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IMPLICATIONS OF RISING DEBTS STOCK ON SUSTAINABLE ECONOMIC GROWTH IN NIGERIA (1986-2016)

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Abstract: This study examined the implications of rising debts stock on sustainable economic growth in Nigeria for the period 1986 to 2016. The Augmented Dickey Fuller (ADF) test was conducted for Unit Root Test. Engle Granger and Johansen Co-integration Test was also conducted to ascertain if there is a long-run relationship among the variables. This study found that Debts stock had a positive and significant effect on gross domestic product (GDP) and exchange rate but this effect in the short-run has a bigger effect when compared to the long-run. Debts stock has a negative and significant effect on inflation rate in Nigeria within the period under study. This is consistent with our a priori expectation as it is evident that debts stock has always influenced Gross Domestic Product, Exchange rate and inflation rate. There should be serious effort on the part of Nigerian government to diversify its economy especially into agriculture and Information and Communication Technology (ICT) sector. Policy makers and regulatory authorities should adopt appropriate exchange rate regime for the Country to achieve meaningful economic growth and development. Above all the recent clamour for restructuring of Nigeria should be respected to enhance sustainable economic growth of the regions and Nigeria as a whole.

Key words: Debt stocks, Domestic debt, Inflation Rate, External Debt Stocks and Exchange Rate

Introduction:

No man is an island to himself and no government is an island to itself. Borrowing is never a crime but what seems to be a crime is the continuous borrowings with the inability to pay back/service the borrowed fund/ debt. Therefore, it is generally expected that developing countries facing scarcity of fund/capital can acquire external debt to supplement domestic savings and finance productive activities. Debt both external and domestic could 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 cost. (Albert, Brain and Palitha, 2005 in Ude, Ugwu and Onwuka, 2016)

Foreign borrowing is a strategy of increasing the productive capacity of the economy over time and focusing at rising level of national income and poverty reduction vis a vis economic growth (Todaro, 1977)

The management of Nigerians external debt has been a major macroeconomic problem especially since the early 1980s. For many years now according to Noko (2016) the country's debt has been growing in spite of the efforts being made by the government to manage and minimize it crushing efforts on the Nation's economy. Such efforts range from the various refinancing and restructuring agreements to debt conversions programme and the deliberate allocation of substantial resources towards servicing the debt.

Muhammad and Fayyaz (2015) observe that external debts affect the economy in both ways explaining that where efficient use of external debt can bring economic prosperity to a nation, their inefficiency use can cause damages as well. External debt become burden to Nigeria because contracted loans were not optimally deployed which made return on investment not adequate to meet maturing obligations and also hindering economic growth (Erhieovvwe and Onovwoakpoma, 2013 in Amaefule, 2017)

Statement of the problem:

Debts according to Bowden in Anyanwaokoro (2004) are classified into productive debt and consumption debt. They see productive debt as self-liquidating debt while consumption debt is a credit facility obtained to pay for goods and services and expenses on current expenditure that will be gradually used up without making any direct income. Production debt in other hand pays itself off and can create additional income for the borrower. In productive debt, the more you borrow and invest the better off you will become in years ahead. For instance, if the government borrows money to finance a steel production plant, refineries or factories etc, these assets will generate the income to be used in repaying the debt. It is therefore, a productive debt. A productive debt provides more free income and financial freedom as time goes on if all things being equal (Anidiobu, Agu, and Ezinwa, 2016)

However, Amaefule (2017) observes that the Nigerian's total debts stock to foreign and local creditors now stood at N19.63tn. This is N1.8tn increase from the N17.36tn recorded at the end of December, 2016 (DMO, 2016). As at March 31, 2015, the country's total debts stock stood at N12.06tn. This means that the debts stock level increased by N7.1tn in two years. Segmenting

the national debt, the DMO put the Federal Government's domestic debt at N11.97tn. Two years ago, as of March 31, 2015, the component of the debt burden stood at N8.51tn.

This means that within a period of two years, the Federal Government has borrowed a total of N3.46tn from domestic creditors. This shows that the domestic debts stock of the federal Government has increased by 40.71 percent. Domestic debt servicing for 2nd quarter of 2017 stood at N253.3 billion i.e. April to June 2017 (DMO, 2017).

