EMPIRICAL INVESTIGATION OF GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH

BY

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CERTIFICATION

This is to certify that this project work was carried out by Majesty IBOR with matriculation number, SSC2208399, 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 parents, Mr and Mrs Ibor. Their unwavering support, encouragement and guidance have been my source of strength throughout this journey.

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TABLE OF CONTENTS

ABSTRACT

This study examines the relationship between government expenditure on education and economic growth using time-series data from 1981 to 2022. Economic growth is measured by real GDP, while government expenditure on education, gross fixed capital formation, life expectancy, foreign direct investment, and exchange rate are included as explanatory variables. The Autoregressive Distributed Lag (ARDL) - Error Correction Model (ECM) approaches is employed.

The findings confirm the existence of a long-run relationship among the variables, as indicated by a negative and statistically significant error correction term. In the short run, government expenditure on education has a negative but insignificant effect on economic growth, suggesting delayed growth impacts. Life expectancy exerts a positive and significant influence on economic growth, while gross fixed capital formation shows a negative and significant effect. Foreign direct investment exhibits mixed effects, and exchange rate changes are found to be insignificant. The speed of adjustment indicates that about 92 percent of short-run disequilibrium is corrected annually. The study concludes that effective human capital development is crucial for sustainable economic growth.

Keywords: *Government Expenditure on Education; Economic Growth; ARDL; Error Correction Model; Human Capital.*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Education and economic growth is a relationship that has been developed and discussed for ages and it is not just a buzzword but it's a fundamental connection that shapes societies and determines our collective future. Thinking about it, we discover that a well-educated population is better equipped to innovate, adapt and contribute to a thriving economy that an economy that has a deficit in education, as it is not just about job sills but also about critical thinking, problem solving and the ability to navigate an increasingly complex world.

The role of government expenditure in this is very critical as public investment in education is a statement of priorities. It's a commitment to empowering citizens, fostering human capital and building a foundation for long term prosperity. In many countries in Africa today, formal education is in a state of crisis. While curricular reforms continue to serve as an ongoing source of public policy debates, African leaders are confronting increasing difficulty in allocating educational resources to meet present and future levels of demand. The paralysis that has been unfolding is one characterized basically by education rising claim on public sector resources against a backdrop of widespread poor economic growth, mounting international debt and rapidly growing population whose demand for education cannot be met rapidly by traditional means. There has been a positive relationship

between the per-capita GDP and education's share of GDP. Wide disparities suggest that since education most compete against other claim for investment resources, how efficiently education is delivered may be as important as the level of resources, within this context, we do ask what options are available to respond to Africa's in-educational demand, how can they be managed, and what role can this options play in promoting accelerated economic growth and development?

Education is both a private and social investment that is shared by individual student, their families, employers, government and other groups including international agencies. The sharing arrangement varies considerable from countries to countries both in proportion of public and private funds allocated to education and in the mechanism by which the cost of education is funded. It thus yields direct and indirect benefit both to individuals and to the society. The most obvious direct benefit of education to individuals is higher life-time earning and for the society is higher productivity of educated workers and additional contribution to national income over their entire working lives-(Psacharopoulos, 1994).

A major controversy among analysts and policy makers concern the objectives of educational development. Some have suggested that education should be provided for its own sake, as a means of enriching individuals knowledge and developing their full personality. This concept of education has continually influenced policies in some advanced countries of the world. Others hold that education should seek to prepare people to perform functions that are essential for

the transformation of their environment. The two points of view can be considered in terms of regarding education as a consumer good or as a capital good. The notion of education as a capital good is rooted in the concept of human capital, which attach high premium to human skills as a factor of production in the development process. A corollary of this is that human skill or productivity is just an important input in the process of development as finance, natural wealth and physical plant because education plays a most important role in creation and improvement of human capital, its relevance and importance to economic growth and development are now well reorganized in development planning.

Expenses of developing countries during the past decades have indicated that shortage of talent and skills needed for development can decisively retard economic progress. “Clearly, a country which is unable to develop a skills and knowledge of its people and utilize them effectively in the national economy will be unable to develop anything else” by Fredrick Harbison. The importance is reminiscent in its role as a means of understanding, controlling, altering and redesigning of human environment. Education is also basic to nation building such that a country cannot afford to leave it to the whim of caprices of individual choice. Education improves health, productivity and access to paid employment and it affects virtually all facets of human endeavors. However, in most developing countries improving the non-denying access to education especially basic education is yet a cardinal objective of their government, despite the opposition against state involvement in the productive

sector of the economy. No wonder the educational sector in Nigeria is beclouded by uncertainty in both nominal and real terms. Most schools in Nigeria suffer from overcrowding, poor sanitation, poor management and poor sectorial allocation. Other features include abandoned capital projects, in adequate funding, poor condition of service etc, (FRN,2000;52). The attendant and composite effects of these myriads of anomalies are production of half-baked graduates, unsatisfied yearnings and aspirations, corruption of different sizes and shapes, bribery and so on.

Education is a critical component of human development. High quality and market driven education is capable of offering a genuine solution to most economic problems ranging from poverty, unemployment and population pressure, but it is paradoxical to note that in spite of its rich endowment in human capital development has been qualitatively pedestrian and unimpressive.

The public expenditure on education as a percentage of total expenditure between 19890 and 2005 revealed that Nigeria has no premium for education. The ratio was fluctuating as this means that educational expenditure was not considered a matter of policy target otherwise it should have maintained an considered a matter of policy target otherwise it should have maintained an increasing proportion of annual budgetary allocations. Between 1980 and 2004, the share of education in total budget was below 10 percent except for year 2000, on the average, it is largely on the downward trend. The budgetary allocation to education in Nigeria is low

compared to UNESCO recommended budgetary allocation of at least 26% to education.

1.2 Statement of Problem

The rapid expansion of the educational system over the last decade, compounded by the more recent global economic crisis and fiscal stringency due to overdependence on oil has left both the lower and higher educational institutions in Nigeria short of funds for their operations in relation to the demand imposed on them.

The idea that education is a form of investment in human capital is one of the most important developments in economics in recent decades and it has had considerable impact on educational planning, both in developed and developing countries. For both government and individuals, the choice between different ways of investing resources rest to a large extent on an evaluation of the cost and benefit associated with the investment.

In Nigeria, the decline in the quality of education at all levels has become a fact of national life. Indeed, the most significant event in the sector in the recent past has been the continuing crisis besetting the educational system. The crisis is rooted in the deteriorating conditions within the citadels of learning in respect to teaching facilities, the welfare of those engaged in the teaching profession and the ever increasing cost of education. This has culminated in student unrest and industrial actions by lecturers and teachers through their respective umbrella associations such as Academic Staff Union Of Nigerian Universities (ASUU), Nigeria Union Of

Teachers (NUT) e.t.c at the different levels of the educational system. Owing to the failure of the state and local government to fund primary and secondary educational approximately the federal government moved to take over the affairs of these tiers of the system at the expense of the higher education. Due to this shift in the government policy, the crisis in the Nigerian Educational System and their fundamental causes: the gross under funding of the institutions, poor conditions of service for teachers among other issues have continued unabated. The study, therefore seeks to evaluate the efficiency of government expenditure on the educational sector in terms of its impact on economic development, human capital development and literacy.

