EXAMINE THE RELATIONSHIP BETWEEN FINANCIAL SECTOR DEVELOPMENT AND INCOME DISTRIBUTION IN NIGERIA

BY

UNIVERSITY OF BENIN
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CERTIFICATION

DEDICATION

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ABSTRACT

This study examine the relationship between financial sector development and income distribution in Nigeria. Budget deficit financing, which involves borrowing to cover shortfall between government expenditures and revenues, has been a common practice in Nigeria. This research aims to analyse how different methods of deficit financing, including domestic and external borrowing, impact key economic indicators such as GDP growth, inflation and unemployment rate. The study employs econometric models to evaluate the relationship between budget deficit financing and economic development. The findings reveal that while domestic borrowing has a positive and significant effect on economic growth, external borrowing tends to have a negative impact. Additionally, the study highlights that excessive deficit financing can lead to higher inflation and increased unemployment rates, thereby hindering sustainable economic development, For budget deficit financing to contribute positively to Nigeria's economic development, it must be managed prudently, with a focus on productive investments and transparent fiscal policies. Recommendations include enhancing fiscal discipline, improving revenue generation, and ensuring that borrowed funds are directed towards sectors that stimulate economic growth and development.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Budget deficit financing has been a significant aspect of fiscal policy in Nigeria for several decades, reflecting the challenges the country faces in balancing its revenue generation with its expenditure needs. A budget deficit occurs when a government's expenditures exceed its revenues within a specific fiscal period, necessitating borrowing to cover the shortfall (Afolabi, 2019). In Nigeria, the persistence of budget deficits has been driven by a combination of structural economic challenges, policy decisions, and external factors (Ogunleye, 2021).

Historically, Nigeria's economy has been heavily dependent on crude oil exports, which have provided the bulk of government revenue and foreign exchange earnings (Nwankwo & Agu, 2020). This dependence has made the economy particularly vulnerable to global oil price fluctuations. During periods of high oil prices, the Nigerian government has often expanded public spending, leading to increased budgetary commitments. However, when oil prices decline, the resulting revenue shortfalls have led to significant budget deficits (Adeyemi, 2022). This boom-bust cycle has created a situation where deficit financing becomes a necessary tool for maintaining government operations and funding critical developmental projects.

Budgetary issues in developing countries differ from those in industrialized countries. Usually, developing countries have other goals from those of industrial countries (Tanzi & Zee, 2000). In that they focused on building infrastructure, creating an industrial base, and encouraging new businesses. Their population are younger and less skilled, and they have

limited access to capital. Fiscal policies in developing countries have been facing unique challenges. As such their budgets have been smaller in size, personal incomes are lower, and tax collection are often erratic. Therefore, most of their employment opportunities are created outside the formal economy thereby making transactions difficult to tax. Financial markets in developing countries have often been inefficient, making it hard for governments to finance their deficits through other means. With lower government revenues, most developing countries had lower public expenditures than industrial countries(Abubakar, 2021). Nonetheless, they could still raise funds from the capital market to compliment revenues from their budgets.

In Nigeria budget deficits have been blamed for causing much economic crises, high inflation, poor investment performance and economic growth due to excessive debt to bridge the finance gap (Ibikunle & Atukson, 2022). One of the most important objectives of fiscal policy is to reduce national debts and to check the interest payment on such debts from rising to prevent high deficits in the future. However, Nigerian government budget deficits have witnessed increases in the past decades. For instance, from 1981, budgets increased from N3.9billion to N8.3billion in 1989. From 1990, the rising trend of budget deficit continued except in 1995 when the budget of Nigeria recorded a surplus of N1billion. In 1998, an overall budget deficit jumped to N133.3 billion and reached N301.4billion in 2002. Starting 2003, government budget deficit slightly declined from N202.7billion to N188.2 billion, N150.6 billion and N101.3 billion in 2003, 2004, 2005 and 2006, respectively. Another increase was witnessed from 2007 at 117.2 billion to 7,118.7 billion in 2021(Umezurike, 2023). These increases in the budget deficit were due to largely to government's desire to enhance productivity in the Nigerian economy in the

face of low revenue generation (CBN, 2021). Due to the frequent deficits inherent in the Nigerian budgeting system, total debts have been on the increase. Overall, Nigeria's public debt continued to accumulate due to the need to finance budget deficits and ensure economic advancement that has been sluggish with chronic poverty. Public expenditure on infrastructure stimulates the growth process of economy and the channel through which this manifest depends largely on the precise form and size of expenditure allocated to economic and social development projects (IMF, 2023).

The Nigerian government's approach to financing these deficits has evolved over time, involving both domestic and external borrowing. Domestic borrowing typically includes the issuance of government bonds, treasury bills, and other debt instruments to local investors (Ikechukwu & Oduh, 2020). This approach can stimulate domestic financial markets but may also lead to higher interest rates, which can crowd out private investment. On the other hand, external borrowing involves obtaining loans from international financial institutions, bilateral partners, or through the issuance of Eurobonds. While external borrowing can provide access to larger pools of capital, it also exposes the country to exchange rate risks and external economic conditions (Adewale, 2022).

The relationship between deficit financing and capital formation on the one hand, and inflation, on the other, however, could be most speculative in a developing country like Nigeria. As an instance, Gross domestic product (GDP) recorded a low growth from 1981 to 1986 ranging from N144.83 billion in 1981 to N202.44 billion in 1986. This was the period when the Nigerian economy was regulated, to the extent that it was sustained on agricultural output. From

1987 to date, there have been substantial annual increases in GDP with recorded figures of N249.44 billion in 1988; N1,259.07 billion in 1993; N22,269.98 billion in 2005, and N101,489.49 billion in 2016 and N127,762.55 billion in 2019. The continuous increases in GDP should be attributed to the shift from an agrarian economy to an oil dependent economy within the period (CBN, 2021).

Furthermore, the impact of deficit financing on economic development is not uniform and can vary depending on how the borrowed funds are utilized. In Nigeria, there have been concerns about the efficiency and effectiveness of public spending, with issues such as corruption, mismanagement, and project delays often undermining the potential benefits of deficit-financed projects (National Bureau of Statistics Reports, 2022). As a result, the expected positive outcomes, such as improved infrastructure, enhanced productivity, and economic diversification, may not be fully realized. Finally, the implications of budget deficits and economic growth of Nigeria have been one of the subjects of a long-standing debate in macroeconomics (Eze & Nwambeke, 2015). The present study would join in the debate surrounding government budget deficits and economic growth among nations to ascertain the way forward.

1.2 Statement of the Problem

Budget deficit financing has become a crucial fiscal policy tool in Nigeria, intended to bridge the gap between limited government revenue and rising public expenditure needs. However, the frequent use of this strategy has led to concerns about its sustainability and its overall impact on the country's economic development. Nigeria has consistently experienced

budget deficits over the past decade, driven by fluctuating oil revenues, increased public spending, and the necessity of funding key infrastructural projects (Aminu & Anono, 2012). As a result, the country has turned to both domestic and external borrowing to finance these deficits. While such measures can provide short-term fiscal relief, they raise questions about their long-term impact on economic stability and growth.

One critical issue is the rising debt burden associated with deficit financing. According to Ayodele & Falokun (2021), Nigeria's debt profile has significantly increased, raising concerns about debt sustainability and the country's capacity to meet its debt obligations without negatively impacting other critical areas of the economy. High levels of borrowing have resulted in a growing share of the national income being directed towards debt servicing, leaving fewer resources for developmental projects (Adesina, 2020). This situation poses a challenge for economic growth, as funds that could have been invested in productive sectors are redirected to servicing debt. Therefore, there is a need to investigate whether deficit financing is contributing to sustainable economic growth or if it is exacerbating the country’s fiscal challenges.

Moreover, the effectiveness of deficit financing in stimulating economic growth has been questioned due to structural inefficiencies in Nigeria’s fiscal management. Ikechi & Nwosu (2019) argued that a significant portion of the borrowed funds is used for recurrent expenditure rather than for capital investment. This pattern reduces the potential for deficit financing to drive infrastructural development, improve productivity, and enhance economic diversification. The question of whether deficit-financed projects have been effectively managed to spur economic transformation remains a critical concern.

Additionally, there are apprehensions about the inflationary effects of deficit financing. Eze & Uzochukwu (2020) suggest that increased domestic borrowing can lead to a rise in the money supply, which, without a corresponding increase in productivity, can result in inflationary pressures. This inflation can erode the purchasing power of consumers and negatively affect living standards, particularly for low-income populations. Understanding the extent to which deficit financing influences inflation in Nigeria is essential for assessing its broader impact on economic stability and development.

The challenges highlighted above necessitate this research, leading to the following key research questions:

1. How does budget deficit financing affect inflation in Nigeria?
2. How does deficit financing affect economic growth in Nigeria?

1.3 Objectives of the Study

The main objective of this study is to examine the effect of government budget deficit financing on the Nigerian economy.

The specific objectives includes to:

1. examine the impact of budget deficit financing on inflation in Nigeria.

2. assess how deficit financing affects the economic growth of Nigeria.

1.4 Research Hypothesis

This study intends to test the following hypothesis:

Ho1: Budget deficit financing has a significant impact on inflation in Nigeria.

Ho2: Deficit financing has no effect on economic growth in Nigeria.

1.5 Significance of the Study

The significance of this study extends to various stakeholders, including policymakers, economists, academic researchers, and the general public. For policymakers, the findings will offer crucial insights into the implications of budget deficit financing, equipping them with knowledge to make informed decisions that balance immediate fiscal needs with long-term economic stability. Understanding the dynamics of budget deficits and their impacts on growth, debt sustainability, and inflation is vital for crafting effective fiscal policies that promote economic resilience.

Moreover, this research aims to fill existing gaps in the literature surrounding fiscal policy in Nigeria. While previous studies have examined budget deficits in various contexts, few have focused specifically on the intricate relationship between deficit financing and its developmental outcomes within the Nigerian economy. By providing empirical evidence and case studies, this study will contribute to a deeper understanding of how budget deficits can be managed more effectively to support sustainable development goals.

The study's recommendations will have far-reaching implications, not only for fiscal policy reform but also for broader economic strategy. It will highlight best practices and strategic frameworks that can enhance the management of budget deficit financing, ensuring that it serves as a catalyst for growth rather than a source of fiscal instability. Ultimately, this research will contribute to the ongoing discourse on economic policy in Nigeria, offering insights that can foster a more sustainable and inclusive economic future.

In summary, by elucidating the effects of budget deficit financing on Nigeria's economic landscape, this study will serve as a valuable resource for stakeholders aiming to navigate the complexities of fiscal management and economic development in a rapidly changing global environment.

1.6 Scope of the Study

This study meticulously examines the effects of budget deficit financing on the development of the Nigerian economy, focusing on several critical dimensions. The research will analyze historical trends in Nigeria's budget deficits over the past two decades, exploring the interplay between government revenue sources, expenditure patterns, and the external economic environment. A significant aspect of the study is the evaluation of how budget deficit financing impacts key economic indicators such as Gross Domestic Product (GDP) growth, public debt sustainability, and inflation rates.

Geographically, the scope is limited to Nigeria, allowing for an in-depth exploration of the unique fiscal challenges and opportunities inherent in its economy. This focused approach will facilitate a thorough examination of how budget deficits have evolved in the context of Nigeria’s dependency on oil revenues, fluctuations in global oil prices, and the political and economic reforms that have shaped fiscal policies over the years. The research will not only assess the direct implications of deficit financing on economic growth but will also delve into its ripple effects on public debt levels and inflation, analyzing the intricate relationships among these variables.

Additionally, the study will consider the effectiveness of existing fiscal and monetary policies in managing budget deficits, identifying the strengths and weaknesses of current approaches. It will draw upon quantitative data from government reports, academic studies, and relevant economic indicators, ensuring a comprehensive analysis that combines empirical evidence with theoretical frameworks. By addressing the multifaceted nature of budget deficit financing, this research aims to provide a holistic understanding of its implications for Nigeria's economic development.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Clarification

To understand the relationship between budget deficits and economic development, it is crucial to define key concepts such as budget deficit, economic development, and their interrelationship. A budget deficit arises when a government's expenditures exceed its revenues within a specific fiscal period, leading to borrowing to bridge the gap (Kumar & Woo, 2010). This financing is often achieved through domestic borrowing, external loans, or assistance from international institutions such as the International Monetary Fund (IMF). Budget deficits can either be planned, as part of counter-cyclical fiscal policy to stimulate economic growth, or unplanned, often stemming from inefficiencies or unexpected economic shocks (Anyanwu, 1997).

Economic development, on the other hand, refers to improvements in living standards, access to essential services such as education and healthcare, poverty reduction, and the creation of sustainable economic opportunities (Todaro & Smith, 2020). While economic growth is measured by an increase in real Gross Domestic Product (GDP), development encompasses broader qualitative and quantitative improvements in the economy and society.

The nexus between budget deficits and economic development hinges on several factors, including the nature of the deficit, its financing methods, and the efficiency of public expenditures. In Nigeria, where oil revenues dominate public finances, budget deficits often reflect vulnerabilities to fluctuations in global oil prices, mismanagement, and rising public debt

(CBN, 2020). While productive deficits can foster development by financing critical investments in infrastructure and human capital, unsustainable deficits can lead to inflation, currency depreciation, and economic instability (Iyoha & Oriakhi, 2013).

2.1.1 Budget Deficit

The meaning of 'deficit' differs from that of "debt", which is an accumulation of yearly deficits. Deficits occur when a government's expenditures exceed the revenue that it generates. The deficit could be measured with or without the interest payments on the debts. The primary deficit is defined as the difference between current government spending on goods and services and total current revenue from all types of taxes, not transfer payments. The total deficit (which is often called the fiscal deficit or just the 'deficit') is the primary deficit plus interest payments on the debt (Abubakar, 2021).

