THE IMPACT OF CURRENCY DEVALUATION ON NIGERIA ECONOMY

BY

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DEPARTMENT OF ECONOMICS

FACULTY OF SOCIAL SCIENCES

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CERTIFICATION

This is to certify that this project work "The Impact of Currency Devaluation on Nigeria Economy" By Racheal Uwenese AYO with matriculation Number SSC2008445 in the Department of Economics, Faculty of Social Sciences, University of Benin.

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DEDICATION

This project is dedicated to the Almighty God who has given me the grace and opportunity to complete this program.

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My profound gratitude goes to God Almighty, who in his infinite mercies, blessings and grace made this work a success.

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ABSTRACT

The study analysed the impact of currency devaluation on economic growth in Nigeria, using secondary data sourced from Central Bank of Nigeria (CBN) Statistical Bulletins, World Bank and the International Monetary Fund (IMF). The data covered a period from 1981-2021. Auto-regressive distributed lag model (ARDL) and multiple regressions analysis were employed to examine the relationship between the dependent variable (GDP) and independent variables (Exchange rate, inflation rate, foreign direct investment and Investment). Findings reveals that GDP has a negative relationship with inflation rate, FDI, GFCF and a positive relationship with exchange rate. In conclusion, currency devaluation has significant and statistical impact on economic growth in Nigeria. This study recommends that government should employ the use of managed exchange rate system to enhance competitiveness without causing excessive depreciation since currency devaluation positively influences economic growth.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

A nation's currency represents more than just a legal tender or medium of exchange for goods and services; it also reflects the economic performance of the country relative to others and indicates the level of international transactions between its residents and those of other countries (Amah, 2020).

Devaluation refers to a reduction in the value of a country's currency compared to the goods, services and other currencies it can be exchanged for. This decrease impacts the nation's economic standing and its exchange rates with other monetary units.

Devaluation of a country's currency occurs when its value is intentionally reduced relative to other currencies. This policy is often employed to address trade imbalances by making the country's exports more competitive and less expensive compared to imports from other countries. Devaluation can help stabilize or correct trade shocks by reducing external imbalances, addressing currency overvaluation, maintaining competitive pricing, and enhancing international competitiveness. It can also boost export expansion and increase foreign currency earnings. Wolf (2014) observed that adjusting the official exchange rate can support both internal and external balance, although it may also have negative impacts on the domestic economy.

According to Genye T. (2010), the International Monetary Fund (IMF) and World Bank advocate for currency devaluation as a strategy to protect domestic firms from external competition and to boost net exports. In alignment with economic theories, nations collectively embrace devaluation as a fiscal policy. This approach is viewed as a means to enhance the domestic economy in the long run by stimulating net exports, promoting economic diversification, boosting domestic international competitiveness, expanding trade balance, generating employment and elevating balance of payment issues.

The Nigerian economy, one of Africa's largest, faces various challenges that impede its sustainable growth and development. These challenges go beyond economic diversification and include high unemployment rates, persistent inflation, heavy reliance on oil revenue, and a significant foreign debt burden. Among these challenges, the high rates of unemployment and underemployment stand out, as they hinder individual prosperity and the nation's ability to utilize its human capital for economic growth. Additionally, consistent inflation rates above desired levels erode citizens' purchasing power, limiting their ability to invest, save, and contribute effectively to the economy. Nigeria's heavy reliance on oil revenue makes it vulnerable to global oil price fluctuations, hindering economic diversification efforts and exposing the country to economic shocks. Meanwhile, the increasing foreign debt burden poses fiscal challenges, with a significant portion of the national budget allocated to debt servicing, reducing financial stability and obstructing sustainable growth (Yusuf & Moshood, 2020).

Scholars such as Momodu & Akani (2016) have suggested that currency devaluation, if managed prudently, can offer potential benefits such as enhancing competitiveness, boosting exports, and attracting foreign investment, thereby contributing to economic growth. Devaluation involves a reduction in the value of a domestic currency relative to foreign currencies, aiming to make exports more competitive globally while making imports relatively more expensive domestically (Momodu & Akani, 2016). However, it is crucial to distinguish between devaluation and depreciation, as the former involves a deliberate government action to reduce the currency's value, while the latter occurs due to market forces in floating exchange rate systems. Momodu and Akani (2016) argue that devaluation might enhance a country's export competitiveness by reducing the cost of its goods while simultaneously increasing the price of imports, discouraging the purchase of foreign products domestically.

This study seeks to empirically investigate the implications and relationship between currency devaluation and the development of the Nigerian economy. Currency devaluation is a common economic policy tool used by nations facing trade imbalances, economic instability, and declining foreign exchange reserves. However, currency devaluation can also have adverse effects, including inflation, rising costs of imported goods, and capital flight. This study aims to analyze the overall impact of currency devaluation on the Nigerian economy, examining key economic indicators such as GDP, inflation, trade balance, and employment.

1.2 Statement of the Research Problem

The Nigerian economy has faced recurrent currency devaluation due to factors such as declining foreign reserves, inflationary pressures, and unstable crude oil prices. Several studies have investigated the effects of currency devaluation in Nigeria. Some of these studies by Loto (2018), Samuel & Udoh (2018), and Abdulrazak, Mohammed, & Abdullahi (2023) primarily focused on short-term macroeconomic indicators like GDP, inflation, and trade balance. While these studies provide valuable insights, they fail to capture the long-term structural changes in the economy that result from sustained devaluation. Additionally, they do not consider the broader socio-economic impacts, such as the effects on employment, income distribution, and poverty levels.

Other studies Oluwaseun Grace (2024), Anagun Michael (2020), and Okoroafor & Adeniji (2017) highlight both the benefits and drawbacks of currency devaluation, including increased export competitiveness and inflationary pressures. However, these studies lack a detailed sectoral analysis, which is essential to understand how different industries, such as agriculture and manufacturing, are impacted by devaluation.

Similarly, the research conducted by Wilson & Anthony (2022), Ojuolape, Yusuf, Alabi, & Oladipupo (2020), and Austin & Akani (2016) discusses the potential of currency devaluation to stimulate economic growth and attract foreign investment. However, these studies overlook the long-term implications for employment and income distribution.

They also do not offer detailed policy recommendations to address the adverse effects of devaluation.

1.3 Research Questions

The research questions that will guide this project are:

1. How does currency devaluation impact economic growth in Nigeria?
2. How does inflation impact economic growth in Nigeria?
3. What is the impact of foreign direct investment on economic growth in Nigeria?

1.4 Objectives of the Study

The primary objective of this research is to assess the impact of currency devaluation on the Nigerian economy. The specific objectives include:

1. To analyze the impact of currency devaluation on Nigeria's economic growth.
2. To examine the relationship between inflation and economic growth in Nigeria.
3. To evaluate the relationship foreign direct investment inflows and economic growth in Nigeria.

1.5 Research Hypotheses

H_0: Currency devaluation has no significant impact on economic growth in Nigeria.

H_0: inflation has no significantly impact on economic growth in Nigeria.

H_0: foreign direct investment has no significant impact on economic growth in Nigeria.

1.6 Significance of the Study

Given the gap identified in previous studies, this research aim to provide a comprehensive analysis on currency devaluation impact on Nigeria's economy. Previous studies by Loto (2018), Samuel & Udoh (2018), and Abdulrazak, Mohammed, & Abdullahi (2023) primarily focused on short-term macroeconomic indicators such as GDP, inflation, and trade balance. These studies have largely ignored the long-term structural changes and broader socio-economic impacts that currency devaluation can cause. This research will examine both the short-term and long-term effects of currency devaluation, including its impact on employment, income distribution, and poverty levels. By providing a detailed analysis of long-term structural changes, our research aims to offer a more comprehensive understanding of currency devaluation's effects on the Nigerian economy.

The studies by Oluwaseun Grace (2024), Anagun Michael (2020), and Okoroafor & Adeniji (2017) failed to provide a detailed sectoral analysis and comprehensive policy recommendations to mitigate the negative effects of devaluation and enhance its positive outcomes. This study will include a thorough sectoral analysis to understand how different industries, such as agriculture, manufacturing, and services, are impacted by currency devaluation. This study will provide comprehensive policy recommendations to help policymakers design effective strategies for mitigating adverse effects and promoting sustainable economic growth.

The research conducted by Wilson & Anthony (2022), Ojuolape, Yusuf, Alabi, & Oladipupo (2020), and Austin & Akani (2016) often neglected the long-term implications of devaluation on employment and income distribution and did not provide comprehensive policy recommendations. This research will analyze the long-term effects of currency devaluation on employment and income distribution, providing a deeper understanding of how devaluation influences these critical socio-economic factors.

CHAPTER TWO

REVIEW OF LITERATURE

2.1 Conceptual Clarification

2.1.1 Gross Domestic Product (GDP)

Economic growth occurs when an economy's productive capacity increases, resulting in a higher level of output. This happens when all factors of production are fully utilized. In simple terms, economic growth means a country produces more goods and services over time. GDP is a key indicator of economic performance, representing the annual percentage increase in the value of all goods and services produced within a country. It is a crucial measure of economic health, reflecting the ability of an economy to grow and expand over time (World Bank, 2021).

2.1.2 Currency Devaluation

Currency devaluation refers to the intentional lowering of a country's currency value compared to others, usually carried out by the central bank. This approach aims to make the country's exports more affordable and competitive on the global market, potentially enhancing the trade balance. However, devaluation can also raise the cost of imports, which may lead to inflation and diminish the purchasing power for local consumers.

2.1.3 Inflation

Inflation represents the continuous rise in the general price level of goods and services within an economy over time, causing a reduction in the purchasing power of money. It is commonly measured by indices such as the Consumer Price Index (CPI), which monitors the average change in prices paid by urban consumers for a fixed basket of goods and services.

2.1.4 Foreign Direct Investment (FDI)

FDI occurs when a country or company invests in a business located in another nation, usually by acquiring a significant ownership stake. This investment typically brings capital, technology, and management expertise to the host country, promoting industrial growth, infrastructure development, and job creation. Moreover, FDI can lead to currency appreciation in the host country due to increased demand for its currency by foreign investors.

2.1.5 Determinants of Naira Devaluation

1. Competitiveness Advantage: If a country has lost its competitive advantage in a fixed exchange rate system, devaluation can be beneficial in restoring competitiveness and fostering economic growth.

2. State of Business Cycle: During a recession, devaluation can help boost growth without causing inflation, whereas in an economic boom, devaluation is more likely to cause inflation. The state of the global economy matters significantly.

3. Elasticity of Demand for Exports and Imports: A devaluation may take time to improve the current account because demand is inelastic in the short term. If demand is price inelastic, a fall in the price of exports will lead to only a small rise in quantity, potentially reducing the value of exports. Over time, demand may become more price elastic, having a bigger effect in the long run.