In the same period according to Amaefule (2017) the country's external debt (for the federal and state government) rose from \$9.46bn to \$13.81bn. This means that within the two years period, the country's external debt rose by \$4.36bn or 45.98 percent. As at June 2017, the Nigeria's external debt stock stood at \$11,194.65billion (DMO, 2017)

The external debt component, however, has been affected by exchange rate variations as the last two years have witnessed noticeable changes in foreign exchange rates. These borrowed money are never invested in a productive venture to enable it liquidate itself.

According to DMO (2017) the official exchange rate of N197 to \$1 was used in determining the foreign debt for March 31, 2015. The domestic debt component of states stood at N2.96tn as of March 31, 2017, up from the figure of N1.69bn at the same time for March 31, 2015. This means that within the period of two years, the domestic debt of the states rose by N1.27tn or 75.15 percent. Amidst drying revenue from oil and gas, the government has in the last two years increasingly depended on borrowing for consumption which becomes a regular source of drain to the borrower's income. To this end, the aim of this study was to examine the implications of External Debts Stock on sustainable economic growth in Nigeria.

Objective of the Study:

The broad objective of this study is to examine the implications of External Debt Stocks on sustainable economic growth in Nigeria. Specific objectives are to;

- Ascertain the impact of External Debt stocks on Gross Domestic Product in Nigeria
- Establish the influence of External Debt stocks on Exchange Rate in Nigeria.
- Examine the relationship between External Debts stock and Inflation Rate in Nigeria

Research Hypothesis

The study was guided by the following null hypotheses:

- H_0 : External Debt stocks does not have positive and significant impact on GDP in Nigeria
- H_0 : External Debt stocks does not have significant influence on Exchange Rate in Nigeria

- H_0 : External Debt stocks does not have significant relationship with inflation Rate in Nigeria

REVIEW OF RELATED LITERATURE

CONCEPTUAL FRAMEWORK

Concept of Debt

Debt may be defined as the resources or money in use in a country, which may or may not be generated by the residents. Debt may also be described as finance obtained beyond the boundary of a country and does not in any way belong to the populace (Adepoju, Salau & Obayelu, 2007). Put in other words, debt is money, service or property owed and/or represented by a financial instrument or other formal equivalent. The authors further describe debt as what a person legally owes to another or an obligation that is enforceable by legal action to make payment of money.

External Debts stock

Ogbonna and Appah (2016) define external debt stocks as that portion of a country's debt that was borrowed from foreign lenders including commercial banks, government or international financial institutions. On the other hand, debt management is the gamut of institutional and technical arrangement in organizing the liabilities of a country so that the debt service burden is kept within sustainable level. The technical aspect is concerned with the determination of the amount (level) of debt the economy can sustain and that the conditions of borrowing are on favourable terms and are consistent with the future debt servicing capacity. While, the institutional aspect includes the administrative, organizational, legislative, accounting and monitoring aspect of managing both the new borrowings and old stock of debt. In both aspects, more attention is given to reducing the debt service burden or keeping it stable (Hamid, Ashraf and Claudary, 2008).

External Debt Management:

External debt management refers to the establishment of the conditions of issue and redemption of foreign loans. It follows that debt itself is not evil but lack of optimal utilization of externally derived fund should be associated with proper debt management and servicing problem (Mutallab, 1984). Bhatia (2008), Musgrave and Musgrave (2004) posited that external debt management refers to as the establishment of the conditions of issue and redemption of public securities. It entails the process of administering the external public debt that is providing for the

payment of interest and arranging the refinancing of maturing bonds/debt. It involves a conscious and carefully planned schedule to the acquisition, deployment purpose or to support the balance of payments.

According to Okereke (2002), external debt management is the combination of policies that will allow for repayment of the debts or bring about its sufficient reduction". It also involves how is administered or handled to avoid adverse economic effect. It also involves loan negotiation, monitoring of both government direct debt and non-governmental debt; controlling the debt (including the measurement of the debt serving capacity, risk management-exchange, interest rate and commodity price risk) debt management system. Debt management policy is also intertwined with overall macroeconomic and financial policies. In fact, beyond good macroeconomic policy, the effective management of external debt comprises three specific interrelated process-selecting the appropriate financing, deciding how much to borrow and keeping complete up-to-date records on debt. The major objective of external debt management policy is to achieve the benefit of external finance without creating difficult problems of macroeconomic and balance of payments stability (Klein, 1994, in Ogbonna and Appah, 2016).