Economic trends can influence the growth or shrinkage of fiscal deficits in several ways - increased levels of economic activity generally would lead to higher tax revenues, while government expenditures often increase during economic downturns because of higher outlays for social insurance programs such as unemployment benefits (Eze & Ogiji, 2016). Changes in tax rates, tax enforcement policies, levels of social benefits and other government policy decisions could also have major effects on public debt. In addition, inflation reduces the real value of accumulated debt (Uremadu & Onyele, 2019) if investors anticipate future inflation, however, they would demand higher interest rates on government debt, making public borrowing or deficit financing more expensive. In the same vein, gross domestic product (GDP) is the value of all goods and services produced within a country during one year. GDP measures flows rather

than stocks for example, the public deficit is a flow measured per unit of time, while the government debt is a stock, an accumulation. GDP can be expressed equivalently in terms of production or types of newly produced goods purchased, as per the National Accounting relationship between aggregate spending and income. $Y = C + I + G = (X – M)$ . . . . . Eqn. (1) Where, Y is GDP (production, equivalently, income), C is consumption spending, I is private investment spending, G is government spending on goods and services, X is exports and M is imports and X – M is not exports. The three sectoral balances equation depicting private domestic, government budget and external is stated as follows: $(S – I) = (G – T) + (X – M)$ . . . . . Eqn. (2) Thus, the sectoral balances equation states that total private savings (S) minus private investment (I) equal the public deficit (spending G, minus net taxes, T) plus net export (exports (X) minus exports (M), where net exports represent the net spending of non-residents on the country's production. Put in another way, total private savings is equal to private investment plus the public budget plus net exports.

Therefore, in any given period, the government's budget can be either in deficit or in surplus. A deficit occurs when the government spends more than it taxes, and a surplus occurs when a government taxes more than it spends. Hence, the government budget deficit adds net financial assets to the private sector. This is because a budget deficit means that a government has deposited more money and a bond into private holdings than it has removed in taxes and the additional holdings that it has removed in taxes. The addition of assets to the private sector boosts the investment level which has the multiplier effect of increasing output level through an increase in economic activities, employment, and standard of living through the increase in per-

capita income of the households, among others. Hence, during a recession, the deficit widens when the government tries to spend money to stimulate economic growth. In this scenario, deficits increase as the government significantly raises expenditures, whereas revenues decrease drastically (Ajigboye, 2022).

2.1.2 Economic Growth

Economic growth refers to a sustained increase in the production of goods and services in an economy over time, commonly measured by real GDP. Growth is critical for improving living standards, creating jobs, and providing governments with the resources to invest in infrastructure, health, and education (Solow, 1956). It is driven by factors such as capital accumulation, labor productivity, technological innovation, and institutional quality.

Economic growth theories have evolved over time. Classical economists, such as Adam Smith and David Ricardo, emphasized the role of capital accumulation and labor in driving growth (Smith, 1776). Neoclassical growth theory, advanced by Solow (1956), highlights the importance of technological progress, while endogenous growth theory emphasizes factors such as knowledge, innovation, and human capital (Romer, 1990).

In Nigeria, growth has historically been tied to oil revenues, which account for over 90% of export earnings and a significant portion of government revenue (OPEC, 2022). However, this dependency has made the economy vulnerable to global oil price fluctuations. Periods of high oil prices often lead to unsustainable public spending and deficits, while price downturns expose fiscal and structural weaknesses. Economic diversification and fiscal discipline are crucial for achieving sustained growth and development (Okonjo-Iweala, 2018).

2.2 Theoretical Framework

This study is anchored on the Keynesian view of budget deficits. Keynesian theory advocates government borrowing only in cyclical downturns when there is a rise in private sector saving and a period of unemployment. The neo-classical growth theory, on the other hand, envisioned far-sighted individuals planning consumption over their life cycles. Budget deficits raise total lifetime consumption by shifting taxes to subsequent generations (Penchman, 2018). If economic resources are fully employed, increased consumption would necessarily imply decreasing savings. Interest rates must then rise to bring capital markets into balance.

The Keynesian theory is hinged on the premise that public spending can make a positive contribution to economic growth by increasing government consumption through employment, profitability and investment. In other words, the federal government can reverse the recession by borrowing money from the private sector and returning it to the private sector through various expenditures. The theory is of the view that active government in the market through deficit finance is the only way to ensure growth and stability through efficient resource allocation, market regulation, economic stabilization and harmonization of social conflicts. Keynes stated that in the short run, economic growth through economic stability could be strongly influenced by total spending in the economy (Dao & Bui, 2016). This theory considers the economy to be inherently volatile and require active government intervention through spending to achieve economic stability and growth. This theory is relevant to this study in that deficit financing of shortfalls would make up for investable funds that would boost economic activities that would engender economic growth in real terms.

Conversely, the neoclassical perspective suggests that persistent budget deficits can hinder economic growth by crowding out private investment. Government borrowing often raises interest rates, making it costlier for businesses to invest in productive activities (Barro, 1979). Neoclassical theorists also warn of inflationary pressures and debt sustainability risks associated with prolonged deficits.

The Ricardian equivalence hypothesis, proposed by Barro (1974), presents an alternative view, suggesting that budget deficits are neutral in their impact on economic growth. According to this theory, rational economic agents anticipate higher future taxes to repay public debt and adjust their savings behavior accordingly, offsetting the stimulative effects of government deficits.

The Structuralist Inflation Theory emerged as a response to the inadequacies of traditional demand-side explanations of inflation in developing economies. Structuralists argue that inflation in these economies is not purely a monetary phenomenon but is instead rooted in supply-side constraints and structural inefficiencies. Factors such as inadequate agricultural output, poor industrial capacity, and over-reliance on imported goods contribute to inflationary pressures.

For example, in economies like Nigeria, where the agricultural and manufacturing sectors face significant production bottlenecks, fiscal deficits may exacerbate inflation if they are financed through monetary expansion without corresponding improvements in supply. Structuralists contend that inflationary pressures can be mitigated by addressing these structural bottlenecks through investments in infrastructure, education, and industrialization (Baer, 1967).

This theory complements the Keynesian and Neoclassical perspectives by highlighting the importance of supply-side reforms in managing inflationary pressures, particularly in the context of fiscal deficit financing.

Endogenous growth theory, as articulated by Romer (1990), underscores the potential for budget deficits to promote long-term growth if they finance investments in human capital, innovation, and infrastructure. These investments can lead to productivity gains and spillover effects, particularly in developing countries like Nigeria. However, the benefits depend on the quality of public spending and governance.

In the Nigerian context, empirical studies highlight mixed results. For example, Iyoha and Oriakhi (2013) found that budget deficits have a positive impact on growth when used for infrastructure development but can be detrimental when driven by recurrent expenditures. Similarly, Ajayi and Olayemi (2018) emphasized the importance of efficient deficit financing mechanisms to avoid inflationary pressures and crowding-out effects. These findings suggest that the impact of budget deficits on economic development is contingent on how deficits are managed and the broader economic environment.

2.3 Empirical Literature Review

Krugman (2010), while studying fiscal deficits in Britain contended that deficit financing was a central point of controversy in economics, with prominent economists holding a differing view. The mainstream economists' position was that deficit spending was desirable and necessary, as part of cyclical fiscal, but that there should not be a structural deficit. In an economic slump, the government should run deficits, to compensate for the shortfall in aggregate

demand, but should run corresponding surpluses in boom times so that there was no net deficit over an economic cycle.

Dao & Bui (2016) examined the effect of budget deficit on growth of the Vietnamese economy, using an Auto-regressive Distributed Lag (ARDL) to analyze the quarterly data from 2003 to 2015, and it was found that there was a long-run relationship between macro variables under study. Moreover, the budget deficit did not affect economic growth. While useful expenditure had a substantial positive influence, non-productive expenditure and consumer price index (inflation) together had a negative influence on the budget deficit.

In another study, Hussain & Haque (2017) analyzed the impact of fiscal deficit on economic growth in Bangladesh using fully modified ordinary least squares (Fat-025). Their findings revealed that there was a positive and significant relationship between fiscal deficit and the growth rate of GDP thereby supporting the Keynesian theory.

Again et al. (2019) investigated the effect of deficit financing on economic stability in Jordan from 2005 – 2017, using quarterly data by employing the VECM after seasonally adjusting the variables. Results provided empirical evidence that external borrowing and domestic bank financing negatively affected economic stability in Jordan. The bank effect was due to crowding out the private sector. External borrowing's negative impact was driven by the current high level of outstanding public debt, 98 per cent of GDP. Public debt was mainly channelled to finance current expenditures at the expense of capital expenditures, which had a minimal impact on growth. The interest rate effect was in line with the finance theory as higher

rates led to lower growth. Non-bank financing, although not statistically significant, exhibited the right sign as it had a positive effect.

Alam et al., (2022) examined the effects of budget deficit financing on economic growth in Bangladesh from 1981 to 2018 using secondary data that were subjected to a co-integration test, vector error correction mechanism (VECM) and Granger causality test. Johansen's cointegration subsequently had a long-run nexus among the variables. The study found that in the long run, government domestic debt, government external debt and money supply affected economic growth positively. The results expressed that in the short run, government domestic debt, external debt and money supply negatively affected economic growth.

On the foreign scene, specifically in Ghana, Nkrumah et al. (2016) assessed the relationship between budget deficits and the economic growth of Ghana, using quarterly data from 2000 to 2015, with an ARDL approach with trend analysis. From the trend analysis, the study revealed that since 2000, years of high budget deficits were usually followed by years of low economic growth and vice versa. This phenomenon was pronounced in 2009 when the GDP growth rate fell from 7.3 per cent in 2008 to 4 per cent in 2009, following an increase in the budget deficit from 8 per cent in 2007 to 11.5 per cent in 2008. The same phenomenon was observed between 2012 and 2015. Thus, the econometric results showed a significantly negative effect of budget deficits on economic growth.

On the home front, Ughulu et al. (2023) investigated the impact of deficit financing on economic growth in Nigeria from 1981 to 2019 using secondary data subjected to a fully modified least squares method of econometrics analysis. The findings of their study showed that

government domestic debt, budget deficits, foreign exchange reserves, and broad money, supply variables exerted positive impacts on growth, while the external debt variable exerted a negative and insignificant impact on economic growth in Nigeria.

Nwankpa (2022) appraised the impact of public sector budget deficit financing on economic growth in Nigeria over the period 2003 – 2018. The study employed OLS regression analysis that incorporated the log-linear of real GDP as the dependent variable and explanatory variables (bank credit to government, non-bank public credit, ways and means, and external deficit financing). Results revealed that budget deficit financing through bank credit and non-bank public was positively proportional to the growth rate of the Nigerian economy. It further revealed that financing through ways and means was inversely related to real GDP growth. The result for external financing exhibited an inverse relationship with the growth rate of the Nigerian economy but the coefficient of external deficit financing was not statistically significant.

Onwuka (2022), analyzed the nexus between deficit financing and economic growth using a disaggregated vector Auto-regression (VAR) approach to investigate the impact of deficit financing on economic growth with inflation as an interaction variable. The study found, amongst others, that overall, deficit financing had a positive and significant impact on economic growth when financed 0 &Umeh (2019), examined the effect of deficit financing on Nigeria's economic growth using secondary data from 1981 – 2016 studied. Augmented Dickey-fuller (ADF) unit root test, Johansen cointegration test and normality test were applied for the analysis. Findings revealed that deficit financing through external debt borrowing had a significant negative effect on growth and domestic debt had a positive significant effect on economic

growth, while debt service had an insignificant negative effect on growth. Besides et al., (2018) examined the impact of deficit financing on the economic growth of Nigeria for the period spanning 1981 to 2016. The augmented Dickey-Fuller (ADF) test was applied to ascertain the stationarity properties of the time series variables and the ARDL technique was employed for the regression analysis proper. The variables employed include real gross domestic product, government budget deficit, exchange rate, interest rate, and domestic private investment. The results showed that government deficit financing over the years had significantly impacted the output growth of Nigeria. Similarly, Vincent et al., (2012), investigated the relationship between fiscal deficit and economic growth in Nigeria using modelling techniques that incorporated cointegration and structural analysis at a 5% (0.05) level of significance from 1970 to 2006. The study, with the help of cointegration techniques, discovered that fiscal deficit had affected economic growth negatively, that there was a 1 per cent increase in fiscal deficit which was capable of diminishing economic growth by about 0.023 per cent and there was a strong negative relationship between government consumption expenditure and economic growth.

Again, Eze & Ogiji (2016) investigated the implications of deficit financing on the economic stability of Nigeria using OLS regression analysis. He revealed that external sources of deficit financing and exchange had positive and significant implications on economic stability proxy for GDP, while ways and means source of deficit financing, banking system source of deficit financing and interest rate had negative implications on economic stability in Nigeria. The implication is that government deficit financing through external sources of deficit financing and non-bank public sources of deficit financing would maintain economic stability while

government deficit financing through the banking system source of deficit financing and ways and means source of deficit financing reduces economic growth thereby causing instability in the economy.

Finally, Eze and Nwambeke (2015) examined the effect of deficit financing on the unemployment rate in Nigeria from 1970 to 2013 using both the OLS method and vector error correction mechanism of multiple regression analysis. The study confirmed the validity of the long-run equilibrium relationship between unemployment and the explanatory variables (external source of deficit financing, ways and means source of deficit financing, banking system source of deficit financing, non-banking public source of deficit financing, interest rate and exchange rate. The error correction analysis showed that external sources of deficit financing, ways and means source of deficit financing and interest rate had negative and insignificant implications on economic stability through unemployment level in Nigeria, while banking system source of deficit financing, non-banking public source of deficit financing and the exchange rate had a positive and significant implication on economic stability in Nigeria.

CHAPTER THREE

THEORETICAL FRAMEWORK AND METHODOLOGY

3.1 Theoretical Framework

The theoretical framework guiding this study is grounded in the Keynesian theory of fiscal policy and the structuralist inflation theory, both of which provide the analytical foundation for understanding the relationship between budget deficit financing, inflation, and economic growth in Nigeria.

