International Journal of Research in Social Sciences
Vol. 8 Issue 8, August 2018,
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gage as well as in Cabell's Directories of Publishing Opportunities, U.S.A

EXPLORING CAUSAL RELATIONSHIP BETWEEN PUBLIC DEBT AND ECONOMIC GROWTH IN A RECESSIONARY ECONOMY: THE NIGERIAN CASE

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ABSTRACT

This study investigated the statistical significance of public debt on economic growth measured by gross domestic product (GDP) and explored the causal relationship between publicdebt and economic growth. Nigerian economic data between 1981 and 2012 obtained from the Central Bank of Nigeria statistical bulletin formed the study's data. Ordinary least square method was used to regress gross domestic product on immediate periods GDP, domestic debt, external debt, government final consumptionexpenditure, private consumption expenditure, exports and imports. The Granger causality test was employed for the test of causal relationship and the augmented Dickey Fuller unit root test was used for the diagnostic tests. Domestic debt had negative relationship with GDP and was found to granger cause GDP, increase in domestic debt stock can be adduced to be one of the reasons for the economic recession in Nigeria, but external debt had no causal relationship with economic growth, furthermore, public debt, that is domestic and external debt hadstatistical insignificant effect on GDP. Domestic debt should be properly managed and used productively while expansionary monetary and fiscal policies deployed to reverse recession in Nigeria.

Keywords: Causality, public debt, economic growth, recession.

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INTRODUCTION

Developing economies are characterized by budget deficits which are expected of such economies having high potential growth rate. This deficit are met usually through borrowings and aids among others. Public debts are money borrowed by government from indigenes or foreigners and channeled to bridge the gap between government spending and revenue. Governments creates debt by issuing securities, government bonds and bills or borrow directly from supranational organizations such as the International Monetary Fund or international financial institutions, however, debt stock has to be repaid with incidental interest as scheduled which is called debt servicing, this may result into cashflow and liquidity crises for the debt enjoying nation if the debt is not properly utilized in ventures that will stimulate economic growth and improve cashflow on macro basis. Several authors have explored the nexus between debt and economic growth in Nigeria with conflicting results. Ogunmuyiwa (2011) examined whether debt promotes economic growth in Nigeria and concluded a no causal relationship between the variables, conversely, Amassoma (2011), established a bidirectional causality between domestic debt and economic growth, this is also supported by Egbetunde (2012). Further controversy in literature is evidenced in the work of Adegbite,Ayadi and Ayadi (2008) which explored the impact of Nigerian external debt on economic growth, their study confirmed the negative impact of debt and it's servicing on growth in Nigeria. However, reviewed empirical work did not consider the nexus between debt and Nigeria economic growth in recession. In recent years, Nigeria debt profile is rising and in the second quarter of 2016 was official declared to be in recession, could the rising debt and incidental debt servicing obligation be the main cause of the dwindling national output? And what is the significance of the relationship between debt and economic growth are questions agitating the minds of the author. Consequently the research aimed to ascertain whether public debt has a significant effect on economic growth and establish the causal nexus between public debt and economic growth in Nigeria. Tested hypotheses in the study include, one, public debt does not have a statistical significant effect on economic growth and two, public debt does not have a causal relationship with economic growth. The next section reviewed relevant literature subdivided into conceptual, theoretical and empirical, while section three discussed the methodology. Section four is the discussion of findings and the paper concluded in section five with conclusions and recommendations.

CONCEPTUAL LITERATURE

Recession

In the thoughts of Lipsey and Chrystal (2007), recession begins when actual gross domestic product (GDP) determined by the intersection of aggregate demand and short run aggregate supply falls short of the potential gross domestic product, the short fall is termed recessionary gap, characterized by fall in input prices. Recession is generally defined as a contraction in a business cycle which results into reduction in GDP, investment capacity, household income, business profits and inflation, while business closedowns, unemployment, bankruptcies and unpaid wages are on the increase. Recession is triggered by poor infrastructural development, poor financial incentive to industries, corruption, inadequate supply of labour in quantity and quality among others. According to Koo (2012), a balanced economy should have the household

as net savers, the corporate sector as net borrowers, a near balanced budget and a net export near to zero. When this relationship becomes imbalanced, recession can develop. Government usually respond by instituting expansionary macroeconomic policies such as increasing money supply, increasing government spending and reducing taxes. Rule of thumb measures of start of recession in an economy include, reduction in quarter on quarter GDP for two consecutive quarters and a 1.5 to 2 percent point rise in unemployment within twelve months. Recession can be V shaped (sharp contraction followed by rapid and sustained recovery), W shaped or double dip. Other variants are U shaped recession (prolonged slump with sluggish recovery) or an L shaped recession (sharp slump without recovery). The L shaped recession can better be described as a depression.