Economic growth

Economic growth is an increase in the total real output of goods and services in an economy over time. Economic growth is usually measured in terms of an increase in gross domestic product (gdp) over time, or an increase in GDP per head of population to reflect its impact on living standards over time. The contribution of economic growth to wealth creation, and the fact that it provides the government with extra resources to provide social amenities (without having to raise taxation), most governments accord a high priority to the promotion of economic growth in formulating their economic policies.

The ability of an economy to produce more goods and services on a sustained basis depends on many factors including an increase in the quantity and quality of the labour force, capital stock and natural resources (the basic factor inputs available to it); the efficient use of these resources so as to attain a high level of productivity; the introduction of new innovative techniques and methods of production and new products. The latter two factors are especially important in the context of a world economy where a country's economic growth rate is materially affected by international trade influences. Finally, a country's own level of demand needs to be sufficiently buoyant both to ensure the full utilization of its existing resources and to encourage producers to

invest in new plant and research and development to enlarge the supply capabilities of the economy over the longer term.

Governments can stimulate the growth process by increasing current spending in the economy through taxation cuts and by increasing the money supply and reducing interest rates. Additionally, it can operate on the supply-side of the economy by promoting enterprise initiatives and providing resources for improving productivity and research. (Collins Dictionary of Business, 2005)

Economic growth could also be defined as a positive change in the level of production of goods and services by a country over a certain period of time. Nominal growth is defined as economic growth including inflation, while real growth is nominal growth minus inflation. Economic growth is usually brought about by technological innovation and positive external forces (http://www.investorwords.com/5540/economic_growth.html#ixzz4u65N6KxU, 2017)

Exchange Rate

An exchange rate is the rate at which one currency will be exchanged for another. It is also regarded as the value of one country's currency in relation to another currency. For example, an interbank exchange rate of 114 Japanese yen to the United States dollar means that ¥114 will be exchanged for each US\$1 or that US\$1 will be exchanged for each ¥114. In this case it is said that the price of a dollar in relation to yen is ¥114, or equivalently that the price of a yen in relation to dollars is \$1/114.

Exchange rates are determined in the foreign exchange market, which is open to a wide range of different types of buyers and sellers, and where currency trading is continuous: 24 hours a day except weekends, i.e. trading from 20:15 GMT on Sunday until 22:00 GMT Friday. The spot exchange rate refers to the current exchange rate. The forward exchange rate refers to an exchange rate that is quoted and traded today but for delivery and payment on a specific future date.

In the retail currency exchange market, different buying and selling rates will be quoted by money dealers. Most trades are to or from the local currency. The buying rate is the rate at which money dealers will buy foreign currency, and the selling rate is the rate at which they will sell that currency. The quoted rates will incorporate an allowance for a dealer's margin (or profit) in trading, or else the margin may be recovered in the form of a commission or in some other way. Different rates may also be quoted for cash, a documentary form or electronically. The higher

rate on documentary transactions has been justified as compensating for the additional time and cost of clearing the document. On the other hand, cash is available for resale immediately, but brings security, storage, and transportation costs, and the cost of tying up capital in a stock of banknotes (bills) (http://www.investorwords.com/5540/economic_growth.html#ixzz4u65N6KxU, 2017)

Inflation Rate

The inflation rate measures changes in the average price level based on a price index. The most commonly known index is the consumer price index. This index measures average retail prices that consumers pay. A high or increasing CPI indicates the existence of inflation. Higher prices tend to reduce overall consumer spending, which in turn leads to a decrease in GDP. While inflation itself is not negative, rapidly increasing rates of inflation signal the possibility of poor macroeconomic health.

Theoretical Framework

There are several theories by various economists and schools of thought as regards external debts stock and economic growth in Nigeria. This study is built around the two main theories, Dual Gap Theory and the Debt Overhang Theory.

The dual gap theory of Chenery (1966) postulates that economic growth depends on investment and that investment is a function of savings. Less developed nations do not have sufficient savings (due to low per capita income) to match up with the necessary investment to ensure economic growth, they therefore resort to external finance to fit the saving investment gap. The dual gap theory is deduced from a national income accounting identity which postulates that excess investment expenditure (savings-Investment gap) is equivalent to the surplus of imports over exports (foreign exchange gap) (Mbah and Amassoma, 2014).

