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Analysis of the Impact of External Debt on the Nigerian Economy: The Implications and Consequences of the Recent Request for $2.2 Billion Loan

Rex Oforitse ARUOFOR, Ph.D
Retired Professor of Economics, Benson Idahosa University, Benin City, Nigeria
Email: aruoforr@yahoo.com

Daniel Risiagbon OGBEIDE, Ph.D
Former Senior Lecturer of Political Science, Augustine University, Ilara-Epe, Nigeria
Email: ogbeidedaniel8@gmail.com
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Abstract

Towards the close of 2024, there was the request and approval of a new foreign loan of $2.2 billion (about N3.3 trillion) for President Bola Tinubu by the National Assembly amid Nigerian debt that has skyrocketed to N121.67 trillion ($91.46 billion) as at June 2024 as reported by the Debt Management Office (DMO). This situation appears worrisome as increasing external debt may be unsustainable. Many scholars have written articles on the impact of external debt on growth of the Nigerian economy but the approaches have been partial and inconclusive. This study examines the impact of external debt on the Nigerian economy as a whole, using the total differential systems modeling and analysis approach (ecostatometrics) as well as explore the implications and consequences of the new loan of $2.2 billion on the Nigerian economy as a whole. The result revealed that even though external debt impacts positively on growth, it promotes poverty and unemployment as the Poor in Nigeria increased by 3.81e-06 million as a result of External debt and 7.1e-06 million absolute poor were exterminated as a result of external borrowing; while the Unemployment rate increased by 5.16e-07%. This result will be useful to both government and citizens of Nigeria. An examination of the Markov plots of the new loan of $2.2 billion showed that the impact of external debt on the Nigeria economy will quickly die down in about two years so that by 2027, the impact would have expired in all the cases. Not until external loans are converted into physical infrastructure including factories and industries, would the full benefits of external borrowing be realized. Some recommendations were adequately made.

Key Words: ***E****xternal debt, Nigerian economy, Total differential systems modeling approach, Markov plots, Growth, Development and dynamic impact.*

INTRODUCTION

Nigeria's External Debt reached 42.5 USD billion in December 2023, which is about N63.75 trillion. This is the debt owed the international community; countries like China, France, Germany and Japan (bilateral debts) and multilateral institutions like the World Bank, International Monetary Fund (IMF), Islamic Development Bank (IsDB) and the African Development bank (AfDB) by the government, businesses and people of the country to overseas lenders such as banks, the IMF, foreign companies and other creditors.

It must be noted that the spate of borrowing by Nigeria has been a source of worry because according to Aruofor and Ogbeide (2024), the major clogs in the wheels of development identified in Nigeria, included first and foremost, Corruption, which is expected to increase by a shift of 47 folds, followed by Low Labour Productivity, Penchant for imported goods by Nigerians and excessive and unsustainable external borrowing which is expected to increase. Indeed the total debt of Nigeria the Debt Management Office (DMO) said on Thursday 20 June 2024 was ₦121.67 trillion ($91.46 billion) and noted that the increase was from new borrowing to part-finance the 2024 Budget deficit. The debt of the States had risen to N11.47trillion as of June 30, 2024 while Nigeria's debt burden rose to 50.7 percent in October 2024. These are all worrisome!

However, Udo Udoma and Bello-Osagie (Internet), in their contribution noted that "Nigeria has witnessed a significant capital inflow from foreign investors through debt and equity investments over the years. The number of cross-border financing transactions and value of the loans have skyrocketed. The reason for this is not far-fetched; cross-border financing is one of the many ways in which Nigerian corporate and financial institutions get funding to finance their operations and projects in Nigeria. In the case of financial institutions, sometimes, the proceeds of the foreign loans are used for on-lending to SMEs, women-led businesses and for trade finance. This has helped in stimulating the growth of the Nigerian economy. The ability of some foreign lenders to provide loans at relatively lower interest rates has also incentivized Nigerian corporate and financial institutions to seek cross-border financing for their projects and business expansion."

The above not withstanding, high levels of external debt can be risky, especially for developing economies. Among other things, it could increase the risk of default and being in another country's pocket, ruin credit ratings, leave little funds to invest and spur growth, and expose the borrower to exchange rate risk (Investopedia). Moreover, economic theory has shown that increase in the public debt will decrease the volume of net savings at national level and therefore a higher interest rate. This leads to a fall in investment and a slowdown in the growth of capital stock. In addition, high levels of debt crowd out private investments in capital goods, workers would have less to use in their jobs, which would translate to lower productivity and, therefore, lower wage. In general, the main factors affecting external debts in the literature can be listed as public revenues, public expenditures, budget deficits, loan demand, domestic debt stock, debt ceiling, debt service ratio, national income level and variability, population, social infrastructure and educational level. In Nigeria however, the causes of external debt include the accumulation of payment arrears on debt

servicing and the capitalization of interest; and then there is the contribution of new direct foreign investment (essentially in the petroleum sector).

It is therefore even more worrisome that towards the close of the year 2024, there was the request and approval of a new loan of $2.2 billion (about N3.3 trillion) for President Bola Tinubu by the National Assembly. Indeed many articles have been written by scholars on the impact of debt on growth of the Nigerian economy but the approaches have been partial and inconclusive. The aim of this study therefore is to examine the impact of external debts on the Nigerian economy as a whole on the one hand and to analyze the consequences and implications of the new loan of $2.2 billion on the Nigeria economy on the other.

OBJECTIVES OF THE STUDY

The objectives of the paper among others, include:

1. To use a comprehensive model of the Nigerian economy to analyze the impact of external debt on the Nigerian economy as a whole, using the total differential systems modeling and analysis approach (ecostatometrics).
2. To analyze the impact, implications and consequences of the new loan of $2.2 billion on the Nigerian economy as a whole, *a'la* the total differential systems modeling and analysis approach (ecostatometrics);
3. To determine the dynamic impact of the recently approved $2.2 billion loan on the Nigerian economy using Markov chains analysis.
4. In particular, to determine the effects on incomes and consumption, sectoral outputs, aggregate demand and supply, investment, inflation, employment, standard of living, poverty, purchasing power, among others; and
5. Conclude and make some recommendations.

The article is therefore divided into five parts. Part I is the introduction and states the objectives of the study. Part II is the literature review while Part III is the methodology. In Part IV, the results of the analyses are presented and discussed and Part V concludes the study and makes some recommendations.

LITERATURE REVIEW

External debt is the portion of a country's debt that is borrowed from foreign lenders, including commercial banks, governments, or international financial institutions. If a country cannot repay its external debt, it is said to be in sovereign debt and faces a debt crisis. These loans, including interest, must usually be paid in the currency in which the loan was made. Additionally, loans remained the largest component of external debt, with a share of 33.4 per cent, followed by currency and deposits at 23.3 per cent, trade credit and advances at 17.9 per cent and debt securities at 17.3 per cent (Wikipedia).

Nigeria's Debt to World Bank has grown to $17bn. Nigeria's indebtedness to the International Development Association (IDA), a member of the World Bank Group (WBG) grew by $600

million in three months, rising from $16.5 billion in June 2024 to $17.1 billion as of September 2024. Nigeria's debt obligations to China increased by almost half a billion dollars in the second half of last year to $5.16 billion, according to new data released by the Nigerian Debt Management Office (DMO,2024). Top sources of Nigeria's foreign debt include:

- International Development Association (IDA). The IDA is part of the World Bank Group.
- China (Exim Bank of China) ...
- International Monetary Fund (IMF) ...
- African Development Bank (AfDB) ...
- African Development Fund.

External debt measures an economy's obligations to make future payments and is an indicator of a country's vulnerability to solvency and liquidity problems (Wikipedia). At this point, we shall just refer to some of the summaries listed in the literature about the cons and pros of external debts.

To start with, we shall explore some of the advantages of external debts. The national debt enables the federal government to pay for important programs and services even if it does not have funds immediately available, often due to a decrease in revenue. Foreign debt can be useful as it allows the country to fund investment in different sectors, thus improving economic growth. Moreover, a country can utilize the funds received from a foreign lender to meet various expenditures. It provides access to financial capital to fund investment, increases financial globalization and promotes better macroeconomic policy and governance in the borrowing country. That said, one must remember that it can lead to a vicious cycle of debt.

The burden and dynamics of external debt shows that they do not contribute significantly to financing economic growth in Nigeria as in most cases, debts accumulate because of the servicing and principal itself. The burden of external debt could constitute negative impact on Growth. Public debt at unsustainable levels harms growth, with consequences on vulnerable citizens. It can inhibit private investment, increase pressures on social and infrastructure spending, and limit governments' ability to implement reforms.

Debt has been translating into a substantial burden for developing countries due to limited access to financing, rising borrowing costs, currency devaluations and sluggish growth. These factors compromise their ability to react to emergencies, tackle climate change and invest in their people and their future. The causes of external debt burden in Nigeria include the fluctuations in export growth, real exchange rate, fiscal deficit, inflation and level of economic activity.