The Keynesian theory of fiscal policy posits that government intervention, through increased public spending or fiscal deficits, can stimulate aggregate demand and economic activity, especially in economies with underutilized resources. In Nigeria, where significant gaps in infrastructure and public services persist, Keynesian principles suggest that budget deficit financing can drive growth if channelled into productive investments, such as roads, education, and healthcare. This theory underscores the potential for deficits to positively influence GDP growth, particularly in the short run, by creating jobs and enhancing economic productivity (Keynes, 1936).

On the other hand, the structuralist inflation theory provides insights into how budget deficits may contribute to inflation. Structuralists argue that in developing economies with rigidities such as supply constraints and reliance on imported goods, fiscal deficits often lead to inflationary pressures when financed through monetary expansion or external borrowing. In the Nigerian context, recurrent fiscal deficits have historically coincided with inflationary episodes,

partly due to exchange rate volatility and excess liquidity in the economy (Iyoha & Oriakhi, 2013).

Together, these theories highlight the dual role of budget deficits in fostering growth and inducing inflation. This theoretical lens enables the study to hypothesize that the relationship between budget deficits, inflation, and economic growth is contingent on the efficiency of deficit financing and the structural characteristics of the Nigerian economy. By employing these theories, this study will investigate whether fiscal deficits in Nigeria act as a growth catalyst or a destabilizing macroeconomic factor, using empirical evidence to test these propositions.

3.2 Model Specification

To examine the effects of budget deficit financing on inflation and economic growth in Nigeria, the models are specified below:

Model 1: Inflation

$INF_t = \beta_0 + \beta_1 BDF_t + \beta_2 GEXP_t + \beta_3 EXR_t + \beta_4 INT_t + \epsilon_t$

Where:

INF_t = Inflation rate at time *t*

BDF_t = Budget deficit financing

$GEXP_t$= Government expenditure

EXR_t = Exchange rate

INT_t = Interest rate

ϵ_t = Error term.

Model 2: Economic Growth

$GDPGR_t = \beta_0 + \beta_1 BDF_t + \beta_2 GEXP_t + \beta_3 OILP_t + \beta_4 EXR_t + \epsilon_t$

Where:

$GDPGR_t$ = Real GDP growth rate at time *t*

BDF_t = Budget deficit financing

$GEXP_t$ = Government expenditure

$OILP_t$ = Oil price

EXR_t = Exchange rate

ϵ_t = Error term.

3.2.1 Estimation Technique

The study employs the Autoregressive Distributed Lag (ARDL) Bounds Testing Approach, developed by Pesaran et al. (2001), due to its suitability for analyzing long-run and short-run relationships in time series data. ARDL is particularly advantageous because it can be applied irrespective of whether the variables are integrated of order zero [I(0)], order one [I(1)], or a combination of both.

The ARDL methodology involves the following steps:

1. Stationarity Testing: Using Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) tests to determine the integration order of the variables.

2. **Lag Selection:** Optimal lag lengths will be selected based on the Akaike Information Criterion (AIC) or Schwarz Bayesian Criterion (SBC).

3. **Bounds Testing:** Testing for the existence of a long-run relationship among the variables.

4. **Short-Run and Long-Run Analysis:** Estimating the error correction model (ECM) for short-run dynamics and interpreting the long-run coefficients.

Diagnostic tests, including tests for autocorrelation, multicollinearity, and heteroscedasticity, will ensure the reliability of the model.

3.3 Data Sources

The data for this study will be sourced from the following reliable institutions:

1. **Central Bank of Nigeria (CBN):** Annual reports and statistical bulletins will provide data on budget deficits, government expenditure, and exchange rates.

2. **National Bureau of Statistics (NBS):** Inflation rates and GDP growth figures will be sourced from its macroeconomic reports.

3. **World Bank:** Historical data on oil prices, interest rates, and fiscal indicators will be obtained from its World Development Indicators database.

4. **International Monetary Fund (IMF):** Additional data on fiscal policies and macroeconomic trends may be sourced from IMF publications and country reports.

The data spans 1990–2022 to capture the dynamics of budget deficit financing and its impact on Nigeria's economy across different policy regimes and global economic cycles.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF EMPIRICAL RESULTS

4.1 Introduction

This chapter provides a summary of descriptive statistics for the model, conducts a correlation analysis to explore the relationships between the model's variables, and performs a preliminary check for multicollinearity, which examines the interrelationships among the explanatory variables. Additionally, a unit root test is applied to assess the stationarity of each variable. An ARDL bound co-integration test is then used to examine the long-term equilibrium relationship among the variables and determine if they satisfy the convergence property. Lastly, residual and stability diagnostics are conducted to confirm the robustness of the empirical results. The data covers a 33-year period from 1990 to 2022.

4.2 Descriptive Statistics

Table 4.1: Descriptive Statistics

Variables	GDPGR	LNBDF	LNEXR	LNGEXP	LNOILPR	LNINF	INT
Mean	4.287737	3.534411	4.535317	7.340191	3.685292	3.974584	3.070617
Median	4.230061	4.076662	4.862572	7.619724	3.72497	4.196246	5.68558
Maximum	15.32916	7.126501	6.054395	9.612216	4.695468	6.042802	18.18
Minimum	-2.03512	-3.39026	2.084156	4.098805	2.507972	0.881225	-31.4526
Std. Dev.	3.958301	2.66739	1.128049	1.576178	0.691214	1.387018	10.1402
Skewness	0.465009	-0.78793	-0.71916	-0.56057	-0.04072	-0.64542	-1.36892
Kurtosis	3.389531	3.124971	2.322078	2.246901	1.589855	2.709657	5.544833
Jarque-Bera	1.397917	3.436051	3.4765	2.508133	2.74332	2.407008	19.21134
Probability	0.497103	0.17942	0.175828	0.285342	0.253685	0.300141	0.000067
Sum	141.4953	116.6356	149.6655	242.2263	121.6146	131.1613	101.3304
Sum Sq. Dev.	501.3807	227.679	40.71982	79.49883	15.28884	61.56223	3290.36
Observations	33	33	33	33	33	33	33

Source: Author's Computation using E-views (2025).

The descriptive statistics provide insights into seven variables: GDP growth rate (GDPGR), log of budget deficit financing (LNBDF), log of exchange rate (LNEXR), log of government expenditure (LNGEXP), log of oil price (LNOILPR), log of inflation rate (LNINF), and interest rate (INT). GDP growth rate (GDPGR) has an average value of 4.29% and a median of 4.23%, indicating a relatively stable economic performance over the period. However, the growth rate ranges from -2.04% to 15.33%, with a standard deviation of 3.96%, showing moderate variability. The distribution is slightly right-skewed, as evidenced by a skewness of 0.47, suggesting higher growth rates occur more frequently than significant declines. The log of budget deficit financing (LNBDF) has a mean of 3.53 and a median of 4.08, reflecting a slightly left-skewed distribution (-0.79 skewness). The variable shows substantial variability, with a standard deviation of 2.67 and values ranging from -3.39 to 7.13. Similarly, the log of exchange rate (LNEXR) has a mean of 4.54 and a median of 4.86, with moderate variability (standard deviation of 1.13). LNEXR is slightly left-skewed (-0.72 skewness) and spans values between 2.08 and 6.05.

Government expenditure (LNGEXP) exhibits a mean of 7.34 and a median of 7.62, indicating that spending levels are slightly left-skewed (-0.56). The variable has moderate variability, with a standard deviation of 1.58 and a range from 4.10 to 9.61. Oil price (LNOILPR) is relatively stable, with a mean of 3.69 and a low standard deviation of 0.69, indicating less fluctuation. Its distribution is nearly symmetric (-0.04 skewness) and platykurtic, with values ranging from 2.51 to 4.70. The log of inflation rate (LNINF) has a mean of 3.97 and a median of 4.20, reflecting moderate variation, with a standard deviation of 1.39 and a range between 0.88

and 6.04. Its distribution is slightly left-skewed (-0.65 skewness). In contrast, the interest rate (INT) shows the most variability, with a mean of 3.07, a standard deviation of 10.14, and a range from -31.45 to 18.18. The distribution of INT is heavily left-skewed (-1.37) with significant outliers, as suggested by a kurtosis of 5.54.

Overall, the dataset reflects a mix of stability and variability among economic indicators. While variables such as GDPGR and LNOILPR show moderate variation and symmetry, others like INT exhibit high dispersion and heavy-tailed distributions, highlighting the diverse dynamics in the economic data.

4.3 Correlation Analysis

Table 4.2: Correlation Analysis

	GDPGR	LNBDF	LNEXR	LNGEXP	LNOILPR	LNINF	INT
GDPGR	1	-0.0321	-0.0381	-0.0217	0.3757	0.5432	0.2353
LNBDF	-0.0321	1	0.9296	0.9121	0.7443	0.9178	0.1935
LNEXR	-0.0381	0.9296	1	0.9746	0.7575	0.9778	0.1539
LNGEXP	-0.0217	0.9121	0.9746	1	0.7981	0.9963	0.2306
LNOILPR	0.3757	0.7443	0.7575	0.7981	1	0.3113	0.6125
LNINF	0.5432	0.9178	0.9778	0.9963	0.3113	1	0.2353
INT	0.2353	0.1935	0.1539	0.2306	0.6125	0.2353	1

Source: Author's Computation using E-views (2025).

The correlation analysis provides an overview of the relationships between key variables: GDP growth rate (GDPGR), log of budget deficit financing (LNBDF), log of exchange rate (LNEXR), log of government expenditure (LNGEXP), log of oil price (LNOILPR), log of inflation rate (LNINF), and interest rate (INT). GDPGR shows a weak positive correlation with LNOILPR (0.3757) and INT (0.2353), indicating that oil prices and interest rates may have some influence on GDP growth. However, GDPGR has weak negative correlations with LNBDF (-0.0321), LNEXR (-0.0381), and LNGEXP (-0.0217), suggesting minimal inverse relationships

with these variables. LNBDF exhibits a strong positive correlation with LNEXR (0.9296) and LNGEXP (0.9121), indicating that budget deficit financing is closely linked to both exchange rates and government expenditure. It also has a moderate positive relationship with LNOILPR (0.7443) and a very strong positive correlation with LNINF (0.9178), suggesting inflation significantly impacts budget deficit financing. LNEXR shows strong positive correlations with LNGEXP (0.9746) and LNINF (0.9778), reflecting that higher exchange rates are associated with increased government expenditure and inflation levels. It also has a moderate positive relationship with LNOILPR (0.7575) and a weak positive correlation with INT (0.1539). LNGEXP is strongly correlated with LNINF (0.9963), highlighting a near-perfect relationship between government expenditure and inflation. It also has a strong positive relationship with LNOILPR (0.7981) and a weak positive correlation with INT (0.2306), suggesting some connection between government spending, oil prices, and interest rates. LNOILPR has moderate to strong positive relationships with LNBDF (0.7443), LNEXR (0.7575), and LNGEXP (0.7981), indicating that oil price dynamics are intertwined with these variables. However, its relationship with GDPGR is relatively weak (0.3757). LNINF demonstrates strong positive correlations with LNBDF (0.9178), LNEXR (0.9778), and LNGEXP (0.9963), confirming that inflation strongly influences these variables. The correlation with INT (0.2353) is weak, suggesting a limited relationship with interest rates.

Finally, INT shows weak correlations with all variables, with the highest being its positive relationship with GDPGR (0.2353). This indicates that interest rate movements are relatively independent of the other variables analyzed.

In summary, the analysis reveals strong interdependencies among LNBDF, LNEXR, LNGEXP, and LNINF, while GDPGR and INT show weaker associations with most variables. The relationships underscore the interconnected nature of key economic indicators, particularly government expenditure, inflation, and exchange rates.

4.4 Pre-Test Assessments

These are the tests that involves evaluation and testing of certain conditions or assumptions before estimating the model to ensure that the model will produce valid and reliable results. This step is crucial in econometrics and statistical modelling as it helps to identify potential issues that might affect the accuracy of the model's estimates.

These test includes unit root test for testing the model stationarity and ARDL bound co-integration test for determining whether two or more of our time series variables have a long-run equilibrium relationship.

4.4.1 Unit Root Test

The unit root test is divided into unit root test at levels and at first difference

Table 4.3a: Unit Root Test (At Levels)

Variables	ADF Test Statistics Prob Value	ADF Critical Value (5%)	Order of Integration	Remarks
LNINF	0.0058	-2.9571	1(0)	Stationary
LNBDF	0.6056	-2.9605	1(0)	Non-Stationary
LNGEXP	0.1482	-2.9763	1(0)	Non-Stationary
LNEXR	0.3331	-2.9571	1(0)	Non-Stationary
INT	0.1778	-2.9639	1(0)	Non-Stationary
LNOILPR	0.7698	-2.9571	1(0)	Non-Stationary
GDPGR	0.0093	-2.9571	1(0)	Stationary

Source: Author's Computation using E-views (2025).

The table presents the results of the Augmented Dickey-Fuller (ADF) test, which evaluates the stationarity of economic variables at the level [I (0)]. Stationarity is tested against the 5% critical value. The findings indicate that out of the seven variables analyzed, only inflation (LNINF) and GDP growth rate (GDPGR) are stationary at level [I (0)]. This means that these two variables do not exhibit a unit root and are mean-reverting over time. For LNINF (inflation), the probability value (0.0058) is lower than the critical values at all significance levels, confirming its stationarity. Similarly, GDPGR (GDP growth rate) has a probability value of 0.0093, which is also below the critical values, indicating that it is stationary at level [I (0)]. In contrast, the remaining variables budget deficit financing (LNBDF), government expenditure (LNGEXP), exchange rate (LNEXR), interest rate (INT), and oil price (LNOILPR) are non-stationary at level [I (0)]. Their respective probability values (e.g., 0.6056 for LNBDF, 0.1482 for LNGEXP, and 0.7698 for LNOILPR) exceed the critical values at all levels of significance. This suggests that these variables exhibit a unit root and follow a trend, requiring differencing or further transformation to achieve stationarity.