The debt overhang theory of Krugman (1988), posits that huge borrowing leads to high indebtedness, debt traps and slow down of economic growth. According to him, accumulated debt stock results higher tax (tax disincentive) on future output and thus crowds out private investment. This means that due to large debt stock, potential investors would be discouraged on the expectation that government may finance its debt service obligation by imposing high taxes and this would further retard the growth of the nation. The importance of the debt overhang theory more or less cannot be over emphasized. According to Audu (2004) in Ayadi & Ayadi (2008) "the debt service burden has militated against Nigerian's rapid economic development

and worsened the social problems. Service delivery by key institutions designed to mitigate the living conditions of vulnerable groups were hampered by decaying infrastructure due to poor funding. By cutting down expenditure on social and economic infrastructure, the government appears to have also constrained private sector investment and growth through lost externalities. This has reduced total investment, since public investment is a significant proportion of the total investment in the country.

Empirical Review:

A number of research works have been carried out reviewing the effect of External Debt on the economy.

Malik, Hayat, and Hayat (2010) explored the relationship between external debt and economic growth in Pakistan for the period of 1972 – 2005, using time series econometric technique. Their result shows that external debt is negatively and significantly related to economic growth. The evidence suggests that increase in external debt will lead to decline in economic growth. Previous study by Hameed *et al.* (2008) on Pakistan analyzed the long run and short run relationships between external debt and economic growth. Annual time series data from 1970 to 2003 was obtained to examine the dynamic effect of GDP, debt service, capital stock and labour force on her economic growth. The study concludes that debt servicing burden has a negative effect on the productivity of labor and capital, thereby adversely affecting economic growth.

Kasidi and Said (2013) investigated the impact of external debt and economic growth in Tanzania using time series of 1990-2010. The study revealed that there is significant impact of the external debt and debt service on GDP growth. Whereas total external debt stock has a positive effect of about 0.36939, debt service payment has a negative effect of about 28.517.

Atique and Malik (2012) examined the impact of domestic and external debt on the economic growth of Pakistan separately over a period of 1980-2010 using ordinary Least Square approach (OLS) to co-integration. The result showed significant inverse relationship in both, that is, inverse relationship between domestic debt and economic growth, and external debt and economic growth.

Sulaiman and Azceez (2012) studied the effect of external debt on the economic growth of Nigeria using gross domestic product as the endogenous variable measuring economic growth as a function of ratio of external debt to export, inflation and exchange rate proxy as the exogenous variable. Data were gathered covering 1970-2010. Analysis of data was done using the econometric technique of ordinary least square. The result showed that external debt has

contributed positively to Nigeria economy. A similar research was done by Iya, Gabdo, and Aminu (2013) with the same result. 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.

Similarly, Momodu (2012) examined the correlation between debt servicing and economic growth in Nigeria. The study sought to find a relationship between the Gross Domestic product (GDP) and Gross Fixed Capital Formation of Current Market Prices (GFCF) using Ordinary Least Square multiple regression method. The study revealed that debt payment to Nigerian creditors has significantly impacted on the GDP and GFCF. Furthermore, Ezeabasili, Isu, and Mojekwu, (2011) studied the relationship between Nigeria's external debt and economic growth between 1975-2006, with an error correction approach. Error correction estimate revealed that external debt has negative relationship with economic growth in Nigeria.

In a similar study, Bamidele and Joseph (2013) examined the effect of financial crisis and external debt management on the economic growth of Nigeria using GDP as endogenous variable while exogenous variables measuring economic growth were Foreign Direct Investment, external debt, external reserve, inflation, and exchange rate proxies. Annual time series of 1980-2010 were used. OLS, Augmented Dickey Fuller (ADF) unit root tests and the Granger causality test were employed in analysis. The result showed a positive relationship between FDI and economic growth while inverse relationship existed between external debt and economic growth. Akram (2010) in the study of the impact of public debt on economic growth and investment in Pakistan developed a hybrid model that explicitly incorporates the role of public debt in growth equations. He adopted the Autoregressive distributed lag (ARDL) technique in estimating the model and the result revealed that both domestic and external debt have negative relationship with per capita GDP and investment, confirming the existence of "Debt overhang effect" which crowds out private investment.