The contraction ofNigerian GDP growth by 2.06 percent between April and June 2016 officially heralded recession in Nigeria. As reported by the Nigerian National Bureau of Statistics, the year on year GDP figures contracted for the first and second quarters of 2016 consecutively. This as reported was caused by the dwindling oil prices which accounted for 70 percent of government income, oil theft and pipeline destruction, in addition, inability of leaders to diversify the economy away from oil exposed the economy to the vulnerability of oil price volatility.

Public Debt

Public debt can be defined as money owed by the government of a country to its citizens or to foreigners to finance fully or partly, the excess of government expenditure over its revenue from other sources. Jhigan (2006) defines it as debt which a state owes its subject or to nationals of other countries. Public debt comes with the obligation to repay the debt plus incidental interest back to the public. Variants of public debt include, voluntary debt and compulsory debt, funded debt and unfunded debt, productive and unproductive debt and lastly domestic and external debt. Public debts are used to finance deficit budget, war, or assuage national calamities and promote economic development through expansion of utilities among others. Debt burden is the hardship on the tax payer brought about by debt, it may be direct money burden, indirect money burden, direct real burden or indirect real burden. Both domestic and external debts inflict burdens on the tax payer. Countries should go for self-liquidating and productive public debt which enhances prompt repayment of principal and interest implications, else debt overhang will result, a situation where the country is unable to pay existing debt obligations and attract new ones even in the face of profitable investment opportunities.

Economic Growth and Development.

Economic growth is the sustained increase in an economy's per capita output or income accompanied by increase in labour force, consumption, capital and volume of trade (Jhigan, 2010), while economic development is the reduction or elimination of poverty, inequality and unemployment in the context of a growing economy (Baran, 1962;Lewis, 1963; Goulet, 1971; Kuznets, 1971; Cohen, 1973) . Economic development is growth plus qualitative change in economic wants, goods, incentives, institutions, productivity and knowledge or the upward movement of the entire social system. Improvement in the social and economic capacity to produce growth can be said to be economic development. In summary, economic growth is

increase in output and production efficiency, if growth is now accompanied with improvement in institutional and technical arrangements by which it is produced, then we have economic development. With growth, development may be lacking because of presence of unemployment and inequality brought about by absence of technological and structural improvement, but it is difficult to imagine development without growth. Measures of economic growth include; output (GDP) and output per capita, while measures of economic development include; gross national product (GNP).

THEORETICAL LITERATURE

According to the conventional view of public debt, in the short run, public debt or higher fiscal deficits have a positive effect on disposable income, aggregate demand and overall output. This positive effect is likely to be large where output is far from capacity (Elmendorf and Mankiw, 1999). However, with the assumption that Ricardian equivalence does not hold, in the long run the situation is different, the decrease in public savings brought about by higher budget deficit is not fully compensated by increase in private savings leading to reduction in national savings and consequently national investment (domestic and foreign). Lower domestic investment results into lower GDP, higher interest rate, lower labour Productivity and wages while lower foreign investment results into reduced foreign capital income and lower future Gross National Product (GNP). This negative effect of public debt could be much larger if high public debt increases uncertainty or leads to expectations of future confistication, possibly through inflation and financial repression (Cochrane, 2011a,b) in this high risk scenario, public debt may have a negative effect on growth even in the short run. Nevertheless, in an economy facing recession, budget deficits or increase in debt may have a positive effect on growth in both short run and the long run, because protracted recession may reduce future potential output. According to Delong and Summers (2012), in a low interest rate environment, expansionary fiscal policy is likely to be self-financing.

