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Fiscal Deficit and Inflation: Evidence from the Nigerian Economy

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Abstract

This study investigated the complex relationship between fiscal deficits and inflation in Nigeria, examining their short-run dynamics, long-run equilibrium, and causal relationships. Using an Autoregressive Distributed Lag (ARDL) model and Granger causality testing, the research revealed several significant findings. In the short run, inflation demonstrated strong persistence, with past inflation values significantly influencing current levels. Fiscal deficits, particularly at their second lag, showed a positive impact on inflation, while real GDP and exchange rate stability exhibited deflationary effects. The error correction term indicated rapid adjustment to long-run equilibrium, highlighting effective fiscal and monetary coordination. Long-run analysis revealed a significant negative relationship between fiscal deficits and inflation, suggesting that disciplined fiscal policies could contribute to price stability over time. The money supply rate showed a positive long-term impact on inflation, consistent with classical monetary theory. Real GDP and exchange rates maintained their deflationary effects in the long run, serving as stabilizing factors in the Nigerian economy. Granger causality tests demonstrated unidirectional causality from fiscal deficits to inflation, establishing fiscal deficits as a predictor of inflation in Nigeria, though the reverse relationship was not significant. Based on these findings, the study recommends enhancing fiscal management through stronger deficit control measures and fiscal consolidation policies. This includes improved budgetary management, prioritized productive spending, and reduced reliance on borrowing. Additionally, the research emphasizes the importance of strengthening monetary and exchange rate policies, suggesting that maintaining exchange rate stability and controlling money supply growth are crucial for managing inflation. These recommendations aim to support price stability and mitigate inflationary pressures in Nigeria's developing economy.

Keywords*:*

Inflation, fiscal deficit, fiscal theory of price level, fiscal policy.

1. Introduction

Fiscal deficits, while often perceived as a precursor to economic instability, particularly in relation to inflation, are not inherently harmful. In fact, many advanced economies have successfully utilized fiscal deficits as tools for economic stabilization. For instance, in the aftermath of the 2008 global financial crisis, several developed countries, including the United States and those in the Eurozone, implemented significant fiscal stimulus packages to counteract the downturn. These measures, while increasing fiscal deficits, were critical in stabilizing economies and preventing deeper recessions (Blanchard, 2019). However, the impact of fiscal deficits on inflation varies significantly between developed and developing economies, often leading to contrasting outcomes.

Empirical evidence supports the notion that the impact of fiscal deficits on inflation can vary significantly based on the economic context. Bordo and Levy (2021) found that the relationship between fiscal deficits and inflation was particularly pronounced during wartime and in specific peacetime episodes where unbacked fiscal deficits contributed to significant inflation, such as in France during the 1920s and the U.S. during the Great Recession. This historical perspective underscores that fiscal deficits do not always lead to high inflation, especially when balanced by other economic policies.

In developing economies, however, the impact of fiscal deficits on inflation tends to be more direct and pronounced. Studies such as those by Bayir and Güvenoğlu (2020) and Eita *et al*. (2021) have demonstrated that in countries like Turkey and Namibia, increases in fiscal deficits are closely linked with rising inflation. Bayir and Güvenoğlu (2020) found a one-way causality from budget deficits to inflation in Turkey, suggesting that fiscal deficits can indeed exert upward pressure on prices if not managed carefully. Similarly, Eita *et al*. (2021) observed a direct effect of fiscal deficits on inflation in Namibia, emphasizing the need for effective coordination of fiscal and monetary policies to control inflation.

Further evidence from emerging economies such as Vietnam, Ghana, and Zimbabwe provides additional insights into the complexities of this relationship. Khieu (2021) found that in Vietnam, while inflation responded to positive shocks in money growth, fiscal deficits did not have a significant impact on inflation, highlighting the predominant role of money supply in driving inflation. In contrast, studies like those by Duodu *et al*. (2022) and Saungweme and Odhiambo (2021) found that in Ghana and Zimbabwe, respectively, fiscal deficits had notable inflationary effects, reinforcing the need for stringent fiscal discipline in these contexts.

Thus, while fiscal deficits can serve as critical tools for economic stabilization, especially in advanced economies, their effects on inflation are highly context-dependent. The evidence suggests that in developed economies, fiscal deficits can be managed effectively to avoid inflationary pressures, whereas in developing economies, fiscal deficits often necessitate careful management to prevent inflation from escalating. This nuanced understanding underscores the importance of tailored fiscal and monetary policies that consider the specific economic conditions and policy environments of each country.

In developed economies, where financial markets are more sophisticated and central banks maintain a high degree of credibility, fiscal deficits are typically managed with a focus on long-term sustainability. Central banks can effectively control inflation through monetary policy, even in the presence of large deficits. For example, the post-crisis era saw developed countries maintain low inflation rates despite significant fiscal deficits, largely due to well-coordinated monetary policies (Woodford, 2012). This contrasts sharply with the experience of many developing economies, where fiscal deficits are more often linked to inflationary pressures.

In developing economies, the relationship between fiscal deficits and inflation tends to be more direct and pronounced. These economies often lack the robust financial markets and institutional frameworks needed to absorb large deficits without adverse effects. As a result, fiscal deficits in developing countries can lead to an increase in money supply, either through direct monetization

or through higher borrowing from domestic sources, which in turn fuels inflation (Catao & Terrones, 2005). Moreover, the credibility of monetary policy in these countries is often weaker, making it harder to control inflation once it begins to rise.

Nigeria serves as a pertinent case study in exploring the relationship between fiscal deficits and inflation in a developing economy. As Africa's largest economy, Nigeria has a complex fiscal environment characterized by a heavy reliance on oil revenues, structural economic challenges, and frequent fiscal imbalances. The country's fiscal history shows that deficits have often been used as a means to finance public spending, especially during periods of economic downturn or falling oil prices. However, these deficits have also been closely linked to inflationary pressures, particularly when financed through central bank borrowing or when fiscal policy lacks coordination with monetary policy (Iyoha & Oriakhi, 2002).

Research on Nigeria's fiscal dynamics suggests that the country's inflationary episodes are often associated with fiscal deficits. For instance, a study by Oladipo and Akinbobola (2011) found that fiscal deficits in Nigeria have a significant positive impact on inflation, primarily through the expansion of the money supply. Similarly, Egwaikhide (1997) argues that the structural weaknesses of the Nigerian economy, including its dependence on oil and the volatility of its revenue base, exacerbate the inflationary impact of fiscal deficits.

As a result, critical questions, such as: What is the effect of fiscal deficits on inflation in Nigeria? and what is the direction of causality between fiscal deficits and inflation in Nigeria? form the basis for this study's objective. Consequently, this research aims to critically examine the relationship between fiscal deficits and inflation in Nigeria by leveraging both empirical data and theoretical insights. Specifically, the study seeks to investigate the effect of fiscal deficits on inflation and to explore the causal relationship between fiscal deficits and inflation within the Nigerian context.

By analyzing the Nigerian experience, this research aims to contribute to the broader discourse on fiscal policy in developing economies, particularly with regard to the challenges of controlling inflation while pursuing fiscal expansion. Understanding these dynamics is crucial for policymakers, who must carefully navigate the trade-off between promoting economic growth and ensuring price stability. The significance of this study lies in its ability to uncover the fiscal dimensions of inflation, offering valuable insights for government decision-makers to guide their strategies. Additionally, it holds relevance for academics and students of economics and public sector management. Following this introduction, the paper is structured into four further sections: the second section reviews the literature on fiscal deficits and inflation, the third outlines the methodology, the fourth presents the empirical findings, and the fifth concludes with policy recommendations and a summary.

2. Literature review

2.1. Conceptual Framework

Understanding the connection between fiscal deficits and inflation is essential in macroeconomic theory, particularly in the context of developing economies. In countries like Nigeria, these

dynamics are more pronounced due to weaker monetary and fiscal institutions, limited financial markets, and reliance on volatile revenue sources such as oil revenue (Central Bank of Nigeria, 2015; Abdulkareem and Abdulhakeem, 2016). Thus, a clear understanding of the conceptual framework of fiscal deficits and inflation is crucial for policymakers. Defining these concepts and their interactions provides a foundation for analyzing the conditions under which deficits contribute to inflation and helps inform sound economic policy formulation.

2.1.1. Fiscal Deficit

A fiscal deficit is a central concept in public finance, referring to the situation where a government's total expenditures exceed its total revenues, indicating that the government is spending beyond its means and needs to borrow funds to cover the shortfall. The fiscal deficit is commonly expressed as a percentage of a country's Gross Domestic Product (GDP) or as a total monetary amount. According to Blanchard and Johnson (2017) and Gruber (2019), a fiscal deficit occurs when government spending on goods, services, and transfers surpasses tax revenues, necessitating borrowing to cover the gap. They emphasize that while fiscal deficits can be an intentional policy tool to stimulate economic activity during periods of recession, persistently high deficits pose sustainability challenges, particularly concerning debt accumulation and potential crowding out of private investment.

Blanchard and Johnson (2017) further differentiate between primary deficits—which exclude interest payments on existing debt—and overall fiscal deficits, which include these interest payments. This distinction is crucial for understanding fiscal policy sustainability, especially when interest obligations are substantial. Carlin and Soskice (2015) describe fiscal deficits as a shortfall in a government's budget financed through debt issuance. They highlight that the implications of a fiscal deficit depend on its size relative to GDP, the interest rate environment, and the government's ability to repay its debt.

Tanzi and Schuknecht (2000) provide a global perspective on the effects of fiscal deficits, emphasizing that the impact of such deficits depends on the economic context. They discuss how sustained fiscal deficits can lead to higher inflation, especially when financed by money creation, and how they can also result in an unsustainable debt burden if not managed properly. Their work underscores the importance of institutional quality and effective fiscal policy frameworks in determining the macroeconomic outcomes of fiscal deficits.

Fiscal deficits can serve various economic purposes. For instance, during economic downturns, governments may intentionally run deficits to stimulate growth by increasing public spending or cutting taxes, which can help boost consumer spending and investment. This approach aligns with Keynesian economic principles, which advocate for deficit spending to counteract economic slumps (Hayes, 2019; Ross, 2022). However, persistent fiscal deficits can lead to significant national debt, as they require ongoing borrowing to finance the gap between spending and revenue. Critics argue that high levels of fiscal deficits can crowd out private investment, increase interest rates, and potentially lead to inflation or higher taxes in the future (Hayes, 2019; Ross, 2022; OECD, 2022).

