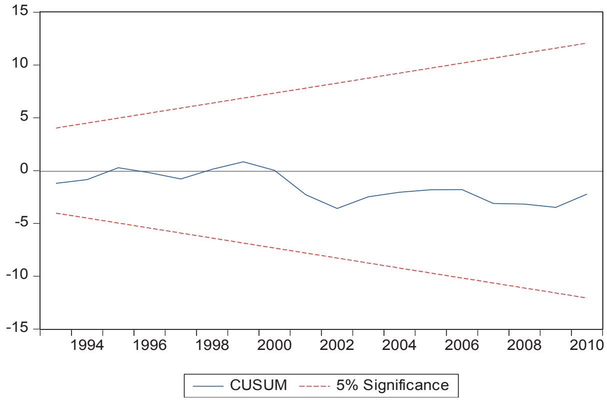
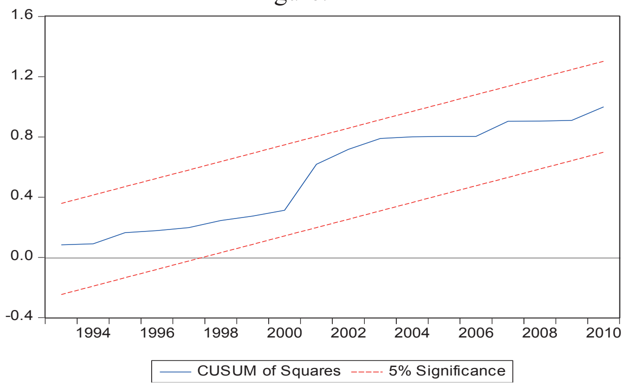


Figure: 2



Source : Authors' Computation Using E-view 7

4.4. Test of Causality Result

The study also applied an error correction based on the Granger causality test to establish the direction of causal relationships between the variables in the model both in the short run and long run using wald test. The results of the application of these techniques are presented in table (5).below. For easy exposition each equation for all the six endogenous variables in the model are labelled equation (10) through (15)

TABLE 6. Granger Non-Causality Test Results

Long Run Causality		Short Run Causality						
Dependent Variables	ϕ_{t-1}	$\sum_{i=1}^{q_1} \Delta Rgdp_{t-i}$	$\sum_{i=1}^{r_1} \Delta Elect_{t-i}$	$\sum_{i=1}^{s_1} \Delta INST_{t-i}$	$\sum_{i=1}^{t_1} \Delta Gcf_{t-i}$	$\sum_{i=1}^{u_1} \Delta Lab_{t-i}$	$\sum_{i=1}^{v_1} \Delta Oilp_{t-i}$	Equ.
Δ Rgdp [χ^2]	43.2562 *		21.1059*	8.1424**	0.2161	3.2952	1.7912	(10)
	(0.0000)		(0.0000)	(0.0171)	(0.8976)	(0.1925)	(0.4084)	
Δ Elect [χ^2]	30.8114 *	7.7713**		5.6189***	9.0498*	6.6143**	3.3653	(11)
	(0.0006)	(0.0205)		(0.0602)	(0.0108)	(0.0366)	(0.1859)	
Δ INST [χ^2]	12.8099	2.2745	4.6612***		1.3408	0.5190	3.6768	(12)
	(0.2345)	(0.3207)	(0.0972)		(0.5115)	(0.7714)	(0.1591)	
Δ Gcf [χ^2]	25.9364 *	0.0034	1.4315	8.1184**		10.9124*	10.4247	(13)
	(0.0038)	(0.9983)	(0.4888)	(0.0173)		(0.0043)	(0.1094)	
Δ Lab [χ^2]	13.6464	0.2156	0.1319	0.7295	7.5127**		0.0759	(14)
	(0.1897)	(0.8978)	(0.9362)	(0.6944)	(0.0234)		(0.9627)	
Δ Oilp [χ^2]	60.8375 *	8.7815**	7.1688**	3.9292	3.5482	48.8745*		(15)
	(0.0000)	(0.0124)	(0.0278)	(0.1402)	(0.1696)	(0.0000)		

Notes*, **, and ** denote statistical significance at 1%, 5% and 10% levels respectively. Figures in parenthesis indicates the probability value.
Source: Authors' Computations using E-view7.1

From equation (10) the result show that ELEC and INST do granger causes output in the short run while there is a long run causality running from all the dependent variables to Rgdp. A glance at ELECT equation results reveals that there is a short run causality running from RGDP/output, INST, LAB and GCF to ELECT while at the same time a long run causality exist between ELECT and all the other endogeneous variable in the model with probability value of 0.006. The above gives credence to the role of institution in the development of infrastructure. It should be noted that supply creates demand, therefore the amount of electricity energy available for consumption to some extent depends on the total energy supply that is greatly influence by the quality of institution.

