DETERMINANTS OF ECONOMIC GROWTH IN NIGERIA

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Abstract
Today, Nigeria's greatest desire is economic transformation and sustained increased economic growth and development. Policy makers need more empirical inputs to carry out rational economic decisions as well as on specific areas that most policies and strategies should be geared towards. The paper considers the determinants of economic growth in Nigeria using data for 1981 to 2010 and the ARDL estimation technique. Foreign aid influences economic growth in a cubic manner with increasing foreign aid increasing economic growth until a point is reached beyond which growth would actually fall. The coefficient of ECM implies that more than 40% of the deviations of the previous year disequilibrium is corrected in the present year. The result further shows that short run deviations of economic growth are mainly influenced by labour force. It is recommended that foreign aid from our development partners should be judiciously used, particularly, for capital projects rather than for recurrent or immediate consumptions expenditure.

Keywords: ARDL, ECM, Foreign aid, Economic Growth and Labour force

1. Introduction

Over the last five decades the determinants of economic growth have attracted increased attention in both theoretical and empirical literature. In spite of this, no consensus has been reached, probably because most of the earlier studies were cross country studies. Despite the lack of a consensus, there are several theories that discuss the role of various factors that determine economic growth. Two main theories distinguished itself in this regard. The first one is the neoclassical growth theory, based on Solow (1956); Swan (1956) also known as Solow - Swan growth model or the exogenous growth model. The second one is the more recent theory of endogenous growth model developed by Romer (1986); Lucas (1988). While Solow-Swan's Neoclassical growth models attempt to explain long run economic growth by looking at productivity, capital accumulation, population growth, and technological progress, Romer and Lucas hold that investment in human capital, innovation and knowledge are significant contributors to economic growth. Among others, Myrdal's (1953) cumulative causation theory is another contribution to the theory of economic growth. Also, other literatures have highlighted the important role non-economic factors play on economic performance. These developments gave rise to a discussion that distinguishes between 'proximate' and 'fundamental' (or 'ultimate') sources of growth. The former refers to issues such as accumulation of capital; labour and technology while the latter refers to institutions, legal and political systems, socio-cultural factors, demography and geography (Petrakos, Arvanitidis & Pavleas, 2007).

Since independence in 1960, the Nigerian economy has been through a period of upswings (1960s to 1970s) and downswings (1980s). A few years after Nigeria's independence, the country experienced encouraging growth rates. In the period 1960-70, the Gross Domestic Product (GDP) recorded 3.1 percent growth annually. During the oil boom era, roughly 1970-78, GDP grew positively by 6.2 percent annually. However, in the 1980s, GDP had negative growth rates. In the period 1988-1997 which constitutes the period of structural adjustment and economic liberalization, the GDP responded to economic adjustment policies and grew at a positive rate of 4.0 percent (Ekpo & Umoh, undated). Nigerian economy has not been performing as expected taken into consideration her enormous natural resources. This can be seen when compared with the emerging Asian economies notably, Thailand, Malaysia, China, India and Indonesia that were far behind Nigeria in terms of GDP per capita in the 1970s. In spite of her natural resource endowments, economic performance has been rather weak and does not reflect these endowments. Nigeria's poor economic performance, particularly in the last forty years is better illustrated when compared with China which now occupies an enviable position as the second largest economy in the world. In 1970, while Nigeria had a GDP per capita of US$233.35 and was ranked 88th in the world, China was ranked 114th with a GDP per capita of US$111.82 (Sanusi, 2010).

Today, Nigeria's greatest desire is economic transformation and sustained increased economic growth and development. Policy makers need more empirical input to carry out rational economic decisions as well as on the specific areas that most policies and strategies should be geared towards. This can help to achieve the desired economic growth. Furthermore, studied on the determinants of economic growth of Nigeria is not common to the best of my knowledge. Furthermore, most studies may not have fitted growth model to a cubic function. Consequently, failure to understand the causes of economic growth and prosperity has caused massive political, economic and social upheaval. The study therefore seeks to analyze the determinants of economic growth in Nigerian using data for 1981 to 2010 and the ARDL estimation methodology. Following section 1, section 2 discusses theories of economic growth while section 3 reviews relevant literature, section 4 presents the theoretical framework and model specification. Section 5 concludes and provides the policy implications of results.