4. Capital Flight: Foreign investors may avoid currencies from emerging markets exposed to oil price turbulence, leading to capital flight.

5. Inflation: The effect on inflation depends on other factors such as spare capacity in the economy. For instance, during a recession, devaluation is unlikely to cause inflation. Import prices are not the only determinant of inflation; other factors like wage increases may also be important.

2.1.6 Reasons for Naira Devaluation

Adekoya O. Fagbohun (2016) and Akindayo and Olawale (2015) argue that many countries have devalued their currencies over time to achieve specific economic goals. Here are the main reasons why a country like Nigeria might choose to devalue its currency:

1. To Encourage Exports: Devaluation makes a country's goods cheaper for other nations, increasing their demand and boosting exports.

2. To Discourage Imports: Devaluation makes foreign goods more expensive, reducing the demand for imports and encouraging domestic consumption.

3. To Correct Balance of Payments: When a country's balance of payments is unfavorable, devaluation is adopted to improve the situation. It increases the value of imports, but the value of exports becomes greater than that of imports, leading to a favorable balance of payments. The improvement in the current account depends on the Marshall Lerner condition and the elasticity of demand for exports and imports.

2.2 Theoretical Literature Review

2.2.1 The Classical Growth Theory

The Classical Growth Theory, developed by early economists such as Adam Smith, David Ricardo, and Thomas Malthus, highlights the role of land, labor, and capital in economic expansion. Adam Smith emphasized the importance of specialization and division of labor in enhancing productivity, arguing that an economy grows when workers focus on specific tasks, thereby improving efficiency. David Ricardo’s theory of comparative advantage demonstrated how international trade fosters growth by allowing countries to specialize in goods where they have a relative efficiency advantage. However, classical economists also recognized potential constraints to economic

expansion. Thomas Malthus, in particular, warned of the risks of rapid population growth outpacing food production, leading to economic stagnation and declining living standards. One major limitation of the Classical Growth Theory is its failure to account for technological progress as a key driver of long-term economic growth.

2.2.2 The Neoclassical Growth Theory

The Neoclassical Growth Theory, developed by Robert Solow and Trevor Swan, improved upon classical economic thought by incorporating technological progress as a fundamental factor in sustaining long-term economic growth. The Solow-Swan model is based on a production function where output is determined by capital, labor, and technological advancements. The Neoclassical framework suggests that while capital accumulation and labor expansion contribute to economic growth, their effects diminish over time due to the principle of diminishing returns. However, technological progress allows for continuous improvements in productivity, preventing economic stagnation. A devalued currency can influence capital formation by altering the cost of imported capital goods and foreign direct investment inflows. Additionally, currency fluctuations can affect labor productivity by influencing employment levels and wage adjustments. If devaluation enhances export competitiveness, it can lead to higher output and employment, supporting economic growth. However, if devaluation leads to inflation and reduces purchasing power, it can negatively impact investment and consumption, thereby slowing economic expansion.

2.2.3 The Endogenous Growth Theory

The Endogenous Growth Theory, introduced by economists such as Paul Romer and Robert Lucas, challenges the Neoclassical assumption that technological progress is exogenous. Instead, it argues that economic policies, education, research and development, and innovation are internal factors that drive long-term growth. Unlike the Neoclassical framework, which assumes diminishing returns to capital, the Endogenous Growth Model suggests that investments in human capital and knowledge creation can generate sustained economic expansion without diminishing returns. This implies that policies promoting research and development, infrastructure improvements, and education can enhance productivity and drive continuous growth. However, critics argue that this theory assumes that all economies have equal access to knowledge and innovation, which is often not the case, particularly in developing countries where institutional weaknesses and market inefficiencies can hinder technological progress.

2.2.4 The Keynesian Growth Theory

The Keynesian Growth Theory, particularly the Harrod-Domar Model, focuses on the role of savings and investment in driving economic expansion. This model suggests that the rate of economic growth depends on the level of savings and the efficiency with which capital is used in production. It introduces the concept of the capital-output ratio, which measures the amount of investment required to generate additional output. The model distinguishes between the warranted growth rate, which maintains full utilization

of capital, and the natural growth rate, determined by labor force expansion. While the Harrod-Domar Model provides useful insights into the relationship between savings, investment, and economic growth, it has been criticized for its rigid assumptions and failure to incorporate technological progress as a key driver of long-term expansion.

2.3 Empirical Literature Review

Samuel & Udoh (2018) analysed the implication of currency devaluation on investment in Nigeria from the period of 2000 to 2015 using the classical linear regressive model. The results found out that exchange rate has significant and direct relationship with investment in Nigeria. They concluded that the direct and positive relationship between exchange rate and investment confirms the theoretical viewpoint that devaluation of currency increases investment growth in the developing countries.

Vasylenko & Bazhenova (2014) examined the causal macroeconomic model of devaluation and inflation with respect to economic impact on the Ukraine and found that both devaluation and inflation always reduces real Gross Domestic Product (GDP). The study also established a relationship among emission, devaluation and inflation in the Ukrainian economy using multiple regression analysis with macroeconomic data. They discovered that when the currency is devalued it negatively affect the country real GDP and trade balance. This means that the economic output and trade performance decline as a result of devaluation.

Wolf (2014) investigated the simultaneity of the effects of devaluation implications for modified planned economies (MPEs). The findings showed that the existing empirical estimates of trade elasticities in MPEs may be downwardly biased and that extreme pessimistic assessments of the devaluation effect may not be entirely internally consistent. It stressed further that trade elasticities in MPEs probably are lower than in market economies.

Reinhart (1994) in his analysis also suggested that large relative prices swings are necessary and required for there to be appreciable impact on trade position. He found that income and relative prices are both necessary and sufficient to pin down steady state trade flows, also in the developed Country's income elasticity is much larger than that of the developing countries. This signified that if countries all operate under the balanced growth hypothesis; the developing countries trade balance should improve with an exception to African countries due to the dominance of primary products in their trade content.

Al-Abdelrazag (1997) analyzed the Jordanian economy which was centred on the devaluation of the Jordanian currency for the period 1969–1994 and established that for the Jordanian economy, currency devaluation could not improve the economic position. He attributed this to the sum of demand for import and exports coefficients being less than one. For improvement to be realized, this sum must be greater than one. If, for example, this sum is equal to one, the balance of trade will remain at the same level.

The Cameroon economy was studied by Navaretti, Tybout, & De Melo (1997). Their findings were that devaluation had a major impact; in particular firms already involved in trade will benefit. Firms increased their exports, while non-exporting firms were reluctant to incur the substantial costs needed to enter the international market. Cost according to them increased especially for import-dependent firms, that is, those firms depending heavily on imported raw material and capital goods.

Akinlo (1996) investigated the devaluation effect on the Nigerian economy. He discovered that a large devaluation of the naira as a policy adjustment during the structural adjustment program for the Nigeria economy worsened the economic situation and had a very terrible effect on the productive sector. According to Akinlo, the higher the exchange rate devaluation, the lower the rate of profit, and vice versa. A nation that devalues must be able to compare where it started from, where it is, and where it is going. There must be a period of testing the impact of devaluation on the economy.

Momodu & Akanni (2016) examined the impact of devaluation on economic growth in Nigeria from 1986 to 2012, using the Johansen co-integration technique and auto regressive distributed lagged model for the error correction mechanism. The study found that short term changes in the economy were sufficiently explained by the currency devaluation policy, since the study revealed a positive relationship between currency devaluation and economic growth. In the long run price increases overshadow and neutralize the positive effect of devaluation. The study recommended that the Central

Bank of Nigeria (CBN) should ensure that they stem down price changes while implementing currency devaluation and that the Nigerian government should consider currency devaluation only as a last resort.

Osundina & Osundina (2016) investigated the effectiveness of naira devaluation on economic growth in Nigeria using the ordinary least squares regression technique. They found that inflation and unemployment are the short run side effects of the devaluation policy and that although devaluation is not a bad idea for Nigeria, discretionary monetary policy measures should be put in place to curb the associated inflation.

Okoroafor & Adeniji (2017) investigated currency devaluation and macroeconomic variable responses in Nigeria using a vector error correction modelling approach on time series data from 1986 to 2016. The study reported a positive statistically significant relationship between devaluation and the macroeconomic variables employed in the model including economic growth; exchange rate devaluation had a progressive and noteworthy impact on balance of payment while having a negative impact on non-oil exports.

Oluwaseun (2024) analyzed currency devaluation and Economic Growth in Nigeria using the Auto regressive distributed lag ARDL model. She found that external debts exert negative significant impact on Nigeria currency devaluation in the short run which indicates that as the currency devaluation increases external debts falls, and in the long run it was revealed that external debts affects currency devaluation positively and

significantly thereby implying that as external debts increases, devaluation of Nigerian naira also increases.

Jaiqi Tang (2024) conducted an econometric analysis on the impact of yen depreciation on Japan's economy. The study found that yen depreciation increased the cost of imported goods affecting consumers and reducing profit margins for firms. However, it also boosted repatriated profits for multinationals and increased tourism revenues. The semiconductor industry benefited from lower production costs and higher investment. Despite these positives, small and medium-sized enterprises struggled due to less pricing power. The anticipated increase in export volumes was not significant as many Japanese multinationals had shifted production abroad. The Japanese current account remained in surplus due to increased tourism and reinstated income.

Mironov (2015) examined the analysis on the Russian devaluation during 2014-2015. The study examined the effects of falling oil prices and financial sanctions on the Russian economy. Mironov found that the devaluation of the ruble enhanced the price competitiveness of Russian producers and stimulated the supply side of the economy unaffected by the recession. The devaluation also led to a reduction in domestic demand and increased inflationary pressures. The study highlighted that while the devaluation provided some short-term benefits, it also posed significant long-term challenges for the Russian economy

Elbagory (2017) explored a study on the effect of currency devaluation on the Egyptian economy. Using a vector auto regression (VAR) model on annual time series data from 1980 to 2016, the study found that currency devaluation was expansionary for the Egyptian economy. It showed that devaluation had a positive effect on GDP growth while government spending had a negative and insignificant impact. The study also highlighted that devaluation explained a significant portion of the real change in Egypt's GDP. It emphasized the need for policies to support poorer groups affected by high prices and to encourage birth control due to the large population increase. He concluded that while devaluation had benefits, complementary policies were necessary to mitigate negative impacts on vulnerable populations.

