

**CAPITAL FORMATION AND ITS IMPACT ON ECONOMIC GROWTH IN
NIGERIA**

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CERTIFICATION

This is to certify that this project work was carried out by **Victoria Gift OJEIZUANBI** with matriculation number **SSC2105592**, in the Department of Economics, Faculty of Social Sciences, University of Benin.

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DEDICATION

This project is dedicated to God almighty for his guidance, protection, mercy and favour upon my life throughout my years in the University of Benin and seeing me through during my project work. To him be all the glory and honour forever and ever, amen. I also dedicate the project to my lovely dad, Mr. Augustine Ojeizuanbi. His unwavering support, encouragement and guidance have been my source of strength throughout this journey, and also to the lovely memory of my dear mother, Late Veronica Ojeizuanbi, whose strength and love will forever be a source of inspiration.

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ABSTRACT

The study aimed to critically assess the relationship between capital formation and economic development in Nigeria and potential avenues for leveraging capital formation to achieve long term and inclusive economic development, focusing on the period from 1991 to 2024. Specifically, the study examined if capital formation and other macroeconomic variables such as foreign direct investment, lending rate and trade openness determine economic growth in Nigeria. The study conducted a descriptive statistic, correlation analysis, the unit root test using the Augmented Dicky-fuller test to check for stationarity of the variables, the co-integration analysis using the bounds test, to check if there is a long run relationship between the variable and the ARDL-ECM approach to analyze the data for both the short run and long run. The findings showed that all variables employed are co-integrated in the long run and thus, have a long-term relationship. It was found that capital formation has a significant impact on economic growth in the short run but does not have a significant impact in the long run, FDI and trade openness both have a positive and significant impact on economic growth rate. However, lending rate has no impact on economic growth rate in Nigeria during the specified period. The study therefore recommends that the government should ensure that capital formation initiatives are sustainable and efficient; focusing on long-term benefits, introduce policies to increase the level of economic development in the country such as increasing the level of infrastructure and policies to further improve trade by increasing the productive base of the country to increase exports and limiting trade restrictions.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Capital formation refers to the portion of current income that is saved and reinvested to expand future production and income. It involves accumulating a nation's stock of productive assets through investments in equipment, plants, and infrastructure. This process is a fundamental component of economic growth, as it fosters increased productive capacity, technological advancement, and job creation (Bakare, 2011).

In developing economies, capital formation serves as a cornerstone of sustainable growth. It encompasses not only the creation of physical assets such as machinery and factories but also the development of human capital—education, skills, and health—that enhances overall productivity (Jhingan, 2016). According to Tushar (2018) and Jhingan (2006), the capital formation process includes three main stages: generating savings, mobilizing those savings through financial and credit systems, and channeling them into investments in capital goods.

From the perspective of Classical and Neo-Classical growth theories, capital formation remains essential for economic progress. The Harrod–Domar and Solow growth models

both emphasize that continuous increases in capital investment are necessary for achieving long-term output expansion (Harrod, 1939; Solow, 1956). Similarly, endogenous growth models developed by Romer (1986) and Lucas (1988) suggest that rising capital formation—particularly through innovation and human capital—can produce a lasting improvement in growth rates.

Odedokun (2001) observed that while capital formation is vital, its effectiveness depends heavily on governance, macroeconomic stability, and a sound regulatory framework. Under favorable institutional conditions, countries like Nigeria can leverage capital formation to achieve inclusive growth. The Central Bank of Nigeria (2020) highlights the importance of encouraging domestic savings, reforming the financial sector, and attracting foreign direct investment to strengthen the nation's capital base.

Researchers have also emphasized the critical role of human capital in development. Investment in education and healthcare enhances living standards and productivity (Eigbiremolen & Anaduaka, 2014; Sankay, Ismail, & Shaari, 2010). Increased capital stock—such as factories, roads, schools, and hospitals—translates into higher output, employment, and better quality of life (Lewis, 1954). Human capital formation contributes further by improving labor efficiency and promoting innovation (Todaro & Smith, 2015). The World Bank (1991, 1993) supports this view, noting that investment in people accelerates economic growth.

Pioneers of human capital theory, such as Schultz (1961) and Becker (1964), argued that expenditure on education and health yields long-term returns comparable to those of physical investment. Ogujiuba and Adeniyi (2005) reinforced this argument, stressing that education enhances labor productivity and is fundamental to development. Historically, Nigeria has sought to increase capital formation through policy initiatives like the Structural Adjustment Programme (SAP) introduced in 1986, which promoted privatization, investment, and commercialization to boost economic progress.

A clear understanding of the factors influencing capital formation is crucial for designing effective economic policies (Okonkwo, 2010). The concept involves channeling savings into tangible goods, infrastructure, and human resources to improve future output and productivity (Bakare, 2011; Ugwuegbe & Uruakpa, 2013). It requires efficient resource utilization, where a portion of national income is redirected from immediate consumption toward investment (Gbenga & Adeleke, 2013; Owolabi & Ajayi, 2013).

Jhingan (2006) identifies three interconnected stages in the process of capital formation:

1. The existence and continuous growth of real savings;
2. The mobilization of savings through the financial system; and
3. The effective use of those savings for investment in capital goods.

Savings, therefore, represent the key determinant of capital formation. Higher savings rates increase investment and, consequently, promote economic growth (Lewis, 1954). Lewis's dual-sector model further explains that transferring surplus labor from the traditional subsistence sector to the industrial sector raises savings, which fuels capital accumulation. For developing nations like Nigeria, where foreign capital inflows remain limited, increasing domestic savings and investment is essential for sustained development (Iyoha & Oriakhi, 2002).

In summary, capital formation contributes not only to increased production through investment in capital equipment but also to employment generation, technological progress, and improved efficiency. These outcomes help economies achieve economies of scale and deepen specialization. Nigeria's relatively low level of capital formation has constrained its capacity for steady economic growth, emphasizing the need for greater investment in both physical and human capital (Iyoha & Oriakhi, 2002).

Jhingan (2007) asserts that no nation can attain sustainable development without deliberate efforts to build both human and physical capital. He emphasizes that capital formation drives productivity and fosters innovation. It remains the backbone of economic progress, particularly in developing nations, when supported by sound macroeconomic policies and institutional reforms (Iyoha & Oriakhi, 2002). Moreover, capital formation provides the

tools and infrastructure needed for human development and helps expand markets while correcting structural imperfections (Net Source, 2025).

1.2 Statement of the Problem

Capital formation both in its physical and human dimensions remains a fundamental driver of a nation's economic growth and sustainability. Theoretically, economies that maintain higher rates of capital accumulation are expected to experience accelerated development as a result of enhanced productive capacity, improved technology, and increased labor efficiency. However, in many developing economies such as Nigeria, this relationship has proven inconsistent and is frequently hindered by deep-rooted structural and institutional constraints (Net Source).

