

Nigeria's External Borrowing and Economic Growth (1981-2017): An Auto-Regressive Distributed Lagged (ARDL) Model Approach

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Abstract

This study empirically examined external borrowing sources and economic growth in Nigeria employing time series data from the Nigerian Bureau of Statistics, Debt Management Office and Central Bank of Nigeria Statistical Bulletin for period of 1981 to 2017. Data were collected on the Nigerian external financing sources namely; Multilaterals (MFIs), London Club of Creditors (LCCs), Paris Club of Creditors (PCCs), Promissory Notes (PNs) and Others which served as the exogenous variables and the Real GDP as the endogenous variable. The data was modeled and analyzed using Autoregressive Distributive Lag (ARDL) Bound test and Cointegrating Long Run technique. Other diagnostic tests as; test of Normality, Autocorrelation test, Heteroskedasticity test and Breusch-Godfrey Serial Correlation LM Test were also carried out and they confirmed the reliability of the model. The study found significant short run and long run relationship between external borrowing and economic growth in Nigeria; In the short run, borrowing from the Paris Club and London Club of Creditors made insignificant negative contribution, Multilateral Financial Institutions and Others made significant negative contribution while, Promissory Note was insignificant positive contributor. On the long run relationship, only borrowing from the Multilateral Financial Institutions made a significant positive contribution, borrowing from Paris Club and London Club of Creditors, Promissory Notes and Others were insignificant negative contributors. The model disequilibrium had 26.90% annual speed of adjustment. The study therefore recommends that Nigeria's external borrowing should concentrate more on Multilateral Financial Institutions to achieve significant positive impact on economic growth. Further consideration may be placed on Promissory Note that made positive contribution on the short run. It also recommends prudent utilization of the borrowed funds.

Keywords: External debt, Economic growth, Nigeria, Relationship, Long Run, ARDL

Introduction

Background of the Study

The struggle for growth and economic sustainability remains an indispensable fundamental that characterizes economic pursuit by virtually all nations. It is financially believed that economic growth could be best achieved through proper fund utilization and adequate financing. Adequate finance often times are not fully generated locally and therefore prompts the quest for sourcing the fund externally.

In the same vein, it could be argued in social, political, economic and financial terms that, a territorially defined sovereign nation (economy) that houses the responsibility of providing for its citizens, is a living economic being that must pursue growth, in order to continue in existence. This is much expedient for developing nations such as Nigeria. Just as the common understanding holds that growth is a function of food intake, a country on the trajectory of

growth (developing nation) must feed itself to grow and be sustained, through fiscal and economic policies.

The fiscal policy here essentially provides sources of the needed funds that the country must take to achieve growth. Because all that is required to nurture a developing (even developed) nation cannot be sourced internally, the need to venture into external sources arises. This gained support in the idea of Anyanwu (1993) where government borrowing is considered germane when the conventional revenue sources (tax and non-tax) are inadequate in carrying out government expenditure. This act of venturing into places outside the domestic sources of fund is financially and economically tagged “external borrowing” or “foreign debt”. These stock of external borrowing form what is known as external debt. Olasode and Babatunde (2008) also affirmed this position by acknowledging that situation as this is uncommon as most of the developing countries are usually faced with scarcity of capital and low national savings, and thus, the need to acquire funds from external sources became the next option to finance their infrastructural needs.

In his writing, Afolabi (1991) also captioned the above scenario “off-shore finance” in which he noted that the servicing and repayment of foreign debts are equally done in foreign currency. Employing a considerable injunction, Pattilo, Ricci and Poirson (2001) argued that because mounting debts have been a recurring decimal with developing countries that will enable enhanced infrastructural facilities, most development economist are now calling for favourable debts. A favourable debt is the type that the capital acquired retains the potentials of maintaining high leftover after off-setting all associated costs attached to the loan. In this situation, the debts will be financing economic growth, increasing the infrastructural capacity and expanding output of the borrowing country.

Writing on the place of external borrowing on economic growth, Anyanwu (1993) observed that the place of this fund is considered necessary as it harnesses domestic investment and hence accelerates economic growth and development. In the same believe also, Adegbite, Ayadi and Ayadi (2008) observed that Nigeria playing along with other developing countries of the world relies substantially on external funding in financing its developmental projects. Notably, Nigeria is constrained by the current economic position to delve into external financing. The growing external debt represents a new direction in Nigeria’s debt profile with the federal government being swayed in its favour due to the high cost of finance in the country (Onwuamaeze, 2017).

Bearing in mind the critical importance of external borrowing, Onwuamaeze (2017) wrote that many had wished that Nigeria never relapsed into the era of borrowing spree after exiting the \$30 billion debt conundrum by the London and Paris Club of creditors in 2006, but for a developing economy it would amount to wishful thinking since the country has been experiencing a precipitous slide in the crude oil and tax revenues.

In the 2018 budget, the federal government of Nigeria in hopeful pursuit of the Economic Recovery Growth Plan (ERGP) 2018 – 2020, reduced deficit and borrowing but stated that 50% of the new borrowing of N1.699 trillion will be sourced externally. The budget provided that the medium-term strategy of the present government is to reduce the proportion of domestic debt from 79% to 60% while increasing external debt from 21% to 40% indicating about 47.5% increase in external borrowing (The Economy, November, 2017).

External debt in Nigeria increased to \$22071.91 million in the first quarter of 2018 from \$18913.44 million in the fourth quarter of 2017, it averaged \$8154.40 million from 2008 until

2018, reaching an all-time high of \$22071.91million in the first quarter of 2018 (<https://tradingeconomics.com/nigeria/external-debt>).

Accordingly, Udeh, Ugwu and Onwuka (2016) observing Albert, Brain and Palitha (2005) wrote “External debt may be used to stimulate the economy but whenever a nation accumulates substantial debt, a reasonable proportion of public expenditure and foreign exchange earnings will be absorbed by debt servicing and repayment with heavy opportunity costs”.

However, Mba, Umunna and Agu (2016) observed that despite the increased volume of external debt sourced by Nigeria over the years in response to desired economic growth, the effort has translated to low economic performance as evidenced in the high unemployment and poverty rate and low standard of living. Consistently, the government of Nigeria over the years has been engaging in external borrowing as a means of financing its deficit budget meant to pursue growth and the volume of these off-shore finance(s) in Nigeria continue to mount as much as the sources run into multiples.

Equally, Ijirshar, Joseph and Godon (2016) posited that the Nigeria external debt profile has been on the increase and has constituted a source of concern about the future in which case the Nigerian government recently embarked on borrowing externally for the main purpose of financing increased proportion of economic activities for economic growth. Olasode and Babatunde (2016) equally complained that the rise in loans from multinational sources posed a great threat to economic independence of Nigeria as incidence of economic imperialism are usually observed when a country relies on loans from these institutions. Specifically, Onwuamaeze (2017) pointed out that statistical evidence indicates that Nigeria is gradually rolling back into another debt trap a little over a decade after Paris and London Club of creditors wrote off its multi-billion-naira debt.

Debts either domestic or foreign are meant to be repaid as they fall due, both the principal and accrued interest or rescheduled but eventually must be set-off, as repudiation of such will attract bad economic pointers: high risk factor (prompting higher borrowing rate(s)), loss of business trust and convenience. Each of the sources has its peculiarities and conditionalities, such as borrowing from the London Club of Creditors which has a variable interest rate attached to London interbank offered rate (LIBOR).

With these different sources having different financial implications, it could be financially and economically affirmed as well that, each of their responses to economic growth will vary, with some being fair and other(s) deflecting economic growth. It continues therefore, to be a source of worry in determining which of these foreign borrowing outlets better guarantees economic growth in Nigeria.

Recent statistical evidence indicate that Nigeria’s level of economic growth has not been satisfactory as opposed to the current government’s claim of high growth rate. Unarguably, present data of Nigeria’s “misery indices” such as corruption, unemployment rate and national disaster (herdsmen farmers clashes, Boko haram foray) far much out-way her “economic performance indices” as standard of living, productivity level, export and balance of trade.