Nils H. Verheuvel (2016) studied the effect of exchange rate volatility on economic growth in South Korea using a three-dimensional vector autoregression (VAR) model. The analysis covering periods before and after the 1997 Asian financial crisis, found that a one standard deviation shock to exchange rate volatility led to a 0.6 percent increase in economic growth in the long run while the short-term effect was negative. He also found that exchange rate volatility increased international trade by 3 percent over five years, but this effect was not statistically significant. The Asian financial crisis did not significantly alter the relationship between exchange rate volatility and international trade

Abdullahi et al. (2013) examined the effect of exchange rate variation on price level and output growth in Bangladesh. Using a vector error correction model (VECM) on time

series data from 1980 to 2010, the study found that exchange rate variation had a significant impact on both price levels and output growth. The results indicated that exchange rate depreciation led to higher price levels and stimulated output growth in the long run. In the short run, the impact on output growth was negative.

Jeffrey Sachs (1997) analyzed the economic effects of the Asian currency devaluation during the East Asian financial crisis. He identified several key factors contributing to the crisis including the instability of short-term capital flows, inadequate financial supervision, and fixed exchange rate regimes. Sachs argued that these issues were not unique to Asia but were indicative of broader systemic problems in the international financial system. He emphasized the need for global financial reforms to mitigate such crises in the future. His recommendations included strengthening financial regulation, adopting more flexible exchange rate policies, and improving transparency in financial markets.

Hashim, & Riaz (2019) conducted a theoretical review to explore the effects of currency devaluation on the economies of the SAARC countries. Their analysis spanned several macroeconomic variables, including exchange rates, output growth, inflation, and government expenditures. They employed a Smooth Transition Regression Model to examine the non-linear relationships between currency devaluation and these economic variables. Additionally, they used the Granger Causality Test to determine the direction of causality between devaluation and the macroeconomic indicators. The study found that

currency devaluation had a mixed impact on the SAARC economies. While devaluation could potentially enhance export competitiveness and improve the balance of payments, it also tended to increase inflationary pressures and negatively affect output growth. They concluded that the effectiveness of devaluation as an economic policy tool varied across different SAARC countries, largely dependent on their unique economic structures and external conditions.

Adekoya & Fagbohun (2016) explored how currency devaluation affects Nigeria's manufacturing output growth from 1980 to 2014. They used various econometric techniques, such as the Augmented Dickey-Fuller test for stationarity, Engel-Granger cointegration for long-run relationships, ordinary least squares for long-run estimates, and Granger causality tests for causal relationships. Their findings revealed that currency devaluation had a negative impact on the manufacturing sector, primarily because of its reliance on imported equipment, machinery, and raw materials. However, other variables had a positive effect. The study recommended reviewing Nigeria's exchange rate policy for better growth in the manufacturing sector.

Abdullah et al. (2020) examined the effects of currency devaluation on output growth in developing economies experiencing currency crises. Using panel data analysis for seven countries (Ghana, Mexico, Malaysia, Pakistan, Philippines, Singapore, and South Africa) from 1981 to 2010, the researchers employed co-integration methods for long-run effects and Fully Modified OLS (FMOLS) and Error Correction Model for short-run effects. The

findings indicated no significant relationship between currency devaluation and output growth in the short run, but a negative relationship in the long run.

Genye, (2010) investigated the effect of currency devaluation on economic growth in Ethiopia using a time series econometric approach covering the period from 1980 to 2010. The study utilized the Johansen cointegration test to ascertain long-run equilibrium relationships among variables and a Vector Error Correction Model (VECM) to capture short-run dynamics and adjustments towards equilibrium. The results showed a negative impact of currency devaluation on GDP per capita growth in the short term (same year) while a significantly positive effect emerged when considering the one-year lagged exchange rate. This implies that devaluation has a time-varying effect on economic growth in Ethiopian with long-term benefits outweighing short-term costs.

Cooper (1971) explored an assessment of currency devaluation in developing countries in his work "An Assessment of Currency Devaluation in Developing Countries in Government and the Economy." The study used cross-sectional analysis to evaluate the impact of devaluation on macroeconomic variables. He indicated that devaluation improved the balance of payments by making exports cheaper and imports more expensive. However, the effectiveness varied based on the price elasticity of demand. Devaluation often improved the terms of trade, particularly for countries exporting primary commodities. The impact on aggregate demand was mixed; some countries experienced increased domestic demand, while others faced inflationary pressures.

Devaluation can led to a wage-price spiral, causing higher inflation that disintegrated initial benefits. Cooper's study underscores that the impact of devaluation on economic growth and stability depends on various factors, including economic structure and trade responsiveness.

Kalyouch (2008) conducted a thorough investigation into the relationship between currency devaluation and output growth in OECD countries. The study employed a panel data analysis approach, analyzing data from 1970 to 2005. Kalyouch's findings revealed that currency devaluation had a mixed impact on output growth. In the short term, devaluation could stimulate economic growth by making exports cheaper and more competitive, the long-term effects were more complex and varied across different countries depending on their specific economic conditions and structural factors. The study highlighted the need to consider country-specific contexts when evaluating the impact of currency devaluation on economic growth emphasizing that what works for one country may not necessarily work for another.

Amah (2020) studied the effect of currency devaluation on macroeconomic variables in Nigeria. The study employed a vector error correction model (VECM) on time series data spanning from 1980 to 2018. The analysis found that currency devaluation led to higher inflation rates as the cost of imported goods increased, which in turn raised overall price levels. The study also revealed that devaluation improved export competitiveness, making Nigerian goods cheaper on the international market and potentially boosting the

export sector. The impact on economic growth was mixed, with some sectors benefiting from increased demand for exports, while others faced challenges due to higher production costs.

Loto (2018) conducted an econometric analysis on the devaluation of the naira and its impact on the Nigerian economy from 1985 to 2015. The study used the Ordinary Least Squares (OLS) regression method, along with initial stationarity and stability tests. The results showed that currency devaluation had not provided a solution for the Nigerian economy. The sum of the relative prices of import and export coefficients was less than one, indicating that devaluation was not the right policy for Nigeria.

Mohammed et al. (2023) investigated the effect of naira devaluation on Nigeria's balance of trade. Using time series data from 1986 to 2021, the study employed an unrestricted Vector Auto Regression (VAR) model, Co-integration, and Vector Error Correction Mechanism (VECM) techniques to analyze the data. The findings indicated a long-run equilibrium relationship between devaluation and trade balance. The results showed that naira devaluation had both positive and negative impacts on trade balance, export rate, and import rate. They concluded that naira devaluation had a positive and significant impact on Nigeria's trade balance. They recommended improving indigenous innovation to reduce dependence on imports and encourage the production of competitive goods and services

Ogiriki & Ogwu (2024) investigated the impact of currency devaluation on economic growth in Nigeria. They employed an ex-post facto research design, analyzing data from 2003 to 2022. Using multiple regression analysis, the study found significant impacts of both the exchange rate and inflation rate on GDP. Specifically, an increase in the exchange rate was associated with increased GDP, while a rise in inflation rates corresponded to a decrease in GDP. The importance of price stability for sustained economic growth and suggested that currency devaluation significantly impacts economic growth in Nigeria.

Ebhotemhim & Aziegbemin (2022) conducted a study on the effect of exchange rate devaluation on investment in Nigeria. Using an autoregressive distributed lag (ARDL) approach, the study analyzed time series data from 1981 to 2020. The findings indicated that exchange rate devaluation had a significant impact on investment levels in Nigeria. The results showed that devaluation led to increased investment in export-oriented industries due to improved competitiveness. It also resulted in higher costs for imported capital goods, which negatively affected investment in other sectors and the need for policies to support domestic industries and mitigate the adverse effects of devaluation on investment.

Akindiyo & Olawale (2015) conducted a study on the devaluation of the Nigerian naira and its impact on the economy. Using an econometric analysis approach, the study examined the effects of naira devaluation on various macroeconomic variables, including

inflation, trade balance, and economic growth. The findings indicated that naira devaluation led to higher inflation rates due to increased import costs. The study found that devaluation improved the trade balance by making Nigerian exports more competitive on the international market. The overall impact on economic growth was mixed, with some sectors benefiting from increased export demand while others faced challenges due to higher production costs.

Adeyemi (2020) conducted a study on the effects of naira devaluation and proposed possible solutions. The study utilized secondary data on Nigeria's exchange rate from 1972 to 2020. The findings indicated that naira devaluation led to increased inflation and higher import costs, which negatively impacted the purchasing power of consumers. It also improved the competitiveness of Nigerian exports, potentially boosting the export sector. The study recommended that the Nigerian government diversify the economy and use devaluation as a last resort to address economic imbalances.

CHAPTER THREE

METHODOLOGY

3.1 Theoretical Framework

The theoretical foundation of this study is based on the Generalized Solow-Swan Growth Model, which extends the Neoclassical Solow-Swan Model by incorporating dynamic exogenous variables such as variable savings rates, technological fluctuations, demographic changes, and external shocks. The classical Solow-Swan model, developed by Robert Solow (1956) and Trevor Swan (1956), explains long-run economic growth through capital accumulation, labor expansion, and technological progress. The model assumes a Cobb-Douglas production function of the form:

$Y = A K^{\alpha} L^{1-\alpha}$

Where;

Y = Output (GDP),

A= Level of technology,

K = Capital stock,

L = Labour force,

α= Capital elasticity of output ($0 < \alpha < 1$).

The model assumes diminishing returns to capital and labour but introduces technological progress () as a key determinant of sustained long-term growth.

In the context of currency devaluation and the Nigerian economy, the model helps explain how devaluation influences capital accumulation, investment, and overall output growth. Currency devaluation affects capital formation, as it influences the cost of imported capital goods and foreign direct investment (FDI) inflows. Additionally, devaluation impacts labor productivity by influencing employment levels and wage adjustments. If devaluation improves export competitiveness, it can lead to higher output growth and employment, reinforcing economic expansion. However, if devaluation leads to inflation and reduces purchasing power, it can negatively impact investment and consumption, slowing economic growth.

Thus, the Solow-Swan model provides a framework for assessing whether currency devaluation enhances capital accumulation and output growth or leads to economic distortions in Nigeria. The steady-state condition in the Solow-Swan model suggests that economies converge to a stable growth path where output per capita is determined by the saving rate, population growth, and technological progress. However, the classical model assumes that saving rates, technological levels, capital depreciation, and population growth rates are fixed positive constants, which may not hold in real-world economies, particularly in developing nations like Nigeria.