If a country's debt crisis is severe, it could result in a sharp economic slowdown at home which impedes economic growth elsewhere in the world, rising costs of food and other goods and services due to inflation. Indeed, high external debt could result in a situation where returns from investing in the domestic economy would be effectively eroded by higher taxes to service the rising stock of debt, resulting in low domestic and foreign investment and slow output growth.

The problem with external debt, include defaulting in payment which can lead to the lenders withholding future releases of assets that might be needed by the borrowing nation. Such instances can have a rolling effect. The borrower's currency may collapse, and the nation's overall economic growth will stall. There are several risks associated with foreign debt as well, which are as follows:

- Affects economic growth. Economic growth occurs when governments and companies incur capital expenditures that boost production and increase output and income levels.
- Long gestation period.
- Unexpected devaluation of domestic currency.

The major disadvantages of Debt Financing include:

- Financial covenants on lending agreements may limit certain actions of borrowers.
- Greater debt-to-equity may increase the businesses' financial risk.
- Business owners may be required to personally guarantee the debt.
- Assets could be seized as a result of payment default.

It is pertinent to note that globally, there is the politics of Foreign/External loans and Aid/Grant. While foreign loan, which is repayable in terms of principal and interest, can be “normal” or “soft” (with lower interest rate and longer moratorium), it sometimes co-exists with Foreign Aid/Grant which is supposedly free but in reality, may have “strings” attached.
It is true that Foreign/External loans which combine to constitute External Debt has some benefits including economic growth and adjustments to withstand shocks, it is also susceptible to disadvantages including uncontrollable policy adjustments by the lender, economic dependency of the borrower and influences of corruption in terms of optimal utilization of such loans.
In summary, the advantages and disadvantages of external sources of finance include, while the possibility to expand business exist, this may be at higher interest costs. There may be flexibility in business strategy but with decreased control over the company (loss of ownership). Finally, there may be the possibility of diversification of risk but this is accompanied by Debt obligations! While having some advantages, public debt can also have negative effects on a country. Public debt can cause an economic recession when not properly managed. A country in huge debt will barely have enough to meet up with the rising demands of governance. One of the most immediate consequences of mismanaging debt is a lower credit score. Late payments, high credit card balances, and other negative factors can lower your score. Missing due dates for credit card payments, loan payments, or other bills can result in late payment notations on your credit report. Therefore, external debt result in slower economic growth, particularly in low-income countries, as well as crippling debt crises, financial market turmoil, and even secondary effects such as a rise in human-rights abuses.

Nigeria spent as much as $3.58 billion to service its external debt in the first nine months of 2024 despite a series of reforms implemented by the government that were supposed to raise revenue and control borrowings. For a country like Nigeria, the Debt Service-to-Revenue is about 60 per

cent. So, a larger part of the revenue of the country goes into debt servicing. The key to managing external debt effectively rests with sound macroeconomic policies that keep the accumulation of external debt within sustainable limits, and with structural policies that ensure an efficient use of savings and investment.

In all this, one is tempted to ask; "What are the roles and functions of IMF and World Bank?" The World Bank Group works with developing countries to reduce poverty and increase shared prosperity, while the International Monetary Fund serves to stabilize the international monetary system and acts as a monitor of the world's currencies.

The World Bank also lends to various governments for irrigation, agriculture, water supply, health and education, encourage foreign investment in other organizations by guaranteeing loans. The World Bank also provides member countries with financial, and technical advice on all projects. The main difference between the International Monetary Fund (IMF) and the World Bank lies in their respective purposes and functions. The IMF oversees the stability of the world's monetary system, while the World Bank's goal is to reduce poverty by offering assistance to middle-income and low-income countries. The World Bank supports investments in countries that underpin long-term growth and that help to meet the needs of their citizens. They work with policy makers to develop markets, institutions, and economies that are stable, equitable, and efficient.

The World Bank is an institution that was established in 1944 and since 1958 has provided Nigeria with low interest rate loans and grants through the International Development Association (IDA) and International Bank for Reconstruction and Development (IBRD). The International Monetary Fund (IMF) works to achieve sustainable growth and prosperity for all of its 191 member countries. It supports economic policies that promote financial stability and monetary cooperation, which are essential to increase productivity, job creation, and economic well-being. The IMF also provides financial assistance and works with governments to ensure responsible spending. The IMF offers various types of loans that are tailored to countries' different needs and specific circumstances.

According to World Bank, Nigeria's weak revenue mobilization has major implications for growth and development, including for improving its dire social service delivery outcomes. Thus, the country needs to take concrete steps to break its oil dependency to improve its economic and social outcomes.

Critics of the World Bank and IMF have argued that policies advice and recommendations by the World Bank and International Monetary Fund that are implemented by African Countries, intended to control inflation and generate foreign exchange to help pay off the IMF debts, often result in increased unemployment, poverty and economic polarization thereby impeding sustainable development. In addition, the World Bank and IMF appear to have failed in their reconstruction work and poverty reduction in Africa especially in Nigeria where their policy is to leave the development of Factories and Industries to the Private Sector that are not thoroughly organized. As rightly opined by Eghosa Osagie, in his paper, titled "Future relationship between Nigeria, World Bank, IMF and others", to the Breton Woods Institutions, capitalist policies are preferred,

not bothered by the fact that policies that work for developed countries may not necessarily succeed or work in Nigeria. Unfortunately, it would seem these facts are not sufficiently considered in the policy advice of the World Bank and IMF. It is pertinent to note that when these Bretton Woods institutions were established in 1944, most of today's Third World nations, including Nigeria, were still colonies and their peculiarities which are critical, were not considered (Aruofor and Ogbeide, 2024).

METHODOLOGY

THE TOTAL DIFFERENTIAL MODELING APPROACH

The approach used in this study is divided into two sections. The first is termed the total differential modeling approach (see Aruofor, 2001, 2017, 2019, and 2020), Aruofor and Okungbowa (2018), Aruofor and Ogbeide (2019), and Aruofor and Ogbeide (2022). It assumes and rightly so, that in the real world situation, every economic variable or subsystem depends on and is depended upon by other variables or subsystems.

A schematic representation of the above theory is presented in Fig. 1.

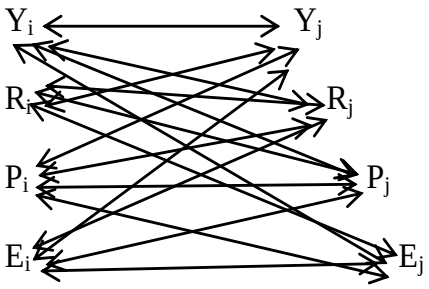


Fig: 1: The True Socio – Economic Causal Chain

Y = Production variables;
R = Primary Factors;
P = Policy instruments;
E = Environmental variables.

Though this theory was first mooted by Walras as early as 1874, it was not developed beyond the conceptual stage. The true practical empirical systems total differential modeling approach (Ecostatometrics) was achieved by Aruofor (2017) and relies on statistically significant multiple simple linear regression coefficients as opposed to multiple linear regression parameters. It is a blend between the traditional Input Output Analysis and Econometrics and assumes the structure of programming models. The theory supporting this is that an economy is not truly dynamic but actually dynamically static. It is the change that occurs in an economy in the current year (t) that

determines where the economy (the endogenous variables) will be at the end of the current year (t) and not in the next year (t+1). This model is a departure from the normal econometric approach, where the structure of the economy is determined by combinations of economic theories. The true structure of an economy is so complex that economic theory will be self defeating (see Duesenberry et al , 1965 and Gordon, 1968). ***Indeed, Adeyoju (1975) had rightly noted that " the unstable nature of population and its growth, national income and its distribution, investment capacity, employment opportunities, balance of payments and raw material base often lead to conflicting theories of economic development".*** Thus, we do not need any elaborate theories to explain the working of an economy.

If we can estimate all the independent relationships among the variables of the economy taken two at a time, (depending on whether they are statistically significant) and classify the significant coefficients into a matrix ***B***, according to whether they are endogenous or exogenous, then we would have in matrix notation,

$$Y = BY + CX + A + U$$

$$\therefore [I - B]Y = CX + A + U$$

$$Y = [I - B]^{-1} CX + [I - B]^{-1} A + [I - B]^{-1} U$$

$$\frac{dY}{dX} = [I - B]^{-1} C$$

$$\therefore dY = [I - B]^{-1} CdX$$

$$\text{i.e } \Delta Y = [I - B]^{-1} C\Delta X$$

$$\therefore Y_t = [I - B]^{-1} CX_t - [I - B]^{-1} CX_{t-1} + Y_{t-1}$$

Where, Y=endogenous and X=exogenous variables. The fact that the relationships are not estimated by multiple linear regressions means that the issue of simultaneous equation bias is by-passed and all the estimation difficulties, including multi-collinearity associated with econometric multiple linear regression, which renders it inconsistent and therefore non-operational, are also by-passed. Moreover, no complicated econometric and economic theories are needed to proceed. It is then possible to view the whole economy at a glance and the structure of the economy is determined automatically.

