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The asymmetric effect of fiscal deficits on macroeconomic stability in Nigeria: evidence from nonlinear autoregressive distributed lag (NARDL)

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Abstract

Purpose – The paper examines the asymmetric effects of fiscal deficits on selected macroeconomic variables in Nigeria, which include economic growth, exchange rates and inflation. The existing works of literature are premised on symmetry assumptions with dichotomous findings. In such situations, they suggest using a nonlinear approach as an alternative to checkmate the findings premised on linearity. This is critical, considering the perpetual fiscal deficit trends of Nigeria, which are considered a major economic problem in the country.

Design/methodology/approach – The study employs nonlinear autoregressive distributed lag (NARDL) estimator using secondary data collected from the statistical bulletin of the Central Bank of Nigeria (CBN).

Findings – The results show that in the short run, both positive and negative shocks to the fiscal deficit have no effect on Nigeria's economic growth. The same is found on the negative shocks in the long run. However, positive shocks to the fiscal deficit have a long-run positive impact on economic growth. It is further revealed that, in the short run, positive shocks as well as negative shocks to fiscal deficits are positively related to the inflation rate. More so, long-run estimates show that positive shocks to the fiscal deficit have negative impacts on inflation, while negative shocks to the fiscal deficit have positive impacts on inflation.

Originality/value – This study introduces novelties to the understanding of the relationship between fiscal deficits and macroeconomic stability in Nigeria. It accounts for asymmetric and nonlinear features that are more aligned with the socioeconomic realities of real-world phenomena. This study also offers more insightful policy perspectives to enhance the fiscal profile of the country.

Keywords Nigeria fiscal deficits, Macroeconomic stability, Asymmetric effects

Paper type Research paper

1. Introduction

Macroeconomic stability is the hallmark of every macroeconomic policy of the government, irrespective of time and place. The desire for stability is a derived demand that emanates from a need for sustainable development and an improved standard of living. However, since economic growth is a necessary condition for development and sustainable growth could only be achieved in a sound macroeconomic environment, it is, therefore, critical to deploy

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much effort in ensuring the stability of macroeconomic variables. In managing macroeconomic stability, fiscal policy instruments play fundamental roles, such that the outcome of the variables would portend stability in the economy. For instance, when key fiscal policy instruments are deployed in a way that allows inflation to be stable, there is a greater possibility of a viable balance of payments situation and a low real interest rate. Thus, to achieve stability, the government embarks on appropriate fiscal policies. However, misuse of fiscal policy instruments may result in macroeconomic imbalances, which may constitute instability. One of the most prominent fiscal policy instruments is the fiscal deficit, which signals the direction of government outlook in terms of balancing between inflation and employment level, but in cases of misuse, it could create a serious imbalance *vis-à-vis* stagflation.

Meanwhile, historically, many countries abused the use of the fiscal deficit and ended up creating an imbalance within the economy. Mercan (2014) posited that many European Union (EU) countries and the Organization for Economic Co-operation and Development (OECD) countries have surpassed 3% budget deficit limit recommended by the Maastricht Treaty. For instance, in 2010, Ireland's fiscal deficit was 32.4%, while the USA had 10.7%, Greece had 10.4%, Finland had 10.3%, Spain had 9.3%, Portugal had 9.2%, Japan had 8.2% and the majority of the OECD countries had a 7.7% deficit. Moreover, Kose *et al.* (2017) observed that the average deficit of many emerging countries increased from 1% in 2007 to 5% in 2016. The situation is more worrisome in Africa. For instance, Ghana had a fiscal deficit of 11.8% of gross domestic product (GDP) in 2012 (Akosa, 2013), and South Africa's fiscal deficit rose from 1.3% of GDP in 1980 to 4.8% of GDP in 2010 (Murwirapachena *et al.*, 2013). However, the absorbable capacity of countries varies; as such, the implication of a fiscal deficit on a country differs from another.

Nigeria, like any other developing country, is faced with a large and persistent budget deficit. From 1981 to 2022, excluding 1995 and 1996, when there were budget surpluses, the overall deficit of Nigeria has increased. The deficit of ₦3.9bn in 1981 rose to ₦35.76bn in 1991, ₦221.05bn in 2001, ₦1.158tn in 2011, ₦3.679tn in 2017, ₦3.628tn in 2018 and ₦4.913tn in 2019. This shows that from 1981 to date, Nigeria has consistently operated fiscal deficits. Meanwhile, the justifications for embarking on expansionary fiscal policy have been hinged on infrastructural development in power, transportation, education, health, housing and security, among others.

The reality is that Nigeria has faced development challenges over the years in spite of the persistent expansionary fiscal policies of the government. Meanwhile, some studies have shown that fiscal deficits positively affect macroeconomic variables (Onwuka, 2022; Ugwu and Efuntude, 2017; Nwakobi *et al.*, 2018). Their studies are largely tailored around the argument that both investment and consumption increased, thereby stimulating domestic consumption. However, Tule *et al.* (2020), Akinmulegun (2014) and Idris *et al.* (2017) showed that fiscal deficits and macroeconomic performance are negatively related. The studies observed that the fiscal deficit created distortion in both goods and money markets and crowded out private investment. Another study argued for a neutral relationship (Iya *et al.*, 2014).

A key observation in the reviewed extant literature is the assumption of linear relationships between fiscal deficits and macroeconomic variables. The studies were conducted within linear frameworks with the assumption that the fiscal deficit has symmetric effects on macroeconomic variables. This assumption does not capture real-world phenomena and socioeconomic realities, which are basically nonlinear (Olaniyi and Odhiambo, 2023, 2024a; Olaniyi *et al.*, 2023; Olaniyi and Ologundudu, 2022; Olaniyi, 2020). Inability to capture these nonlinear and asymmetric features could produce biased outcomes and invalid policy implications (Olaniyi and Olayeni, 2020; Olayeni *et al.*, 2021; Olaniyi, 2019). A linearity assumption simply implies that the effects of positive fiscal deficit shocks on

economic growth, exchange rate, inflation rate, and any other macroeconomic variables are the same in absolute terms and magnitude as the effects of negative fiscal deficit shocks. This supposition is too restrictive and impractical, as it tends to produce suboptimal empirical outcomes and inappropriate macroeconomic policy to stabilize the economy. Hence, this study differs from previous research on Nigeria by employing a nonlinear autoregressive distributed lag (NARDL) estimator that was recently developed to investigate the effects of fiscal deficits on macroeconomic variables (inflation rate, exchange rate and economic growth) in Nigeria.

The remaining parts of the work are structured as follows: Section 2 discusses theoretical and empirical literature; data description and methodology are captured in Section 3, while empirical results and discussion of findings are the major issues discussed in Section 4 and summary, conclusion, policy implications and recommendations are the main things presented in Section 5, which is the last aspect of the work.

