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## **Fiscal Vulnerability Index for Nigeria**

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**CENTRAL BANK OF NIGERIA**

**CBN Working Paper Series**

**Fiscal Vulnerability Index for Nigeria**

By

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Abstract

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*The paper constructed a fiscal vulnerability index in Nigeria using a public debt dynamic equation on annual data spanning a period of sixteen (16) years, 2000 to 2015. The methodology allows us to estimate the primary balance that stabilizes the public debt. In order to establish fiscal vulnerability, we computed the primary gap, which is the difference between the stabilizing primary balance and the current primary balance. Based on the methodology, only positive values of the primary gap suggest fiscal vulnerability. The analysis of the results showed that episodes of vulnerability were observed in ten 10 (66.67 per cent) out of fifteen 15 observations that were captured. In addition, episodes of fiscal vulnerability were more prevalent during the period of the global financial crisis. The study thus, recommends the need for all key institutions and stakeholders to continue to support the Country's fiscal framework in order to establish stronger credibility of fiscal policy, enforcement and flexibility of fiscal rules. This is in view of the fact that concerns about fiscal vulnerability and a stream of other events would continue to shape the future of Nigerian Economy.*

JEL Classification:

Key words: fiscal policy, vulnerability, debt, primary gap, primary balance, stabilizing primary balance

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## 1. Background

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The literature on fiscal policy is replete on how it has been confronted with various issues since the last decades especially in the aftermath of the global financial crisis. Studies in this regards include: debt limit beyond which fiscal solvency is in doubt (Gosh, Kim, Mendoza, Ostry and Qureshi 2011), when sovereign debts turns bad (Scott 2010), increasing public debt (Reinhart and Rogoff), solvency risk exposure (Ciarlone and Trebeschi, 2006), ageing population (Corsetti and Roubini 1996), Since June 2014 for instance, when oil prices began to plummet, it has become obvious that fiscal policy is faced with difficulties in overcoming different external shocks that might occur. In fact, the decline in global oil prices and the severe economic downturn that followed especially for oil exporting countries, suggests vulnerability, however, this assertion to some extent may be counterintuitive. Hence, the logical challenge and expectation is for us to attempt to proffer a concise discourse of fiscal vulnerability.

Over the years, the plummeting of oil prices has continued to pose economic challenges for many oil-exporting countries including Nigeria. In the past the oil industry which encountered booms and busts has recently faced its deepest downturn beginning from the 1990s, owing to supply glut and weak global demand. Earnings are down for countries that have made record receipts from taxes and royalties in recent years, leading to sharp cut in investments, exploration and production. Several thousands of oil workers have lost their jobs, and manufacturing of drilling and production equipment has fallen sharply.

The recent decline in crude oil prices created severe economic consequences for most oil exporting countries particularly, Nigeria because of its overly dependence on crude oil exports. The development requires greater fiscal flexibility in view of the fact the current decline is unconnected to the conventional factors like geopolitics and natural occurrences. Rather, the current decline is technologically- induced following the discovery of shale gas. The greater fiscal flexibility envisaged is one that has the capacity to provide instant response whenever there is a shock(s) like the current one that could affect fiscal solvency. Empirical evidence indicates that fiscal policy has been confronted with numerous difficulties since the 2007/2008 global financial and economic crisis which has weakened its capacity to react to shocks and thus, increased its vulnerability.

For Nigeria, the low oil prices has led to a sharp decline in government revenue and worsening of government finances. As a result, public debts are likely to rise and expected to increase more.

Fiscal problems in the country have manifested in the form of reduced Federal Accounts and Allocation Committee (FAAC) distribution, reduced external reserves and in fact, pressure in the

foreign exchange market. These worrisome developments have brought to the fore issues of economic policy management and fiscal sustainability.

The channels through which fiscal policy can be transmitted within an economy underscore the importance of fiscal operations in an economy. Although, there are divided schools of thought in determining fiscal policy transmission mechanism, on one end; the neo-classicals believe that expansionary fiscal policy would decrease output and inflation. In that as government increases its public debt, interest rates on debt also increases due to perceived default risk. The rise in interest rates will result to a fall in output and inflation. On the other end, expansionary fiscal policy through increased public debt would result to high public anticipation on future interest rates; which in turn raises labor supply. (i.e people will prefer to work more to pay tax which brings down real wages and consumption). But the new Keynesian school of thought posit that increases in public spending raises demand and in turn increased activities resulting to higher output.

No doubt, fiscal policy can be useful in enabling the economy to achieve progress in a variety of ways including price stability, economic growth, income redistribution and reduction in unemployment. Thus, an unsustainable fiscal environment has dire consequences for monetary policy implementation. Blommestein and Turner (2011) for example, observed that an unsustainable fiscal environment could set the stage for fiscal dominance, which could undermine the traditional demarcation between monetary, fiscal and public debt management authorities. The authors also noted that, a situation where the central bank begins to intervene in the sovereign bond markets is an indication of fiscal dominance.

Another plausible example on this occurs when financial markets show aversion for sovereign risks. We observed this scenario in 2010 during the crisis in Greece when it faced a particularly heavy debt-repayment burden and was unexpectedly, shut out from borrowing in the financial markets. We recall that Greece had announced in October 2009 that it had been understating its deficit figures for years, raising alarms about the soundness of Greek finances.

A sound or appropriate fiscal policy could be associated with economic growth and development (Khosravi and Karimi 2010). This condition, however, does not hold in Nigeria where stringent fiscal policies translate to growth. The Nigeria's experience portrays the complications of implementing fiscal policy in a situation of increased volatility in oil revenue (Baungard 2003). In

the past few years, Nigeria has witnessed a considerable increase in government indebtedness despite the crude oil gains. These developments may be associated with the issue of poor fiscal policies as exhibited by the government's inability to save during windfalls. Evidence revealed substantial increase in government spending in past years, as states government sought for continuous agitation for sharing from the Excess Crude account (ECA).

Government debt profile has increased significantly after the debt pardon in 2005. It substantially rose from about ₦4.2 billion to ₦12.1 billion in the second quarter of 2015, thereby increasing the debt service and debt to GDP ratio. In the recent time as the oil receipts decreased as a result of the global oil price, government spending have been negatively affected, thus financing the budget becomes a constraint. Over the years, there have been revenue deficits driven largely by oil prices collapse, with negative implications attendance to the stable provision of government services.

It is thus crucial to have in place a fiscal framework to monitor public finance risks. The existence of a well-entrenched fiscal rules and medium-term framework can be a source of great support because it can facilitate unimpeded access to borrowing at favorable conditions. It also has the potential to provide control over expenditure during a budget cycle as well provide the latitude to be able to respond to shocks. Recurring and persistent fiscal imbalances, which have plagued the Nigerian economy, usually lead to high levels of government debt, sovereign debt rollover and eventually, indebtedness. The foregoing highlights the significance of developing indices to measure fiscal vulnerabilities to cater for unexpected fiscal shocks and their attendant effects on the Nigeria economy.

Blanchard (1990) identified four sets of questions that fiscal indicators can help answer:

- i. What part of the changes in fiscal position is due to changes in the economic environment and what part is due to policy
- ii. Can the government sustain its current course of fiscal policy, or will the government have to adjust taxes or spending?
- iii. What is the effect of fiscal policy on economic activity: effects on relative prices- labour or the price of capital?
- iv. What is the macroeconomic impact of fiscal policy, through deficit and debt finance?

It is against this background that, this study contributes to the literature on fiscal monitoring framework, the core objective of developing a fiscal vulnerability indicator. The paper aims to develop index (indicators/indices) for measuring fiscal vulnerability in Nigeria. In specific terms, the

paper analyzes the current state of fiscal developments in Nigeria and identifies basic fiscal variables to cater for unexpected fiscal shocks and their attendant effects on the Nigeria economy. In the longrun, the study aims to develop fiscal vulnerability forecasting model for tracking fiscal conditions and to guide monetary policy implementation. While, we posit that there is no single indicator that can proffer solutions to all these questions, our attempt in this study is to design fiscal indicators in line with the peculiarities of the Nigerian environment. In terms of output, we develop a set of indicators and apply them to explain fiscal policy in Nigeria. In addition, the indicator is expected to provide early warning signals on rollover problems, as well as provide avenues for policy makers to adjust policies when confronted with signs of fiscal vulnerabilities or extreme fiscal stress. Following this introduction, the rest of the paper is organized as follows. Section 2 presents the conceptual framework. Section 3 discusses some country experiences, while section 4 provides some stylized facts on fiscal developments in Nigeria. Section 5 looks at the methodology and results. We conclude the paper in Section 6.

## **2. Conceptual Framework**

Fiscal vulnerability depicts a government's exposure to the possibility of not achieving its broad fiscal policy objectives. Its main concern is with the occurrence of unexpected fiscal policy challenges and the capacity of the government to handle them. When addressing fiscal vulnerabilities, the first risk that comes to mind is "sovereign debt risk" and how much damage it could cause to the economy in the absence of fiscal adjustments. Frequent fiscal imbalances could lead to high levels of government debt, sovereign debt rollover and ultimately, insolvency. There is need to develop indices that can gauge fiscal vulnerabilities in order to be able to absorb unexpected fiscal shocks and their attendant effects on the economy. Two basic concerns that feature prominently in the theoretical literature on fiscal vulnerability are the determination of the thresholds or limits for public debt and the choice of appropriate fiscal variables to estimate rollover risks and fiscal vulnerabilities.

### **2.1 Prudential Limits on Public Debt**

In the analysis of fiscal consolidation and fiscal vulnerability, the need to recommend limits on public debt to GDP ratio is of fundamental importance in view of its crucial role. Following rigorous and time-tested methodologies, the International Monetary Fund (IMF) has in times past, established benchmarks that policy makers and studies have widely received and referred. Although, the Fund has not officially endorsed some of these benchmarks, they are not doubt robust enough to guide analysis on fiscal policy and in proposing prudential limits on public debt to GDP ratios.

Thus, while a debt-to-GDP ratio of 60 per cent has often been quoted as a prudential limit for developed countries, a debt-to-GDP ratio of 40 per cent has been suggested for developing emerging economies. Thus, crossing these limits has the capacity to threaten fiscal sustainability. Remedial measures like fiscal adjustment as often times suggested to countries that are in the breach in order to enable them to reach the required suggested public debt-to-GDP ratios within a given period. In the follow up to the preparation for the economic and monetary union and the eventual formation of the euro zone, European countries agreed on a 60 per cent debt-to-GDP ratio among a handful of targets during the early 1990s. There was no indication of optimality; it was the median debt-to-GDP ratio.