2.1.2. Inflation

Inflation is a critical concept in macroeconomics, representing a sustained increase in the general price level of goods and services in an economy over time. As inflation rises, the purchasing power of money diminishes, meaning each unit of currency buys fewer goods and services (Blanchard & Johnson, 2017). Understanding inflation is vital because it affects economic stability, growth, and the standard of living.

Inflation is commonly measured using price indices that reflect the average change in prices over time. The two primary indices used are the Consumer Price Index (CPI) and the Producer Price Index (PPI). The CPI measures the average change in prices paid by urban consumers for a basket of goods and services, including items such as food, transportation, and medical care, reflecting the cost of living for households (Mankiw, 2019). It is often employed to gauge the impact of inflation on consumers. On the other hand, the PPI measures the average change in selling prices received by domestic producers for their output, providing insight into inflation at the wholesale level by capturing changes in input costs faced by producers (Blanchard & Johnson, 2017). The inflation rate is typically calculated as the percentage change in these indices over a year. A high inflation rate indicates a rapid increase in prices, while a low inflation rate suggests more stable price levels (Oner, 2024; Fernando, 2024).

2.1.2.1. Types and Causes of Inflation

Economic theory identifies several types of inflation, each driven by different factors:

i. **Demand-Pull Inflation:** This occurs when aggregate demand in an economy exceeds aggregate supply, often due to increased consumer spending, investment, or government expenditure. In a booming economy, higher demand leads to higher prices as suppliers struggle to keep up (Mankiw, 2019). This type of inflation is commonly associated with economic growth periods and can be exacerbated by low-interest rates or expansionary fiscal policies.
ii. **Cost-Push Inflation:** Cost-push inflation arises when the costs of production rise, such as through increased wages or raw material costs. Firms facing higher production costs may pass these costs onto consumers in the form of higher prices, leading to inflation (Boyle, 2021; Fernando, 2024). Supply-side shocks, like a rise in oil prices or natural disasters disrupting supply chains, can trigger this type of inflation.
iii. **Built-In Inflation**: Also known as wage-price inflation, this type occurs when workers demand higher wages to keep up with rising living costs. Businesses then increase prices to cover these wage costs, leading to a feedback loop of rising wages and prices (Samuelson and Nordhaus, 2010; Fernando, 2024). Built-in inflation is often perpetuated by inflation expectations, where businesses and workers act in anticipation of future inflation.
iv. **Monetary Inflation:** This occurs when there is an excessive growth in the money supply relative to economic output. Expansionary monetary policies, such as low-interest rates and quantitative easing, can lead to an oversupply of money, reducing its value and causing inflation. This form of inflation is often discussed in monetarist theory, which emphasizes the role of money supply in driving inflation.

v. **Imported Inflation:** This type of inflation is a result of rising prices of imported goods and services. For countries heavily reliant on imports, a depreciation of their currency or rising global commodity prices (such as oil) can lead to higher domestic inflation.

2.1.2.2. Implications of Inflation

The effects of inflation on an economy are multifaceted:

i. **Negative Effects:** High inflation erodes purchasing power, reducing consumers' ability to buy goods and services (Boyle, 2021). It can lead to uncertainty and discourage long-term investments and savings. Additionally, inflation can distort price signals, leading to inefficient resource allocation and reducing economic efficiency (Fischer, Dornbusch, and Startz, 2018). For fixed-income earners, inflation reduces real income, lowering their standard of living.

ii. **Positive Effects**: Moderate inflation, however, can have several benefits. It can reduce the real burden of debt, as debts are repaid with less valuable money. It may also lower unemployment due to nominal wage rigidity, where workers are less likely to accept nominal wage cuts, but inflation allows for real wage adjustments without reducing nominal wages (Blanchard and Johnson, 2017). Furthermore, moderate inflation encourages borrowing and investment rather than hoarding cash, promoting economic activity.

2.1.2.3. Control and Management of Inflation

To maintain economic stability, central banks, such as the Federal Reserve, the European Central Bank, and the Central Bank of Nigeria, use various monetary policy tools to control inflation:

i. **Interest Rate Policy:** Central banks manipulate interest rates to control money supply and demand. Raising interest rates can reduce borrowing and spending, thereby lowering inflation. Conversely, lowering interest rates can stimulate economic activity (Mishkin, 2019).

ii. **Open Market Operations:** This involves the buying and selling of government securities in the open market to regulate the money supply. Selling securities can absorb excess liquidity, helping to curb inflation, while buying securities can inject liquidity to combat deflation.

iii. **Reserve Requirements:** Central banks may change the reserve requirements for commercial banks, influencing the amount of money that banks can lend. Higher reserve requirements reduce the money supply, helping to control inflation.

iv. **Communication and Forward Guidance**: Central banks also use forward guidance to influence inflation expectations. By communicating their future policy intentions clearly, they can manage public expectations and prevent inflationary or deflationary spirals.

2.2. Theoretical Literature

From a conceptual standpoint, a fiscal deficit is fundamentally a fiscal phenomenon, while inflation is traditionally understood as a monetary issue. Therefore, the relationship between them is not straightforward, as it involves specific transmission mechanisms that create a cause-and-effect

dynamic between fiscal deficits and inflation. This section will explore the theoretical frameworks that highlight and explain these mechanisms.

2.2.1. Quantity Theory of Money

The Quantity Theory of Money (QTM) is a fundamental economic concept that posits a direct relationship between money supply and the price level in an economy. The theory, initially articulated by Irving Fisher and later developed by Milton Friedman and other monetarists, is summarized by the equation of exchange,

$MV = PY$ …….1

where M represents the money supply, V is the velocity of money, P is the price level, and Y is the real output. The core principle of QTM asserts that inflation arises when the growth rate of the money supply exceeds the rate of economic growth, assuming that both the velocity of money and real output remain constant (Skidelsky, 2018; Friedman, 1968).

Within this theoretical framework, if a government chooses to finance its fiscal deficit by printing money, it leads to an increase in the money supply. If this increase is not accompanied by a corresponding rise in economic output, the excess money in circulation raises aggregate demand, causing inflationary pressures. Therefore, the primary mechanism by which fiscal deficits contribute to inflation, according to the QTM, is through the direct expansion of the money supply beyond the productive capacity of the economy. This perspective highlights the critical role of monetary policy and fiscal discipline in maintaining price stability.

2.2.2. Keynesian Perspective

Keynesian economics provides a demand-side explanation for the relationship between fiscal deficits and inflation. Keynesians argue that inflation often results from demand-pull factors, where aggregate demand in the economy exceeds its aggregate supply, particularly when the economy is operating near or at full productive capacity (Keynes, 1936). Under this framework, a fiscal deficit can stimulate aggregate demand through increased government spending or tax cuts, which in turn raises overall consumption and investment. The effect of a fiscal deficit on aggregate demand is often amplified by fiscal multipliers, which suggest that initial government spending can have a multiplied impact on economic activity. However, if the economy is already close to full capacity, where most resources are fully employed, the increased demand can lead to demand-pull inflation as it surpasses the economy's ability to produce additional goods and services. Therefore, the transmission mechanism in the Keynesian view is centered on the impact of fiscal deficits on aggregate demand, with inflationary pressures becoming significant when there are capacity constraints.

2.2.3. Monetarist View

The Monetarist view, prominently advanced by Milton Friedman, holds that "inflation is always and everywhere a monetary phenomenon" (Friedman, 1968). This theory posits that inflation results from an excessive growth in the money supply relative to the economy's productive capacity,

assuming a relatively stable velocity of money. According to monetarists, fiscal deficits do not directly cause inflation; rather, it is the method of deficit financing that matters. If fiscal deficits are financed by borrowing from the central bank, this leads to an increase in the monetary base, and consequently, the money supply, potentially resulting in inflation. This perspective highlights the money supply as the primary transmission mechanism of inflation rather than the fiscal deficit itself.

Therefore, as long as fiscal deficits are financed through non-monetary means, such as issuing government bonds in well-developed financial markets, and without central bank intervention, they may not necessarily cause inflation (Mishkin, 2019). However, this view has faced criticism, especially in contexts where the velocity of money is unstable or where financial markets are underdeveloped, making the relationship between money supply and inflation more complex and less predictable (Goodhart, 1989). Empirical studies have shown mixed results, suggesting that while the monetarist view holds in certain conditions, it may not universally apply across all economic contexts.

2.2.4. Fiscal Theory of the Price Level (FTPL)

The Fiscal Theory of the Price Level (FTPL) presents an alternative, non-monetary perspective on inflation, emphasizing that the price level is chiefly influenced by a government's fiscal policy rather than the money supply (Woodford, 1995). Unlike conventional monetary theories, the FTPL asserts that the value of money is directly tied to the government's intertemporal budget constraint—its capacity and commitment to manage future debt obligations. This can be achieved through either higher primary surpluses or credible fiscal adjustments. If a government consistently runs fiscal deficits without a clear strategy for stabilizing debt, the resulting fiscal imbalance could drive inflation, effectively reducing the real value of the debt.

In the FTPL framework, inflation is transmitted through the government's budget constraint and public expectations. When economic agents, such as investors, perceive that a government will struggle to meet its debt obligations without resorting to inflationary financing (i.e., printing money to cover the debt), confidence in the currency diminishes. This erosion of confidence can trigger a rise in the price level as individuals expect inflation to devalue the currency. In this sense, inflation acts as a mechanism to align the government's fiscal position with its debt obligations.

According to Bolhuis (2024), Michael Woodford’s seminal contributions (1995, 2001) highlight that the price level is determined by the discounted value of future primary surpluses relative to the outstanding nominal debt. This sharply contrasts with Monetarist theories that center the money supply as the key determinant of inflation. Further work by Cochrane (2005) and Leeper (1991) has expanded on this view, showing that the FTPL is particularly relevant in economies where the monetary authority is constrained or where fiscal dominance exist that is, where fiscal policy takes precedence over monetary policy in shaping economic outcomes.

From a policy perspective, the FTPL emphasizes the significance of credible fiscal policies. A government that demonstrates a commitment to sustainable fiscal management and communicates this effectively can anchor inflation expectations even when running temporary deficits. However,

in contexts where fiscal credibility is lacking—often the case in developing economies the FTPL offers an explanation for persistent inflation despite seemingly sound monetary policies.