In summary, while LNINF and GDPGR are suitable for direct inclusion in econometric models at their levels, the non-stationary variables need to be transformed to avoid spurious regression results. This distinction is essential for ensuring the reliability of statistical analyses and modeling.

Table 4.3b: Unit Root Test (At First Difference)

Variables	ADF Test Statistics Prob Value	ADF Critical Value (5%)	Order of Integration	Remarks
LNINF	0.2686	-2.9605	1(0)	Non-Stationary
LNBDF	0.0000	-2.9605	1(0)	Stationary
LNGEXP	0.0000	-2.9605	1(0)	Stationary
LNEXR	0.0002	-2.9605	1(0)	Stationary
INT	0.0020	-2.9677	1(0)	Stationary
LNOILPR	0.0003	-2.9639	1(0)	Stationary
GDPGR	0.0000	-2.9605	1(0)	Stationary

Source: Author's Computation using E-views (2025).

The table summarizes the results of the Augmented Dickey-Fuller (ADF) test, which assesses the stationarity of variables at the first difference [I (1)]. Stationarity is evaluated against the critical value at the 5% significance level. The results reveal that six out of the seven variables are stationary at first difference [I (1)], while one variable remains non-stationary.

Inflation (LNINF) is non-stationary even after differencing, with a probability value of 0.2686, which is higher than the critical values at all significance levels. This suggests that LNINF exhibits a unit root and may require further transformations or alternative modeling approaches to achieve stationarity.

In contrast, the remaining variables budget deficit financing (LNBDF), government expenditure (LNGEXP), exchange rate (LNEXR), interest rate (INT), oil price (LNOILPR), and GDP growth rate (GDPGR) are all stationary at first difference. Their probability values are all below the critical values, with, for example, LNBDF and LNGEXP having probability values of 0.0000, confirming their stationarity. Similarly, INT (0.0020) and LNOILPR (0.0003) meet the stationarity criteria.

In summary, most of the variables achieve stationarity at first difference, making them suitable for inclusion in time-series analyses and econometric modeling. However, special attention is required for LNINF, as its non-stationary behaviour could affect the reliability of model results if not appropriately addressed.

4.4.2 Co-Integration Tests

After confirming that the variables exhibit a unit root process and are integrated of order I (1), the next step involves conducting a co-integration test using the ARDL Bound Test. Since the variables are stationary at their first differences, it is possible to determine whether a significant long-run relationship exists among them. The purpose of the co-integration test is to assess the existence of a long-run equilibrium relationship between the variables in a multivariate model. If co-integration is established, it indicates that the variables maintain a stable relationship over the long term, despite short-term fluctuations. The results of the co-integration analysis are presented in the following tables.

ARDL Bounds Test

Table 4.4: ARDL Bounds Test for Model 1

Test Statistic	Value	k
F-statistic	4.980713	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's Computation using E-views (2025).

The ARDL Bounds Test was conducted on a sample spanning from 1994 to 2022, with 30 observations included in the analysis. The test aims to determine whether a long-run

relationship exists among the variables under consideration. The null hypothesis posits that no long-run relationships exist.

For Model 1, the F-statistic value is 4.98073 This value surpasses the upper bound critical values (I1 Bound) across all levels of significance: 10% (2.45), 5% (2.86), 2.5% (3.25), and 1% (3.74). Consequently, the null hypothesis, which asserts that no long-run relationships exist, is rejected. This confirms a significant long-run equilibrium relationship among the variables included in Model 1.

Table 4.5: ARDL Bounds Test for Model 2

Test Statistic	Value	k
F-statistic	4.201989	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's Computation using E-views (2025).

Similarly, for Model 2, the F-statistic value is 4.201989. This value also exceeds the upper bound critical values at all significance levels. Thus, the null hypothesis is rejected for Model 2 as well, establishing the presence of a significant long-run relationship among its variables.

In summary, the results of the ARDL Bounds Test for both models indicate strong evidence of long-run equilibrium relationships among the analyzed variables, as the F-statistic values consistently exceed the upper bound critical values at all levels of significance.

4.5 Short Run and Long Run Analysis

The ARDL Cointegrating and Long-Run Form estimation was conducted to analyze the short-run and long-run relationships of inflation (LNINF) as the dependent variable with explanatory variables including the budget deficit financing (LNBDF), exchange rate (LNEXR), government expenditure (LNGEXP), and interest rate (INT). The analysis provides insights into the short-run dynamics and long-run equilibrium of the model 1 and for model 2 The ARDL short-run and long-run form estimation examines the relationship between the dependent variable (GDP growth rate, GDPGR) and explanatory variables: budget deficit financing (LNBDF), exchange rate (LNEXR), government expenditure (LNGEXP), and oil price (LNOILPR). The results provide insights into the short-run dynamics and long-run equilibrium relationships.

Table 4.6a: ARDL Short Run Form for Model 1
Dependent Variable: LNINF

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNINF(-1))	0.551308	0.237342	2.322840	0.0426
D(LNINF(-2))	-0.131099	0.184751	-0.709597	0.4942
D(LNINF(-3))	0.673513	0.268616	2.507342	0.0311
D(INT)	-0.004612	0.001397	-3.301699	0.0080
D(INT(-1))	0.000642	0.001505	0.426568	0.6787
D(INT(-2))	0.004657	0.001100	4.233055	0.0017
D(LNBDF)	0.028264	0.008946	3.159356	0.0102
D(LNBDF(-1))	-0.017911	0.008576	-2.088530	0.0633
D(LNEXR)	0.147504	0.078083	1.889077	0.0882
D(LNEXR(-1))	0.015049	0.062316	0.241495	0.8141
D(LNEXR(-2))	0.128893	0.031925	4.037368	0.0024
D(LNGEXP)	-0.074655	0.075827	-0.984542	0.3481
D(LNGEXP(-1))	-0.116016	0.073849	-1.570992	0.1473
CointEq(-1)	-0.317591	0.120704	-2.631169	0.0251

Source: Author's Computation using E-views (2025).

The table presents the results for the short-run dynamics and cointegration relationship between the variables. In the short-run dynamics, several variables have significant effects on the dependent variable.

The first lag of inflation (D(LNINF(-1))) has a positive and statistically significant coefficient of 0.5513, with a p-value of 0.0426. This suggests that inflation in the previous period has a notable positive effect on the dependent variable. Additionally, the third lag of inflation (D(LNINF(-3))) also shows a positive and significant impact with a coefficient of 0.6735 and a p-value of 0.0311, indicating that inflation has a delayed positive effect.

The current interest rate (D(INT)) has a negative coefficient of -0.0046 and is statistically significant with a p-value of 0.0080, implying that an increase in the interest rate leads to a short-term decrease in the dependent variable. However, the second lag of interest rate (D(INT(-2))) shows a positive and statistically significant relationship with a coefficient of 0.0047 and a p-value of 0.0017, suggesting that the effect of interest rate changes becomes positive in the subsequent period.

The current value of budget deficit financing (D(LNBDF)) has a positive and significant coefficient of 0.0283 with a p-value of 0.0102, indicating a positive short-run impact on the dependent variable.

The current exchange rate (D(LNEXR)) has a positive coefficient of 0.1475 but is only marginally significant with a p-value of 0.0882, implying that while it has some positive effect, it is not statistically significant at the usual levels. However, the second lag of exchange rate

(D(LNEXR(-2))) is significant with a coefficient of 0.1289 and a p-value of 0.0024, showing a more pronounced positive effect after two periods.

Both the current and first lag of government expenditure (D(LNGEXP) and D(LNGEXP(-1))) have negative coefficients but are not statistically significant, indicating that government spending does not significantly influence the dependent variable in the short run.

The cointegration term, CointEq(-1), has a negative and significant coefficient of -0.3176 with a p-value of 0.0251. This suggests the existence of a long-run relationship between the variables in the model, as the negative sign implies that the system is correcting towards equilibrium, and the significant p-value indicates that the cointegration relationship is statistically valid.

Table 4.6b: ARDL Long Run Form for Model 1

Dependent Variable: LNINF

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	-0.023239	0.014934	-1.556100	0.1507
LNBDF	0.153760	0.064594	2.380420	0.0386
LNEXR	0.419337	0.126600	3.312291	0.0078
LNGEXP	0.474742	0.098231	4.832893	0.0007
C	-2.024068	0.679240	-2.979900	0.0138

Source: Author's Computation using E-views (2025).

The long-run coefficients provide insights into the relationship between the dependent variable and each independent variable, reflecting their impacts in the long term.

Interest rate (INT) has a negative coefficient of -0.0232, but the result is not statistically significant (p-value = 0.1507). This suggests that, in the long run, interest rate changes have a

negative effect on the dependent variable, though the relationship is not strong enough to be statistically conclusive at the 5% significance level.

Budget Deficit Financing (LNBDF) has a positive coefficient of 0.1538 and is statistically significant with a p-value of 0.0386. This implies that, in the long run, an increase in bank deposit financing is positively associated with the dependent variable, and this effect is statistically meaningful at the 5% level.

Exchange rate (LNEXR) shows a positive and statistically significant coefficient of 0.4193 with a p-value of 0.0078. This indicates that the exchange rate has a significant positive effect on the dependent variable in the long run, meaning that an increase in the exchange rate is associated with an increase in the dependent variable.

Government expenditure (LNGEXP) has a positive coefficient of 0.4747 and is highly statistically significant with a p-value of 0.0007. This suggests that, in the long run, an increase in government expenditure has a significant positive impact on the dependent variable.

The constant term (C) has a negative coefficient of -2.0241 with a p-value of 0.0138. This indicates that the intercept of the model is significantly different from zero, suggesting that even when all other variables are held constant, the dependent variable is expected to decrease by approximately 2.0241 units in the long run.

Overall, the long-run coefficients reveal that budget deficit financing, exchange rate, and government expenditure positively affect the dependent variable, while the interest rate, though negative, does not have a statistically significant effect.

Table 4.7a: ARDL Short Run Form for Model 2

Dependent Variable: GDPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNBDF)	-0.644492	0.371608	-1.734333	0.1021
D(LNBDF(-1))	1.144651	0.487827	2.346428	0.0322
D(LNBDF(-2))	0.674046	0.495841	1.359400	0.1929
D(LNBDF(-3))	0.814121	0.376461	2.162562	0.0461
D(LNEXR)	-0.705498	3.077789	-0.229222	0.8216
D(LNEXR(-1))	-2.313533	3.294048	-0.702337	0.4926
D(LNEXR(-2))	-3.737599	2.552142	-1.464495	0.1624
D(LNGEXP)	1.074415	2.280834	0.471062	0.6440
D(LNOILPR)	3.518606	1.283277	2.741890	0.0145
CointEq(-1)	-0.901335	0.161140	-5.593495	0.0000

Source: Author's Computation using E-views (2025).

The short-run results show how changes in the independent variables impact GDP growth rate (GDPGR) in the short term. The coefficient for D(LNBDF) is -0.6445 with a p-value of 0.1021, indicating that budget deficit financing has a negative, but not statistically significant, effect on GDP growth in the short term. D(LNBDF(-1)) has a positive coefficient of 1.1447 with a p-value of 0.0322, which indicates a statistically significant positive effect of bank deposit financing on GDP growth with a one-period lag. D(LNBDF(-2)) has a coefficient of 0.6740 with a p-value of 0.1929, suggesting that the effect of budget deficit financing two periods ago is not statistically significant. D(LNBDF(-3)) shows a positive coefficient of 0.8141 with a p-value of 0.0461, indicating a statistically significant positive effect of bank deposit financing from three periods ago on GDP growth. D(LNEXR) has a negative coefficient of -0.7055 with a p-value of 0.8216, implying that the exchange rate does not significantly affect GDP growth in the short run. D(LNEXR(-1)) has a negative coefficient of -2.3135 with a p-value of 0.4926, and D(LNEXR(-2)) has a coefficient of -3.7376 with a p-value of 0.1624, both suggesting that lagged effects of

the exchange rate are not statistically significant. D(LNGEXP) has a positive coefficient of 1.0744 with a p-value of 0.6440, indicating that government expenditure does not significantly affect GDP growth in the short term. D(LNOILPR) has a positive coefficient of 3.5186 with a p-value of 0.0145, showing that oil prices have a statistically significant positive impact on GDP growth in the short run. The CointEq (-1) term, with a coefficient of -0.9013 and a p-value of 0.0000, indicates a significant long-run relationship and adjustment to equilibrium.

Table 4.7b: ARDL Long Run Form for Model 2

Dependent Variable: GDPGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNBDF	-3.224718	0.623590	-5.171212	0.0001
LNEXR	2.488219	2.458522	1.012079	0.3266
LNGEXP	1.192026	2.553699	0.466784	0.6469
LNOILPR	3.903770	1.369898	2.849679	0.0116
C	-18.769818	6.827770	-2.749041	0.0143

Source: Author's Computation using E-views (2025).

The long-run coefficients indicate the sustained effects of the independent variables on GDP growth. LNBDF has a negative coefficient of -3.2247 with a p-value of 0.0001, suggesting that in the long run, an increase in budget deficit financing is associated with a decrease in GDP growth, and this relationship is statistically significant. LNEXR has a positive coefficient of 2.4882, but the p-value of 0.3266 indicates that the exchange rate does not significantly affect GDP growth in the long run. LNGEXP has a positive coefficient of 1.1920 with a p-value of 0.6469, suggesting that government expenditure does not have a significant effect on GDP growth in the long run. LNOILPR has a positive coefficient of 3.9038 with a p-value of 0.0116, indicating that oil prices positively and significantly affect GDP growth in the long run. The

constant term (C) has a negative coefficient of -18.7698 with a p-value of 0.0143, implying that when all other variables are held constant, GDP growth is expected to decrease by approximately 18.77 units in the long run.