An issue that is worthy of note is the rising tendency for countries to want to accept these thresholds as "optimal" in the specific sense that crossing these thresholds poses threats to public debt sustainability. This may not necessarily be so as some literature have often emphasized that a debt

ratio above the suggested threshold (60 or 40 per cent) is by any means necessarily implying a crisis. It was also suggested that there is an 80 percent probability of not having a crisis (even when the debt ratio exceeds 60 or 40 percent of GDP. The IMF (2010) has even suggested that the public debt limit, is not an absolute and immutable barrier, nor should the limit be interpreted as being the optimal level of public debt. As Domar (1944), argued “the problem of the burden of debt is essentially a problem of achieving a growing national income”. The principle underlying this argument is that, higher fiscal deficits can only enhance purchasing power and do not wield any mounting pressure on interest rates or inflation, nor do they cause large current account deficits in an economy that has spare capacity or unemployment.

As has been argued in the literature, this is consistent with the IMF’s global macroeconomic model, which assigns a dual role to fiscal policy, which is namely that of smoothing out business cycles in the short run; and meeting targets for debt sustainability in the longrun.

Another claim in the literature is the theory that higher public debt today would be repaid by higher tax in the future. Domar (1944) posted a contrary view when he inferred that, “the problem of the burden of debt is essentially a problem of achieving a growing national income”. In addition, Domar (1993) suggested that, “the proper solution of the debt problem lies not in tying ourselves into a financial strait-jacket, but in achieving faster growth of the GNP”. We could interpret Domar’s arguments to mean that, the debt need not be repaid as long as the interest on the debt is less than the annual increase in nominal GDP. This is because; the debt will be a shrinking fraction of GDP.

## **2.2 Basic Fiscal Vulnerability Variables**

Baldacci, McHugh, and Petrova (2011) underscored some key fiscal indicators, to estimate rollover risks and fiscal vulnerabilities. The indicators, which were grouped into three pillars, include basic fiscal variables; long-term trends; and asset and liability management.

A number of fiscal variables have been found to be theoretically useful as univariate leading indicators for signaling crises on an annual basis. The literature has identified some indicators like short-term debt, foreign currency debt, and various deficit measures as the best indicators. These indicators have performed as well as the best (annual) leading indicators in other Early Warning Signal (EWS) studies. For instance, the deficit and financing variables are perceived to have capacity to send clear signals of impending crisis as was demonstrated during the crises in in Bulgaria, Pakistan, Russia, Ukraine, Brazil, and Ecuador in the late 1990s. Results from the event studies suggested that deficits are significantly higher, on average, in the two years prior to currency and

debt crises than in non-crisis periods. Thus, indicating that fiscal variables could indeed trigger financial sector crises in view of the strong relationship that exist between them and banking crises as well as currency and debt crises.

In Coratelli (2011), a sovereign risk can manifest in a number of ways; it could take the form of a roll over crisis, which varies in intensity, ranging from a surge in interest rates to open default on public debt. It may also arise from a situation whereby risk of instability is not looming but there is a presence of increasing government and deficit, thereby negatively affecting economic growth.

Next is the rollover risk, which defines the risk that is associated with the refinancing of debt. Countries are exposed to rollover risk when a matured debt is rolled over into a new debt. Thus, the country could be forced to refinance its debt at a higher rate and incur more interest charges if interest rates rise adversely in the future. When assessing rollover risk, the variables to focus on include: public debt stock, current and estimated primary fiscal balances, differential between interest rate on public debt and the GDP growth rate and the growth-adjusted interest rate on public debt (Escolano, 2010, Baldacci, McHugh, and Petrova (2011)). To measure public debt, literature identifies the debt to GDP ratio as an appropriate proxy, because it accounts for not only public liabilities but also the assets which could be used to pay back the debt as and when due.

When the debt ratio is on the increase government finds it more difficult to generate surpluses to offset the debt. A higher debt ratio also connotes a history of fiscal indiscipline, complicating the task of government to efficiently managing the debt scenario (Jędrzejowicz and Koziński, 2012).

The public debt to GDP ratio can then be compared to the widely accepted benchmark levels (e.g. 40 per cent of GDP for emerging economies, 60 per cent of GDP for advanced economies and 90 per cent of GDP for the United States and Japan). Therefore, a higher debt level compared to the benchmark would signify a red flag because the government would find it more difficult to adjust to a sustainable level of debt (Hayes, 2011).

Other variables to consider when measuring fiscal vulnerabilities according to Hemming et al (2003) include financial market indicators such as the spread on long-term public external debt. This variable provides the necessary information on risk of debt default, which is useful in fiscal vulnerability analysis. However, financial indicators should be used with caution because they tend

not to signal looming crisis on time and there is usually the difficulty of specifying the exact contribution of fiscal elements to the crisis.

It is also pertinent to consider variables that address the financing needs of the government when addressing fiscal vulnerabilities. For instance, a government's exposure to a crisis becomes more apparent, if it has needs to raise large sums of money at frequent intervals (Hayes, 2011). It becomes even worse when a country needs to raise the funds in foreign currency, as it would affect the level of external reserves of the country as well as the stability of the exchange rate. Therefore, variables such as the average duration of government bonds (which depicts the frequency with which the government needs to refinance its debt), the percentage of external debt to the value of exports and the fiscal balance are also considered.

The health of a country's financial sector is also very important when measuring fiscal vulnerabilities. As has been observed in the global economy, banking crises and public debt crises usually occur side by side. This is because the balance sheets of banks have the potential to grow even higher than a nation's output and peradventure a crisis occurs in the banking system, the bailout provided by government often have negative impacts on government finances. Therefore, variables such as the capital ratio of the banking sector (which shows the capacity of the banking sector to absorb losses without the need for government support), the proportion of loans to deposits and the percentage of non-performing loans should be explored.

The Value at Risk (VaR) approach, which is commonly used for evaluating risks by private sector businesses, may also be applied to the public sector (Hemming et al, 2003). This approach identifies risks associated with portfolio or balance sheet problems and provides a measure for such risks. This approach identifies the relevant shocks and areas of exposure thereby arriving at a measure of solvency, which takes into account the highly volatile nature of the macroeconomic and financial environment.

However, some problems have been identified with using the VaR approach, one of the most common is the dearth of comprehensive data on the balance sheet item of the public sector, making it difficult to estimate and make meaningful inferences. In addition, a standard VaR model makes use of asset prices which are based on a probability distribution; it may therefore, be difficult to incorporate public finance variables in the model which exhibit more of behavioral relationships than random tendencies.

Another set of important indicators as highlighted by Jędrzejowicz and Koziński, (2012) and Hayes (2011) are fiscal rules and institutional factors. Globally and in the light of present crises faced by many countries, there is an urgent need for a strong commitment to fiscal consolidation while ensuring that the objective of economic growth does not suffer. One way to promote growth is to build investor's confidence in the economy by ensuring that strong legal and political institutions are in place. When such institutions are in place, it becomes less difficult to attract investors and other economic agents to do business in the economy.

Some of the institutional variables include Voice and accountability (which measures the extent of democratic participation in the country, freedom of expression and association as well as the freedom of the media). Others are the level of political stability and absence of terrorism or violence, and the degree of government effectiveness (in terms of the quality of public services, independence of the civil service and the commitment of government to policy implementation). In addition were the quality of regulation (in terms of financial laws and regulation, and the extent to which taxes are heavy and distorted), rule of law (with respect to the law enforcement agencies, the courts etc.) and level of corruption.

## **2.2 Long-Term Fiscal Trends**

These indicators are factors that affect the long-term trends in fiscal variables. They are regarded as very important because fiscal solvency is dependent on the degree to which long-term economic trends exerts pressure on the nation's budget.

Apart from the current fiscal position, fiscal solvency also depends on expected future primary balances and current projections of long-term fiscal challenges that could affect the perception of solvency as well as increase the risk of rollover. Some of the long term factors as identified by Coratelli (2011), include trends in health care and pension expenditure, expenditure to fight global warming, spending to combat resource depletion etc. Demographic trends such as the fertility rate are also important because they have weighty effects on economic activity and the fiscal position of a country. For example, a low fertility rate below a certain level could lead to a significant decrease in the labor force especially if there are not enough migratory inflows entering the labor force.

### **2.3 Asset and Liability Management**

These indicators look at the structure of government's assets and liabilities and their exposure to rollover needs. For instance, an economy can be said to have higher exposure to solvency problems if it has higher need to rollover huge amounts of debts in the near term. Therefore, the lower the financing requirements, the lower will be the risk of fiscal solvency concerns and rollover crisis. Some of the asset and liability management indicators as described by Baldacci, McHugh, and Petrova (2011) are as follows:

- a) Gross Financing Needs: This refers to the total stock of maturing public debt. It serves as a good measure of the requirements for government rollover.
- b) Share of Short Term Government Debt to Total Public Debt: Typically, countries with a higher need for short-term funds are more exposed to hostile market reactions when the risks of solvency are high. Therefore, in most emerging economies where financial market conditions are not too encouraging, a large stock of short-term debt compared to the total debt signifies a higher exposure to rollover risks and solvency.
- c) Ratio of Short Term External Debt to International Reserves: This variable provides insight on the likely amount of foreign currency needed to service short-term foreign currency debts.
- d) Share of External Debt, To Total Debt: For most emerging economies, debt cannot be issued in domestic currency like it can in the advanced world because of investors risk averse attitude towards currency risk. This exposes emerging economies to foreign exchange risk. A high level of foreign currency debt raises the possibility of a negative impact on the ability of the government to service its debt, given a series of exchange rate shocks.

### **3. Country Study/Experiences**

#### **Uruguay**

Rial and Vicente (2004) in their work on Fiscal Sustainability and Vulnerability in a Small Open Economy found that small emerging economies experiencing recurrent shocks of significant magnitude, could not base its findings on fiscal sustainability but on level of debt. They rather recommended that, the debt structure, debt maturity, interest rate, Instrument types etc are variables that are considered important. Relying on the risks related to the structure of debt, the work found that, despite the debt to GDP ratio that was low in Uruguay, at the beginning of the 1990s, there was high vulnerability. The study concluded that, future studies on vulnerability should consider the fact that, increase in component of the country's domestic currency in its debt profile, would enable debt sustainability. In addition, suggested was that, about 2 per cent of GDP relative to the endogenous trend would be required in order to return to a sustainable path.

#### **Poland**

The worsening fiscal positions of most countries in the aftermath of the global financial crisis encouraged Tomasz Jędrzejowicz and Witold Koziński (year) to assess Poland's fiscal vulnerability. Their work consisted five elements consisting of (i) the medium-term dynamics of public debt (ii); the level of public debt (iii) public debt management and the liquidity position of the government (iv) long term sustainability of public debt;; and (v) fiscal rules and institutions. Despite the limited fiscal risks in Poland's, there is still need to correct fiscal lapses. In Poland, there exists a well-defined fiscal policy anchor, representing a public debt threshold of 60 per cent of GDP, These threshold are established in the public finance act. Thus, whenever the debt to GDP exceeds the 60 per cent statutory ratio, it is termed as vulnerable. The bridge of this signaled for fiscal consolidation government.