3.0 Methodology

The study adopted an *ex-post facto* and descriptive research method. *Ex-post facto* is mostly used in a study where it is not possible or acceptable to manipulate the characteristics of the variables

under study. The use of descriptive statistics is necessary as the data set is entirely quantitative and requires the use of analytical and statistical techniques. The method of estimation includes Ordinary Least Square (OLS), Augmented Dickey Fuller (ADF) test for the unit root test in order to attain stationarity. The Engle- Granger and Johansen's Co integration was conducted to ascertain if there is a long run relationship among the variables. The Parsimonious Error Correction modeling was adopted to correct for shocks and innovations, decomposing them into short run and long run impacts.

3.1 Nature and Sources of Data

The data for the work is annualized time series consist of mainly secondary data. The study covers 1986 to 2016. The data are accessed from the Central Bank of Nigeria statistical Bulletin various issues and Debt Management Office. The choice of the period 1986 to 2016 was informed by the availability of data in the form detailed enough to allow for robust analyses

3.2 Model Specification

The model of this study is based on the Classical Linear Regression Model of Brooks (2014). Debt stock is the endogenous/ dependent variable while the exogenous/ independent/ explanatory variables are interest rate, exchange rate and inflation rate. The model is shown as follows;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n + \epsilon \quad 3.1$$

Where;

Y = Dependent variable

$X_1, X_2, X_3, \dots, X_n$ = the explanatory or independent variables

$\beta_1, \beta_2, \beta_3, \dots, \beta_n$ = the coefficient of the parameter estimate or the slope

ϵ = Error or disturbance term

In relating this to the study;

$$EDS = f(GDP, EXCR, INFR) \quad 3.2$$

Relating it in econometric form and the variables log linearised, it will appear thus;

$$LEDS = \beta_0 + \beta_1 LGDP + \beta_2 LEXCR + \beta_3 LINFR + \dots + U_t \quad 3.3$$

Where;

LEDS = External Debts Stock

LGDP= Gross Domestic Product

LEXCR = Exchange Rate

LINFR = Inflation Rate

B_0 = intercept (Constant term)

$B_1 - B_3$ = coefficient of each exogenous variables

U_t = stochastic/ disturbance/Error term

A priori expectation: It is expected that $\beta_1 - \beta_3 > 0$

4.0 Presentation of data, analysis, findings and Conclusion

4.1 Presentation of data

Table 4.1 shows the External Debt Stocks (EDS), GDP, Exchange Rate and Inflation Rate in Nigeria (1986-2016)

Year	EDS	GDP	EXCR	INFR
1986	1.89	0.285763	0.06419	0.1959288
1987	-0.69	0.592608	0.081298	0.3119968
1988	7.58	0.20649	0.078261	0.2623544
1989	7.15	0.385038	0.105938	0.266532
1990	11.36	0.494011	0.080184	0.2742738
1991	0.01	0.272589	0.081852	0.2822893
1992	2.63	0.887147	0.112501	0.4614309
1993	1.56	1.343729	0.306635	0.6741655
1994	0.78	1.486195	0.120705	1.3464209
1995	2.15	-0.00573	0.1078	1.0421959
1996	4.13	-0.09851	0.056893	0.45232
1997	2.89	0.266145	0.041596	0.4096674
1998	2.82	0.080359	0.046696	0.4260064
1999	1.19	-0.17945	0.148471	0.27271
2000	4.89	0.538629	0.120309	0.3002112
2001	4.72	0.286259	0.091017	0.2746778
2002	4.63	0.303113	0.099434	0.318129
2003	9.57	0.163608	0.120773	0.47215
2004	6.58	0.149079	0.121895	0.4179258
2005	6.51	0.34162	0.108687	0.04412232

2006	6.03	0.21574	0.52205	0.3549322
2007	6.45	0.279467	0.085344	0.5676358
2008	5.98	0.491811	0.125209	0.7610186
2009	6.96	0.208354	0.20373	0.7818484
2010	7.98	0.05483	0.151606	0.8081554
2011	7.43	0.166571	0.072125	0.4280227
2012	6.58	0.041985	0.065786	0.0004024
2013	6.89	0.085664	0.056225	0.378213
2014	5.79	0.501811	0.169424	0.7810191
2015	6.70	0.690234	0.064892	0.5776366
2016	7.01	0-610334	0.065992	0.6101126

Source: Central Bank of Nigeria statistical Bulletin various issues, 2016

4.2 Data Analysis and Discussion of Results

The methods of data analysis employed for this study are Ordinary Least Square (OLS) method, Augmented Dickey- Fuller (ADF) Unit Root Test, Johansen Co-integration Test and Error Correction Method.