It therefore may not be a metaphoric statement for one to argue that, the nature of connectivity between external debt at their various sources and economic growth in Nigeria remains unclear. With this case in hand, the continued search for the nature of inter-play between Nigeria’s foreign debt (per source) and her economic growth is considered much germane.

This study therefore, objectively sought to know whether external borrowing had a significant relationship with economic growth in Nigeria within the period of study. Examine whether each of the external borrowing sources impact on the economic growth of Nigeria on the short run and long run respectively.

The span of this research was strictly defined to cover external borrowing and economic growth in Nigeria from the period of 1981 to 2017. The exogenous variables were restricted to the main sources of external borrowing in Nigeria regressed on the gross domestic product as a proxy for economic growth.

Review of Related Literature

Conceptual Review: External Borrowing (Foreign Debt)

Ojo and Sulaiman (2012) defined external debt as the phenomenon used to describe the financial obligation that ties one party (debtor country) to another (lender country). Ayegbite, Ayadi and Ayadi (2008) described external debt as a means of financing capital formation. This idea equally makes capital to execute projects that will translate to economically feasible growth.

External debt may be defined as debt owed to non-residents repayable in terms of foreign currency, food or service (World Bank, 2004)

The external debt is debt incurred by a nation that is payable in currencies other than that of the debtor country. External debt includes short-term debts, such as trade debts which mature between one and two years, or whose payment would be settled within a fiscal year in which the transaction is conducted (CBN, 2013).

Afolabi (1991) also captioned the above scenario as “off-shore finance” in which he defined it as credits that are obtained in foreign exchange and are also to be serviced and repaid in foreign currency. Such loans may be bilateral, being negotiated between two countries mainly on mutual bases. It may also be multilateral where another party is acting in-between the borrowing and the lending parties or where the loan is syndicated in which case one party has to act for the member of the financing syndicate.

Anyanwu (1993) in a clear expression pointed out that external debt has been given prioritized attention over the domestic borrowing in most on-going negotiations, refinancing re-scheduling and amortization of financing.

IMF (2014) offered, “Gross external debt, at any given time, is the outstanding amount of those actual current, and not contingent, liabilities that require payment(s) of principal and or interest by the debtor at some point in the future and that are owed to non-residents by residents of an economy”.

Having considered these explanations, this work defines external debt as - a fiscal policy effort that contracts funds from outside the regional boundary of a country by engaging either states or multilateral financial institutions on a stated period of time and terms. The terms here including repayment condition on principal and interest as well as currency option.

Economic Growth

Shearer (1961) stated that definition of economic growth, openly invites a very fundamental type of criticism. Economists and other social scientists jealously guard their right to define concepts as they see fit. Like lexicographers, they argue that the meanings of words must be essentially flexible, changing and developing with usage and with the dictates of the problem being studied. Thus, it presupposes agreement on a “uniquely correct” definition of economic growth. If several inconsistent or overlapping definitions are regarded as equally admissible this must signify the existence of several different (perhaps related) phenomena, each deserving separate (or joint) study, and each, perhaps, an appropriate subject for theory. In the interests of clarity, however, each should be distinguished by a different label.

Haller (2012) perceived economic growth as the process of increasing the sizes of national economies, the macro-economic indications, especially the GDP per capita, in an ascendant

but not necessarily linear direction, with positive effects on the economic-social sector, while development shows us how growth impacts on the society by increasing the standard of living. This is equally an argument that justifies GDP as a good proxy for economic growth.

Balcerowicz (2001) avowed, “Economic growth is a process of quantitative, qualitative and structural changes, with a positive impact on economy and on the population’s standard of life, whose tendency follows a continuously ascendant trajectory”.

Based on the foregoing, this study defines economic growth as- an upward shift from a given economic position of a country made manifest in the economic performance indices as; exchange rate, balance of payment, reduced unemployment and inflation rates, increase in per capita income, productivity level and prominently in standard of living at present state of the country. The measurement of economic growth involves the measurement of changes in aggregate economic welfare (Shearer, 1961).

Determinants of Economic Growth

Boldeanu and Constantinescu (2015) defined determinants of economic growth as interrelated factors that influence the growth rate of an economy. They went further to establish that there are six known factors that are classified as such out of which four were labelled direct factors. However, they submitted that there is no consensus on the key determinants of growth.

Human Resource and Its Quality: Considering the human resource as all important factor in estimating a country’s economic growth, it corroborates areas of available labour force and the quality as per education, training, skills and inventive and innovative abilities. Also considered here is the quality and quantity of manpower in which case it is established that there is high supply of unskilled labour in the less developed countries. Dwivedi (2008) however remarked that while optimum combination of skilled and unskilled labour force promote economic growth, excess supply of labour force of any kind retards economic growth. A similar idea was buttressed in Ajide (2014) in reviewing the work of Pourshahabi et al (2011) acknowledged human capital as a significant contributor in economic growth.

Natural Resources: This encompasses both landed and underground (in common Nigerian parlance, “on-shore” “off-shore” dichotomy) resources. The countries with rich natural resource endowment have larger growth potentials than those lacking natural resources. It could therefore be argued here that countries with greater deposit of natural resource can always conveniently and cheaply obtain external borrowing that will eventually translate to significant economic upswing. Countries like Kuwait, UAE, Saudi Arabia etc are known to have benefited in this regard. Boldeanu and Constantinescu (2015) opined that natural resources directly contribute to the industrialization of a country by essential components for production.

Capital Formation: Writing under this, Dwivedi (2008) stated that capital here include all man-made factors of production including; plant and building, machinery, means of transportation and communication, social overheads etc. the acquisition of these factors is referred to as capital formation. This implies saving men and material resources for investment and productive functions. This theory asserts a direct relationship between capital formation and economic growth. The common argument here is, can any level of capital formation make a country self-sufficient in driving to the optimum level of economic growth without engaging in external borrowing? Financially believing, no country has been found with this record.

Technological Development: Technology in this contest is referred to as the scientific approach adopted in improving production function. Research and innovation in recent time are the common catalysts that drive the world of technology which improves production.

Udejaja and Obi (2015) inferred that the place of technological progress as a key driver of long-run economic growth has recently been brought under examination through studies, which accept constant and increasing returns to capital. Dwivedi (2008) wrote that evidence available in economic history show that countries which achieve technological development at a rapid pace have made big strides in economic performances.

Political and Social Factors: Recent studies hold that social and political systems, institutions, social values, etc also play invaluable role in the part of economic growth. The better these values a country experiences, the more it clings to higher economic prospect and growth. Elucidating on this, (Boldeanu and Constantinescu, 2015; Lensink et al, 1999) observed that Political factors like political regimes, political instability, civil freedom, the perception of politics play also an important role in fostering economic growth and political instability which has a negative effect on companies and their willingness to invest, can create violence and anarchy in the society and in the end can have serious consequences on economic growth

Theoretical Review

Dual Gap Theory

The common understanding of dual gap theory holds that development spills from investment activities and investment in turn depends on domestic savings which most times fall short of the amount required to finance development thereby creating a savings investment gap which brings about borrowing. In the light of this short fall, governments are constrained to adopt the strategy of seeking foreign assistance to augment the domestic effort. The amount sought for is usually equal to the sum that is saved. On a similar note, if the maximum import requirement necessary to realize the growth target is larger than the maximum possible level of export, then there is an export- import exchange gap (Lawal, Bibire, Adegbola and Johnson, 2016)

Dependency Theory

The proponents of this School of Thought as argued by Lawal, Bibire, Adegbola and Johnson, (2016) explained the underdevelopment and dependency of the third world countries as being internally inflicted rather than externally afflicted. To this school of thought, a way out of the problem is for third world countries to seek foreign assistance in terms of aid, loan, investment, etc, and allow uninterrupted operations of the Multinational Corporations (MNCs). This theory therefore advocates that it takes soliciting external intervention to cushion the internal shortfall in actualizing expected growth.