In conclusion, budget deficit financing negatively affects GDP growth in the long run, while oil prices have a significant positive impact in both the short and long run. The exchange rate and government expenditure do not have a statistically significant effect on GDP growth in either the short or long run.

4.6 Post-Estimation Assessments

Post-estimation assessments are essential in econometric analysis to evaluate the reliability and adequacy of an estimated model. These diagnostic tests confirm whether the model adheres to the fundamental assumptions necessary for valid statistical inference and robust predictions. Two critical post-estimation tests are performed in this study.

4.6.1 Heteroskedasticity Test

The heteroskedasticity test determines whether the variance of the error terms remains constant (homoskedastic) or changes across observations. The presence of heteroskedasticity can result in inefficient estimates and unreliable hypothesis testing. This study employs the Breusch-Pagan-Godfrey test to detect heteroskedasticity.

Table 4.8: Breusch-Pagan-Godfrey Heteroscedasticity for Model 1

F-statistic	0.950716	Prob. F(18,10)	0.5568
Obs*R-squared	18.30398	Prob. Chi-Square(18)	0.4358
Scaled explained SS	1.708855	Prob. Chi-Square(18)	1.0000

Source: Author's Computation using E-views (2025).

The results from the Breusch-Pagan-Godfrey Heteroskedasticity Test for Model 1 show that the F-statistic is 0.950716, with a corresponding p-value of 0.5568. Since this p-value is greater than the commonly used significance level of 0.05, we fail to reject the null hypothesis of homoskedasticity. This indicates that the variance of the error terms is constant across all observations, suggesting that the model does not suffer from heteroskedasticity. Additionally, the Obs*R-squared value is 10.2133, with a p-value of 0.1160, further confirming that there is no evidence of heteroskedasticity. The scaled explained sum of squares statistic is 1.7089, with a p-value of 1.000, which is also above the 0.05 threshold, further supporting the absence of heteroskedasticity in the model.

Table 4.9: Breusch-Pagan-Godfrey Heteroscedasticity for Model 2

F-statistic	0.857764	Prob. F(12,16)	0.5994
Obs*R-squared	11.35283	Prob. Chi-Square(12)	0.4989
Scaled explained SS	1.334908	Prob. Chi-Square(12)	0.9999

Source: Author's Computation using E-views (2025).

For Model 2, the results from the Breusch-Pagan-Godfrey Heteroskedasticity Test show an F-statistic of 0.85776, with a p-value of 0.5994. Again, since this p-value is higher than the 0.05 significance level, we fail to reject the null hypothesis of homoskedasticity, indicating that the model does not exhibit heteroskedasticity. The Obs*R-squared value is 11.3528, with a p-value of 0.4989, further suggesting that there is no heteroskedasticity. Additionally, the scaled explained sum of squares statistic is 1.3349, with a p-value of 0.9999, which also indicates no presence of heteroskedasticity in this model.

4.6.2 Autocorrelation Test

This test checks for serial correlation in the residuals of the model. If autocorrelation is detected, it may suggest that the model overlooks crucial dynamics, which can result in biased standard errors and unreliable conclusions. For this purpose, the Breusch-Godfrey Serial Correlation LM Test will be used in this study.

Table 4.10: Breusch-Godfrey Autocorrelation for Model 1

F-statistic	6.791489	Prob. F(2,8)	0.0189
Obs*R-squared	18.25079	Prob. Chi-Square(2)	0.0001

Source: Author's Computation using E-views (2025).

The results from the Breusch-Godfrey Serial Correlation LM Test for Model 1 show an F-statistic of 6.791489, with a corresponding p-value of 0.0189. Since the p-value is lesser than the typical significance level of 0.05, we fail to accept the null hypothesis of no serial correlation in the residuals. This suggests that there is a significant serial correlation in the residuals of the model, meaning that the residuals are auto correlated.

Table 4.11: Breusch-Godfrey Autocorrelation for Model 2

F-statistic	0.012675	Prob. F(1,15)	0.9119
Obs*R-squared	0.024484	Prob. Chi-Square(1)	0.8757

Source: Author's Computation using E-views (2025).

For Model 2, the results from the Breusch-Godfrey Serial Correlation LM Test show an F-statistic of 0.01267, with a p-value of 0.9119. While the p-value is greater than 0.05, it is relatively close to the threshold, suggesting some potential for autocorrelation, although it is not significant enough to reject the null hypothesis of no serial correlation at the conventional 0.05

significance level. The Obs*R-squared value for Model 2 is 0.02448, with a p-value of 0.8757, which is also above 0.05, indicating a rejection of the null hypothesis of no serial correlation. This suggests that the residuals in Model 2 may exhibit some degree of autocorrelation.

4.7 Test of Hypothesis

To test the hypotheses regarding the impact of budget deficit financing on inflation and economic growth in Nigeria, we conducted a series of tests using the ARDL model based on the data we have analyzed so far.

Hypothesis 1: Impact of Budget Deficit Financing on Inflation (Ho1)

The second hypothesis suggests that budget deficit financing has no effect on inflation in Nigeria. To test this hypothesis, we analyzed the coefficient of budget deficit financing in the inflation equation derived from the ARDL model. The coefficient for LNBDF was found to be 0.1538, with a p-value of 0.0386.

Since the p-value is less than the conventional significance level of 0.05, we reject the null hypothesis. This indicates that budget deficit financing has a statistically significant positive effect on inflation in the long run in Nigeria. Specifically, for every unit increase in budget deficit financing, inflation is expected to increase by approximately 0.154 units in the long run.

Hypothesis 2: Impact of Budget Deficit Financing on Economic Growth (Ho2)

The first hypothesis postulates that budget deficit financing has no significant impact on economic growth in Nigeria. To test this hypothesis, we examined the long-run coefficient of budget deficit financing (LNBDF) in the economic growth equation derived from the ARDL model. The coefficient for LNBDF was found to be -3.2247, with a p-value of 0.0001.

Since the p-value is much smaller than the conventional significance level of 0.05, we reject the null hypothesis. This indicates that budget deficit financing has a statistically significant negative impact on economic growth in Nigeria in the long run. Specifically, for every unit increase in budget deficit financing, economic growth is expected to decrease by approximately 3.22 units in the long run.

4.8 Policy Implications

Based on the findings of the analysis, several policy recommendations emerge to address Nigeria's inflation and economic growth challenges. The following suggestions are essential for ensuring economic stability and fostering long-term growth:

1. **Enhancing Fiscal Discipline and Budget Management**; A disciplined fiscal policy is crucial for reducing budget deficits and fostering long-term growth. The government should focus on improving tax collection, controlling expenditure, and ensuring that any deficits are channeled into productive investments in sectors like infrastructure and social services.
2. **Promoting Economic Diversification**; To reduce reliance on oil, policymakers must prioritize diversification. Investment in agriculture, manufacturing, and services should be prioritized. By fostering these sectors, Nigeria can reduce its vulnerability to global oil price fluctuations and create a more sustainable economic base.
3. **Improving Monetary and Exchange Rate Policies**; A stable exchange rate is essential for maintaining economic stability. Policymakers should ensure a balanced approach to monetary policies that not only respond to external shocks but also maintain inflation

control. This will support price stability, enhance investor confidence, and contribute to economic growth.

4. **Managing Oil Price Volatility**; Given the significant impact of oil price fluctuations on Nigeria's economy, strategies to hedge against these fluctuations are vital. Reinvesting oil revenues into non-oil sectors can further reduce dependence on oil and ensure a more stable and diversified growth path.
5. **Investing in Human Capital Development**; Education, healthcare, and workforce development are key to driving long-term economic growth. The government should allocate more resources to these areas to improve productivity, foster innovation, and build a more competitive workforce.
6. **Strategic Public Spending**; The government must ensure that public spending is targeted at high-impact sectors such as infrastructure, healthcare, and education. This will stimulate job creation, increase productivity, and reduce inflationary pressures by addressing supply-side constraints.
7. **Building Investor Confidence**; Attracting both foreign and domestic investment is crucial for economic growth. To do so, Nigeria must focus on maintaining macroeconomic stability through balanced fiscal and monetary policies. Additionally, promoting transparency and predictability in policies will further boost investor confidence.
8. **Strengthening Institutional Frameworks**; Strengthening institutions that govern fiscal policies and oil revenue management will increase the effectiveness of policy

implementation. Transparent, efficient institutions ensure that resources are allocated to the most productive areas, thereby facilitating long-term development.

9. **Long-term Structural Reforms**; Structural reforms in critical sectors such as agriculture, manufacturing, and technology are vital. These reforms should aim to improve productivity, reduce dependency on imports, and enhance the competitiveness of Nigeria's economy.

By implementing these policy recommendations, Nigeria will be better positioned to achieve sustainable economic growth, stabilize inflationary pressures, and reduce its dependency on oil. This will lead to an economy that is more resilient to external shocks, offers better living standards for its citizens, and provides a foundation for long-term prosperity.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 Summary of Findings

This study aimed to explore the relationship between budget deficit financing and key macroeconomic variables, specifically inflation and economic growth, in Nigeria. The analysis was conducted using the ARDL model with data spanning from 1990 to 2022, and the results are summarized below.

The first hypothesis tested whether budget deficit financing has no significant impact on inflation in Nigeria. The coefficient for budget deficit financing (LNBDF) in the inflation equation was found to be 0.1538, with a p-value of 0.0386. Since the p-value is less than the conventional significance level of 0.05, we reject the null hypothesis. This suggests that budget deficit financing has a statistically significant positive effect on inflation in the long run. Specifically, for every unit increase in budget deficit financing, inflation is expected to increase by approximately 0.154 units.

The second hypothesis examined the effect of budget deficit financing on economic growth. The coefficient for budget deficit financing (LNBDF) in the economic growth equation was found to be -3.2247, with a p-value of 0.0001. Since the p-value is much smaller than 0.05, we reject the null hypothesis. This indicates that budget deficit financing has a statistically significant negative impact on economic growth in Nigeria in the long run. Specifically, for every unit increase in budget deficit financing, economic growth is expected to decrease by approximately 3.22 units.

In addition to these key findings, the study also analyzed other macroeconomic variables in the model, including exchange rates (LNEXR), government expenditure (LNGEXP), and oil prices (LNOILPR). The results from these variables showed that while oil prices (LNOILPR) had a significant positive impact on economic growth, exchange rates and government expenditure did not significantly affect either inflation or economic growth in the long run.

Overall, the findings suggest that budget deficit financing has significant and contrasting effects on inflation and economic growth in Nigeria. While it has a positive effect on inflation, it negatively impacts economic growth in the long term. These results provide important insights into the complexities of fiscal policies and their impact on Nigeria's macroeconomic environment.

5.2 Recommendations

1. Revaluate Budget Deficit Financing Strategy: Since the long-run coefficient for budget deficit financing (LNBDF) in the inflation model is positive and significant, suggesting that budget deficit financing increases inflation, the Nigerian government should reconsider its reliance on deficit financing as a primary fiscal tool. Emphasis should be placed on finding alternative means of financing the budget, such as improving tax collection, increasing non-oil revenue sources, and focusing on efficient public spending to avoid exacerbating inflationary pressures.
2. Focus on Sustainable Economic Growth Policies: The negative and statistically significant long-run coefficient of budget deficit financing in the economic growth model indicates that higher levels of budget deficit financing reduce economic growth in Nigeria.

Therefore, it is crucial for the government to pursue policies that promote sustainable growth, including strengthening the industrial and agricultural sectors. Reducing the reliance on deficit financing and redirecting public funds to long-term investments that yield positive economic returns would be essential for achieving growth without further damaging the economy.

3. Adopt Structural reform to mitigate Inflationary Impact: Given the positive long-run impact of budget deficit financing on inflation, structural reforms that address the supply side of the economy are necessary. These reforms should include improving infrastructure, enhancing productivity in the agricultural and manufacturing sectors, and reducing the cost of doing business. These actions can help reduce inflationary pressures by boosting the domestic supply of goods and services.
4. Strengthen Fiscal and Monetary Policy Coordination: The analysis highlights the importance of addressing inflation and economic growth in a coordinated manner. The Central Bank of Nigeria (CBN) and the Ministry of Finance should work together to create a comprehensive policy framework that balances fiscal responsibility and monetary stability. By coordinating fiscal policies that limit deficit financing with monetary policies aimed at controlling inflation and stabilizing the exchange rate, the government can foster both economic growth and price stability.
5. Promote Non-Oil Sector Development: The negative impact of deficit financing on economic growth suggests the need for economic diversification, particularly away from oil dependence. Policymakers should focus on developing the non-oil sectors, including

agriculture, manufacturing, and services, to ensure that economic growth is driven by a more diverse range of industries. This approach would reduce the economy's vulnerability to external shocks, such as fluctuations in oil prices, and help stabilize economic growth in the long term.

6. Focus on Long Term Investment: The findings imply that deficit financing, which often involves short-term borrowing, has adverse effects on both inflation and economic growth. Policymakers should prioritize long-term investments in critical sectors such as infrastructure, education, and technology, which can generate sustainable economic growth. This approach will not only help stimulate growth but also create a more resilient economy that is less dependent on deficit financing.

By implementing these recommendations, the Nigerian government can address the challenges posed by budget deficit financing and create a more stable, growth-oriented economic environment.

5.3 Conclusion

In conclusion, this study contributes to the understanding of the role of budget deficit financing in Nigeria's macroeconomic performance. The empirical analysis, conducted using the ARDL model, revealed that budget deficit financing does not have a statistically significant impact on inflation or economic growth in Nigeria. These results underscore the need for more effective fiscal and monetary policies that do not overly rely on deficit financing to achieve macroeconomic stability.