#### **Bulgaria**

Brix, Shatalov, and Zlaoui (2000) established the structure in managing fiscal risk in Bulgaria. They found that, it is the responsibility of the Central Authority to manage their liabilities and other forms of fiscal risk in developing a framework to assess and manage fiscal risk. It was suggested that this could be achieved policy strategy adjustments. They identified key sources of risk: they are; collection capacities of the social protection institutions, environmental liabilities and investment requirements, and further engagement in off-budget programs. They proffered that the government' should limit the risk exposure, yet accommodate investment that are crucial to growth. The country

should optimized strategy for liability management, fiscal reserves, and risk mitigation. Other recommendation is to prioritize and place strict limits on the amounts of government obligations.

**Belgium, Ireland, Germany, Greece, Spain, France, Italy, Netherlands, Austria, and Portugal**

Andreea Stoian (2013) computed the fiscal policy vulnerability of 10 advanced economies in European Union; they are Belgium, Ireland, Germany, Greece, Spain, France, Italy, Netherlands, Austria, and Portugal. He evaluated the primary balance that stabilizes public debt using the public debt equation methodology. By determining the difference between the current and stabilizing primary balance, the primary gap, which indicated fiscal vulnerability, was computed. With annual data that ranged from 1971 to 2010, he found that a few episodes of more severe fiscal vulnerability occurred after the financial turmoil. Majority of the analyzed data showed a normal state of fiscal vulnerability induced by not aiming at the stabilization of public debt, rather than government's failure in achieving the stabilizing the primary balance. According to this study a country's fiscal policy is determined as "vulnerable" if the government primary balance that stabilizes public debt denoted by  $P_t^*$  is more than the ration of government current primary balance to GDP at time (t) denoted by  $P_t$ .

#### **4. Review of Fiscal Developments in Nigeria: Some Stylized Facts**

There are empirical evidences to support the argument on the existence of a number of different channels through which fiscal policy promotes economic growth and development. The use of fiscal policy as a major stool for stabilization is paramount in most less developed countries (LDCs). Government fiscal policy actions affect revenue receipts and expenditure and thus provide a measure of government's net receipts, its surplus or deficit. Fiscal policy serves as the government's shock absorber in specific areas of development as the government may decide to counterbalance variations that are in private consumption and investment using counter cyclical revenue and expenditure measures.

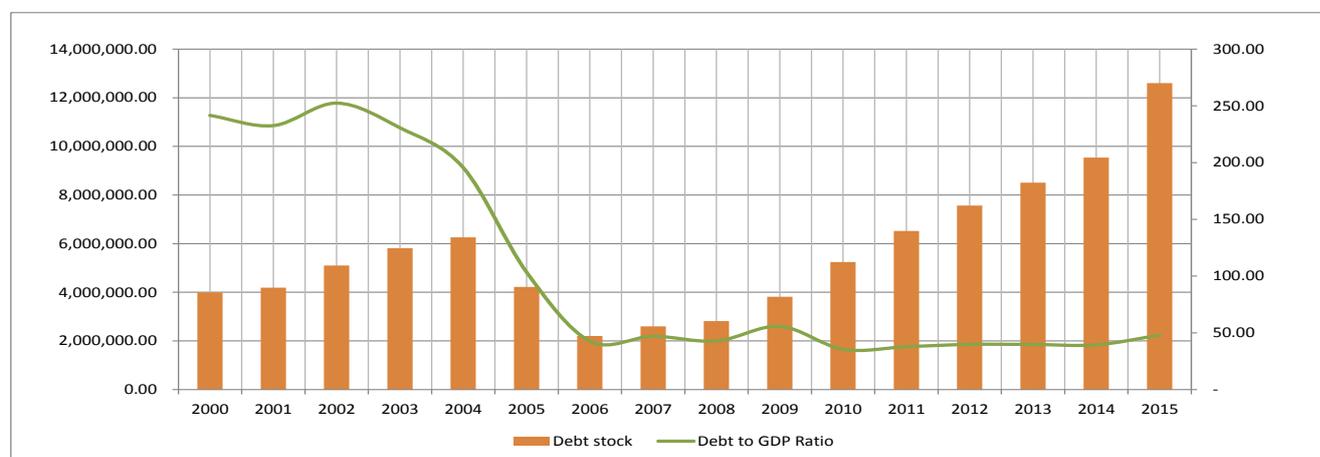
In this section, using annual time series data of some stylized facts on the impact of fiscal policy, we provide analysis of fiscal policy in terms of government expenditure, tax revenue, debts and debt service.

There were indications of substantial increase in government spending between 2000 -2005. The spending may have been exacerbated by the oil windfall, which resulted in increased government spending with an average of about 21 percent of GDP during that period. The advent of a civilian government in 1999 and the subsequent reform programs restored fiscal discipline in the system. However, another era of oil windfall (2000 -2004) and the associated regular monetization of foreign exchange receipts for the purpose of distribution to various tiers of government, triggered large increases in government spending. Thus, government spending jerked up to 19 per cent of GDP. It was 14 per cent in 2000. Ratio of deficit to GDP also rose by 7.5 per cent in 2005, from 0.30 per cent in 2000. The ratio of deficit to GDP peaked at 12.72 in 2009 owing to increases in extra budgetary outlays.

Bearing in mind, the need to enhance transparency and accountability in the sphere of public finance, the Nigerian authorities embraced fiscal consolidation following the implementation of various fiscal stimulus packages by the Federal Government beginning from in 2009 through 2010. The consolidation was targeted at reviving economic activities, while creating the enabling environment for greater private sector participation in the economy and accelerating sustainable economic growth.

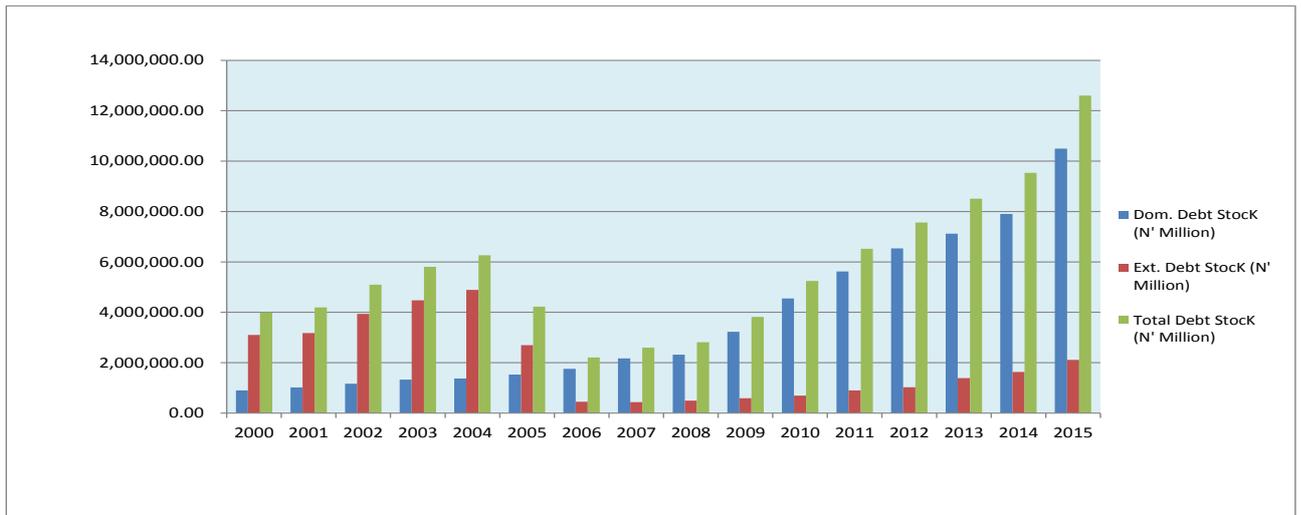
## Nigeria's Debt Profile and Debt/GDP

The public debt-to-GDP ratios play a crucial role in fiscal consolidation and in setting prudential limits on public borrowing. Although, there is empirical evidence of a weak relationship between the debt-to-GDP ratios, there are also, strong arguments in the literature that, high debt-to-GDP ratios cause macroeconomic instability, which is not good for growth, and hence make debt unsustainable. The Nigeria public debt has been consistently on the increase since the Paris Club exit in 2005, thus making fiscal policy more vulnerable. Public debt increased significantly as most of the borrowings deployed to financing recurrent expenditures. The debt to GDP ratio dropped significantly from the early 2000s to 2005, it has however attained a stable trend from 2005 when the country exited from the Paris Club of nations. Since then, the trend remained stable; accompanied by the growth in GDP in recent years.



**Figure 1: Nigeria's Debt Profile and Debt/GDP**

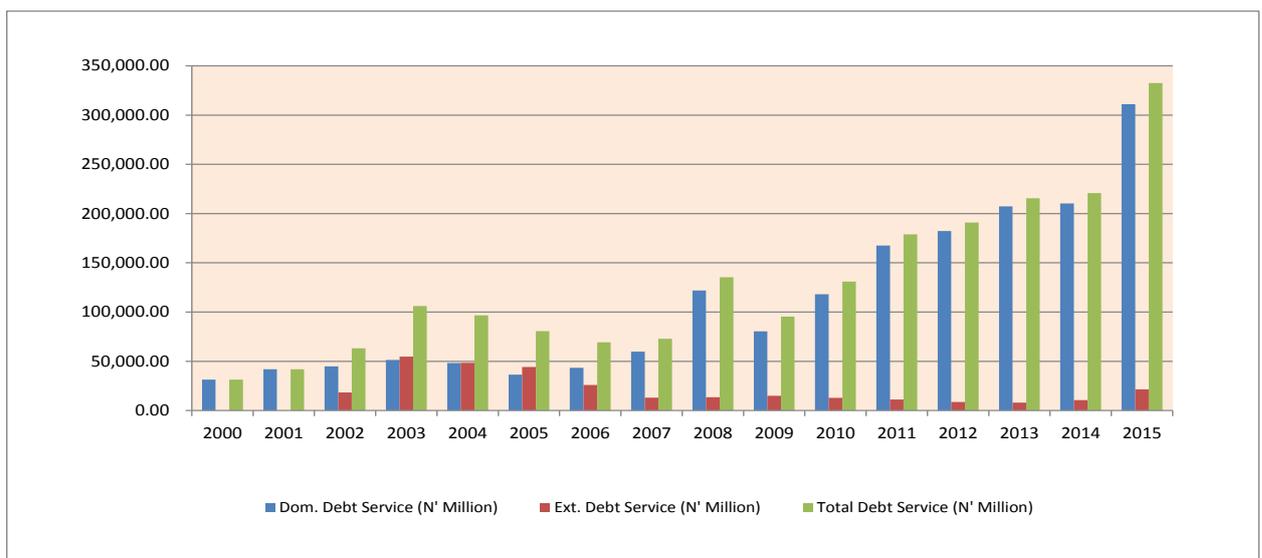
Except in 2002 and 2008, the government had fiscal deficit all through with the debt to GDP ratio remaining in the negative region within the period under consideration (Figure 4). While external debt stock dropped substantially following the exit from the Paris club. Nigeria enjoyed some reprieve through debt forgiveness by these international creditors in 2006 which made for as low as less than 4.66 per cent in 2010. It was expected that there would be fiscal policy consolidation and improvement. On the contrary, the country experienced a continuous rise in domestic debt and got to a peak in 2015 with the sharp drop in oil prices. Total debt to GDP ratio peaked at 252.41 Per cent in 2002. Since then, debt toll, especially domestic debt kept increasing up to 2015



**Figure 2: Domestic External and Total Debt Stock, 2000 – 2015**

From Figure 2, we can infer that the stock of external debt was significantly higher than that of domestic debt from 2000 to 2005. After Nigeria’s debt relief in late 2005, the external debt stock was significantly reduced and has remained low compared to the level of the domestic debt. Domestic debt, on the other hand had been on a steady increase from 2000. It has accounted for over 80 per cent of the total debt stock from 2007 to 2015.