The neo-classical growth model (Solow Growth Model and External Debt)

The Solow growth model is built on a closed economy framework as developed by Swan and Solow in the 1960s, which makes use of labour and capital as its means of production. Under this scenario the implication of external debt on growth can be seen through its effect on the domestic saving which in turn is used as investment in a closed model. The general effect of external debt on the Solow growth model can be analyzed by looking at the individual effects of the debt overhang and debt crowding theories on the Solow growth model (Lawal, Bibire, Adegbola and Johnson, 2016).

Empirical Review

Discussions around external borrowing and economic growth has been on the centre stage in the Nigerian economic space over the years and has attracted the interest of financial experts in carrying out empirical investigation with the aim of finding out the nature of relationship that exists amongst them.

Adepoju, Salau and Obayelu (2007) examined the time series data for Nigeria for the period of 1962 to 2006. Exploring time to time behavior of donor agencies as an outcome of various bilateral and multilateral arrangements, they concluded that accumulation of external debt hampered economic growth in Nigeria.

While trying to make inference on the impact of the debt relief which was granted to Nigeria in 2006, Adegbite, Ayadi and Ayadi (2008) conducted a research on the impact of external debt on economic development in Nigeria which made use of ordinary least square and generalized least square, the study found that external debt had negative impact on Nigeria's economic growth.

Adesola (2009) investigated the nature of relationship that connects foreign debt servicing and economic growth in Nigeria between the period of 1981 to 2004 employing the use of ordinary least square multiple regression approach in which his result showed that payment of debt to institutions as London and Paris club of creditors, Promissory Notes holders and other creditors had significant impact on the economic growth (gross domestic product) and Gross Fixed Capital Formation, while debt payment to Paris Club and debt payments on promissory notes are positively connected to GDP and GFCF, debt payments to London creditors and other creditors indicated negative connection to GDP and GFCF within the period of study.

Employing the Autoregressive Distributive Lag (ARDL) technique, Akram (2010) examined the impact of public (domestic and foreign) debt on economic growth and investment in Pakistan with the result of the estimated model revealing that both domestic and external debts had negative relationship with per capita GDP and investment

Ogege and Ekpudu (2010) examined the impact of debt burden on the Nigerian economy using time series data from 1970-2007. Ordinary least square (OLS) was used to test the relationship between debt burden and growth of the Nigeria economy. The result showed a negative relationship between debt stocks of internal and external; and gross domestic product, meaning that an increase in debt stock will lead to a reduction on the growth rate of Nigerian economy. Ezeabasili, Isu and Mojekwu (2011) studied the relationship between Nigeria's external debt and economic growth from 1975-2006, with an error correction approach. Error correction estimate revealed that external debt has negative relationship with economic growth in Nigeria. Sulaiman and Azeez (2012) investigated the impact of external debt on economic growth in Nigeria using GDP as the dependent variable while ratio of external debt to export, inflation and exchange rate were used as the independent variables. Annual time series data covering the period of 1970 to 2010 were used, which were analyzed using the ordinary least square technique, ADF unit root test, Johansen co-integration test and Error correction model (ECM). Results from the study showed that external debt has a positive impact on the Nigerian economy in the long run. They therefore recommended that external borrowing should be obtained for economic growth reasons rather than social and political motives.

Mba, Umunna and Agu (2016) conducted a study on impact of external debt on economic growth in Nigeria for the period of 1970 to 2013 using Autoregressive Distributive Lag Bound Testing Approach (ARDL) and Granger Causality Test, and found a long run relationship among the variables, and external debt impacts negatively significantly on the output with unidirectional causality between external debt and economic growth.

Udeh, Ugwu and Onwuka (2016) researched on the impact of external debt on economic growth in Nigeria covering period of 1980 to 2013 employing econometric tools as Ordinary Least Square (OLS), Augmented Dickey Fuller (ADF) and Error Correction Model (ECM). They found that external debt had a positive relationship with Gross Domestic Product (GDP) at the short run but exhibited a negative relationship at the long run.

Olasode and Babatunde (2016) carried out a research to explain the casual relationship between accumulated funds/ loans from external sources (external debts) and economic growth with focus on Nigerian economy. The work made use of the Autoregressive Distributed Lag (ARDL) model to capture the effect of external debts on viability and growth of Nigerian economy from 1984-2012. The econometric tests of Stationarity (Unit Root Test) and Co-integration Tests conform that all the variables exhibit Stationarity at first difference and the existence of long-run relationship between the variables was also confirmed by the Johansen Cointegration test carried out. The result from the ordinary least squares method used confirms the existence of a dual behaviour as the lag 1 of external debts was positive while external debts of present year posed a negative effect on the performance of the economy.

In line with these divergent empirical findings, Udeh, Ugwu and Onwuka (2016) inferred that “the effect of external debt on investment and economic growth of a country has remained questionable for policy makers and academics alike. There has not been consensus on the impact of external debt on economic growth”.

Egungwu (2018) considered the impact of increase in external debt stock and its servicing on human capital development in Nigeria within the period, 1986 to 2015 using Ordinary Least Square (OLS) regression technique. The study found that both external debt stock and external debt servicing had significant negative effect on human capital development; external debt stock borrowed from Paris Club and Multilateral Creditors had insignificant negative effect; those borrowed from London Club had insignificant positive effect while those borrowed from Bilateral creditors had significant positive effect. On debt servicing, all the creditors showed insignificant positive effect except London club that had significant positive effect.

Gap in the Literature:

There is a common finding here that among the literatures empirically reviewed in line with so many not reviewed, there exists a discordance on the nature of the relationship that exists between external borrowing and economic growth in Nigeria. As also observed by Egungwu (2018), “Extant studies have revealed conflicting results on the interaction between economic development dynamics and external debt fundamentals”. Fewer studies like Adesola (2009) and Egungwu (2018) examined this impact using the sources of external borrowing. Adesola (2009) carried out this study using Ordinary Least Square (OLS) method for the period of 1981 to 2004, while Egungwu using the same tool covered 1986 to 2015. This study shall therefore join in this debate in investigating the relationship between external borrowing and economic growth in Nigeria adopting the same variables in Adesola (2009) but for a wider period (1981 to 2017) using a different statistical technique being Auto-regressive Distributed Lag (ARDL).

Methodology

Research Design: The research adopted the ex-post facto research design in which case it made use of existing data on the categories of external debt as well as the real gross domestic product for the period of 1981 to 2017.

Type and Sources of Data Review: Conspicuously, the data used in this study were secondary type meticulously sieved from the statistical bulletin of the Central Bank of Nigeria (CBN), 2017 edition and the Central Bank of Nigeria website (www.cenbak.org). Debt data was gotten from debt Management office (DMO) publication through their website (www.dmo.org). These data were gathered for the period of thirty-seven years, covering 1981 to 2017.

Model Specification: The model of the research was attuned to the neo-classical linear growth model where production as a growth indicator relied on capital and labour. Capital in financial parlance is, fund (equity or debt) employed in financing functions. The model here will adopt part of capital (debt) as a determinant of growth (gross domestic product, GDP). Locally,

Adesola (2009) was serially modeled using gross domestic product to represent Nigeria's economic growth as a function of external borrowing outlets. In this study therefore, the gross domestic variable was used as endogenous variable measuring economic growth, while the aggregate amount annually sourced from the various outlets of external debt by Nigeria for the 37 years period covering 1981 to 2017 namely: Borrowing from Multilaterals Financial Institutions (BMFIs), Borrowing from London Club of Creditors (BLCCs), Borrowing from Paris Club of Creditors (BPCCs), Borrowing through Promissory Notes (BPNs), and Borrowing through Others (1981-2017), were used to serve as exogenous variables representing external debt.

Endogenous Variable: This study adopts gross domestic product (GDP) as a proxy for economic growth which serves as the dependent variable. This idea gained support in the works of (Malizia, (n.d); Haller, 2012) in which they emphasized that, as the practice at the national level, economic growth may be measured by examining various outcomes of the production system with GDP as a prime macro-economic indicator being an appropriate growth measure.

Exogenous Variables: The total external borrowing of Nigeria (1981-2017) was decomposed into the different sources to serve as the exogenous variables. The idea of using these sources as the explanatory variables was to catch the specific effect of each of them on economic growth in Nigeria. In concordance with this practice, Adesola (2009) posited, "the effect was strongest when private debt rather than total debt was used as a measure of the debt overhang". Egungwu (2018) equally aligned with this line of study.