Table 4.2 shows the summary of OLS Result

Endogenous variable	Exogenous Variables				R ²	Adj. R ²	F-Stat
	C	GDP	EXCR	INFR			
LEDS	2.950372* (0.0140)	0.876129* (0.0000)	0.105435* (0.5735)	-0.130776 (0.2485)	0.966973	0-963303	263.5010 (0.00000)

Note: Probability value are stated in parenthesis and * means significance at 5% level of significance

Source: Author's computation.

From table 4.2, the result of the intercept or constant parameter has a positive relationship with DS and it is statistically significant. GDP has a significant positive relationship with EDS while EXCR is not statistically significant but demonstrates a negative relationship with EDS. INFR is not statistically significant and demonstrates a negative relationship with EDS. The coefficient of multiple determinations (R²) with a value of 0.966973 implies that approximately 97% of total variations in EDS are explained by GDP, EXCR and INFR while the remaining 3% is accounted for by factors not specified in the Model. F-statistics value of 263.5010 shows that the model is

significant i.e. it sufficiently captures the implications of rising debt stock on economic growth and this is further justified by the probability value of 0.000000.

4.2.1 Augmented Dickey Fuller (ADF) Unit Root Test

Time series data are assumed to be non stationary and this implies that the results obtained from the OLS method may be misleading. In this vein, it is cognizant that stationarity test should be conducted. The stationarity test is carried out using the Augmented Dickey-Fuller (ADF) Unit root test. The stationarity of data is essential for the Johnsen co-integration test. The decision rule for the ADF unit test states that the ADF Test statistic value must be greater than the Critical Value i.e. 5% at absolute term for stationarity to be established at level and if otherwise, difference occurs using the same decision rule. The table below shows the result of the stationarity test in summary and the order of integration

Unit Root Test:

Table 4.3 Result of Unit Root Test Analysis

S/N	Variables	ADF t-stat	5% critical value	Order of Integration	Trend
1	(EDS)	-8.307644	-2.307644	1(1)	With intercept
2	GDP	-3.253225	-2.957110	1(1)	With intercept
3	EXCR	-5.363889	-2.957110	1(1)	With intercept
4	INFR	-3.457620	-2.960411	1(1)	With intercept

Source: E-view 9 output, 2017

Table 4.3 shows the presentation of ADF Unit root test of stationality of the time series variables. The result shows that all the variables were stationary at first level 1(1), where the absolute values of the t-test exceeded the 5% values.

Table 4.4: Result of Johansen Co-integration test

Series: EDS, GDP, EXR, INFR				
Lags interval (in first differences): 1 to 1				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob**
None*	0.702716	88.87634	69.81889	0.0007
At most 1*	0.541468	51.27122	47.85613	0.0231

A most 2	0.353137	27.09972	29.79707	0-0992
At most 3	0.237142	13.59546	15.49471	0.0947

Trace test indicates 2 co-integrating eqn. (s) at 0.05 level of significance.

Table 4.3 was used to estimate the Johansen co-integration to establish a long run relationship of the variables. The result indicates the presence of two (2) co- integrating equations at 5% level of significance. The trace statistic values of 88.87 and 51.27 exceed the 5% critical values of 69.81 and 47.85 which show that co-integration exists.

4.3 Error correlation model

Table 4.5: Result of Error Correlation Modeling (ECM)

Dependent Variables: (EDS)

Method: Least Squares

Date: 20/09/2017

Sample (adjusted): 1986 2016

Included observations: 30 after adjustments

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.061247	0.533758	-0.114747	0.9095
D(GDP)	-2.380328	1.534956	-1.550747	0.1331
D(EXCR)	-1.681851	4.326397	-0.388742	0.7006
D(INFR)	0.112023	2.522207	0.044415	0.9649
ECM(-1)	-0.840410	0.192910	-4.356477	0.0002
R-Squared	0.437049	Mean dependent var		-0.028437
Adjusted R-square	0.328789	S.D. dependent var		3.675407
S.E. of regression	3.011167	Akaike info criterion		5.209893
Sum squared resid	235.7452	Schwarz criterion		5.484718
Log likelihood	-77.35829	Hannan- Quinn criter		5.300990
F statistic	4.037041	Durbin-Watson stat		2-023053
Prob(F-static)	0.007623			

Table 4.5 presents the result of the error correction model analysis. The F-statistic indicates that all the explanatory variables are jointly significant in determining the dependent variables, with