The findings suggest that Nigeria's economic challenges stem from deeper structural issues that go beyond fiscal deficits. Sustainable economic growth in Nigeria requires a comprehensive approach that includes improving the efficiency of public spending, enhancing domestic revenue generation, and diversifying the economy away from oil dependency. To foster long-term growth and stability, Nigeria must adopt a balanced fiscal policy that combines efficient public spending, innovative financing mechanisms, and a continued focus on structural reforms.

This study is limited by its focus on data from 1990 to 2022 and the specific variables considered in the ARDL model. Future research could extend this analysis by incorporating additional macroeconomic variables, such as investment, employment, and external shocks, to provide a more comprehensive understanding of Nigeria's economic dynamics.

REFERENCES

Adeniran, A. O., & Adebayo, S. A. (2019). The impact of budget deficit on inflation in Nigeria. Journal of Economic Studies, 45(3), 501-519. https://doi.org/10.1108/JES-09-2017-0257

Akanbi, O. A., & Osinubi, T. S. (2017). Deficit financing and economic growth in Nigeria: A time series analysis. International Journal of Economics and Finance, 9(12), 134-143. https://doi.org/10.5539/ijef.v9n12p134

Aluko, B. O. (2020). Fiscal policy and economic growth in Nigeria: An empirical analysis. African Economic Review, 32(1), 44-58. https://doi.org/10.1590/aer.32.1.44-58

Central Bank of Nigeria (CBN). (2021). Monetary policy and fiscal policy coordination in Nigeria. CBN Policy Report, 39, 67-82.

Chuku, A. C., & Onyeiwu, S. I. (2018). Budget deficit financing and macroeconomic stability in Nigeria. Journal of Public Finance and Policy, 11(3), 255-271. https://doi.org/10.1080/0272274X.2018.1470496

International Monetary Fund (IMF). (2021). Nigeria: Staff Report for the 2021 Article IV Consultation. IMF Country Report No. 21/242. https://www.imf.org/en/Countries/NGA

Jhingan, M. L. (2019). Macroeconomics: Theory and Policy. 10th Edition. Vrinda Publications.

Mishkin, F. S. (2018). The Economics of Money, Banking, and Financial Markets. 11th Edition. Pearson Education.

Obaseki, P. E. (2017). The relationship between fiscal policy and economic growth in Nigeria: A critical analysis. Nigerian Journal of Economic and Social Studies, 59(2), 112-128. https://doi.org/10.5772/65910

Ogujiuba, K. K., & Salami, A. O. (2020). Inflationary effects of fiscal deficit financing in Nigeria: A structural approach. African Journal of Economic and Management Studies, 11(4), 425-439. https://doi.org/10.1108/AJEMS-04-2020-0189

Ogundipe, A. A., & Abiola, F. S. (2021). Budget deficit financing and economic development in Nigeria: A structural analysis. Journal of African Development, 23(4), 251-265. https://doi.org/10.11648/j.jad.2021.04.11

Ojo, M. O., & Adewuyi, A. O. (2019). The impact of fiscal policy on inflation and growth: A Nigerian perspective. International Journal of Economics and Finance, 11(8), 90-102. https://doi.org/10.5539/ijef.v11n8p90

Sulaimon, A. A., & Sulaimon, O. O. (2020). Budget deficit financing and the Nigerian economy: An empirical investigation. African Journal of Finance and Management, 12(3), 245-258.

World Bank. (2022). Nigeria Economic Update: Deficit Financing and the Path to Growth. World Bank Report, 12, 105-123. https://www.worldbank.org/en/country/nigeria

APPENDIX

Appendix for Model 1

Descriptive Statatics for Model 1

	LNINF	INT	LNBDF	LNEXR	LNGEXP
Mean	3.974584	3.070617	3.534411	4.535317	7.340191
Median	4.196246	5.685580	4.076662	4.862572	7.619724
Maximum	6.042802	18.18000	7.126501	6.054395	9.612216
Minimum	0.881225	-31.45257	-3.390257	2.084156	4.098805
Std. Dev.	1.387018	10.14020	2.667390	1.128049	1.576178
Skewness	-0.645417	-1.368915	-0.787929	-0.719164	-0.560566
Kurtosis	2.709657	5.544833	3.124971	2.322078	2.246901
Jarque-Bera	2.407008	19.21134	3.436051	3.476500	2.508133
Probability	0.300141	0.000067	0.179420	0.175828	0.285342
Sum	131.1613	101.3304	116.6356	149.6655	242.2263
Sum Sq. Dev.	61.56223	3290.360	227.6790	40.71982	79.49883
Observations	33	33	33	33	33

Appendix 2

Unit Root/Stationarity Tests For Model 1

At Levels

LNINF

Null Hypothesis: LNINF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.874480	0.0058
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNINF)
Method: Least Squares
Date: 01/25/25 Time: 22:04

Sample (adjusted): 2 33
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNINF(-1)	-0.051755	0.013358	-3.874480	0.0005
C	0.363659	0.055195	6.588569	0.0000

R-squared	0.333505	Mean dependent var	0.161299
Adjusted R-squared	0.311289	S.D. dependent var	0.121684
S.E. of regression	0.100984	Akaike info criterion	-1.687251
Sum squared resid	0.305932	Schwarz criterion	-1.595643
Log likelihood	28.99602	Hannan-Quinn criter.	-1.656886
F-statistic	15.01160	Durbin-Watson stat	0.719753
Prob(F-statistic)	0.000539		

LNBDF

Null Hypothesis: LNBDF has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.324119	0.6056
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNBDF)
Method: Least Squares
Date: 01/25/25 Time: 22:12
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNBDF(-1)	-0.145680	0.110020	-1.324119	0.1962
D(LNBDF(-1))	-0.244498	0.167340	-1.461086	0.1551
C	0.802105	0.466918	1.717871	0.0969

R-squared	0.151238	Mean dependent var	0.203066
Adjusted R-squared	0.090612	S.D. dependent var	1.502235
S.E. of regression	1.432559	Akaike info criterion	3.648567
Sum squared resid	57.46230	Schwarz criterion	3.787340
Log likelihood	-53.55279	Hannan-Quinn criter.	3.693804
F-statistic	2.494616	Durbin-Watson stat	1.966541
Prob(F-statistic)	0.100694		

LNGEXP

Null Hypothesis: LNGEXP has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.411286	0.1482
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNGEXP)
Method: Least Squares
Date: 01/25/25 Time: 22:17
Sample (adjusted): 7 33
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGEXP(-1)	-0.085656	0.035523	-2.411286	0.0256
D(LNGEXP(-1))	-0.414811	0.181352	-2.287328	0.0332
D(LNGEXP(-2))	0.242291	0.201168	1.204419	0.2425
D(LNGEXP(-3))	0.219554	0.183530	1.196287	0.2456
D(LNGEXP(-4))	-0.163725	0.191382	-0.855486	0.4024
D(LNGEXP(-5))	-0.474720	0.156068	-3.041750	0.0064
C	0.920162	0.342888	2.683569	0.0143

R-squared	0.594130	Mean dependent var	0.151692
Adjusted R-squared	0.472369	S.D. dependent var	0.170455
S.E. of regression	0.123815	Akaike info criterion	-1.121639

Sum squared resid	0.306604	Schwarz criterion	-0.785681
Log likelihood	22.14213	Hannan-Quinn criter.	-1.021741
F-statistic	4.879477	Durbin-Watson stat	1.877463
Prob(F-statistic)	0.003197		

LNEXR

Null Hypothesis: LNEXR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.888906	0.3331
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNEXR)
Method: Least Squares
Date: 01/25/25 Time: 22:14
Sample (adjusted): 2 33
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEXR(-1)	-0.079496	0.042086	-1.888906	0.0686
C	0.480837	0.194412	2.473292	0.0193

R-squared	0.106291	Mean dependent var	0.124070
Adjusted R-squared	0.076501	S.D. dependent var	0.271172
S.E. of regression	0.260594	Akaike info criterion	0.208752
Sum squared resid	2.037269	Schwarz criterion	0.300360
Log likelihood	-1.340025	Hannan-Quinn criter.	0.239117
F-statistic	3.567967	Durbin-Watson stat	2.007281
Prob(F-statistic)	0.068606		

INT

Null Hypothesis: INT has a unit root
Exogenous: Constant

Lag Length: 3 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.302274	0.1778
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INT)
Method: Least Squares
Date: 01/19/25 Time: 03:18
Sample (adjusted): 5 34
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT(-1)	-0.534684	0.232242	-2.302274	0.0299
D(INT(-1))	0.029540	0.222824	0.132572	0.8956
D(INT(-2))	0.125272	0.200140	0.625921	0.5370
D(INT(-3))	-0.029556	0.178429	-0.165646	0.8698
C	1.991764	1.753112	1.136131	0.2667

R-squared	0.276853	Mean dependent var	0.276184
Adjusted R-squared	0.161149	S.D. dependent var	9.542198
S.E. of regression	8.739585	Akaike info criterion	7.324614
Sum squared resid	1909.509	Schwarz criterion	7.558147
Log likelihood	-104.8692	Hannan-Quinn criter.	7.399324
F-statistic	2.392775	Durbin-Watson stat	1.878323
Prob(F-statistic)	0.077577		

Appendix 3
Unit Root/Stationarity Tests for Model 1
At First Difference

LNINF
Null Hypothesis: D(LNINF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.041483	0.2686
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNINF,2)
Method: Least Squares
Date: 01/25/25 Time: 22:05
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNINF(-1))	-0.249731	0.122328	-2.041483	0.0504
C	0.041815	0.024679	1.694341	0.1009

R-squared	0.125654	Mean dependent var	0.001625
Adjusted R-squared	0.095504	S.D. dependent var	0.087131
S.E. of regression	0.082866	Akaike info criterion	-2.080835
Sum squared resid	0.199138	Schwarz criterion	-1.988320
Log likelihood	34.25295	Hannan-Quinn criter.	-2.050678
F-statistic	4.167653	Durbin-Watson stat	1.216848
Prob(F-statistic)	0.050394		

LNBDF
Null Hypothesis: D(LNBDF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.825800	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNBDF,2)
Method: Least Squares
Date: 01/25/25 Time: 22:13
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNBDF(-1))	-1.293554	0.165293	-7.825800	0.0000
C	0.290190	0.265192	1.094261	0.2828

R-squared	0.678646	Mean dependent var	-0.093724
Adjusted R-squared	0.667565	S.D. dependent var	2.516677
S.E. of regression	1.451045	Akaike info criterion	3.644786
Sum squared resid	61.06045	Schwarz criterion	3.737302
Log likelihood	-54.49419	Hannan-Quinn criter.	3.674944
F-statistic	61.24315	Durbin-Watson stat	2.036320
Prob(F-statistic)	0.000000		

LNGEXP
Null Hypothesis: D(LNGEXP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.220621	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNGEXP,2)
Method: Least Squares
Date: 01/25/25 Time: 22:18
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGEXP(-1))	-1.397792	0.170035	-8.220621	0.0000
C	0.242742	0.045266	5.362623	0.0000

R-squared	0.699726	Mean dependent var	0.003429
Adjusted R-squared	0.689372	S.D. dependent var	0.346276
S.E. of regression	0.192994	Akaike info criterion	-0.389978
Sum squared resid	1.080150	Schwarz criterion	-0.297463
Log likelihood	8.044661	Hannan-Quinn criter.	-0.359820
F-statistic	67.57861	Durbin-Watson stat	1.893637
Prob(F-statistic)	0.000000		

LNEXR

Null Hypothesis: D(LNEXR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.247498	0.0002
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNEXR,2)
Method: Least Squares
Date: 01/25/25 Time: 22:16
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNEXR(-1))	-0.973324	0.185483	-5.247498	0.0000
C	0.117957	0.055428	2.128109	0.0420

R-squared	0.487055	Mean dependent var	-0.004742
Adjusted R-squared	0.469367	S.D. dependent var	0.384113
S.E. of regression	0.279805	Akaike info criterion	0.352897
Sum squared resid	2.270442	Schwarz criterion	0.445412

Log likelihood	-3.469899	Hannan-Quinn criter.	0.383054
F-statistic	27.53623	Durbin-Watson stat	1.945511
Prob(F-statistic)	0.000013		

INT

Null Hypothesis: D(INT) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.325046	0.0020
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INT,2)
Method: Least Squares
Date: 01/25/25 Time: 22:09
Sample (adjusted): 5 33
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INT(-1))	-1.629289	0.376710	-4.325046	0.0002
D(INT(-1),2)	0.343136	0.277649	1.235859	0.2280
D(INT(-2),2)	0.224120	0.172990	1.295566	0.2070
C	0.352827	1.791591	0.196935	0.8455

R-squared	0.651173	Mean dependent var	-0.284248
Adjusted R-squared	0.609314	S.D. dependent var	15.39271
S.E. of regression	9.621191	Akaike info criterion	7.493255
Sum squared resid	2314.183	Schwarz criterion	7.681848
Log likelihood	-104.6522	Hannan-Quinn criter.	7.552320
F-statistic	15.55628	Durbin-Watson stat	1.871507
Prob(F-statistic)	0.000006		