The researchers following the neo-classical theory of economic growth therefore modeled this study in line with the model given by Pesaran & Shin, 1999; Pesaran, Shin, & Smith, 2001, thus;

$$\text{Economic growth} = f(\text{Capital}) \dots\dots\dots (1)$$

Where capital employed was "Debt" and the debt used here were the externally sourced categories. Therefore,

$$\text{GDP} = f(\text{BMFIs, BLCCs, BPCCs, BPNs, BOthers}) \dots\dots\dots (2)$$

Developing the linear function of the above, it translated to;

$$\text{GDP} = \alpha_0 + \alpha_1 \text{BMFIs} + \alpha_2 \text{BLCCs} + \alpha_3 \text{BPCCs} + \alpha_4 \text{BPNs} + \alpha_5 \text{BOthers} + \varepsilon_t \dots (3)$$

Where,

BMFIs = Multilateral Financial Institutions

BLCCs = Borrowing from London Club of Creditors

BPCCs = Borrowing from Paris Club of Creditors

BPNs = Borrowing through Promissory Notes and

BOthers = Borrowing from aggregate external loans not included in the above

ε = Random disturbance term

$\alpha_0 - \alpha_5$ = Parameters of the model to be estimated

It will be pertinent to inform readers that while there are numerous sources of external borrowing in Nigeria, such as the recently introduced Diaspora Bond (2017), our research is restricted to those accommodated in the model that can make statistical contributions.

Apriori Expectation

It was expected from economic point of view that external borrowing will drive economic growth. Therefore, significant positive relationship between economic growth and each of the external loan categories was hoped for (i.e $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5 > 0$)

Method of data analyses

The Auto-regressive Distributed Lag (ARDL) was used to analyze the data. First was the test for presence of unit root or stationarity of the data. The essence of this test was in order to

determine the nature or order of integration of the data since the study was dealing with time series data. The Augmented Dickey Fuller was used in the test of unit root where the ADF Statistics was compared with the critical value at 5% level of significance. The next in sequence was test for long run relationship amongst the variables using the ARDL Bound test and long run estimate. The results of these two pre-estimation (diagnostic) tests gave the condition for the model estimation using the ARDL technique. How well the model fits the parameters was determined by the Adjusted R-square. The individual and joint significance of the model parameters were also determined. The test for Autocorrelation ends the analyses.

Autoregressive Distributed Lag (ARDL) Bound Test:

The ARDL Bound testing approach was developed by Pesaran and Shin (1995, 1999) and in the further work of Pesaran & Pesaran (2001) to estimate the long run equilibrium and to establish the direction of causation between variables. The bounds test is mainly based on the joint F-statistic;

H0: $b_{i1} = b_{i2} = b_{i3} \dots b_{in} = 0$

H1: $b_{i1} \neq b_{i2} \neq b_{i3} \dots \neq 0$ for $i = 1, 2, 3 \dots n$.

This test according to Salihu (2016) has to be performed since the time series is found to be in mixed order of integration. The bound test here tests for long run relationship amongst the variables. The research applied the autoregressive distributed lag (ARDL) cointegration technique because the variables are $I(0)$ and $I(1)$ integrated and as a general vector autoregressive (VAR) model of order p , in Y_t , where Y_t is a column vector composed of the explanatory variables: $Y_t = (X_{1t} X_{2t} X_{3t} X_{4t} X_{5t})$.

Two sets of critical values for a given significance level can be determined (Pesaran et al., 2001). The first level is calculated on the assumption that all variables included in the ARDL model are integrated of order zero $I(0)$, while the second one is calculated on the assumption that the variables are integrated of order one $I(1)$. Pesaran, Shin and Smith 1999 as buttressed in Salihu (2016) gave the decision criterion as; If the calculated F-statistic is greater than the Critical Value Bounds for the upper bound $I(1)$, then we can conclude that there is cointegration hence there exists long-run relationship, If the calculated F-statistic falls below the theoretical critical value for the lower bound $I(0)$ bound, then we conclude that there is no cointegration, hence, no long run relationship and if the F-statistic falls between the lower bound $I(0)$ and the upper bound $I(1)$, the test is considered inconclusive. Dave (2013) however put it that “as in conventional cointegration testing, we're testing for the absence of a long-run equilibrium relationship between the variables”

Results and Findings

The result here shall concentrate on resolving and attending to the hypotheses of this study which mainly state;

Ho1: there is no long run relationship between external borrowing and economic growth in Nigeria

Ho2: there is no short run relationship among the sources of external debt and economic growth in Nigeria.

Table 1: ADF Test of Unit Root

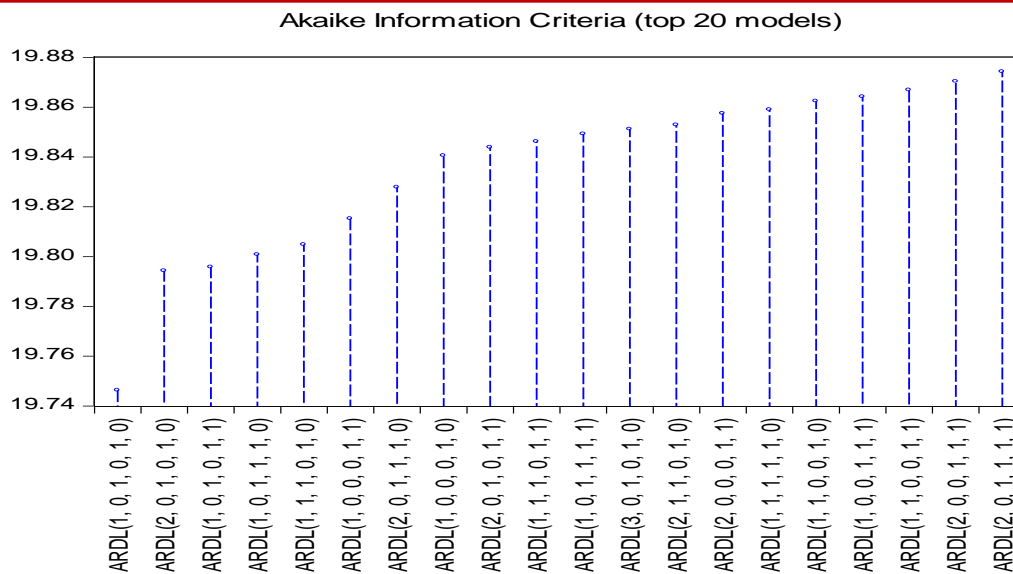
variables	ADF stistics 1(0)	ADF stistics 1(1)	ADF critical at 5%	Order of integration
RGDP	3.617652	2.680691	2.945842	1(0)
BMFI	-1.085979	-4.058109	2.945842	1(1)
BLCC	-1.925989	-3.912826	-3.004861	1(1)
BPCC	-2.276445	-3.768109	-2.998064	1(1)
BPN	-3.589831	-3.103582	-2.998064	1(0)
Bothers	-1.262671	-5.729863	-2.951125	1(1)

Source: researcher's computation from ADF E-view 9 output

The table presents the result of unit root test of stationarity using the Augmented Dickey Fuller as computed from the E-view 9 output (see appendix). Conducting the stationarity test at level and at first difference, the result shows that only external borrowing sourced through Promissory Note (PN) was seen to be integrated at level being Order 1(0) at 5% level of significance. While the other exogenous variables; Multilateral Financial Institutions (MFIs), London Club of Creditors (LCCs), Paris Club of Creditors (PCCs), and Others became stationary only after first difference, implying that they are integrated of order 1(1). The endogenous term, Real Gross Domestic Product (RGDP) was found to be stationary at level confirming its integration at order 1(0). The Pvalue column shows the level of significance of the variables at their respective order of cointegration. This confirms that our regression is not spurious since there is no I(2) variable. With this condition of mixed series of order 1(0) and 1(1) found among the variables, the need to employ the ARDL bound testing research technique therefore applies. Following the development, the study proceeded to the test of long-run relationship using the bound test.

