Journal of Global Economics and Business **April 2023, Volume 4, Number 13, 86-96**
ISSN: Print 2735-9344, Online 2735-9352

THE THRESHOLD LEVEL OF BUDGET DEFICIT AND MONEY SUPPLY THAT STABILIZE INFLATION IN NIGERIA

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Abstract

This study evaluates the threshold level of budget deficit and money supply that stabilize inflation in Nigeria spanning 1986 and 2020. The study aimed at determine the threshold level of budget deficit and money supply that stabilize inflation in Nigeria. In Addition, the study applied the Hansen threshold model (1998) to estimate the threshold level. The study employed annual data on budget deficit (proxied by budget deficit as a share of GDP), money supply (proxied by money supply), inflation (proxied by consumer price index) collected from Central Bank of Nigeria Statistical Bulletin, 2020 edition. Based on the findings of our analyses, the study concludes that budget deficit raises money supply and induces inflationary pressure in Nigeria. The study therefore recommends that there is need for the authorities in Nigeria should reduce the cost of governance by reducing overhead and allowance of political office holder in order to reduce budget deficit. The study therefore recommends that government must ensure that yearly budget imbalance does not exceed this threshold in order to mitigate deficit induce inflation. Also, there is the need for government to strengthening public financial management reforms (like Fiscal Responsibility Act, the Medium-Term Expenditure Framework). This will engender fiscal discipline and reduce fiscal deficit over time.

Keywords**:** *Budget Deficit, Threshold Level, Money Supply, Inflation, Fiscal Deficit, Budget Imbalance.*

DOI: 10.58934/jgeb.v4i13.142

1. Introduction

Persistent budget deficit has become a major concern in Nigeria due to its related macroeconomic effects by inducing inflationary pressure and reducing the competitiveness of the nonoil sector, thereby restraining economic development (Usman and Adebisi, 2017; and Olubiyi and Bolarinwa, 2018). The associated risk to inflation from high fiscal deficit occurs when fiscal stimulus is spent on consumption rather than productive investment which could have serviced the repayment obligations arising from larger debt (Khundrakpam and Pattanaik,

2010). Nigerian government have initiated sound fiscal framework to reduce budget imbalance and debt to sustainable levels by widening its revenue base, reduce subsidies and imports, reduce government involvement in economic activities and relocate resources in favour of the private sector. However, this process has faced a stern impediment as a result of volatile revenue base, continuous increase in government expenditure, global financial crisis of 2008, fluctuations of oil price in the international market as well as recent covid-19 pandemic which has made fiscal deficits inevitable (Dockery, Ezeabsili and Herbert, 2012; and Aladejare, 2017).

Budget deficit poses a challenge when the deficit level becomes too high and chronic. The negative effects of high deficits are linked to the way they are financed and how they are used. The budget deficits can be financed through domestic borrowing, foreign borrowing or by printing money. Excess use of any particular mode of financing the budget deficits has adverse macroeconomic consequences, namely: printing money to finance fiscal deficit can create inflationary pressures in the economy, bond financing of budget deficit can lead to rise in interest rates and this can turn out to crowd out private investment and the external financing of fiscal deficit can spill over to balance of payment crisis and appreciation of exchange rates and in turn cyclical debt (Osinubi and Olaleru, 2016).

However, with the fiscal deficits expansion in Nigeria over the years, the anticipated results remained vague. More than 70% of Nigeria's citizenry are still living in abject poverty, persistent high mortality rate and low life expectancy due to inaccessibility to basic health care delivery. The poor road network, shortage of food and essential body nutrients for physical growth and embarrassingly high rate of unemployment are other clear indications of poverty level in Nigeria (Akinmulegun, 2014). Hence, government resorted to internal and external borrowing to fill the resource gap. In the most significant case, many economic policies of the Nigerian government, including the well celebrated Structural Adjustment Program (SAP) of 1986 were implemented with the help of deficit financing. In addition, the financing of the so-called oil subsidy; the perennial insecurity problems such as Boko haram insurgency and banditry are being financed through deficit budgeting (Ogunmuyiwa, 2011).