A theoretical model was developed by Checherita-Westphal, Hughes Hallet, and Rother (2012) in which over the business cycle, debt can only be issued to finance public investment and the optimal level of public debt is determined by the public to private capital ratio that maximizes economic growth, the authors illustrated that the level of debt that maximizes economic growth is a function of the output elasticitity of the capital stock. Griener (2012a) was of the opinion that a more general debt policy leads to a monotone and negative relationship between public debt and steady state growth. Griener (2012a) further argued that the effect of debt on growth depends on the presence of rigidities and elastic labour supply, public debt has a negative effect on labour supply, investment and economic growth in the presence of wage rigidities and unemployment, public debt has a no effect on the allocation of resources and can be have a positive effect if it is used to finance productive investment.

EMPIRICAL LITERATURE

Developed Economies

Kumar and Woo (2010), investigated the nexus between public debt and growth, the study's sample covered a panel of advanced and emerging economies over almost forty years period.

Various variables determining growth were involved in the study's model, furthermore, estimation issues such as reverse causality, endogeniety, threshold effect, non linearities and difference between advanced and emerging markets were also considered. The study found out that high initial public debt is significantly and consistently associatedwith slower subsequent growth.

Panizza and Presbitero (2013) investigated the causal relationship between debt and economic growth. The study found the presence of threshold and that a non- monotonic relationship between debt and growth is not robust to small change in data coverage and empirical techniques.

Developing Economies

Fosu (2011) measured the effect of debt burden on economic growth of sub saharan African (SSA) countries, using 1980 to 1999 World Bank data across 35 SSA countries in an augmented production function framework. The study concluded that debt was harmful to economic growth for given level of production inputs. However there was little evidence of a negative correlation between debt and investment levels.

Amoateng and Amoako-Adu (2016) conducted a trivariate causality analysis among economic growth, export and external debt. The study concluded the existence of a feedback or bidirectional causality between external debt servicing, economic growth and exports and the structural adjustment programs introduced between 1983 and 1990 removed economic distortions, promoted exports and encouraged external debt management and increased growth in the countries involved.

Nigeria

Adegbite, Ayadi and Ayadi (2008) investigated the impact of huge external debt on economic growth in Nigeria in other to make inferences on the impact of the debt relief granted to the country in 2006. The study adopted the neo classical growth model and investigated the linear and nonlinear effects of debt on growth and investment using ordinary least square and the generalized least square methods of regression analysis. The research findings confirmed the negative impact of debt and its servicing on growth in Nigeria. Furthermore external debt initially has direct relationship to growth but reverses to an indirect one after a maximum point confirming a nonlinear relationship.

Ogunmuyiwa (2011) examined whether debts promotes economic growth in Nigeria. The study employed the unit root tests of augmented Dickey Fuller, Granger causality test and the Johansen cointegration test. No causal relationship was found between debt and economic growth in Nigeria, conversely Egbetunde (2012) found presence of causal relationship between public debt and growth.

Amassoma (2011) examined causal nexus between external debt, domestic debt and economic growth in Nigeria between 1970 and 2009 using a vector autoregressive (VAR) and a vector error correction (VEC) models. Cointegration test conducted evidenced the presence of longterm

relationship between external debt and economic growth and the VAR model revealed a bi directional causality between domestic debt and economic growth, however, the VEC model evidenced a unidirectional causality from economic growth to external debt in Nigeria.

METHODOLOGY

The study's sample period was between 1981 and 2014. Nigeria economic data obtained from the secondary source of Central Bank of Nigeria statistical bulletin was used in the study. The study's model was adapted from the works of National Center for Economic Management (2002) and Gana (2002) that modelled GDP as dependent on immediate past period's GDP, external debt, external debt servicing, government expenditure, private consumption expenditure, trade balance (exports minus imports) and gross fixed capital formation thus:

$GDP_t = f (GDP_{t-1}, EXTD, EXTDS, GEXP, CONS, TB, CAP)$……1

This functional form is adapted to include public debt and written in equation form as follows

$GDP_t = \alpha_0 + \alpha_1 GDP_{t-1} + \alpha_2 EXTD + \alpha_3 DD + \alpha_4 GEXP + \alpha_5 CONS + \alpha_6 X - \alpha_7 M + \alpha_8 CAP + \varepsilon$ ……..2

The logarithm forms of the variables were used in the analyses

Where

GDP = Gross domestic product at current purchasers' prices, a measure of economic growth

EXTD= External debt outstanding

DD = Domestic debt outstanding

GEXP= Government final consumption expenditure

CONS= Private consumption expenditure

X= Exports of goods and services

M = Imports of goods and services

CAP= Gross fixed capital formation

α_0 = Constant

α_1 toα_8= variables' coefficients and

t = time

ε = Stochasticerror term

The ordinary least square method of solving multiple regression equations was used andthe t statisticsused to ascertain the variables' significance and decide the test of hypotheses, Granger causality test was used for the test of causal relationship and the augmented Dickey Fuller test of stationarity was employed as a diagnostic test.