Model Selection and Lag Length Structure

The analysis of the model selection and lag period followed from Figure 1 below. The model of the study was produced through the lag length selection criteria. The Akaike Information Criterion (AIC) giving the minimized value in the VAR model was chosen. Out of the first 20 models considered, the criterion automatically selected the ARDL order of (1, 0, 1, 0, 1, 0) model maximum lags for the variables; meaning that the maximum lag period of the endogenous variable-GDP was a year and for the exogenous variables it was zero year lag period for Paris Club, Promissory Notes had one year lag, others zero year lag period, Multilateral Financial Institutions a year maximum lag period and zero-year maximum lag period for London Club of Creditors.



Source: Eviews 9 output.

Figure 1: Model Selection and Lag Length Structure

Table 2: ARDL Bound Test Output

ARDL Bounds Test

Date: 10/11/18 Time: 01:45

Sample: 1982 2017

Included observations: 36

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	4.767994	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: Eviews 9 output

Testing the first hypothesis of this study from table 2 above, the bound cointegration test shows that H_0 is quickly rejected as against H_1 . F-statistic value of 4.767994 being greater than both the lower and upper bounds of all the critical value Bounds at 1%, 2.5%, 5% and 10% respectively, thereby pointing to a situation of consistent long run relationship between Nigeria’s external borrowing and her economic growth.

Long Run and short Run Estimation of the ARDL Model (cointegration and long run form)

Having determined the cointegration of the model through the bound test result, the study progressed to the next step in the analysis. The model is determined and the lag selection criterion is satisfied using the Akaike Info Criterion (AIC). The long run model is given as:

$$GDP_{t-1} = \alpha_0 + \alpha_1 MFIS_{t-1} + \alpha_2 LCCS_{t-1} + \alpha_3 PCCS_{t-1} + \alpha_4 PN_{t-1} + \alpha_5 Other_{t-1} + ECM(-1)$$

Where ECM(-1) is the one period lag of the model residual. The parameters α_0 to α_5 are the long run coefficients of the model while the coefficient of ECM(-1) is the long run speed of adjustment of the model. The sign of the coefficient of ECM(-1) should be negative and significant as well for holding the long run equilibrium (Dhungal, 2014). According to Salihu (2016) the upper part of the result output represents the short run estimates while the lower part represents the long run estimates.

Table 3: ARDL Model Cointegration and Long Run Form

Selected Model: ARDL(1, 0, 1, 0, 1, 0)

Date: 10/11/18 Time: 01:46

Sample: 1981 2017

Included observations: 36

CointEq(-1)	-0.269011	0.130982	-2.053792	0.0498
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$$\text{Cointeq} = \text{RGDP} - (-3.9230*\text{BPCCS} -105.9973*\text{BPNS} -103.4035 * \text{BOTHERS} + 161.0500*\text{BMFIS} -84.6994*\text{BLCCS} + 1831.7787)$$

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BPCCS	-3.922984	6.652616	-0.589691	0.5603
BPNS	-105.997300	147.894834	-0.716707	0.4797
BOTHERS	-103.403478	57.966340	-1.783854	0.0857
BMFIS	161.049976	46.272364	3.480479	0.0017
BLCCS	-84.699429	134.390260	-0.630250	0.5338
C	1831.778744	4916.112303	0.372607	0.7123

Source: author's computation from evIEWS 9 output

Confirming the long run relationship, the analysis further considered the cointegrating and long run form in the table above. The long run relationship was consolidated by this test as the value of the error correction term showed significantly negative at 5% level. On the parameter estimate, only borrowing from the Multilateral Financial Institutions made a significant positive contribution in line with the apriori expectation while the other sources as borrowing from Paris Club and London Club of Creditors, Promissory Notes and Others made

insignificant negative contribution to Nigeria's economic growth, making deviation from the expectation. The adjustment of this disequilibrium shall be verified in the ECM analyses.

Table 4: ARDL Model Cointegration and Short Run Form

Selected Model: ARDL(1, 0, 1, 0, 1, 0)

Date: 10/11/18 Time: 01:46

Sample: 1981 2017

Included observations: 36

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BPCCS)	-1.055324	1.754964	-0.601337	0.5526
D(BPNS)	51.876807	48.827136	1.062459	0.2974
-	-	-	-	-
D(BOTHERS)	27.816634	8.274072	-3.361904	0.0023
D(BMFIS)	-2.447774	0.560746	-4.365213	0.0002
-	-	-	-	-
D(BLCCS)	22.785046	35.804501	-0.636374	0.5299
CointEq(-1)	-0.269011	0.130982	-2.053792	0.0498

Source: evIEWS 9 output

The analysis from table 4 above attends to the second hypothesis of the study which tests for short run relationship among the variables of the model. The probability value of the error correction model of (0.0498) being significant at 5% indicates the rejection of the null hypothesis and the acceptance of the alternative which states that there is a short run relationship among the variables. On the individual parameters, borrowing from Paris Club and London Club of Creditors made insignificant negative contribution, Multilateral Financial Institutions and others however made significant negative contribution while, borrowing through Promissory Note was insignificant positive contributor in the model. This equilibrium disturbance shall be clarified in the ECM debate.

Table 5: Error Correction Model

CointEq(-1)	-0.269011	0.130982	-2.053792	0.0498
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Source: EvIEWS 9 output

From the table above, it indicates that the model has speed of adjustment to equilibrium with the value being significant at 5%. The value of (-0.269011) implies that the model has speed of adjustment of 26.90% annually, and most likely convergent. This speed though low is considered normal and indicates a sustainable equilibrium as it lies between 0 and -1 (Norman 2013). Therefore, the shortfall witnessed in the long run relationship corrects itself 0.269011 times in the following period.

Diagnostic Verification

From the ARDL model in appendix 2, the result showed the goodness of fit of the specification, being R-squared and R-adjusted were 0.989292 and 0.986119 respectively. The global F-

statistics of (311.8021) was statistically significant at (0.00000). The efficiency of the model was further verified by other diagnostic tests in appendix 2;

Test of Serial Correlation:

Table 6: Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.345610	Prob. F(3,10)	0.7931
Obs*R-squared	3.194050	Prob. Chi-Square(3)	0.3627

Source: E-view 09 output (see appendix)

In line with the rules, a common observation from the table above shows that the P-values of 0.7931 and 0.3627 are statistically insignificant. With the P-value being insignificant, the model is said to be free from serial correlation'

Test of Heteroskedasticity

Table 7: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.250244	Prob. F(20,13)	0.9972
Obs*R-squared	9.451102	Prob. Chi-Square(20)	0.9771
Scaled explained SS	1.550254	Prob. Chi-Square(20)	1.0000

Source: E-view 09 output (see appendix)

The Heteroskedasticity test was further conducted to justify the reliability of the model. Equally, the table presented above shows all our P-values to be greater than 5% thereby making it insignificant. With the F-statistic and scaled explained SS versions of the test statistic giving the same conclusion that reveals the absence of heteroscedasticity problem, evidenced by the p-values which are significantly greater than 0.05.

Test of Normality

This is another diagnostic test conducted to ensure that the model complied with the pre-condition of normality or normal distribution of data. Observing from the normality diagram (see appendix) as well as the Skewness that has value of 0.467167 being close to zero and the Kurtosis 3.243994 being close to 3, the normality assumption therefore holds.

Correlogram Q-Statistic

The correlogram Q-Statistic was also carried out to examine whether there was existence of any sense of partial or full auto correlation in the model. This was also to consolidate on the value of the Durbin Watson statistic produced in the ARDL estimate. The correlogram Q-Statistic table (see appendix) indicate that all Pvalues were greater than 5% hence, the conclusion that the model was free from auto correlation problem.