Thus, given a simple linear regression between two variables, X *and* Y, we proceed as follows and state the equation as below:

$$Y = a + bX + u$$

Where Y = the dependent variable

X = the independent variable

$a \& b$ = parameters

u = error term.

The estimate of the parameters $a \& b$, is achieved by the application of least squares to the data on the variables, with a view to minimize the sum of squared deviations around the regression line (Koutsoyiannis, 1977, Aruofor, 2001, Aruofor, 2017 and Aruofor, 2020).

The parameters can be estimated by solving the following normal equations:

$$a\sum 1 + b\sum X = \sum Y \qquad (1)$$

$$a\sum X + b\sum X^2 = \sum XY \qquad (2)$$

This was the basic procedure adopted and the coefficients were estimated by means of a computer software, ESM-Lab 4.4, that tested for statistical significance at the 5% level of significance using the asymptotic t-ratios. It was designed jointly by the author Professor Rex OforitseAruofor and Mr. Kingsley Igbiniba Omoruyi of Microcraft Nigeria Limited. The procedure is to determine the important variables required for the solution of the problem, classify them into endogenous and exogenous variables before feeding them to ESM-Lab 4.4. The model is then estimated, and the statistically significant coefficients are automatically classified into a matrix ***B*** and the structural relationship of the economy is automatically specified. Further analysis can then be performed. (The computer software can be downloaded as esmlab.ng.com from the internet and ran as administrator). For this study, the data were assembled from the Central Bank Statistical Bulletin (CBN, 2017, 2018, 2019 and 2021) and Aruofor, (2017) and Aruofor and Ogbeide (2019, 2024). The time series ranged from 1981 to 2023. The list of variables consists of one hundred and thirteen variables, made up of one hundred and eleven (111) endogenous variables followed by two (2) exogenous variable (see fig 2).

THE CONSTRUCTION OF THE COMPOSIT MODEL OF NIGERIA ECONOMY.

The Nigeria model consists of the primary sectors comprising of the agricultural sector, the manufacturing sector, industry, construction, transport, services, education and health; and other real sectors including national income, consumption and investment, population, labor and employment, foreign sector, economic indicators and policy instruments. Together, they comprise the endogenous variables of the model, while the exogenous variable consist of external debt.

THE POPULATION MODEL AND DERIVATION OF VARIABLES

Extant models of the Nigerian economy lacked data on total active work force, employment, etc. These are major defects and according to Stolper, (1966), the development planner cannot afford to assume his facts; he must find them as best as he can. We therefore proceeded as follows:
The population of Nigeria is growing at approximately 3% per year. Given this fact, we back cast the population at 3% discount rate to 1901 and projected it to 2021 assuming that the population has been adjusted for deaths.

1) Going by international standard, children are those people of ages Sixteen (16) years and below and was derived as:

Children = Pop_t - Pop_{t-16}

2) Population of people eighty years and below was derived as:
   Pop_t– Pop_{t-80}
3) Estimated potential active work force (EPAWF) = Pop_t – Pop_{t-80} – Children.
4) Population of old people equals the residual.
5) Unemployed work force = EPAWF x Unemployment rate.
6) Employed work force (EMPWF) = EPAWF - Unemployed work force.
7) Employment = $\Delta EMPWF$
8) Average wage rate = $Labor \quad Force \quad Compensation / EMPWF$
9) National Productivity = NGDP/Labor force compensation
10) Labor Productivity = NGDP/ EMPWF
11) Demand for Employment = $\Delta EMPWF_{-1}$
12) Demand Pressure for Employment = ($\Delta EMPWF_{-1}$)/Unemployed Work Force
13) Demand for Health care = $\Delta HGDP_{-1}$
14) Demand Pressure for Health care = $\Delta HGDP_{-1} / Pop$
15) Demand for Education = $\Delta EdGDP_{-1}$
16) Demand Pressure for Education = $\Delta EdGDP_{-1} / Pop$
17) Demand for Imports = $\Delta IMPOTS_{-1}$

Fig 2: LEGEND OF VARIABLES NIGERIA MARKET ECONOMY

S/no.	ACRONYMS	ACTIVITY	UNIT
1	NGDP(t)	GDP at Current Basic Prices	N million
2	AGGDD	Aggregate Demand	
3	AGGSS	Aggregate Supply	
4	INVST(t)	Investment	N million
5	AGRSEC(t)	1. Agriculture	N million
6	INDUST(t)	2. Industry	N million
7	MANUFC(t	(c) Manufacturing	N million
8	OILREFIN	OIL Refining	N million
9	ELECTSS(t)	3. Electricity,Gas,Steam & Air conditioner	N million
10	WATER(t)	4. Water supply, sewage, waste Mang.	N million
11	CONSTN(t)	5. Construction	N million
12	SERVCS(t)	C. SERVICES	N million
13	TRADE(t)	1. Trade	N million
14	ACCOFOOI	2. Accomadation and Food Services	N million
15	TRASPOT(t	3. Transportation and Storage	N million
16	TRANSEV(t	e. Transport Services	N million
17	POSTCUR(t	f. Post and Courier Services	N million
18	INFOCOM(	4. Information and Communication	N million
19	TELECOM(t	a. Telecommunications and Information Services	N million
20	PUBLSHN(t	b. Publishing,	N million
21	MPIC&SNI	c. Motion Pictures, Sound recording and Music production	N million
22	BRODCST(t	d. Broadcasting	N million
23	ARTRECRT	5. Arts, Entertainment & Recreation	N million
24	FININSUR(t	6. Financial and Insurance	N million
25	FINANCE(t	a. Financial Institutions	N million
26	INSURANS	b. Insurance	N million
27	REALEST(t)	7. Real Estate	N million
28	PROFSERV	8. Professional, Scientific & Technical Serv.	N million
29	ADMINSUI	9. Administrative and Support Services	N million
30	PUBADMN	10. Public Administration	N million
31	EDUCATN(	11. Education	N million
32	HLT&SOC	12. Human Health & Social Services	N million
33	OTHSERVS	13. Other Services	N million
34	DISPINC(t)	Disposable Income	N million
35	REALINC(t)	Real Income	N million
36	REALGDP(t	Real GDP	N million
37	GROWTRT	Growth rate	%
38	GROWTH(t	Growth	N million
39	CONS(t)	Consumption	N million
40	CAPITAL(t)	Capital accumulation	N million
41	FDI(t)	Foreign Direct Investment	N million
42	CPI(t)	Consumer Price Index	
43	INFLTD(t)	Inflation Dummy = 1 when CPI increases, otherwise = 0	
44	INFLATN(t)	Inflation = INFTD X CPI	
45	INFLTRT(t)	Inflation Rate	%
46	UNEMPL(t	Unemployment Rate	%
47	LABCOMP	Labor Force Compensation	N million
48	MALE	Male Population	Million
49	FEMALE	Female Population	Million
50	URBAN	Urban Population	Million
51	RURAL	Rural Population	Million
52	CHLDRN	Children Population (16 years and below)	Million
53	CHDRNSS	Children Supply	Million
54	EPAWF	Estimated Potencial Active Work Force	Million
55	NADDWF	New Addition to Workforce	
56	POPOLD	Population of Old People (80 years and above)	Million
57	UNEMWF	Unemployed Work Force	Million
58	EMPWF	Employed Work Force	Million
59	EMPLMNT	Employment	Million
60	PRDTIVTY	Productivity	
61	LPROVITY	Labor Productivity	
62	AVWAGE	Average Wage Rate	Naira
63	DDEMENT	Demand for Employment	

Fig 2: LEGEND OF VARIABLES NIGERIA MARKET ECONOMY CONTINUED

S/no.	ACRONYMS	ACTIVITY	UNIT
64	EMDDPR	Employment Demand Pressure	
65	POOR(t)	Poor	Million
66	EXTPOOR(t	Extremely (Absolute) Poor	Million
67	POVRT(t)	Poverty Rate	%
68	SLAVERY	Slavery	
69	SAVINGS(t	Savings	N million
70	BOT(t)	Balance of trade	N million
71	BOP(t)	Balance of payments	N million
72	EXTRES(t)	External reserve	N million
73	DBTBDN(t)	Debt burden or Bondage	
74	OILREV(t)	Oil revenue	N million
75	NOILREV(t	Non-oil revenue	N million
76	CORPTD(t)	Corruption Dummy = 1 when DDMOPR increases, otherwise = 0	
77	CORRPTN(t	Corruption= CORPTD X DDMOPR.	
78	DDMONY(t	Demand for money	N million
79	DDMOPR(t	Demand for money pressure	
80	DEMOCY(t	Dummy Variable 1.0 for New Democracy and 0 elsewhere.	
81	CORDEM(t	Equals DEMOCY x CORRPTN	
82	PWLFARE	Personal Welfare (Per capita income)	Naira
83	STDOLIVN	Standard of Living	
84	PUPWER	Purchasing Power	
85	FODSRITY	Food Security	
86	HLTCARE	Health Care	
87	DDHCARE	Demand for Health Care	
88	HCRDDPR	Health Care Demand Pressure	
89	HRESDEV	Human Resource Development	
90	DDEDUC	Demand for Education	
91	EDUDDPR	Education Demand Pressure	
92	WEALTH	National Wealth	
93	PWEALTH	Personal Wealth	
94	IMPDPEN	Import Dependence	
95	DDIMP	Demand for Imports	
96	PENCIMP	Penchant for Imports	
97	TIME(t)	Time	
98	EXCHRTRP	Exchange rate (Relative poverty)	N million
99	POP(t)	Population	Million
100	IMPORT(t)	Imports	N million
101	XPOTOIL(t	Oil export	N million
102	XPTNOIL(t	Non-oil export	N million
103	DODBT(t)	Domestic debts	N million
104	EXTDBT	External debts	$ million
105	GEXPDN(t)	Government expenditure	N million
106	PRIMELR(t	Primary lending rate	%
107	INTSAV(t)	Interest rate	%
108	MONYSS(t	Money supply	N million
109	TAX(t)	Tax	N million
110	ACGSC	Agricultural Credit Guarantee Scheme	N million
111	DFUELP(t)	Domestic fuel price	N/Litre
	EXOGENOUS VARIABLES		
112	EXTERNAL DEBT		N million
113	$2.2 BILLION LOAN		N million