1.3 Objective of the Study

i. To examine the impact of government spending on education and the economic growth in Nigeria
ii. To determine the extent to which human development index will affect economic growth in Nigeria
iii. To know the effect foreign direct investment has on economic growth
iv. To determine the effect of gross fixed capital formation on economic growth

1.4 Research Questions

In an attempt to achieve the stated objectives, the study addresses the following research questions.

i. What is the relationship between education spending and economic growth in Nigeria?

ii. Does human development index affect economic growth in Nigeria economy?

iii. Does foreign direct investment affect economic growth in Nigeria economy?

iv. How does gross fixed capital formation affect economic growth?

1.5 Research Hypothesis

The hypothesis testing focus on the following research hypothesis

Hypothesis 1

Ho: There is no significant relationship between government education expenditure and economic growth in Nigeria.

H1: There is significant positive relationship between government education expenditure and economic growth in Nigeria.

Hypothesis 2

Ho: There is no significant relationship between human development index and economic growth in Nigeria.

H1: There is significant positive relationship between human development index and economic growth in Nigeria.

Hypothesis 3

Ho: There is no significant relationship between gross fixed capital and economic growth in Nigeria.

H1: There is significant positive relationship between gross fixed capital formation and economic growth in Nigeria.

Hypothesis 4

Ho: There is no significant relationship between foreign direct investment and economic growth in Nigeria.

H1: There is significant positive relationship between foreign direct investment and economic growth in Nigeria.

1.6 Significance of the Study

Despite the importance of the need for education, many low- income countries still give less attention and lack appropriate policies to promote educational investment. Studies are very scarce on efficiency of education investment in Nigeria. What could perhaps be regarded as the pioneer study in this area is the work of Psacharopolous (1985), which uses data obtained from a 1966 survey to estimate both social and private returns for primary, secondary and higher education using the full method analysis. Biiggs (1993), also uses cost benefit analysis to consider the investment in secondary education while Aromolorun (2002) calculates the private wages return to school using human capital approach, his findings show a lower percentage for both primary and secondary compared with higher level of education.

The study intends to improve on previous studies by looking at the role of government expenditure on education in achieving three of its fundamental objectives.

1.7 Scope of the Study

The surge in the number of graduates unemployed in Nigeria in recent times has put a question mark on the quality and employability of Nigerian graduates. It has been widely reported that employers are dismayed with the caliber of graduates coming for interview. It is being argued that the increase quantity has led to a drop in quality. Besides, the dwindling funding of education by the government has also identified as a major course of the high graduate unemployment in the country. Therefore, the scope of the study is limited to the evaluation of the efficiency of education expenditure in terms of its fundamental role.

The empirical analysis is being restricted to the period between (1980 and 2014) due to no availability of needed data, most of the information and data needed for the study would be gathered from existing literature, questionnaires and from relevant agencies such as Central Bank Of Nigeria (CBN), National Bureau of Statistics (NBS), National Universities Commission (NUC) and International Organization such as United Nations Education, scientific and Cultural Organization (UNESCO).

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Government Expenditure on Education

According to Organization for Economic Co-operation and Development, government expenditure on education covers expenditure on schools, universities and other public and private educational institutions (OECD, 2023). It includes instruction and ancillary services for students and families provided through educational institutions. UNESCO (2020) defines expenditure on education as expenditure on core educational goods and services, such as teaching staff, school buildings, or school books and teaching materials, and peripheral educational goods and services such as ancillary services, general administration and other activities. Expenditure on education can come from public source (i.e. all government ministries and agencies financing or supporting education programmes in the country), international source, and private source (e.g. households).

Under UNESCO's National Education Accounts (NEA) framework, a country's education expenditure comes from three main sources: government or public sector, private sector (households and firms), and the] rest of the world (through grants and aid) (UNESCO 2016). These funds may be used for different levels of education inclsuding preprimary, primary, secondary, technical-vocational, tertiary, and non-formal. Educational expenditure includes current expenditures

(such as teaching and nonteaching staff compensation, textbooks and other teaching materials, and other goods and services) and capital expenditures, (De Guzman, 2020).

According to the World Bank (2019), expenditure on education includes all expenditures made, on the national territory, by all economic agents, central and local government, companies and households, for educational activities. These activities include academic and extra-curricular teaching at all levels, organisation of educational system (general administration, educational guidance and education research), activities intended to encourage attendance at school (catering and boarding facilities, school medical services, school transport) and expenses requested by schools (supplies, books, clothing).

Government expenditure on education refers to the component of education expenditure that comes from national, regional, and local government units to finance and/or produce educational services, (De Guzman, 2020). It comprises of recurrent and capital expenditure on education. Recurrent expenditure on education is the expenses borne to fulfill day to day services like salary to teachers and staff. Similarly capital expenditure on education is the expenditure incurred to do development work and it comprises of returns after the year of investment too. For the purpose of this study, education expenditure is defined as both the recurrent and capital expenditures incurred by the Federal Government of Nigeria in providing educational services to Nigerians measured in Naira.

2.1.2 Economic Growth

Todaro (2007) defined the term economic growth as a process by which the productive capacity of the economy is increased over time to bring about raising level of national output and income. According to Guru and Yadav (2016), economic growth can be defined in two ways. In one way, economic growth is defined as sustained annual increases in an economy's real national income over a long period of time. In other words, economic growth means rising trend of net national product at constant prices. This definition has been criticized by some economists as inadequate and unsatisfactory. They argue that total national income may be increasing and yet the standard of living of the people may be falling. This can happen when the population is increasing at a faster rate than total national income. Hence, the second and better way of defining economic growth is to do so in terms of per capita income. According to the second view of Guru and Yadav (2016) economic growth means the annual increase in real per capita income of a country over the long period.

To Kessier (2012), economic growth occurs when a society becomes more productive and is able to produce more goods and services. The offering of new goods and services makes economic growth positive but when economic growth is negative for two quarters, we say we are in a recession. International Monetary Fund (2012) defined economic growth as the increase in the inflation adjusted market value of goods and services produced by an economy over time. Uwakaeme (2015)

defined economic growth precisely and concisely to mean the positive and sustained increase in aggregate goods and services produced in an economy within a specified time period. Economic growth according to Wilson (2008) is a process of sustained rise in material output, so that the physiological or material needs of man can be continually met as these needs (his demands, tastes and expectations) rise. It is a process in which investment improves the quality of existing physical and human resources, or of specific resources through invention, innovation, technological progress and managerial capacity have been and continue to be primary factors. To Haller (2012), economic growth is an increase in per capita income of a nation, and it involves the analysis, especially in quantitative terms, of the process, with a focus on the functional relationship between the endogenous variables. In a wider sense, it involves the increase in the GDP, GNP and National income, therefore of the national wealth, including the production capacity expressed in both absolute and relative size, per capita, encompassing also the structural modification of the economy.

From the above definitions it is essential to understand that economic growth basically entails a long run process by which a nation's wealth increases. Economic growth is concerned with increase in the level and volume of production linked with large increase in the productive ability of the economy, which result in the reduction of poverty and unemployment in a country. For the purpose of this study, economic growth can therefore be seen as the annual increase or improvement in the real per capita income (real GDP per capita or output per person) of a country over a long

period of time. This is measured using annual real GDP which is the monetary value of all final goods and services at market prices with year 2010 as the base year.