Conclusion and Recommendations

This study empirically examined the relationship between external borrowing and economic growth in Nigeria on the long run and short run bases. The Autoregressive Distributive Lag

(ARDL) Model was used in analyzing the time series data of 37 years covering 1981 to 2017. The results of the Bound Test and cointegrating and long run form indicate that external borrowing and economic growth shared both long run and short run relationship. On the parameter estimate based on the short run impact, borrowing from Paris Club and London Club of Creditors made insignificant negative contribution, Multilateral Financial Institutions and Others however made significant negative contribution while, borrowing through Promissory Note was insignificant positive contributor in the model. On the long run relationship, only borrowing from the Multilateral Financial Institutions made a significant positive contribution while the other sources such as borrowing from Paris Club and London Club of Creditors, Promissory Notes and Others made insignificant negative contribution. These findings however did not agree with that of Adesola (2009) which found significant relationship between sources of external borrowing and economic growth with borrowing from Paris club of creditors and Promissory Note having positive relationship while borrowing from London club of creditors and Others having negative relationship.

The disturbance in the functional relationship was found to have 26.90% annual speed of adjustment to equilibrium.

The study therefore recommends that;

- 1) Nigeria's external borrowing should concentrate more on Multilateral Financial Institutions to achieve significant positive impact on economic growth in the long run which is part of the central objective of foreign borrowing.
- 2) Further consideration may be placed on Promissory Note that made positive contribution in the short run.
- 3) Again, since the implication of economic growth are made feasible in the long run and having established a long run relationship between Nigerian's external borrowing and her economic growth, the Nigerian government through the public administrators should develop strong-will in ensuring objective and good utilization of borrowed funds.

References

- Adegbite E. O, Ayadi. F. S. and Ayadi O.F. (2008) The Impact of Nigeria's External Debt on Economic Development. *International journal of emerging market*, 3(3):285-301 July 2008. https://www.researchgate.net/publication/235679833_The_Impact_of_Nigeria_27s_External_Debt_on_Economic_Development
- Adepoju, A. A, Salau, A. S, Obayelu, A. E. (2007). The effects of external debt management on sustainable economic growth and development: *Lessons from Nigeria. Econ papers.*
- Adesola, W.A. (2009). "Debt servicing and Economic Growth in Nigeria: An Empirical Investigation" *Global Journal of Social Sciences* 8
- Afolabi, A. (1991) *Monetary Economics*. Ibadan, Intec Printers LTD.
- Ajide, K. B. (2014) Determinants of economic growth in Nigeria. *CBN Journal of Applied Statistics Vol. 5 No.2 (December, 2014)*
<https://www.cbn.gov.ng/out/2015/sd/determinants%20of%20economic%20growth%20in%20nigeria.pdf>
- Akram, W. (2010). "Impact of Public Debt on the Economic Growth of Pakistan." *Centre for Poverty Reduction and Social Policy Development, Islamabad.*
- Anyanwu, J. C. (1993) *Monetary Economics: Theory, Policy and Institutions*. Onitsha, Hybrid Publishers, Ltd.
- Amassoma, D. (2011). "External Debt, Internal Debt and Economic Growth Bound in Nigeria using a Causality Approach" *Current Research Journal of Social Sciences* 4
- CBN, (2013) understanding monetary policy series No 36

- <https://www.cbn.gov.ng/out/2016/mpd/understanding%20monetary%20policy%20series%20no%2036.pdf> <https://tradingeconomics.com/nigeria/external-debt>
- Aminu U. S (2017) Nigeria's debt management solutions. *DailyTrust* November 20, 2017
<https://www.dailytrust.com.ng/nigeria-s-debt-management-solutions.html>
- Dave G. (2013) *Econometrics Beat: A resource for econometrics students & practitioners*
Retrieved on 8th October, 2018 from
<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=2ahUKEwjKqsyI7eAhXIIMAKHaxSAHkQFjADegQIAxAB&url=https%3A%2F%2Fdavegiles.blogspot.com%2F2013%2F06%2Fardl-models-part-ii-bounds-tests.html&usg=AOvVaw3LvKgr3JkOE4wl6qtuwBRI>
- Boldeanu, F. T and Constantinescu, L (2015) The main determinants affecting economic growth. *Bulletin of the Transilvania University of Braşov Series V: Economic Sciences* • Vol. 8 (57) No. 2 - 2015.
http://webbut.unitbv.ro/BU2015/Series%20V/BILETIN%20I/38_Boldeanu%20Constantinescu.pdf
- Dwivedi, D. N. (1980) *Managerial Economics (7th, edition)*. India, Vikas Publishing House, PVT Ltd.
- Egungwu I C (2018) Impact of External Debt on Human Capital Development in Nigeria. *International Journal of Advance Research and Innovation, Volume 6 Issue 1 (2018)* 47-57. <http://ijari.org/CurrentIssue/2018Volume1/IJARI-MG-18-03-101.pdf>
- Haller, P. A. (2012). *Concepts of Economic Growth and Development. Challenges of Crisis and of Knowledge*. Romanian Academy Branch of Iasi, ROMANIA.
<http://www.ugb.ro/etc/etc2012no1/09fa.pdf>
- Ijirshar, V. U, Joseph F. and Godo M. (2016), The Relationship between External Debt and Economic Growth in Nigeria. *Int. Journal Econ. Mgt. Sci.* 6: 390.
- IMF (2014) *External Debt Statistics; guide for compilers and users*. Sourced on 2nd september, 2018 from
https://unstats.un.org/unsd/nationalaccount/docs/External_debt_statistics_guide.pdf.
- Lawal I. A, Bibire M. B, Adegbola O. O, Johnson O. A (2016) External Debt and Economic Growth: Evidence from Nigeria. *Acta Universitatis Danubius. Œconomica*, 12, (6) (2016)
<http://journals.univ-danubius.ro/index.php/oeconomica/article/view/3655/3744>
- Nalizia, E. E. (nd) *Economic Growth and Economic Development: Concepts and Measures* from
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.918.2251&rep=rep1&type=pdf>
- Norman A (2015) ARDL with Cointegrating Bounds using EViews 9. Retrieved on 8th October, 2018 from
<https://webcache.googleusercontent.com/search?q=cache:B3UnYF9NrnQJ:https://nmanarshed.wordpress.com/2015/05/02/ardl-with-cointegrating-bounds-using-eviews-9/+&cd=2&hl=en&ct=clnk&gl=ng>
- Nwankwo, A. E. (2016) Understanding Nigeria's Debt Management Strategy. *Thisday* December 5, 2016.
<https://www.thisdaylive.com/index.php/2016/12/05/understanding-nigerias-debt-management-strategy/>
- Mba, U. and Agu (2016). Impact of External Debt on Economic Growth in Nigeria: An ARDL Bound Testing Approach. (*ME16Dubai October Conference*) ISBN: 978-1-943579-27-3 Dubai-UAE. 14-16 October, 2016. PaperID: DF601
http://globalbizresearch.org/Dubai_Conference_2016_Oct/docs/doc/1.%20Global%20Business,%20Economics%20&%20Sustainability/DF601.pdf

- Ogege, S. & Ekpudu, J. E. (2010), The Effect of Debt Burden on the Nigerian Economy. *Journal of Research in National Development* 8(2). December.
- Ojo, M. O, Sulaiman, L. A. (2012). [External Debt, Economic Growth and Investment in Nigeria. *European Journal of Business and Management*11: 67-75](#)
- Olasode, O. S, Babatunde, T. S (2016), External Debts and Economic Growth in Nigeria: An Empirical Study Using Autoregressive Distributed Lag Model. *Bus Eco J* 7:239.
- Udeh S. N, Ugwu J. I. and Onwuka I. O. (2016), External Debt and Economic Growth: The Nigeria Experience. *European Journal of Accounting Auditing and Finance Research* 4, (2), 33-48, February 2016
- Onwuamaeze, D. (2017) Nigeria's rising debt profile, *The Economy (December, 2017)* 1 (71)
- Pattilo, C. Ricci L, Poirson, H. (2001). Non-linear Impact of External Debt Growth. *Journal of Policy Modeling* 31: 272-288
- Rasheed, A. O and Olusola, O. O (2016) Management of Nigeria external debt (Mned) and economic growth. *JORIND* 14(1) June, 2016. ISSN 1596-8303.
<http://www.transcampus.org/JORINDV14JUN2016/11.pdf>
- Salihu, A. (2016) Analyses of long run and short run models *Econometrics Workshop, Nigeria, Centre for Econometric & Allied Research, University of Ibadan, DOI:10.13140/RG.2.2.35204.53121* Retrieved on 8th October, 2018 from
https://www.researchgate.net/publication/315785982_Analyses_of_long_run_and_short_run_models
- Shearer R. A. (1961). The concept of economic growth. Sourced on 2nd September, 2018.from,
<https://deepblue.lib.umich.edu/bitstream/handle/2027.42/75479/j.14676435.1961.tb00368.x.pdf?sequence=1&isAllowed=y>
- The Economy (November, 2017) 1 (70)
- Udejaja, A. E and Obi, K. O (2015) Determinants of Economic Growth in Nigeria: Evidence From Error Correction Model Approach. *Developing Country Studies*. ISSN 2224-607X (Paper) ISSN 2225-0565 (Online) Vol.5, No.9, 201.
https://www.researchgate.net/publication/307571134Determinants_of_Economic_Growth_in_Nigeria_Evidence_from_Error_Correction_Model_Approach
- World Bank (2017) GDP by Country | Statistics from the World Bank, 1960-2017
<http://nigeria.opendataforafrica.org/mhrzolg/gdp-by-country-statistics-from-the-world-bank-1960-2017?country=Nigeria>
- World Bank Publications (2004). World Development Indicators.