Despite Nigeria's abundant human and natural resources, the country continues to face persistent underinvestment in infrastructure, limited domestic savings, and inadequate development of human capital. This persistent disconnect between the level of capital formation and actual development outcomes raises serious concerns regarding the quality, efficiency, and productive utilization of the nation's capital stock (Iyoha & Oriakhi, 2002; Jhingan, 2011). Empirical evidence indicates that Nigeria's capital accumulation has been relatively low and unstable, failing to translate effectively into sustained and broad-based economic growth (Uremadu, 2006).

Although both public and private investment efforts have expanded over the years, their impact on long-term economic transformation remains weak. Several factors—such as corruption, macroeconomic volatility, and limited technological advancement—have impeded the full realization of the developmental potential of these investments (Ajakaiye & Ncube, 2010). In particular, public sector projects are often mismanaged or poorly executed due to corruption and weak governance frameworks, while private sector participation is constrained by policy inconsistency, poor infrastructure, and economic instability (Adeniyi & Egwaikhide, 2013).

Moreover, human capital development in Nigeria has been inadequate. High unemployment, low educational outcomes, and skill mismatches have collectively undermined workforce quality and diminished the productivity gains expected from physical capital investment (World Bank, 2020). The nation continues to face critical challenges ranging from poor infrastructure and weak institutions to insecurity, limited credit access, and low domestic savings that significantly weaken the effectiveness of capital formation (Net Source).

Given these realities, this study seeks to examine in detail the nature and strength of the relationship between capital formation and economic development in Nigeria. It further aims to explore practical strategies through which improved capital accumulation—both

physical and human can be leveraged to achieve inclusive, sustainable, and long-term economic growth within the country.

1.3 Research Questions

1. What is the impact of capital formation on economic growth?
2. What is the direction of casual relationship between capital formation and economic growth in Nigeria?

1.4 Research Hypothesis

1. H1: capital formation does not have significant impact on economic growth.
2. H2: There is no casual relationship between capital formation and economic growth in Nigeria.

1.5 Significance of the study

The significance of this study in its contribution to the existing body of knowledge on capital formation and it's impact on economic development. By employing the ARDL-ECM approach to examine the extent of capital formation and it's impact on economic growth. It provides valuable insight to the fact that capital formation has an impact on economic growth.

The use of ARDL-ECM approach in this study is particularly significant as it allows for examination of both short term and long term relationship between capital formation

and economic growth. By using the ECM, it captures the dynamic relationship between capital formation and economic growth by providing comprehensive understanding in how capital formation influence economic growth. The findings are crucial to policy makers and stakeholders who seek to influence economic growth through capital formation. Policy makers can develop targeted policies and strategies to improve on the workings of capital formation to enhance economic growth.

The findings of this study highlights the importance of savings, foreign direct investment, investment, interest rate and government asset which are component of capital formation to enhance economic growth. It helps guide policy makers to improve resource allocation and attract investment all of which are essential for achieving long term economics growth.

1.6 Scope of the Study

The geographical scope of this study is limited to Nigeria,a country located in West Africa.

The time scope of this study covers a period of 35 years from 1981-2024. The time frame is chosen to capture the changes in the Nigerian economy. It will use data from world development indicators (world bank). The methodical scope involves the use of quantitative research method to analyze capital formation and it's impact on economic

development. The study employs the ECM model to examine relationship between capital formation and economic growth. This study also uses descriptive statistics and correlation analysis to examine the characteristics of the data and relationships between the variables.

1.7 Structure of the Study

This study is divided into five chapters. Chapter one provides an introduction to the study including the background, statement of problem, research questions, objectives of the study, research hypothesis, significance of the study, scope of the study, limitations of the study and structure of the study. Chapter two reviews the literature of capital formation and it's impact on economic growth including the definition of various concept, theoretical literature and empirical evidence. Chapter three presents the methodology of the study including the theoretical framework, research design, data collection methods and data analysis technique. Chapter four presents and analyses the result of the study including the descriptive statistics and correlation analysis. Chapter five presents the conclusion and recommendations of the study including the implications of the findings for policy makers and stakeholders.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

Capital formation refers to the process through which a nation accumulates and enhances its stock of productive assets. It involves the mobilization of savings and their conversion into physical capital such as machinery, infrastructure, and buildings that contribute to future productive capacity. In macroeconomic terms, capital formation is often equated with gross domestic investment, encompassing both public and private sector expenditure (Gbenga & Adeleke, 2013).

Jhingan (2007) explains that capital formation entails acquiring and increasing capital goods that enhance the productive capacity of an economy. It includes investment in fixed assets—such as buildings, equipment, and technology—as well as human capital development through education and healthcare (Jhingan, 2006). This process takes place when a portion of current income is saved and reinvested to increase material and human resources.

The Harrod–Domar model underscores the role of investment in promoting growth, asserting that higher savings and investment levels result in greater capital accumulation

(Todaro & Smith, 2011). Similarly, the Solow–Swan growth model identifies long-term economic progress as a function of increased capital formation and technological advancement (Barro & Sala-i-Martin, 2004). Iyoha and Oriakhi (2002) observed that inadequate investment in infrastructure and human capital has slowed Nigeria’s growth trajectory.

In Nigeria, capital formation has been unstable due to political uncertainties, policy inconsistency, and macroeconomic imbalances. The World Bank (2023) reported that gross fixed capital formation as a share of GDP has hovered between 15% and 20% over the years. To address this, the *Economic Recovery and Growth Plan (2017–2020)* and the *National Development Plan (2021–present)* were introduced to promote investment through both public and private participation.

Empirical findings by Odo et al. (2016) and Olaiya and Adeyeye (2021) reveal a positive but weak link between capital formation and Nigeria’s economic development. Between 1981 and 2024, capital formation has remained an essential driver of global and national growth. However, its success depends on efficient mobilization, management, and alignment of investments with developmental objectives.

Capital formation serves as a catalyst for production and economic expansion, enhancing the speed and efficiency of technical progress (Pathania, 2013). Conversely, inadequate

capital accumulation constrains economic growth and limits the ability of an economy to reach its full productive potential.

2.2 Determinants of Capital Formation in Nigeria

Kanu and Ozurumba (2014) identified several sources of financial capital formation in Nigeria, including total national savings, foreign investment and aid, public corporations, taxation, and marketing boards. The effectiveness of these sources significantly influences economic growth. Nweke, Odo, and Anoke (2017) emphasized that capital formation is central to economic growth as it both reflects effective demand and facilitates productive efficiency for future output.

Total National Savings:

Stephen and Obah (2017) define savings as income remaining after consumption and government spending. It encompasses both public and private savings. Igbatayo and Agbada (2012) argue that higher national savings translate into greater investment and higher output since the level of savings determines the extent of capital accumulation.

Foreign Direct Investment (FDI):

FDI represents the inflow of capital from multinational corporations headquartered abroad. It entails not only financial investment but also the transfer of technology, management

skills, and marketing expertise (Ali, 2005). Such investments introduce innovation and productivity gains that contribute to capital accumulation.

Surplus Labour:

Donwa and Odia (2009) explain that developing nations often face disguised unemployment, and this surplus labour can be redirected toward capital projects such as construction and infrastructure development. Aiyelogbon (2011) adds that economic growth occurs when surplus labour shifts from the rural to industrial sectors, thereby generating profits that promote further investment.