3.1.1 The Generalized Solow-Swan Model

The generalized Solow-Swan model expands on the classical growth theory by recognizing that key economic factors such as saving rates, technological progress, and population growth are not fixed but fluctuate over time, shaping economic stability. In the context of currency devaluation, these dynamics become even more crucial in determining long-term growth. Population growth and labor market effects play a significant role, as a high population growth rate can reduce per capita capital and slow economic expansion, while stable population growth and higher labor force participation enhance productivity. However, labor market instability caused by devaluation can disrupt wages, employment levels, and investment flows, leading to economic volatility. Similarly, the savings rate and investment dynamics influence capital accumulation, with higher savings fostering economic expansion, while fluctuations in savings—often triggered by inflationary pressures and investor uncertainty following devaluation—can lead to financial instability. Technological progress is another key determinant, as economies with Hicks-neutral and Solow-neutral advancements experience higher per capita capital, while those adopting Harrod-neutral technology have the potential to catch up with more advanced economies. In the context of devaluation, investment in technology-driven industries can counterbalance rising costs and enhance export competitiveness, fostering long-term growth. However, if technological progress remains inconsistent or subject to external shocks, it can lead to economic fluctuations. While short-term shocks like exchange rate volatility, inflation, and interest rate changes may

not permanently derail growth if stability is restored, persistent fluctuations in key economic variables—such as capital inflows, trade balances, and domestic investment—can create lasting structural weaknesses. Applying this model to Nigeria's economy, where currency devaluation is a recurrent challenge, allows us to assess how devaluation affects capital accumulation, inflation, foreign direct investment (FDI), and trade performance. The model helps determine whether Nigeria's economic fluctuations are temporary adjustments or symptoms of deeper macroeconomic instability, ultimately providing a realistic framework for understanding the long-term impact of devaluation on economic growth.

3.2 Variable Descriptions

This study examines key economic variables to understand how currency devaluation affects Nigeria's economic growth. The variables include both dependent and independent factors, each playing a crucial role in shaping economic performance.

3.2.1 Dependent Variable

Gross Domestic Product (GDP): GDP represents the total value of goods and services produced in Nigeria within a given year. It serves as the primary indicator of economic growth and is used to measure the overall impact of currency devaluation on the country's economic performance.

3.2.2 Independent Variables

Exchange Rate (EXR): The exchange rate reflects the value of the Nigerian Naira relative to the US Dollar. It indicates how much the Naira has appreciated or depreciated over time. A weaker exchange rate (devaluation) can make exports cheaper and imports more expensive, influencing trade balances, inflation, and investment flows.

Inflation Rate (INF): Inflation measures the rate at which prices of goods and services increase over time. It affects the purchasing power of consumers and businesses, with higher inflation often leading to reduced economic stability. In the context of currency devaluation, inflation can rise as import costs increase, making essential goods and services more expensive.

Foreign Direct Investment (FDI): FDI represents the amount of capital that foreign investors bring into Nigeria. It includes investments in businesses, infrastructure, and industries. A stable exchange rate often attracts more foreign investment, while frequent devaluation can either discourage investors due to uncertainty or attract them if they see potential for higher returns.

Investment (INV): Investment, often measured as gross fixed capital formation, reflects how much businesses and the government spend on infrastructure, equipment, and other productive assets. A strong investment environment drives long-term growth, but

devaluation can either encourage or discourage investment depending on factors like inflation, interest rates, and overall economic stability.

3.3 Empirical Model Specification

To empirically analyse the impact of currency devaluation on Nigeria's economic growth, this study adopts a modified version of the Solow-Swan growth model, incorporating key macroeconomic variables that capture the effects of exchange rate fluctuations on output. The model integrates variables that reflect both short-term shocks (such as inflation and exchange rate volatility) and long-term growth determinants (such as capital accumulation and trade performance), ensuring a comprehensive assessment of devaluation dynamics. The functional form of the model is specified as follows:

$$GDPG = f(EXR, INF, FDI, GFCF) \quad .....(3.3.1)$$

Where;

GDPG represents Gross Domestic Product Growth over time, serving as a proxy for economic growth.

EXR denotes the exchange rate (Naira per USD), capturing the effect of currency devaluation on economic performance.

INF is the inflation rate, accounting for price stability and purchasing power erosion following devaluation.

FDI represents foreign direct investment inflows, reflecting investor confidence and external capital flows in response to exchange rate fluctuations.

GFCF denotes gross fixed capital formation, representing investment levels and capital accumulation, a critical component of the Solow-Swan growth framework.

The econometric form of the above model is stated as follows:

$GDPG_t = \beta_0 + \beta_1 EXR_t + \beta_2 INF_t + \beta_3 FDI_{tt} + \beta_4 GFCF_t + \varepsilon_t$. ..... (3.3.2)

Where:

GDPG = Gross Domestic Product growth over time (proxy for economic growth),

EXC = Exchange rate (proxy for currency devaluation),

INF = Inflation rate,

FDI = Foreign Direct Investment inflows

GFCF= Gross fixed capital formation (proxy for investment),

β0= Intercept

β1, β2, β3, β4 = Slope Coefficients

ε = Error term.

3.3.1 A Priori Restrictions.

$\beta 0>0$; $\beta 1>0$, $\beta 1<0$; $\beta 2<0$; $\beta 3>0$; $\beta 4>0$

Where:

$\beta 0$ = Constant term.

B1= Coefficient of Exchange Rate.

B2= Coefficient of Inflation Rate.

B3= Coefficient of Foreign Direct Investment.

B4= Coefficient of Gross fixed capital formation.

These expectations provide a theoretical basis for interpreting the coefficients of the econometric models.

3.4 Data and Estimation Methodology

3.4.1 Data Methodology

This study is based on secondary data sourced from reputable institutions, including the Central Bank of Nigeria (CBN), the National Bureau of Statistics (NBS), the World Bank, and the International Monetary Fund (IMF). The dataset includes key macroeconomic indicators such as GDP, exchange rates, inflation, foreign direct

investment (FDI), trade balance, and investment levels, all of which are essential for understanding the relationship between currency devaluation and economic growth.

By covering multiple years, the dataset allows us to analyse long-term trends and short-term fluctuations in Nigeria's economy. The selection of these variables is guided by economic theory and empirical evidence, ensuring that our model effectively captures the complex interactions between exchange rate movements and overall economic performance. The data will be processed and analysed using appropriate econometric techniques to ensure accuracy and reliability.

3.4.2 Estimation Methodology

This section provides an in-depth analysis of the methodological structure of this study, which examines the impact of currency devaluation on economic growth in Nigeria.

This study uses a quantitative research design to examine the relationship between the dependent and independent variable, this study utilizes data from 1981-2021 the data collected was organized in a tabular form, the main source of these data is the world bank database and the Central Bank statistical bulletin, since the design of this study is quantitative it enables empirical testing of hypothesis, which makes use of selected numerical data and econometric techniques.

The multiple regression analysis will be used to test the validity of the hypothesis formulated. The estimation technique that would be applied is the Autoregressive

distributed lag Error Correction model, ARDL model specification is usually used to factor in the lagged values of the independent variables which helps to take care of the problem of autocorrelation in the residuals and endogeneity issues, ARDL Error correction model is flexible and it's able to account for co-integration and show the short and long run dynamics of the variable relationship.

Unit Root Tests (Augmented Dickey-Fuller - ADF Test): To determine whether the variables are stationary and avoid misleading regression results.

ARDL Bounds Co-Integration Test: To check if there is a long-term relationship between exchange rate changes and economic growth.

Error Correction Model (ECM): To analyse how short-term fluctuations in the exchange rate adjust toward long-run economic stability.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF EMPIRICAL RESULTS

4.1 Descriptive Statistics

In this section, the various variables employed in this study are tested, their parameters estimated, presented and results interpreted in line with economic theorizing as it relates to their policy implications. The section starts with descriptive statistics, followed by the unit root test, Johansen co-integration test, the short run regression estimates of the models, the long run estimates and the granger causality. Finally, the chapter ends with a summary of the results and its policy implications. The summary statistics of all the series employed in this study are presented and discussed below. Specifically, we have Measures of Central tendencies and Variability. The mean of each of the series is a pointer to the average of the respective variable. The standard deviation shows how distributed the variable is from the mean. The maximum value shows the highest value for each variable, while the minimum value shows the lowest value for the entire period under study.

Table 4.1 Descriptive Statistics

	GDPG	GFCF	INF	FDI	EXR
Mean	3.055069	5.93E+10	18.94905	1.175352	171.3427
Median	4.195924	5.71E+10	12.87658	0.853396	153.8625
Maximum	15.32916	1.09E+11	72.83550	2.900249	425.9792
Minimum	-13.12788	3.92E+10	5.388008	-0.039127	9.909492
Std. Dev.	5.387712	1.30E+10	16.65937	0.815572	114.7234
Skewness	-0.825581	1.311413	1.854161	0.458274	0.470708
Kurtosis	4.621278	6.437670	5.306526	2.065612	2.349389
Jarque-Bera	9.147918	31.94034	32.58085	2.926615	2.237161
Probability	0.010317	0.000000	0.000000	0.231469	0.326743
Sum	125.2578	2.43E+12	776.9110	48.18943	7025.053
Sum Sq. Dev.	1161.097	6.75E+21	11101.39	26.60629	526458.0
Observations	41	41	41	41	41

Source: Author's computation (2025) using E-views 9.0

From the table above, it can be seen that exchange rate has the highest average value for the period is 171.3427, with a maximum value of 425.9792, a standard deviation of 114.7234 and a minimum value of 9.909492. The result also shows exchange rate is positively skewed.

The result above shows the mean value of inflation rate is given as 18.94905 with a maximum value of 72.83550 and a minimum value of 5.388008. Inflation rate deviation from the mean is given as 16.65937 and it's positively skewed.

The result above shows the mean value of foreign direct investment is given as 1.175352 with a maximum value of 2.900249 and a minimum value of -0.039127. Foreign direct

investment deviates from the mean at a value given as 0.815572 and it's positively skewed.

The result above shows the mean value of gross fixed capital formation is given as 5.93 with the highest value given as 1.09 and the lowest value given as 3.92. Gross fixed capital formation deviates from the mean is given as 1.30 and it's positively skewed.

The result above shows the mean value of Gross domestic product growth rate is given as 3.055069 with a maximum value of 15.32916 and the lowest value is -13.12788. Gross domestic product growth rate deviates from the mean at a value given as 5.387712 and it's positively skewed.

4.2 Correlation Analysis

Table 4.2 Covariance analysis

	GDPG	GFCF	INF	FDI	EXR
GDPG	1	-0.0412	-0.1456	-0.2883	0.3427
GFCF	-0.1456	1	-0.2665	-0.2058	0.2469
INF	-0.1456	-0.2665	1	0.0778	-0.2381
FDI	-0.2883	-0.2058	0.0778	1	-0.3888
EXR	0.3427	0.2469	-0.2381	-0.3888	1

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

From the table 4.2 above which shows the relationship in terms of direction and strength between the variables used for the study. The dependent variable (GDPG) has a weak and negative relationship with (GFCF) with a coefficient of correlation value of -0.0411 which implies that as GDPG increases, GFCF decreases slightly.