The FTPL model also distinguishes between scenarios of "fiscal dominance" and "monetary dominance" (Sargent and Wallace, 1981). Under fiscal dominance, monetary policy becomes subordinate to fiscal needs, making it challenging to control inflation if fiscal policies are unsustainable. In contrast, under monetary dominance, the central bank retains control over inflation by adhering to a rule-based policy, independent of fiscal conditions.

In conclusion, the relationship between fiscal deficits and inflation is complex and highly context-dependent, with different theories providing varying mechanisms through which deficits may lead to inflation. In the context of developing nations, where institutional quality may be lower, and financial markets less developed, the Quantity Theory of Money and the Fiscal Theory of the Price Level (FTPL) are particularly relevant. These economies often face higher risks of monetization of debt and loss of investor confidence, making the direct links between fiscal deficits, money supply, and inflation more pronounced. Among these, the Quantity Theory of Money is most applicable because it directly ties inflation to money supply growth, a common issue in developing countries where deficits are frequently financed through central bank borrowing rather than deep capital markets. Nevertheless, this study would base its analysis on the Fiscal Theory of the Price Level (FTPL) because it provides a valuable framework for understanding inflation, particularly in settings where traditional monetary explanations are inadequate, such as in economies facing fiscal distress. For developing countries, where fiscal institutions are often weak and fiscal discipline is tenuous, the FTPL offers key insights into the inflationary risks posed by unsustainable fiscal policies.

2.3. Empirical Literature

The interplay between fiscal deficits and inflation has been extensively analyzed across various economies, with findings revealing diverse dynamics and implications. From the international plane, Catao and Terrones (2005) conducted a study on 107 countries from 1960 to 2001, utilizing dynamic panel data techniques. Their research highlighted a strong positive association between fiscal deficits and inflation, particularly among high-inflation and developing countries, but not in low-inflation advanced economies. This suggests that the inflationary impact of fiscal deficits is more pronounced in less stable economies, where fiscal imbalances may exacerbate inflationary pressures. On the contrarily, Helmy (2008) using a vector error correction model (VECM) examined Egypt’s fiscal dynamics from 1982 to 2006. This study revealed a two-way dynamic link between budget deficits, government credit, exchange rates, and inflation. The results underscore the importance of fiscal discipline in curbing inflation, advocating for reduced budget deficits and improved exchange rate flexibility to bolster monetary policy and promote economic stability.

Similarly, to Catao and Terrones (2005), Karakaplan (2009) conducted a panel studies to analyzed the effects of public debt on inflation across 121 developed nations from 1960 to 2004 but employed the generalized method of moments (GMM). The findings were similar to Catao and Terrones (2005), suggesting that public debt exerts less inflationary pressure in developed economies. This implies that advanced economies may have more effective mechanisms for managing debt without

triggering significant inflation. In the same vein, Kwon, McFarlane, and Robinson (2009) conducted a panel analysis on 71 countries from 1962 to 2004 using a fully modified OLS (FMOLS) technique. Their research identified a significant risk of a debt-inflation trap in highly indebted countries, suggesting that purely monetary stabilization efforts might be insufficient. This indicates the need for comprehensive fiscal and monetary strategies to address inflationary risks.

Nguyen (2015) focused on Asian countries, including Bangladesh, Cambodia, and Thailand, from 1985 to 2012, utilizing a pooled mean group (PMG) estimation-based error correction model and the panel differenced GMM estimator. The study found that while broad money supply (M2) significantly impacts inflation, fiscal deficit, government expenditure, and interest rates are also crucial determinants. This highlights the complex interplay of fiscal and monetary variables in influencing inflation, particularly in rapidly developing economies. However, Nastansky and Strohe (2015) investigated Germany's public debt and inflation dynamics from 1991 to 2014 using a VECM. Their findings suggest that government debt can cause elevated inflation if accompanied by increased money supply. The study recommends a flexible monetary policy, suggesting that the management of public debt should be closely aligned with monetary policy to control inflation.

Andoni and Osmani (2017) explored the relationship between inflation, growth, and fiscal deficits in Albania from 1993 to 2015 using ARDL, threshold, and switching regression models. Their results indicated a negative relationship between inflation and growth, a positive relationship between inflation and fiscal deficits, but no significant link between fiscal deficits and growth. The study suggests IMF stabilization programs as effective measures for managing these dynamics in Albania. However, Hashem (2017) examined fiscal shocks and their impact on monetary policy and inflation in Egypt from 2005 to 2015 using a Structural Vector Auto-regression (SVAR) model. The study revealed that inflation responds significantly to positive shocks in budget deficits, suggesting that inflation is more a result of fiscal rather than monetary factors. Consequently, sustained fiscal reforms coupled with coordinated monetary policies are recommended to control inflation.

Using the ARDL model, Bulawayo, Chibwe, and Seshamani (2018) investigated Zambia's budget deficits and inflation from 1992 to 2016. They found a short-run relationship between budget deficits and inflation, with no significant long-term association. This unexpected result highlights the need for further research into the long-term effects of fiscal deficits on inflation in Zambia, while recommending sustainable budget deficit levels. On the contrary, Thahara and Washima (2019) using an error correction model (ECM) analyzed Sri Lanka's public debt and inflation from 1977 to 2015. Their study found a significant negative relationship between public debt and inflation, suggesting that reducing public debt could be a viable strategy for controlling inflation in Sri Lanka.

Ssebulime and Edward (2019) examined Uganda's budget deficits and inflation dynamics from 1980 to 2016 using co-integration and ECM techniques. Their research identified a unidirectional causality from budget deficits to inflation, with no feedback effect. The study advocates for a combined approach of budgetary, monetary, and exchange rate policies to address inflation effectively. However, Durguti (2020) investigated budget deficit impacts on inflation in Western Balkans countries from 2001 to 2017 using a VECM. The study found that a one percentage point

increase in the budget deficit to GDP ratio corresponds to a 9.34 percentage point increase in inflation. This significant finding underscores the inflationary risks associated with high fiscal deficits and calls for prudent fiscal management to mitigate inflationary pressures.

Bayir and Güvenoğlu (2020) explored the relationship between money supply, budget deficits, and inflation in Turkey from 2009 to 2019 using Granger causality techniques. Their analysis revealed a one-way causality from money supply and budget deficits to inflation, suggesting that increases in either can lead to higher inflation. The study highlights the importance of addressing budget deficits through increased tax revenues and optimal tax rates to mitigate inflationary pressures. Nonetheless, Eita *et al.* (2021) investigated the impact of fiscal deficits on inflation in Namibia from 2002 to 2017 using the Autoregressive Distributed Lag (ARDL) model and Granger causality approach. Their findings indicate a direct effect of fiscal deficit on inflation, with unidirectional causality running from fiscal deficits to inflation. The study suggests that effective coordination of fiscal and monetary policies is essential for controlling inflation, emphasizing the need to monitor budget deficits and price developments in neighboring countries.

Khieu (2021) analyzed budget deficits, money growth, and inflation in Vietnam from 1995 to 2012 using a structural vector autoregressive (SVAR) model. The study found that while inflation rose in response to positive shocks to money growth, budget deficits had no significant impact on money growth or inflation. This implies that in the Vietnamese context, money growth is a more critical driver of inflation than fiscal deficits. Notwitstanding, Bordo and Levy (2021) examined the historical relationship between fiscal deficits and inflation from 1920 to 2020. Their exploratory study found that fiscal deficits contributed to inflation primarily during wartime when governments resorted to inflationary financing. They also identified instances in peacetime where unbacked fiscal deficits led to significant inflation, such as in France during the 1920s and the U.S. during the Great Recession. The study highlights the complex interplay of fiscal and monetary policies in influencing inflation across different historical contexts.

Saungweme and Odhiambo (2021) investigated the relationship between public debt and inflation in Zimbabwe from 1980 to 2020 using the Autoregressive Distributed-lagged (ARDL) model. Their findings indicate that changes in public debt levels contribute to variations in inflation. The study recommends that the government manage its public debt levels carefully to avoid exacerbating inflationary pressures. Nevertheless, Urquhart (2021) explored the link between public debt and inflation in Paraguay from 1993 to 2019 using a Structural Vector Autoregressive (SVAR) model. The study revealed both positive and negative connections between public debt and inflation, suggesting that the relationship is not straightforward. The study advocates for a balanced approach combining both fiscal and monetary policies to manage inflation effectively.

Boukraine (2021) examined the impact of debt, economic growth, and inflation in Tunisia using quarterly data from 2010 to 2019. Applying the Autoregressive Distributed-lagged (ARDL) and bound test models, the study found that foreign debt significantly affects inflation in both the short and long term, while economic growth affects inflation only in the long run. This indicates that foreign debt management is crucial for controlling inflation in Tunisia. Similarlly, Aimola and Odhiambo (2021) investigated the impact of public debt on inflation in Ghana from 1983 to 2018 using ARDL and error correction models. Their results revealed that public debt has inflationary

effects, suggesting that the Ghanaian government should exercise caution in accumulating debt due to its potential economic risks and inflationary impact.

Duodu *et al*. (2022) conducted an empirical investigation into money supply, budget deficit, and inflation dynamics in Ghana using quarterly data from 1999Q1 to 2019Q4 and a vector error correction model (VECM). The study found that inflation responds positively to budget deficit shocks but negatively to money supply shocks. The results support the fiscal theory of the price level, emphasizing the importance of managing government expenditure and ensuring stable inflation through fiscal discipline. Similarly adopting the same methodology, Alam *et al*. (2022) examined the impact of macroeconomic variables on the budget deficit in Bangladesh from 1980 to 2018 using a Vector Error Correction Model (VECM) and Granger causality tests. The study found a positive long-run relationship between macroeconomic variables such as the real effective exchange rate, inflation, and money supply with the budget deficit, while GDP showed a negative relationship. The short-run results indicate a negative impact of GDP, inflation, and money supply on the budget deficit.