Population Growth:

According to Jhingan (2006), rapid population growth exerts pressure on per capita income, reducing savings and investment capacity. In Nigeria, high dependency ratios limit disposable income and consequently lower the rate of capital formation.

Interest Rate:

Interest rate, defined as the cost of borrowing or the reward for saving, plays a vital role in investment decisions. Lower interest rates encourage borrowing and stimulate capital formation, while higher rates discourage investment (Jhingan, 2006).

Government Assets and Policies:

Mark (2012) notes that government assets and land acquisition during economic downturns can stimulate capital formation. Favorable government policies—such as subsidies, tax incentives, and investment allowances—also enhance the investment climate (Donwa & Odia, 2009).

Investment:

Investment represents the allocation of resources to produce goods and services that contribute to future wealth. It is the foundation of capital formation, facilitating both physical and human capital development. Policymakers must therefore prioritize measures that promote private and public investment, mobilize domestic savings, and attract foreign capital to ensure long-term growth.

2.3 Classification of Capital Formation in Nigeria

Ugwuegbe and Uruakpa (2013) classify capital formation into public and private investment. Public investment consists of government expenditure on infrastructure and services, while private investment involves capital spending by individuals and corporations. Anibor, Shuaib, and Kadiri (2014) argue that economic advancement depends on large-scale investment in capital goods that improve productivity in agriculture,

industry, and mining, as well as infrastructure such as schools, hospitals, and transportation networks.

Capital formation in Nigeria can be grouped into three main types:

1. **Physical Capital Formation:** Creation of tangible assets such as buildings, roads, and machinery, which directly boost production capacity (Iyoha & Oriakhi, 2002).
2. **Human Capital Formation:** Investment in education, skills, and health to improve labor productivity (Becker, 1993; World Bank, 2023).
3. **Financial Capital Formation:** Mobilization of monetary resources through savings, the banking system, and capital markets. Nigeria's weak financial infrastructure and low savings rate limit its investment potential (Odo, Nwoba, & Elon, 2016).

Despite reforms by the Central Bank of Nigeria to promote financial inclusion, structural challenges continue to constrain effective capital accumulation. Sustainable growth requires coordinated investment across all three forms of capital.

2.4 Reasons for Low Level of Capital Formation in Nigeria

Jhingan (2007) identified several factors responsible for Nigeria's low rate of capital formation:

- **Low Income:** A significant proportion of Nigerians live below the poverty line, making it difficult to save or invest (Iyoha & Oriakhi, 2002).
- **Low Productivity:** Limited infrastructure, outdated technology, and a shortage of skilled labor constrain productivity and reduce investment capacity (Anibor, Shuaib, & Kadiri, 2014).
- **Demographic Factors:** High population growth and dependency ratios reduce the number of productive workers and limit per capita savings (World Bank, 2023).
- **Income Inequality:** Wealth concentration among a small elite leads to low overall savings since the poor cannot save, and the rich often invest abroad (Odo et al., 2016).
- **Small Market Size:** Low purchasing power restricts domestic demand, discouraging entrepreneurs from investing in large-scale production (Jhingan, 2007).

These challenges collectively weaken Nigeria's ability to generate the savings and investments needed for sustained growth.

2.5 Capital Formation and Economic Growth in Nigeria

Capital formation remains a critical component of economic growth, as it determines a country's capacity to expand production. Savings and investments are essential to

accumulate the capital stock required for development. Stephen and Obah (2017) note that Nigeria's GDP growth peaked around 1970 but experienced significant fluctuations due to oil price shocks and economic crises.

During the *Structural Adjustment Programme (SAP)* of 1986, the government sought to diversify the economy and reduce dependence on oil. Although the policy improved FDI inflows, it also led to reduced public investment in infrastructure (Ogun, 2010). Subsequent initiatives—including the *National Rolling Plan* (1990–1998), *Vision 2010*, *NEEDS* (2004–2007), *Vision 20:2020*, and the *Economic Recovery and Growth Plan* (2017–2020)—all aimed to stimulate capital formation but were hampered by weak implementation, corruption, and political instability (Olayemi, 2012; Akabueze, 2018).

The *National Development Plan* (2021–present) emphasizes public–private partnerships and seeks to increase gross fixed capital formation to 25% of GDP (FGN, 2021). Despite these reforms, issues of governance and macroeconomic instability continue to undermine their success (Iyoha & Oriakhi, 2002; Ajakaiye & Jerome, 2006).

2.6 Theoretical Literature

Endogenous Growth Theory:

This theory posits that long-term growth arises from internal factors such as innovation, human capital, and investment in research and development (Romer, 1986). It stresses that technological advancement and education-driven productivity improvements sustain growth.

Life-Cycle Theory of Savings:

Proposed by Modigliani and Brumberg (1950), this theory explains that individuals' savings behavior varies across their lifetime, influencing national savings rates and, consequently, capital formation (Nwachukwu & Egwaikhide, 2007).

Neo-Classical Growth Model:

Developed by Solow and Swan, this model asserts that growth results from savings and investment, with economies eventually reaching a steady state where output, capital, and labor grow at constant rates (Kaldor, 1957).

Financial Intermediation Theory:

According to Schumpeter (1911) and Shaw (1973), financial institutions play a central role in channeling savings to productive investment, reducing transaction costs, and promoting innovation.

Structural Hypothesis:

Gerschenkron (1962) emphasizes that in less developed economies, weak financial systems and limited demand for financial services constrain capital formation, making government and banks key drivers of industrial financing.

2.7 Empirical Literature Review

Numerous studies have examined the relationship between capital formation and economic growth in Nigeria. Adedokun (1997) found that public investment in education and health enhances long-term development. Iyoha and Oriakhi (2002) confirmed that gross fixed capital formation correlates positively with GDP. Similarly, Bakare (2011), Isola and Alani (2012), and Ugwuegbe and Uruakpa (2013) reported that capital formation significantly influences growth.

Adenuga (2006) and Adetakun (2011) emphasized the importance of human capital investment, showing that education and training accelerate growth. Later studies—such as Nweke et al. (2017), Adewunmi (2019), Akinbobola and Saibu (2021), and Eze and Ogiji (2021) produced mixed results, with some showing positive but insignificant relationships between capital formation and GDP.

Recent findings by Ajagbe et al. (2023) and Opadeji et al. (2023) reaffirm that household savings and infrastructure development are significant drivers of capital formation. Amade and Oyigebe (2024) found that FDI contributes positively to growth, while Ojima and Wasurun (2024) noted that capital flight weakens the impact of investment on GDP.

Overall, empirical evidence supports the conclusion that capital formation—whether physical, human, or financial remains a crucial determinant of Nigeria’s economic development, though its impact depends heavily on governance quality, policy implementation, and macroeconomic stability.