18) Penchant for Imports = $\Delta IMPOTS_{-1} / Pop$
19) Import Dependence = $IMPOTS / NGDP$
20) Slavery = EXTDEBT/Pop

Some other variables were derived from existing data as follows:

- $GROWT\ \ RATE = ((\Delta GDP) / GDP_t) * 100)$
- $DINCOM = GDP - TAX$
- $COLIVN = (CONS_{t-1}((1 + (INFRT_t / 100)))$
- $POOR = POP / ((RGDP / EXCHRT) * \$720)$
- $ABPOOR = POP / ((RGDP / EXCHRT) * \$360)$
- $RICH = POP - (POOR + ABPOOR)$
- $RPOVRT = (1 - ((RGDP / EXCHRT) / RGDP) * 100)$
- $DDMONY = (\Delta MONYSS)_{-1}$
- $DDMOPR = ((\Delta MONYSS)_{-1} / POP)$
- $IMPDD = (\Delta IMPORT)_{-1}$
- $IMPDDPR = ((\Delta IMPORT)_{-1} / POP)$
- $XPOTDD = (\Delta XPORT)_{-1}$
- $DBTBDN = (EXDBT / (GDP / EXCHRT))$
- $INVEDU = (INVSTNENT/NGDP)*EDUGDP$
- $INVIND = (INVSTNENT/NGDP)*INDGDP$

However the 2001 and 2006 census of the Nigerian economy by the National Bureau of Statistics was used to adapt the population of male and female, as well as urban and rural populations in Nigeria according to their shares.

MARKOV CHAINS ANALYSIS

The second section is Markov Chains analysis. An economy and indeed the world consists of variables interacting in a dynamic fashion. These variables include people (i.e. children, the work force, employed and unemployed, old people), businesses, vocations, sectors, governments etc interacting and changing in space and time. Even the policies they implement and the policy instrument they use also change in time and space and the ability to manage these changes tend to depend on our ability not only to understand them but to be able to analyze and interpret them.

Markov Chains Analysis provides us with such a tool for analyzing and understanding these changes and ecostatometrics alias total differential modeling approach provides the enabling

mechanisms for capturing the changes. Markov Chains Analyses can be approached in terms of flows which is the original concept but also can be approached in terms of change or a combination of both which is a new concept. However, the concept is versatile and depends on how we define our variables in the Markov Chains, especially in the estimation and interpretation of the transition matrix, which is vital to the procedure.

In the above connection, our variables can be defined as the probability of being in one state in period (*t+1*), when another state changes in period (*t*); or just the probability that a variable will change in period (*t+1*) when another variable changes in period (*t*) or both. Given the above definitions, it is worthy of note that Markov Chains analysis deals only with probabilities which do not admit of negative values; but an economy interacts in both negative and positive numbers. This impasse can be overcome by reducing the system to conform (see Aruofor, 2003 and 2020). This was the methodology applied in this study.

A computer programme has been developed by the author, Professor Aruofor, Rex Oforitse and Mr. Omoruyi, Kingsley Igbinoba of Microcraft Nigeria Ltd and incorporated into ESM Lab and can be assessed on the Internet as esmlab.ng.com.

RESULTS AND DISCUSSION

THE IMPACT OF EXTERNAL DEBT ON THE NIGERIA ECONOMY.

The details are as presented in Tables 1a and 1b.

The Impact of External Debt on Income, Investment and Consumption.

The impact of external debts on income, investment and consumption is mixed because while external debts impact positively on investment, disposable income and real income by N2.95 billion, N4.8 billion and N0.0013 million respectively, nominal income, real output (real GDP), consumption, capital and foreign direct investment all fell by –N6.26 billion, -N2.13 billion, -N5.84 billion, -N1.16 billion and –N0.01322 million respectively.

TABLE 1a: IMPACT OF DEBT ON NIGERIA ECONOMY.

S/no.		EXTDBT(t)	NEWDBT(t)
1	NGDP(t)	-6.26386	-4.5E-06
2	AGGDD	-2.92688	1.48E-06
3	AGGSS	1.773399	3.54E-07
4	INVST(t)	2.46545	4.54E-07
5	AGRSEC(t)	-1.14762	-3.1E-07
6	INDUST(t)	0.251779	4.81E-07
7	MANUFC(t	-0.77765	-6.2E-07
8	OILREFIN	-0.00392	-1.3E-09
9	ELECTSS(t)	0.026604	1.67E-08
10	WATER(t)	-0.00265	-1.9E-09
11	CONSTN(t)	0.144806	9.39E-08
12	SERVCS(t)	1.423495	-9E-07
13	TRADE(t)	0.831735	-1.2E-07
14	ACCOFOOI	0.022825	1.27E-08
15	TRASPOT(t	0.012876	2.44E-08
16	TRANSEV(t	0.000369	2.07E-09
17	POSTCUR(t	0.001226	-6.4E-10
18	INFOCOM(	-0.15257	-7.9E-08
19	TELECOM(t	-0.31967	6.32E-09
20	PUBLSHN(t	-0.00243	-1.6E-09
21	MPIC&SNI	0.002315	-2E-08
22	BRODCST(t	-0.13971	-7.6E-08
23	ARTRECRTI	-0.01331	-1.8E-08
24	FININSUR(t	0.173739	-1.7E-08
25	FINANCE(t	0.150845	-1.6E-08
26	INSURANS	0.022881	-1.1E-09
27	REALEST(t)	0.509141	5.48E-08
28	PROFSERV	0.176991	-1.3E-08
29	ADMINSUF	0.001482	-2E-10
30	PUBADMN	-0.1326	-2.2E-07
31	EDUCATN(	-0.08016	-3.8E-08
32	HLT&SOC	0.007362	2.09E-08
33	OTHSERVS	-0.31815	-2.6E-07
34	DISPINC(t)	4.804765	-9.4E-07
35	REALINC(t)	0.001844	9.06E-09
36	REALGDP(t	-2.13131	-2E-06
37	GROWTRT(	1.7E-06	-1.2E-11
38	GROWTH(t	3.19E-07	1.93E-13
39	CONS(t)	-5.84534	-4E-06
40	CAPITAL(t)	-1.16305	-1E-06
41	FDI(t)	-0.01322	4.39E-08
42	CPI(t)	1.67E-05	2.23E-12
43	INFLTD(t)	-5.9E-08	-8.2E-14
44	INFLATN(t)	1.16E-05	-2.7E-12
45	INFLTRT(t)	-2.2E-07	-4.8E-12
46	UNEMPL(t)	5.16E-07	-2.4E-13
47	LABCOMP	-1.37702	1.91E-07
48	MALE	1.12E-06	-1.8E-13
49	FEMALE	1.1E-06	-1.8E-13
50	URBAN	1.51E-06	1.22E-12
51	RURAL	2.64E-06	2.14E-12
52	CHLDRN	-3.2E-06	-1.8E-12
53	CHDRNSS	-2.1E-06	-3.8E-12
54	EPAWF	2.95E-08	-1.4E-12
55	NADDWF	1.33E-07	1.96E-15
56	POPOLD	3.73E-08	-2E-13
57	UNEMWF	-1E-06	-4.9E-13
58	EMPWF	7.97E-07	3.19E-13
59	EMPLMNT	-3.1E-07	2.99E-13
60	PRDTIVTY	-3.5E-06	-2.1E-12
61	LPROVITY	0.01757	-5.6E-08
62	AVWAGE	0.004282	7.77E-09
63	DDEMENT	2.56E-07	1.55E-13

TABLE 1b: IMPACT OF DEBT ON NIGERIA ECONOMY.