2. Brief literature reviews

Theoretically, the debate on how fiscal deficits affect macroeconomic variables is deeply rooted in controversy among Keynesian, Neoclassical and Ricardian economists. The Keynesians assert that fiscal deficits affect economic performance positively (Eisner, 1989), the Neoclassical believe that they affect macroeconomic performance negatively (Bernheim, 1989) and the Ricardian economists opine that they have a neutral effect on macroeconomic performance (Barro, 1989). In line with the theoretical positions, diverse outcomes are recorded in the empirical literature, even though the philosophy of several countries, including developing countries and emerging markets, is Keynesian. However, whatever the outcome observed in the literature, a unique position is that the excessive use of deficit has a lot of implications on macroeconomic variables, namely economic growth, inflation, exchange rate and current account balance, among others (Epaphra, 2017; Awolaja and Esefo, 2019; Chukwu *et al.*, 2020; Gyasi, 2020; Olaniyi, 2020).

Epaphra (2017) and Brima and Mansaray-Pearce (2015) affirmed that real GDP and budget deficits are negatively related in Tanzania and Sierra Leone, respectively. Dao and Bui (2016) demonstrated that budget deficits have a neutral effect on economic growth in Vietnam, and the same is observed in Velnampy and Achchuthan (2013) in Sri Lanka. However, a similar study by Tung (2018) on Vietnam shows there is a negative effect of fiscal deficits on economic growth. In the same way, Navaratnam and Mayandy (2016) found that the nexus between deficit and growth was negative in a number of selected South Asian countries, except Nepal, where they argued in support of a positive effect. Sabr *et al.* (2021) also concluded that there is a strong negative relationship between budget deficit and economic growth in Iraq. However, Okelo *et al.* (2013) and Onwioduokit and Inam (2018) showed that budget deficits contribute positively to economic growth in Kenya and Liberia. A positive long-run relationship is found by Gyasi (2020) in Morocco. Meanwhile, Awolaja and Esefo (2019) used a panel analysis on 20 Sub-Saharan African countries and found positive effects of budget deficits on economic growth in the short run but negative effects in the long run.

In the study of Umeora (2013) on Nigeria, budget deficits are found to have a positive effect on the exchange rate. However, contrary to this, in the subsequent work of Wuyah and Amwe (2015) and Chukwu *et al.* (2020), it was evident that fiscal deficits have negative effects on exchange rate. In another study, Fasoranti and Amasoma (2013) investigated the direction of causality between fiscal deficits and external sector performances in Nigeria and found a long-run bi-directional causality but found unidirectional causality in the short run that runs from external sector performance to budget deficit. In the extension of their study, correlation analysis results suggest that fiscal deficits would lead to a long-term deterioration of external

reserves and the exchange rate, which is similar to the results obtained by Wuyah and Amwe (2015) and Chukwu *et al.* (2020) on how budget deficits affect the exchange rate.

The literature reviewed on the effects of fiscal deficits on diverse macroeconomic variables shows wide inconsistency in the findings. This is, therefore, strongly justifies that the assumption of linearity of relationship among the variables in the studies, as assumed by many authors, may have contributed to the dichotomous conclusions. Therefore, in a more rigorous way, the effects of fiscal deficits on macroeconomic variables in this article are conducted using a nonlinear approach. It should be stressed that for more practical views of the literature review, we present a summary of the empirical studies in Table 1.

Studies	Data span	Country	Technique	Findings
Epaphra (2017)	1966–2015	Tanzania	VECM	FS ↓ EG FS ↓ EXCH FS ↑ INF
Brima and Mansaray-Pearce (2015)	1980–2014	Sierra Leone	VECM	FS ↓ EG FS ↓ EXCH FS ↑ INF
Dao and Bui (2016)	2003–2015	Vietnam	ARDL	FS≠>EG
Velnampy and Achchuthan (2013)	1970–2010	Sri Lankan	OLS	FS≠>EG
Tung (2018)	2003–2016	Vietnam	Error-correction estimator	FS↓EG
Navaratnam and Mayandy (2016)	1980–2014	South Asian countries	Error-correction estimator	FS ↓↑EG
Sabr *et al.* (2021)	1980–2018	Iraq	ARDL	FS ↓↑EG
Momanyi *et al.* (2013)	1970–2007	Kenya	Error-correction estimator	FS↑EG
Onwioduokit and Inam (2018)	—	Liberia	Error-correction estimator	FS↑EG
Gyasi (2020)	—	Morocco	ARDL	FS↑EG
Awolaja and Esefo (2019)	1991–2018	Sub-Saharan Africa	Pool mean Group	FS ↓↑EG
Umeora (2013)	1970–2011	Nigeria	OLS	FS↑EXCH
Wuyah and Amwe (2015)	1970–2013	Nigeria	VECM	FS↓EXCH FS↑INF
Chukwu *et al.* (2020)	1980–2012	Nigeria	Two-stage least squares	FS ↓EG FS ↓ EXCH FS ↓ INF
Fasoranti and Amasoma (2013)	1961–2011	Nigeria	Error-correction estimator	FS↑EXCH
Okoro and Oksakei (2020)		Nigeria	ARDL	FS≠>INF
Ekomabasi and Ekong (2023)	1981–2019	Nigeria	ARDL	FS↓INF
Kolawole (2023)	1981–2021	Nigeria	ARDL	FS ↓↑EG
Adekunle (2023)	1985–2018	Nigeria	ARDL	FS ↓↑EXCH

Note(s): FS: fiscal deficits; EG: economic growth; EXCH: exchange rate; INF: inflation; VECM: vector error correction mechanism; ARDL:
autoregressive distributed lag estimator and OLS: ordinary least squares
↑: it implies positive effect; ↓: it indicates negative effect; ↓↑: it means evidence of mixed results of positive and negative effects;
≠>: I\it signals insignificant effect and —: it implies that the study does not indicate the scope of the study
Source(s): Authors' computations

Table 1.
The list of studies on the effects of fiscal deficits on macroeconomic stability

3. Data description and methodology

3.1 Data description and sources

This study utilizes Nigeria's annual dataset from 1981 to 2021. The chosen timeframe aligns with the period when fiscal deficits in Nigeria became prominent and persistent. With the exception of 1995 and 1996, the country recorded persistent fiscal deficits for the timeframe. Annual data on economic growth (measured by the growth rate of GDP), gross fixed capital formation, interest rate, inflation rate, exchange rate, fiscal deficit (measured by fiscal deficits as a ratio of nominal GDP), interest rate and total population were gleaned from the 2022 edition of Central Bank of Nigeria (CBN) Statistical Bulletin, and the 2022 edition of World Development Indicator (WDI).

3.2 Model specification

Following the work of Shin *et al.* (2014), an asymmetric NARDL model that captures short- and long-run nonlinearity is employed.