CHAPTER THREE

THEORETICAL FRAMEWORK

3.1 Endogenous growth theory

The endogenous growth theory provides a modern framework for understanding the drivers of economic expansion. Unlike the neoclassical model, which attributes long-term growth to external or exogenous factors, this theory emphasizes internal mechanisms such as innovation, investment in human capital, and knowledge accumulation as key determinants of sustained prosperity. According to proponents of this theory, economic progress is not predetermined by external shocks but is influenced by deliberate actions and policies that promote creativity, learning, and productivity.

Endogenous growth economists argue that improvements in productivity can be directly linked to accelerated innovation and greater investment in education, research, and technology. Consequently, both government and private institutions play a vital role in fostering innovation through incentives such as research and development (R&D) funding, patent protection, and intellectual property rights. By supporting these mechanisms, economies can stimulate continuous technological progress and human capital enhancement, ensuring a persistent rate of growth.

A core principle of this theory is the accumulation of knowledge as a driver of expansion. Knowledge-intensive sectors such as telecommunications, electronics, biotechnology, and software have increasingly become engines of growth, particularly in developing countries. The theory underscores that such industries produce positive externalities that spill over into the wider economy, generating long-term competitive advantages.

The key propositions of the endogenous growth theory can be summarized as follows:

1. **Technological Progress:** The rate of technological advancement is not constant but can be influenced by deliberate policy and investment decisions.
2. **Role of Policy:** Government actions that enhance competition, innovation, and entrepreneurship can permanently raise a nation's growth rate.
3. **Returns to Scale:** The theory challenges the neoclassical assumption of diminishing returns, asserting that new capital investments often generate increasing returns to scale.
4. **Private Investment in R&D:** Sustained innovation is driven by private sector investment in research and development, supported by an available and skilled workforce.
5. **Entrepreneurship and Innovation:** Policies that encourage entrepreneurship foster new business creation, job opportunities, and technological progress.

In essence, the theory highlights that economic growth can be continuously sustained when policies promote human capital development, protect intellectual property rights, and encourage both private and public investment in innovation. Endogenous growth thus depends on internal productivity dynamics rather than on external or temporary economic forces.

3.2 Model specification

The multiple linear regression model is specified below

$$EG = F(GFCF, FDI, LR, TO)$$

Where EG is the dependent variable and GFCF, FDI, LR and TO are the independent variables.

The above model can be stated in an econometric form below;

$$EG = \beta_0 + \beta_1 GFCF + \beta_2 FDI + \beta_3 LR + \beta_4 TO + U_t$$

Where EG = Economic growth

GFCF= Gross fixed capital formation

FDI = Foreign direct investment

LR = Lending rate

TO= Trade openness

Where $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ are parameters

Ut = Error term

A priori expectations

$\beta_1, \beta_2, \beta_4 > 0$

$\beta_3 < 0$

3.3 Methodology

This study employs a variety of analytical methods which include descriptive statistics, correlation analysis, unit root testing for stationarity of variables, cointegration test for long run relationship and the ARDL approach.

Descriptive Statistics

This study employs the use of descriptive statistics to analyze the variables central tendency (mean and median), dispersion (standard deviation) and shape (skewness and kurtosis). The mean provides a measure of the average value while standard deviation quantifies the variability around the mean. Skewness indicates the symmetry of the data distribution with positive values suggesting a right skewed distribution and negative values indicating a left skewed distribution. Kurtosis measures the peakedness of the distribution

with higher values indicating a more peaked distribution. The Jarque-Bera test assessed the normality of the data determining whether the skewness and kurtosis were consistent with a normal distribution. A probability value greater than 5% indicates that variables were normally distributed.

Unit root test

This study employs unit root test to determine the stationarity of the time series data. At this stage, we verify the sequence of integration within each series and determine whether or not they are stationary. Researchers have devised many techniques for ensuring the right order of integration.

Dickey and Fuller 1983 created Augmented Dickey fuller (ADF) test, currently the gold standard. ADF is predicted on rejecting the unit root null hypothesis (that series are not stable) in favour of the alternative hypothesis of no unit root (that series are stationary). Each series is analyzed in both presence and absence of a deterministic trend.

The Augmented Dickey fuller model (for each variable under this study) for intercept without trend is specified as;

H^0 : There is a unit root (that time series data is non stationary)

H^1 : There is no unit root (that time series data is stationary).

Cointegration test

Cointegration is a statistical concept suggesting a long-term relationship between non stationary variables that become stationary when differenced once. This means that though the variables may fluctuate independently in the short term, they tend to move together in the long run. Cointegration analysis is typically applied to time series data. If a linear combination of two or more non stationary time series is stationary, then the series is said to be cointegrated. The bound test will be used to examine the long run relationship of the variables.

ARDL (Autoregressive distributed lab)

This study utilizes ARDL bound testing framework to estimate the long run equilibrium relationship. ARDL model is a model that includes lagged values of the dependent variables (Autoregressive) and lagged values of the independent variables (distributed lab) as one of the explanatory variables. The ARDL cointegration is used to establish whether there is a long run equilibrium relationship among the variables, when the variables are integrated of both order zero $I(0)$ and order one $I(1)$. In addition, the ARDL model avoids configuring a large number of specifications in the standard cointegration test. These include decisions regarding the number of endogenous and exogenous variables to be included. The ARDL approach allows the use of different optimal Lags for the different variables which is not possible in the standard cointegration test. Since time series data could be vulnerable to the unit root problems, Augmented Dickey fuller (ADF) unit

test is implement on the series to avoid spurious regressions. Unit root test are first conducted to determine the stationarity of the variables which must be a combination of I(0) and I(1) series.

Error correction mechanism

The ECM is a statistical technique used to correct deviations from the long run equilibrium relationships between economic variables. It is based on the idea that economic variables tend to return to their equilibrium values over time.

In ECM, the error term represents the deviation from the long run equilibrium relationship. The ECM model estimate the speed at which the variables return to their equilibrium value known as the error correction term. The ECM model consists of two parts; the short run dynamic capture the temporary deviations from the equilibrium

$$\Delta Y_t = \gamma + I = 1 \sum P \beta_i \Delta X_{t-i} + \alpha (Y_{t-1} - \beta_0 - \beta_1 X_{t-1}) + V_t$$

Where:

- ΔY_t and ΔX_t are the first differences of the variables.
- α is the error correction term coefficient.
- V_t is the white noise error term.

relationship while the long run equilibrium relationship represents the underlying structural relationship between the variables. The ECM can be specified below;

3.4 Justification of the model

The justification for the use of ARDL-ECM approach is that the endogeneity problems and inability to test hypothesis in the limited coefficient in the long run are avoided. That is, it has superior statistical properties in small samples as it is relatively more efficient in small sample data size found mostly in studies in developing countries. Moreover, the long run and short run parameters of the model are estimated simultaneously and it can be applied irrespective of whether the variables in the model are endogenous. Lastly, applying ARDL-ECM is helpful in data generating process through taking sufficient number of lags generally to specific modeling framework.

Result valuation

This study aims to know whether the variables are significant or otherwise the result of the model will be evaluated on the basis of three criteria namely; Econometric apriori expectation, statistical test of significance and econometric test.