S/no.		EXTDBT(t)	NEWDBT(t)
64	EMDDPR	8.76E-08	1.87E-13
65	POOR(t)	3.81E-06	-3.8E-12
66	EXTPOOR(t	-7.1E-06	5.47E-12
67	POVRT(t)	-1.3E-07	-2.4E-13
68	SLAVERY	0.002023	4.6E-09
69	SAVINGS(t	0.197748	2.36E-07
70	BOT(t)	-0.02892	-8.5E-08
71	BOP(t)	-0.58026	-3.4E-07
72	EXTRES(t)	0.004157	3.69E-10
73	DBTBDN(t)	-1.6E-08	-1.2E-14
74	OILREV(t)	0.116642	5.27E-08
75	NOILREV(t	-0.24997	-1.1E-07
76	CORPTD(t)	9.65E-08	8.15E-14
77	CORRPTN(t	-0.00397	-7E-09
78	DDMONY(t	-0.17682	-4.4E-07
79	DDMOPR(t	-0.00201	-1.3E-09
80	DEMOCY(t	-4.2E-09	5.7E-14
81	CORDEM(t	-0.00398	-7E-09
82	PWLFARE	0.028017	-8.4E-09
83	STDOLIVN	0.020981	-5E-10
84	PUPWER	-0.00012	-9.4E-11
85	FODSRITY	0.010981	3.87E-09
86	HLTCARE	2.05E-05	-6.3E-11
87	DDHCARE	0.006068	6.07E-09
88	HCRDDPR	3.41E-05	3.75E-11
89	HRESDEV	-0.00027	-2E-10
90	DDEDUC	0.025499	2.27E-08
91	EDUDDPR	-4.7E-05	-1.4E-11
92	WEALTH	1.92E-09	1.66E-15
93	PWEALTH	-0.00081	-1.3E-09
94	IMPDPEN	-5.4E-09	5.43E-14
95	DDIMP	-0.44311	-2.2E-06
96	PENCIMP	0.001874	2.32E-11
97	TIME(t)	8.68E-07	1.56E-13
98	EXCHRTRP	-8.4E-06	-8.5E-12
99	POP(t)	2.22E-06	-3.6E-13
100	IMPORT(t)	-0.0274	4.59E-07
101	XPOTOIL(t)	-0.37454	2.05E-06
102	XPTNOIL(t)	-0.16207	-2.1E-08
103	DODBT(t)	-0.5834	-2.1E-07
104	EXTDBT	-0.65819	-3.4E-07
105	GEXPDN(t)	0.387689	5.31E-08
106	PRIMELR(t	-1E-06	-1.5E-12
107	INTSAV(t)	9.53E-07	1.05E-12
108	MONYSS(t)	-0.08821	-1.8E-08
109	TAX(t)	-0.58277	7.28E-07
110	ACGSC	-0.79455	-7.6E-07
111	DFUELP(t)	-3.3E-06	-8.1E-12

The Impact of External Debt on Sectoral Outputs.

The impact of external debts on sectoral output is more profound because Industry increased by N1.252 million, Electricity supply by N0.026604 million, Construction by N0.145 million, Services by N1.4235 million, Trade by N0.832 million and Health and Social services by N0.0074 million. However, Agriculture fell by –N1.15 billion, Manufacturing fell by –N0.778 million and Oil Refining by –N0.00392 million.

The Impact of External Debt on Aggregate Demand and Supply.

The impact of external debt on Aggregate supply is positive at N1.7734 million while the impact on Aggregate demand is negative at –N2.93 million.

The Impact of External Debt on Growth and Interest Rate.

Growth rate increased by 1.70e-06% and Growth by N3.19e-07 million; thus indicating that when nominal GDP falls, the economy can still grow which means that GDP is a poor measurement of economic growth. In addition, Interest rate rose by 9.53e-07% while Primary lending rate fell by -1e-06%.

The Impact of External Debt on Inflation and Unemployment.

Inflation experienced a shift of -5.9e-08, while Inflation rose by 1.16e-05 points. The impact on Inflation rate was negative at –2.2e-07%, while the Unemployment rate increased by 5.16e-07%.

The Impact of External Debt on Poverty

The Poor in Nigeria increased by 3.81e-06 million as a result of External debt and 7.1e-06 million absolute poor were exterminated as a result of external borrowing. The Poverty rate however fell by -1.3e07%.

The Impact of External Debt on Welfare.

While external debt impacts positively on Standard of living and Food Security to the tune of N0.021 million/capita and N0.011 million/capita respectively, the Purchasing power of Nigerians fell by –N0.00012 million/capita.

The Impact of External Debt on Education and Health Care.

The impact of external debt on Education and Health Care is quite profound. Indeed, Health care increased by N2.05e-05 million/capita; Human Resources Development increased by N3.41e-05 million/capita but the demand for Health care and Education still increased by N0.0061 million/capita and N0.0255 million/capita respectively indicating that there is more to be done.

The Impact of External Debt on External Sector.

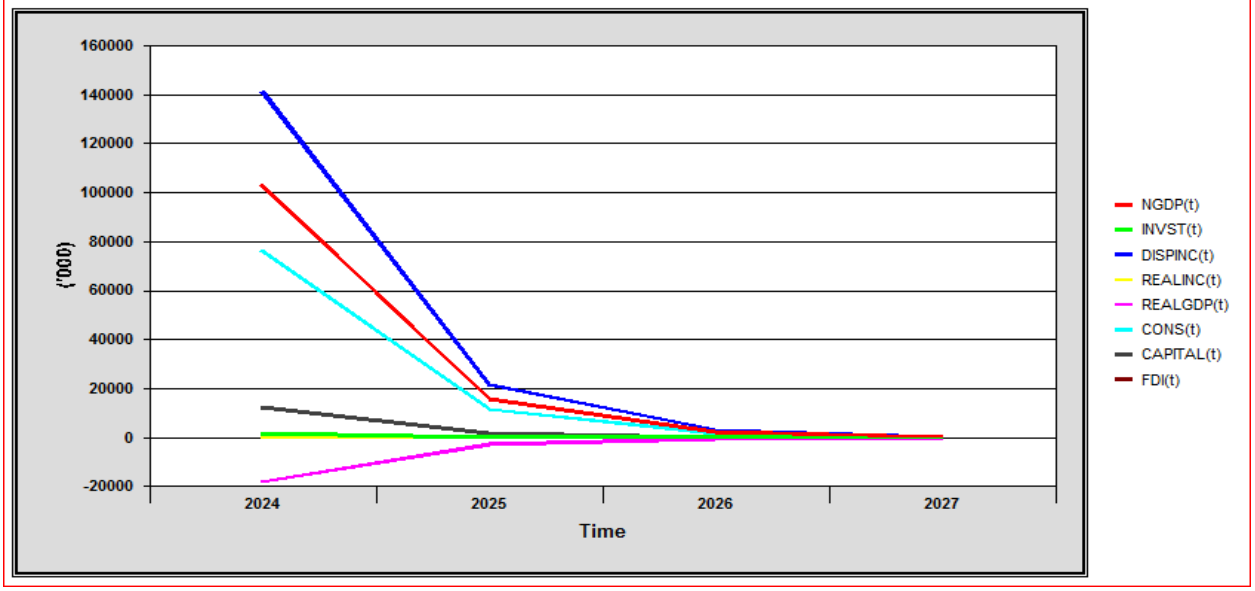
The impact of external debt on the external sector is not as profound as only external reserves recorded a positive increase of N0.0042 million. Balance of Trade fell by –N0.029 million; Balance of Payments by –N0.58 million; Imports by –N0.0274 million; Oil exports by –N0.375 million and Non-oil exports by –N0.162 million.

THE IMPACT OF EXTERNAL DEBT OF $2.2 BN ON THE NIGERIA ECONOMY.

The Impact of External Debt of $2.2 Billion on Income, Investment and Consumption.

Real Income, Investment and Foreign Direct Investment responded positively at N9.06e-09 million, N4.51e-07 million and N4.39e-08 million respectively. Nominal Income fell by –N4.5e-06 million; Disposable Income by –N9.4e-07 million; Real Output by –N2e-06 million; Consumption by –N4e-06 million and Capital by –N1e-06 million. From Fig. 3 it can be seen that the Markov plot of the impact will die down very quickly and become zero by 2027.