The dependent variable (GDPG) has a weak and negative relationship with (INF) with a coefficient of correlation value of -0.14564, which implies that as GDPG increases, (INF) decreases slightly.

The dependent variable (GDPG) has a weak and negative relationship with (FDI) with a coefficient of correlation value of -0.2882, which implies that as GDPG increases, (FDI) decreases slightly.

The dependent variable (GDPG) has a weak and positive relationship with (EXR) with a coefficient of correlation value of 0.3427, which implies that as GDPG increases, (EXR) increases slightly.

The table also provides insights into the relationship between explanatory variables (INF)

and (GFCF) has a weak and negative relationship with a correlation coefficient value of

-0.2665, as (INF) decreases, (GFCF) decreases alongside slightly.

(INF) and (EXR) has a weak and negative relationship with a correlation coefficient value of -0.2381, as (INF) decreases (EXR) decreases alongside slightly. Similarly, the relationship among the variables can be observed from the table.

4.3 UNIT ROOT TEST

Table 4.3a (ADF Unit Root Test at Levels).

Variables	Test Statistics Probability value	ADF Critical Value (Probability Value)			Order of Integration	Remarks
		1% level	5% level	10% level		
GDPG	0.0835	0.01	0.05	0.1	I(0)	Non-stationary
INF	0.0425	0.01	0.05	0.1	I(0)	stationary
EXR	0.6308	0.01	0.05	0.1	I(0)	Non-stationary
GFCF	0.2088	0.01	0.05	0.1	I(0)	Non-stationary
FDI	0.2717	0.01	0.05	0.1	I(0)	Non-stationary

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

Test hypothesis:

$H_{0:}$ the series has unit root

$H_{1:}$ the series does not have unit root

Decision rule: if the test p-value is less than the critical p-value, reject the null hypothesis, otherwise fail to reject the null hypothesis.

Conclusion: The table shows the summarized unit root results at levels using the augmented dickey fuller test, from the results inflation rate is stationary at the 1%, 5% and 10% critical levels with probability value of 0.0425, it is therefore time invariant with a constant mean and variance. We therefore reject the null hypothesis of the presence of unit root at levels. The other variables which includes exchange rate, foreign direct investment, gross domestic product growth rate and gross fixed capital formation are non-stationary at levels.

Table 4.3b ADF Unit Root Test after First Difference.

Variables	Test Statistics Probability value	ADF Critical Value (Probability Value)			Order of Integration	Remarks
		1% level	5% level	10% level		
GDPG	0.0000	0.01	0.05	0.1	I(1)	stationary
INF	0.0000	0.01	0.05	0.1	I(1)	stationary
EXR	0.0000	0.01	0.05	0.1	I(1)	stationary
GFCF	0.0001	0.01	0.05	0.1	I(1)	stationary
FDI	0.0000	0.01	0.05	0.1	I(1)	stationary

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

Test hypothesis:

$H_{0:}$ the series has unit root

$H_{1:}$ the series does not have unit root

Decision rule: if the test p-value is less than the critical p-value, reject the null hypothesis, otherwise fail to reject the null hypothesis.

Conclusion: The table shows the summarized unit root results after first difference using the Augmented-dickey fuller test, from the results GDPG, INF, EXR, GFCF, and FDI are stationary at the 1%, 5% and 10% critical levels with probability values of 0.000 for

GDPD, INF, EXR and FDI while INF has a p-value of 0.0001 . They are therefore time invariant with a constant mean and variance. We therefore reject the null hypothesis of the presence of unit root in the series.**4.4 Co-integration Test**

Table 4.4 ARDL Bounds Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.963814	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

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

This test is used to determine the existence of a long-run equilibrium relationship among the variables in a multivariate model. The ARDL bounds test is used in determining the long equilibrium in an auto regressive lag model.

Test Hypothesis:

$H_{0:}$ the series has no long-run equilibrium relationship.

$H_{1:}$ the series has a long run-run equilibrium relationship.

Decision rule of the bounds test states that when the f-statistic is greater than the upper bound reject the null hypothesis of no co-integrating relationship, co-integration therefore exists amongst the variables.

From the analysis in table 4.4, the computed f-statistic (4.9638) is greater than the 5% critical upper bound value (3.49).

Conclusion: There is therefore the existence of co-integration relationship amongst the variables in the long run, the conclusion made is that co-integration exists among the variables in the long-run.

4.5 ARDL Error Correction Model Short Run Estimate

Table 4.5 ARDL ECM Short-Run Results

ARDL Error Correction Regression
Dependent Variable: D(GDPG)
Selected Model: ARDL(4, 3, 4, 3, 2)
Case 2: Restricted Constant and No Trend
Date: 03/06/25 Time: 04:17
Sample: 1981 2021
Included observations: 37

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPG(-1))	-0.128158	0.113641	-1.127739	0.2761
D(GDPG(-2))	0.207394	0.124890	1.660613	0.1163
D(GDPG(-3))	-0.206832	0.096225	-2.149468	0.0472
D(GFCF)	1.32E-10	7.58E-11	1.746959	0.0998
D(GFCF(-1))	2.76E-10	8.40E-11	3.280176	0.0047
D(GFCF(-2))	1.27E-10	8.80E-11	1.442519	0.1684
D(INF)	-0.172226	0.037665	-4.572513	0.0003
D(INF(-1))	0.269167	0.050858	5.292516	0.0001
D(INF(-2))	-0.028334	0.036095	-0.785002	0.4439
D(INF(-3))	0.180995	0.033954	5.330524	0.0001
D(FDI)	-1.360621	0.872609	-1.559257	0.1385
D(FDI(-1))	2.403147	0.793828	3.027288	0.0080
D(FDI(-2))	-1.958190	0.775066	-2.526482	0.0224
D(EXR)	0.019987	0.007000	2.855284	0.0115
D(EXR(-1))	-0.029132	0.007171	-4.062300	0.0009
CointEq(-1)*	-0.708383	0.113301	-6.252202	0.0000

R-squared	0.886218	Mean dependent var	0.246752
Adjusted R-squared	0.804945	S.D. dependent var	4.734098
S.E. of regression	2.090813	Akaike info criterion	4.611452
Sum squared resid	91.80148	Schwarz criterion	5.308066
Log likelihood	-69.31187	Hannan-Quinn criter.	4.857041
Durbin-Watson stat	2.154664		

* p-value incompatible with t-Bounds distribution.

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

The Error Correction Term (ECM) is -0.708383 with a p-value of 0.0000, the error term is statistically significant and represents the speed of adjustment needed to restore equilibrium in the dynamic model after a disturbance appropriately explains the short run dynamics of the relationship the regressors and the regressand. The implication of this is that a shock to gross domestic product growth rate in the current period will be restored at a speed of adjustment of about 70.8383% in the next period. This confirms the adequacy and statistical efficiency of the model. From the results of the autoregressive distributed lag model Error correction model short run dynamics the R-Squared value is 0.886218, the R-squared which is also the coefficient of determination is the explanatory Power of the model and accounts for the how much the variations in the dependent variable (GDPG) are explained by the regressors in the model.

The regressors in this model account for 88.6218% changes in gross domestic product growth rate, however after accounting for degree of freedom the adjusted coefficient of determination is also used as a measure of the explanatory power of the model and a better statistical criteria. The value of the adjusted coefficient of determination is 0.804945, which indicates that 80.4945% changes in the dependent variable is accounted for by the explanatory variables or regressors. The difference of 19.50% is captured in the error term of the model.

Short- Run ECM Regression Coefficients.

D (EXR) - Exchange Rate

The coefficient of exchange rate is 0.019987 with a p-value of 0.0115, the coefficient is positive and statistically significant at the 1%, 5% and 10% critical p-values, which implies that the coefficient impacts the model. 1unit increase in exchange rate will lead to a 0.019987 increase in gross domestic product growth rate in Nigeria in the short-run.

D (INF) - Inflation Rate

The coefficient of inflation rate is -0.1722 with a p-value of 0.0003, the coefficient is negative and statistically significant at the 1%, 5% and 10% critical p-values, which implies that the coefficient impacts the model. 1unit increase in inflation rate will lead to a 0.019987 decrease in gross domestic product growth rate in Nigeria in the short-run.

D (GFCF) – Gross Fixed Capital Formation

The coefficient of Gross Fixed Capital Formation is 1.32 with a p-value of 0.0998, the coefficient is positive and statistically significant at the 10% critical p-value, which implies that the coefficient impacts the model. 1unit increase in will lead to a 1.32 increase in gross domestic product growth rate in Nigeria in the short-run.

D (FDI) – Foreign Direct Investment

The coefficient of Foreign Direct Investment is -0.1722 with a p-value of 0.0003, the coefficient is negative and not statistically significant at the 1%, 5% and 10% critical p-values, which implies that the coefficient does not impact the model. 1unit increase in Foreign Direct Investment will lead to a 0.1385 decrease in gross domestic product growth rate in Nigeria in the short-run. The lagged values of foreign direct investment at the first and second lags are significant and impact the model. FDI (-1) and FDI (-2) has a positive and negative coefficients with the following coefficient and p-values respectively- (2.403147, 0.0080) and (-1.958190, 0.0224).

4.5.1 Long-Run ARDL Error Correction Estimates

Table 4.5.1 ARDL ECM Long-run Results

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GDPG)
Selected Model: ARDL(4, 3, 4, 3, 2)
Case 2: Restricted Constant and No Trend
Date: 03/06/25 Time: 04:19
Sample: 1981 2021
Included observations: 37

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.09207	5.461731	3.861791	0.0014
GDPG(-1)*	-0.708383	0.193560	-3.659762	0.0021
GFCF(-1)	-3.20E-10	9.03E-11	-3.546554	0.0027
INF(-1)	-0.242693	0.056137	-4.323252	0.0005
FDI(-1)	1.830289	0.864935	2.116101	0.0504
EXR(-1)	0.014555	0.008024	1.814013	0.0885
D(GDPG(-1))	-0.128158	0.173376	-0.739189	0.4705
D(GDPG(-2))	0.207394	0.193942	1.069360	0.3008
D(GDPG(-3))	-0.206832	0.131100	-1.577670	0.1342
D(GFCF)	1.32E-10	1.00E-10	1.324036	0.2041
D(GFCF(-1))	2.76E-10	1.04E-10	2.648522	0.0175
D(GFCF(-2))	1.27E-10	1.10E-10	1.157206	0.2642
D(INF)	-0.172226	0.045670	-3.771081	0.0017
D(INF(-1))	0.269167	0.066855	4.026156	0.0010
D(INF(-2))	-0.028334	0.043146	-0.656711	0.5207
D(INF(-3))	0.180995	0.046290	3.909996	0.0012
D(FDI)	-1.360621	1.153475	-1.179584	0.2554
D(FDI(-1))	2.403147	0.972846	2.470223	0.0251
D(FDI(-2))	-1.958190	0.967225	-2.024545	0.0599
D(EXR)	0.019987	0.009302	2.148613	0.0473
D(EXR(-1))	-0.029132	0.009278	-3.140002	0.0063

* p-value incompatible with t-Bounds distribution.