Apriori expectations;

$$\beta_1, \beta_2, \beta_4, > 0$$

$$\beta_3 < 0$$

The statistical criteria

Statistical test is done to evaluate reliability of the estimated parameter in accordance with statistical theory and expectation. The statistical test to be carried out include;

The T-test: This is used to test the significance of individual parameters of the regression model. The decision to accept the null hypothesis is based on the test statistics from the data.

F-test: It is carried out to ascertain the overall significance of the model.

Coefficient of determination (R^2): It explains the percentage (%) in the total variation of the dependent variable being explained by the independent variables. It measures the extent to which the explanatory variables are responsive for judging the explanatory power of the regression.

Econometric criteria

This test will be performed on the regression results in order to evaluate the model.

These tests are discussed briefly below;

Test for multi-collinearity

This will be used to test the linear collinearity among the explanatory variables. When two or more explanatory variables in a regression model are highly correlated, it distorts the estimation of coefficient. Multi-collinearity undermines the reliability of the regression coefficient making it difficult to identify the true effect of each variable. The variable inflation factor (VIF) is used to detect multi-collinearity. If the VIF exceeds 10, then multi-collinearity exists within the model. This study will use a simple correlation matrix for this test.

Autocorrelation test

This is used to test if the errors corresponding to different observations are correlated, testing for randomness of error term. The Durbin Watson statistic would be employed for this test. The close DW statistic is to 2 indicated the absence of autocorrelation.

Heteroskedasticity test

This is used to ascertain if the error term of the explanatory variable of the estimated model have equal variance

Normality test

This will be used to show whether the error term of the estimated model is normally distributed.

3.5 Method of Data Collection

This study relies on secondary data from world development indicators (world bank) and Central bank statistical bulletin. The data collected was used to analyze capital formation and it's impact on economic development.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents a descriptive statistic of the model, a correlation analysis to determine the relationship between the variables of the model as well as a preliminary check of the problem of multicollinearity i.e. relationship between the explanatory variables in the model, the unit root test to determine the stationarity of the individual variables.

The bound co-integration test was then performed to check out if there is a long-run equilibrium relationship between the variables and to determine if the variables satisfy the convergence property. The ARDL-ECM estimation was used to analyse the short run dynamics and bounds testing co-integration technique of estimation was used to determine the relationship of the variable in the long run. Finally, residual and stability diagnostics were carried out to validate the empirical findings.

4.2 Descriptive Statistics

Descriptive statistics is the process of using and analysing the summary statistic which statistically describes or summarizes features from the collection of data. Table 1 shows the summary statistics for GDP growth rate (GR), gross fixed capital formation (GFCF), foreign direct investment (FDI), lending rate (LR), and trade openness (TO).

Table 1;

	Growth rate	GFCF	FDI	LR	TO
Mean	3.999	15578.78	1.28	18.25	29.25
Median	3.92	7741.70	1.29	17.57	29.73
Maximum	15.33	82889.22	2.90	31.65	49.98
Minimum	-2.04	285.59	-0.039	11.48	8.73
Std. Dev.	3.67	21146.22	0.85	3.94	10.34
Skewness	0.54	1.824	0.200	1.15	-0.21
Kurtosis	4.02	5.300	1.84	5.41	2.15
Jarque-Bera	3.14	26.35	2.12	15.71	1.27
Probability	0.21	0.000002	0.35	0.0004	0.53
Sum	135.97	529678.6	43.521	620.62	994.40
Sum Sq. Dev	445.29	1.48	23.92	511.37	3528.56
Observations	34	34	34	34	34

Source: Authors' computation using E-views 12.

From the table 1 the mean of growth rate is 3.999, while the median is 3.92. The data ranges from -2.04% to 15.33% and the Jarque Bera probability value of 3.14 shows that growth rate is normally distributed. The mean GFCF is 15578.78, while the median is 7741.70. The data ranges from 285.59 to 82889.22 and the Jarque Bera probability value of 26.35 shows that the GFCF is normally distributed. The mean of FDI is 1.28, while the median is 1.29. The data ranges from -0.039 to 2.90 and the Jarque Bera probability value of 2.12 shows that the FDI is normally distributed. The mean LR is 18.25%, while the median is 17.57%. The data ranges from 11.48 to 31.65 and the Jarque Bera probability value of 15.71 shows that the LR is normally distributed. The mean of the TO is 29.25, while the median is 29.73. The data ranges from 8.73 to 49.98 and the Jarque Bera probability value of 1.27 shows that the TO is normally distributed.

4.3. Correlation Analysis

Table 2:

	Growth rate	GFCF	FDI	LR	TO
Growth rate	1	-0.17	0.37	0.05	0.40
GFCF	-0.17	1	-0.47	-0.67	-0.04
FDI	0.37	-0.47	1	0.43	0.59

LR	0.05	-0.67	0.43	1	0.101
TO	0.40	-0.04	0.59	0.101	1

Source: Authors' computation using E-views 12.

Table 2 presents the results of a Spearman rank-order correlation analysis, which measures the strength and direction of the relationship between pairs of variables. The analysis covers a sample from 1991 to 2023, with 34 observations.

The correlation between growth rate (GR) and gross fixed capital formation (GFCF) is -0.17, indicating a weak negative relationship. Meaning as GFCF increases, growth rate decreases. Theoretically this is not the case as capital formation have a positive relationship with economic growth. A positive increase in capital formation increases economic growth rate. The correlation between growth rate and FDI is 0.37, indicating a weak positive relationship. This implies that increase in FDI inflows will grow the economy. The correlation between growth rate and lending rate is 0.05 indicating a weak but positive relationship. Theoretically, this is not the case as reduction in lending rate are aimed to grow the economy. The correlation between growth rate and trade openness is 0.40, indicating a weak positive relationship. Meaning and increase in the volume of international trade will lead to increase in economic growth.

4.4 Pre-Test Assessments

Pre-test assessments involve evaluating and verifying certain conditions or assumptions before estimating the model to ensure it yields valid and reliable results. This step is essential in econometric and statistical modeling, as it helps identify potential issues that could impact the accuracy of the model's estimates.

The assessments include a unit root test to examine the stationarity of the model and the ARDL bounds co-integration test to determine whether two or more time series variables share a long-run equilibrium relationship.

4.5 Unit Root Test

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

Null hypothesis (H_0): There is no unit root

Decision rule: If the probability of the ADF test statistics is lesser than the critical value at 5% we fail to reject the null hypothesis.

Variables	Augmented Dickey-Fuller test statistic (prob values)	ADF Critical Value (prob value)			Order of Integration	Remarks
		1% Level	5% Level	10% level		

Growth rate	0.044	0.01	0.05	0.1	I (0)	Stationary
GFCF	0.999	0.01	0.05	0.1	I (0)	Non-stationary
FDI	0.333	0.01	0.05	0.1	I (0)	Non-stationary
LR	0.274	0.01	0.05	0.1	I (0)	Non-stationary
TO	0.227	0.01	0.05	0.1	I (0)	Non-stationary

Source: Authors' computation using E-views 12.