2. Theories of Economic Growth

The theories of economic growth started with the classical theory of economic growth. This was a combination of economic work done by Adam Smith, David Ricardo, and Robert Malthus in the 18th and 19th centuries. The theory states that every economy has a steady state GDP and any deviation from the steady state is temporary and will eventually return. This is based on the concept that when there is a growth in GDP, population will increase with an adverse effect on GDP due to the higher demand on limited resources from a larger population. The GDP will eventually lower back to the steady state. When GDP deviates below the steady state,

population will decrease and thus lower demand on the resources. In turn, the GDP will rise back to its steady state.

Another theory of economic growth is the Neo-Classical theory associated with the work done by Solow (1956); Swan (1956). Both of them independently developed relatively simple growth models. The theory focuses on three factors that impact economic growth: labour, capital, and technology, or more specifically, technological advances.

Among the short run implications of the model is that growth is affected only in the short-run as the economy converges to the new steady state output level. Furthermore, the rate of growth that converges to the steady state is determined by the rate of capital accumulation as the economy improves. Capital accumulation is in turn determined by the savings rate that is the proportion of output used to create more capital rather than being consumed and the rate of capital accumulation. In this model, the long-run rate of growth is exogenously determined, that is, it is determined outside the model. A common prediction of these models is that an economy will always converge towards a steady state rate of growth. This however, depends only on the rate of technological progress and the rate of labour force growth. The basic assumptions of the model are: constant returns to scale, diminishing marginal productivity of capital, exogenously determined technical progress and substitutability between capital and labour. As a result, the model highlights the savings or investment ratio as important determinant of short-run economic growth. The model predicts convergence in growth rates on the basis that poor economies will grow faster compared to rich ones.

In the mid-1980s, a group of growth theorists became increasingly dissatisfied with common accounts of exogenous factors determining long-run growth. They favoured a model that replaced the exogenous growth variable (unexplained technical progress) with a model in which the key determinants of growth were explicit in the model. The endogenous growth theory holds that investment in human capital, innovation, and knowledge are significant contributors to economic growth. Romer (1986); Lucas (1988); Rebelo (1991) omitted technological change in the model. Instead, they opined that growth in these models was due to indefinite investment in human capital which had spillover on the economy and reduces the diminishing return to capital accumulation.

The simplest endogenous model is the AK model. It gives a constant-saving-rate of endogenous growth. It assumes a constant exogenous saving rate and fixed level of the technology. It shows elimination of diminishing returns leading to endogenous growth. However, the endogenous growth theory is further supported with models in which agents optimally determined the consumption and saving, optimizing the resources allocation to research and development leading to technological progress. Romer (1990); Aghion and Howitt (1992); Grossman and Helpman (1991) incorporated imperfect markets and Research as well as development to the growth model. In the AK model, technology displays a positive long run growth per capita without any exogenous technological development. The per capita growth depends on behavioural factors of the model as the saving rate and

population. It is unlike the neoclassical model which is higher saving, (s), promotes higher long-run per capita growth (Wikipedia, 2013).

Another strand of literature, perhaps less influential is the growth theory of cumulative causation developed by Myrdal (1957); Kaldor (1970) as cited by Petrakos, Arvanitidis and Pavleas (2007). Essential to this theory is the argument of 'cumulative causation' in which initial conditions determine economic growth of places in a self-sustained and incremental way. As a result, the emergence of economic inequalities among economies is the most possible outcome. In contrast to theories mentioned above, theories of cumulative causation has a medium term view and often described as "soft" development theories due to a lack of applied mathematical rigour (Plummer & Taylor, 2001). From a more macro perspective, institutional economics has underlined the substantial role of institutions (Jutting, 2003), economic sociology stresses the importance of socio-cultural factors (Knack & Keefer, 1997), political science focuses its explanation on political determinants (Brunetti, 1997) and others shed light on role played by geography (Gallup, Sachs & Mallinger, 1999) and demography (Kalemli-Ozcan, 2002).

3. Review of Relevant Literature

Literature on the determinants of growth reveals that many studies have been done on the economies of developed countries and very little on the developing economies and to be the best of our knowledge, much less on African economies. Majority of the literature are cross country studies with few that are country specific, particularly for emerging economies. Although some of the empirical research preceded formal models, Solow's work (1957) was the foundation of empirical exercises on the sources of economic growth. Solow's neoclassical growth model gave the theoretical framework for quantifying the contribution of traditional inputs and their total factor productivity to the gross domestic product (Amin, 2002).