DISCUSSION OF FINDINGS

Data Descriptive

The gross domestic product (GDP) had the highest deviation around its mean at N12,193.49 billion (table 2). Both domestic and external debt had positive correlation with GDP but that of the domestic debt was higher at 0.98(table 3). The graphs of the logarithms of domestic debt, external debt and GDP contained in figures 1-3 corroborated this. The summary of the augmented Dickey Fuller unit root test as presented in table 4, revealed that all the variables were non-stationary at level, but became stationary at first difference, as such the first difference forms of the variables were used in the regression analysis.

Regression Result

Table 5, contained the summary of the regressionresult using ordinary least square method.Domestic debt had a negative relationship with GDP, the higher the domestic debt the lower would be the GDP,and this partly confirmed the findings in Adegbite, Ayadi and Ayadi (2008), signs of other variables were also in accordance with theoretical *apraori* expectation.The critical t statistics at 31 difference level and 5% level of significance gave 1.96, comparing this with the variables calculated t statistics revealed that external debt and domestic debt were not statistically significant in their effects on gross domestic product. Similarly immediate past GDP was not also significant, however, all other variables presented a significant relationship. Subsequently, we accepted the null hypothesis that public debt do not have a statistically significant relationship with economic growth.

Granger Causality Test

Table 6 contained the results of the pairwise causality tests. The critical F statistics at 1, 29 (k-1) (n-k) was 4.18. The null hypothesis that logarithm of domestic debt does not granger cause the logarithm of GDP was significant. The tests were not significant in other cases. The study concluded that domestic debt granger cause gross domestic product, this is similar to the conclusions inEgbetunde (2012) however there was no causal relationship between external debt and gross domestic product, (Ogunmuyiwa 2011). In addition there was no evidence of causal relationship between external debt and domestic debt.

SUMMARY AND RECOMMENDATION

The study investigated whether public debt has a significant effect on economic growth in Nigeria. It also ascertained the causal relationship between public debt and economic growth as measured by gross domestic product.It was found that public debt did not have a significant

effect on gross domestic product and domestic debt had a negative relationship with GDP, furthermore, there was a unidirectional causal relationship flowing from domestic debt to gross domestic product while external debt and gross domestic product had no causal relationship. As such movement in domestic debt is the only aspect of public debt that may cause changes in gross domestic product and which could have caused the economic recession presently experienced in Nigeria. Proper management and productive utilization of domestic debt will help redirect Nigerian economy to the path of economic growth. Furthermore to counter recession expansionary monetary and fiscal measures should be deployed. Monetary authority should lower interest rates, ease conditions for banks to borrow from Central Bank of Nigeria and buy government securities from the secondary market window. On the fiscal side, the government should lower taxes on citizens and increase spending in real productive activities. Lastly essential structural reforms that would improve transparency and stability in both financial system and fiscal activities should be instituted and sustained.

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Tables and Figures

Table 1: Study's Data in N' billion.