To investigate the asymmetric impact, a nonlinear cointegration equation is considered. The assumption behind the model is that the effect of an increased deficit (negative) could be different from the effect of a decreased deficit (positive). Following the work of Shin *et al.* (2014), therefore, the fiscal deficit is decomposed into the partial cumulative sum of positive and negative changes, as shown in Equations 1 and 2

$$GFD_t^+ = \sum_{j=1}^{t} \Delta GFD_j^+ = \sum_{j=1}^{t} Max(\Delta GFD_j, 0) \tag{1}$$

$$GFD_t^- = \sum_{j=1}^{t} \Delta GFD_j^- = \sum_{j=1}^{t} Min(\Delta GFD_j, 0) \tag{2}$$

Thus, asymmetric cointegration becomes

$$r_{yt} = \theta_0 + \theta_1{}^+ GFD_t^+ + \theta_2{}^- GFD_t^- + \theta_3 GINV_t + \theta_4 r_{x_t} + \varepsilon_t \tag{3}$$

Equation 3 is a baseline long-run model for the explanation of how fiscal deficits impact on economic growth, exchange rate and inflation rate. r_{y_t} is a generic representation of these macroeconomic stability indicators in turns. GFD_t^+ and GFD_t^- are the positive and negative changes components of fiscal deficits, respectively. GFD_t is investment, and it is a factor that is common to all the three macroeconomic stability indicators. r_{x_t} captures all other control variables that might not be common to the three macroeconomic stability indicators.

To capture the short- and long-run nonlinearities, an NARDL model is employed. Equation 3 is written to reflect the three macroeconomic variables as shown in Equation 4, 5 and 6.

Model 1 – Economic growth

$$\begin{aligned}\Delta GGDP_t = {} & \alpha_0 + \sum_{i=1}^{P_1} \alpha_{1i} \Delta GGDP_{t-i} + \sum_{i=0}^{P_2} \alpha_{2i}{}^+ \Delta GFD_{t-i}^+ + \sum_{i=0}^{P_3} \alpha_{3i}{}^- \Delta GFD_{t-i}^- \\ & + \sum_{i=0}^{p_4} \alpha_{4i} \Delta GINV_{t-i} + \sum_{i=0}^{p_5} \alpha_{5i} \Delta GINT_{t-i} + \sum_{i=0}^{p_6} \alpha_{6i} \Delta POP_{t-i} + \rho_1 GGDP_{t-1} \\ & + \rho_2{}^+ GFD_{t-1}^+ + \rho_3{}^- GFD_{t-1}^- + \rho_4 GINV_{t-1} + \rho_5 GINT_{t-i} + \rho_6 GPOP_{t-1} + \varepsilon_t\end{aligned} \tag{4}$$

where $GGDP_t$ is the growth rate of gross domestic product; GFD^{+}_{t-i} and GFD^{-}_{t-i} are positive and negative changes' components of fiscal deficits, respectively; $GINV_t$ is the investment measured by gross capital formation and the other control variables are interest rate ($GINT_t$) and population ($GPOP_t$); t is the time period covered in the study; i is the lag indicator; α is the respective coefficient of the short-run dimensions of the variables and ρ is the long-run coefficient of each variable, while ε_t is the stochastic error. The main essence of Equation 4 is to examine the effects of fiscal deficits on economic growth.

Model 2 – Exchange rate

$$\Delta GEXC_t = \alpha_0 + \sum_{i=1}^{P_1} \alpha_{1i} \Delta GEXC_{t-i} + \sum_{i=0}^{P_2} \alpha_{2i}{}^{+} \Delta GFD^{+}_{t-i} + \sum_{i=0}^{P_3} \alpha_{3i}{}^{-} \Delta GFD^{-}_{t-i} + \sum_{i=0}^{p_4} \alpha_{4i} \Delta GINV_{t-i} + \sum_{i=0}^{p_5} \alpha_{5i} \Delta GINT_{t-i} + \rho_1 GEXC_{t-1} + \rho_2^{+} GFD^{+}_{t-1} + \rho_3^{-} GFD^{-}_{t-1} + \rho_4 GINV_{t-1} + \rho_5 GINT_{t-1} + \varepsilon_t \quad (5)$$

Where $GEXC_t$ is the exchange rate, GFD^{+}_{t-i} and GFD^{-}_{t-i} are positive and negative changes components in fiscal deficits, respectively, and $GINV_t$ is the investment, $GINT_t$ in the exchange rate model. The baseline objective of Equation 5 is to ascertain the effect of fiscal deficits on exchange rate.

Model 3 – Inflation rate

$$\Delta GINF_t = \alpha_0 + \sum_{i=1}^{P_1} \alpha_{1i} \Delta GINF_{t-i} + \sum_{i=0}^{P_2} \alpha_{2i}{}^{+} \Delta GFD^{+}_{t-i} + \sum_{i=0}^{P_3} \alpha_{3i}{}^{-} \Delta GFD^{-}_{t-i} + \sum_{i=0}^{p_4} \alpha_{4i} GINV_{t-i} + \sum_{i=0}^{p_5} \alpha_{5i} \Delta GINT_{t-i} + \rho_1 GINF_{t-1} + \rho_2{}^{+} GFD^{+}_{t-1} + \rho_3{}^{-} GFD^{-}_{t-1} + \rho_4 GINV_{t-1} + \rho_5 GINT_{t-1} + \varepsilon_t \quad (6)$$

where $GINF_t$ is the inflation rate, and other variables are as defined in Equations 4 and 5 except $GINT_t$ and $GINV_t$, which denote interest rate and investment. The main rationale of Equation 6 is to examine the effects of fiscal deficits on inflation.

General information of Equation 4, 5 and 6

α_i are short-run coefficients and $\rho_1 - \rho_4$ are long-run coefficients, normalized on ρ_0. When Equations 4, 5 and 6 are estimated, the following hypotheses, in relation to the asymmetric effects of fiscal deficit on macroeconomic stability, are tested for the purpose of the analysis.

(1) Short-run adjustment asymmetry effects are inferred if $\Delta GFD_t{}^{+}$ and $\Delta GFD_t{}^{-}$ take different lag order;

(2) Short-run asymmetry effects are determined if at the same lag order i, the estimate of $\alpha_{2i}{}^{+}$ is different from the estimate of $\alpha_{3i}{}^{-}$;

(3) Short-run cumulative asymmetry effects are established if $\sum \widehat{\alpha}_{2i}{}^{+} \neq \sum \widehat{\alpha}_{3i}{}^{-}$, i.e. if the estimate of $\sum \alpha_{2i}{}^{+}$ is not equal to the estimate of $\sum \alpha_{3i}{}^{-}$ and

(4) Long-run asymmetric impact is inferred if the normalized long-run estimates obtained for GFD_t^+ is different from that of GFD_t^-, i.e. $\frac{\widehat{\rho_1}^+}{-\rho_0} \neq \frac{\widehat{\rho_2}^-}{-\rho_0}$

This study stresses that the number of variables in each of the models varies because the factors that determine economic growth, the exchange rate and the inflation rate are not the same. These macroeconomic indicators have different determining factors, although some determinants are common to them all.