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCF	-4.52E-10	1.43E-10	-3.168305	0.0060
INF	-0.342602	0.100968	-3.393183	0.0037
FDI	2.583756	1.333055	1.938221	0.0704
EXR	0.020547	0.009493	2.164377	0.0459
C	29.77494	9.049209	3.290336	0.0046

EC = GDPG - (-0.0000*GFCF -0.3426*INF + 2.5838*FDI + 0.0205*EXR + 29.7749)

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

Long- Run ECM Regression Coefficients.

Intercept Coefficient

The value of the long-run constant term or intercept is 29.77494 with a p-value of 0.0046, it is statistically significant at the 1%, 5%, 10% level and it is the expected value of gross domestic product growth in the long-run when all other explanatory variables are held constant.

D (GFCF) Gross Fixed Capital Formation

The coefficient of (GFCF**)** is -4.52 with a p-value of 0.0060, the coefficient is negative and statistically significant at the 1%, 5% and 10% critical p-values, which implies that gross fixed capital formation impacts the model in the long-run. 1unit increase in gross fixed capital formation leads to a 4.52units decrease in gross domestic product growth in Nigeria in the long-run.

D (INF) Inflation Rate

The coefficient of (INF**)** is -0.3426 with a p-value of 0.0037, the coefficient is negative and statistically significant at the 1%, 5% and 10% critical p-values, which implies that inflation rate impacts the model in the long-run. 1unit increase in inflation rate leads to a 0.3426 decrease in gross domestic product growth in Nigeria in the long-run.

D (EXR) Exchange Rate

The coefficient of (EXR**)** is 0.020547 with a p-value of 0.0459, the coefficient is positive and statistically significant at the 1%, 5% and 10% critical p-values, which implies that exchange rate impacts the model in the long-run. 1unit increase in exchange rate leads to a 0.020547units increase in gross domestic product growth in Nigeria in the long-run.

D (FDI) Foreign Direct Investment

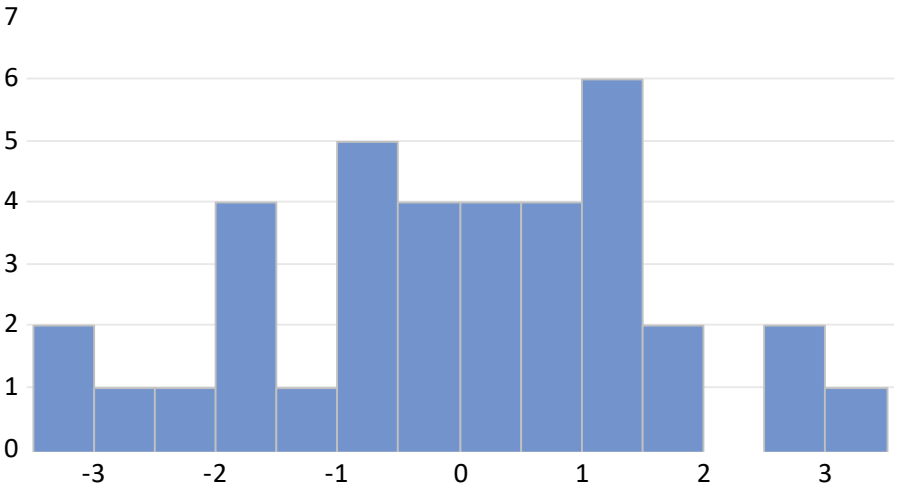
The coefficient of (FDI**)** is 2.583756 with a p-value of 0.0704, the coefficient is positive and statistically significant at the 1% and 10% critical p-values, which implies that foreign direct investment impacts the model in the long-run. 1unit increase in foreign direct investment leads to a 2.583756units increase in gross domestic product growth in Nigeria in the long-run.

4.6 Diagnostics test

This test is used to check the validity, reliability and robustness of the estimated model, they help in identifying whether of the econometric model holds usually the assumptions made about the residuals in the model, they include the following;

1) Test for model specification error – Ramsey Reset test.
2) Test for heteroskedasticity- Breusch – Pagan test
3) Test for serial auto correlation- Breusch- Godfrey test.
4) Test for Normality of the Residuals – Jarque-Bera test

4.6.1 Normality Test



Series: Residuals	
Sample 1985 2021	
Observations 37	
Mean	-2.76e-16
Median	0.111545
Maximum	3.025941
Minimum	-3.335459
Std. Dev.	1.596885
Skewness	-0.194107
Kurtosis	2.496222
Jarque-Bera	0.623608
Probability	0.732125

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

Test Hypothesis:

$H_{0:}$ The residuals are normally distributed

$H_{1:}$ The residuals are not normally distributed

Decision rule:

If the p-value of the Jarque-Bera is less than critical probability value of 5% (0.05), reject $H_{0,}$ otherwise fail to reject $H_{0.}$

From the result the p- value of Jarque-Bera is 0.732125 and is greater than the critical value of 0.05, this gives us enough reason to fail to reject $H_{0.}$

Conclusion: The residuals are normally distributed.

Table 4.6.2 Breusch-Pagan Heteroskedasticity Test

This test is used to check if the residuals of the model have a constant variance.

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.700257	Prob. F(20,16)	0.7768
Obs*R-squared	17.27004	Prob. Chi-Square(20)	0.6354
Scaled explained SS	2.415996	Prob. Chi-Square(20)	1.0000

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

Test Hypothesis:

$H_{0:}$ There is homoscedasticity

$H_{1:}$ There is no homoscedasticity

Decision rule:

If the probability value is less than critical probability value of 5% (0.05), reject $H_{0,}$ otherwise fail to reject $H_{0.}$

From the result the p- value is 0.7768 and is greater than the critical value p-value of 0.05, this gives us enough reason to fail to reject $H_{0.}$

Conclusion: There is homoscedasticity among the variance of the error terms.

Table 4.6.3 Breusch-Godfrey Auto-Correlation Test

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.519642	Prob. F(2,14)	0.2528
Obs*R-squared	6.599660	Prob. Chi-Square(2)	0.0369

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

This is used to check if there is a relationship or correlation amongst the residuals in the model.

Test Hypothesis:

$H_{0:}$ There is no serial auto-correlation among the error terms

$H_{1:}$ There is serial auto-correlation among the error terms

Decision rule:

If the p-value is less than critical p-value of 5% (0.05), reject $H_{0,}$ otherwise fail to reject $H_{0.}$

From the result the p-value is 0.2528 and is greater than the critical value of 0.05, this gives us enough reason to fail to reject $H_{0.}$

Conclusion: There is no serial auto-correlation among the error terms or residuals of the model.

4.6.4 Ramsey Reset Test

	Value	df	Probability
t-statistic	1.297858	15	0.2139
F-statistic	1.684436	(1, 15)	0.2139
Likelihood ratio	3.937766	1	0.0472

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	9.268142	1	9.268142
Restricted SSR	91.80148	16	5.737593
Unrestricted SSR	82.53334	15	5.502223

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

This test evaluates if there is a mis-specification of the variables or regressors used in the analysis, the Ramsey Reset test will be used to conduct this check.

Test Hypothesis

$H_{O:}$ The model is not mis-specified.

$H_{1:}$ The model is mis-specified.

Decision rule: if the research p-value is less than the critical p-value at 5% level reject the Null hypothesis, otherwise fail to reject the null hypothesis

Conclusion: From the result the p-value of the f-statistics is 0.2139 and it's greater than the critical p-value at 5%, we therefore fail to reject the Null hypothesis, which implies that the model is correctly specified.

4.7 Evaluation of the Research Hypotheses

The research put forward the following hypothesis;

H_0: Currency devaluation has no significant impact on economic growth in Nigeria.

H_0: inflation has no significantly impact on economic growth in Nigeria.

H_0: foreign direct investment has no significant impact on economic growth in Nigeria.

1. Insignificant impact of Currency devaluation on economic growth:

   From the empirical research study, exchange rate was used to measure currency devaluation, exchange rate has a positive and significant impact in the short-run and long-run. We therefore have sufficient evidence to reject the null hypothesis made in the study.
2. Inflation has a negative and significant impact in the short-run and long-run from the estimation results, we therefore reject the null hypothesis made in the study.
3. Foreign direct investment has a negative and significant impact in the short-run and a positive and significant impact in the long-run, we therefore reject the null hypothesis made in the study.
4. Gross fixed capital formation used as a control variable in the analysis has a positive and significant impact in the short-run and a negative and significant impact in the long-run, it therefore impacts the model.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Summary

This study investigated the impact of currency devaluation on economic growth in Nigeria from 1981 to 2021. The research utilized gross domestic product growth rate as a proxy for economic growth, other monetary instruments such as monetary policy rate and inflation rate were also used plus the addition of gross fixed capital formation as a control variable.

The study started by looking at chapter one, which is the introduction where the background to the study, statement of the problem, objectives of the study, research questions, research hypothesis, significance of the study where examined. In the chapter two, various literatures were reviewed amongst which are the theoretical frame work of the study, concepts and empirical literatures were discussed. Chapter three was concerned with theoretical framework. It contained the research design, sources of data, procedure for data analysis, and mode estimation technique; while in chapter four, The ARDL-Bounds co-integration test showed that the non-stationary series or variables have a long-run relationship, augmented-dickey fuller test was used to check for the stationarity of the data on the variables, the data was analysed using multiple regression model (MRM) and adopted the auto distributed lag Error Correction Model (ARDL-ECM) to identify the

presence of a long run and the short run association between currency devaluation and economic growth in Nigeria.

5.2 Conclusion

The study which analysed the impact of currency devaluation on economic growth in Nigeria, using relevant variables such as exchange rate to measure currency devaluation, interest rate, foreign direct investment and gross fixed capital formation as a relevant control variable to measure investment in capital projects in the country has sufficient evidence from the empirical study to relay the important roles this variables play in accelerating economic growth especially the use of exchange rate regulation and other related policies affecting currency devaluation to regulate trade, industrialization, production, agriculture and other sectors which account for structural development and growth of any nation.