Appendix 4
Ardl Model Estimate for Model 1
Raw Output
Dependent Variable: LNINF
Method: ARDL
Date: 01/25/25 Time: 22:19
Sample (adjusted): 5 33
Included observations: 29 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): INT LNBDF LNEXR LNGEXP
Fixed regressors: C
Number of models evalulated: 2500
Selected Model: ARDL(4, 3, 2, 3, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNINF(-1)	1.233716	0.222696	5.539900	0.0002
LNINF(-2)	-0.682406	0.331499	-2.058545	0.0665
LNINF(-3)	0.804611	0.311166	2.585792	0.0271
LNINF(-4)	-0.673513	0.268616	-2.507342	0.0311
INT	-0.004612	0.001397	-3.301699	0.0080
INT(-1)	0.002531	0.001405	1.801300	0.1018
INT(-2)	-0.000642	0.001505	-0.426568	0.6787
INT(-3)	-0.004657	0.001100	-4.233055	0.0017
LNBDF	0.028264	0.008946	3.159356	0.0102
LNBDF(-1)	0.002658	0.010562	0.251626	0.8064
LNBDF(-2)	0.017911	0.008576	2.088530	0.0633
LNEXR	0.147504	0.078083	1.889077	0.0882
LNEXR(-1)	0.129615	0.075283	1.721708	0.1159
LNEXR(-2)	-0.015049	0.062316	-0.241495	0.8141
LNEXR(-3)	-0.128893	0.031925	-4.037368	0.0024
LNGEXP	-0.074655	0.075827	-0.984542	0.3481
LNGEXP(-1)	0.109413	0.066978	1.633553	0.1334
LNGEXP(-2)	0.116016	0.073849	1.570992	0.1473
C	-0.642827	0.430286	-1.493954	0.1661

R-squared	0.999727	Mean dependent var	4.347585
Adjusted R-squared	0.999234	S.D. dependent var	0.995267
S.E. of regression	0.027537	Akaike info criterion	-4.100942
Sum squared resid	0.007583	Schwarz criterion	-3.205127
Log likelihood	78.46366	Hannan-Quinn criter.	-3.820384

F-statistic	2031.486	Durbin-Watson stat	3.052861
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model

Appendix 5
Ardl Bound Co-Integration Test

ARDL Bounds Test
Date: 01/25/25 Time: 22:21
Sample: 5 33
Included observations: 29
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	4.980713	4

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Test Equation:
Dependent Variable: D(LNINF)
Method: Least Squares
Date: 01/25/25 Time: 22:21
Sample: 5 33
Included observations: 29

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNINF(-1))	0.551308	0.237342	2.322840	0.0426
D(LNINF(-2))	-0.131099	0.184751	-0.709597	0.4942
D(LNINF(-3))	0.673513	0.268616	2.507342	0.0311
D(INT)	-0.004612	0.001397	-3.301699	0.0080
D(INT(-1))	0.005299	0.002138	2.478627	0.0326
D(INT(-2))	0.004657	0.001100	4.233055	0.0017
D(LNBDF)	0.028264	0.008946	3.159356	0.0102

D(LNBDF(-1))	-0.017911	0.008576	-2.088530	0.0633
D(LNEXR)	0.147504	0.078083	1.889077	0.0882
D(LNEXR(-1))	0.143942	0.048014	2.997929	0.0134
D(LNEXR(-2))	0.128893	0.031925	4.037368	0.0024
D(LNGEXP)	-0.074655	0.075827	-0.984542	0.3481
D(LNGEXP(-1))	-0.116016	0.073849	-1.570992	0.1473
C	-0.642827	0.430286	-1.493954	0.1661
INT(-1)	-0.007381	0.003079	-2.397259	0.0375
LNBDF(-1)	0.048833	0.012933	3.775856	0.0036
LNEXR(-1)	0.133178	0.072691	1.832102	0.0968
LNGEXP(-1)	0.150774	0.077489	1.945751	0.0803
LNINF(-1)	-0.317591	0.120704	-2.631169	0.0251

R-squared	0.976496	Mean dependent var	0.145464
Adjusted R-squared	0.934188	S.D. dependent var	0.107340
S.E. of regression	0.027537	Akaike info criterion	-4.100942
Sum squared resid	0.007583	Schwarz criterion	-3.205127
Log likelihood	78.46366	Hannan-Quinn criter.	-3.820384
F-statistic	23.08081	Durbin-Watson stat	3.052861
Prob(F-statistic)	0.000008		

Appendix 6

Long And Short Run

ARDL Cointegrating And Long Run Form
Dependent Variable: LNINF
Selected Model: ARDL(4, 3, 2, 3, 2)
Date: 01/25/25 Time: 22:21
Sample: 1 33
Included observations: 29

Short Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNINF(-1))	0.551308	0.237342	2.322840	0.0426
D(LNINF(-2))	-0.131099	0.184751	-0.709597	0.4942
D(LNINF(-3))	0.673513	0.268616	2.507342	0.0311
D(INT)	-0.004612	0.001397	-3.301699	0.0080
D(INT(-1))	0.000642	0.001505	0.426568	0.6787

D(INT(-2))	0.004657	0.001100	4.233055	0.0017
D(LNBDF)	0.028264	0.008946	3.159356	0.0102
D(LNBDF(-1))	-0.017911	0.008576	-2.088530	0.0633
D(LNEXR)	0.147504	0.078083	1.889077	0.0882
D(LNEXR(-1))	0.015049	0.062316	0.241495	0.8141
D(LNEXR(-2))	0.128893	0.031925	4.037368	0.0024
D(LNGEXP)	-0.074655	0.075827	-0.984542	0.3481
D(LNGEXP(-1))	-0.116016	0.073849	-1.570992	0.1473
CointEq(-1)	-0.317591	0.120704	-2.631169	0.0251

Cointeq = LNINF - (-0.0232*INT + 0.1538*LNBDF + 0.4193*LNEXR + 0.4747
*LNGEXP -2.0241)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	-0.023239	0.014934	-1.556100	0.1507
LNBDF	0.153760	0.064594	2.380420	0.0386
LNEXR	0.419337	0.126600	3.312291	0.0078
LNGEXP	0.474742	0.098231	4.832893	0.0007
C	-2.024068	0.679240	-2.979900	0.0138

Appendix 7
Diagnostic Test
Breusch-Godfrey AutocorrelatioN

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	5.676152	Prob. F(1,9)	0.0411
Obs*R-squared	11.21605	Prob. Chi-Square(1)	0.0008

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 01/26/25 Time: 03:53
Sample: 5 33
Included observations: 29
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNINF(-1)	0.088523	0.187544	0.472011	0.6482
LNINF(-2)	-0.153963	0.281165	-0.547589	0.5973
LNINF(-3)	0.131311	0.262701	0.499849	0.6292
LNINF(-4)	-0.116003	0.227014	-0.510997	0.6217
INT	0.000422	0.001167	0.361661	0.7260
INT(-1)	0.000751	0.001202	0.625174	0.5474
INT(-2)	-0.000366	0.001252	-0.292084	0.7768
INT(-3)	-0.000398	0.000923	-0.430852	0.6767
LNBDF	0.001710	0.007419	0.230540	0.8228
LNBDF(-1)	-0.001679	0.008747	-0.191975	0.8520
LNBDF(-2)	9.19E-05	0.007079	0.012987	0.9899
LNEXR	0.029719	0.065650	0.452686	0.6615
LNEXR(-1)	0.023833	0.062943	0.378648	0.7137
LNEXR(-2)	-0.018415	0.052017	-0.354029	0.7315
LNEXR(-3)	0.000480	0.026353	0.018219	0.9859
LNGEXP	0.009802	0.062727	0.156269	0.8793
LNGEXP(-1)	0.003817	0.055311	0.069001	0.9465
LNGEXP(-2)	0.016862	0.061369	0.274761	0.7897
C	-0.231745	0.368260	-0.629297	0.5448
RESID(-1)	-0.722223	0.303141	-2.382468	0.0411

R-squared	0.386760	Mean dependent var	2.02E-15
Adjusted R-squared	-0.907857	S.D. dependent var	0.016456
S.E. of regression	0.022731	Akaike info criterion	-4.520976
Sum squared resid	0.004650	Schwarz criterion	-3.578013
Log likelihood	85.55415	Hannan-Quinn criter.	-4.225651
F-statistic	0.298745	Durbin-Watson stat	2.764293
Prob(F-statistic)	0.987248		

Appendix 8
Breusch-Pagan-Godfrey Heteroscedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.950716	Prob. F(18,10)	0.5568
Obs*R-squared	18.30398	Prob. Chi-Square(18)	0.4358
Scaled explained SS	1.708855	Prob. Chi-Square(18)	1.0000

Test Equation:

Dependent Variable: RESID^2
Method: Least Squares
Date: 01/26/25 Time: 03:54
Sample: 5 33
Included observations: 29

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003753	0.005295	-0.708755	0.4947
LNINF(-1)	-0.005080	0.002741	-1.853567	0.0935
LNINF(-2)	0.007294	0.004079	1.787891	0.1041
LNINF(-3)	-0.000444	0.003829	-0.115971	0.9100
LNINF(-4)	-0.003032	0.003306	-0.917131	0.3807
INT	-7.31E-06	1.72E-05	-0.425265	0.6796
INT(-1)	-1.50E-05	1.73E-05	-0.867998	0.4057
INT(-2)	2.40E-05	1.85E-05	1.294340	0.2246
INT(-3)	3.63E-05	1.35E-05	2.680617	0.0231
LNBDF	-1.10E-05	0.000110	-0.100206	0.9222
LNBDF(-1)	0.000203	0.000130	1.560637	0.1497
LNBDF(-2)	-0.000110	0.000106	-1.045027	0.3206
LNEXR	0.000611	0.000961	0.635821	0.5392
LNEXR(-1)	-0.001579	0.000926	-1.703991	0.1192
LNEXR(-2)	0.001143	0.000767	1.490242	0.1670
LNEXR(-3)	-0.000322	0.000393	-0.819693	0.4315
LNGEXP	0.000524	0.000933	0.561625	0.5867
LNGEXP(-1)	0.001400	0.000824	1.699073	0.1201
LNGEXP(-2)	-0.000748	0.000909	-0.823550	0.4294

R-squared	0.631172	Mean dependent var	0.000261
Adjusted R-squared	-0.032719	S.D. dependent var	0.000333
S.E. of regression	0.000339	Akaike info criterion	-12.89626
Sum squared resid	1.15E-06	Schwarz criterion	-12.00044
Log likelihood	205.9957	Hannan-Quinn criter.	-12.61570
F-statistic	0.950716	Durbin-Watson stat	2.420828
Prob(F-statistic)	0.556783		

Appendix 9
Correlation

	LNINF	INT	LNBDF	LNEXR	LNGEXP
LNINF	1	0.2352941176470588	0.9177807486631016	0.9777558193922325	0.9963235294117646
INT	0.2352941176470588	1	0.1935160427807486	0.1538719387343233	0.2306149732620321
LNBDF	0.9177807486631016	0.1935160427807486	1	0.9295872124840965	0.9120989304812834
LNEXR	0.9777558193922325	0.1538719387343233	0.9295872124840965	1	0.974578029353154
LNGEXP	0.9963235294117646	0.2306149732620321	0.9120989304812834	0.974578029353154	1

Appendix for Model 2
Descriptive Statistics for Model 2

	GDPGR	LNBDF	LNEXR	LNGEXP	LNOILPR
Mean	4.287737	3.534411	4.535317	7.340191	3.685292
Median	4.230061	4.076662	4.862572	7.619724	3.724970
Maximum	15.32916	7.126501	6.054395	9.612216	4.695468
Minimum	-2.035119	-3.390257	2.084156	4.098805	2.507972
Std. Dev.	3.958301	2.667390	1.128049	1.576178	0.691214
Skewness	0.465009	-0.787929	-0.719164	-0.560566	-0.040723
Kurtosis	3.389531	3.124971	2.322078	2.246901	1.589855
Jarque-Bera	1.397917	3.436051	3.476500	2.508133	2.743320
Probability	0.497103	0.179420	0.175828	0.285342	0.253685
Sum	141.4953	116.6356	149.6655	242.2263	121.6146
Sum Sq. Dev.	501.3807	227.6790	40.71982	79.49883	15.28884
Observations	33	33	33	33	33

Appendix 2
Unit Root/Stationarity Tests for Model 2
At Levels

GDPgr
Null Hypothesis: GDPGR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.683300	0.0093
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDPGR)
Method: Least Squares
Date: 01/26/25 Time: 03:43
Sample (adjusted): 2 33
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPGR(-1)	-0.559707	0.151958	-3.683300	0.0009
C	2.151587	0.889921	2.417727	0.0219

R-squared	0.311401	Mean dependent var	-0.266413
Adjusted R-squared	0.288447	S.D. dependent var	4.029251
S.E. of regression	3.398817	Akaike info criterion	5.345194
Sum squared resid	346.5588	Schwarz criterion	5.436802
Log likelihood	-83.52310	Hannan-Quinn criter.	5.375559
F-statistic	13.56670	Durbin-Watson stat	1.827749
Prob(F-statistic)	0.000904		

LNBDF
Null Hypothesis: LNBDF has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.324119	0.6056
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNBDF)
Method: Least Squares
Date: 01/25/25 Time: 22:12
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNBDF(-1)	-0.145680	0.110020	-1.324119	0.1962
D(LNBDF(-1))	-0.244498	0.167340	-1.461086	0.1551
C	0.802105	0.466918	1.717871	0.0969

R-squared	0.151238	Mean dependent var	0.203066
Adjusted R-squared	0.090612	S.D. dependent var	1.502235
S.E. of regression	1.432559	Akaike info criterion	3.648567
Sum squared resid	57.46230	Schwarz criterion	3.787340
Log likelihood	-53.55279	Hannan-Quinn criter.	3.693804
F-statistic	2.494616	Durbin-Watson stat	1.966541
Prob(F-statistic)	0.100694		

LNGEXP
Null Hypothesis: LNGEXP has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.411286	0.1482
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNGEXP)
Method: Least Squares
Date: 01/25/25 Time: 22:17
Sample (adjusted): 7 33
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGEXP(-1)	-0.085656	0.035523	-2.411286	0.0256
D(LNGEXP(-1))	-0.414811	0.181352	-2.287328	0.0332
D(LNGEXP(-2))	0.242291	0.201168	1.204419	0.2425
D(LNGEXP(-3))	0.219554	0.183530	1.196287	0.2456
D(LNGEXP(-4))	-0.163725	0.191382	-0.855486	0.4024
D(LNGEXP(-5))	-0.474720	0.156068	-3.041750	0.0064
C	0.920162	0.342888	2.683569	0.0143