In recent times, huge and persistent budget imbalance and inflation has become an issue of concerns in Nigeria because it is believed that huge budget imbalance give rise to high cost of borrowing which in turn crowd-out private investment, impede capital formation, higher price level and worsen standard of living (Ahmad and Aworinde, 2019). Tentatively, the Keynesian

economists argue that notably in the period of economic downturn, budget imbalance stimulate the aggregate demand to increase expeditious than aggregate supply thereby accelerate growth (Olaniyi, 2020). Contrarily, the monetarists assert that budget imbalance is detrimental to an economy (Oladipo & Akinbobola, 2011). It has been observed that sustained inflationary trends in an economy could force the government to incur deficits in order to catch up with rising trends in price level (Danlami *et al.*, 2019). Accordingly, inflation could cause budget deficit through lag in tax collection (Pekarski, 2011; and Akgay, Alper, Ozmucur, 2018).

Available statistics from the Central Bank of Nigeria statistical bulletin (2020) indicates that Nigeria has persistently experienced budget deficits since 1988. Specifically, the ratio of budget deficits to GDP was 3.8% in 1988 and increased to 12.8% in 1989. Nigeria recorded a surplus in 1990 and 1992 with 1.8% and 0.2% respectively. However, since 2005, the budget to GDP ratio has been snowballing, it stood at 400.9% in 2015, increased significantly to 975.4% in 2016. Between 2017 and 2019, ratio of budget deficit to GDP has increased from 1.932.7% to 2103.2% and stood at 4128.9% in 2020 (CBN, 2020). One of the underlying reasons why budget deficits have increased in recent years is that the Nigeria government wanted to boost the economy by raising expenditures. It is notable that such a significant increase in the ratio of budget deficits to GDP in recent years has led to higher prices and prompts inflationary pressure. In particular, inflation rate in Nigeria has been double-digit since 1988 to 2005 with the exception of 1999. Inflation rate stood at 61.2% in 1988 and reached its pick of 76.8% in 1994 before reducing to 11.60% in 2005. Remarkably, inflation in 2016 hit its record of 18.60% and stood at 15.75% in 2020 (CBN, 2020). Additionally, a cursory glance at the dynamics of money supply in Nigeria indicates that it has constantly increased since the early 2000s. Particularly, the ratio of money supply to GDP was 15.41% and increased to 22.9% in 2009. Between 2010 and 2020, the average of money supply to GDP ratio was 22.74% (CBN, 2020). From the foregoing, therefore, the perceived correlation between budget deficit, money growth and the movements in price level elicits the need for an empirical study on the linkage in Nigeria.The issue of threshold of budget deficit and money growth that can stabilize price level has not been empirically addressed in Nigeria. Studies on budget imbalance and money growth threshold effects in Nigeria are relatively scarce. To the best of my knowledge, no study has empirically probed the threshold level of budget imbalance and money growth on price level in Nigeria. Therefore, this paper estimates the threshold of budget deficit and money growth on inflation in Nigeria since huge budget imbalance leads to enormous debt which crowd-out investment and retard growth through higher interest payment, distort price level

and worsen standard of living (Ahmad and Aworinde, 2019). Meanwhile, only a moderate budget deficit finance via debt can spur growth, stabilize price level and improve standards of living.

2. Empirical Literature

By investigating the influence of budget deficit on money supply and output for 5 South East Asian Central Banks (SEACEN) countries (South-Korea, Malaysia, Philippines, Singapore, Sri Lanka and Thailand) using quarterly data from 1974 to 1989, Dejtbamrong (2011) found that budget deficit had no impact on money supply in South-Korea and Philippines but increases money supply due to increased capital inflow in Sri Lanka and Singapore. In a specific country study, Rani and Kumar (2016) explore the link between budget deficits and interest rates in India from 1980-2014. The result of the ARDL confirm the presence of long run relationship between the variables while VECM casualty found a unidirectional causality from budget deficit to interest rates in short run. Rani and Kumar (2017) examined the deficit-interest rate linkage by incorporating money supply and inflation for India spanning 1980 and 2014. The study employed ARDL technique and found that fiscal deficit raises interest rate which suggests that deficit financed via domestic debt increases interest rate. However, money supply exerts a negative impact on interest rate indicating that increase in money supply inject extra cash in banks thus lowering the rate of interest.