The results of the Augmented Dickey-Fuller (ADF) Test for stationarity at levels are summarized as follows. The test examines whether each variable is stationary or non-stationary by comparing their probability values (p-values) with critical values at the 1%, 5%, and 10% significance levels.

The analysis reveals that Growth rate is stationary at levels, with a probability value of 0.044, which is lesser than the critical value at 5% significance level. This indicates the

absence of a unit root and suggests that Growth rate is stable over time. GFCF is not stationary at levels, having a p-value of 0.999, which is higher than the critical values at the 1%, 5%, and 10% levels. This implies that GFCF is characterized by unit roots hence GFCF is non-stationary. FDI is not stationary at levels, with a probability value of 0.333. This value is higher than the critical values at all levels, indicating that FDI does have a unit root and is not stable over time. Again, the Lending rate is non-stationary at levels, with a probability value of 0.274. This value is higher than the critical values at all levels, indicating that the lending rate is characterized by a unit root and is not stable over time. Lastly, TO is non-stationary at levels, with a probability value of 0.227. This value is greater than the critical values at the 1%, 5% and 10% levels, indicating that trade openness is characterized by a unit root and is not stable over time.

In summary, the ADF test shows only growth rate being stationary at levels, while GFCF, FDI, lending rate and trade openness are non-stationary and require further transformation, such as differencing, to attain stationarity. This distinction in stationarity characteristics is crucial for determining the appropriate econometric models for further analysis, such as Johansen cointegration or ARDL models.

4.5.1. Unit root test (at first difference)

Variables	Augmented Dickey-Fuller test statistic (prob values)	ADF Critical Value (prob value)			Order of Integration	Remarks
		1% Level	5% Level	10% Level		
Growth rate	0.0000	0.01	0.05	0.1	I (1)	Stationary
GFCF	0.0033	0.01	0.05	0.1	I (1)	Stationary
FDI	0.0000	0.01	0.05	0.1	I (1)	Stationary
LR	0.0000	0.01	0.05	0.1	I (1)	Stationary
TO	0.0012	0.01	0.05	0.1	I (1)	Stationary

Source: Author's Computation using E-views 12.

The results of the Augmented Dickey-Fuller (ADF) Test at first differences are summarized below, highlighting the stationarity properties of the variables. The test compares the probability values (p-values) of each variable with critical values at the 1%, 5%, and 10% significance levels, determining whether they are stationary or non-stationary at their first differences.

The analysis indicates that Growth rate is stationary at first difference (I (1)), with a p-value of 0.0000. This value is below the critical values at all significance levels, confirming the absence of a unit root and suggesting that growth rate is still stable after differencing once. Similarly, GFCF is also stationary at I (1), with a p-value of 0.0033, well below the critical values at the 1%, 5%, and 10% levels. This indicates that GFCF achieves stability after first differencing. Furthermore, FDI is also stationary at first difference. Having a p-value of 0.0000, which is lower than the critical values across all levels. These results confirm that FDI is also stable after being differenced once. LR is stationary at first difference (I (1)), with a p-value of 0.0000. This value is below the critical values at all significance levels, confirming the absence of a unit root and suggesting that LR becomes stable after differencing once. Lastly, Trade openness is stationary after first difference with probability value now 0.0012, lesser than all critical values.

4.6 Co-Integration Tests

Since we've shown that our data exhibits a unit root and is integrated of order one, we proceed to conduct a co-integration test using the ARDL Bound Test. Given that the variables become stationary after differencing once, we can investigate the presence of a significant co-integrating relationship among the variables.

Co-integration tests are used to determine if there's a stable, long-run equilibrium relationship among the variables in a multivariate model. If co-integration is established, it

signifies the existence of a long-run relationship between the variables hence the ARDL co-integration will have to be specified. The co-integration tables are presented below.

BOUNDS TEST

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	7.114484	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
Finite Sample: n=35				
Actual Sample Size	31	10%	2.46	3.46
		5%	2.947	4.088
		1%	4.093	5.532
Finite Sample: n=30				
		10%	2.525	3.56
		5%	3.058	4.223
		1%	4.28	5.84

Source: Author's Computation using E-views 12.

H_0 : There is no co-integration equation.

Decision rule: If the calculated f-statistics is greater than the value for upper bound I (1) at 5% level, then we fail to accept the null hypothesis and conclude that there is co-integration or long run relationship and vice versa.

From the analysis in table 4.6 the study finds out that the computed F-statistics value (7.1145) is greater than the critical value at 5% (3.49) meaning that we reject the null hypothesis of no co-integration (No long-run relationships exist) that is; there is a presence of co-integration, meaning the variables have a long-term equilibrium relationship.

Since the variables are cointegrated using bounds test, the ARDL-ECM model for short-run analysis and ARDL long-run form will be estimated.

4.7 Error correct model analysis

Table 4.6: ARDL-ECM SHORT RUN RESULT

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG_GFCF)	6.393	1.7575	3.6375	0.0022
D(FDI)	-0.248	0.9667	-0.2573	0.8003
D(FDI(-1))	-4.671	1.2487	-3.7411	0.0018
D(FDI(-2))	-3.360	0.7942	-4.2305	0.0006
D(LR)	0.180	0.1612	1.1175	0.2803
D(LR (-1))	0.592	0.1775	3.3329	0.0042
D(TO)	0.051	0.0409	1.2356	0.2344
D(TO (-1))	-0.315	0.0730	-4.3165	0.0005
ECT(-1)*	-0.840	0.1122	-7.4851	0.0000

R-squared	0.806	Mean dependent var	0.175
Adjusted R-squared	0.723	S.D. dependent var	3.225
S.E. of regression	1.698	Akaike info criterion	4.152
Sum squared resid	60.530	Schwarz criterion	4.615
Log-likelihood	-54.359	Hannan-Quinn criter	4.303
Durbin-Watson stat	2.237		

Source: Authors' computation using E-views 12, 2025.

4.7.1 Interpretation of the ARDL ECM result

The table presents the Error Correction Model (ECM) results. The ECM framework captures short-run dynamics and long-run equilibrium relationships between the dependent variable and its explanatory variables.

Error Correction Term (ECT) with the coefficient of -0.840

The error correction term (ECT) measures the speed at which deviations from the long-run equilibrium are corrected in subsequent periods. The coefficient is negative and highly significant with a probability value of 0.0000, confirming that the variables have a long-run equilibrium relationship. This means that approximately 84.0% of the disequilibrium from the previous period is corrected in the current period. This is a fast adjustment speed, suggesting that the system quickly returns to equilibrium after a shock.

The coefficient of LOG_GFCF is positive and statistically significant (p-value = 0.0022), suggesting that a percentage increase in gross fixed capital formation will increase the level of economic growth rate in the short run. A 1% increase in GFCF would lead to a 6.393% increase in economic growth. This means that GFCF has a positive immediate impact on economic growth. This is in accordance to the expected positive relationship.