APPENDIX 1

Table 1: Nigeria's external borrowing outstanding (1981-2017)

Years	RGDP (N' Billion)	BMFIs (N' Billion)	BPCCs (N' Billion)	BLCCs (N' Billion)	BPNs (N' Billion)	Bothers (N' Billion)
1981	94.33	0.18	1.98	0	0	0.18
1982	101.01	0.53	5.47	1.98	0	0.83
1983	110.06	0.57	6	2.76	0.55	0.7
1984	116.27	1.27	6.36	5.44	1.16	0.58
1985	134.59	1.29	7.73	6.16	1.27	0.84
1986	134.6	4.67	21.73	8.44	4.15	2.46
1987	193.13	8.78	63.21	6.77	20.63	1.4
1988	263.29	9.99	75.45	14.99	25.74	7.79
1989	382.26	21.47	121.23	42.84	35.07	19.78
1990	472.65	34.61	154.55	53.43	40.95	15.08
1991	545.67	39.46	173.05	58.24	43.56	14.14
1992	875.34	89.27	324.73	41.89	64.14	24.23
1993	1089.68	81.46	400.38	45.32	69.67	36.32
1994	1399.7	97.06	404.21	45.37	70.07	32.11
1995	2907.36	97.04	476.73	44.99	69.26	28.85
1996	4032.3	102.63	420	44.95	47.08	2.66
1997	4189.25	96.2	417.57	44.95	35.48	1.74
1998	3989.45	93.21	458.26	44.95	35.15	1.45
1999	4679.21	361.19	1,885.66	187.63	136.52	6.36
2000	6713.57	379.04	2,320.27	223.83	158.49	15.75
2001	6895.2	313.5	2,475.51	228.95	144.75	13.58
2002	7795.76	375.7	3,220.82	182.96	146.34	7.06
2003	9913.52	413.88	3,737.28	196.16	123.99	7.02
2004	11411.07	384.25	4,196.84	196.16	106.56	6.46
2005	14610.88	330.65	2,028.58	189.77	85.53	60.54
2006	18564.59	332.22	0	0	64.83	54.41
2007	20657.32	374.3	0	0	0	64.59
2008	24296.33	464.56	0	0	0	58.7
2009	24794.24	524.2	0	0	0	66.23
2010	54612.26	635.45	0	0	0	54.39
2011	62980.4	723.12	0	0	0	173.73
2012	71713.94	828.72	0	0	0	198.18
2013	80092.56	986.84	0	0	0	400.49
2014	89043.62	1,142.29	0	0	0	489.23
2015	94144.96	1,489.41	0	0	0	622.12
2016	102809.8	2,436.41	0	0	0	1,042.51
2017	110434.2	31,338.81	0	0	0	0

Source: CBN Statistical Bulletin 2017

Dependent Variable: RGDP

Method: ARDL

Date: 10/11/18 Time: 01:44

Sample (adjusted): 1982 2017

Included observations: 36 after adjustments

Maximum dependent lags: 3 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (1 lag, automatic): BPPCS BPNS BOTHERS BMFIS
BLCCS

Fixed regressors: C

Number of models evaluated: 96

Selected Model: ARDL(1, 0, 1, 0, 1, 0)

Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	0.730989	0.130982	5.580821	0.0000
BPPCS	-1.055324	1.754964	-0.601337	0.5526
BPNS	51.87681	48.82714	1.062459	0.2974
BPNS(-1)	-80.39121	38.16426	-2.106452	0.0446
BOTHERS	-27.81663	8.274072	-3.361904	0.0023
BMFIS	-2.447774	0.560746	-4.365213	0.0002
BMFIS(-1)	45.77193	11.48918	3.983914	0.0005
BLCCS	-22.78505	35.80450	-0.636374	0.5299
C	492.7679	1320.378	0.373202	0.7119
R-squared	0.989292	Mean dependent var		23252.78
Adjusted R-squared	0.986119	S.D. dependent var		34332.85
S.E. of regression	4045.029	Akaike info criterion		19.66068
	4.42E+08	Schwarz criterion		20.05656
Log likelihood	-344.8923	Hannan-Quinn criter.		19.79886
F-statistic	311.8021	Durbin-Watson stat		2.439826
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

ARDL Bounds Test

Date: 10/11/18 Time: 01:45

Sample: 1982 2017

Included observations: 36

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	4.767994	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BPNS)	-2.062984	35.64289	-0.057879	0.9543
D(BMFIS)	-0.786106	0.445778	-1.763449	0.0891
C	1076.295	1360.450	0.791132	0.4358
BPCCS(-1)	-1.390129	1.855472	-0.749205	0.4602
BPNS(-1)	-52.76050	45.11345	-1.169507	0.2524
BOTHERS(-1)	-36.76747	14.03885	-2.618981	0.0143
BMFIS(-1)	37.00547	11.36694	3.255536	0.0030
BLCCS(-1)	4.187152	39.82153	0.105148	0.9170
RGDP(-1)	-0.219992	0.139980	-1.571596	0.1277
R-squared	0.527654	Mean dependent var		3064.996
Adjusted R-squared	0.387700	S.D. dependent var		5520.346
S.E. of regression	4319.650	Akaike info criterion		19.79205
Sum squared resid	5.04E+08	Schwarz criterion		20.18793
Log likelihood	-347.2570	Hannan-Quinn criter.		19.93023
F-statistic	3.770187	Durbin-Watson stat		2.588533
Prob(F-statistic)	0.004391			

ARDL Cointegrating And Long Run Form

Dependent Variable: RGDP

Selected Model: ARDL(1, 0, 1, 0, 1, 0)

Date: 10/11/18 Time: 01:46

Sample: 1981 2017

Included observations: 36

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BPCCS)	-1.055324	1.754964	-0.601337	0.5526
D(BPNS)	51.876807	48.827136	1.062459	0.2974
D(BOTHERS)	-27.816634	8.274072	-3.361904	0.0023
D(BMFIS)	-2.447774	0.560746	-4.365213	0.0002
D(BLCCS)	-22.785046	35.804501	-0.636374	0.5299
CointEq(-1)	-0.269011	0.130982	-2.053792	0.0498

$$\text{Cointeq} = \text{RGDP} - (-3.9230*\text{BPCCS} - 105.9973*\text{BPNS} - 103.4035 * \text{BOTHERS} + 161.0500*\text{BMFIS} - 84.6994*\text{BLCCS} + 1831.7787)$$

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BPCCS	-3.922984	6.652616	-0.589691	0.5603
BPNS	-105.997300	147.894834	-0.716707	0.4797
BOTHERS	-103.403478	57.966340	-1.783854	0.0857
BMFIS	161.049976	46.272364	3.480479	0.0017
BLCCS	-84.699429	134.390260	-0.630250	0.5338
C	1831.778744	4916.112303	0.372607	0.7123