3. Theoretical Model

On inflation classical school of thought believed that sustained price inflation is caused by an extreme increase in the amount of money in circulation. However, the classical theory is frequently referred to as the "quantity theory of money," despite the fact that it is a theory of inflation rather than a theory of money (Ireland, 2014). According to classical quantity theory, the velocity of money circulation is constant, and the money supply thus determines the total money value of transactions in the economy at any given time (Jhingan, 2005). Money, according to the classical idea, is a curtain that serves as a neutral intermediary in the economy. The classical theory of money, like Say's Law of markets, assumes that money has no utility other than the usefulness of the commodities and services it is used to acquire, and hence it is not always wanted (Obafemi & Ifere, 2015). The classical money theory is explained using Fisher's equation of exchange.Introduced by Irving Fisher (1956) when determining the relationship between money supply and price level, the quantity theory of money (hereafter

QTM) has been widely tested in previous studies (Thornton, 2008; Maitra, 2015; Li et al, 2016; Bekiros et al, 2017; and Van, 2020). The QTM suggests that any change in the quantity of money produces an exactly proportional change in the price level and the output level remains fixed at the full employment (Maitra, 2015). Thus, the long-run relationship between money supply growth and inflation is unity. The price level changes with money supply movement in the same direction and proportion (Fisher and Brown, 1911; Pigou, 1951).Fisher and Brown (1911) suggests that as the monetary authorities increase the amount of currency (money supply) in the economy, price level must increase in the same proportion, while the velocity and quantity of goods remain unchanged. Hence, inflation to currency factor implied that money supply exceeding money demand causes and intensifies price level (Dragos et al., 2013). The mathematical expression of the QTM is specified as:

$$M(V) = P(Y) \qquad [1.1]$$

Where M is money supply and V denote velocity of money while P and Y signifies price level and aggregate output respectively. Hence, a change in money supply while velocity of money and output remain unchanged will result to equal and proportionate changes in the inflation rate (Li et al., 2016).

The threshold below or above which budget imbalance (deficit) and money mass (supply) becomes detrimental to stabilizing price level (inflation) in Nigeria. On basis of this, the study specifies time series threshold model propounded by Hansen (1999) to determine the threshold of budget imbalance and money supply on inflation. The choice of this estimation approach stem from the fact that it allows non-linear relationship between dependent and independent variables, which are determined by the threshold level (Bilman & Karaoglan, 2020). In addition, this threshold technique estimates the threshold value with the aid of asymmetric model rather than setting the threshold (Swamy & Dharani, 2020; and Tariq, Khan and Rahman, 2020).

The standard Hansen threshold model is specified as:

$$Z_t, q_t, X_{t;}\ \ 1 \le t \le T \qquad [1.1]$$

From Eq. [2.1] above, Z_t is the dependent variable at time t while q_t is the threshold variable and $X_{t;}$ represent other control variables that might influence the dependent variable. Thus, for this, Eq. [1.1] becomes:

$$CPI_t, BD_t; MS_t, \ 1 \le t \le T \qquad [1.2]$$

From Eq. [2.2], CPI denote inflation and the threshold variables are budget imbalance and money supply represented by $BD_t; MS_t$ respectively at time t.

The structural form of Eq. [2.2] for a two variable threshold is specified as:

$$CPI_t = \begin{cases} \delta_0 + \delta_1 BD_t + \mu_t ; if BD \le \gamma \\ \delta_0 + \delta_2 BD_t + \mu_t ; if BD \ge \gamma \end{cases} \qquad [1.3]$$

$$CPI_t = \begin{cases} \delta_0 + \delta_1 MS_t + \mu_t ; if MS \le \gamma \\ \delta_0 + \delta_2 MS_t + \mu_t ; if MS \ge \gamma \end{cases} \qquad [1.4]$$

From Eq. [1.3] and [1.4], δ_0 is constant term, μ_t represent stochastic error term while γ is threshold value and while BD_t and MS_t denote regime-dependent regressor. The threshold level of budget deficit and money supply can be estimated in two ways namely: when BD_t and MS_t are below or above the estimated threshold parameter γ, an estimated value of BD_t and MS_t partition into low and high BD_t and MS_t regimes. After estimating threshold parameter γ. Then, the regime dependent coefficients δ_1 and δ_2 for both budget imbalance and money mass are estimated which corresponds with low and high BD_t and MS_t regimes respectively. The significance of the threshold value is tested with the aid of Likelihood ratio test based on the following hypothesis:

$$H_0 : \delta_1 = \delta_2$$
$$H_0 : \delta_1 \neq \delta_2$$

The decision rule is that If F-statistic of the likelihood ratio test is greater than critical value, then null of no threshold is rejected. However, if F-statistic of the likelihood ratio test is less than critical value, then the alternative hypothesis of threshold is accepted.