The coefficient of FDI, although negative, is not statistically significant with prob (0.8003). This means that foreign direct investment does not have an immediate impact on economic growth in Nigeria in the short run. The coefficient on the first lag of FDI is negative and statistically significant. Meaning after the first period, FDI impact on economic growth negatively. This is contrary to the expected positive relationship. This is as a result of the non-immediate effect of FDI as it is a long-term type of investment taking years to yield good results in the economy. The coefficient on the second lag period of FDI is negative and statistically significant in the short-run. Again, this is because of the long-term nature of FDI and its effect on the economy.

The coefficient on the first difference of lending rate (LR) is positive and not statistically significant indicating that changes in LR does not have an immediate on economic growth in the short run. Again, the coefficient on the first lag of LR is positive and significant. Indicating that after the first period, changes in LR affects economic growth negatively. Here, a 1% increase in LR will increase economic growth by 0.592% after the first period. Again, this is in contrary with the expected sign; this could be because

of the lag effect of monetary policies compared to fiscal policies as the effect of changes in monetary policy rates (e.g. Lending rate) does not have an immediate impact on the economy.

The coefficient on the first difference of Trade openness is positive and not statistically significant, this indicates that TO does not have an immediate impact on economic growth in Nigeria. The coefficient on the first lag of TO is negative and statistically significant. This means that after the first period TO affects economic growth negatively in Nigeria. This could be as a result of other factors affecting economic growth in the country.

The R-squared: 0.806. This means that the model explains 80.6% of the variation in the changes in Economic growth rate. Adjusted R-squared: 0.723 After adjusting for the number of explanatory variables, 72.3% of the variation is explained. Durbin-Watson statistic: 2.237 This value is close to 2, indicating no evidence of significant autocorrelation in the residuals.

4.8 ARDL Long Run Form

The ARDL long-run form is often used to derive recommendations because it captures the equilibrium relationship between the dependent variable and independent variable over time. Policymakers are generally interested in how variables relate in the long run rather than focusing solely on short-run fluctuations; by focusing on the long-run

coefficients, policymakers can understand the enduring effects or structural changes, making the ARDL long-run model a popular choice in policy-oriented research.

Table 4.7 ARDL long run result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_GFCF	0.7797	1.1564	0.6743	0.5097
FDI	6.2218	2.2776	2.7317	0.0148
LR	-0.9293	0.4582	-2.0280	0.0596
TO	0.5428	0.1160	4.6780	0.0003
C	-9.0519	16.4344	-0.5508	0.5894

$$EC = GR - (0.7797*LOG_GFCF + 6.2218*FDI - 0.9293$$

$$*LR + 0.5428*TO - 9.0519$$

Source: Authors' computation using E-views 12, 2025.

Variables	ECM Regression			
	Coefficient	Std. Error	t-Statistic	Prob
D(Log_GFCF)	6.393	1.748	3.637	0.0022
D(FDI)	-0.249	0.967	-0.257	0.8003
D(FDI(-1))	-4.671	1.249	-3.741	0.0018
D(LR)	0.18	0.161	1.117	0.28
D(LR(-1))	0.592	0.177	3.333	0.0042
D(TO)	0.051	0.041	1.236	0.234
D(TO(-1))	-0.315	0.073	-4.316	0.0005
ECT(-1)*	-0.840	0.1122	-7.4851	0.0000

4.8.1 Interpretation of ARDL long run form

In the long-run, the coefficient of LOG_GFCF is not statistically significant. Meaning that LOG_GFCF does not impact economic growth in the long-run. This could be as a result of other factors variable significantly driving the outcome of economic growth in Nigeria rather than GFCF. Again, it could be as a result of the inefficiency in the allocation of capital in Nigeria that causes a non-generative significant economic return. The coefficient of FDI is positive and statistically significant in the long run. A percent increase in FDI inflows will lead to a 6.222% increase in economic growth. Lending rate is negative and marginally significant at the 5% level but significant at the 10% level in the long run.

Lastly, the coefficient of TO is positive and statistically significant in the long run. This means that a better rate of trade openness in Nigeria impacts economic growth

positively. A percent increase in trade openness will increase economic growth by 0.0519% in the long run.

4.8.2 Test of Research Hypotheses using the long run analysis

Hypothesis One (H₀₁): Capital formation does not have significant impact on economic growth in Nigeria

From the result above, LOG_GFCF has a significant positive impact on economic growth in the short run indicating an immediate impact. However, in the long run, LOG_GFCF does not have a significant impact on economic growth. As indicated in the interpretation, it could be as a result of other factors variable significantly determining the outcome of economic growth in Nigeria, structural challenges, underinvestment in infrastructure, inadequate savings, insufficient human capital development in the country and the inefficient allocation of capital formation. Given the above statement, we fail to reject the null hypothesis and assert that LOG_GFCF does not have a significant impact on economic growth in Nigeria over the years.

Hypothesis Two (H₀₂): There is no causal relationship between capital formation and economic growth in Nigeria

Here again, from the long run analysis, the coefficient of LOG_GFCF was positive but not statistically significant. Meaning capital formation does not have a significant causal relationship with economic growth in Nigeria in the long run. Therefore, we fail to

reject the null hypothesis and assert that there is no causal relationship between capital formation and economic growth in the long run.

4.9. Diagnostics test

4.9.1. Heteroskedasticity Test

This test evaluates whether the variance of the error terms is constant (homoskedastic) or varies across observations. Heteroskedasticity, if present, can lead to inefficient estimates and unreliable hypothesis tests. This study will utilize the use of the Breusch-Pagan-Godfrey heteroscedasticity test to detect the presence of heteroskedasticity.

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

F-statistic	1.166271	Prob. F(14,16)	0.3805
Obs*R-squared	15.65717	Prob. Chi-Square(14)	0.3348
Scaled explained SS	3.072817	Prob. Chi-Square(14)	0.9989

Source: Authors' computation using E-views 12

H₀: There is no presence of heteroscedasticity

H₁: There is presence heteroscedasticity

Decision Rule:

If Prob F value > 0.05 accept the null hypothesis

If Prob F value < 0.05 reject the null hypothesis

The result in Table 4.7 shows that the probability of f-statistics is 0.3805, greater than 0.05 at a 5% significant level, and therefore, we fail to reject the null hypothesis. This, therefore, confirms the absence of heteroscedasticity in the model.

4.9.2. Autocorrelation Test

This examines whether residuals from the model are serially correlated. The presence of autocorrelation may indicate that the model fails to capture important dynamics, leading to biased standard errors and unreliable inferences. This study will utilize the Breusch-Godfrey Serial Correlation LM Test to check for the presence of autocorrelation.

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

F-statistic	1.253182	Prob. F(2,14)	0.3157
Obs*R-squared	4.707111	Prob. Chi-Square(2)	0.0950

Source: Authors’ computation using E-views 12

H₀: The residuals are not serially correlated

H₁: The residuals are serially correlated

Decision Rule:

If Prob F value > 0.05 accept the null hypothesis

If Prob F value < 0.05 reject the null hypothesis

From the result in the above table, the probability of f-statistics is 0.3157, which is greater than 0.05 at a 5% significant level, and therefore, the null hypothesis is accepted. This, therefore, confirms the absence of serial correlation in the model.