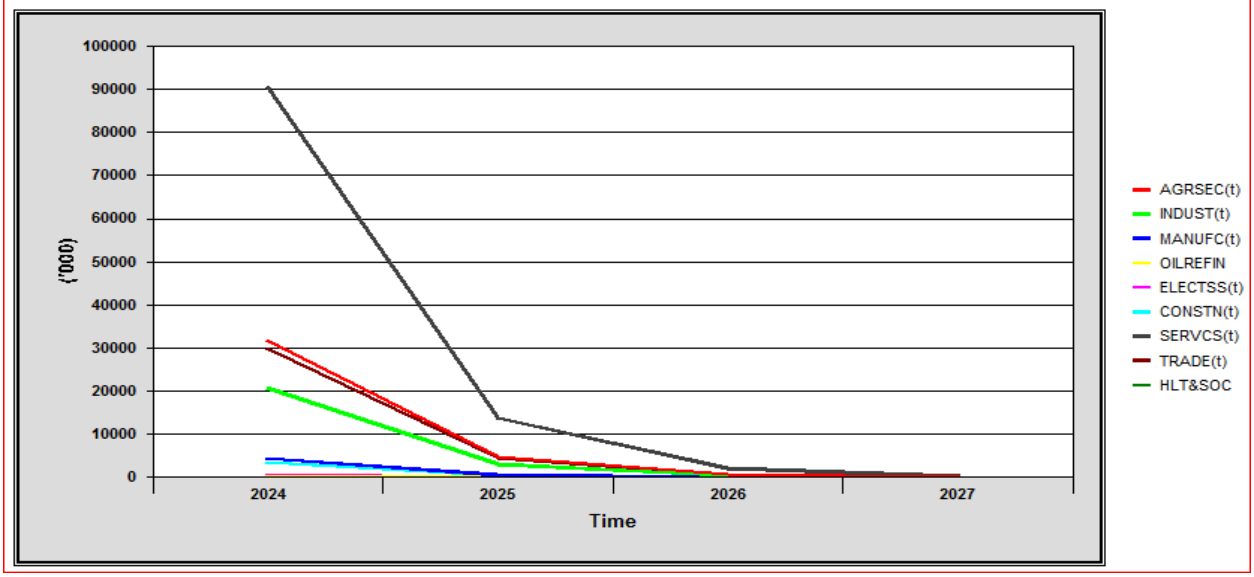
Fig. 3: DYNAMIC IMPACT OF EXTERNAL LOAN OF $2.2 BILLION ON INCOMES, INVESTMENT AND CONSUMPTION



The Impact of External Debt of $2.2 Billion on Sectoral Output.

Industry, Electricity supply, Construction and Health and Social Services responded positively at N4.81e-07 million, N1.67e-08 million, N9.39e-08 million and N2.09e-08 million respectively. On the other hand, Agriculture fell by –N3.1e-07; Manufacturing by –N6.2e-07 million; Oil Refining by –N1.3e-09 million; Services by –N9e-07 million and Trade by –N1.2e-07 million. The Markov plot indicate that the impact will die down after two years in 2027.

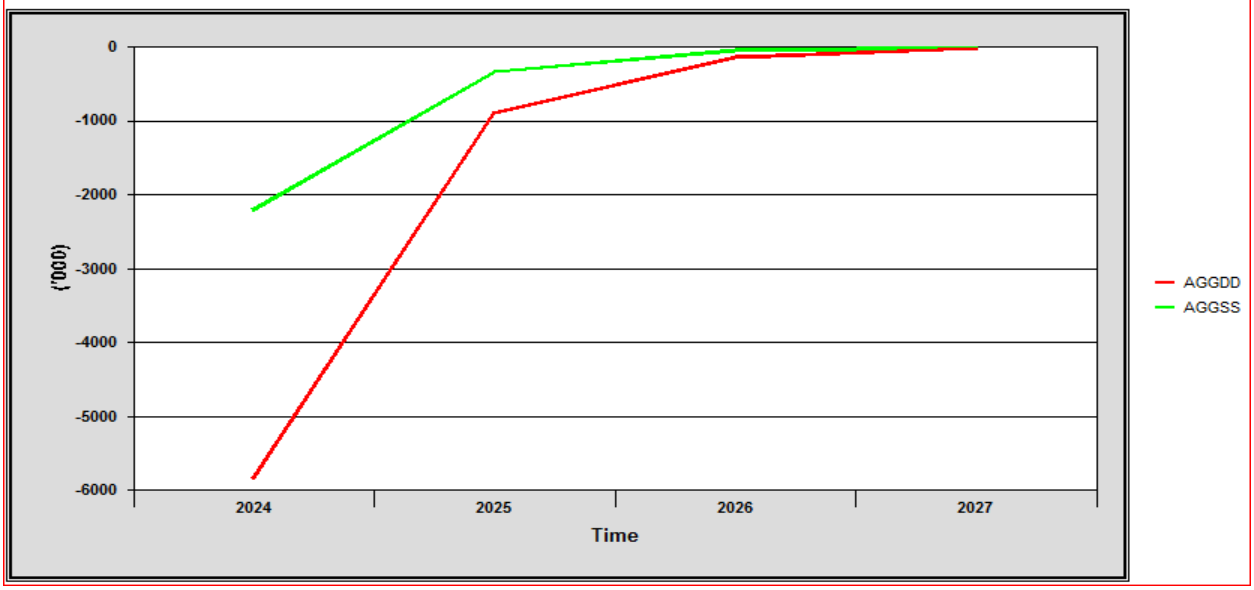
Fig. 4: DYNAMIC IMPACT OF EXTERNAL LOAN OF $2.2 BILLION ON SECTORAL OUTPUTS.



The Impact of External Debt of $2.2 Billion on Aggregate Demand and Supply.

The impact is positive with Aggregate Demand increasing by N1.48e-06 million and Aggregate Supply by N3.54e-07 million. The Markov plot is shown in Fig. 5.

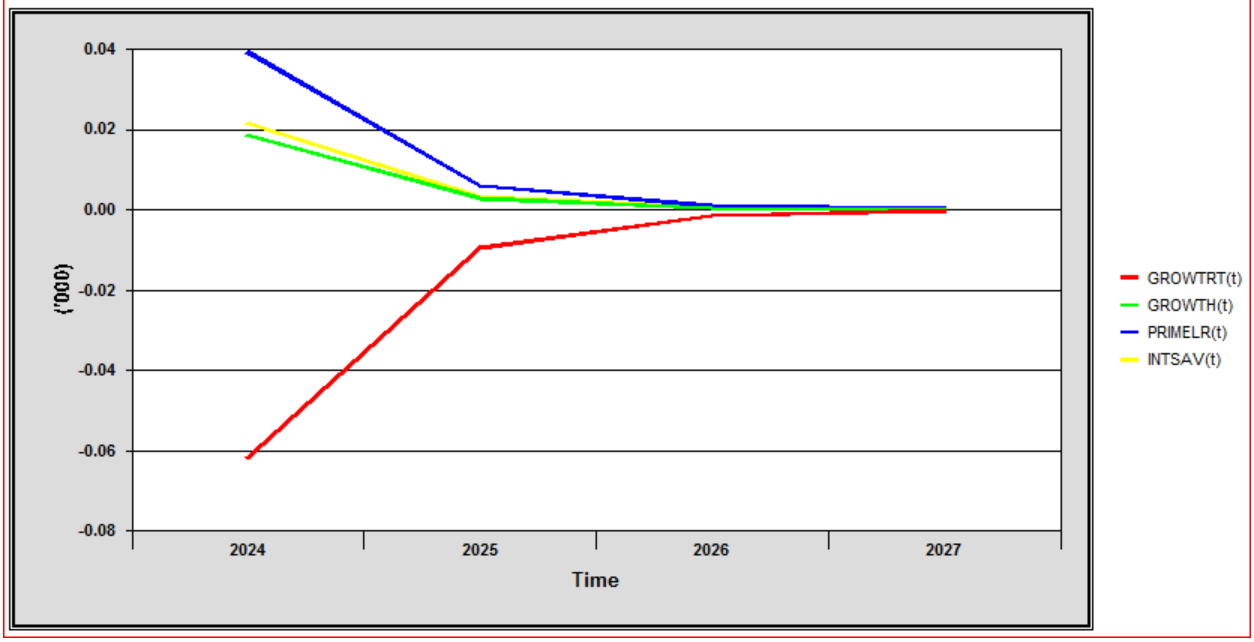
Fig. 5: DYNAMIC IMPACT OF EXTERNAL LOAN OF $2.2 BILLION ON AGGREGATE DEMAND AND SUPPLY.



The Impact of External Debt of $2.2 Billion on Growth and Interest Rate

The economy will experience a growth of N1.93e-13 million but the Interest rate will also increase by 1.05e-12%. Growth rate will fall by -1.2e-11% and Primary lending rate by -1.5e-12%. The Markov plot is shown in Fig. 6.