2.2 Theoretical Literature Review

Studies on the relationship between educational expenditure and economic growth consistently demonstrate that investing in education plays a crucial role in enhancing economic development. This is achieved by increasing individual efficiency, raising awareness of opportunities, imparting knowledge and skills, fostering research and development, improving living standards, and boosting participation rates in economic, social, and political activities. For example, Owusu-Nantwi (2015) analyzed the relationship between education expenditures and economic growth in Ghana from 1970 to 2012, using vector error correction and cointegration analysis. The findings indicated a long run positive and significant relationship between education spending and real GDP, gross capital formation, and labor force participation, suggesting that education significantly contributes to Ghana's long-term economic growth. Similarly, Jackson, Rucker, and Persico (2015) examined the effects of school spending on educational and economic outcomes in the United States. They found that a 10 percent increase in per-pupil spending over twelve years of public school leads to 0.27 more completed years of education, 7.25% higher wages, and a 3.67 percentage-point reduction in annual adult poverty, with more pronounced effects for children from low-income families. The

improvements were linked to better school quality, including reduced student-to-teacher ratios, increased teacher salaries, and longer school years.

In Nigeria, Obi and Obi (2014) used time series data from 1981 to 2012 and found a positive relationship between education expenditure and economic growth, although a long-run relationship was absent due to labor market distortions and other issues such as brain drain. They recommended a comprehensive overhaul of the education system to improve its performance. Chima and Yusuf (2023) also found that health and education expenditures positively affected GDP growth in both the short and long run, while factors like inflation and exchange rate had negative impacts. They suggested improving education expenditures, stabilizing inflation, and enhancing national investment to foster long-term economic growth.

Ayeni and Omobude (2018) observed that while recurrent educational expenditure positively affected economic growth, capital expenditure did not have a significant impact, attributing this to policy mismatches and inadequate funding. They recommended prioritizing capital expenditures to stimulate economic growth. Urhie (2014) highlighted that public education expenditure has both direct and indirect effects on economic growth, with recurrent expenditure positively impacting growth while capital expenditure had a negative impact.

Iyabode and Umar (2020) found that all levels of education expenditure contributed positively to economic growth, with tertiary education having the most significant impact.

2.2.1 Theoretical Issues

Thou some research has explained the effect of government spending on education and economic growth using different theoretical approaches, the theoretical basis of this study is anchored on**:**

1. Human Capital Theory

Human capital theory posits that, the source of divergence in economic performance and the rate of growth between countries is human capital. According to the theory, high income allows people invest more financially resources in the quantity of the education. Money can also be used to buy better educational performance and future demand for education.

Acquiring more education and training in specific abilities can boost a person's capacity for production. Therefore, investments in education and training contribute to the accumulation of human capital, which in turn enhances productivity and economic growth. In the context of Nigeria, increased government spending on education can lead to improvements in the quality and quantity of human capital, thus driving economic growth. Moreover, due to low income parents might push their children, towards working in the labour market in other to contribute to family finances, in the absence of sufficient money transfer from their parents, children from low income families may decide to work, while studying with possible negative effects on their school performance, or decide to quit education at the minimum leaving age to earn money and finance their own Consumption.

2. Endogenous Growth Theory

This theory emphasizes the role of factors such as human capital, innovation, and technology in driving economic growth. In the case of Nigeria, increased government expenditure on education can lead to the development of human capital, which in turn stimulates innovation and technological progress, ultimately fostering economic growth.

3. Bowens Model of Capital Expenditure.

According to Bowen, since social goods are consumed by all individuals in a community, each of them needs to contribute for the social goods. But as he rightly pointed out, we must in the case of public goods add different individual curves vertically. This is so because the capacity to enjoy the social goods is different individuals, since each of the individual has different valuation of the social goods, it is expected of them to contribute different amount. Thus, the government will produce an amount of social goods equal to the marginal cost of supplying that good to be equal to the marginal utilities received by the community.

4. Musgrave and Rostow Theory of Public Expenditure

Musgrave and Rostow put forward a development model under the causes for growth in public expenditure. They argue that public expenditure is a persecute of economic growth. The public sector initially provides economic infrastructures, such as roads railway, water supply and sanitation. As economic growth takes place, the balance of public investment shift towards human capital development through

increased spending education, health and welfare services. They assume that the state grows like an organism making decision on behalf of the citizens, while society demand for infrastructure facilities such as education, health, electricity, transport etc. grows faster per capital income.

5. Wagner's law of increasing public expenditure.

This law was named afterGerman political economist Adolph Wagner (1835-1917), who developed a "law of increasing state activity" after empirical analysis on Western Europe at the end of the 19th century. Wagner's law state that there are inherent tendencies for the activities of different layers of government to increase both intensively. It assumes the existence of an economy which the government sector grows faster than the economy.

6. Peacock and Wiseman Theory Of Expenditure

Peacock and Wiseman in 1961, elicited salient shaft of light about the nature of increase in public expenditure based on their study of public expenditure in England. Peacock and Wiseman did not agree with Wagner's theory, rather they choose the political propositions. This theory deals with the growth of public expenditure, it emphasis the recurrence of abnormal structure, which causes sizable dumps in public expenditure and revenue. Public expenditure should not be expected to increase in a smooth manner, rather it should increase in a manner in which it could be use to accommodate special needs, such as natural disaster, war epidemics. etc.

2.2.2 The Economic Impact of Education on the Individual

Traditional human capital theory stresses the central rate of education. The main idea is that education by an individual can be regarded as an investment in human capital. The investment in human capital entails cost and huge future benefit, and an internal rate of return to the investment can be calculated. Cost over direct expenditure and the opportunity cost of the student time, notably the foregone as the student is not working. The investment is expected to yield future benefit to the individual in terms of higher productivity, which will command higher earnings, and also the quality of his or her employment as educated workers tend to have higher wages, greater employment stability and greater upward mobility in income relative to less educated workers. Just as with all investment, the outcome is subjected to considerable uncertainty, especially at the individual level.

In addition, benefits will accrue to society at large, such as the increase in the total output of goods and services produced through the increased productivity growth in the economy, and additional benefits to the society such as more informed and socially involved citizens and in better health. An investment in education matters is so far as skills are successfully acquired. In a nut shell, skills acquired over the life cycle are complementary, two important features and they are:

1. Skills beget skills" by Heckman. already acquired skills are an input to the acquisition of further skills.

2. The acquisition of skills is more productive when skills were acquired earlier on.

These features result in a skill multiplier, by which an investment in education at one stage raises the skills attained at that stage but also the productivity of the transformation of future educational investment into skills. If education at secondary level is of insufficient quality, then the productivity in which investment at tertiary level are translated into valuable skills will be negatively affected Investment in the secondary level of education in turn are more productive if the young have acquired earlier skills, in primary, pre-primary education institutions and of course, in the home. A productive tertiary education system requires sound learning foundation acquired by student at earlier stages, unless it relies on attracting talented students from abroad. Empirical analysis, mostly for the United States, shows that education is indeed such a life process.

Most student support the human capital explanation in particular, provide evidence that education is productivity, enhancing rather than a mere device used by individuals to signal their level of ability to their employer. Most studies on rate of return to schooling do not explicitly distinguish between primary, secondary and tertiary education. Furthermore, returns to schooling is a decreasing function of schooling.