Romer (1990) opines that quality development of labour force generates new products or ideas that underlie technological progress. According to him, countries with a large and well developed labour force experience a more rapid rate of introduction of new goods and thereby tend to grow faster. Barro (1991) uses data for 98 countries for the period 1960-1985 and concludes that the growth rate of real per capita GDP is positively related to initial human capital (proxied by 1960 school-enrollment rates). Barro (1996) further carried out a cross country empirical study on the determinants of economic growth for a panel of 100 countries using data from 1960 to 1990. The result strongly supports the general notion of conditional convergence. According to him, for a given starting level of real per capita GDP, the growth rate is enhanced by higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation, and improvements in the terms of trade. For given values of these and other variables, growth is negatively related to the initial level of real per capita GDP. Political freedom has only a weak effect on growth but there is some indication of a nonlinear relation. At low levels of political rights, an expansion of these rights stimulates economic growth. Sachs and Warner (1997) also note that a rapid increase

in human capital development would result in rapid transitional growth. On the other hand, a well developed labour force, in terms of better education and health is likely to be able to produce more from a given resource base than less-skilled workers (Gallup, Sachs & Mellinger, 1998).

Drawing from Barro and Lee (1993) variable, Gallup *et al.* (1999) find a strong relationship between initial levels of health and economic growth. They used life expectancy at birth as their basic measure of overall health of the population and conclude that improved health is associated with faster economic growth. Though, when they used the average total years of education of the adult population as their main measure of education, they were unable to find a statistically significant relationship between initial levels of education and subsequent economic growth in their sample of countries. As shown by Levine and Zervos (1993), countries that have more students enrolled in secondary schools grow faster than countries with lower secondary school enrollment rates. Brunetti (1997) noted that education, measured by secondary school enrolment is positively related to growth.

Some authors consider geography and agriculture as important determinants of economic growth. Some cross country studies that took geography into consideration are Hall and Jones (1997); Sachs and Warner (1995). They generally conclude that countries located in the tropics tend to grow more slowly than countries in more temperate climates. As regards agriculture, Dewan and Hussein (2001) opine that developing countries that largely depend on the agricultural sector as their main source of export earnings are often adversely affected by the tropical climates which hinder growth. As cited in Dewan & Hussein (2001), Gallup *et al*. (1999) state that two possible reasons for this negative relationship could be as follows: (i) the presence of parasitic diseases in tropical countries; and (ii) the tropics have more fragile soils and more natural disasters, all of which hinder agricultural growth.

Brunetti (1997) is therefore of the view that efficiency and reliability are the two channels through which policies may influence economic growth. According to the author, efficiency reflects the implementation of macro and micro-economic policies in a timely manner. On the other hand, reliability of policies refers to the stability surrounding their implementation. Exploring the relationship between three basic government policies - openness to the global economy, government saving and the composition of government expenditures - and the growth of per capita income, Gallup *et al.* (1999) conclude that open economies are generally in a better position to import new technologies and new ideas from the rest of the world. Brunetti (1997) also noted that higher government saving is likely to support aggregate economic growth through two ways: (i) countries which have higher government saving rates also tend to have greater overall savings and investment, and therefore grow faster (ii) higher government saving indicates sound overall macroeconomic management which lowers risks for investors and increases investment. They conclude that prudent government fiscal policies appear to be associated with faster overall economic growth. The third policy examined by them is the composition of government spending, particularly, the extent of government spending on health and education. They find a positive relationship between government spending on health and

education (measured as a share of GDP) and growth of per capita income. Kowalski (2000) attempted to ascertain the determinants of economic growth in East Asia using a linear regression model. Among others, the results show that increased levels of exports and investment including FDI and domestic investment will all help support increased levels of economic growth in East Asia.

Radelet, Sachs and Lee (2001) attempted to establish the determinants and prospects of economic growth in Asia using data from 1965 to 1990 for a panel of 78 countries. The results show strong evidence for conditional convergence. They conclude that countries with lower incomes in 1965 grew faster than countries that began with higher incomes after controlling for the other variables that influence the steady-state level of income. According to them, East Asian countries grew faster than the rest of the world for four key reasons (i) they had substantial potential for catching up (ii) their geography and structural characteristics were by-and-large favourable (iii) demographic changes worked in favour of more rapid growth (iv) their economic policies and strategy were conducive to sustained growth. Amin (2002) examined the sources of growth in Cameroun using data from 1961–1997. The author used both parametric and non-parametric approaches and found that the contribution of the growth of factor inputs is greater than the contribution of total factor productivity, with capital input playing a larger role. At the sector level, input growth greatly influenced the primary sector output growth.