Exchange rate dynamics and fluctuations therefore needs to be properly regulated to maximise its inherent benefits in facilitating growth and development through its influence on trade with the other countries in the world.

5.3 Recommendations

From the empirical results from the study the following policy recommendations derivable are as follows;

1. Exchange Rate Management: The government should employ the use of managed exchange rate system to enhance competitiveness without causing excessive depreciation since currency devaluation positively influences economic growth.
2. Diversifying Exports: this initiative can help maximise the benefits of devaluation across multiple sectors rather than relying on a few sector.
3. Strengthening Foreign Reserves: this can help stabilize the exchange rate and mop out excessive volatility that could harm economic stability.
4. Optimizing Foreign Direct Investment Benefits: the short term negative effects of FDI indicates that local industries or capital outflows have been stimulated through FDI inflows; policies that promote technology transfer and human capital training should be adopted.
5. Incentives for long-term investments such as tax benefits on reinvested profits to encourage investors to keep their capital in the country should be encouraged.
6. Improving capital formation efficiency: since investments in infrastructure and capital goods drive short-term growth but have a negative long term impact, steps to improve investment efficiency should be taken and this includes;

i. Public-private partnerships should be encouraged

ii. Prioritizing high-quality investments

iii. Implementing monitoring and evaluating systems.

7. Inflation control strategies: inflation rate has a persistent and negative impact on economic growth, adjusting monetary policies such as interest rate to curb inflation while increasing food production, improving security and stabilizing exchange rate for adjustments for imported inflation will help regulate in the inflationary pressures on the economy.

REFERENCES

Abdullahil, M. et al., (2013). Effect of Exchange Rate Variation on Price Level and Output Growth In Bangladesh. Mediterranean Journal of Social Science, MCSER-CEMAS Vol. 4(6).

Abdulrazak inuwa, Mohammed A. Usman, Abdullahi Mohammed (2023) An analysis of the effect of Naira devaluation on Nigeria Balance of Trade.

Adekoya, O. M., Fagbohun, A., & Abeokuta (2016). Currency Devaluation and Manufacturing Output Growth in Nigeria, Journal of Economics and Sustainable Development

Akindiyo, O., & Olawole, A. (2015). Devaluation of Nigeria naira: Bane or panacea. Arabian Group of Journals

Akinlo Enitan (1996) The Devaluation effect of the Nigerian Economy.

Al-Abdelrazag. B. “Does Devaluation Improve Jordan’s Trade Balance (1969-94)."

Amah, P.N. (2020). Effect of Currency Devaluation on Macro-Economic Variables: The Nigerian Experience. 1-15.

Amin Sana, Dr. Shumaila Hashim, Dr Samina Riaz (2019) Effects of currency devaluation on the Economy of the SAARC countries: A theoretical review.

Anagun, Adeyemi Micheal (2020) Naira Devaluation: its effects and possible solutions.

Ebhotemhen Wilson and Anthony Aziegbemin (2022) Effect of exchange rate devaluation on investment in Nigeria.

Genye T (2010). Currency devaluation and economic growththe case of Ethiopia; M.Cs heGsis, Stockholm University.

Jeffrey Sachs (1997). Economic effect of the Asain currency devaluation.

Jiaqi Tang (2024) An analysis of Yen Depreciation on Japan's Economy.

Kalyoucu. H (2008) currency devaluation and output growth: An empirical evidence from OECD countries, international research journal of Finance and Economics.

Khaled Elbagory (2017) The effect of currency Devaluation on Egyptian Economy.

Loto, M.A.(2011) “Does Devaluation Improve the Trade Balance of Nigeria? (A Test of the Marshall-Lerner Condition.” Journal of Economics and International Finance 3, no. 11.

Momodu A.A., and F.N. Akanni (2016) “The Impact of Currency Devaluation on Economic Growth in Nigeria.” International Journal of Arts and Humanities 5, no. 1.

Navaretti K., J.R. Tybout, and L.R. De Melo (1997) “Firm-level Responses to the CFA evaluation in Cameroon.” Journal of African Economics 6, no. 1.

Nils H. Verheuvel (2016) The effect of exchange rate volatility on Economic Growth in south Korea.

OJuolape, A., Mohammad, Y. H., Agboola, Alabi, K. M., OladiPupoo O. & Abddullah. (2015). The Effect Of Currency Devaluation On Output Growth In Developing Economies With Currency Crises. IJER Serials Publications Vol. 12(4).

Okoroafor O.K., and S.O. Adeniji (2017) "Currency Devaluation and Macroeconomic Variables Responses in Nigeria: A Vector Error Correction Model Approach: 1986-2016." Journal of Finance and Economics 5, no. 6.

Oluwaseun Grace (2024) currency devaluation and Economic Growth in Nigeria.

Osundina K.C., and J.A. Osundina (2016) "Effectiveness of Naira Devaluation on Economic Growth in Nigeria." International Journal of Science and Research 5, no. 3.

Reinhart C.M (1994) "Devaluation, Relative Prices and International Trade: Evidence from Developing Countries." IMF working paper.

Richard Cooper N (1971) Currency Devaluation in Developing Countries. Essays in International Finance. Princeton University, Princeton, New Jersey.

Samuel, U. E., Udo, B. E., & Imolemen, K. I. (2018). The implication of naira devaluation to the Nigeria's economic development. Business and Economics Journal, 9(1).

Tonye Ogiriki and Ogwu festus Emeke (2024) Impact of currency devaluation on Economic Growth in Nigeria.

Valeriy Mironov (2015) Russian Devaluation 2014 - 2015

Vasylenko Y., and O. Bazhenova (2014) "A Causal Macroeconomic Model of Devaluation and Inflation Impact on the Economy of Ukraine." EKONOMIKA 93, no. 1

Wolf T.A (2014) "The Simultaneity of the Effects of Devaluation Implication for Modified Planned Economy." Akademia Kado

APPENDIX

Descriptive statistics

	GDPG	GFCF	INF	FDI	EXR
Mean	3.055069	5.93E+10	18.94905	1.175352	171.3427
Median	4.195924	5.71E+10	12.87658	0.853396	153.8625
Maximum	15.32916	1.09E+11	72.83550	2.900249	425.9792
Minimum	-13.12788	3.92E+10	5.388008	-0.039127	9.909492
Std. Dev.	5.387712	1.30E+10	16.65937	0.815572	114.7234
Skewness	-0.825581	1.311413	1.854161	0.458274	0.470708
Kurtosis	4.621278	6.437670	5.306526	2.065612	2.349389
Jarque-Bera	9.147918	31.94034	32.58085	2.926615	2.237161
Probability	0.010317	0.000000	0.000000	0.231469	0.326743
Sum	125.2578	2.43E+12	776.9110	48.18943	7025.053
Sum Sq. Dev.	1161.097	6.75E+21	11101.39	26.60629	526458.0
Observations	41	41	41	41	41

Covariance analysis

	GDPG	GFCF	INF	FDI	EXR
GDPG	1	-0.0411562...	-0.1456414...	-0.2882575...	0.34273310...
GFCF	-0.0411562...	1	-0.2665091...	-0.2057757...	0.24687159...
INF	-0.1456414...	-0.2665091...	1	0.07781915...	-0.2381133...
FDI	-0.2882575...	-0.2057757...	0.07781915...	1	-0.3888138...
EXR	0.34273310...	0.24687159...	-0.2381133...	-0.3888138...	1

ECM Short Run Estimate

ARDL Error Correction Regression
Dependent Variable: D(GDPG)
Selected Model: ARDL(4, 3, 4, 3, 2)
Case 2: Restricted Constant and No Trend
Date: 03/06/25 Time: 04:17
Sample: 1981 2021
Included observations: 37

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPG(-1))	-0.128158	0.113641	-1.127739	0.2761
D(GDPG(-2))	0.207394	0.124890	1.660613	0.1163
D(GDPG(-3))	-0.206832	0.096225	-2.149468	0.0472
D(GFCF)	1.32E-10	7.58E-11	1.746959	0.0998
D(GFCF(-1))	2.76E-10	8.40E-11	3.280176	0.0047
D(GFCF(-2))	1.27E-10	8.80E-11	1.442519	0.1684
D(INF)	-0.172226	0.037665	-4.572513	0.0003
D(INF(-1))	0.269167	0.050858	5.292516	0.0001
D(INF(-2))	-0.028334	0.036095	-0.785002	0.4439
D(INF(-3))	0.180995	0.033954	5.330524	0.0001
D(FDI)	-1.360621	0.872609	-1.559257	0.1385
D(FDI(-1))	2.403147	0.793828	3.027288	0.0080
D(FDI(-2))	-1.958190	0.775066	-2.526482	0.0224
D(EXR)	0.019987	0.007000	2.855284	0.0115
D(EXR(-1))	-0.029132	0.007171	-4.062300	0.0009
CointEq(-1)*	-0.708383	0.113301	-6.252202	0.0000

R-squared	0.886218	Mean dependent var	0.246752
Adjusted R-squared	0.804945	S.D. dependent var	4.734098
S.E. of regression	2.090813	Akaike info criterion	4.611452
Sum squared resid	91.80148	Schwarz criterion	5.308066
Log likelihood	-69.31187	Hannan-Quinn criter.	4.857041
Durbin-Watson stat	2.154664		

* p-value incompatible with t-Bounds distribution.

ECM Long run

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GDPG)
Selected Model: ARDL(4, 3, 4, 3, 2)
Case 2: Restricted Constant and No Trend
Date: 03/06/25 Time: 04:19
Sample: 1981 2021
Included observations: 37

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.09207	5.461731	3.861791	0.0014
GDPG(-1)*	-0.708383	0.193560	-3.659762	0.0021
GFCF(-1)	-3.20E-10	9.03E-11	-3.546554	0.0027
INF(-1)	-0.242693	0.056137	-4.323252	0.0005
FDI(-1)	1.830289	0.864935	2.116101	0.0504
EXR(-1)	0.014555	0.008024	1.814013	0.0885
D(GDPG(-1))	-0.128158	0.173376	-0.739189	0.4705
D(GDPG(-2))	0.207394	0.193942	1.069360	0.3008
D(GDPG(-3))	-0.206832	0.131100	-1.577670	0.1342
D(GFCF)	1.32E-10	1.00E-10	1.324036	0.2041
D(GFCF(-1))	2.76E-10	1.04E-10	2.648522	0.0175
D(GFCF(-2))	1.27E-10	1.10E-10	1.157206	0.2642
D(INF)	-0.172226	0.045670	-3.771081	0.0017
D(INF(-1))	0.269167	0.066855	4.026156	0.0010
D(INF(-2))	-0.028334	0.043146	-0.656711	0.5207
D(INF(-3))	0.180995	0.046290	3.909996	0.0012
D(FDI)	-1.360621	1.153475	-1.179584	0.2554
D(FDI(-1))	2.403147	0.972846	2.470223	0.0251
D(FDI(-2))	-1.958190	0.967225	-2.024545	0.0599
D(EXR)	0.019987	0.009302	2.148613	0.0473
D(EXR(-1))	-0.029132	0.009278	-3.140002	0.0063

* p-value incompatible with t-Bounds distribution.