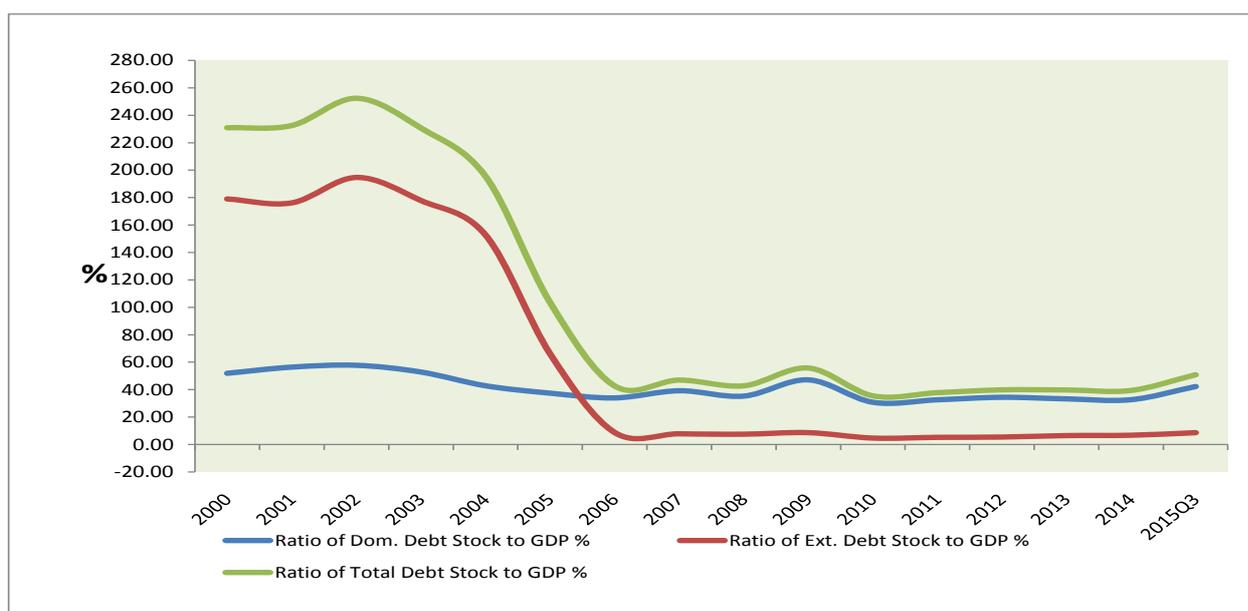
Nigeria’s total debt stock stood at ₦12.60 trillion as at end-2015. While the highest debt stock was ₦4.89 trillion in 2004 for external debt, the highest domestic debt stock was ₦10.49 trillion in 2015. In addition, the average *total* debt stock was ₦5.69 trillion in the review period; the average domestic debt stock was ₦3.68 trillion, while the average for external was ₦1.99 trillion.



**Figure 3: Domestic, External and Total Debt Service, 2000 - 2015**

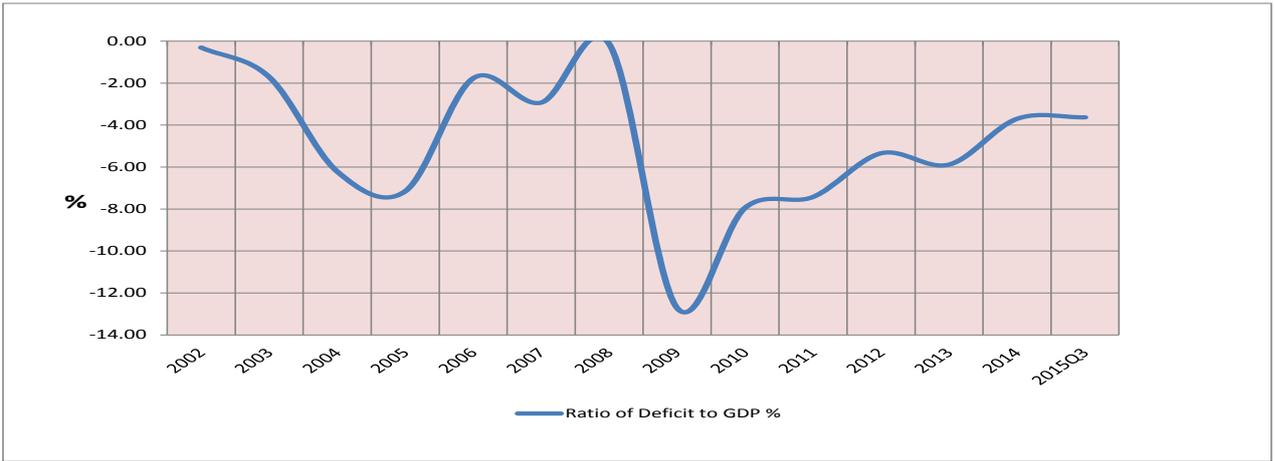
Figure 3 shows the trend in domestic, external and total debt service in Nigeria for the period, 2000 to 2015. It indicates that the amount expended on servicing external debt had been on a steady decline from 2003 to 2014. It also reveals that domestic debt service accounted for over 80 per cent of the total debt service, from 2007 to 2015.

Total debt service averaged ₦128.89 billion in the review period. While average domestic debt stock was 3.68 billion, the average for external was ₦1.99 billion. While the highest service amount was ₦54.58 billion in 2003 for external debt service, the highest for domestic debt service was ₦311.04 in 2015.



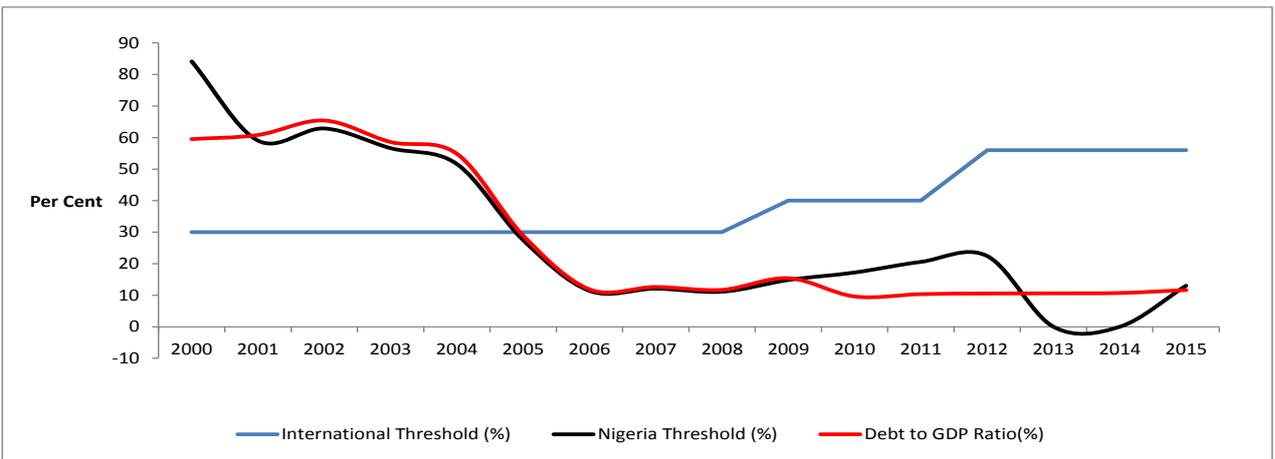
**Figure 4: Domestic, External and Total Debt to GDP Ratios, 2000 – 2015Q3**

In terms of the ratios, figure 4 illustrates the components of total debt in Nigeria as percentages of the Gross Domestic Product (GDP). The ratio of external debt stock has moved in tandem with total debt stock. The ratio for total debt to GDP was very high (over 200 per cent) from the 2000 to 2005. It however, experienced a sharp decline in 2006 and remained within a range of 30 and 50 percent (averaging 43.11 per cent) for the rest of the review period; which is below the 2013 DMO Public Debt sustainability threshold of 56 per cent. The ratio of external debt to GDP remained below 2 per cent throughout the review period. It stayed below the 40 per cent threshold set by the DMO Public Debt sustainability report of 2013.

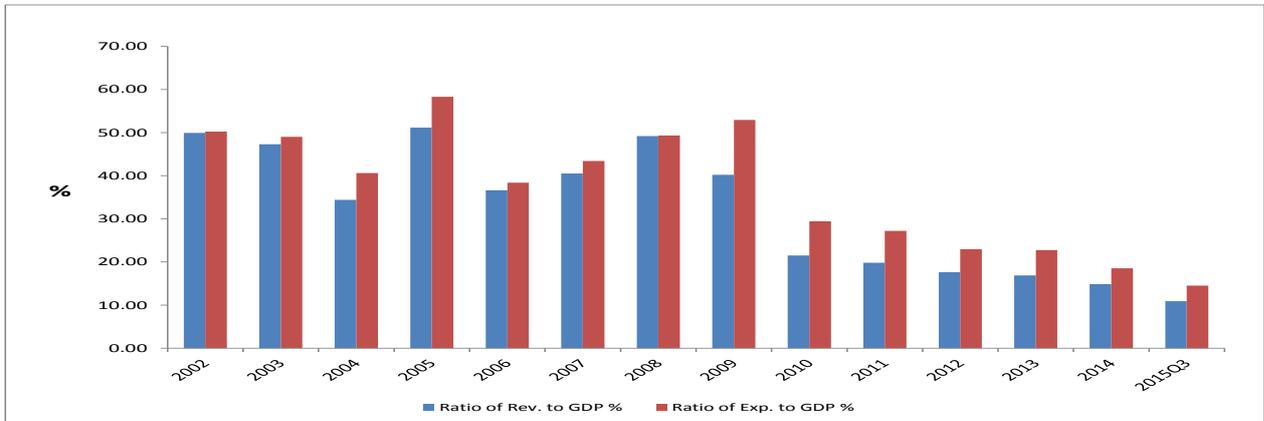


**Figure 5: Deficit to GDP Ratio, 2002– 2015Q3**

Figure 5 shows that the ratio of deficit to GDP (an indication of a country's ability to pay back its debts) increased steadily from 2002 to 2005 after which it fluctuated downwards. Between 2008 and 2009, it rose significantly from 0.13 to 12.72 percent but dropped gradually to 3.63 percent by 2015Q3. This was slightly above the widely accepted threshold of 3 per cent.