The result of a recent study carried out by Abdullah (2012) for a panel of 177 countries and data for 1995-2009 shows that corruption had negative coefficients; indicating that corruption negatively affects the economic growth of a country, irrespective of the location and status of the country. Democracy only showed significant coefficient for African countries, indicating that a democratic setup will have better prospects of bringing higher economic growth in a country. Health was also seen to positively impact on economic growth for least developed countries. This shows the need for better health facilities in the country to boost up the economic output. Government consumption, population growth, tropical climate and agricultural growth variables led to a mixed relationship with economic growth, positive for some of the regions whereas negative for other regions. Military expenditure did not have any significant coefficient throughout their analyses, indicating that it may not have a strong impact on the economic growth of a country. Trade openness positively impacted on economic growth for most of the regions indicating that a country with open access to trade is expected to have higher economic growth.

4. Theoretical Framework and Model Specification

Following the study of Kwabena (2004), assuming an aggregate production function of the form:

$$Y_t = A_t F(K_t, L_t) \quad (1)$$

where:

Y_t is output of the economy at each time t;

A_t is the coefficient of technology, measuring total factor productivity at each time t;

K_t is capital at each time t;

L_t is labour at each time t.

Equation (1) can be written in percentage term (growth rates) as shown in (2) with the assumption of profit maximization.

$$y_t = a_t + S_K k_t + S_L l_t \quad (2)$$

Assuming constant returns to scale, $S_K + S_L = 1$. Also, shares of capital and labour inputs in total inputs are S_K and S_L while y_t, a_t, k_t, l_t are respectively growth rates of Y_t, A_t, K_t, L_t. Given the above, the economic wide production function can be restated as:

$$GDP_t = \alpha_0 \exp(\alpha_1 ODA)(EXPT)^{\alpha_2}(LBR)^{\alpha_3}(KPT)^{\alpha_4} \quad (3)$$

Where exp =exponential operator

$$GDP_t = \alpha_0 + \alpha_1(ODA) + \alpha_2(EXPT) + \alpha_3(LBR) + \alpha_4(KPT) \quad (4)$$

The estimated model from (4) can be stated as:

$$LNGDP_t = \alpha_0 + \alpha_1 LNODA_t + \alpha_2 LNEXPT_t + \alpha_3 LNLBR_t + \mu_t \quad (5)$$

where *GDP* is real GDP; Economic Growth; ODA is foreign aid; EXPT is total exports (made up of oil and non-oil exports); LBR is total labour force; *KPT* is capital stock. Capital stock was not used as part of the estimation because it was not stationary even at second differencing. μ_t is error term assumed to be normally distributed with zero mean and constant variance.

***A priori* expectations**

It is assumed that the impact of foreign aid on economic growth is positive while on the second estimation it follows a cubic function. This is because, very small relative size of foreign aid is initially likely to impact negatively on economic growth while medium-sized foreign aid accelerates economic growth through the provision of basic infrastructure and improved legal framework. Beyond a certain level, a foreign may hamper economic growth through bureaucratic delays and slow implementation of policies. This is also in line with government size with respect to economic growth (Kwabena, 2004). Furthermore, in line with economic theory, increased total exports and labour inputs are expected to lead to increased economic growth.

Methodology and Data

The sample period for this study covers annual data from 1981 to 2010. The data were obtained from World Bank data base (2012). All the variables are estimated in log form and the coefficients will be taken as elasticity. The Augmented Dickey

Fuller (ADF) which is the wider version of the standard Dickey Fuller (DF) test is employed to verify the presence of unit root in the series. This is because many economic series are non- stationary at their levels.
Given a simple AR (1) process as in (6),

$$y_t = \phi y_{t-1} + x_t \pi + e_t \quad (6)$$

where y_t is a time series, x_t represents exogenous regressors, ϕ and π are the parameters to be estimated and e_t is the white noise error component. Subtracting the term y_{t-1} from both sides of (6), we have (7).