Obeng and Abotsi (2024) investigated fiscal deficits and inflation in Ghana from 1976 to 2019 using ARDL co-integration tests and vector error correction models. Their findings reveal a significant negative short- and long-run relationship between fiscal deficits and inflation, with unidirectional causality running from inflation to fiscal deficit. The study recommends that Ghana finance fiscal deficits through external sources and non-banking methods to mitigate inflationary effects. Also, Batool *et al*. (2024) explored fiscal dominance and inflation dynamics in Pakistan from 1971 to 2020 using the autoregressive distributed lag (ARDL) technique. Their study found strong and statistically significant long-term relationships between budget deficits and money growth, and between money creation and inflation. The results validate the presence of fiscal dominance in Pakistan, indicating that fiscal policies significantly influence inflation dynamics in the country.

In the context of Nigeria, the relationship between fiscal deficits and inflation has also been widely researched, with various studies employing different methodologies to examine the dynamics between these two economic variables. Each study provides unique insights into the causality, correlation, and policy implications of managing fiscal deficits to control inflationary pressures in Nigeria. Oladipo and Akinbobola (2011) investigated the role of budget deficits on economic growth through inflation, focusing on the Nigerian economy from 1970 to 2005. They utilized the Granger causality pairwise test to determine the causal relationship among the variables. Their findings revealed a unidirectional causality from budget deficits to inflation, suggesting that an increase in budget deficits directly leads to higher inflation rates. They recommended implementing proper monetary and commercial policies to mitigate the adverse effects of budget deficits, thereby preventing inflationary pressures.

Anayochukwu (2012) extended the analysis of the correlation between inflation and fiscal deficits in Nigeria using data spanning from 1970 to 2009. The study employed the Ordinary Least Squares (OLS) regression analysis, the autoregressive distributed lag (ARDL) model, and the Granger causality test. The findings indicated that inflation is significantly dependent on the budget deficit in Nigeria, implying that fiscal deficits have a direct impact on price levels. The study

recommended that to control inflation, the government should adopt policies that reduce inflation with the budget deficit in mind, emphasizing the collaborative use of fiscal and monetary policies. However, Inam (2014) examined the long-run causal link between budget deficits and inflation in Nigeria over the period from 1970 to 2010. The study used a multivariate cointegration approach to analyze the relationship between the variables. The findings revealed a causal transmission from budget deficits to inflation, reinforcing the notion that fiscal deficits can lead to inflationary pressures. The study recommended that policymakers maximize deficit financing while creating avenues to accommodate resulting productive shocks, suggesting that well-managed deficit spending could stimulate economic growth without necessarily leading to runaway inflation.

Abubakar, Aliero, and Umaru (2014) took a different approach by investigating the long-run relationship between fiscal deficits and inflation in Nigeria using the ARDL model, with data from 1970 to 2011. Contrary to some other studies, their results showed that there is no significant long-term relationship between fiscal deficits and inflation. However, they found a significant positive relationship between inflation and interest rates, indicating that while fiscal deficits may not directly drive inflation in the long run, monetary policy instruments such as interest rates play a more crucial role. They recommended adjusting interest rates as a tool for managing inflation.

Egbulonu and Amadi (2016) analyzed the link between fiscal policy and inflation in Nigeria from 1970 to 2013, using OLS regression and the Error Correction Mechanism (ECM) techniques. Their study found a long-run relationship between inflation and fiscal policy, highlighting the importance of a balanced approach between monetary and fiscal policies. They suggested that policymakers should formulate a flexible mix between these policies to reduce public borrowing and increase revenue, which could help stabilize inflationary pressures. Nevertheless, Essien, Agboegbulem, Mba, and Onumonu (2016) examined the impact of public sector borrowings on prices, interest rates, and output in Nigeria from 1970 to 2014 using a Vector Autoregressive model. Their findings revealed that changes in external debt stocks tend to increase the prime lending rate. However, neither external nor domestic debt significantly impacts the general price level and output, suggesting that the effects of debt on inflation may be more nuanced than previously thought. They recommended that the government continue borrowing from the long-term market through the Debt Management Office (DMO) to manage debt more effectively.

Nwakoby, Okaro, and Ananwude (2016) investigated the relationship between fiscal deficits and inflation in Nigeria from 1981 to 2015 using a vector error correction model. The study discovered that fiscal deficits have a relationship with inflation, implying that deficit financing practices impact price stability in Nigeria. They recommended that the government should reduce its reliance on deficit financing by making practical and prudent expenditure choices, ensuring that spending is targeted and efficient.

Ezeanyeji, Priscilla, and Ugochukwu (2019) examined the relationship between public debt and inflation in Nigeria for the period 1981 to 2017, employing the Error Correction Model (ECM). Their study revealed that public debt, exchange rates, and money supply have a positive and significant impact on inflation in Nigeria. To stabilize the general price level, they suggested that the government implement a subsidy program for essential food items and introduce policies to reduce public debt by expanding the tax base and reducing expenditures through structural reforms.

Tule, Nuruddeen, Ogundele, and Martins (2019) investigated the fiscal theory of the price level in Nigeria from 2002 to 2017 using the ARDL model. Their research found that budget deficits have a positive and statistically significant influence on inflation across all models tested, supporting the fiscal theory that fiscal imbalances can drive inflation. They concluded that addressing severe fiscal imbalances is crucial for stabilizing inflation in Nigeria. Furthermore, Shuaibu, Mahmud Muhammad, Abdullahi, and Gwazawa (2021) analyzed the impact of public debt on inflation and unemployment in Nigeria from 1985 to 2020 using ARDL and Error Correction models. The study found that sovereign debt increases unemployment, with the impact being more pronounced from external debt than domestic debt. However, no significant relationship was found between public debt and inflation. The study recommended decreasing public debt levels and prioritizing domestic over external debt to manage economic stability better.

Muhammad, Olaolu, Abu, and Umar (2021) studied the effect of government borrowing on inflation in Nigeria between 1985 and 2020 using the ARDL technique. Their findings indicated a positive relationship between domestic debt and inflation, suggesting that increased domestic borrowing can lead to higher inflation. They recommended that the government increase its revenue inflow and reduce expenditure on recurrent expenses to manage inflation effectively. Similarly, Fasanya, Fajobi, and Adetokunbo (2021) investigated the relationship between fiscal deficits and inflation in Nigeria from 1980 to 2019 using the Linear Autoregressive Dickey-Fuller Lag approach and Bai and Perron (2003) to examine structural breaks. The findings revealed that fiscal deficits, exchange rates, lending rates, and money supply significantly influence inflation in Nigeria. The study recommended fiscal reforms that promote revenue generation while discouraging high levels of budget deficits.

Oyeleke (2021) explored the non-linear relationship between fiscal deficits and inflation in Nigeria from 1981 to 2015 using the ARDL bounds test technique of co-integration. The results showed that both in the short and long run, the squared term of fiscal deficits was positive and statistically significant, indicating a non-linear relationship between fiscal deficits and inflation. The study suggested that Nigerian authorities adopt a new method of debt financing to ensure fiscal consolidation, which would be more effective in stabilizing prices. Additionally, Isiaka *et al.* (2022) focused on the long-run and short-run relationships between budget deficits and inflation in Nigeria from 1981 to 2019 using the ARDL approach. They found that budget deficits have no significant influence on inflation in both the short and long run. Consequently, they concluded that budget deficits should not be criticized solely based on their potential to induce inflation, and recommended that the impact of inflation should be given less weight in evaluating budget deficit decisions.

Adediji and Adesanya (2023) studied budget deficit financing options and inflationary pressures in Nigeria from 1998Q1 to 2020Q4 using the ARDL technique. Their findings revealed that both central bank advances and treasury bills/bonds positively and significantly affect inflation in both the short and long run. Notably, treasury bills/bonds exert more influence on inflation. They recommended prioritizing central bank advances as an instrument for financing the deficit budget to achieve less inflationary pressure. Also, Akpan and Ekong (2023) examined the effects of fiscal deficits on inflation in Nigeria from 1981 to 2019 using the ARDL and cointegration bound test estimation techniques. Their results showed a significant negative long-run relationship between

fiscal deficits and inflation, suggesting that controlling budget deficits could help manage inflation effectively. They concluded that chronic deficit spending over time is a root cause of inflation, advocating for targeted fiscal policies to control inflation by managing both budget deficits and exchange rates.

Collectively, these studies underscore the complexity of the relationship between fiscal deficits and inflation in the international and local context (Nigeria), offering a range of perspectives that suggest both direct and indirect pathways through which fiscal policies can influence inflationary trends. The evidence indicates that while fiscal deficits can drive inflation under certain conditions, the effectiveness of deficit financing, debt management, and policy coordination between fiscal and monetary authorities is crucial for achieving macroeconomic stability.

2.4. Summary of literature

The literature reviewed in this document uncovers an extensive body of work that examines the relationship between fiscal deficits and inflation across various economies, with a significant focus on developing nations where fiscal imbalances and institutional weaknesses often heighten inflationary pressures. Studies such as Catao and Terrones (2005) highlight a strong positive correlation between fiscal deficits and inflation in developing countries, emphasizing the pronounced inflationary impact of fiscal deficits in these regions compared to more stable, developed economies. Similarly, Karakaplan (2009) corroborates these findings by demonstrating that public debt has a less inflationary effect in advanced economies, suggesting that stronger institutional frameworks in developed nations may mitigate inflationary risks associated with fiscal deficits. Furthermore, Nguyen (2015) and Eita *et al*. (2021) highlight the complex interplay of fiscal and monetary variables in influencing inflation, especially in rapidly developing economies such as Bangladesh and Namibia.

Within the Nigerian context, the research reveals a nuanced and sometimes contradictory understanding of the fiscal deficit-inflation dynamic. For example, Oladipo and Akinbobola (2011) and Tule *et al*. (2019) establish a direct causal relationship between fiscal deficits and inflation in Nigeria, suggesting that increasing budget deficits leads to higher inflation. On the other hand, Aliero and Umaru (2014) found no significant long-term relationship between fiscal deficits and inflation, emphasizing that interest rates plays a more critical role in driving inflation than fiscal deficits themselves. This divergence in findings highlights a gap in understanding the exact transmission mechanisms through which fiscal deficits impact inflation in Nigeria, particularly considering factors such as public debt management, the effectiveness of monetary policies, and the role of fiscal institutions.

To address this gap, a comprehensive time-series econometric analysis could be employed, focusing on Nigeria's fiscal deficits, inflation rates, public debt, and relevant monetary variables. A suitable methodology would involve using the Autoregressive Distributed Lag (ARDL) model and the Vector Error Correction Model (VECM) to capture both short- and long-term relationships between these variables. These techniques are frequently used in the literature to analyze dynamic causal links and co-integration between fiscal variables and inflation. Empirical tests such as the

Granger causality test could also be implemented to determine the direction of causality between fiscal deficits and inflation.