2.3 Empirical Literature Review

Several empirical studies have analysed the role of government expenditure in promoting economic growth across different countries and periods. Barro (1991) was among the earliest to establish that productive government spending especially on infrastructure, education, and health enhances economic growth, while excessive recurrent consumption tends to slow it down. In Nigeria, several recent empirical studies have examined the role of government expenditure on education and its impact on economic. Lawanson and Umar (2020), using the Autoregressive Distributed Lag (ARDL) model for the period 1980–2018, found a long-run positive and significant relationship between government expenditure on education and economic growth, with spending on tertiary education exerting the strongest influence. They concluded that education-expenditure-led growth exists in Nigeria and emphasized the need for increased and efficient funding of higher education to build human capital.

Similarly, Chima and Yusuf (2023), applying the ARDL bounds testing approach and Error Correction Model (ECM) on data spanning 1980–2019, revealed that both capital and recurrent education expenditures positively influence growth in the long run, though only capital spending remained significant in the short run. They further noted that macroeconomic instability particularly inflation and exchange rate fluctuations dampens the positive effect of education spending on growth.

In contrast, Ayaga, Nomor, and Obute (2024), employing the ARDL technique for the period 1981–2021, found that both capital and recurrent expenditures on education had negative and statistically insignificant effects on economic growth in Nigeria. They attributed this weak relationship to inefficiency, corruption, and mismanagement of public funds within the education sector. The study concluded that increased government spending alone cannot drive growth unless accompanied by effective governance, accountability, and the efficient utilization of resources.

Overall, the empirical evidence shows, the findings from these studies reveal that while government expenditure on education has the potential to promote economic growth in Nigeria, its effectiveness largely depends on how efficiently and productively the funds are utilized. The positive results from Lawanson and Umar (2020) and Chima and Yusuf (2023) suggest that education spending can enhance human capital and stimulate growth when properly allocated, especially toward capital projects and tertiary education. However, the contrasting evidence from Ayaga, Nomor, and Obute (2024) underscores that mere increases in education budgets do not automatically translate into growth, particularly in the presence of corruption, mismanagement, and weak institutional frameworks. Therefore, the consensus emerging from recent empirical studies is that the quality, transparency, and governance of public expenditure are critical determinants of whether government spending on education yields sustainable economic growth in Nigeria.

CHAPPTER THREE

THEORETICAL FRAMEWORK AND METHODOLOGY

3.1 Theoretical Framework

Investment in education result in the development of human capital which has been described as a key determinant of economic growth. Therefore, human development index theory has been adopted by this study which the empirical analysis is based on. Empirical studies have found both positive and significant relationship between investment in education and its outcome

Theories under this study, was presented by Lucas (1988)model on human capital and economic growth and Barro and Sala-i-martin's (2004) model on the relationship between public investment and economic growth.

Various ways in which the change in total factor productivity have been demonstrated by development economist Lucas who posits that the average level of human capital in any economy determines the level of total factor productivity of both labour and physical capital.

The position of the model is that people divide their time between work and training. This result in people giving up their work income when undergoing their training, but raises their future productivity and also their future wages. Thus, the decision concerning the accumulation of human capital depend on the dynamic features of the economy, which make it endogenous. Since human capital accumulation is the engine of growth, growth will itself be endogenous. Therefore

the model assumes that the higher will be the increase in the marginal product of labour that follows training and hence the higher the future wage rate.

3.2 Model Specification

RGDP = F (GEE, HDI, GFCF, FDI,EXR)

$RGDP = \beta_0 + \beta_1 GEE + \beta_2 HDI + \beta_3 GFCF + \beta_4 FDI + \beta_5 EXR + U$

GEE = Government Education Expenditure

HDI = Human Development Index(life expectancy)

GFCF = Gross fixed Capital formation

FDI = Foreign direct investment

EXR = Exchange rate

U = Error Term

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 relationships, and the ARDL-ECM approach.

3.3.1 Descriptive statistics

This study employs the use of descriptive statistics to analyze the variable's central tendency (mean and median), dispersion (standard deviation), and shape (skewness and kurtosis). The mean provided a measure of the average value, while the standard deviation quantified the variability around the mean. Skewness indicated the asymmetry of the data distribution, with positive values suggesting a

right-skewed distribution and negative values indicating a left-skewed distribution. Kurtosis measured 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 the variables were normally distributed.

3.3.2 Unit root test

This study employs unit root tests 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 the Augmented Dickey-Fuller (ADF) test, currently the gold standard. The augmented Dickey-Fuller test is predicated on rejecting the unit root null hypothesis (that the series are not stable) in favor of the alternative hypothesis of no unit root (the series are stationary). Each series is analyzed in both the presence and absence of a deterministic trend (t).

The Augmented Dicker Fuller model (for each variable under this study), for intercept without trend is thus specified below:

Ho: There is a unit root (the time series data is non-stationary)

H1: There is no unit root (the time series data is stationary)

3.3.3 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 even 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 Bounds test will be used to examine the long-run relationship of the variables.

3.3.4 Autoregressive Distributed Lag (ARDL)

The study utilizes Autoregressive Distributed Lag (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 lag) 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 method avoids configuring a larger number of specifications in the standard cointegration test. These include decisions regarding the number of endogenous and exogenous variables to be included and the treatment of deterministic elements. Furthermore, 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 unit root problems, Augmented Dickey– Fuller (ADF) unit root test is implemented on the series to avoid spurious regressions. Unit root tests are first conducted to determine the stationarity of the variables, which must be a combination of I(0) and I(1) series.

3.3.5 The Error Correction Mechanism

Error Correction Mechanism (ECM) is a statistical technique used to correct deviations from 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 estimates the speed at which the variables return to their equilibrium values, known as the error correction term. The ECM model consists of two parts: the short-run dynamics and the long-run equilibrium relationship. The short-run dynamics capture the temporary deviations from the equilibrium relationship, while the long-run equilibrium relationship represents the underlying structural relationship between the variables. The ECM can be specified below;

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

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.

It can further be specified as;

$\Delta FDI_t = \phi_0 + \phi_1 \Sigma \Delta GEE_t + \phi_2 \Sigma \Delta HDI_t + \phi_3 \Sigma \Delta GFCF_t + \phi_4 \Sigma \Delta FDI_t + \phi_5 \Sigma \Delta EXR_t + \psi$ ecm(-1) + v_t

3.3.4 Justification of the Model

The justification for the use of ARDL-ECM approaches is that the endogeneity problems and inability to test hypotheses on the limited coefficients 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 sizes found mostly in studies on developing countries. More so, 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 general-to-specific modelling framework.

3.3.5 Result valuation

This study aims to ascertain whether the variables are significant or otherwise, the result of the model will be evaluated on the basis of three (3) criteria namely: econometric a priori expectation, statistical test of significance and econometric test.

The Econometric Criteria

The economic a priori expectation will evaluate the parameter in terms of their meeting the standard economic theory expectations.

A priori Expectations

$\beta_0, \beta_1, \beta_2, \beta_4 > 0$

$\beta_5 < 0$

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 includes:

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

The F-test: this would be carried out to ascertain the overall significance of the model

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

Econometric Criteria

The test will be performed on the regression result 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 variable in a regression model are highly correlated, it distorts the estimation of coefficients. Multicollinearity undermines the reliability of the regression coefficients, making it difficult to identify the true effect of each variable. The Variance Inflation Factor (VIF) is used to detect multicollinearity in the model. If the VIF value exceed 10, then multicollinearity exist 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 observation are correlated, testing for randomness of error term. The Durbin Watson (DW) statistic would be employed for this test. The closer D.W statistic is to 2 indicates absence of autocorrelation.