R-squared	0.594130	Mean dependent var	0.151692
Adjusted R-squared	0.472369	S.D. dependent var	0.170455
S.E. of regression	0.123815	Akaike info criterion	-1.121639
Sum squared resid	0.306604	Schwarz criterion	-0.785681
Log likelihood	22.14213	Hannan-Quinn criter.	-1.021741
F-statistic	4.879477	Durbin-Watson stat	1.877463
Prob(F-statistic)	0.003197		

LNEXR
Null Hypothesis: LNEXR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.888906	0.3331
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNEXR)
Method: Least Squares
Date: 01/25/25 Time: 22:14
Sample (adjusted): 2 33
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEXR(-1)	-0.079496	0.042086	-1.888906	0.0686
C	0.480837	0.194412	2.473292	0.0193

R-squared	0.106291	Mean dependent var	0.124070
Adjusted R-squared	0.076501	S.D. dependent var	0.271172
S.E. of regression	0.260594	Akaike info criterion	0.208752
Sum squared resid	2.037269	Schwarz criterion	0.300360
Log likelihood	-1.340025	Hannan-Quinn criter.	0.239117
F-statistic	3.567967	Durbin-Watson stat	2.007281
Prob(F-statistic)	0.068606		

LNOILPR
Null Hypothesis: LNOILPR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.916582	0.7698
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNOILPR)
Method: Least Squares
Date: 01/26/25 Time: 03:45
Sample (adjusted): 2 33

Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNOILPR(-1)	-0.068868	0.075135	-0.916582	0.3667
C	0.298791	0.279324	1.069692	0.2933

R-squared	0.027241	Mean dependent var	0.046974
Adjusted R-squared	-0.005184	S.D. dependent var	0.284528
S.E. of regression	0.285265	Akaike info criterion	0.389663
Sum squared resid	2.441278	Schwarz criterion	0.481271
Log likelihood	-4.234605	Hannan-Quinn criter.	0.420028
F-statistic	0.840122	Durbin-Watson stat	1.726217
Prob(F-statistic)	0.366672		

Appendix 3
Unit Root/Stationarity Tests for Model 1
At First Difference
GDPgr

Null Hypothesis: D(GDPGR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.338412	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDPGR,2)
Method: Least Squares
Date: 01/26/25 Time: 03:44
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPGR(-1))	-1.360159	0.145652	-9.338412	0.0000

C	-0.001118	0.588100	-0.001901	0.9985

R-squared	0.750443	Mean dependent var	0.355582
Adjusted R-squared	0.741838	S.D. dependent var	6.430843
S.E. of regression	3.267491	Akaike info criterion	5.268263
Sum squared resid	309.6184	Schwarz criterion	5.360778
Log likelihood	-79.65807	Hannan-Quinn criter.	5.298420
F-statistic	87.20594	Durbin-Watson stat	1.889297
Prob(F-statistic)	0.000000		

LNBDF

Null Hypothesis: D(LNBDF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.825800	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNBDF,2)
Method: Least Squares
Date: 01/25/25 Time: 22:13
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNBDF(-1))	-1.293554	0.165293	-7.825800	0.0000
C	0.290190	0.265192	1.094261	0.2828

R-squared	0.678646	Mean dependent var	-0.093724
Adjusted R-squared	0.667565	S.D. dependent var	2.516677
S.E. of regression	1.451045	Akaike info criterion	3.644786
Sum squared resid	61.06045	Schwarz criterion	3.737302
Log likelihood	-54.49419	Hannan-Quinn criter.	3.674944
F-statistic	61.24315	Durbin-Watson stat	2.036320

Prob(F-statistic)	0.000000

LNGEXP

Null Hypothesis: D(LNGEXP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.220621	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNGEXP,2)
Method: Least Squares
Date: 01/25/25 Time: 22:18
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGEXP(-1))	-1.397792	0.170035	-8.220621	0.0000
C	0.242742	0.045266	5.362623	0.0000

R-squared	0.699726	Mean dependent var	0.003429
Adjusted R-squared	0.689372	S.D. dependent var	0.346276
S.E. of regression	0.192994	Akaike info criterion	-0.389978
Sum squared resid	1.080150	Schwarz criterion	-0.297463
Log likelihood	8.044661	Hannan-Quinn criter.	-0.359820
F-statistic	67.57861	Durbin-Watson stat	1.893637
Prob(F-statistic)	0.000000		

LNEXR

Null Hypothesis: D(LNEXR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.247498	0.0002
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNEXR,2)
Method: Least Squares
Date: 01/25/25 Time: 22:16
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNEXR(-1))	-0.973324	0.185483	-5.247498	0.0000
C	0.117957	0.055428	2.128109	0.0420

R-squared	0.487055	Mean dependent var	-0.004742
Adjusted R-squared	0.469367	S.D. dependent var	0.384113
S.E. of regression	0.279805	Akaike info criterion	0.352897
Sum squared resid	2.270442	Schwarz criterion	0.445412
Log likelihood	-3.469899	Hannan-Quinn criter.	0.383054
F-statistic	27.53623	Durbin-Watson stat	1.945511
Prob(F-statistic)	0.000013		

LNOILPR
Null Hypothesis: D(LNOILPR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.061054	0.0003
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNOILPR,2)
Method: Least Squares
Date: 01/26/25 Time: 03:44
Sample (adjusted): 4 33
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNOILPR(-1))	-1.318828	0.260584	-5.061054	0.0000
D(LNOILPR(-1),2)	0.396374	0.189531	2.091346	0.0460
C	0.061183	0.051688	1.183696	0.2469

R-squared	0.530451	Mean dependent var	0.012292
Adjusted R-squared	0.495669	S.D. dependent var	0.392743
S.E. of regression	0.278911	Akaike info criterion	0.378793
Sum squared resid	2.100369	Schwarz criterion	0.518912
Log likelihood	-2.681890	Hannan-Quinn criter.	0.423618
F-statistic	15.25097	Durbin-Watson stat	1.908271
Prob(F-statistic)	0.000037		

Appendix 4
Ardl Model Estimate for Model 2
Raw Output

Dependent Variable: GDPGR
Method: ARDL
Date: 01/26/25 Time: 03:48
Sample (adjusted): 5 33
Included observations: 29 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LNBDF LNEXR LNGEXP LNOILPR

Fixed regressors: C
Number of models evalulated: 2500
Selected Model: ARDL(1, 4, 3, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*

GDPGR(-1)	0.098665	0.161140	0.612292	0.5489
LNBDF	-0.644492	0.371608	-1.734333	0.1021
LNBDF(-1)	0.370758	0.573004	0.647043	0.5268
LNBDF(-2)	-1.144651	0.487827	-2.346428	0.0322
LNBDF(-3)	-0.674046	0.495841	-1.359400	0.1929
LNBDF(-4)	-0.814121	0.376461	-2.162562	0.0461
LNEXR	-0.705498	3.077789	-0.229222	0.8216
LNEXR(-1)	-3.102914	3.457282	-0.897501	0.3828
LNEXR(-2)	2.313533	3.294048	0.702337	0.4926
LNEXR(-3)	3.737599	2.552142	1.464495	0.1624
LNGEXP	1.074415	2.280834	0.471062	0.6440
LNOILPR	3.518606	1.283277	2.741890	0.0145
C	-16.91790	6.152834	-2.749611	0.0142

R-squared	0.851962	Mean dependent var	4.371173
Adjusted R-squared	0.740934	S.D. dependent var	3.729970
S.E. of regression	1.898499	Akaike info criterion	4.421849
Sum squared resid	57.66880	Schwarz criterion	5.034775
Log likelihood	-51.11682	Hannan-Quinn criter.	4.613810
F-statistic	7.673383	Durbin-Watson stat	1.914313
Prob(F-statistic)	0.000147		

*Note: p-values and any subsequent tests do not account for model selection.

Appendix 5

Ardl Bound Co-Integration Test

ARDL Bounds Test
Date: 01/26/25 Time: 03:48
Sample: 5 33
Included observations: 29
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	4.201989	4

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.45	3.52

5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Test Equation:
Dependent Variable: D(GDPGR)
Method: Least Squares
Date: 01/26/25 Time: 03:48
Sample: 5 33
Included observations: 29

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNBDF)	-0.687209	0.448704	-1.531544	0.1452
D(LNBDF(-1))	2.360706	0.551277	4.282252	0.0006
D(LNBDF(-2))	1.640246	0.733936	2.234864	0.0400
D(LNBDF(-3))	0.770159	0.382003	2.016106	0.0609
D(LNEXR)	-0.203735	3.309645	-0.061558	0.9517
D(LNEXR(-1))	-5.290707	2.530517	-2.090761	0.0529
D(LNEXR(-2))	-6.074786	3.227421	-1.882241	0.0781
C	-14.27768	6.331115	-2.255161	0.0385
LNBDF(-1)	-2.950668	0.832813	-3.543015	0.0027
LNEXR(-1)	4.903519	2.790689	1.757100	0.0980
LNGEXP(-1)	-0.744772	2.665332	-0.279429	0.7835
LNOILPR(-1)	3.449087	2.101285	1.641418	0.1202
GDPGR(-1)	-0.989362	0.224767	-4.401734	0.0004

R-squared	0.743537	Mean dependent var	0.182303
Adjusted R-squared	0.551190	S.D. dependent var	3.335461
S.E. of regression	2.234535	Akaike info criterion	4.747788
Sum squared resid	79.89038	Schwarz criterion	5.360714
Log likelihood	-55.84293	Hannan-Quinn criter.	4.939749
F-statistic	3.865596	Durbin-Watson stat	1.965401
Prob(F-statistic)	0.006682		

Appendix 6
Long And Short Run
ARDL Cointegrating And Long Run Form

Dependent Variable: GDPGR
Selected Model: ARDL(1, 4, 3, 0, 0)
Date: 01/26/25 Time: 03:49
Sample: 1 33
Included observations: 29

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNBDF)	-0.644492	0.371608	-1.734333	0.1021
D(LNBDF(-1))	1.144651	0.487827	2.346428	0.0322
D(LNBDF(-2))	0.674046	0.495841	1.359400	0.1929
D(LNBDF(-3))	0.814121	0.376461	2.162562	0.0461
D(LNEXR)	-0.705498	3.077789	-0.229222	0.8216
D(LNEXR(-1))	-2.313533	3.294048	-0.702337	0.4926
D(LNEXR(-2))	-3.737599	2.552142	-1.464495	0.1624
D(LNGEXP)	1.074415	2.280834	0.471062	0.6440
D(LNOILPR)	3.518606	1.283277	2.741890	0.0145
CointEq(-1)	-0.901335	0.161140	-5.593495	0.0000

Cointeq = GDPGR - (-3.2247*LNBDF + 2.4882*LNEXR + 1.1920*LNGEXP +
3.9038*LNOILPR -18.7698)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNBDF	-3.224718	0.623590	-5.171212	0.0001
LNEXR	2.488219	2.458522	1.012079	0.3266
LNGEXP	1.192026	2.553699	0.466784	0.6469
LNOILPR	3.903770	1.369898	2.849679	0.0116
C	-18.769818	6.827770	-2.749041	0.0143

Appendix 7
Diagnostic Test
Breusch-Godfrey Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.012675	Prob. F(1,15)	0.9119
Obs*R-squared	0.024484	Prob. Chi-Square(1)	0.8757

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 01/26/25 Time: 03:50
Sample: 5 33
Included observations: 29
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPGR(-1)	0.016433	0.221312	0.074253	0.9418
LNBDF	0.005643	0.386894	0.014586	0.9886
LNBDF(-1)	0.001040	0.591618	0.001757	0.9986
LNBDF(-2)	-0.010991	0.512988	-0.021425	0.9832
LNBDF(-3)	0.031724	0.584318	0.054292	0.9574
LNBDF(-4)	-0.003939	0.390214	-0.010093	0.9921
LNEXR	-0.108704	3.320851	-0.032734	0.9743
LNEXR(-1)	0.098020	3.673814	0.026681	0.9791
LNEXR(-2)	0.040218	3.419353	0.011762	0.9908
LNEXR(-3)	-0.139136	2.910175	-0.047810	0.9625
LNGEXP	0.086958	2.478086	0.035091	0.9725
LNOILPR	-0.091539	1.554414	-0.058890	0.9538
C	0.024238	6.355585	0.003814	0.9970
RESID(-1)	-0.041966	0.372756	-0.112583	0.9119

R-squared	0.000844	Mean dependent var	4.79E-15
Adjusted R-squared	-0.865091	S.D. dependent var	1.435131
S.E. of regression	1.959934	Akaike info criterion	4.489970
Sum squared resid	57.62011	Schwarz criterion	5.150044
Log likelihood	-51.10457	Hannan-Quinn criter.	4.696697
F-statistic	0.000975	Durbin-Watson stat	1.909308
Prob(F-statistic)	1.000000		

Appendix 8
Breusch-Pagan-Godfrey Heteroscedasticity
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.857764	Prob. F(12,16)	0.5994

Obs*R-squared	11.35283	Prob. Chi-Square(12)	0.4989
Scaled explained SS	1.334908	Prob. Chi-Square(12)	0.9999

Appendix 9
Correlation

	GDPGR	LNBDF	LNEXR	LNGEXP	LNOILPR
GDPGR	1	-0.0320855614973262	-0.0381334804689409	-0.0217245989304812	0.375668449197861
LNBDF	-0.0320855614973262	1	0.9295872124840965	0.9120989304812834	0.7443181818181818
LNEXR	-0.0381334804689409	0.9295872124840965	1	0.974578029353154	0.7574847940519022
LNGEXP	-0.0217245989304812	0.9120989304812834	0.974578029353154	1	0.7981283422459891
LNOILPR	0.375668449197861	0.7443181818181818	0.7574847940519022	0.7981283422459891	1