$$\Delta y_t = \eta y_{t-1} + x_t \pi + e_t \quad (7)$$

In equation (7), Δ is the is the first difference operator, $\eta = \phi - 1$, and e_t is the error term with zero mean and constant variance. The ADF test "augments" the traditional DF test assuming that the y series is a $AR(p)$ process, and therefore, adding p lagged difference terms of the dependent variables to the right hand side of regression of (6),

$$\Delta y_t = \eta y_{t-1} + x_t \pi + \sum_{i=1}^{p} \lambda_i \Delta y_{t-i} + \varpi_t \quad (8)$$

A linear combination of two or more non-stationary series may be stationary and if such a stationary linear combination exists, then the non-stationary time series are said to be co integrated (Engle & Granger, 1987). The stationary linear combination is called the cointegrating equation and may be interpreted as a long-run equilibrium relationship among the variables.

Cointegration test is done using the Johansen and Juselius (1990) method. This involves estimating (9), an unrestricted vector autoregressive (VAR) model.

$$y_t = \delta_0 + \sum_{j-1}^{p} \delta_j y_{t-j} + \varepsilon_t \quad (9)$$

where y_t is an $n \times 1$ vector of non-stationary $I(1)$ variable δ_0 is a $n \times 1$ vector of constants, p is the number of lags, δ_j is a $n \times n$ matrix of the estimated parameters and ε_t is a $n \times 1$ vector of independent and identically distributed (*iid*) error terms.
VAR can be rewritten as:

$$y_t = \delta_0 + \sum_{j-1}^{p} \Gamma_{j\,y-1} + \Pi y_{t-1} + \varepsilon_t \quad (10)$$

where $\Gamma_j = -\sum_{i=j+1}^{p} \delta_t$ and $\Pi = -\sum_{j=1}^{p} \delta_t - I$, Δ is the difference operator and I is an $n \times n$ identity matrix. The rank of matrix Π determines the number of cointegration vectors. It shows the number of cointegrating relationship existing among the variables. If the rank of Π equals r and r p n, then there exists r cointegrating relationship among the variables. The existence of cointegration implies that an error-correction model (ECM) exists. The model combines the long-run relationship with the short-run dynamics of the model. It is important to know that cointegration provides the theoretical underpinning for error correction model. Equation (5) can be rewritten to have the error correction model for this study. This can be written in a compact form as:

$$\Delta LNGDP_t = \alpha_0 + \alpha_1 \Delta LNODA_t + \alpha_2 \Delta LNEXPT_t + \alpha_3 \Delta LNLBR_t + \alpha_4 ecm(-1) + \mu_t \quad (11)$$

where:

Δ is lag operator

μ_t is error term

According to Gujarati (2003), the parameter estimates associated with all the independent variables show the short run effects of changes in these variables on short run changes in the dependent variable. The absolute value of the parameter estimate associated with the error correction term shows how quickly the equilibrium is restored.

Results and interpretation

Using the Augmented Dickey Fuller test for stationarity, it was found that all the variables are integrated of order one as shown in Table 1.

Table 1: ADF Stationarity Results

Variable	Intercept Only	Intercept and Trend	Remark
LNGDP	-3.7574 (-2.9750)	-4.0776 (-3.5867)	I(1)
LNODA	-5.3239 (-2.9750)	-5.2258 (-3.5867)	I(1)
LNEXPT	-5.5958 (-2.9750)	-6.1734 (-3.5867)	I(1)
LNLBR	-3.1243 (-2.9750)	-4.2323 (-3.5867)	I(1)

Figure in parenthesis are the critical value (5%)

The Johansen cointegration result reveals the existence of one long run relationship between the dependent and the explanatory variables based on Maximal

Eigenvalue of the Stochastic Matrix Table 2(a) and Trace of the Stochastic Matrix Table 2(b).

Table 2: Johansen Cointegration Results

(a) Cointegration with no intercepts or trends in the VAR
Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

28 observations from 1983 to 2010. Order of VAR = 2.
List of variables included in the cointegrating vector:
LNGDP LNODA LNEXPT LNLBR
List of eigenvalues in descending order:
.67267 .32467 .16153 .7013E-3

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	31.2703	23.9200	21.5800
r<= 1	r = 2	10.9917	17.6800	15.5700
r<= 2	r = 3	4.9331	11.0300	9.2800
r<= 3	r = 4	.019644	4.1600	3.0400

Use the above table to determine r (the number of cointegrating vectors).