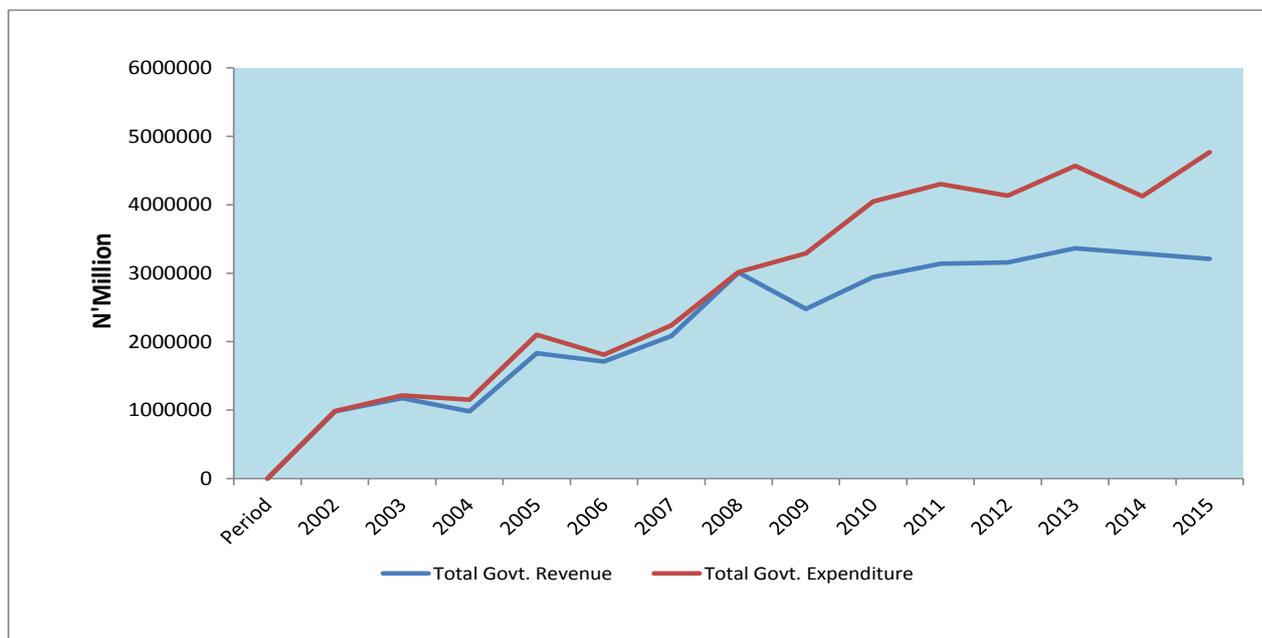


**Figure 6: Debt to GDP Ratio, 2002– 2015Q3**



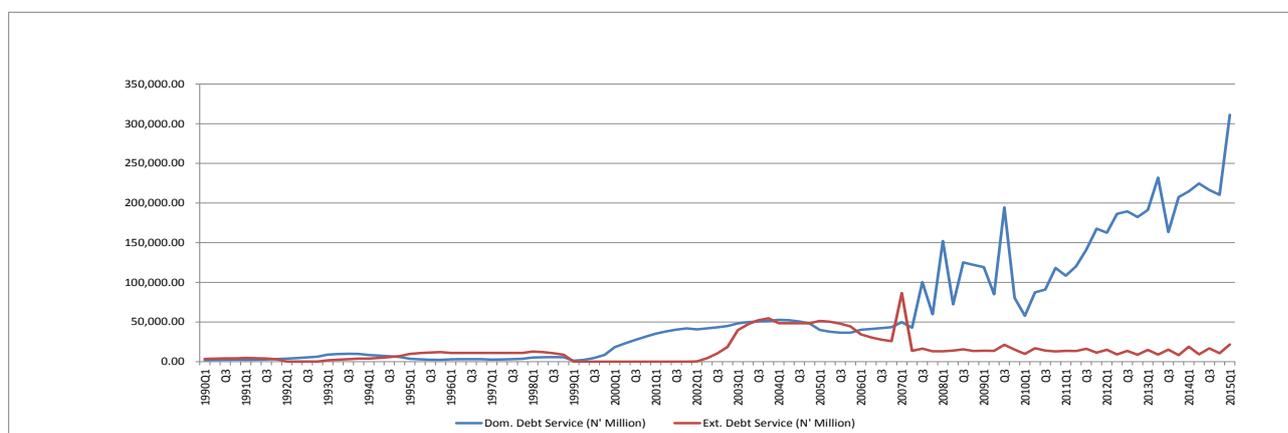
**Figure 7: Revenue to GDP vs Expenditure to GDP Ratios, 2002– 2015Q3**

From Figure 7, the ratios of revenue and expenditure to GDP trended downwards between 2005 and 2015 with the ratio of expenditure to GDP being constantly higher than the revenue to GDP ratio throughout the review period.



**Figure 8: Total Govt. Revenue and Expenditures, 2002 – 2015**

From Figure 8, total Government revenue and expenditure grew gradually within the review period (2002 – 2015). Government expenditure has continually been higher than its revenue for the years studied, indicating a system of deficit budgeting by the Government.

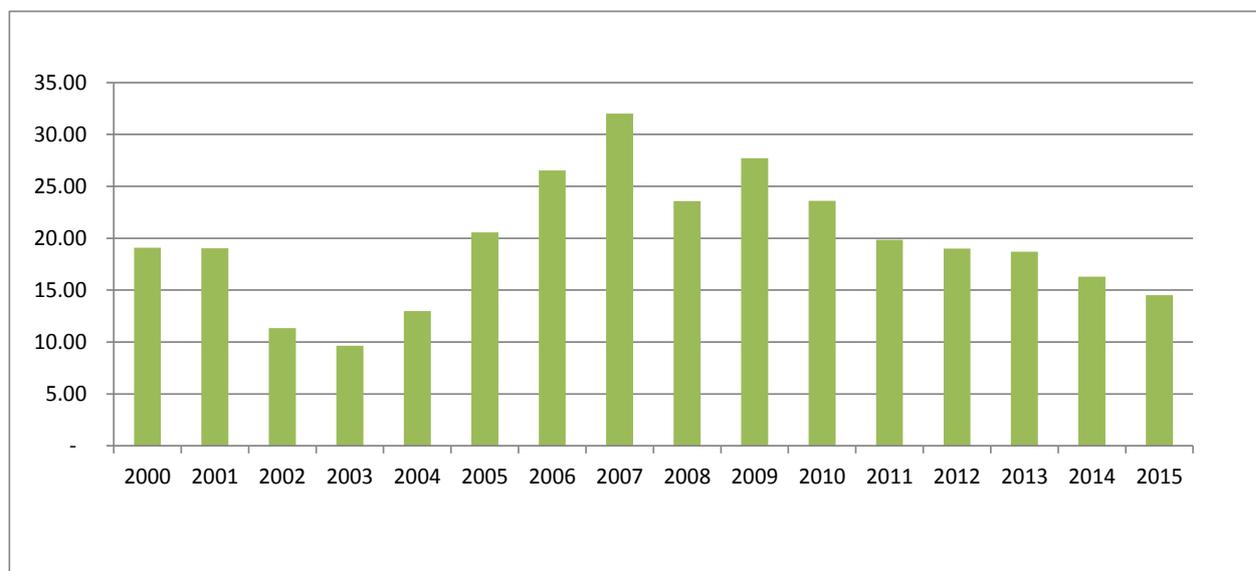


**Figure 9: Trend in Domestic and External Debt Service**

### Debt Service Coverage Ratio

The Debt Service Coverage Ratio (DSCR) is a measure of available cash flow to honour debt obligations. It is thus a measure of the ability to service current debt obligations. Though often analyzed by most creditors, the ratio is very important to both creditors and investors. Often times,

lenders rely on this ratio in deciding whether to extend a term loan depends. The ratio is defined as net operating income as a multiple of debt obligations due within one year, including interest payments, principal repayments, sinking fund and lease payments. In this study, we have used the ratio of government revenue to total debt service as our coverage ratio. (Figure 9).



**Figure 10: Coverage Ratio - Ratio of Revenue to Debt Service**

Generally, the higher the DSCR, the better it is because it indicates that the country can borrow more. Theoretically, the ideal threshold is 1. However, a DSCR of less than 1 means negative cash flow. Nevertheless, it is typical in the analysis to expect the ratio to be more than ‘1’, because it is calculated based on the projections. It is against this background that, a debt coverage ratio of between ‘1.25 to 2’ is considered good and satisfactory, as there is always a risk of projections not turning correct. In addition, there may also be abnormal periods in between, thus allowing for a margin of safety.

Thus, a DSCR that is above ‘1’ increases the possibility of payment by the borrower. However, this threshold may vary with different countries, different types of loans, different industries etc. In addition, a DSCR of 0.95 means that there is only enough net operating income to cover 95 per cent of annual debt payments. For Nigeria, the DSCR averaged 19.66 during the review period. The highest was 32.02 in 2007 while the lowest was 9.65 in 2003 (Figure 10). Notwithstanding, high debt coverage ratio is good and could be translated to mean that the country can borrow more, but it is not borrowing. In other words, the potential benefit of leverage due to debt proportion in capital structure is not taken.

## 5. Methodology

One area that there is a consensus in the literature is the fact that, fiscal vulnerability indicators can be used or could help to predict crises. In the short run, factors that affect fiscal solvency might be indicated by fiscal vulnerability conditions, the governments' ability to overcome its budget constraint within a certain period, as well as its ability to achieve fiscal sustainability in the longrun. For instance, fiscal sustainability is jeopardized, if the government decides to shelve actions on adjustment and continues to operate a vulnerable fiscal policy for many consecutive years.

Thus, this section outlines a methodological framework for understanding fiscal vulnerability. To the best of our knowledge, several methodologies have been advanced in the literature to explain the concept of fiscal vulnerability. For the purpose of this study, we have attempted to test two of these methodologies because of Nigeria's peculiarity and the fact that, they could be easily adapted using local data. We start with the work by Stoian (2013) which studied fiscal vulnerability for advanced European Union countries using a *public debt dynamic equation*. The other method deployed for computing fiscal vulnerability is the method proposed by Baldacci et al (2011) which measures the level of continuous changes of country's' key fiscal variables as they deviate from their historical norms.