Data collection would involve gathering information on Nigeria's fiscal deficits, inflation, public debt, and key monetary indicators from 1980 to the present. This time frame allows for the inclusion of various economic cycles, fiscal policies, and inflationary episodes. Using these models, the research could examine both the short- and long-term effects of fiscal deficits on inflation and explore the influence of other factors such as public debt and interest rates on inflation dynamics. This methodology will contribute to a more precise understanding of the fiscal deficit-inflation relationship in Nigeria, filling the gaps in the current literature and providing valuable insights for policy recommendations on managing fiscal deficits and controlling inflation.

3. Research Methodology

3.1. Research Design

This study employs the ex post facto research design to investigate the relationship between fiscal deficit and Inflation in Nigeria. The ex post facto research design is a type of non-experimental research design that looks at the relationship between two variables (independent and a dependent) that have already occurred or existed. In other words, the researcher has no control over the variables because they have already occurred, and the study is conducted after the fact. The research period of study spans from 1985 to 2023.

3.2. Model Specification

The model adapted in this study is a modification of the Fiscal theory of the Price Level specified by Kwon, McFarlane, and Robinson (2009). The model specification is as follow;

$INF = f(TPD, MS, RGDP)$ …….2

In Equation 1 total public debt is employed. However, this study adopts fiscal deficit. Thus, the variables of interest are inflation (response), fiscal deficit (repressor). While money supply, Prime lending rate, and exchange rate are control variables.

$INF = f(FDT, MSR, PLR, EXRT, RGDP)$ …… 3

linear econometric format as;

$$INF = \beta_0 + \beta_1 FDT + \beta_2 MSR + \beta_3 PLR + \beta_4 EXRT + \beta_5 RGDP + \mu \quad \ldots\ldots 4$$

(+) (+) (-) (+) (+)

INF = Inflation rate growth rate (%),

FDT = Fiscal Deficit (%)

EXRT = Exchange rate (Naira to 1USD),

MSR = Broad Money Supply growth rate (%),

PLR = Prime Lending rate (%),

RGDP = Real Gross Domestic Product growth rate (%),

μ = error term.

NB: β_0 is the intercept. β_1, β_2, β_3, β_4, and β_5 are parameters.

A priori Expectations

The signs in parenthesis represent a priori expectations about the variables.

3.3. Nature and Sources of Data

The data used for this study were annually obtained from the following secondary sources; the central bank of Nigeria (CBN) Statistical Bulletin and the world bank indicators.

Table 1: Description of Variables

Variable	Description
Inflation growth rate(%)	Inflation (as measured by the consumer price index) indicates the annual percentage change in the cost to the typical consumer of obtaining a basket of goods and services that may be fixed or altered at predetermined intervals, such as annually.
Fiscal Deficit (%)	A fiscal deficit occurs when a country's expenditures exceed its revenue, prompting the government to borrow in order to cover the shortfall. It is expected to have a positive relationship with inflation
Broad Money Supply growth rate (%)	The broad money supply growth rate is a measure of the rate of increase of the money supply that includes cash, checking deposits, and readily convertible near money. It is extensively monitored as a measure of the money supply and future inflation, as well as an aim of central bank monetary policy.
Prime Lending Rate (%)	This is used as a proxy for interest rate. It is expected to have a negative relationship with Inflation.
Exchange rate (₦ / $)	The rate at which one currency is exchanged for another. In this context the rate at which Naira is exchange for dollar. It is expected to have a positive relationship with inflation.
Real GDP growth rate (%)	The annual percentage growth rate of GDP at market prices is based on constant local currency. It is expected to have a positive relationship with inflation.

Source: Researcher's computation (2024)

3.4. Analytical Techniques

The analytical techniques that this study plans to adopt are based on the specific objectives of the study.

Objective 1

To investigate the effect of fiscal deficits on inflation, the study employed an Autoregressive Distributed Lag (ARDL) model.

3.4.1a. Autoregressive Distributed Lag (ARDL)

The Autoregressive Distributed Lag (ARDL) test for co-integration was developed by Pesaran *et al* (2001). In contrary with other techniques, the model does not require pretest for unit roots. The Autoregressive Distributed Lag (ARDL) model is most suitable for variables that are integrated of different orders, I(0), I(1) or the combination of both. The ARDL format is written as;

$$\Delta INF_t = \beta_0 + \sum_{i=1}^{p} \beta_{1j} \Delta INF_{t-i} + \sum_{i=1}^{q_1} \beta_{2j} \Delta FDT_{t-i} + \sum_{i=1}^{q_2} \beta_{3j} \Delta MS_{t-i} + \sum_{i=1}^{q_3} \beta_{4j} \Delta PLR_{t-i} + \sum_{i=1}^{q_4} \beta_{5j} \Delta RGDP_{t-i} + \sum_{i=1}^{q_5} \beta_{6j} \Delta EXRT_{t-i} + \lambda ECT_{t-i} + \mu_t \ldots 5$$

The ARDL model is most suitable for variables of mix orders. Furthermore, a dynamic error correction model (ECM) can be derived from ARDL through a simple linear transformation. Likewise, the ECM integrates the short-run dynamics with the long-run equilibrium without losing long-run information and avoids problems such as spurious relationship resulting from non-stationary time series data. Furthermore, the Autoregressive Distributed Lag (ARDL) bound co-integration Econometric technique is used to check the presence of co-integration or a long run relationship in a model.

Objective 2

To explore the causal relationship between fiscal deficits and inflation the study will employ Granger causality test.

3.4.2a Granger causality test

To ascertain the cause-and-effect relationship between variables, the causality test is utilized. There are various methods to determine if a relationship is causative, including the Granger test and the Vector Autoregressive (VAR) test. The Granger causality test will be used in this study to establish the causal link between fiscal deficits and inflation. According to Gugarati (2013), the Granger causality test is a bilateral test that relies on the presumptions that the disturbance terms are uncorrelated and that the time series data on these variables include all the information necessary to forecast each variable. The Granger causality test equations are specified as:

$$INF_t = \sum_{i=1}^{n} \alpha i \ FDT_{t-i} + \sum_{j=1}^{n} \beta_j \ INF_{t-j} + U_{1t} \quad \ldots\ldots\ldots 6$$

$$FDT_t = \sum_{i=1}^{n} \lambda i \ INF_{t-i} + \sum_{j=1}^{n} \delta_j \ FDT_{t-j} + U_{6t} \quad \ldots\ldots\ldots 7$$

3.5. Diagnostic Tests

The validity of this study's regression model is necessary. Thus, the need for various diagnostic tests such as normality, serial correlation, homoscedasticity, linearity, and stability test.

3.5.1. Normality Test

The normality test revolves around the assumption that the error term has a normal distribution, and the Jarque-Berra Stastictic test is employed. The Jarque-Bera Statistics shows if the residual violates the normality assumption. There are two hypotheses - null (the presence of normality) and alternative (the absence of normality) hypotheses.

3.5.2. Serial Correlation Test

The serial correlation test checks if error terms are temporarily independent, and the Breusch–Godfrey test and correlogram-Q-statistics are employed. In other words, the past error term should be independent of another period. There are two hypotheses - null (the absence of serial correlation) and alternative (the presence of serial correlation) hypotheses.

3.5.3. Homoscedasticity test

The Homoscedasticity test checks if the error term exhibits a constant variance. In other words, the presence of heteroscedasticity is the violation of the constant variance. There are two hypotheses - the null (no constant variance - homoscedastic) and the alternative (presence of constant variance - heteroscedastic) hypotheses.

3.5.4. Stability Test

The cumulative sum (CUSUM) of recursive residuals and the CUSUM of square (CUSUMSQ) tests are applied to assess the model stability. If the plot of the CUSUM and CUSUMSQ stays within the 5% critical bounds, the null hypothesis that all the parameters are stable cannot be rejected.

4. Data Presentation, Analysis, and Discussion of Findings

4.1. Data Presentation

The relationship between inflation and fiscal deficit can be visualized using charts. Fiqure 1, represents a trend of both variables of interest - inflation (INF) and fiscal deficit (FDT) and some controlled variables such as exchange rate (EXRT), money supply (MS), prime lending rate (PLR) and economic growth rate (RGDP).