For the estimation of asymmetric dynamic multiplier effects, the following equations were used:

For GDP

$$K_{b^+} = \sum_{J=0}^{b} \frac{\partial GGDP_{t+j}}{\partial GFD_t^+}, K_{b^-} = \sum_{J=0}^{b} \frac{\partial GGDP_{t+j}}{\partial GFD_t^-}, b = 1, 2, 3 \ldots \quad (7)$$

Noting that $b \to \infty, K_{b^+} \to \theta_1^+$ and $K_{b^-} \to \theta_2^-$

For exchange rate

$$K_{b^+} = \sum_{J=0}^{b} \frac{\partial EXG_{t+j}}{\partial GFD_t^+}, K_{b^-} = \sum_{J=0}^{b} \frac{\partial EXG_{t+j}}{\partial GFD_t^-}, b = 1, 2, 3 \ldots \quad (8)$$

Noting that $b \to \infty, K_{b^+} \to \theta_1^+$ and $K_{b^-} \to \theta_2^-$

For inflation

$$K_{b^+} = \sum_{J=0}^{b} \frac{\partial INF_{t+j}}{\partial GFD_t^+}, K_{b^-} = \sum_{J=0}^{b} \frac{\partial INF_{t+j}}{\partial GFD_t^-}, b = 1, 2, 3 \ldots \quad (9)$$

Noting that $b \to \infty, K_{b^+} \to \theta_1^+$ and $K_{b^-} \to \theta_2^-$

At each level of the estimation, diagnostic tests are carried out to ensure the appropriateness of the estimations.

4. Analyses and discussions of results

4.1 Descriptive analyses of variable

Table 2 showed that the mean and standard deviation values of all variables are positive. The link between mean and standard deviation values demonstrates the extent to which mean represents the actual dataset. Variables such as inflation rate (GINT), population (GPOP) and investment (GINV) appear to have significantly spread out from their average values. This is an indication that they are unstable and somewhat volatile. Thus, other variables are stable and less volatile as their data cluster around their respective mean values.

Variable	Mean	Standard deviation	Min	Max	Skewness	Kurtosis	Jaque-Bera (p-value)	Observation
GFD	2.321	1.607	0.000	5.999	0.442	2.378	0.407	41
GINT	17.781	4.907	8.917	31.650	0.193	3.596	0.679	41
GGDP	5.236	3.726	0.061	15.329	0.687	3.167	0.229	41
GPOP	2.582	0.069	2.489	2.710	0.091	1.663	0.246	41
GEXC	3.440	1.808	0.112	5.723	−0.594	1.928	0.139	41
GINV	36.685	19.629	14.169	89.386	0.953	3.570	0.047	41
GINF	19.519	17.450	5.382	72.836	1.670	4.677	0.101	41

Table 2.
Descriptive statistics

Source(s): Authors' computations

Furthermore, the skewness and kurtosis statistics provide important information about symmetry of different data series' probability distributions, as well as the thickness of their tails, respectively. The coefficients of kurtosis that the variables such as interest rate (GINT), economic growth (GGDP), investment (GINV) and inflation rate (GINF) are leptokurtic (sharply peaked with heavy tails) while other variables such as fiscal deficit (GFD), exchange rate (GEXC) and population (GPOP) are all platykurtic (have flat peaks with lighter tails). None of these variables exhibits the properties of mesokurtic kurtosis; therefore, the variables do not portray the elements of exact normal distribution. Thus, the variables are not symmetric in their data distribution as they portray elements of asymmetric distribution in their data spreading. However, the coefficients of skewness also support the asymmetric nature of the data distribution. This implies that the data are either positively skewed or negatively skewed to the right or to the left. Thus, the distributions are not symmetric.

The result of Jarque-Bera statistic implies that there is normality in data distribution with the exception of GINV. This is an indication that most of the data can be used for further analysis.

4.2 Unit root tests

To avoid spurious findings in the analysis, it is important to ensure that time series data are stationary. If the data are trending, trend removal is required Zivot (2006). The most common trend removal or de-trending procedure is first differencing of data. First differencing is appropriate for I(1) time series. In time series analysis, unit root tests are used to determine if trending data should be first differenced or be differenced at higher order to render the data stationary. Phillips and Perron and Augmented Dickey–Fuller (ADF) unit root tests are employed in this analysis. The Phillips–Perron (PP) unit root tests only differ from ADF tests in how they deal with serial correlation and heteroscedasticity in errors. ADF tests use a parametric autoregression to approximate the structure of errors in the test regression and PP tests ignore any serial correlation in the test regression using non-parametric method. Usually, a use of multiple unit root test approaches is important to provide a robustness check so as to ensure that the limitations inherent in the use of a single approach do not lead to spurious conclusion. It should be noted that this study allows the system to endogenously choose the optimal lag length through Akaike's Information Criterion (AIC). This process is consistent in all of the study's estimations.

The results of the ADF test presented in Table 3 revealed that a few of the variables are stationary at the levels (integrated of order zero, I(0)), while others attain stationarity at first difference, I(1). Collectively, all variables become stationary at first difference, I(1). This

	Unit root tests					
	ADF test			Philip Perron test		
Variables	Level	First difference	Status	Level	First difference	Status
GFD	−2.9843**	−6.8499**	I(0)	−2.9843**	−7.8362**	I(0)
GINT	−2.4623	−5.2367**	I(1)	−2.4357	−6.7060**	I(1)
GGDP	−2.3517	−13.0659**	I(1)	−5.2239**	−14.0334**	I(0)
GPOP	−4.7644**	−2.9805**	I(0)	−2.2895	−4.3525**	I(1)
GEXC	−1.0708	−5.2899**	I(1)	−1.0685	−5.2792**	I(1)
GINV	−3.1871**	−4.7623**	I(0)	−3.1502**	−4.7623**	I(0)
GINF	−2.8592	−5.5147**	I(1)	−2.7317	−9.3988**	I(1)

Note(s): ADF is Augmented Dickey-Fuller. ** indicates rejection of the null hypothesis of non-stationary at 5% level of significance
Source(s): Authors' computations

Table 3.
ADF and Philip Perron unit root tests results

mixture of integrated order zero and one justifies the adoption of the autoregressive distributed lag (ARDL) estimator, which takes care of this peculiar situation. The PP test also validates the results of the ADF to confirm the mixed orders of integration. Collectively, the two tests indicate the mixed orders of integration among the variables in the study, and they all attain stationarity at the first difference. The mixed orders of integration imply that the variables are liable to behave divergently in the short run. This necessitates examining cointegration or the long-run relationship among the variables to ensure that the variables have a high likelihood to converge and comove along the long-run path for sound policy implications.