Beginning with the first, Stoian's methodology was adapted from the work of Blanchard (1990), which relies to some extent on primary gap. The methodology allows for estimating the primary balance that stabilizes the public debt. The work is also similar to the later work by Pasinetti (1998). The study used annual data for 10 advanced European countries from 1971 to 2010 to investigate the vulnerability of fiscal policy. A unique feature of this approach is the recourse to annual data. We start with the proposition by Stoian (2013) that fiscal policy is vulnerable when the government cannot fulfill its budget constraints. Fiscal vulnerability thus exists, whenever the government faces a liquidity or fiscal solvency risk.

### 5.1 Stoian's Model of Fiscal Vulnerability

Stoian (2011) methodology as adopted explains the sustainability of the economy based on the country's debt profile position using the "Dynamic Debt Equation". This equation assumes that the government borrows money ( $B_t$ ) at time t, to finance the primary deficit. The primary deficit is defined as the difference between primary expenditures,  $G_t$ , and government revenues,  $R_t$ . public debt from the previous year ( $B_{t-1}$ ) and interest payment ( $i.B_{t-1}$ ).

$$B_t = G_t - R_t + B_{t-1} + i * B_{t-1} \text{-----} (1)$$

Where:

$i$  represents the nominal interest rate.

Re-arranging equation (1), we have

$$B_t - B_{t-1} = G_t - R_t + i * B_{t-1} \text{-----} (2)$$

Considering the variables as ratios of GDP and using GDP deflator ( $P_t$ ) and real GDP ( $Y_t$ ), equation 2 gives us:

$$\frac{B_t}{PY_t} - \frac{B_{t-1}}{P_{t-1}Y_{t-1}} * \frac{P_{t-1}Y_{t-1}}{PY_t} = \left( \frac{G_t}{Y_t} - \frac{R_t}{Y_t} \right) + i * \frac{B_{t-1}}{P_{t-1}Y_{t-1}} * \frac{P_{t-1}Y_{t-1}}{PY_t} \text{-----} (3)$$

Defining inflation rate as  $\pi_t = \frac{P_t}{P_{t-1}}$  and real growth rate as  $g_t = \frac{Y_t}{Y_{t-1}}$ ,

We can re-write equation (3) as:

$$b_t - \frac{1}{(1+\pi)(1+g)} b_{t-1} = P_t + \frac{1}{(1+\pi)(1+g)} b_{t-1} \text{-----} (4)$$

Where:

$P_t$  = ratio of primary balance-to-GDP (- surplus; + deficit), at time  $t$ .

Giving the above scenario, the goal of government will be to stabilize the public debt in a period when there is high level of public indebtedness ratio. This is to make sure that the ratio of public debt-to-GDP remains unchanged, that is ( $b_t = b_{t-1}$ ).

We can thus, re-write equation 4 as:

$$-P_t - \frac{1}{(1+\pi)(1+g)} b_{t-1} - \frac{(1+\pi)(1+g)-(1)}{(1+\pi)(1+g)} b_{t-1} \text{-----} 5$$

Where:

$P_t$  = ratio of primary balance-to-GDP (- surplus; + deficit), at time  $t$ .

While the foregoing argument holds, there are also debates in the literature on the timing of the stabilization of public debt. On a priori, the fiscal intervention or adjustment should be immediate in order to indicate the existence of a flexible fiscal policy regime. The purpose of the intervention is to generate the necessary primary surplus that would eventually inhibit the growth of the public debt, whenever it increases.

We can thus, rearrange equation (5) to obtain:

$$P_t = \frac{i - \{(1+\pi)(1+g)-(1)\}}{(1+\pi)(1+g)} b_{t-1} \text{-----} 6$$

$$P_t^* = \frac{i - \pi - g}{(1 + \pi)(1 + g)} b_{t-1} \dots\dots\dots 7$$

Where equation 7 is the required primary balance to stabilize the public debt

$p_t$  is current primary balance

$P_t^*$  is the stabilizing primary balance or fiscal rule

Thus,  $P_t^* > p_t$  suggests that fiscal policy is vulnerable, and the converse holds if,  $P_t^* < p_t$ . It implies that the primary balance required to stabilize the public debt is unachievable by the fiscal authority. The primary balance is defined as the budget balance net of interest payments on the debt. The government thus has to issue more bonds in order to service its debt obligations. Consequently, a fiscal risk resonating in fiscal solvency may crystallize in the longrun; should the public debt continue to increase, and the government is unable to achieve a primary surplus.

Also  $P_t^* - p_t \leq 0$  implies that fiscal policy is not vulnerable. The government managed to achieve or to exceed the stabilizing primary balance.

Our methodology used annual data from 2000 to 2015. We thus made yearly comparisons between the two levels of primary balance. Consequently, we are able to detect each year when fiscal policy was vulnerable. Theoretically, it can be stated that, fiscal sustainability would be compromised in the longrun with the attendant implications, if the government is consistently unable to achieve the stabilizing primary balance for many successive years.

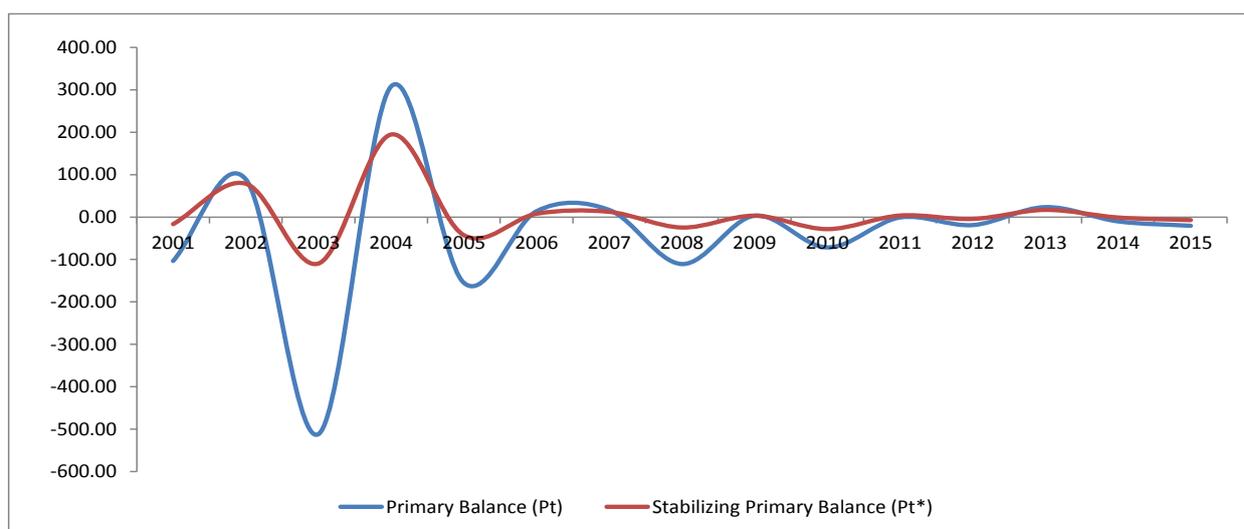
**Primary Gap**

The primary gap represents the difference between the primary balance ( $P_t$ ) and the stabilising primary balance ( $P_t^*$ ) (Blanchard 1990). Our approach in this study is meant to make yearly comparism between the two levels of the primary balance on annual basis. Therefore fiscal sustainability is said to be affected in the long run if government fails in achieving the stabilizing primary balance for consectives years. The table below shows the primary gap of the period for Nigeria.

**Table 2: Primary Gap Between Primary Balance and Stabilizing Primary Balance**

Primary Balance (Pt)	Stabilizing Primary Balance (Pt*)	Primary Gap
$P_t = i - \frac{\pi}{1+\pi} \frac{1+g}{1+g} b_{t-1}$	$P_t^* = i - \frac{\pi}{1+\pi} \frac{1+g}{1+g} b_{t-1}$	$P_t^* - P_t$
-18.17	-1.12	17.05
22.28	19.64	-2.64
<b>-136.29</b>	<b>-28.47</b>	<b>107.82</b>
92.86	69.25	-23.61
-44.02	-12.16	31.86
3.72	2.09	-1.63
3.85	2.75	-1.10
-29.36	-6.62	22.74
1.39	1.17	-0.22
-20.47	-8.05	12.42
0.09	1.15	1.06
-5.82	-1.45	4.36
6.50	4.67	-1.83
-2.25	-0.08	2.17
-4.99	-1.74	3.24

A cursory look at the distribution of values for the primary gap shows years for which fiscal policy encountered more severe vulnerability. The primary gap shows fiscal vulnerability, indicating that government’s inability to achieve the required primary balance consistent with the stabilization of the public debt. From table 2 and the associated figure 5, we observe that normal fiscal vulnerability is indicated within the ranges that have the most frequent positive primary gaps, while the severe fiscal vulnerability is observed at ranges covering extreme positive values. For Nigeria, we observed a few episodes of more severe fiscal vulnerability that occurred after the 2007/2008 global crisis. Further observation here indicates that normal fiscal vulnerability might have occurred because of government inability at stabilizing public debt. Thus, for those periods especially post 2007/2008 global financial crisis, the Nigerian government ought to have considered slowing down or stopping growth in the public debt.



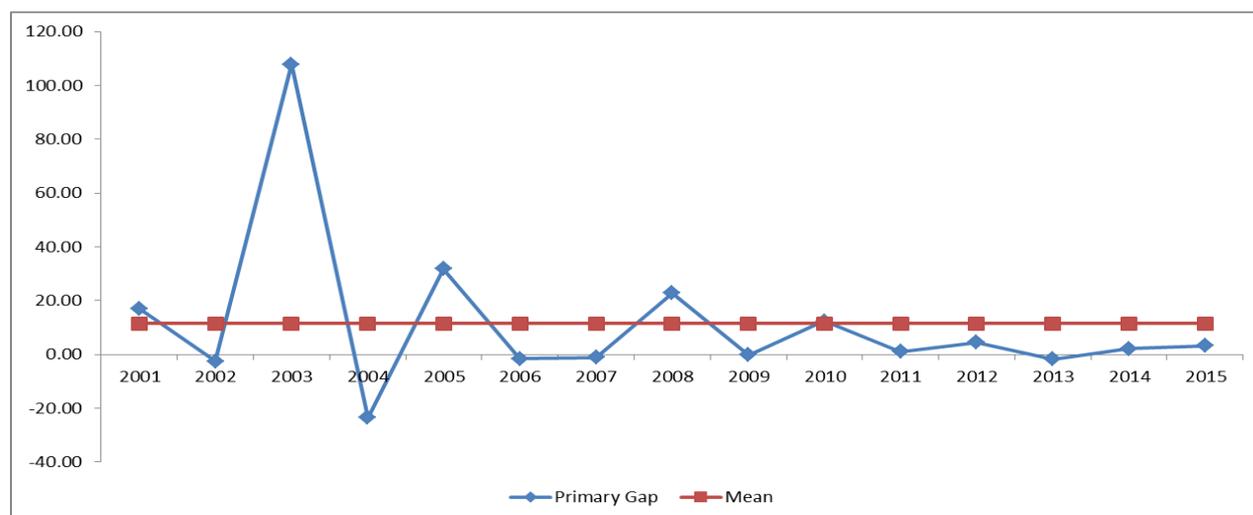
**Figure 11: Fiscal Vulnerability**

Table 3 shows how the gap values are distributed on various ranges. The range of data falls within the bracket (-30 and 120). Only Positive values of the primary gap suggest fiscal vulnerability. As indicated in figure 11, It can be considered that, range consisting the highest frequency of positive gaps may be considered as being a normal state of fiscal vulnerability. The mean computation (Figure 12) represents period in which the gap covers when fiscal policy is tolerably vulnerable. From our findings, the gap between the stabilising and the current primary balance was highest positive at 90 and 120 range.