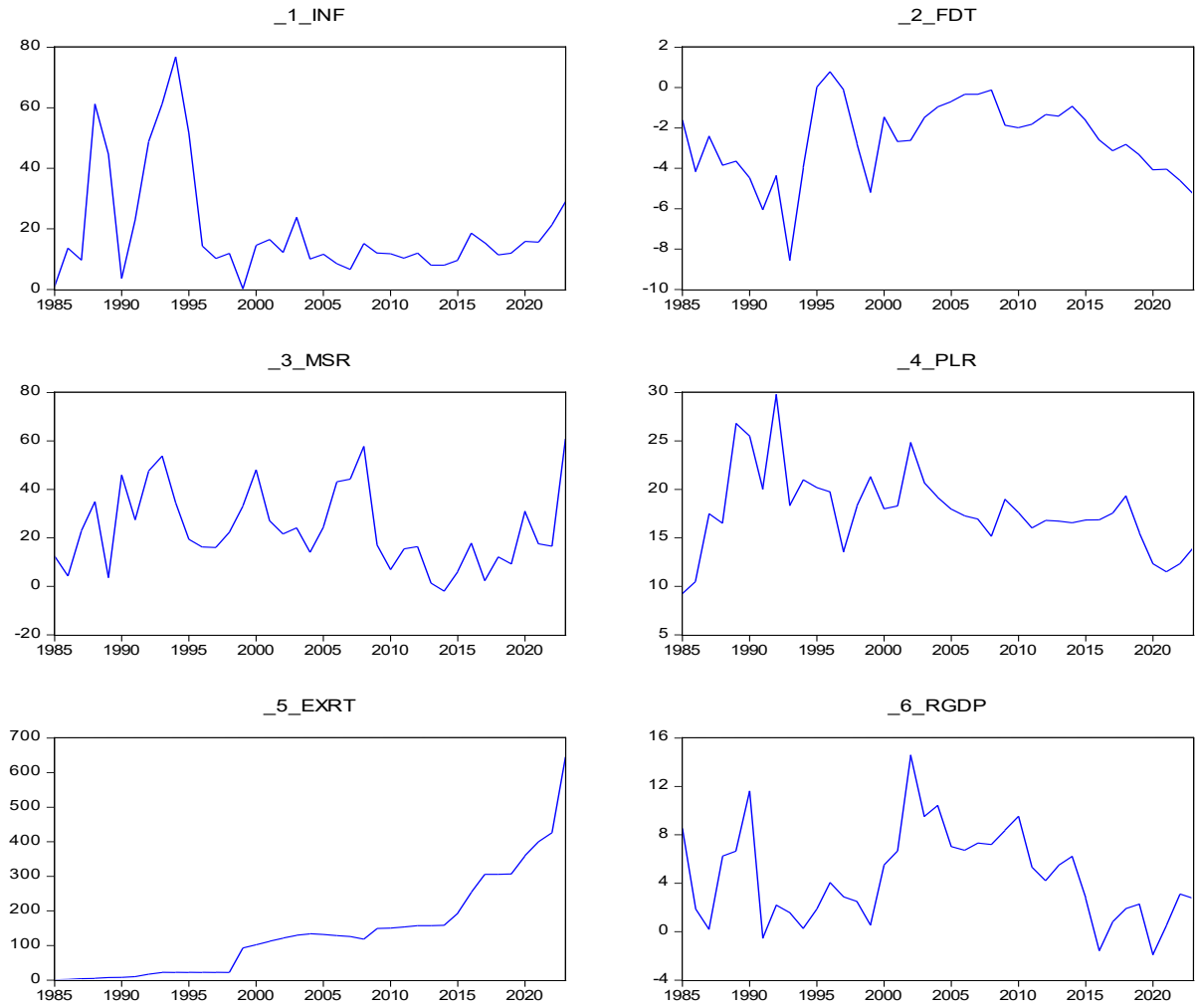

Figure 1: Categorical graphs of inflation, fiscal deficit and controlled variables employed
Source: Computed from Eviews by Author

One key observation among the variables is the apparent stationary nature of most variables except the exchange rate (EXRT). While this is not sufficient to conclusively determine stationarity, as formal verification through unit root tests (e.g., Augmented Dickey-Fuller or Phillips-Perron tests) is necessary, a rough assessment can be made by examining trends and seasonality over time. Stationary variables typically exhibit no persistent trend or seasonality, and the range between their highest and lowest values remains relatively stable over time. This pattern appears to hold for variables such as inflation (INF), fiscal deficit (FDT), money supply rate (MSR), prime lending rate (PLR), and real GDP growth rate (RGDP). In contrast, the exchange rate (EXRT) shows a pronounced upward trend over the years, indicating non-stationarity. This initial observation underscores the importance of verifying stationarity formally, as it significantly impacts econometric modeling, including the choice of estimation techniques and the validity of results.

Nevertheless, the chart reveals the following about the data. Inflation (INF) in Nigeria has shown considerable volatility over the years, with sharp spikes in the late 1980s, early 1990s, and early 2020s. This reflects periods of macroeconomic instability, with a mean inflation rate of 19.53%, which is alarmingly high for an emerging economy. While the declining trend post-2000s points to

some success in monetary policy, the recurrence of inflationary spikes underscores the persistent fragility of the economy. Fiscal deficits (FDT), on the other hand, are consistently negative, highlighting chronic fiscal imbalances where government spending has continually outpaced revenue. The deeper deficits observed in the early 1990s and 2020s coincide with periods of economic stress, such as oil price volatility and the COVID-19 pandemic, while smaller deficits in the 2000s suggest temporary fiscal reforms.

The money supply rate (MSR) has trended upwards over the years, with notable surges during economic shocks, signaling attempts by monetary authorities to stabilize liquidity amidst inflationary pressures. Lending rates (PLR) peaked during the 1990s, mirroring the high cost of borrowing and macroeconomic instability, but stabilized in subsequent decades, reflecting improved financial conditions and central bank interventions. The exchange rate (EXRT) stands out with rapid depreciation post-1999, marking the shift to a market-determined regime and later exacerbated by currency devaluations and external shocks in the 2020s. Finally, real GDP growth (RGDP) has shown relative stability historically but sharply declined in the 2020s due to pandemic-induced economic disruptions and oil price crashes. At an average growth rate of 4.49%, Nigeria's GDP growth remains below the level needed for sustainable economic development, painting a complex picture of structural vulnerabilities across these key indicators.

4.2. Analysis

In this section, both pre-diagnostic and post-diagnostic tests was conducted to ensure the validity and reliability of the analysis. The pre-diagnostic phase mainly focused on unit root tests to verify the stationarity of the variables and a co-integration test to explore relationships among the variables. These steps were to provide a foundation for the main analysis. After conducting the main analysis, post-diagnostic test was carried out to evaluate the robustness of the model. These tests include normality checks, serial correlation tests, homoscedasticity tests, and stability tests to ensure the results are statistically sound and reliable.

4.2.1. Unit root tests

Unit root tests play a crucial role in time-series analysis by determining whether variables are stationary or non-stationary. Stationary datasets tend to revert to their long-run mean values, with their mean, variance, and covariance remaining constant over time. In contrast, non-stationary datasets exhibit fluctuating mean, variance, and covariance, signaling the presence of a unit root (Shrestha and Bhatta, 2018). Given that most regression analysis methods rely on data stationarity, assessing the stationarity of variables is a prerequisite for valid and reliable analysis. While the graphical trend analysis in Figure 1 suggests that all variables, except for the exchange rate, appear stationary, it is crucial to validate this observation statistically. To achieve this, unit root tests were conducted using the Augmented Dickey-Fuller (ADF) and Phillips-Perron test specifications. The determination of stationarity was based on the comparison of test statistics, critical values, and probability values. Specifically, the null hypothesis assumes the presence of a unit root (indicating non-stationarity), whereas the alternative hypothesis indicates the absence of a unit root (implying stationarity).

Table 2 confirms that all variables are stationary, either at levels or at first differences, except for the exchange rate, which remained non-stationary at both levels and first differences.

Table 2: Augmented Dickey-Fuller and Philip Perron unit root test

Variables	PP t-stat	Integration order	ADF t-stat	Integration order	Summary
INF	-3.1896	I(0), I(1)	-5.9372	I(1)	I(1)
FDT	-2.8236	I(0), I(1)	-3.3297	I(1)	I(1)
MSR	-3.4926	I(0), I(1)	-4.2828	I(0), I(1)	I(0)
PLR	-3.9033	I(0), I(1)	-6.0587	I(0), I(1)	I(0)
RGDP	-3.4399	I(0), I(1)	-3.3626	I(0), I(1)	I(0)
LNEXRT	-3.2063	I(0), I(1)	-3.1651	I(0), I(1)	I(0)

Source: Computed from Eviews by Author

To address this, a logarithmic transformation was applied to the exchange rate to stabilize its variance, resulting in stationarity. This transformation also implies that changes in inflation, as influenced by changes in the exchange rate, will now be interpreted in percentage terms. Overall, the mix order of stationary at levels and first difference implies that an ARDL model is best suited for this analysis but a co-integration test is necessary to check if a long run relationship exist or not.

4.2.2. Co-integration test

The unit root tests indicate that the variables in the inflation-fiscal deficit model exhibit a mixed order of integration, I(0) and I(1). In such cases, the series may be co-integrated, leading to spurious estimations if not appropriately addressed. Therefore, a co-integration test is essential to ascertain the existence of a long-run relationship within the model. The ARDL bounds co-integration test was employed for this purpose.

Table 3: ARDL Bound co-integration Test

			Critical Value Bounds		
Test Statistic	**Value**	**k**	**Significance**	**I0 Bound**	**I1 Bound**
F-statistic	4.512062	5	0.05	2.62	3.79

Source: Computed from Eviews by Author

As shown in Table 3, the results reveal that the F-statistic value of 4.512062 exceeds both the lower and upper critical bounds at the 5% significance level (2.62 and 3.79, respectively). Consequently, the null hypothesis of no co-integration is rejected, confirming the presence of a long-run relationship in the model.

4.2.3. ARDL results

The Autoregressive Distributed Lag (ARDL) model was utilized due to the mixed order of integration of the variables, as indicated by the unit root tests conducted using the Augmented Dickey-Fuller (ADF) and Phillips-Perron approaches. The co-integration test further confirmed the presence of a long-run relationship among the variables. Consequently, the ARDL model was estimated to capture both the short-run dynamics and the long-run equilibrium relationship.

Table 4: ARDL Short Run and ECM Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	0.989507	0.182704	5.415915	0
D(INF(-2))	0.324961	0.14778	2.198952	0.0398
D(FDT)	1.987357	1.173671	1.693282	0.1059
D(FDT(-1))	0.2461	1.150346	0.213936	0.8328
D(FDT(-2))	3.340411	1.18363	2.822176	0.0105
D(MSR)	0.059843	0.098067	0.610231	0.5486
D(MSR(-1))	-0.193815	0.144163	-1.344411	0.1939
D(MSR(-2))	-0.295616	0.125354	-2.358257	0.0287
D(PLR)	-1.023673	0.664007	-1.54166	0.1388
D(RGDP)	-2.375872	0.761179	-3.121306	0.0054
D(LNEXRT)	-20.422495	7.341056	-2.781956	0.0115
ECM(-1)	-1.777071	0.252234	-7.045324	0

Source: Computed from Eviews by Author

Table 4 presents the results for 12 variables, including 11 short-run coefficients and the Error Correction Term (ECM). Among these, 7 variables were statistically significant (p-value < 0.05), while 5 were not. The first lag of inflation (D(INF (−1) is significant, with a coefficient of 0.9895 and a p-value of 0.0000, which is below the 0.05 threshold. This indicates that a 1-unit increase in lagged inflation (the previous year's value of inflation) leads to a 0.99-unit increase in the current period's inflation, holding other factors constant (ceteris paribus). Similarly, the second lag of inflation (D (INF (−2) is also significant, with a coefficient of 0.3250 and a p-value of 0.0398. This suggests that inflation from two years ago has a smaller but statistically significant positive effect on current inflation.