4.9.3. Ramsey RESET Test

This test investigates whether the functional form of the model is correctly specified. It identifies potential omitted variables or incorrect model structures that could distort the estimation results. Ramsey RESET Test is used to check for model stability.

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: GROWTHRATE GROWTHRATE(-1) LOG_GFCF
LOG_GFCF(-1) FDI_1 FDI_1(-1) FDI_1(-2) FDI_1(-3) LR LR(-1) LR(-2)
TO TO(-1) TO(-2) TO(-3) C

	Value	df	Probability
t-statistic	1.187988	15	0.2533
F-statistic	1.411316	(1, 15)	0.2533
Likelihood ratio	2.787549	1	0.0950

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	5.205374	1	5.205374
Restricted SSR	60.53004	16	3.783127
Unrestricted SSR	55.32467	15	3.688311

LR test summary:

	Value
Restricted LogL	-54.35896
Unrestricted LogL	-52.96518

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

H0: The model is not mis specified.

Decision Rule:

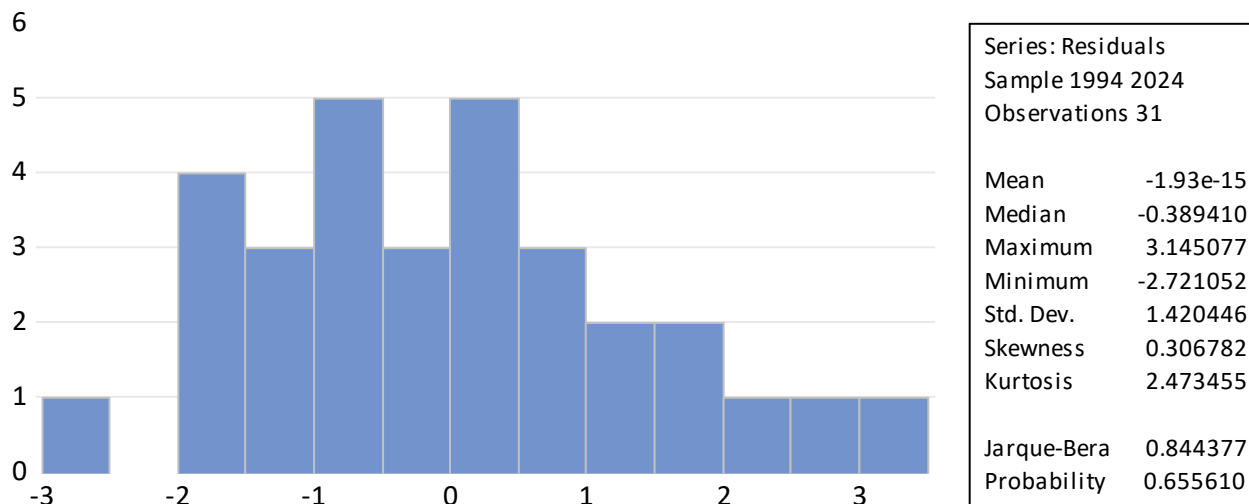
If Prob F value > 0.05 accept the null hypothesis

If Prob F value < 0.05 reject the null hypothesis

From the result in the table, the probability of f-statistics is 0.253 which is greater than 0.05 at a 5% significant level, and therefore, the null hypothesis is accepted. This therefore confirms that the model is not mis-specified.

4.9.4. Normality Test

This assesses whether the residuals follow a normal distribution, a critical assumption for many econometric methods to ensure the validity of t-tests and confidence intervals.



Source: Author's computation using E-views.

H0: The residuals are normally distributed.

Decision Rule:

If Prob Jarque Bera > 0.05 accept the null hypothesis

If Prob Jarque Bera < 0.05 reject the null hypothesis

From the result in the table, the p-value is 0.6556 which is greater than 0.05 at a 5% significant level, and therefore, the null hypothesis is accepted. This, therefore, confirms that the residuals are normally distributed.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of findings

The study aimed to critically assess the relationship between capital formation and economic development in Nigeria and potential avenues for leveraging capital formation to achieve long term and inclusive economic development, focusing on the period from 1991 to 2024. The variables used in this study are Economic growth rate as proxy for economic development, Gross fixed capital formation (GFCF), Foreign direct investment (FDI), Lending rate (LR) and Trade openness (TO). The study employed ARDL-ECM as the prime estimation technique in conjunction with other diagnostic and post-estimation tests.

From the findings, GFCF has an immediate impact on economic growth rate in the short run. A percentage increase in GFCF will lead to a 6.393% increase in economic growth rate. Implying that a favorably increase in capital formation will grow the economy in the short run. However, in the long run, GFCF does not significantly impact economic growth in Nigeria.

Again, findings revealed that FDI have a positive and significant impact on economic growth rate both in the short run and long run. Meaning, increase in FDI inflows into the country will grow the economy positively

Findings also revealed that the lending rate does not significantly affect economic growth rate both in the short run and long run.

Lastly, it was found Trade openness although negatively impacts economic growth in the short run, however in the long run, have a significant and positive impact on economic growth rate in Nigeria. A percent increase in the volume of trading activities internationally will grow the economy by 0.543%.

5.2 Conclusion

This study used the ARDL-ECM model to determine the impact of capital formation on economic growth in Nigeria from 1991-2024. The study also introduced other macroeconomic variables that may impact economic growth. According to the empirical results, foreign direct investments and trade openness had positive and significant effects on economic growth rate. Additionally, it showed that capital formation had a positive and

significant impact on economic growth in the short run. On the other hand, it does not impact economic growth in the long run. Lastly, it was found that lending rate does not significantly impact economic growth rate. In conclusion, this study believes that the empirical data obtained is sufficient to claim that while FDI and trade openness were significant determinants of economic growth, capital formation did not significantly impact economic growth in Nigeria for this study period.

5.3 Policy recommendations

Based on the findings, this study therefore recommends the following policies;

1. That the government should ensure that capital formation initiatives are sustainable and efficient, focusing on long-term benefits and also diversify investments across various sectors such as education, healthcare, and technology to promote long term economic growth, development and capital formation.
2. This study also recommends that government strengthen institutions and governance to support long term economic development and capital formation. The government should also examine the role of institutional factors, such as governance and regulatory frameworks in shaping the relationship between capital formation and economic development.

3. Again, this study recommends that government pays maximum attention to economic development to complement economic growth. This may include creating infrastructures like roads, bridges, water, electricity, hospitals, etc. this would attract FDI inflows into the country to further grow the economy. Economic factors like increasing per capita income should be paid much attention to, as well as reducing corruption. Policies aimed at increasing political stability should be prioritized. This includes tighter national security and ensuring peaceful political activities.
4. Lastly, this study recommends that government encourages trade by increasing the productive base of the country. This can be done by diversifying the economy to encourage other sectors such as the agricultural sector and limiting all forms of trade restrictions.