The significance of the Rgdp chi-square value in equation (11) as well as the chi- square value of overall causality of the same equation confirms the existence of bi-directional causality between ELECT and RGDP both in the short run and long run in Nigeria. The positive bidirectional causality between electricity consumption and RGDP seems to be more consistence with studies for other developing countries (see Jumbe, 2004; Rufail, 2006; Bekhet and Yusop, 2009)

In the institutions equation (equation 12) with the exception of ELECT that granger cause INST, there is no either short run or long run causality running from all the other endogenous variables to INST. Thus the null hypothesis that ELECT does not Granger cause INST, and INST does not granger cause ELECT in the system is rejected in respect of all the variables and are statistically significant at 10% level, hence confirming a bidirectional causality between Institutional quality and electricity consumption in Nigeria. The results also conclude the existence of positive unidirectional short run and long run causality running from INST to RGDP in Nigeria. All these further complement the result of our estimated ARDL long and short run model, thus a proof of consistencies in all the result of the studies.

Results in equation (13) support the hypothesis that there is a long run causality running from all the variables in the model to GCF while in the short run all the variables in model do not granger cause GCF with the exception of INST and LAB. In equation (14) the result reveals that with the exception of GCF that is significant at 5% indicating the existence of causality in the short run, LAB is exogenous to all the variables in the model. Thus a bidirectional relationship exist between LAB and GCF in the short run

Finally, looking at equation (15), there exist short run causalities running from RGDP, ELECT and LAB to OILP; while in the long run all the variables on the right hand side granger cause OILP. Studies have confirmed a causal relationship between output growth and energy consumption It should be noted that crude oil is a substitute to electricity, thus the availability of electricity for consumption determine the degree of elasticity of demand for other source of energy in Nigeria and consequently its price. Therefore, one should not be surprised with the existence of causality between them.

5. Conclusion and Policy Recommendations

The development of strong institutions and functional infrastructures (electricity) is an important challenge for the policymakers of developing economies such as Nigeria. The growing economy requires more energy consumption, which can only be made available with functional institutions. This paper examines the relationships among economic growth, institutions and energy consumption in Nigeria during the period of 1980-2011. The study applied the ARDL test and VECM based test techniques to establish the short run and long run relationships between the variables in the model. The stationarity of the variables were confirmed using the ADF and Philip Peron, follow by selection of optimal lag and then test for existence of co-integration. Empirical findings suggest that a long run relationship between economic growth, energy consumption and institutions exist in Nigeria. The long run estimated elasticity coefficient of electricity consumption is positively significant and less than unity as well as a significant positive impact of institutions, implying essentiality of electricity consumption and institutions in the country growth process.
Since higher energy consumption and improve quality of institutions lead to increasing growth in output, then it is not surprising to have such positive and significant relationship between these two variables and RGDP. The results indicate that the elasticity of institutional quality is higher than that of energy consumption in Nigeria. The estimated elasticity OILP, LAB, and GCF are all positively significant both in the short run and in long run with the exception of GCF that was not significant in the long - run. The lagged value of labour force reveals a negative relationship with economic growth both in the short run and in long run. Different diagnostic test were carried out on the short run and long run models, the results show that both models passes through all the tests. Confirming the stability of the model, the chow breakpoint test, CUSUM and CUSUMQ provide evidence in support of the stability of the model.

The application of the ECM-based Granger Causality test is found to be consistent with the outcomes of the ARDL test. The results indicate that Institution, electricity consumption, labour force OIL price and gross capital formation does granger cause growth, and the neutrality hypothesis that there is no causal relationship between economic growth and energy consumption(electricity) does not hold in the case of Nigeria rather, bidirectional relationship exist both in the short run and long run. In the Short run, the Granger causality results support the existence of bidirectional causal relationship between institutional quality and electricity consumption in the study. The result further shows that labour force oil price and capital stock are germane to improved electricity consumption and does to growth.

Drawing from the foregoing, the so called energy neutrality hypothesis that implies energy conservation policies do not affect economic growth as concluded by (Asafu-Adjaye, 2000; Paul et al, 2004; Oderinde,2010) is not valid in Nigeria, hence policies that can ensure uninterrupted and increase power supply capable of meeting energy demand should be adopted.

Based on the above, Policy makers should adopt policies that can ensure total overhauling of our institutions capable of driving investment in infrastructures as well as reorientation of the individuals in term of altitudes, trust, respect for rule of law and accountability, thereby embedded in our human capital ethical value required. The just concluded privatization of the energy sector and the introduction of Independent Power project (IPP) are germane to development of the sector if only there exist strong institution without which it cannot flourish. In an environment of weak institutions, firms cannot engage in complex long-term contracts along with effective enforcement as they do in developed economies. Therefore, a basic structure of property rights that encourage long-term contracts in energy sector appears essential for its development and other infrastructures that are necessary for growth.

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