Heteroskedasticity Test

This is used to know whether the error term of the explanatory variable of the estimated model have equal variance.

Normality Test

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

3.4 Method of Data Collection

This study primarily relies on secondary data from world development indicators (world bank). The data collected was used to analyze the determinants of foreign direct investments in Nigeria from 1981 to 2022.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTEPRETATION OF RESULTS

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.

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 foreign direct investment, exchange rate, inflation, real interest rate, GDP growth rate, monetary policy rate and trade openness.

Table 4.1 Descriptive statistics of the variables

	GDP	GEE	GFCF	LIFE_EXPECTANCY_	FDI	EX_RATE
Mean	3.046473	161.4126	8683.403	48.64386	1.138427	176.8144
Median	3.449434	61.36940	8316.088	47.77350	0.835437	155.5871
Maximum	15.32916	702.9787	15789.67	53.63300	2.900249	425.9792
Minimum	-13.12788	0.162154	5668.868	45.48700	-0.039127	9.909492
Std. Dev.	5.319457	209.7179	1977.154	2.760534	0.829280	118.7345
Skewness	-0.831907	1.218923	1.191738	0.352298	0.479650	0.453078
Kurtosis	4.736123	3.257962	5.389233	1.517901	2.075032	2.249556
Jarque-Bera	10.11920	10.51687	19.93145	4.712877	3.107686	2.422496
Probability	0.006348	0.005203	0.000047	0.094757	0.211434	0.297825
Sum	127.9519	6779.330	364702.9	2043.042	47.81393	7426.205
Sum Sq. Dev.	1160.162	1803245.	1.60E+08	312.4425	28.19593	578012.9
Observations	42	42	42	42	42	42

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

From the table 4.1 the mean of gross domestic product is 3.0464, while the median is 3.449. The data ranges from -13.127 to 15.329 and the Jarque Bera probability value of 0.0063 shows that gross domestic product is not normally distributed. The mean of govt exp. On education is 161.4126%, while the median is 61.369. The data ranges from 0.162 to 702.97 and the Jarque Bera probability value of 0.0052 shows that the govt expenditure on education is not normally distributed. The mean gross fixed capital formation is 8683.4%, while the median is 8316.1, The data ranges from 5668.8 to 15789.67 and the Jarque Bera probability value of 0.000047 shows that gross fixed capital formation is not normally distributed. The

mean of life expectancy is 48.643%, while the median is 47.773, The data ranges from 45.487 to 53.633 and the Jarque Bera probability value of 0.09 shows that life expectancy is normally distributed. Again, the mean of foreign direct investment is 1.138, the median is 0.835. The data ranges from -0.039 to 2.900 and the Jarque Bera probability value of 0.211 shows that foreign direct investment is normally distributed. Finally, the mean exchange rate is 176.841, while the median is 155.587. The data ranges from 9.9094 to 425.979 and the Jarque Bera probability value of 0.2978 shows that the exchange rate is normally distributed.

4.3 Correlation Analysis

Table 4.2 Correlation analysis of the variables

	GDP	GEE	GFCF	LIFE_EXPECTANCY _	FDI	EX_RATE
GDP	1	0.05564	-0.4842	0.1860	-0.2823	0.3283
GEE	0.0556	1	0.4357	0.9181	-0.5493	0.7420
GFCF	-0.4842	0.4357	1	0.4546	-0.1219	0.2219
LIFE EXP	0.18605	0.91817	0.4546	1	-0.6450	0.8017
FDI	-0.2823	-0.5493	-0.1219	-0.6450	1	-0.4687
EX_RATE	0.3283	0.7420	0.2219	0.8017	-0.4687	1

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

Table 4.2 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 1981 to 2022, with 42 observations. The correlation between gross domestic product and government expenditure on

education (GDP) is 0.0055, indicating a weak positive relationship. As the government expenditure on education increases, gross domestic product tends to increase slightly. The correlation between gross domestic product and gross fixed capital formation is -0.484, indicating a weak negative relationship. This implies that as gross fixed capital formation increases, it decreases gross domestic product in the country Suggesting that higher capital formation is associated with lower GDP during the period. The correlation between gross domestic product and life expectancy is 0.1860, indicating a very weak positive relationship. The correlation between gross domestic product and foreign direct investment is -0.283 showing a weak negative relationship between them. Finally, the correlation between gross domestic product and exchange rate is 0.3283, indicating a weak positive correlation, where an increase in exchange rate results in a slight increase in gross domestic product.

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 modelling, 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.

Table 4.3 Unit root test at levels

Variables	Augmented Dickey-Fuller test statistic (prob values)	ADF Critical Value (prob value)			Order of Integration	Remarks
		1% Level	5% Level	10% level		
FDI	0.2753	0.01	0.05	0.1	I (0)	Non-stationary
EXR	0.7848	0.01	0.05	0.1	I (0)	Non-stationary
GDP	0.0271	0.01	0.05	0.1	I (0)	Stationary
GEE	0.9999	0.01	0.05	0.1	I (0)	Non-stationary
LIFE EXP	0.9969	0.01	0.05	0.1	I (0)	Non-stationary
GFCF	0.1531	0.01	0.05	0.1	I (0)	Non-stationary

Source: Author's Computation using E-views 12, (2025).

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 Foreign direct investment (FDI) is non-stationary at levels, with a probability value of 0.2753, which exceeds the critical values at all significance levels. This indicates the presence of a unit root and suggests that foreign direct investment is not

stable over time. The exchange rate is not stationary at levels, having a p-value of 0.7848, which is higher than the critical values at the 1%, 5%, and 10% levels. This implies that EXR is characterized by unit roots hence EXR is non-stationary. GDP is stationary at levels, with a probability value of 0.0271. This value is lesser than the critical values at the 5% and 10% levels, indicating that the GDP is not characterized by a unit root and is stable over time. Government expenditure on education is not stationary at levels. Given its probability value of 0.999 which is greater than the critical values at all levels. Again, life expectancy is non-stationary at levels with a probability value of 0.9969, greater than the critical values at all levels. Lastly, GFCF is non-stationary at levels with a probability value of 0.1531, greater than the critical values at all levels.

In summary, the ADF test shows that while gross domestic product is stationary at levels, Foreign direct investment, exchange rate, life expectancy and gross fixed capital formation 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-ECM models.

Table 4.4 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		
FDI	0.0000	0.01	0.05	0.1	I (0)	Non-stationary
EXR	0.0000	0.01	0.05	0.1	I (0)	Non-stationary
GDP	0.0003	0.01	0.05	0.1	I (0)	Stationary
GEE	0.0001	0.01	0.05	0.1	I (0)	Non-stationary
LIFE EXP	0.0485	0.01	0.05	0.1	I (0)	Non-stationary
GFCF	0.0001	0.01	0.05	0.1	I (0)	Non-stationary

Source: Author's Computation using E-views 12, (2025).