YEAR	GDP	EXTD	DD	GEXP	CONS	X	M	CAP
1981	57.73	2.33	11.19	7.58	28.57	11.48	13.51	18.22
1982	53.66	8.82	15.01	8.41	30.41	9.57	10.69	17.15
1983	57.96	10.58	22.22	8.89	35.22	8.43	7.25	13.34
1984	64.33	14.81	25.67	8.46	42.86	10.1	5.08	9.15
1985	73.54	17.3	27.95	9.36	49.3	12.79	6.26	8.8
1986	74.91	41.45	28.44	9.42	51.54	9.97	7.79	11.35
1987	111.91	100.79	36.79	8.06	75.98	30.15	16.46	15.23
1988	147.94	133.96	47.03	11.31	106.68	33.81	18.43	17.56
1989	228.45	240.39	47.05	12.44	126.19	100.48	37.49	26.83
1990	281.55	298.61	84.09	13.98	177.23	99.51	49.79	40.12
1991	329.07	328.45	116.2	15.9	206.81	137.23	76.26	45.19
1992	555.45	544.26	177.96	33.12	373.53	208.34	130.65	70.81
1993	715.24	633.14	273.84	46.8	502.78	241.97	173.66	96.92
1994	945.56	648.81	407.58	169.67	610.34	229.87	170.19	105.58
1995	2008.56	716.87	477.73	242.74	1387.45	718.29	482.18	141.92
1996	2799.04	617.32	419.98	280.38	2124.27	902.37	712.42	204.05
1997	2906.62	595.93	501.75	377.78	2091.07	1214.23	1019.8	242.9
1998	2816.41	633.02	560.83	393.55	2371.33	836.23	1027.47	242.26
1999	3312.24	2577.37	794.81	231.29	2454.79	1121.84	727.93	231.66
2000	4717.33	3097.38	898.25	393.55	2478.78	2440.29	926.96	331.06
2001	4909.53	3176.29	1016.97	403.1	3687.66	2231.29	1785.34	372.14
2002	7128.2	3932.88	1166	478.29	5540.19	2563.71	1954.41	499.68
2003	8742.65	4478.33	1329.68	450.49	7044.54	3478.52	3097.61	865.88
2004	11673.6	4890.27	1370.33	785.82	8637.73	3520.85	2134.8	863.07
2005	14735.32	2695.07	1525.91	1003.1	11075.06	4664.76	2813.18	804.4
2006	18709.79	451.46	1753.26	1283.4	11834.58	8066.04	4022.23	1546.53
2007	20940.91	438.89	2169.64	2131.81	16243.72	7063.06	6436.06	1936.96
2008	24665.24	523.25	2320.31	2871.38	16090.5	9837.27	6188.47	2053.01
2009	25236.06	590.44	3228.03	3269.93	18980.96	7764.79	7831.82	3050.58
2010	34494.58	689.84	4551.82	4156.13	22845.13	13472.28	9993.93	4012.92
2011	38016.97	896.85	5622.84	4979.9	22840.83	19961.27	13675.63	3908.28
2012	41177.82	1026.9	6537.54	4852.81	19536.05	22824.41	9395.4	3357.4

Source: Central Bank of Nigeria Statistical Bulletin 2014.

Table 2: Data descriptive

	CAP	CONS	DD	EXTD	GDP	GEXP	M	X
Mean	786.2797	5615.065	1173.959	1095.377	8521.505	904.6516	2342.161	3557.038
Median	217.8550	2107.670	489.7400	593.1850	2807.725	261.5600	720.1750	869.3000
Maximum	4012.920	22845.13	6537.540	4890.270	41177.82	4979.900	13675.63	22824.41
Minimum	8.800000	28.57000	11.19000	2.330000	53.66000	7.580000	5.080000	8.430000
Std. Dev.	1210.644	7535.084	1662.082	1403.213	12193.49	1475.146	3548.072	5783.070
Skewness	1.653550	1.192492	1.947009	1.517262	1.467005	1.789138	1.731446	2.087306
Kurtosis	4.389521	2.956627	6.070348	3.964320	3.920800	4.841379	5.093363	6.687074
Jarque-Bera	17.15690	7.586706	32.78722	13.51767	12.60838	21.59298	21.83172	41.36254
Probability	0.000188	0.022520	0.000000	0.001161	0.001829	0.000020	0.000018	0.000000
Sum	25160.95	179682.1	37566.70	35052.06	272688.2	28948.85	74949.15	113825.2
Sum Sq. Dev.	45435389	1.76E+09	85638052	61039166	4.61E+09	67457710	3.90E+08	1.04E+09
Observations	32	32	32	32	32	32	32	32

Source : Author's calculations 2017.

Table 3: correlation matrix.

	CAP	CONS	DD	EXTD	GDP	GEXP	M	X
CAP	1.000000	0.975378	0.956881	0.044672	0.978269	0.982809	0.984657	0.935738
CONS	0.975378	1.000000	0.929137	0.149116	0.980596	0.953605	0.969729	0.912005
DD	0.956881	0.929137	1.000000	0.136971	0.975721	0.976262	0.957788	0.984827
EXTD	0.044672	0.149116	0.136971	1.000000	0.109329	0.001400	0.075157	0.072595
GDP	0.978269	0.980596	0.975721	0.109329	1.000000	0.981767	0.973282	0.972590
GEXP	0.982809	0.953605	0.976262	0.001400	0.981767	1.000000	0.979500	0.967533
M	0.984657	0.969729	0.957788	0.075157	0.973282	0.979500	1.000000	0.946052
X	0.935738	0.912005	0.984827	0.072595	0.972590	0.967533	0.946052	1.000000

Source: Author's calculations

TABLE 4: Result of unit root test.