(b) Cointegration with no intercepts or trends in the VAR
Cointegration LR Test Based on Trace of the Stochastic Matrix

28 observations from 1983 to 2010. Order of VAR = 2.
List of variables included in the cointegrating vector:
LNGDP LNODA LNEXPT LNLBR
List of eigenvalues in descending order:
.67267 .32467 .16153 .7013E-3

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r>= 1	47.2147	39.8100	36.6900
r<= 1	r>= 2	15.9444	24.0500	21.4600
r<= 2	r>= 3	4.9527	12.3600	10.2500
r<= 3	r = 4	.019644	4.1600	3.0400

Use the above table to determine r (the number of cointegrating vectors).

The results of estimated optimal ARDL growth model are shown in Tables 3a and 3b. The optimality of the model is determined using the Akaike Information Criterion. Based on the various diagnostic tests, the model is good. The model is said to be correctly specified based on the Ramsey Reset test results. There is also the absence of significant autocorrelation based on Lagrange multiplier test of residual

serial correlation as well as absence of the problem of heteroscedasticity as shown in Table 3b. The strength of the model is strong given the values of R-squared is 99.4 percent and that of R-bar squared is 99.3 percent. The t-ratio of the individual variable shows that the value of real GDP at lag one is positive and significant at 1% in the determination of economic growth in Nigeria. This implies that economic growth is determined by its own last year value. Foreign aid is also found to be positively significant in the determination of economic growth. The result reveals that a 10% increase in foreign aid will increase economic growth by less than 1%. While its one year lag value was negatively insignificant, its two years lag value was positively significant. Though, export has a positive coefficient as expected, it was not significant in the determination of economic growth. The variable representing the first lag value of foreign aid and the second lag value of export were negatively insignificant whereas that of the second lag value was positively significant. Labour force was positively significant at 1% significance level in the determination of economic growth. A 10% increase in labour will propel economic growth by more than 5%.

Table 3a: Autoregressive Distributed Lag Estimates

ARDL(1,2,2,0) selected based on Akaike Information Criterion

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Dependent variable is LNGDP

28 observations used for estimation from 1983 to 2010

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Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNGDP(-1)	.59714	.14510	4.1154[.001]
LNODA	.027183	.010645	2.5535[.019]
LNODA(-1)	-.010661	.013528	-.78806[.440]
LNODA(-2)	.026872	.011608	2.3149[.031]
LNEXPT	.044137	.031715	1.3917[.179]
LNEXPT(-1)	.021110	.037596	.56149[.581]
LNEXPT(-2)	-.069171	.029363	-2.3557[.029]
LNLBR	.51978	.19433	2.6748[.015]

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R-Squared	.99449	R-Bar-Squared	.99257
S.E. of Regression	030504	F-stat. F (7, 20)	516.1021[.000]
Mean of Dependent Variable	24.4851	S.D. of Dependent Variable	.35383
Residual Sum of Squares	.018610	Equation Log-likelihood	62.6971
Akaike Info. Criterion	54.6971	Schwarz Bayesian Criterion	49.3683
DW-statistic	1.7518	Durbin's h-statistic	1.0251[.305]

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Table 3b: Diagnostic Test of Autoregressive Distributed Lag Estimates

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*  Test Statistics  *       LM Version       *       F Version       *
*************************************************************
*                   *                        *                       *
* A:Serial Correlation*CHSQ(  1)=  .15099[.698]*F(  1,  19)=  .10301[.752]*
*                   *                        *                       *
* B:Functional Form  *CHSQ(  1)=  1.3007[.254]*F(  1,  19)=  .92563[.348]*
*                   *                        *                       *
* C:Normality        *CHSQ(  2)=  .61992[.733]*      Not applicable      *
*                   *                        *                       *
* D:Heteroscedasticity*CHSQ(1)=  .19110[.662]*F( 1,  26)=  .17867[.676]*
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A:Lagrange multiplier test of residual serial correlation
B:Ramsey's RESET test using the square of the fitted values
C:Based on a test of skewness and kurtosis of residuals
D:Based on the regression of squared residuals on squared fitted values

On the long run as shown in Table 4, foreign aid and labour force were found to be significant in determining economic growth. Surprisingly, exports have negative and insignificant relationship with economic growth and with very low coefficient estimate. This may result from the fall in crude oil exports as a result of the past Niger Delta insurgence. Another reason for this could be that most of our non-oil exports cannot compete favourably in international markets. It may also result from government revenue derived from exports not significantly used for capital investments as seen recently in our budgets where recurrent expenditure is usually greater than capital expenditure. In the long run, a 10% increase in foreign aid will increase economic growth by about 1% while the same percent increase in labour will increase economic growth by more than 12%. In a different estimation using simple OLS, foreign aid influenced economic growth in cubic format with growth initially decreasing function of foreign aid. With further expansion of foreign aid, growth increases and later declined with further expansion (see appendix 1 for results).