In addition, the second lag of fiscal deficit (D (FDT (−2))) is statistically significant, with a coefficient of 3.3404 and a p-value of 0.0105. This implies that a 1-unit increase in the fiscal deficit from two years ago significantly increases inflation by 3.34 units in the short run. Among the controlled variables, the second lag of money supply (D(MSR (−2))) is significant, with a p-value of 0.0287. However, its coefficient is negative (-0.2956), indicating that a 1-unit increase in money supply today would lead to a 0.30-unit reduction in inflation after two years, ceteris paribus.

Real GDP growth (D(RGDP)) is also significant, with a p-value of 0.0054 and a negative coefficient of -2.3759. This indicates that a 1-unit increase in real GDP growth results in a significant 2.38-unit reduction in inflation in the short run. Nevertheless, the exchange rate (D(LNEXRT)) has a coefficient of -20.4225 and a p-value of 0.0115, making it statistically significant at the 5% level. The negative coefficient implies an inverse relationship between the exchange rate and inflation in the short run. Specifically, a 1% increase in the exchange rate (a depreciation of the local currency) leads to a 20.42% decrease in inflation, ceteris paribus. Finally, The Error Correction Term (ECM) has a coefficient of -1.7771 and its p-value is less than 5%, signifying its significance. Its coefficient is negative and significant, confirming the presence of a long-run equilibrium relationship. Its magnitude (-1.7771) suggests that about 178% of the disequilibrium is corrected each period, indicating a very rapid adjustment speed back to

equilibrium. However, in the Short Run D(FDT), D (FDT(−1)), D(MSR), D(MSR(−1)), and D(PLR) are not significant as their p-values are greater than 0.05.

While the long-run effect of the independent variables on the dependent variable are detailed in Table 5 with their corresponding coefficients, standard error, t-statistics and probability values.

Table 5: ARDL Long Run Coefficient

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDT	-3.092302	0.825827	-3.744489	0.0013
MSR	0.27794	0.082849	3.354785	0.0032
PLR	-0.576045	0.392044	-1.46934	0.1573
RGDP	-1.336959	0.340604	-3.925255	0.0008
LNEXRT	-6.546189	0.895247	-7.312161	0
C	52.370272	9.666629	5.417636	0

Source: Computed from Eviews by Author

Table 5 presents the long-run relationships between the dependent variable and its explanatory variables. The results indicate that fiscal deficit (FDT), money supply rate(MSR), real GDP(RGDP), and the logarithm of the exchange rate(ln(EXRT)) significantly influence the dependent variable. These variables have varying directions and magnitudes of impact. The fiscal deficit (FDT) has a coefficient of -3.0923 with a p -value of 0.0013, showing a statistically significant negative impact. This implies that a 1-unit increase in the fiscal deficit leads to a 3.09-unit decrease in the dependent variable, ceteris paribus. Similarly, real GDP (RGDP) also has a significant negative relationship, with a coefficient of -1.3369 and a p -value of 0.0008. This indicates that a 1-unit increase in real GDP results in a 1.34-unit decrease in the dependent variable.

The logarithm of the exchange rate(ln(EXRT)) exhibits the largest negative impact, with a coefficient of -6.5462 and a highly significant p -value of 0.0000. Interpreted in percentage terms, a 1% increase in the exchange rate (e.g., depreciation of the domestic currency) leads to a 6.55% decrease in the dependent variable, ceteris paribus. In contrast, the money supply (MSR) shows a positive and significant relationship with the dependent variable. Its coefficient of 0.2779 and p -value of 0.0032 indicate that a 1-unit increase in the money supply rate leads to a 0.28-unit increase in the dependent variable, ceteris paribus. The constant term(C) is also statistically significant, with a coefficient of 52.3703 and a p -value of 0.0000, representing the baseline value of the dependent variable when all explanatory variables are zero.

On the other hand, the prime lending rate (PLR) does not show a statistically significant effect on the dependent variable in the long run. With a coefficient of -0.5760 and a p -value of 0.1573, its impact is not considered meaningful within the model's framework.

4.2.4. Granger Causality Test

Granger Causality Test was employed to reveal the nature of causality between inflation (INF) and fiscal deficit (FDT). In other words, $\mathbf{H_0}$: fiscal deficit (FDT) in Nigeria **does not Granger Cause** inflation (INF) or $\mathbf{H_1}$: inflation (INF) in Nigeria **Granger does not Cause** fiscal deficit (FDT). The

rule is that we reject or accept the null or alternative base on the statistical significance of the probability value (p-value < 0.05 or < 0.10). **Table 6,** reveals the result of the test.

Table 6: Granger Causality Result

Null Hypothesis:	Obs	F-Statistic	Prob.
FDT does not Granger Cause INF	37	7.15859	0.0027
INF does not Granger Cause FDT		0.81663	0.4509

Source: Computed from Eviews by Author

The Granger causality results in Table 6 provide insights into the causal relationship between fiscal deficit (FDT) and inflation (INF). The null hypothesis that **"FDT does not Granger Cause INF"** is rejected at the 5% significance level, as the p-value of 0.0027 is less than 0.05, with an F-statistic of 7.1586. This indicates that fiscal deficits Granger-cause inflation, meaning that past values of fiscal deficits significantly predict changes in inflation. This finding aligns with economic theories that link fiscal deficits, particularly those financed through monetary expansion, to inflationary pressures.

On the other hand, the null hypothesis that **"INF does not Granger Cause FDT"** cannot be rejected, as the p-value of 0.4509 is greater than 0.05, with an F-statistic of 0.8166. This suggests that inflation does not Granger-cause fiscal deficits, indicating that past values of inflation do not significantly predict changes in fiscal deficits. In summary, the results reveal a unidirectional causality from fiscal deficits to inflation, emphasizing the predictive influence of fiscal deficits on inflationary trends. However, inflation does not exhibit a reciprocal predictive effect on fiscal deficits. These findings highlight the critical role of fiscal management in controlling inflation and maintaining macroeconomic stability.

4.2.5. Diagnostic Test Results

i. Normality test

The Jarque-Bera statistic was employed to test for normality within the model, assessing whether the residuals conform to the normality assumption. The hypotheses for this test are as follows: the null hypothesis indicates the presence of normality, while the alternative hypothesis suggests the absence of normality. The decision rule is to reject the null hypothesis if the histogram deviates from a bell-shaped curve or if the Jarque-Bera probability value is above the 0.05 significance threshold.

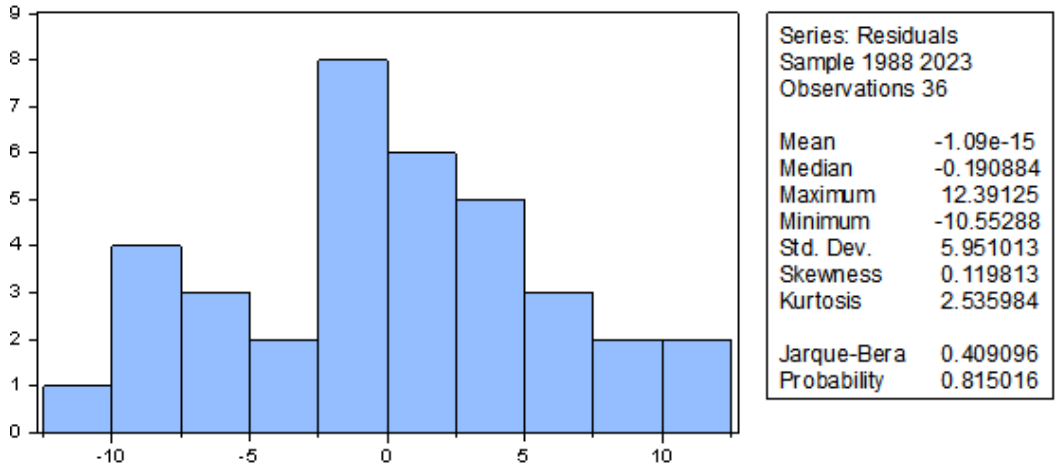

Figure 2. Residual Normality chart, Source: Author's Computation

The **Figure 2** above shows that the residual is normally distributed as the probability value for the Jarque-Bera is more than 0.05.

ii. Serial Correlation Test

The Breusch-Godfrey LM Test is used in this study to check for Serial Correlation. The null (H_0: the absence of serial correlation) and alternative (H_1: the presence of serial correlation) hypotheses. The decision rule is to accept the null hypothesis if the p-value is greater than 0.05 or reject it if the p-value is less than 0.05.

Table 7. Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.751285	Prob. F(2,18)	0.2019
Obs*R-squared	5.864068	Prob. Chi-Square(2)	0.0533

Source: Computed from Eviews by Author

Table 7 shows the results of the test. The probability values of the F and Chi-square are higher than 0.05. Thus, we fail to reject the null hypothesis which means that our model is free from serial correlation.

iii. Heteroskedasticity test

The Breusch-Pagan-Godfrey test is employed in this study to check for Heteroskedasticity. The null (H0: no constant variance - homoscedastic) and alternative (H1: constant variance - heteroscedastic) hypotheses. The decision rule is to accept the null hypothesis if the p-value is above 0.05 or reject it if the p-value is less than 0.05.

Table 8. Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.825545	Prob. F(15,20)	0.6428
Obs*R-squared	13.76623	Prob. Chi-Square(15)	0.5433
Scaled explained SS	3.263073	Prob. Chi-Square(15)	0.9993

Source: Computed from Eviews by Author

Table 8 represents the Heteroskedasticity test result of the model which shows the Probability F is above 0.05. As a result we fail to reject the null hypothesis and accept that our model is homoscedastic.

iv. Stability Test

The cumulative sum (CUSUM) of recursive residuals and the cumulative sum of squares (CUSUMSQ) tests were conducted to evaluate the stability of the model. These tests assess whether the model's parameters remain stable over time. If the plots of the CUSUM and CUSUMSQ statistics remain within the 5% critical bounds, the null hypothesis, which posits that all parameters are stable, cannot be rejected. **Figure 3** represents the CUSUM test and CUSUMSQ test for inflation-fiscal deficit model and both test plot is between the 5% critical bound and as a result we fail to reject the null. Thus, all our models are stable.