4.3 Cointegration test

Consistent with the mixed orders of integration among the variables as established by the unit root tests, this study adopts the cointegration variant of Pesaran *et al.* (2001). The bounds test cointegration was carried out to examine the existence or otherwise of cointegration among the variables. The results are presented in Table 4. In the results, F-statistic values exceed the upper bound critical value at the 1% level of significance in all the three models, indicating evidence of a long-term relationship among the variables. This implies that a long-run relationship exists in all the models examined. It also means that if there are short-run shocks that affect the movement of the individual series, they will eventually converge over time (in the long run). This implies that the variables are cointegrated and that there are significant long-run relationships among them. The confirmation of a long-run relationship indicates that, as unit root tests attest to divergence and different behavior of variables in the short run through factors that cause disequilibrium and distortion (Olaniyi and Oladeji, 2022; Olaniyi and Adedokun, 2022). Meanwhile, the confirmation of long-run relationship that the variables are bound to converge and behave in the same direction along the long-run dynamics (Olaniyi *et al.*, 2023). These findings demonstrate that long-run estimates are more reliable and predictable for policy implications (Olaniyi and Odhiambo, 2024b). Note that each model has a different number of independent variables due to variations in the factors determining each dependent variable. These variations can be seen in models I, II, and III. Economic growth, the exchange rate, and the inflation rate are the dependent variables in models I, II, and III, respectively.

4.4 Nonlinear ARDL estimation results

The nonlinear ARDL model was estimated after decomposing fiscal deficit into partial sum of negative change and partial sum of positive change to empirically judge accurately whether the negative or positive shocks or both to gross domestic product, exchange rate and inflation rate have symmetric or asymmetric effects on macroeconomic stability. To adequately reveal

Models	I	II	III
F-statistics	7.0014	4.5623	5.4534
Number of independent variables–*k*	5	4	4
Critical values	**Lower bound**		**Upper bound**
10%	2.03		3.13
5%	2.32		3.50
1%	2.96		4.26

Source(s): Authors' computations

Table 4.
ARDL bounds test for cointegration

the asymmetric effect of fiscal deficit on macroeconomic stability, the results of the three models comprising gross domestic product – fiscal deficit nexus (Model 1), exchange rate – fiscal deficit nexus (Model 2) and inflation rate – fiscal deficit nexus (Model 3) are presented in Table 5. We first explore the presence of short and long-run asymmetries in all the three nonlinear ARDL models. The results of the short and long-run asymmetries are presented in Table 6. Model 1 and 3 attest to the presence of asymmetries in the short and long-runs, while model 2 confirms asymmetries long-run asymmetries and short-run asymmetry is found nonexistent. These findings hint that earlier studies that did not capture asymmetries and nonlinearities might have overestimated their respective models. As a result, their estimates and policy implications might have missed some important fundamentals of real-world socioeconomic realities. It implies that this present study's outcomes are more robust and have far-reaching policy implications that align and explain the real-world realities.

In Model 1, the effects of fiscal deficit (GFD) on gross domestic product (GGDP) using interest rate (GINT), investment (GINV) and population (GPOP) as control variables were examined. Model 2 entails the effects of fiscal deficit (GFD) on exchange rate (GEXC) using interest rate (GINT) and investment (GINV) as control variables while Model 3 investigates the effects of fiscal deficit (GFD) on rate of inflation (GINF) considering the interest rate (GINT) and investment (GINV) as control variables as well.

Model 1: (4, 4, 3, 3, 4, 3) Dep. Variable: GGDP			Model 2: (1, 2, 4, 4, 0) Dep. Variable: GEXC			Model 3: (4, 4, 4, 4, 4) Dep. Variable: GINF		
Variable	Co-eff	*P*-value	Variable	Co-eff	*P*-value	Variable	Co-eff	*P*-value
Short run estimate								
D(GGDP(−1))	2.6736	0.057	D(GFD+)	−0.0898	0.0336	D(GINF(−1))	3.1705	0.0053
D(GGDP(−2))	2.0704	0.0449	$D(GFD^{+}(-1))$	−0.0668	0.0686	D(GINF(−2))	1.9143	0.0057
D(GGDP(−3))	0.7729	0.0685	$D(GFD^{-})$	0.0521	0.4284	D(GINF(−3))	0.6484	0.0179
$D(GFD^{+})$	−3.1305	0.1549	$D(GFD^{-}(-1))$	−0.0573	0.1762	$D(GFD^{+})$	1.0194	0.6507
$D(GFD^{+}(-1))$	−0.5821	0.7169	$D(GFD^{-}(-2))$	−0.0005	0.9909	D(GFD(−1))	1.4671	0.7024
$D(GFD^{+}(-2))$	−3.4544	0.1213	$D(GFD^{-}(-3))$	0.0704	0.0671	$D(GFD^{+}(-2))$	1.4292	0.7414
$D(GFD^{+}(-3))$	−1.2753	0.1753	D(GINT)	0.0383	0.0128	$D(GFD^{+}(-3))$	8.5292	0.0533
$D(GFD^{-})$	−0.2844	0.715	D(GINT(−1))	−0.0151	0.2252	$D(GFD^{-})$	4.9724	0.1946
$D(GFD^{-}(-1))$	−0.8864	0.5338	D(GINT(−2))	0.0101	0.4031	$D(GFD^{-}(-1))$	5.3761	0.1559
$D(GFD^{-}(-2))$	−1.5258	0.1024	D(GINT(−3))	−0.0259	0.0232	$D(GFD^{-}(-2))$	2.5065	0.4681
D(GINT)	1.1296	0.0346	D(GINV)	0.0171	0.0961	$D(GFD^{-}(-3))$	−7.5204	0.0202
D(GINT(−1))	0.6487	0.1002	ECT(−1)	−1.154	0.0002	D(GINT)	−2.1247	0.0745
D(GINT(−2))	0.2405	0.5741				D(GINT(−1))	−2.7873	0.0056
D(GINV)	1.5761	0.033				D(GINT(−2))	−3.9349	0.0151
D(GINV(−1))	−0.3904	0.1774				D(GINT(−3))	−1.0661	0.0381
D(GINV(−2))	0.8153	0.083				D(GINV)	0.8295	0.2376
D(GINV(−3))	−0.1703	0.492				D(GINV(−1))	0.6292	0.3042
D(GPOP)	1.5794	0.0489				D(GINV(−2))	2.0837	0.0197
D(GPOP(−1))	−1.0874	0.1208				D(GINV(−3))	−1.0645	0.0577
D(GPOP(−2))	2.1572	0.4305				ECT(−1)	−5.5186	0.0011
ECT(−1)	−4.3169	0.0166						
Long run estimate								
GFD^{+}	1.137	0.0111	GFD^{+}	−0.214	0.0013	GFD^{+}	−1.2332	0.0828
GFD^{-}	0.2935	0.3617	GFD^{-}	0.0895	0.0672	GFD^{-}	0.3011	0.5301
GINT	0.0297	0.0947	GINT	0.0635	0	GINT	0.2952	0.1006
GINV	−0.3787	0.0063	GINV	−0.0148	0.0989	GINV	−0.3014	0.0233
GPOP	0.4513	0.0006	C	−1.4086	0.0035	C	2.3824	0.0025
C	−8.7349	0.0015						