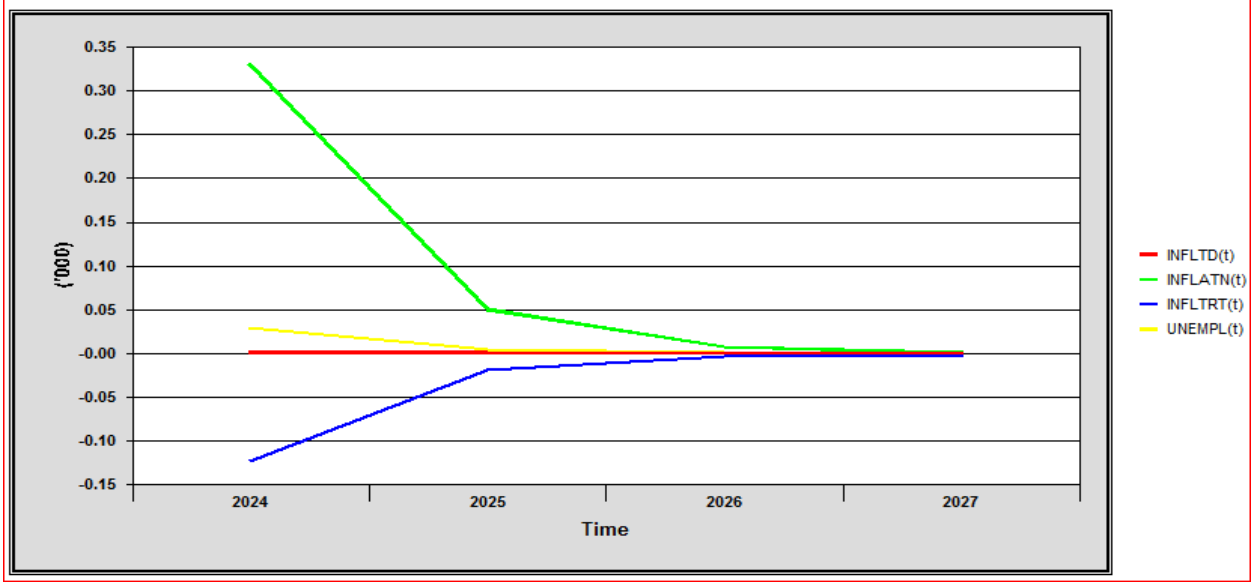
Fig. 6: DYNAMIC IMPACT OF EXTERNAL LOAN OF $2.2 BILLION ON GROWTH AND INTEREST RATE.



The Impact of External Debt of $2.2 Billion on Inflation and Unemployment.

The impact will indeed be favorable as all the indices fell with a downward shift of -8.2e-14 on inflation; inflation falling by -2.7e-12 points, inflation rate by -4.8e-12% and unemployment rate by -2.4e-13%. The dynamic plots are shown in Fig.7.

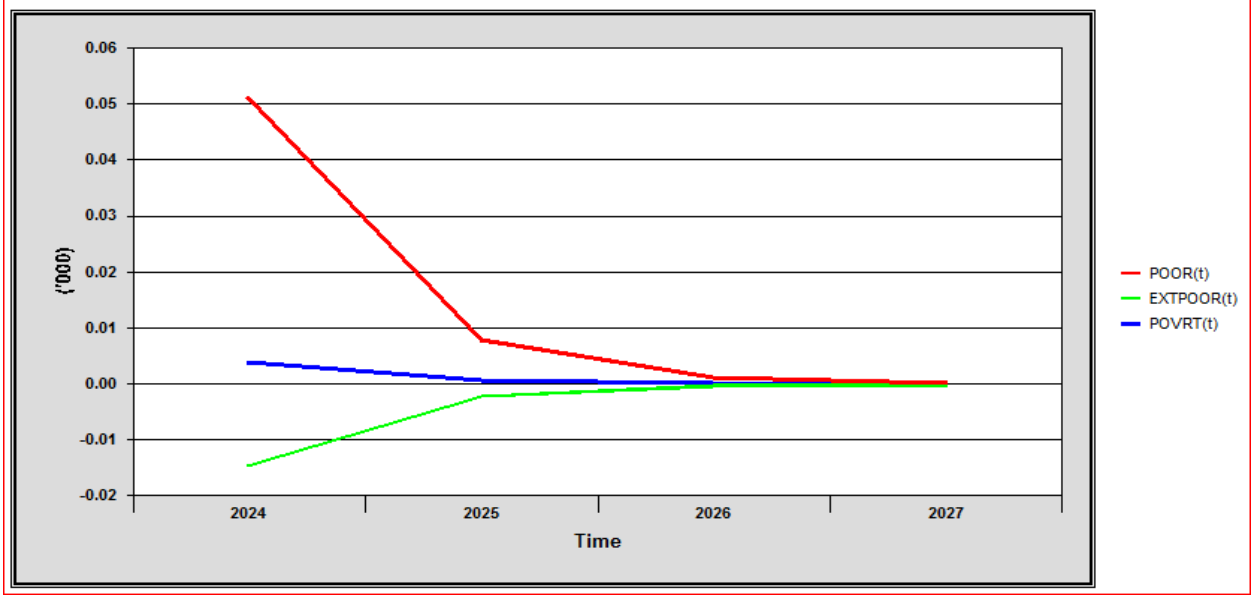
Fig. 7: DYNAMIC IMPACT OF EXTERNAL LOAN OF $2.2 BILLION ON INFLATION AND UNEMPLOYMENT RATE



The Impact of External Debt of $2.2 Billion on Poverty.

The impact on poverty is not encouraging because many poor people will become absolute poor. The Poor will decline by -3.8e-12 million but the Absolute Poor will increase by 5.47e-12 million. However the poverty rate will fall by -2.4e-13%. The impact will also die out by 2027.

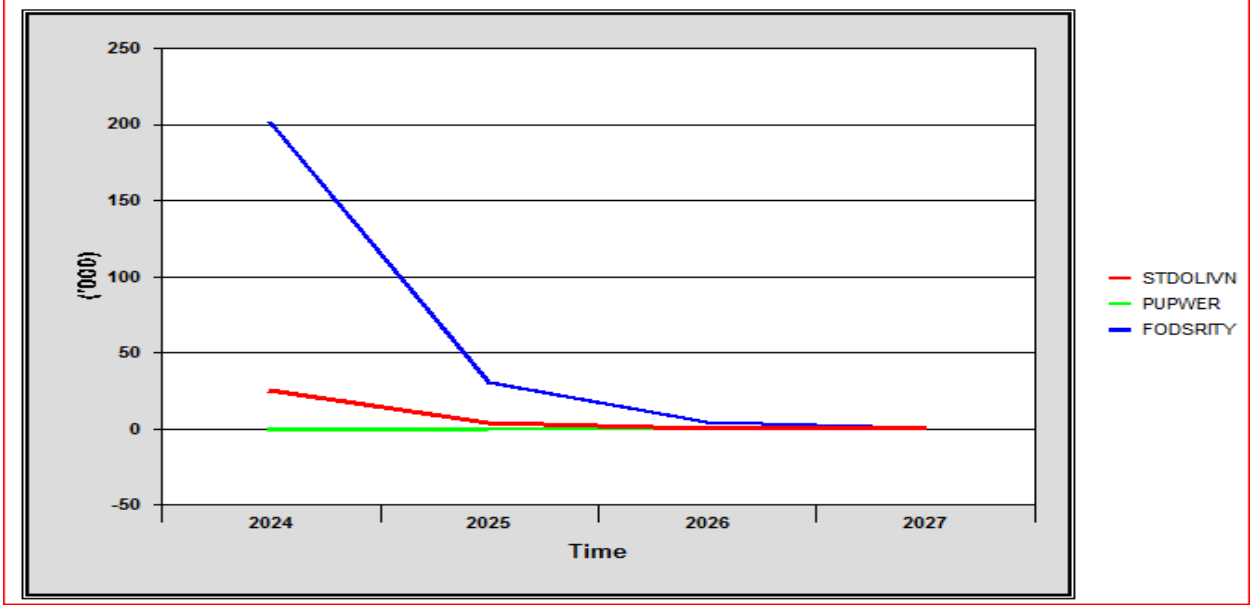
Fig. 8: DYNAMIC IMPACT OF EXTERNAL LOAN OF $2.2 BILLION ON POVERTY



The Impact of External Debt of $2.2 Billion on Welfare.

Food Security will increase by N3.87e-09 million but standard of living will decline by-N5e-10 million/capita while the purchasing power of the Nigerian citizens will be eroded by -N9.4e-11 million/capita. Fig. 9 shows that the impact will die down by 2027.

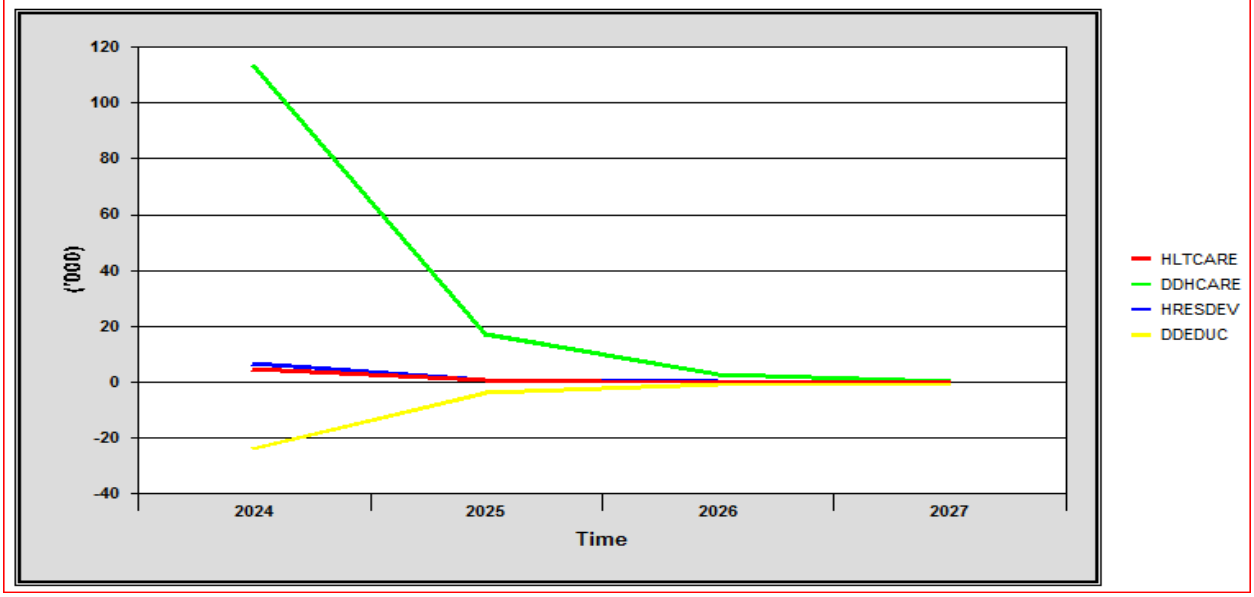
Fig. 9: DYNAMIC IMPACT OF EXTERNAL LOAN OF $2.2 BILLION ON WELFARE 1



The Impact of External Debt of $2.2 Billion on Education and Health Care.