4. Estimation Result

4.1. Threshold of Budget Deficit on Inflation in Nigeria

TABLE 1.0 Threshold Result of Budget Deficit on Inflation in Nigeria

Dep. Variable: LCPI			
Variable			
Threshold ($\hat{\gamma}$)			
Budget Deficit			
$\hat{\beta}_L(BD \le \gamma)$			
$\hat{\beta}_H(BD \ge \gamma)$			
Non-threshold variable			
C			
LMS			
LGR			
LINT			
R^2			
F-stat.		11.9283	0.0010***
Diagnostic Test Statistics			
Serial Correlation		0.6711	0.7149
Heteroscedasticity		0.1448	0.7035

Note 1: Note 1: BD, MS, CPI, GR and INT denote budget deficit, money supply, inflation, income per capita and interest rate respectively. Note 2: ***, **, * indicate statistical significance at 1%, 5% and 10% respectively.

Source: Author's Computation

From the result, the threshold of budget deficit is 0.1375. In addition, beneath the threshold value of 0.1375, budget deficit has a negative and significant impact of inflation. The coefficient value of -0.1259 indicates that a 1 per cent decrease in budget deficit (% of GDP) below the threshold of 0.1375 will decrease price level by 0.1259%. On the other hand, the effect of budget deficit on inflation beyond the threshold of 0.1375 will accelerate price level by 0.1199 per cent. This suggests that increase in budget deficit (% of GDP) will trigger inflationary pressure by 0.1199 per cent. Specifically, the result show that a 1 per cent increase in money supply, income and interest rate lower price level by 1.2694, 0.1024 and 0.4632 per

cent respectively. In addition, the R2 which measures the degree at which budget deficit, money supply, income and interest rate explain price level in Nigeria is high at 69.23%.

4.2. Threshold Money Supply on Inflation in Nigeria.

Table 1.1 present the result of the threshold of money supply on inflation in Nigeria

Dep. Variable: LCPI	Coefficient	T-statistics	Prob.
Variable			
Threshold ($\hat{\gamma}$)		15.4649	
Money Supply			
$\hat{\beta}_L(MS \leq \gamma)$	-8.4516	-1.7080	0.0987*
$\hat{\beta}_H(MS \geq \gamma)$	0.0724	0.0639	0.9494
Non-threshold variable			
C	45.9719	2.4207	0.0222**
BD	-0.2695	-2.4447	0.0210**
LGR	-1.9289	-1.4052	0.1709
LINT	0.0715	0.0998	0.9212
R^2	0.6302		
F-stat.	3.5240		0.0100**
Diagnostic Test Statistics			
Serial Correlation	1.0241		0.5993
Heteroscedasticity	0.0898		0.7644

Note 1: Note 1: BD, MS, CPI, GR and INT denote budget deficit, money supply, inflation, income per capita and interest rate respectively. Note 2: ***, **, * indicate statistical significance at 1%, 5% and 10% respectively.

Source: Author's Computation

From the result, the threshold of money supply is 15.4649. In addition, below the threshold value of 15.4649, money supply exerts a negative and significant impact of inflation. The coefficient value of -8.4516 indicates that a 1 per cent decrease in money supply (% of GDP) below the threshold of 15.4649 will lead fall in inflationary rate by 8.4516%. Contrarily, the impact of money supply on inflation beyond the threshold of 15.4649 will lead to increase in price level by 0.0724 per cent. This suggests that increase in money supply (% of GDP) beyond the threshold value of 15.4649 will induce inflation by 0.0724 per cent. Subsequently

this study found that budget imbalance (BD) is positively and significantly linked with money supply in both short and long run. This is conformity with the FTPL hypothesis which contends that budget imbalance financed through printing of money (seigniorage) or borrowing increases money supply in an economy.

5**. Conclusion and recommendations**

The study concludes that increase in budget deficit raises money supply in Nigeria. This study established a threshold of budget deficit to GDP ratio of 0.1375. On this basis, it is recommended that government must ensure that yearly budget imbalance does not exceed this threshold in order to mitigate deficit induce inflation.

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