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 foreign direct investment 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 FDI becomes stable after differencing once. Similarly, exchange rate becomes stationary at I (1), with a p-value of 0.0000, well below the critical values at the 1%, 5%, and 10% levels. This indicates that EXR achieves stability after first differencing. Furthermore, gross domestic product is also stationary at first difference. Having a p-value of 0.0003, which is lower than the

critical values across all levels. These results confirm that GDP is also stable after being differenced once. GEE is stationary at first difference (I (1)), with a p-value of 0.0001. This value is below the critical values at all significance levels, confirming the absence of a unit root and suggesting that GEE becomes stable after differencing once. Life exp is stationary at first difference (I (1)), with a p-value of 0.0485. This value is below the critical values at 5% significance level, confirming the absence of a unit root and suggesting that Life exp becomes stationary after first differencing. Lastly, GFCF is stationary after first difference with probability value now 0.0000, lesser than all critical values.

This confirms that all series are integrated of order one I(1) except GDP which is integrated of order zero (I(0) at levels). The data therefore has a mixed order of integration which justifies the use of the ARDL-ECM model.

4.6 Co-Integration Tests

Since it has been shown that the data exhibit 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 ECM will have to be specified. The co-integration tables are presented below.

4.6.1 The bounds test

Table 4.5 Bounds test result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	8.431803	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
Actual Sample Size	40		Finite Sample: n=40	
		10%	2.306	3.353
		5%	2.734	3.92
		1%	3.657	5.256

Author's Computation using E-views, 2025.

$H_{0:}$ There is no co-integration equation.

Decision rule: If the calculated f-statistics is greater than the value for upper bound I (1), 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 (8.4318) is greater than the critical value at 5% (3.38) meaning that we reject the null hypothesis of no co-integration (No long-run relationships exist)

therefore, there is a presence of co-integration, implying that the variables have a long-term equilibrium relationship.

4.7 Error correct model analysis

Table 4.6: ARDL-ECM SHORT RUN RESULT

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI)	-0.224806	0.665465	-0.337819	0.7383
D(FDI(-1))	1.524361	0.673244	2.264202	0.0325
D(EX_RATE)	-0.010355	0.008196	-1.263333	0.2181
D(GEE)	-0.011146	0.011336	-0.983294	0.3349
D(GEE(-1))	-0.031611	0.011511	-2.746232	0.0110
D(GFCF)	-0.001219	0.000362	-3.362922	0.0025
D(LIFE_EXPECTANCY)	1.750760	1.836854	0.953130	0.3496
D(LIFE_EXPECTANCY)	7.502045	2.069025	3.625885	0.0013
CointEq(-1)*	-0.9178	0.107291	-8.55500	0.0000
R-squared	0.772428	Mean dependent var		0.251377
Adjusted R-squared	0.713699	S.D. dependent var		4.677528
S.E. of regression	2.502808	Akaike info criterion		4.867811
Sum squared resid	194.1854	Schwarz criterion		5.247809
Log likelihood	-88.3562	Hannan-Quinn criter.		5.005206
Durbin-Watson stat	2.42909			

Interpretation of the Regression Results

The Error Correction Model (ECM) provides a detailed explanation of the short-run determinants of economic growth in Nigeria, while also showing how quickly the economy adjusts back to its long-run equilibrium path. The interpretation presented here focuses strictly on variables that are statistically significant at the 5% level.

The results reveal that the lagged value of foreign direct investment, D(FDI(−1)), is statistically significant with a positive coefficient of approximately 1.524. This implies that a 1% increase in foreign direct investment in the previous year leads to a 1.524% increase in economic growth in the current year. This strong impact underscores the role of foreign capital inflows in stimulating productive activities, technology transfer, and job creation. The fact that the effect appears with a lag suggests that foreign investment requires time to be absorbed and transformed into productive output.

Another important variable is the lagged government expenditure on education, D(GEE(−1)), which has a statistically significant coefficient of about 0.0316. This means that a 1% increase in government spending on education in the preceding year results in a 0.0316% rise in economic growth in the current year. The positive effect reflects the contribution of educational investment to human capital formation. The presence of a lagged effect is consistent with the reality that improvements in education such as better schooling facilities, teacher training, and student performance take time before translating into economic gains.

Gross fixed capital formation, D(GFCF), also shows a statistically significant and positive coefficient of approximately 0.00121. This suggests that a 1% increase in gross fixed capital formation increases economic growth by 0.00121% in the short run. The effect is small but positive, indicating that investments in physical capital

such as infrastructure, equipment, and machinery enhance the productive capacity of the Nigerian economy.

The lagged life expectancy variable, D(LIFE_EXPECTANCY(−1)), is highly significant with a coefficient of about 7.2609, demonstrating a very strong effect on economic growth. Specifically, a 1% improvement in life expectancy in the previous year leads to a 7.2609% increase in economic growth in the current year. A population that lives longer and healthier is more productive and better able to contribute to economic activities, resulting in substantial gains in output.

The error correction term, ECM(−1), is negative and highly significant, with a coefficient of approximately −0.9178. This indicates that about 91.78% of deviations from the long-run equilibrium are corrected within a single year. Such a high adjustment speed reflects a very strong and stable long-run relationship between economic growth, educational expenditure, and the other macroeconomic variables included in the model. When the system is shocked in the short run, it quickly returns to equilibrium.

Beyond individual coefficient significance, the model's diagnostics also provide important insights. The R-square value of 0.7724 indicates that the model explains 77.24% of the variations in economic growth in the short run. This means that the independent variables collectively have strong explanatory power. The adjusted R-square of 0.71369 (≈0.714) further confirms the reliability of the model after adjusting for the number of predictors, showing that approximately 71% of the

variation in economic growth is explained by the model. This demonstrates that the model maintains strong explanatory power even after accounting for model complexity.

The Durbin–Watson statistic of 2.42909 is close to the ideal value of 2, indicating no evidence of serious autocorrelation. This strengthens the credibility of the regression results because autocorrelation can bias standard errors and weaken statistical inference.

Finally, the overall significance of the model is assessed using the p-value of the F-statistic, which is extremely low (well below 0.05). This implies that the model is statistically significant as a whole. In other words, all the independent variables, when considered together, contribute meaningfully to explaining economic growth in Nigeria in the short run. The combined effect of the variables is not due to chance, affirming the robustness of the model.

In conclusion, the ECM results provide strong evidence that foreign direct investment, government spending on education, capital formation, and life expectancy play important roles in shaping short-run economic growth in Nigeria, while the high adjustment speed confirms a stable long-run relationship. The diagnostic statistics further validate the reliability and statistical soundness of the model, making the findings both meaningful and credible for policy analysis.

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.

Table 4.8 Heteroskedasticity test: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.416343	Prob. F(14,25)	0.9548
Obs*R-squared	7.562795	Prob. Chi-Square(14)	0.9108
Scaled explained SS	2.413032	Prob. Chi-Square(14)	0.9997

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

H_0: There is no heteroscedasticity

H_1: There is 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 0.9548, greater than 0.05 at a 5% significant level, and therefore, the null hypothesis is accepted. 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.

Table 9: Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.221882	Prob. F(2,23)	0.3131
Obs*R-squared	3.841829	Prob. Chi-Square(2)	0.1465

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

H_0: The residuals are not serially correlated

H_1: The residuals are serially correlated

Decision Rule:

If Prob F value > 0.05 fail to 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 0.3131, which is greater than 0.05 at a 5% significant level, and therefore, the null hypothesis cannot be rejected. 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.