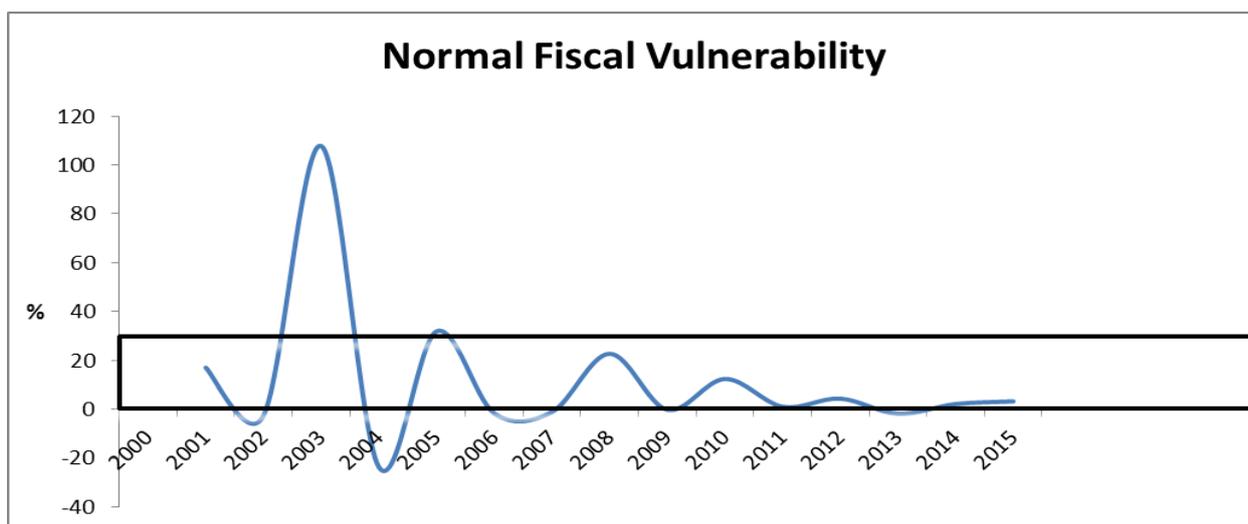
**Table 3: Gap Distribution Analysis**

<b>GAP DISTRIBUTION</b>		
<b>Range</b>	<b>Mean</b>	<b>Observation</b>
(-30, 0)	-5.2	6
(0, 30)	9.0	7
(30, 60)	31.86	1
(60, 90)	0	0
(90, 120)	107.8	1
<b>All</b>	<b>11.5</b>	<b>15</b>

The positive range within the “mean” indicates a bearable state of fiscal vulnerability See figure 12; such that if the government fails in achieving the stabilising primary balance, then the government may have failed in stabilising the current debt position.



**Figure 12: Mean Computation of Primary Gap**



**Figure 13: Primary Gap and Vulnerability Ranges for Nigeria**

### Fiscal Vulnerability Episodes

The methodology looks at Nigeria’s Fiscal Vulnerability before and after the global financial crisis. The Dynamic Debt Equation assumes that the Government receives debts and other foreign grants in foreign currency and as such, the global financial crisis may have affected Nigeria financial position during those periods.

**Table 4: Fiscal Vulnerability Statistics**

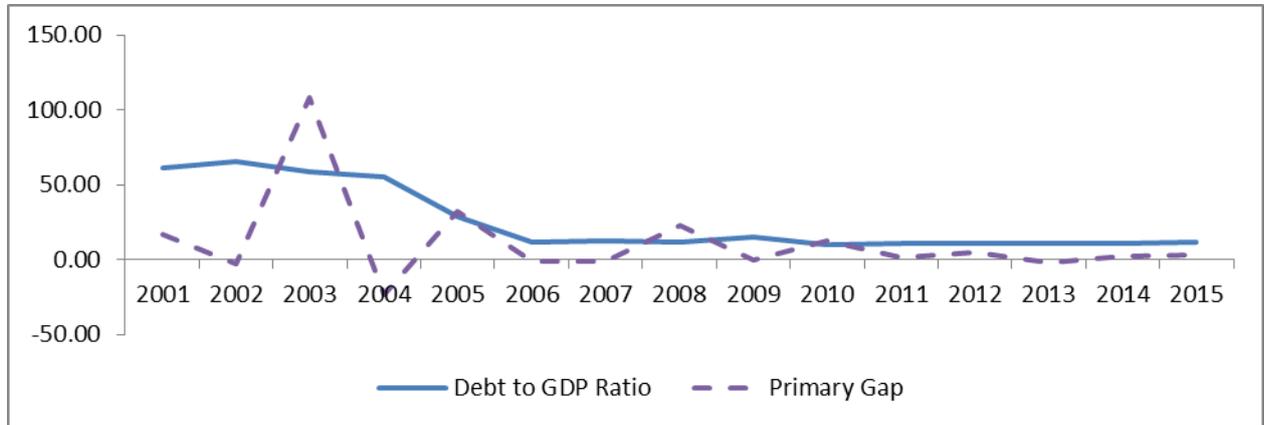
Country	Total Observation	Fiscal Vulnerability (all)	% of Total Observatn	Fiscal Vulnerability before GFC	Fiscal Vulnerability after GFC	% of Total Observation after GFC
Nigeria	15	10	66.67	3	7	46.67

Table 4 presents some relevant statistics on fiscal vulnerability episodes in Nigeria. From the Table, It can be established that within the review period fiscal vulnerability in Nigeria occurred in more than half of the period. Episodes of vulnerability were observed in ten (10) out of fifteen 15 observations that were captured. The periods for which episodes of vulnerability were observed before and after the crisis were 3 and 7 periods (years), respectively. In addition, the size of total vulnerability episodes was 46.67 per cent of total observations after the crisis periods.

### Tracking Fiscal Indices with the Computed Fiscal Vulnerability Index

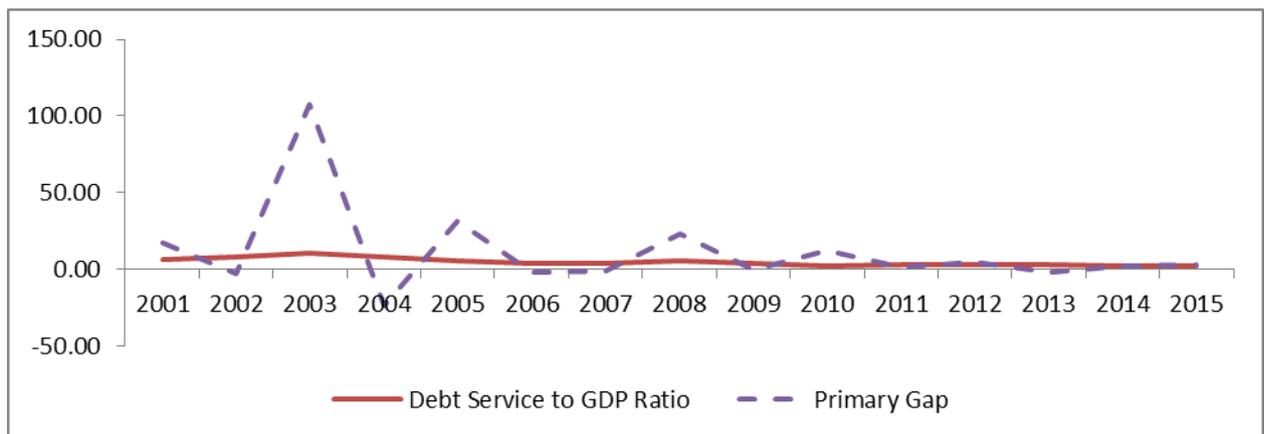
We set out to develop a fiscal vulnerability that would enable us to measure the level of continuous changes of the Country’s key fiscal variables as they deviate from their historical norms or past performance standards. We used our computed indicator, the primary gap to track each indicator of our major indicators namely, Ratio of Debt to GDP (Actual), Ratio of Debt Service to GDP (Actual)

and Revenue to Debt Service (Actual). Thus, when compared with the actual debt to GDP ratio Figure 14, our computed fiscal vulnerability index as shown by the primary gap was able to track this measure especially from 2005 to 2015.



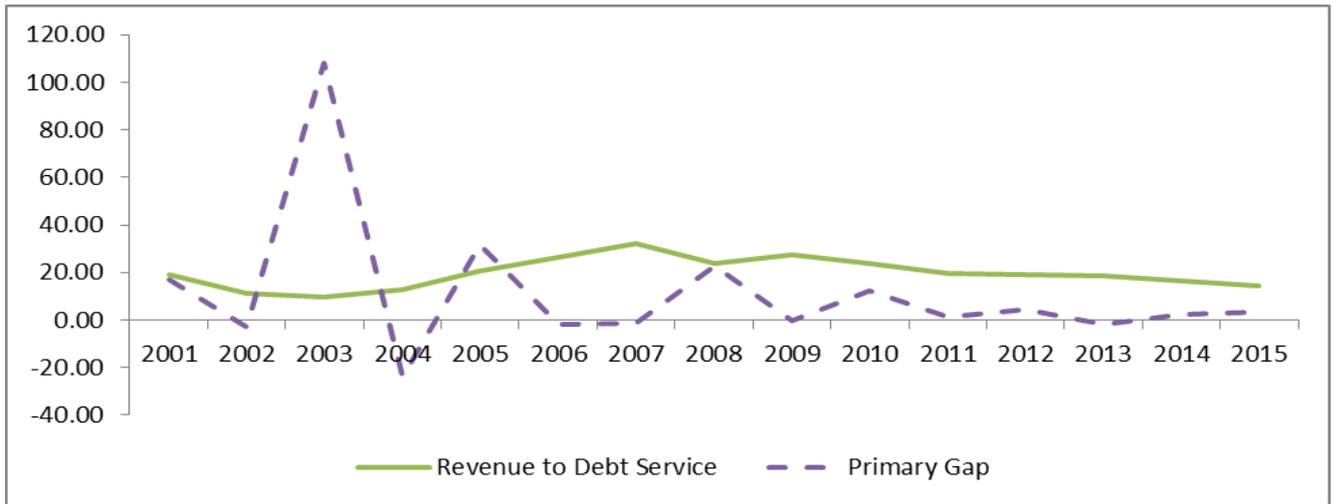
**Figure 14: Fiscal Vulnerability Index and Ratio of Debt to GDP (Actual)**

In addition, when compared with the actual ratio of debt service to GDP ratio our computed fiscal vulnerability index was able to track this measure especially from 2011 to 2015 Figure 15.