Variables	Level Critical t: -2967	First difference Critical t: -2.96
LOG(CAP)	-0.169	-4.057
LOG(CONS)	-1.233	-4.10
LOG(DD)	-1.155	-4.260
LOG(EXTD)	-3.309	-4.290
LOG(GDP)	-0.345	-4.728
LOG(GEXP)	0.046	-4.823
LOG(M)	-0.320	-4.690
LOG(X)	-3.5	-7.582

Source: Author's calculations 2017.

Table 5: regression result

variables	coefficient	Standard error	T statistics
C	0.014539	0.017346	0.838201
D(LOG(GDP(-1)))	0.008824	0.048758	0.180972
D(LOG(EXTD))	0.028130	0.015730	1.788331
D(LOG(DD))	-0.076763	0.049462	-1.551958
D(LOG(GEXP))	0.141294	0.024860	5.683619
D(LOG(CONS))	0.555542	0.045916	12.09920
D(LOG(X))	0.332455	0.022924	14.50277
D(LOG(M))	-0.234529	0.035346	-6.635259
D(LOG(CAP))	0.188829	0.041411	4.559915
R^2 : 96% Durbin Watson: 2.07%			

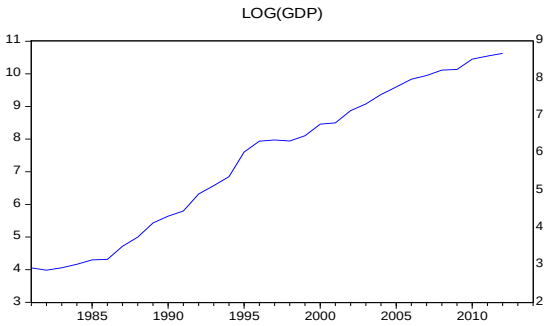
Source: Author's calculations 2017.

Table 6: Result of Granger causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
LOG(DD) does not Granger Cause LOG(GDP)	30	5.38220	0.0114
LOG(GDP) does not Granger Cause LOG(DD)	30	0.92088	0.4113
LOG(EXTD) does not Granger Cause LOG(GDP)	30	3.08517	0.0635
LOG(GDP) does not Granger Cause LOG(EXTD)	30	0.68004	0.5157
LOG(EXTD) does not Granger Cause LOG(DD)	30	0.10983	0.8964
LOG(DD) does not Granger Cause LOG(EXTD)	30	0.05648	0.9452

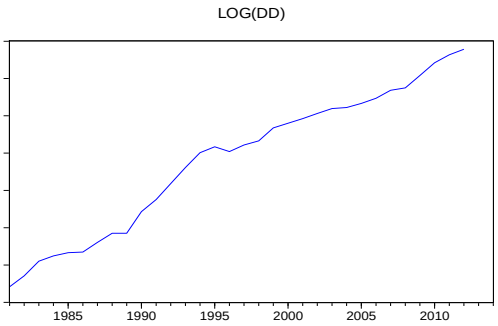
Source: Author's calculations 2017.

Figure 1 : GDP Trend 1981-2012



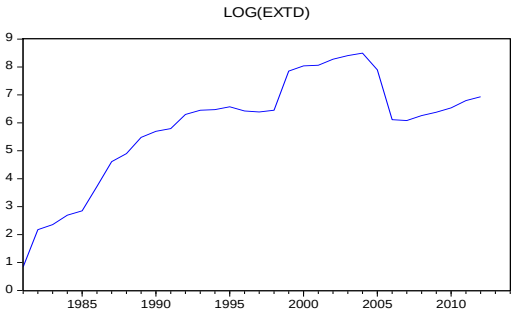
Author's computation 2017

FIGURE 2: Domestic Debt Trend 1981-2012



Author's computation 2017

Figure 3: external Debt trend 1981-2012



Author's computation 2017.