Source(s): Authors' computations

Table 5. The results of nonlinear ARDL

Table 6.
The results of short and long-run asymmetries

Model 1					Model 2					Model 3				
Exog. Var	Long run asymmetry		Short run asymmetry		Exog Var	Long run asymmetry		Short run asymmetry		Exog. Var	Long run asymmetry		Short run asymmetry	
	F-stat	PV	*F*-stat	PV		*F*-stat	PV	*F*-stat	PV		*F*-stat	PV	*F*-stat	PV
GFD	1.820	0.020	0.057	0.083	GFD	1.742	0.021	1.526	0.208	GFD	1.862	0.020	1.056	0.037

Source(s): Authors' computations

In the three models, the appropriate lag length was chosen for NARDL model, using the general-to-specific criterion. Some diagnostic tests were carried out after estimating the required model. This was done to check the appropriateness of the dynamic model. The diagnostic tests results for Non-linear version of the model appeared satisfactory as shown in Table 4. Moreover, in all cases, for the estimated nonlinear ARDL model, the null hypotheses of serial correlation and heteroskedasticity were rejected.

In the Model 1, it is shown that signs of GFD^{+} coefficients are the same but with different magnitudes. In the short run, the effect of a positive shock to the fiscal deficit on the gross domestic product, though found to be negative, but are statistically insignificant. Similarly, the signs of GFD^{-} coefficients are also the same but with different magnitudes resulting in negative shocks to gross domestic product, even then they are statistically insignificant. The short-run result implies that fiscal deficit is not relevant to growth in gross domestic product, regardless of the magnitude of the fiscal deficit. These findings suggest that persistent increases in fiscal deficits do not immediately stimulate economic growth or dictate the pace of economic activities in Nigeria. This research indicates that fiscal deficits have no significant impact as a short-term fiscal policy tool to drive economic growth in Nigeria.

Unlike short-term findings, the results of long-term analysis indicate that positive changes in components of the fiscal deficit (positive shocks) have a significant and positive impact on economic growth. Meanwhile, the coefficient of the negative shocks to the fiscal deficit is also positive but insignificant in the long run. These findings clearly show that positive shocks in the fiscal deficit act as a stimulus, promoting economic activities, investment, and other growth-enhancing measures for long-term growth prospects in Nigeria's economy. The research findings offer valuable insights for macroeconomic decision-makers, stakeholders, and policymakers. It suggests that continually increasing fiscal deficits in Nigeria do not provide immediate growth incentives, but they have the potential to support the necessary elements that drive Nigeria's economic growth in the long run. These findings align with the theoretical principles of Keynesian economics. The implication is that Nigeria's persistent fiscal deficits provide incentives and stimuli to boost investment prospects, employment opportunities, and other ingredients that could enhance economic growth. Meanwhile, these growth-enhancing incentives and activities do not have immediate benefits; they only promote economic growth in the long run.

In short, a budget deficit, according to the Keynesian school of thought, is an efficient fiscal policy tool that can lead to output expansion and stimulate aggregate demand, thereby generating more investment and employment opportunities, especially during recessions, but with a longer time lag for the impacts to be felt and visible in the economy. These results are in consonance with the findings of Obinabo and Agu (2018), Nwakobi *et al.* (2018), and Yusuff and Abolaji (2020), which revealed that the budget deficit has a positive effect on economic growth in Nigeria.

Interest rate (GINT) has positive and significant effect on gross domestic product in the short-run. The implication is that investors maintain risk neutrality in the face of higher interest rate, thus a rise in investment leads to a rise in output growth. In other words, Nigeria exhibits higher returns on investment which is still far above the prevailing interest rate. The results also supported the Keynesian School of Thought, which assumes that deficit tends to raise consumer's aggregate demand which enhances profitability and viability of private investment resulting in an appreciable high degree of investment at an appreciable specified interest rate. However, the effects of interest rate on economic growth fizzle out in the long run.

Expectedly, investment has positive and significant effect on gross domestic product in the short run. However, the positive effect could not be accounted for in the long-run. This could be attributed to long-run crowd-out effects of fiscal deficits on private investment. This

implies that in the long-run, a rise in productive efforts in the economy does not translate to the desired economic growth. The conclusions follow partly the works of Ali *et al.* (2018) which showed that fiscal deficit crowds out private investment and therefore impacted negatively on growth. It otherwise negates the findings of Nwakobi *et al.* (2018) which argued that increase in both investment and consumption would stimulate domestic production and growth in the long-run.

Population (GPOP) maintains a significant positive relationship with gross domestic product in short and long-run. By implication, the labor force in Nigeria is highly productive owing to the fact that as active population rises so also the growth rate of the nation's output. It is an indication that a rise in the active population accounts for significant rise in the growth of gross domestic product in Nigeria. Additionally, a significant rise in population tends to broaden tax net of government and in line with Ricardian position, tax payers with appropriate foresight tend to increase their savings and this strengthens investment potential and hence, economic growth.

In the Model 2, positive shocks to fiscal deficit maintain significant negative relationship with exchange rate in both the short and long-run, while negative shocks, though has positive relationship with exchange rate, is not significant. This implies that a rise in the size of fiscal deficits depreciate Naira exchange rate which may be due to crowding out effects of budget deficits on foreign reserves. A drop in foreign reserve weakens the absorbing capacity of excess demand for foreign currency at the exchange market. In other words, the CBN could not have enough foreign exchange to stabilize the market, which leads to freefalls in value of Naira. The results are in line with the Neoclassical theory and various empirical literature which postulates that a rise in budget deficit subsequently results to exchange rate depreciation, Epaphra (2017), Brima and Mansaray-Pearce (2015), Fasoranti and Amasoma (2013), Wuyah and Amwe (2015) and Chukwu *et al.* (2020).

The results of short run dynamics and long-run reveal that interest rate (GINT) has positive effect on the exchange rate. It also shows that the cumulative effects of interest rate on exchange rate are positive. By implication, higher interest rate has the potential of increasing the exchange rate. This is because local investors will be discouraged as a result of higher interest rate and this will pave way for greater import and hence rise in the exchange rate. The findings also buttressed the Keynesian view which states that in an emerging economy an increase in budget deficit raises interest rate which subsequently results to exchange rate appreciation. Moreover, investment maintained a significant positive relationship with exchange rate, in the short run but negative relationship in the long-run. This implies that a rise in productive efforts in the economy tends to hinder higher exchange rate growth in the long run. It has the potential of enhancing relatively stable exchange rate policy.

The results in Model 3 indicate from the estimates that the sizes of GFD^{+} and GFD^{-} are different as well. It can also be shown from the estimates that the signs of GFD^{+} and GFD^{-}coefficients are the same but with different magnitudes.

In the same vein, interest rate (GINT) maintained a negative relationship with inflation rate in the short run. The cumulative effects of the variable were equally found to be significantly positive in the short run. On the contrary, an increased investment necessitated by an increase in interest rate skyrockets the price of goods and services. Theoretically, it will result in an induced inflation in the economy.