**Figure 15: Fiscal Vulnerability Index and Ratio of Debt Service to GDP (Actual)**

We compared in figure 16, the coverage ratio that is actual ratio of revenue to debt service with our computed fiscal vulnerability index. As shown in the accompanying figure, our indicator was able to track ratio of revenue to debt service for more than half of the review period, especially from 2008 to 2015.



**Figure 16: Fiscal Vulnerability Index and Ratio of Revenue to Debt Service**

Overall our index as measured by the primary gap, reveals that the fiscal vulnerability exits, though fairly low and within tolerable limits. Our index Although, there is no forecast of the FVI, as indicated in figures 14, 15 and 16, we expect that fiscal vulnerability would continue in 2017 given the various indices. In addition, empirical evidence shows that, there is no likelihood that a country can exit a precarious fiscal situation within one budget cycle. However, there is need to continue to monitor these indices especially the coverage ratio, which is the ratio of revenue to debt service. Oil prices have remained low and non-oil revenue sources have failed to meet their targets for 2016.

## Conclusion

We investigated fiscal vulnerability for a sixteen-year period 2000 to 2015. We used our computed indicator, the primary gap to track each indicator of our major indicators namely, Ratio of Debt to GDP (Actual), Ratio of Debt Service to GDP (Actual) and Revenue to Debt Service (Actual). Thus, when compared with the actual debt to GDP ratio, our computed fiscal vulnerability index as shown by the primary gap was able to track this measure especially from 2005 to 2015. Given our results, we found that episodes of fiscal vulnerability were more prevalent during the period of the global financial crisis. From our findings, concerns about fiscal vulnerability and indeed a stream of other unprecedented and unanticipated events would continue to shape the future of monetary policy implementation in Nigeria. Furthermore, Our study aims at providing more insight on the concept of fiscal vulnerability, particularly as it affects Nigeria. The literature on fiscal vulnerability on Nigeria is indeed scanty and existing studies from other countries provides only limited explanation of this concept. The widely accepted view is that government's inability to generate primary surplus to service its payments as when due describes a situation of fiscal vulnerability (Stoain 2013).

We had noted that factors that might affect fiscal solvency in the short run could explain fiscal vulnerability and the governments' ability to overcome its budget constraint within a certain period, as well as its ability to achieve fiscal sustainability in the long run. Our study adopted a methodological framework for investigating fiscal vulnerability that relied mainly on public debt dynamic equation. This method assumes that government proposes at stabilizing public debt.

In our view, this method considers the peculiarities and the behaviour of key fiscal variables in Nigeria viz, increasing government budgetary deficits and public debt.

We conclude this paper by suggesting that, in view of the dictates for prudence, countries must ensure that they target a debt level that is below the threshold. This is in view of the fact that the threshold defines the point at which fiscal vulnerability becomes evident or fiscal soundness becomes questionable. Key factors that could impinge on fiscal soundness are the response of primary balance to increases in debts, and the possibility of adverse shocks. The principle underlying this assumption is that, when debt gets very large, it may be difficult to generate a primary balance that is sufficient to ensure sustainability, and that shocks can push countries beyond their debt limit. It thus often advised that countries must endeavour to remain well below the threshold as a way of exercising restraint or caution.

Against this backdrop, the focus of monetary policy in the future should be geared towards the choice of a monetary framework that will continue to depend on a number of considerations including the

nature of fiscal shocks confronting the economy, structural characteristics of the economy, prioritization of macroeconomic objectives, political economy, and the credibility of monetary policy.

## **Recommendations**

1. Overall, our index as measured by the primary gap, reveals that the fiscal vulnerability exists in Nigeria, though fairly low and within tolerable limits. We expect that fiscal vulnerability would continue in 2017 given the various indices. In addition, empirical evidence shows that, there is no likelihood that a country can exit a precarious fiscal situation within one budget cycle. However, there is need to continue to monitor these indices especially the public debt and the coverage ratio.
2. There is need to support the Country's fiscal framework with key institutions that can help establish stronger credibility of fiscal policy, enforcement and flexibility of fiscal rule.
3. In view of the Country's over reliance on oil sales receipt and the lessons of the 2014 oil price crash, the Country needs to strengthen the management of oil revenues by integrating oil funds with the budget in order to enhance fiscal policy coordination and public spending efficiency.
4. Government must build the needed capacity that would support the satisfactory execution of the fiscal framework. For instance, the fiscal authorities can build capacity around such areas like long-term revenue forecasts, budget orientation, and quality of public investment as well as in the management of the excess crude account (ECA).
5. As indicated, many years of exposure of fiscal policy to solvency debt risk may affect fiscal sustainability negatively in the longrun. There is thus, the need for the fiscal authorities to ensure that it continually exercise restraint over excessive and unnecessary borrowing. In addition, all new borrowings whether local or foreign, must be tied to capital projects and should have significant multiplier effects that would provide long-term benefits for the economy.

## References

- Aizenman, J. and G. Pasricha (2010). "Fiscal Fragility: What the Past Say about the Future". *NBER Working Paper* No.16478, October 2010.
- Alesina A. (2000) "Dollarisation", A Paper Prepared for the 2001 Meeting of the American Economic Association. <http://www.google.com/url?>
- Baldacci, E., J. McHugh, and I. Petrova (2011). "Measuring Fiscal Vulnerability and Fiscal Stress: A Proposed Set of Indicators" *IMF Working Paper*, Available at: <https://www.imf.org/external/pubs/ft/wp/2011/wp1194.pdf> , Accessed on March 04, 2016.
- Baldacci, E., I. Petrova, H. Belhocine, G. Dobrescu and S. Mazraani. (2011). "Assessing Fiscal Stress". *IMF Working Paper* WP/11/100, 2011.
- Baungard, O. J. (2003), "Fiscal Policy in Nigeria: Any Role for Rules?" *IMF WP/03/155*
- Blommestein, H. J. and P. Turner (2011), "Interactions Between Sovereign Debt Management and Monetary Policy Under Fiscal Dominance and Financial Instability", *OECD Working Papers on Sovereign Borrowing and Public Debt Management*, No.3
- Brixi, H. P., S. Shalotov and L. Zlaoui (2000). "Managing Fiscal Risk in Bulgaria". *Policy Research Working Paper* 2282, January 2000, The World Bank, 2000.
- Ciarlone, A. and G. Trebeschi, (2006) "A Multinomial Approach to Early Warning Systems for Debt Crises", *Economic Working Papers* 588, Bank of Italy.
- Corsetti G and N. Roubini, (1996) "European versus American Perspectives on Balanced- Budget Rules", *American Economic Review*, 86, 408 - 13
- Cottarelli, C. (2011). "The Risk Octagon: A Comprehensive Framework for Assessing Sovereign Risks", *A Presentation delivered at a seminar held at the Sapienza University in Rome on January 25, 2011*. Available at: [www.imf.org/external/np/fad/news/2011/docs/Cottarelli1.pdf](http://www.imf.org/external/np/fad/news/2011/docs/Cottarelli1.pdf), Accessed on March 04, 2016
- Domar, E. D. (1944). "The Burden of the Debt' and the National Income." *American Economic Review* 34(4): 798-827
- Domar, E. D. (1993). "On Deficits and Debt", *American Journal of Economics and Sociology* 52 (4): 475-478
- Escolano, J. (2010) "A Practical Guide to Public Debt Dynamics, Fiscal Sustainability, and Cyclical Adjustment of Budgetary Aggregate", *FAD Technical Notes and Manuals*. International Monetary Fund, Washington DC.
- Ghosh, A. R., Kim, J. I., Mendoza, E.G., Ostry J. D., and Qureshi, M. S. (2011), "Fiscal Fatigue, Fiscal Space and Debt Sustainability in Advanced Economies", NIBER Working Paper No 16782
- Hayes, S. (2011), "Fiscal vulnerability: A Stocktake", *The IFS Green Budget*, February 2011, p.61.

- Hemming R., M. Kell, and A. Schimmelpfennig (2003), “Fiscal Vulnerability and Financial Crises in Emerging Market Economies”, *IMF Occasional Paper No. 218*. Available at: <http://www.imf.org/external/pubs/cat/longres.aspx?sk=16237>, Accessed on March 05, 2016.
- Jędrzejowicz T. and W. Koziński, (2012), “A Framework for Fiscal Vulnerability Assessment and Its Application to Poland”, *BIS Paper No. 67*, p. 285-294. Available at SSRN: <http://ssrn.com/abstract=2205706>, Accessed on March 05, 2016.
- Khosravi .A and M. S. Karimi (2010), “Investigation the Relationship between Monetary, Fiscal Policy and Economic Growth in Iran”: *American Journal of Applied Sciences*, Vol. 7, 3
- Kotlikoff L. J and C. Hagist (2005), “Who is Going Broke? Comparing Growth in Healthcare in Ten OECD Countries”, *NBER Working Paper w11833*
- Pasinetti, L. (1998), “The Myth (or folly) of the 3% Deficit/GDP Maastricht Parameter”. *Cambridge Journal of Economics*, Vol 22, p. 103-116.
- Reinhart, C. M. and K. S. Rogoff, (2011), “From Financial Crash to Debt Crisis”, NBER Working Paper No. 15795
- Reinhart, C. and K. Rogoff, (2011). “A Decade of Debt”. *NBER Working Paper No.16827*, February 2011.
- Rial, I. and L. Vicente, (2004). “Fiscal Sustainability and Vulnerability in a Small Open Economy: The Uruguayan Experience, in Public Debt”. Edited by Banca D’Italia, Research Department Public Finance Workshop, 2004.
- Scott, R. (2010), “Inflation Targeting Turns 20”, *Finance and Development*, IMF Paper
- Stoian, A. (2011). “Fiscal Vulnerability vs. Fiscal Sustainability: Theoretical Background”. *Theoretical and Applied Economics*, Vol. 5, p. 541-547.