APPENDIX 2

DIAGNOSTIC TESTS

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.345610	Prob. F(3,10)	0.7931
Obs*R-squared	3.194050	Prob. Chi-Square(3)	0.3627

Test Equation:

Dependent Variable: RESID

Method: ARDL

Date: 09/11/18 Time: 03:37

Sample: 4 37

Included observations: 34

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP(-1)	-0.107469	0.208391	-0.515707	0.6173
RGDP(-2)	0.114540	0.361319	0.317005	0.7578
RGDP(-3)	0.046803	0.267529	0.174946	0.8646
BPNS	14.33146	65.03044	0.220381	0.8300
BPNS(-1)	31.08534	75.47546	0.411860	0.6891
BPNS(-2)	-9.854907	81.58159	-0.120798	0.9062
BPNS(-3)	5.156368	62.99197	0.081858	0.9364
BPCCS	0.616419	2.415871	0.255154	0.8038
BPCCS(-1)	-0.094685	2.944366	-0.032158	0.9750
BPCCS(-2)	0.141035	2.676882	0.052686	0.9590
BOTHERS	2.809720	26.40130	0.106424	0.9174
BOTHERS(-1)	-9.374600	42.59688	-0.220077	0.8302
BOTHERS(-2)	-2.690261	37.87954	-0.071021	0.9448
BOTHERS(-3)	-0.766257	66.39752	-0.011540	0.9910
BMFIS	0.212047	1.148855	0.184572	0.8573
BMFIS(-1)	-0.992593	24.11115	-0.041167	0.9680
BMFIS(-2)	8.004872	31.79691	0.251750	0.8063
BMFIS(-3)	-7.169443	28.99972	-0.247225	0.8097
BLCCS	-22.48632	53.47435	-0.420507	0.6830
BLCCS(-1)	-16.55487	53.71206	-0.308215	0.7642
C	-170.5473	1528.830	-0.111554	0.9134
RESID(-1)	0.289928	0.471676	0.614676	0.5525
RESID(-2)	-0.250264	0.711706	-0.351640	0.7324
RESID(-3)	-0.318350	0.654688	-0.486263	0.6373
R-squared	0.093943	Mean dependent var		7.93E-12
Adjusted R-squared	-1.989989	S.D. dependent var		1715.593
S.E. of regression	2966.533	Akaike info criterion		19.01616
Sum squared resid	88003153	Schwarz criterion		20.09360
Log likelihood	-299.2748	Hannan-Quinn criter.		19.38360
F-statistic	0.045080	Durbin-Watson stat		2.116969
Prob(F-statistic)	1.000000			

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.250244	Prob. F(20,13)	0.9972
Obs*R-squared	9.451102	Prob. Chi-Square(20)	0.9771
Scaled explained SS	1.550254	Prob. Chi-Square(20)	1.0000

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

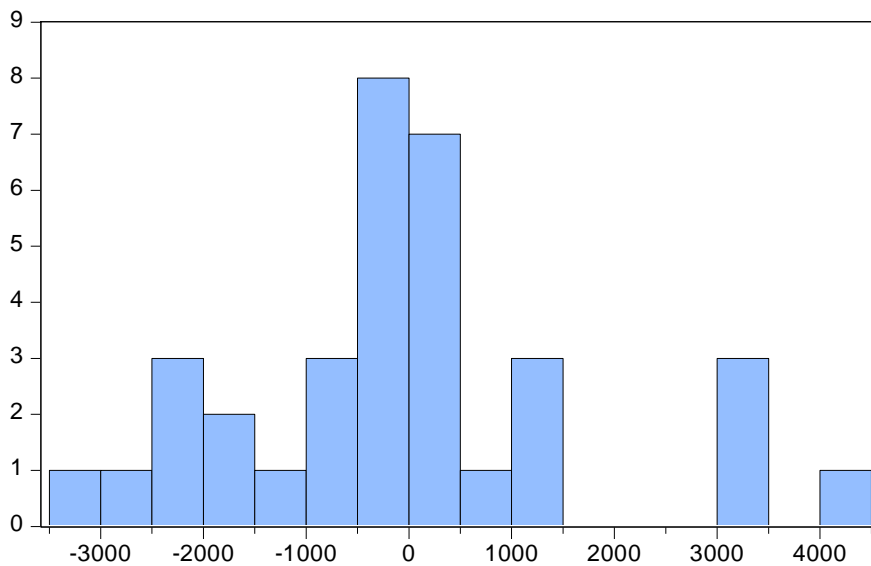
Date: 09/11/18 Time: 03:54

Sample: 4 37

Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5993446.	2597086.	2.307758	0.0381
RGDP(-1)	-268.7471	344.3777	-0.780385	0.4491
RGDP(-2)	-18.03585	530.3632	-0.034007	0.9734
RGDP(-3)	122.3619	416.9775	0.293450	0.7738
BPNS	-67851.21	102565.7	-0.661539	0.5198
BPNS(-1)	15977.35	133510.9	0.119671	0.9066
BPNS(-2)	-31981.36	146618.3	-0.218127	0.8307
BPNS(-3)	-19151.22	117394.1	-0.163136	0.8729
BPPCS	2133.604	3413.258	0.625093	0.5427
BPPCS(-1)	-1227.036	4877.498	-0.251571	0.8053
BPPCS(-2)	151.3831	4615.137	0.032801	0.9743
BOTHERS	-9631.173	47571.93	-0.202455	0.8427
BOTHERS(-1)	7039.573	81474.64	0.086402	0.9325
BOTHERS(-2)	-1883.291	70097.82	-0.026867	0.9790
BOTHERS(-3)	3652.413	126785.3	0.028808	0.9775
BMFIS	-671.3953	2007.195	-0.334494	0.7433
BMFIS(-1)	2813.320	46368.92	0.060673	0.9525
BMFIS(-2)	19183.01	60542.06	0.316854	0.7564
BMFIS(-3)	-8663.519	46256.03	-0.187295	0.8543
BLCCS	6616.942	67253.74	0.098388	0.9231
BLCCS(-1)	14600.20	70379.79	0.207449	0.8389
R-squared	0.277974	Mean dependent var		2856693.
Adjusted R-squared	-0.832836	S.D. dependent var		4343671.
S.E. of regression	5880561.	Akaike info criterion		34.28609
Sum squared resid	4.50E+14	Schwarz criterion		35.22884
Log likelihood	-561.8635	Hannan-Quinn criter.		34.60759
F-statistic	0.250244	Durbin-Watson stat		1.152009
Prob(F-statistic)	0.997209			

Test of normality



Series: Residuals	
Sample 4 37	
Observations 34	
Mean	7.93e-12
Median	-79.60527
Maximum	4246.143
Minimum	-3289.461
Std. Dev.	1715.593
Skewness	0.467167
Kurtosis	3.243994
Jarque-Bera	1.321059
Probability	0.516578

Date: 09/11/18 Time: 04:48

Sample: 1 41

Included observations: 34

Q-statistic probabilities adjusted for 3 dynamic regressors

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. *.	. *.	1	0.142	0.142	0.7466	0.388
. .	.* .	2	-0.053	-0.074	0.8524	0.653
* .	* .	3	-0.125	-0.109	1.4648	0.690
* .	* .	4	-0.110	-0.083	1.9618	0.743
* .	* .	5	-0.189	-0.183	3.4644	0.629
. .	. *.	6	0.058	0.088	3.6139	0.729
** .	** .	7	-0.246	-0.336	6.3640	0.498
. .	. *.	8	0.036	0.100	6.4254	0.600
* .	** .	9	-0.087	-0.221	6.7943	0.659
* .	* .	10	-0.102	-0.156	7.3232	0.695
* .	* .	11	-0.120	-0.163	8.0854	0.706
. *.	* .	12	0.097	-0.073	8.6120	0.736
. .	. .	13	0.034	-0.014	8.6798	0.797
. **	. .	14	0.217	-0.015	11.575	0.640
. .	* .	15	0.001	-0.081	11.575	0.711
* .	** .	16	-0.078	-0.209	11.988	0.745

*Probabilities may not be valid for this equation specification.