The impact is dissimal as Health Care will fall by –N6.3e-11 million/capita and Education by –N2e-10 million/capita. The demand for Health Care and Education will increase by N6.07e-09 million/capita and N2.27e-08 million/capita. The impact will also die out by 2027.

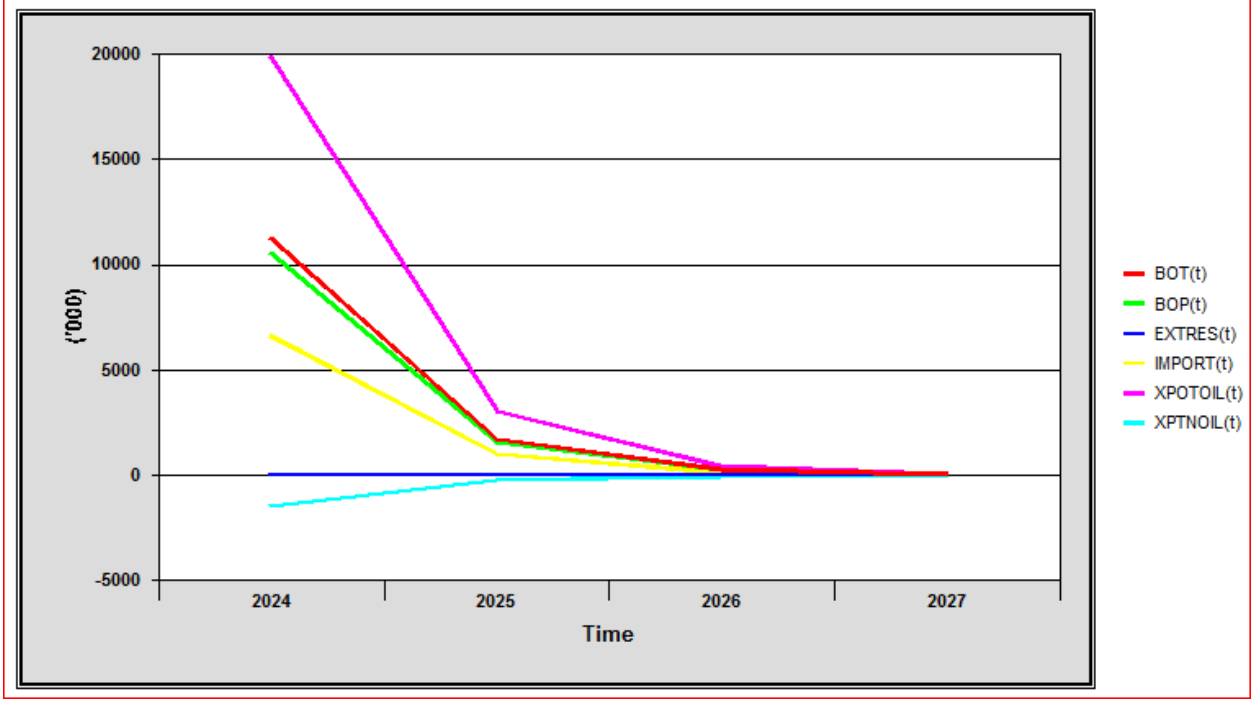
Fig. 10: DYNAMIC IMPACT OF EXTERNAL LOAN OF $2.2 BILLION ON EDUCATION AND HEALTH CARE



The Impact of External Debt of $2.2 Billion on External Sector.

The impact on the External Sector is mixed with External reserves, Imports and Oil Exports increasing by N3.69e-10 million, N4.59e-07 Million and N2.05e-06 million respectively; while Balance of Trade, Balance of Payments and Non-oil Exports declined by –N8.5e-08 million, -N3.4e-07 million and –N2.11e-08 million respectively. Fig. 11 shows the dynamic plot and indicates that the impact will die down in two years by 2027.

Fig. 11: DYNAMIC IMPACT OF EXTERNAL LOAN OF $2.2 BILLION ON EXTERNAL SECTOR



CONCLUSION

Indeed, the total debt of Nigeria, the Debt Management Office (DMO) said on Thursday 20 June 2024 was ₦121.67 trillion ($91.46 billion) and noted that the increase was from new borrowing to part-finance the 2024 Budget deficit. Deficit financing is not a new phenomenon in the quest to develop among nations. The idea of importing capital for economic development is very common among developing countries and particularly so in Nigeria. This trend may have been informed in Nigeria, by the dearth of capital (investment funds) for fueling Nigeria's development. However, when it is not applied efficiently, it gives birth to debt burden. In the quest to develop, Nigeria has resorted to deficit financing over the last decades but what is not immediately obvious, is whether such efforts are yielding the desired results. This paper in principle applies the total differential modeling approach that focuses attention on evaluating the impact of debt and therefore deficit financing on employment and capital formation in the fight against underdevelopment. In particular, the study sought to assess the impact of external debt on the Nigerian economy as a whole, using the total differential systems modeling and analysis approach (ecostatometrics). The findings in this paper corroborate the general conclusion that the Nigerian economy is over dependent on imports, which are more of consumer goods rather than capital equipment. Besides, the economy is not very responsive to fiscal deficit and only partially responsive to foreign direct investment. Empirical evidence seem to confirm the incidence of capital flight in Nigeria while the responsiveness of employment is zero and Poverty is high especially among the most vulnerable in Nigeria. It will also seem that deficit financing is not being used to an advantage most probably because borrowed funds are not applied optimally. Even though external debt

impacts positively on growth, it promotes poverty and unemployment as the Poor in Nigeria increased by 3.81e-06 million as a result of External debt and 7.1e-06 million absolute poor were exterminated as a result of external borrowing; while the Unemployment rate increased by 5.16e-07%. An examination of the dynamic plots of the new loan of $2.2 billion showed that the impact of external debt on the Nigeria economy will quickly die down in about two years so that by 2027 the impact would have expired in all the cases. Not until external loans are converted into physical infrastructure including factories and industries, would the full benefits of external borrowing be realized.

The temptation is to recommend that Nigeria should cut down on budget deficit and minimize external debts but from findings elsewhere, (Osagie, 2007), deficit financing has proved advantageous especially in Asian countries. The role of finance and investment in the development of any nation cannot be overemphasized. Besides, the ability of a country to take advantage and make effective use of the opportunities offered by markets, depend on the capability of its citizens and a lot of other considerations. Indeed, the reasons for the sluggish growth in the Nigerian economy are not farfetched and can be attributed to among other things, poor and inadequate infrastructure, unstable socioeconomic and political environment, poor expertise and low productivity, poor technology, high crime rate, unemployment, corruption and indiscipline. The challenges facing the Nigerian economy therefore, are to redress these inhibiting factors and create an enabling environment for private investments.

Of all the above constraints, the least recognized but yet the most militating factor against Nigeria's development and social progress is "corruption and indiscipline". This has so eaten deep into the fabrics of society and government that they are no longer recognized as odd.

RECOMMENDATIONS

1. External loans should be converted into physical infrastructure including factories and industries, for the full benefits of external borrowing to be realized;
2. Indeed, the reasons for the sluggish growth in the Nigerian economy are not farfetched and can be attributed to among other things, poor and inadequate infrastructure, unstable socioeconomic and political environment, poor expertise and low productivity, poor technology, high crime rate, unemployment, corruption and indiscipline. The challenges facing the Nigerian economy therefore, are to redress these inhibiting factors and create an enabling environment for private investments;
3. The least recognized but yet the most militating factor against Nigeria's development and social progress is "corruption and indiscipline". This has so eaten deep into the fabrics of society and government that they are no longer recognized as odd. Therefore the fight against corruption and indiscipline should be ruthless with no sacred cows. Of course this will require political will and decisive leadership; and
4. Maintain good governance and ensure the security of life and property.

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