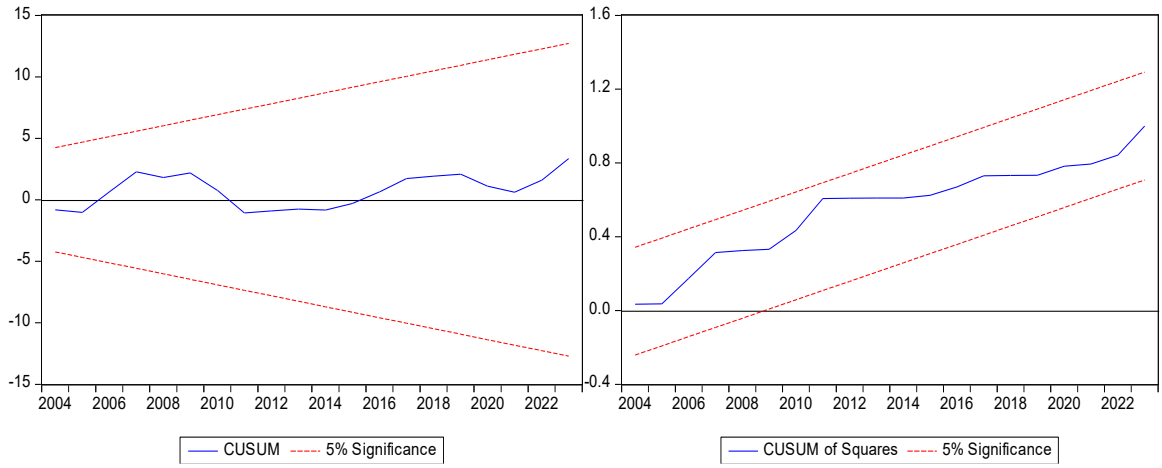

Figure 3. CUSUM and CUSUM of squares
Source: Author's Computation

4.3. Discussion of Findings

The findings from the analysis provide valuable insights into the relationship between fiscal deficits and inflation in Nigeria, addressing the study's objectives and contributing to the existing literature on fiscal and monetary policy dynamics in developing economies.

4.3.1. Objective 1 was to examine the effect of fiscal deficit on inflation in Nigeria and from the analysis, the relationship between fiscal deficit and inflation has a short-run and long-run dynamics.

i. Short Run Discussion

First, the short run findings reveal that an inflation inertia which is the tendency of inflation to be persistent and to carry over from one period to the next. The positive coefficients of the lagged inflation variables suggest that past inflation strongly influences current inflation. The first lag (0.9895) indicates that inflation from the previous year has a significant positive impact on current inflation, highlighting the close connection between past and present inflation. The second lag (0.3250), though smaller, also shows that inflation from two years ago continues to exert a statistically significant effect on current inflation.

This reinforces the notion of inflation persistence, where past inflationary pressures propagate forward, creating a self-reinforcing cycle. Consequently, inflation tends to continue rather than decrease automatically over time, as past inflation increases the likelihood of current inflation remaining high except specific interventions (like monetary tightening or fiscal reforms) are put in place to break the cycle.

Second, this study found that fiscal deficits, specifically the second lag of fiscal deficit (D(FDT(-2))), significantly affect inflation in the short run, with a coefficient of 3.34 and a p-value of 0.0105. This suggests that fiscal deficits from two years' prior have a substantial positive impact on inflation in the current period. This result is consistent with the findings of Anayochukwu (2012) and Nwakoby et al. (2016), who similarly observed a significant relationship between fiscal deficits and inflation, reinforcing the idea that fiscal deficits exert direct pressure on inflation. However, the time lag identified here (two years) is noteworthy, as some studies, such as those by Oladipo and Akinbobola (2011), focused on immediate (or one-year) impact

Additionally, a significant finding in this study was the inverse relationship between the exchange rate and inflation, with the coefficient of D(LNEXRT) being -20.42. This suggests that an increase in the exchange rate (depreciation of the local currency) leads to a substantial reduction in inflation, a result which aligns with the findings of Abubakar et al. (2014) and Essien et al. (2016). Both studies found significant roles for monetary policy variables such as interest rates and exchange rates in influencing inflation, although the magnitude of the effect observed here is larger than in previous studies. Real GDP growth (D(RGDP)) also showed a significant negative relationship with inflation, which is consistent with the work of Egbulonu and Amadi (2016) who emphasized the role of economic growth in moderating inflationary pressures.

The ECM in this study was highly significant, with a coefficient of -1.7771, suggesting a rapid adjustment back to long-run equilibrium. This finding supports the idea that fiscal and monetary imbalances tend to correct quickly in Nigeria, as found by previous studies such as Anayochukwu (2012), which also found that inflationary pressures adjust to fiscal imbalances in the long run. However, the speed of correction observed in this study (178% per period) appears notably higher than in some prior research, such as that by Abubakar et al. (2014), which found no significant long-run relationship.

ii. Long-run Discussion

The long-run results presented in Table 5 reveal that fiscal deficits (FDT), Money supply (MSR) real GDP (RGDP), and the exchange rate (LNEXRT) have significant long-run effects on inflation. Specifically, fiscal deficits exhibit a significant negative impact on inflation, which contrasts with the findings of studies like Abubakar et al. (2014), who did not find a significant long-term relationship between fiscal deficits and inflation. This disparity suggests that while fiscal deficits may not always directly drive inflation in the long run, their role is more pronounced in the context of Nigerian fiscal and monetary policies.

Fiscal deficits exhibit a significant negative relationship with inflation in the long term, suggesting that fiscal consolidation and disciplined deficit management contribute to price stability. The money supply rate demonstrates a significant positive influence on inflation, reaffirming the

classical monetarist view that excessive money supply growth fuels long-term inflation. Real GDP continues to exert a significant deflationary impact in the long run, reinforcing the importance of economic growth as a stabilizing factor for inflation. Additionally, exchange rates show a strong negative relationship with inflation, indicating that policies ensuring exchange rate stability are crucial for controlling long-term inflationary trends.

iii. Contrasting Views on Fiscal Deficits and Inflation

The findings in this study stand in contrast to those of studies like Isiaka et al. (2022), who found no significant relationship between fiscal deficits and inflation in both the short and long run. This contradiction could stem from differences in the methodological approaches, data periods, or the specific economic conditions in Nigeria during the respective periods studied. While this study observes a direct link between fiscal deficits and inflation, other scholars, such as Akpan and Ekong (2023), have found a negative long-run relationship, suggesting that controlling fiscal deficits could help manage inflation.

In summary, the findings align with the Quantity Theory of Money and the Fiscal Theory of the Price Level, both of which emphasize the inflationary potential of fiscal deficits, particularly when financed through monetary expansion. The results also corroborate empirical studies in similar developing economies, such as Namibia and Ghana, where fiscal deficits have been shown to exert upward pressure on inflation. The significant role of exchange rates and economic growth in the findings highlights the importance of integrated fiscal and monetary policy coordination.

4.3.2. Objective 2 was to explore the causal relationship between fiscal deficits and inflation. The Granger causality test results indicate a unidirectional causality from fiscal deficits to inflation, confirming that fiscal deficits significantly predict inflation in Nigeria. However, the reverse causality from inflation to fiscal deficits was not supported, suggesting that inflation does not directly influence fiscal policy decisions. These findings align with theoretical perspectives that link fiscal imbalances to inflationary pressures, particularly in developing economies with limited institutional capacity to manage deficits effectively.

5. Conclusion

This study explored the relationship between fiscal deficits and inflation in Nigeria, focusing on their short-run dynamics, long-run equilibrium, and causal relationships. The research aimed to determine the effect of fiscal deficits on inflation and assess the direction of causality between these two variables. Using the Autoregressive Distributed Lag (ARDL) model and Granger causality test, the analysis provided insights into how fiscal policies influence inflationary trends in a developing economy like Nigeria.

The findings revealed several key points. In the short run, inflation exhibited significant persistence, as past values of inflation strongly influenced current inflation levels. Additionally, fiscal deficits, particularly their second lag, had a significant positive effect on inflation, emphasizing the delayed but impactful role of fiscal imbalances. Other significant factors included real GDP, which showed a deflationary effect, and exchange rate stability, which contributed to

reduced inflationary pressures. The error correction term demonstrated a rapid adjustment to long-run equilibrium, underscoring the model's stability and the effectiveness of fiscal and monetary coordination.

In the long run, fiscal deficits showed a significant negative relationship with inflation, suggesting that disciplined fiscal policies and fiscal consolidation efforts could stabilize prices over time. The money supply rate had a positive long-term impact on inflation, aligning with classical monetary theory that links excessive liquidity to rising price levels. Real GDP and exchange rates continued to exhibit significant deflationary effects, highlighting their roles as stabilizing factors in the Nigerian economy.

The Granger causality results indicated a unidirectional causality from fiscal deficits to inflation, confirming that fiscal deficits are a predictor of inflation in Nigeria. However, the reverse was not true, as inflation did not significantly influence fiscal deficits. This unidirectional causality aligns with theoretical perspectives and highlights the critical importance of managing fiscal deficits to control inflationary trends.

The discussion of findings integrates these results with theoretical frameworks, such as the Quantity Theory of Money and the Fiscal Theory of the Price Level, which emphasize the link between fiscal deficits and inflation. The results align with empirical studies in other developing economies, where fiscal imbalances often translate into inflationary pressures due to weaker institutional frameworks and limited monetary policy effectiveness.

6. Recommendation

Based on the study's findings, the following recommendations can be made to help manage the relationship between fiscal deficits and inflation in Nigeria:

Enhance Fiscal Management and Deficit Control Measures: Given the observed significant short- and long-term effects of fiscal deficits on inflation, it is recommended that the Nigerian government implement more robust fiscal discipline measures, including fiscal consolidation policies aimed at reducing deficits. This could involve better budgetary management, prioritizing productive spending, and limiting reliance on borrowing. By controlling fiscal deficits, Nigeria can potentially mitigate inflationary pressures, particularly in the long run. Additionally, creating a more effective mechanism for monitoring and regulating government expenditure could help prevent the continuation of inflation inertia.

Strengthen Monetary and Exchange Rate Policies: The study highlights the significant role of exchange rates and money supply in influencing inflation. Given the inverse relationship between exchange rates and inflation observed in the short run, it is recommended that Nigeria's monetary authorities focus on strengthening exchange rate stabilization policies. Moreover, effective control of money supply growth is crucial to prevent long-term inflation. Policies aimed at maintaining exchange rate stability, along with a well-coordinated monetary policy to limit excessive money

supply expansion, can support price stability and help mitigate inflationary pressures stemming from fiscal deficits.

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