Contrary to the results of short run analysis, long run estimates show that positive shock to fiscal deficit maintained negative relationship with inflation. From a practical and policy standpoint, these findings suggest that the continuous increase in fiscal deficits in Nigeria were not used for activities that put pressure on aggregate demand. This means that the fiscal deficits could have been used wisely for subsidies and other incentives aimed at reducing the overall price level, thereby leading to a decrease in inflation. However, it is important to

interpret this result cautiously. There may be hidden asymmetric dimensions in the inflation rate. We are still unsure about the specific aspect of inflation, whether positive or negative shocks, in which fiscal deficits contribute to a decrease in inflation. This aspect could be further examined in future research efforts. On the contrary, negative shock to fiscal deficit maintained positive relationship with inflation. This implies that fiscal deficit has implications for inflation in Nigeria. Therefore, the results revealed that an increased fiscal deficit implies higher government expenditure, which pushes up aggregate demand and increases the volume of money in the circulation. Thus, this may lead to demand-pull type of inflation as an increased fiscal deficit implies government's inability to earn as much as it is spending.

Interest rate (GINT) maintained a positive relationship with inflation rate while investment growth rate (GINV) which showed an estimated coefficient of 0.3014 implies that a 1% rise in investment results in 0.3014% fall in inflation rate in the long run.

More generally, the coefficients of error-correction term (ECT) are all negative and statistically significant in the non-linear results of the three models as shown in Table 3 above. This shows that there exists a long run relationship among the variables.

4.5 Diagnostic tests for the non-linear ARDL

Diagnostic tests were performed on the Non-linear ARDL to confirm the correctness of the estimates. Therefore, the synopses of residual diagnostic tests of normality, serial correlation, heteroskedascity and the Ramsey RESET test for the three models are provided in Table 7.

The results of Jarque-Bera test for normality reveal that the error terms are normally distributed and that the data can be used for further analysis. Breusch-Godfrey Serial Correlation LM Test results indicate that the non-linear models are free from the problem of autocorrelation. This implies that the residuals are not serially correlated and the equations of the three models can be used for hypothesis testing and forecasting as well. Absence of specification error is also confirmed by Ramsey RESET Test and the results suggest that there is possible nonlinearity in the data. Similarly, the results of Breusch-Pagan-Godfrey Heteroskedasticity test authenticate the non-existence of heteroskedasticity in the three models. Thus, the estimator appeared unbiased and consistent. This implies that none of the independent variables is correlated with the error term. Similarly, the results reveal that the models are free of serial correlation, heteroscedasticity, and the data is normally distributed. Furthermore, we examine the stability of the estimates of error-correction version of nonlinear ARDL through cumulative sum (CUSUM) test and cumulation sum square (CUSUMSQ) test. These tests affirm stability of the short and long-run estimates in each of the three models estimated in this study. Considering the number of the graphical illustrations of these tests, we do not present them in this study.

4.6 Dynamic Multiplier Graphs of NARDL estimates

The Dynamic Multiplier graphs of NARDL estimates of the three Models of the study are presented in Figures 1–3 below.

Diagnostic tests	Model 1		Model 2		Model 3	
Jarque-Bera test for normality	2.9232	(0.2380)	3.7157	(0.6265)	2.2410	(0.9231)
Breusch-Godfrey serial correlation LM test	2.0151	(0.6109)	0.3091	(0.3873)	0.0384	(0.6229)
Ramsey reset test	1.1447	(0.1262)	1.2571	(0.7619)	7.3175	(0.3012)
Heteroskedasticity test: Breusch-Pagan-Godfrey	1.6101	(0.6273)	2.6127	(0.2108)	2.4307	(0.1456)

Source(s): Authors' computations

Table 7.
Diagnostic tests

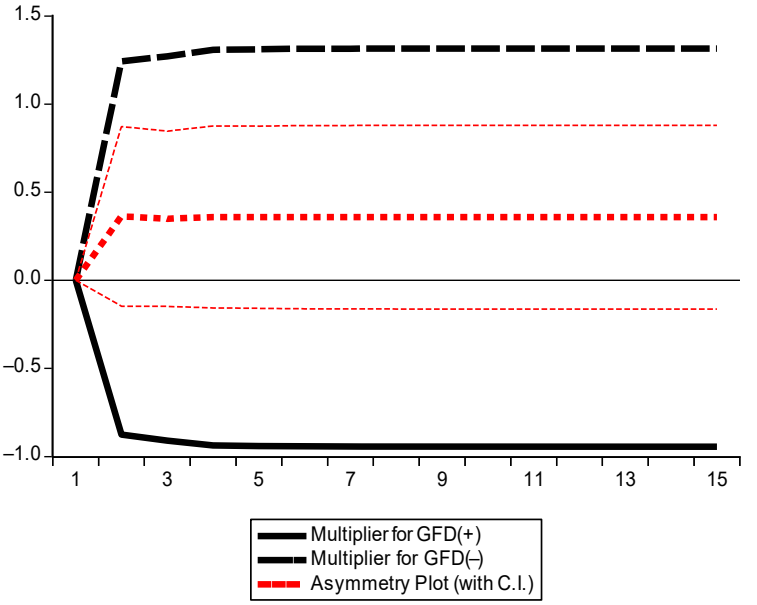


Figure 1.
Dynamic multiplier graph of NARDL estimate of Model 1

Source(s): Authors' graphical illustration

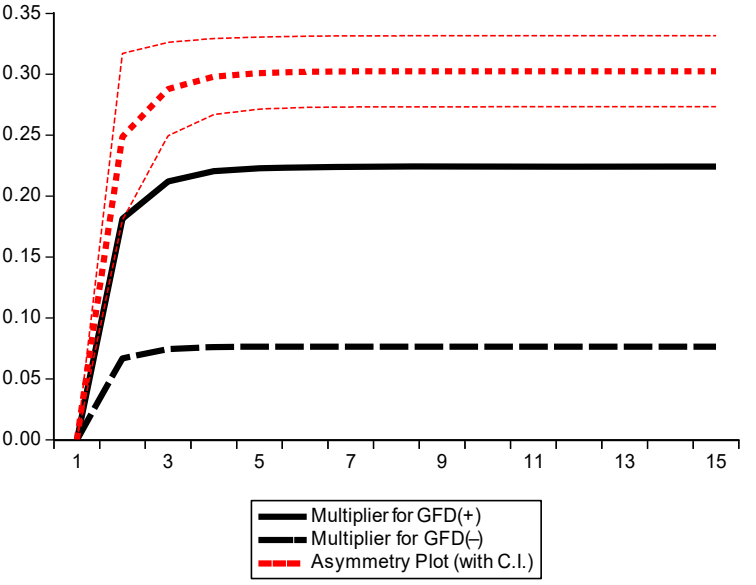
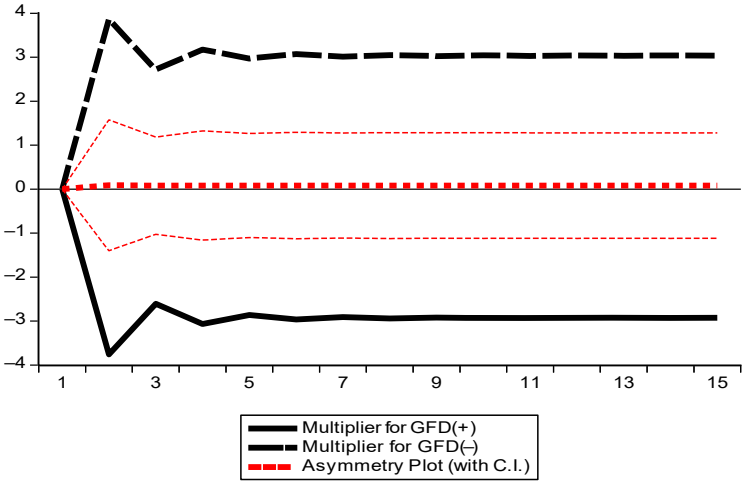