Table 4: Estimated Long Run Coefficients using the ARDL Approach

ARDL(1,2,2,0) selected based on Akaike Information Criterion

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*********************************************************
Dependent variable is LNGDP
28 observations used for estimation from 1983 to 2010
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Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNODA	.10772	.024899	4.3261[.000]
LNEXPT	-.0097395	.050448	-.19306[.849]

LNLBR	1.2902	.025465	50.6678[.000]

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The results of the short-run ECM are reported in Table 5. The results show that short run deviations of economic growth were mainly influenced by labour force. The coefficient of ECM (-0.40286) was statistically significant and could be interpreted as more than 40% of the deviations of the previous year disequilibrium is corrected in the present year.

Table 5: Error Correction Representation for the Selected ARDL Model

ARDL(1,2,2,0) selected based on Akaike Information Criterion

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Dependent variable is dLNGDP

28 observations used for estimation from 1983 to 2010

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Regressor	Coefficient	Standard Error	T-Ratio[Prob]
dLNODA	.027183	.010645	2.5535[.018]
dLNODA1	-.026872	.011608	-2.3149[.030]
dLNEXPT	.044137	.031715	1.3917[.178]
dLNEXPT1	.069171	.029363	2.3557[.028]
dLNLBR	.51978	.19433	2.6748[.014]
ecm(-1)	-.40286	.14510	-2.7764[.011]

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R-Squared	.56225	R-Bar-Squared	.40903
S.E. of Regression	.030504	F-stat. F(5, 22)	5.1376[.003]
Mean of Dependent Variable	.040869	S.D. of Dependent Variable	.039681
Residual Sum of Squares	.018610	Equation Log-likelihood	62.6971
Akaike Info. Criterion	54.6971	Schwarz Bayesian Criterion	49.3683
DW-statistic	1.7518		

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5. Conclusions and Policy Implications of Results

The main factors that influence long-run economic growth in Nigeria were determined using a neoclassical growth model based on data from 1981 to 2010. Long run economic growth was significantly and positively influenced by foreign aid and labour force. Foreign aid influences economic growth in cubic format, that is, increasing foreign aid increasing economic growth until a point is reached beyond which growth would eventually fall. Total exports have an insignificant negative relationship with economic growth. Short-run economic growth was mainly influenced by labour force. The error correction term in the short-run ECM was statistically significant indicating that the independent variables Granger cause long run economic growth. With respect to policy implications of the results, there is need to devote more resources to labour force productivity in private and public sector particularly in technical and vocational education and other skills development centers. Furthermore, foreign aid from our development partners should be

judiciously used, particularly, for capital projects rather than for recurrent or immediate consumptions. Also, increasing foreign aid impacts positive on economic growth and after a while, it begins to result in negative growth. This may result from unnecessary bureaucracy in the approval of the use of funds, poor implementation of the use of funds among others.

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Appendix 1: Testing ODA and GDP with a Cubic function

Dependent Variable: LNGDP
Method: Least Squares
Sample: 1981 2010
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	58.50903	17.13365	3.414860	0.0023
LNODA	-19.56907	5.693993	-3.436792	0.0022
LNODA^2	2.223218	0.633554	3.509122	0.0018
LNODA^3	-0.083642	0.023438	-3.568636	0.0016
LNEXPT	0.053047	0.046645	1.137250	0.2667
LNLBR	1.205376	0.078731	15.30997	0.0000

R-squared	0.986190	Mean dependent var	10.62054
Adjusted R-squared	0.983313	S.D. dependent var	0.156528
S.E. of regression	0.020220	Akaike info criterion	-4.787420
Sum squared resid	0.009812	Schwarz criterion	-4.507180
Log likelihood	77.81130	Hannan-Quinn criter.	-4.697769
F-statistic	342.7726	Durbin-Watson stat	1.683291
Prob(F-statistic)	0.000000		