Table 10: Ramsey Reset test result

	Value	df	Probability
t-statistic	0.867646	24	0.3942
F-statistic	0.752809	(1, 24)	0.3942
F-test summary:			
	Sum of Sq.	df	Mean Squares
Test SSR	5.905778	1	5.905778
Restricted SSR	194.1854	25	7.767417
Unrestricted SSR	188.2797	24	7.844986

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

H0: The model is not misspecified.

Decision Rule:

If Prob F value > 0.05 fail to reject the null hypothesis

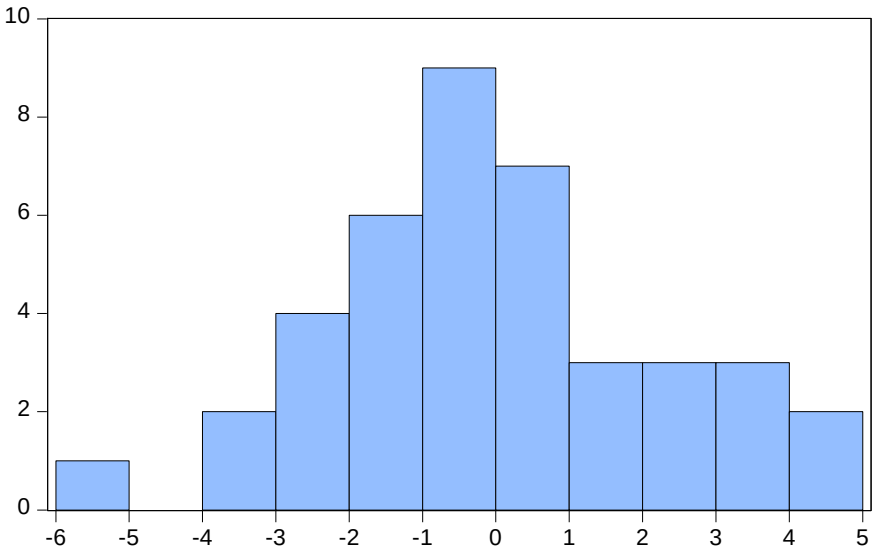
If Prob F value < 0.05 reject the null hypothesis

From the result in the table, the probability of f-statistics is 0.3942 which is greater than 0.05 at a 5% significant level, and therefore, the null hypothesis cannot be rejected. 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.

Table 11: Normality test result



Series: Residuals	
Sample 1983 2022	
Observations 40	
Mean	7.11e-15
Median	-0.153720
Maximum	4.786092
Minimum	-5.032088
Std. Dev.	2.231393
Skewness	0.183339
Kurtosis	2.633619
Jarque-Bera	0.447813
Probability	0.799390

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

H_0: The residuals are normally distributed.

Decision Rule:

If Prob Jarque Bera > 0.05 fail to reject the null hypothesis

If Prob Jarque Bera < 0.05 reject the null hypothesis

From the result in the table, the p-value is 0.799390 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

This study examined the relationship between government expenditure on education and economic growth in Nigeria using annual data from 1981 to 2022. The investigation was motivated by the persistent decline in educational outcomes, inconsistent funding of the education sector, and the fluctuating pattern of economic growth in the country. To address these issues, the study employed secondary macroeconomic data covering government educational spending, economic growth, foreign direct investment, gross fixed capital formation, and life expectancy.

An Error Correction Model (ECM) was used after confirming long-run relationships among the variables. This approach enabled the analysis to capture both short-run dynamics and the speed at which deviations from long-run equilibrium are corrected. The empirical results indicated that key variables such as government expenditure on education, foreign direct investment, capital formation, and life expectancy play important roles in explaining variations in economic growth during the study period. The ECM term revealed a rapid adjustment toward long-run equilibrium, suggesting that the variables move together over time and that the growth process in Nigeria is strongly influenced by these factors.

Diagnostic tests further demonstrated the reliability of the model. The R-squared and adjusted R-squared values indicated that the explanatory variables

jointly account for a substantial proportion of the changes in economic growth. The Durbin–Watson statistic confirmed the absence of serious autocorrelation, while the F-statistic probability showed that the overall model is statistically significant. These results affirm that the model is robust and that the selected variables are relevant in understanding Nigeria's growth dynamics. Overall, the study highlights the critical role of educational funding, health improvements, capital investment, and foreign inflows in shaping the country's economic performance over more than four decades.

5.2 Conclusion

The study concludes that government expenditure on education is an important contributor to Nigeria's economic growth, although its impact tends to manifest gradually over time. This emphasizes the role of human capital development as a foundational driver of long-term economic progress. Foreign direct investment, life expectancy, and gross fixed capital formation were also found to be significant, indicating that Nigeria's economic growth is influenced by a combination of public spending, health conditions, domestic investment, and foreign capital flows.

The presence of a strong and significant error correction mechanism confirms a stable long-run equilibrium relationship among the variables, suggesting that the economy adjusts quickly when short-run disturbances occur. Taken together, the findings imply that sustainable economic growth in Nigeria depends on consistent

investment in education, improved healthcare delivery, enhanced capital formation, and policies that attract and retain foreign investment.

5.3 Recommendations

Based on the findings, the following recommendations are made:

1. **Increase and sustain funding to the education sector**: Government should prioritize consistent and adequate funding for education. Long-term planning and proper monitoring of allocated funds are essential to ensure meaningful improvements in human capital.
2. **Strengthen policies that attract foreign direct investment**: Nigeria should create a more investor-friendly environment by enhancing security, reducing bureaucratic challenges, ensuring regulatory stability, and improving infrastructure to encourage greater foreign participation in the economy.
3. **Enhance healthcare investment and accessibility**: Given the importance of life expectancy, the government should invest more in healthcare facilities, disease prevention, and public health programs to improve the overall productivity of the population.
4. **Promote domestic capital formation**: Investment in infrastructure, technology, and industrial capacity should be encouraged through public–private partnerships, tax incentives, and increased budgetary allocation for capital projects.

5. **Ensure transparency and accountability in public spending**: Strong institutional frameworks are needed to monitor how funds are used in education, health, and capital projects to maximize their developmental impact.
6. **Maintain macroeconomic and policy stability**: Stable fiscal and monetary policies will encourage investment, both domestic and foreign, and support long-term economic growth.

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APPENDIX

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.203694	0.0271
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.55369	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.296073	0.9999
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.904915	0.0003
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.102794	0.9969
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.950514	0.0485
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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		-2.382544	0.1531
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

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		-5.322180	0.0001
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

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		-1.916908	0.3215
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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		-7.848213	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.058953	0.7227
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.705342	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

ARDL Error Correction Regression
Dependent Variable: D(GDP)
Selected Model: ARDL(1, 2, 2, 1, 2, 1)
Case 2: Restricted Constant and No Trend
Date: 12/15/25 Time: 06:59
Sample: 1981 2022
Included observations: 40

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GEE)	-0.011146	0.011336	-0.983294	0.3349
D(GEE(-1))	-0.031611	0.011511	-2.746232	0.0110
D(LIFE_EXPECTANC...	1.750760	1.836854	0.953130	0.3496
D(LIFE_EXPECTANC...	7.502045	2.069025	3.625885	0.0013
D(GFCF)	-0.001219	0.000362	-3.362922	0.0025
D(FDI)	-0.224806	0.665465	-0.337819	0.7383
D(FDI(-1))	1.524361	0.673244	2.264202	0.0325
D(EX_RATE)	-0.010355	0.008196	-1.263333	0.2181
CointEq(-1)*	-0.917876	0.107291	-8.555002	0.0000