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCF	-4.52E-10	1.43E-10	-3.168305	0.0060
INF	-0.342602	0.100968	-3.393183	0.0037
FDI	2.583756	1.333055	1.938221	0.0704
EXR	0.020547	0.009493	2.164377	0.0459
C	29.77494	9.049209	3.290336	0.0046

EC = GDPG - (-0.0000*GFCF -0.3426*INF + 2.5838*FDI + 0.0205*EXR + 29.7749)

Diagnostics test

Ramsey reset test

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: GDPG GDPG(-1) GDPG(-2) GDPG(-3) GDPG(-4) GFCF GFCF(-1) GFCF(-2) GFCF(-3) INF INF(-1) INF(-2) INF(-3) INF(-4) FDI FDI(-1) FDI(-2) FDI(-3) EXR EXR(-1) EXR(-2) C

	Value	df	Probability
t-statistic	1.297858	15	0.2139
F-statistic	1.684436	(1, 15)	0.2139
Likelihood ratio	3.937766	1	0.0472

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	9.268142	1	9.268142
Restricted SSR	91.80148	16	5.737593
Unrestricted SSR	82.53334	15	5.502223

LR test summary:

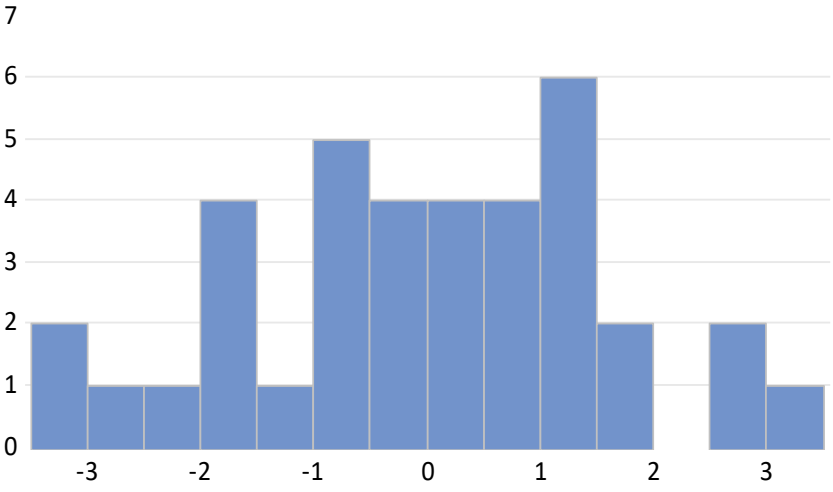
	Value
Restricted LogL	-69.31187
Unrestricted LogL	-67.34299

Unrestricted Test Equation:
Dependent Variable: GDPG
Method: Least Squares
Date: 03/07/25 Time: 15:53
Sample: 1985 2021
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPG(-1)	0.029689	0.193441	0.153477	0.8801
GDPG(-2)	0.202219	0.186346	1.085180	0.2950
GDPG(-3)	-0.220716	0.216407	-1.019910	0.3239
GDPG(-4)	0.133511	0.140262	0.951868	0.3563
GFCF	8.24E-11	1.05E-10	0.782745	0.4460
GFCF(-1)	-1.20E-10	9.36E-11	-1.277645	0.2208
GFCF(-2)	-6.92E-11	1.00E-10	-0.691110	0.5001
GFCF(-3)	-1.36E-10	1.08E-10	-1.267084	0.2244
INF	-0.124597	0.057853	-2.153702	0.0479
INF(-1)	0.119887	0.091191	1.314683	0.2084
INF(-2)	-0.175251	0.120377	-1.455844	0.1660
INF(-3)	0.108965	0.098844	1.102393	0.2877
INF(-4)	-0.081741	0.088901	-0.919461	0.3724
FDI	-1.595248	1.143943	-1.394516	0.1835
FDI(-1)	3.366229	2.109954	1.595404	0.1315
FDI(-2)	-2.103019	2.135124	-0.984964	0.3403
FDI(-3)	0.849065	1.275717	0.665559	0.5158
EXR	0.012441	0.010807	1.151225	0.2677
EXR(-1)	-0.019554	0.016539	-1.182279	0.2555
EXR(-2)	0.016299	0.013428	1.213747	0.2436
C	16.75660	6.305996	2.657248	0.0179
FITTED^2	0.041943	0.032317	1.297858	0.2139

R-squared	0.853780	Mean dependent var	4.105631
Adjusted R-squared	0.649071	S.D. dependent var	3.959677
S.E. of regression	2.345682	Akaike info criterion	4.829351
Sum squared resid	82.53334	Schwarz criterion	5.787194
Log likelihood	-67.34299	Hannan-Quinn criter.	5.167035
F-statistic	4.170714	Durbin-Watson stat	2.393497
Prob(F-statistic)	0.003334		

Normality test



Series: Residuals	
Sample 1985 2021	
Observations 37	
Mean	-2.76e-16
Median	0.111545
Maximum	3.025941
Minimum	-3.335459
Std. Dev.	1.596885
Skewness	-0.194107
Kurtosis	2.496222
Jarque-Bera	0.623608
Probability	0.732125

Heteroskedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.700257	Prob. F(20,16)	0.7768
Obs*R-squared	17.27004	Prob. Chi-Square(20)	0.6354
Scaled explained SS	2.415996	Prob. Chi-Square(20)	1.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/06/25 Time: 04:23
Sample: 1985 2021
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.992260	7.684482	-0.909920	0.3764
GDPG(-1)	-0.022849	0.235189	-0.097151	0.9238
GDPG(-2)	0.134186	0.223369	0.600736	0.5564
GDPG(-3)	-0.450613	0.225351	-1.999604	0.0628
GDPG(-4)	-0.068984	0.184453	-0.373991	0.7133
GFCF	1.84E-10	1.41E-10	1.309901	0.2087
GFCF(-1)	-4.73E-11	1.18E-10	-0.399164	0.6950
GFCF(-2)	8.59E-11	1.14E-10	0.753841	0.4619
GFCF(-3)	-1.56E-10	1.54E-10	-1.013333	0.3260
INF	0.050487	0.064256	0.785712	0.4435
INF(-1)	0.065891	0.097743	0.674123	0.5099
INF(-2)	-0.042876	0.107691	-0.398141	0.6958
INF(-3)	0.003985	0.088451	0.045057	0.9646
INF(-4)	-0.056411	0.065129	-0.866136	0.3992
FDI	-0.295232	1.622903	-0.181916	0.8579
FDI(-1)	1.429155	1.762806	0.810727	0.4294
FDI(-2)	0.924506	1.777757	0.520041	0.6102
FDI(-3)	0.427203	1.360854	0.313923	0.7576
EXR	0.013159	0.013088	1.005412	0.3297
EXR(-1)	-0.000525	0.016986	-0.030882	0.9757
EXR(-2)	0.006255	0.013053	0.479169	0.6383

R-squared	0.466758	Mean dependent var	2.481121
Adjusted R-squared	-0.199795	S.D. dependent var	3.076774
S.E. of regression	3.370149	Akaike info criterion	5.564597
Sum squared resid	181.7265	Schwarz criterion	6.478902
Log likelihood	-81.94504	Hannan-Quinn criter.	5.886932
F-statistic	0.700257	Durbin-Watson stat	1.517510
Prob(F-statistic)	0.776793		

Auto correlation

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.519642	Prob. F(2,14)	0.2528
Obs*R-squared	6.599660	Prob. Chi-Square(2)	0.0369

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 03/06/25 Time: 04:25
Sample: 1985 2021
Included observations: 37
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPG(-1)	0.091843	0.213034	0.431117	0.6729
GDPG(-2)	0.127773	0.182629	0.699631	0.4956
GDPG(-3)	-0.079229	0.168463	-0.470305	0.6454
GDPG(-4)	-0.082819	0.138477	-0.598068	0.5593
GFCF	-2.46E-11	9.92E-11	-0.247760	0.8079
GFCF(-1)	2.70E-11	8.44E-11	0.319495	0.7541
GFCF(-2)	-1.23E-11	8.01E-11	-0.153492	0.8802
GFCF(-3)	6.42E-11	1.13E-10	0.568526	0.5787
INF	0.026981	0.047932	0.562910	0.5824
INF(-1)	-0.002136	0.067404	-0.031693	0.9752
INF(-2)	0.033667	0.076699	0.438955	0.6674
INF(-3)	-0.010041	0.061365	-0.163628	0.8724
INF(-4)	0.007328	0.045549	0.160886	0.8745
FDI	0.064137	1.148590	0.055839	0.9563
FDI(-1)	-0.308290	1.316980	-0.234089	0.8183
FDI(-2)	0.458813	1.323997	0.346536	0.7341
FDI(-3)	-0.296710	0.962845	-0.308160	0.7625
EXR	0.005776	0.009611	0.600974	0.5575
EXR(-1)	-0.002569	0.011901	-0.215902	0.8322
EXR(-2)	-0.000192	0.009040	-0.021279	0.9833
C	-4.890224	6.260971	-0.781065	0.4478
RESID(-1)	-0.390324	0.384714	-1.014584	0.3275
RESID(-2)	-0.576999	0.386794	-1.491749	0.1580

R-squared	0.178369	Mean dependent var	-2.76E-16
Adjusted R-squared	-1.112765	S.D. dependent var	1.596885
S.E. of regression	2.321129	Akaike info criterion	4.793367
Sum squared resid	75.42693	Schwarz criterion	5.794748
Log likelihood	-65.67728	Hannan-Quinn criter.	5.146401
F-statistic	0.138149	Durbin-Watson stat	1.960861
Prob(F-statistic)	0.999975		

Unit root test

Null Hypothesis: EXR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.277059	0.6308
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

Null Hypothesis: D(EXR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.682951	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

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

Null Hypothesis: FDI has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.034129	0.2717
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

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

Null Hypothesis: D(FDI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.712750	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

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

Null Hypothesis: INF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.009166	0.0425
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.549446	0.0000
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

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

Null Hypothesis: GDPG has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.697845	0.0835
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

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

Null Hypothesis: D(GDPG) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.64287	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

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

Null Hypothesis: GFCF has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.202437	0.2088
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

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

Null Hypothesis: D(GFCF) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.170095	0.0001
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

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

Co-integration test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.963814	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37