Figure 2.
Dynamic multiplier graph of NARDL estimate of Model 2

Source(s): Authors' graphical illustration

The asymmetric nature of the results in the long-run equilibrium was corrected after passing a new equilibrium as a result of positive and negative shocks as shown in Figure 1.



Source(s): Authors' graphical illustration

Figure 3.
Dynamic multiplier graph of NARDL estimate of Model 3

The symmetric (difference) curve depicts dynamic multiplier interaction resulting from both positive and negative shocks to GFD. The GFD-negative and positive shocks reveal details information about asymmetric GDP (GGDP) adjustment to negative and positive fiscal deficit shocks. The results show that GGDP responds proportionately both to negative and positive shocks from GFD in both short run and the long run. The graph indicates that positive component of GFD negatively affects GGDP while negative component of GFD positively affects GGDP.

From the graph, it shows that the red thick dotted line falls in between the positive and negative components of multiplier lines both in short run and long run. This reveals clear evidence of asymmetry between economic growth and fiscal deficit both in short run and long run.

Figure 2 depicts the dynamic multiplier interaction resulting from both positive and negative shocks to GFD. The GFD-negative and positive shocks reveal details information about asymmetric exchange rate (GEXC) adjustment to negative and positive fiscal deficit shocks. The findings reveal that GEXC responds more to positive shocks than negative shocks from GFD in both the short run and the long run. The graph indicates that negative component of GFD negatively affects GEXC while positive component of GFD positively affects GEXC.

From the graph, it was shown that the red thick dotted line breaks out of the positive and negative components of multiplier lines both in the short run and the long run. This indicates that, both in short and long run, there is no evidence of asymmetry between exchange rate and fiscal deficit.

Similar to the results in Model 1, the asymmetric nature of the results in the long-run equilibrium was corrected after passing a new equilibrium as a result of positive and negative shocks as shown in Figure 3 above which depicts the dynamic multiplier combinations resulting from both positive and negative shocks to GFD. The GFD-negative and positive shocks reveal details information about asymmetric inflation rate (GINF) adjustment to negative and positive fiscal deficit shocks. The results show that GINF responds proportionately both to negative and positive shocks from GFD in both the short run and

the long run. The graph indicates that positive component of GFD negatively affects GINF while negative component of GFD positively affects GINF.

From the graph, it shows that the red thick dotted line falls in-between the positive and negative components of multiplier lines both in the short run and the long run. This reveals a presence of asymmetry between inflation rate and fiscal deficit both in short run and the long run.

5. Summary, conclusion, policy implications and recommendations

From a theoretical and empirical standpoint, the roles of fiscal deficits in stimulating and stabilizing macroeconomic indicators, such as economic growth, exchange rate and inflation, have continued to attract the attention of scholars and policymakers because of their far-reaching policy implications on socioeconomic fundamentals. All the existing research that has examined the effects of fiscal deficits on economic growth, exchange rate and inflation rate has been based on the assumption of linearity and symmetry. These suppositions are impractical and do not align with real-world socioeconomic realities. Recent advances in modern empirical research and econometrics have criticized the oversimplifying assumptions of linearity and symmetry. As a result, this study introduces more realistic nonlinearities and asymmetric structures into the sensitivities of economic growth, exchange rate and inflation rate to changes in fiscal deficits. This study utilizes Nigerian data, using an NARDL approach. Nigeria's case provides an exciting opportunity for examination. The country has experienced persistent fiscal deficits over the years covered in this study, and some of the macroeconomic indicators, such as the exchange rate and inflation rate, have also been unstable.

Fiscal deficit in Nigeria does not explain the economic growth in the short run which implies that the argument of government in support of fiscal deficit to boost the immediate growth in the economy is not supported by empirical evidence. Instead, some level of positive magnitude in the fiscal deficit could only account for some level of growth over a relatively long time; even then, there are some levels of deficits that are deadweight in the long run. This nonlinear approach to the investigation is clarifying the ambiguity inherent in linear analysis which dominates the literature on Nigeria. The linear approach could only show the average effects, while the nonlinearity involves the analysis of separate effects of positive and negative shocks. It could be summarized that fiscal deficit has minimal contributions to the economic growth in Nigeria. In line with this submission, policy actors in Nigeria should avoid using fiscal deficit as a major tool to boost economic growth.

More so, fiscal deficit is weakening Nigeria Naira against foreign currencies. In this case, it is playing two major bad roles in the economy. Theoretically, fiscal deficit is expected to stimulate the economic growth and enhance export vis-à-vis exchange rate. In such case, if the exchange rate is weakened, then export is expected to stimulate and discourage import which would further stimulate the production of import substitute goods in the domestic economy for a faster economic growth. However, in the case of Nigeria, going by the current findings, fiscal deficit weakens exchange rate and fails to stimulate economic growth effectively. It could be said that Nigerian could not see fiscal deficit as a tool to instill discipline in support of domestic economic growth through the expansion of domestic production, but rather, it is seen as a way to easy money which should be expended on imported goods with the expectation of more such funds in the subsequent years. It is expected that government should provide a lead in the process of reorientation of the citizens on the danger of overdependence on basic imported goods and services through the enforcement and standardization of locally produced items.

The taste of Nigerians has been so inelastic to the extent that reduction in the fiscal deficit is not significantly improving Naira exchange rate. This further shows a need for urgent action to end the bad trend of excessive desires for foreign goods.

So also, fiscal deficits aggravate inflation in the short run, but the impact decreases in the long run. However, the impact of the positive and negative shocks on fiscal deficit which shows inconsistent pattern in the long run is strong evidence that Nigeria suffers imported inflation which could be much more attributed to the exchange rate than domestic economic behaviors. It means that policies which address import substitution would significantly solve the problem of inflation in Nigeria.

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