R-squared	0.772428	Mean dependent var	0.251377
Adjusted R-squared	0.713699	S.D. dependent var	4.677528
S.E. of regression	2.502808	Akaike info criterion	4.867811
Sum squared resid	194.1854	Schwarz criterion	5.247809
Log likelihood	-88.35622	Hannan-Quinn criter.	5.005206
Durbin-Watson stat	2.429099		

F-Bounds Test — Null Hypothesis: No levels relationship

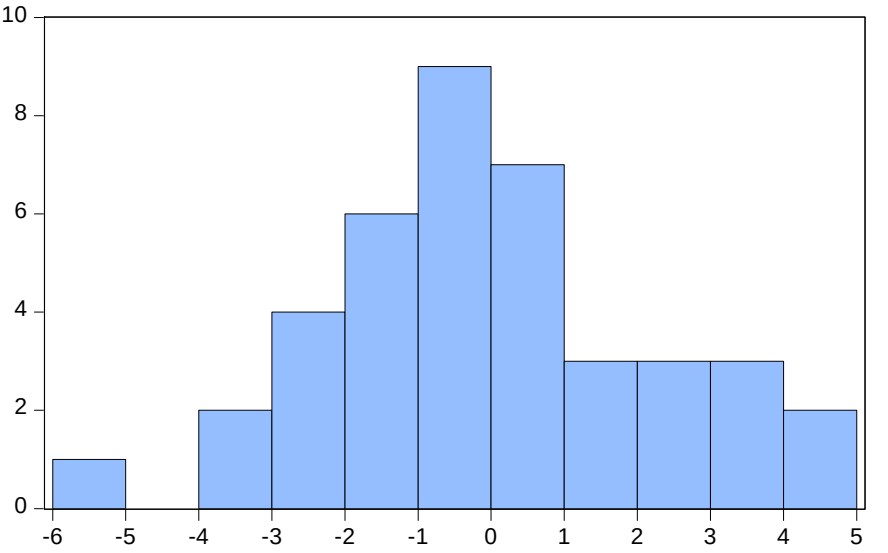
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	8.431803	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.221882	Prob. F(2,23)	0.3131
Obs*R-squared	3.841829	Prob. Chi-Square(2)	0.1465

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.416343	Prob. F(14,25)	0.9548
Obs*R-squared	7.562795	Prob. Chi-Square(14)	0.9108
Scaled explained SS	2.413032	Prob. Chi-Square(14)	0.9997



Series: Residuals
Sample 1983 2022
Observations 40

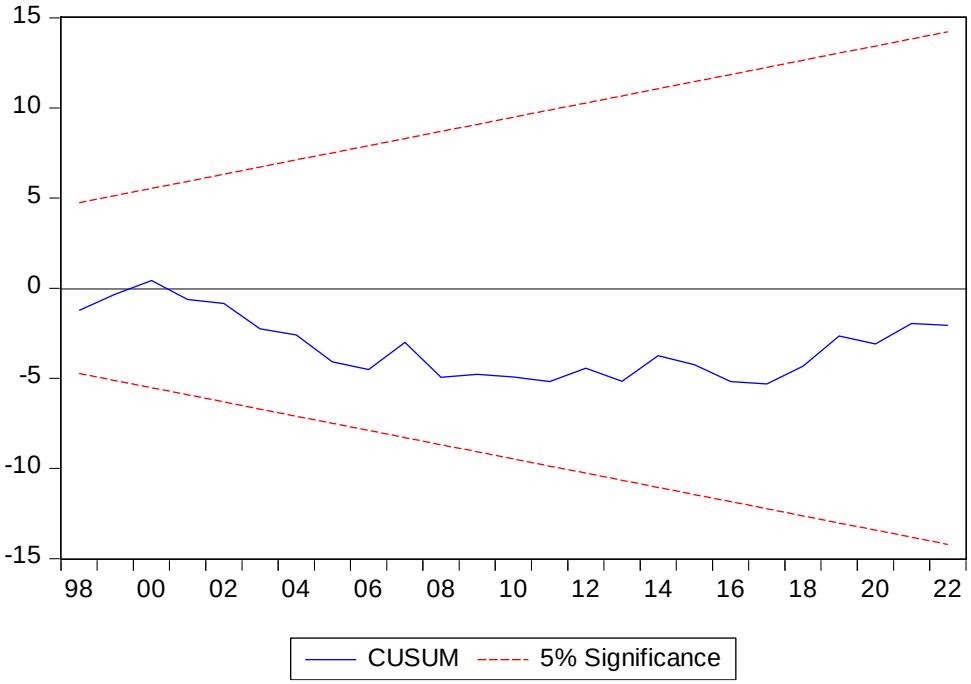
Mean	-1.73e-14
Median	-0.153720
Maximum	4.786092
Minimum	-5.032088
Std. Dev.	2.231393
Skewness	0.183339
Kurtosis	2.633619
Jarque-Bera	0.447813
Probability	0.799390

Ramsey RESET Test
Equation: UNTITLED
Specification: GDP GDP(-1) GEE GEE(-1) GEE(-2) LIFE EXPECTANC Y_AT_BIRTH__TOTAL__YEARS_ LIFE_EXPECTANCY_AT_BIRT H__TOTAL__YEARS_(-1) LIFE_EXPECTANCY_AT_BIRTH__TOT AL YEARS (-2) GFCF GFCF(-1) FDI FDI(-1) FDI(-2) EX RATE EX_RATE(-1) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.867646	24	0.3942
F-statistic	0.752809	(1, 24)	0.3942

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	5.905778	1	5.905778
Restricted SSR	194.1854	25	7.767417
Unrestricted SSR	188.2797	24	7.844986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CUSUM
5% Significance

year	GDP	GEE	Life expectancy	GFCF	FDI	EX RATE
1981	-13.1279	0.17	46.493	15,789.67	1.20	9.91
1982	-6.80339	0.19	46.513	12,893.80	1.72	17.30
1983	-10.9241	0.16	46.638	10,198.26	2.37	22.07
1984	-1.11562	0.20	46.55	7,121.28	2.44	22.00
1985	5.913027	0.26	46.317	6,032.26	0.24	21.90
1986	0.060945	0.26	45.975	6,045.46	0.27	21.88
1987	3.200125	0.23	46.018	5,668.87	0.23	21.89
1988	7.334025	1.46	46.072	6,047.75	0.14	21.89
1989	1.919381	3.01	46.182	6,441.90	1.70	92.34
1990	11.77689	2.40	46.037	7,331.16	1.65	101.70
1991	0.358353	1.26	45.691	7,240.29	1.62	111.23
1992	4.631193	0.29	45.668	7,277.43	1.97	120.58
1993	-2.03512	8.88	45.788	7,825.69	1.91	129.22
1994	-1.81492	7.38	45.513	7,633.27	1.38	132.89
1995	-0.07266	9.75	45.487	7,126.18	2.84	131.27
1996	4.195924	11.67	45.567	7,610.32	2.04	128.65
1997	2.937099	14.85	45.792	8,055.21	2.17	125.81
1998	2.581254	13.59	46.036	8,167.45	2.41	118.57
1999	0.584127	43.61	46.614	8,385.96	2.90	148.88
2000	5.015935	57.96	47.193	8,996.91	1.64	150.30
2001	5.917685	39.88	47.619	6,860.44	2.13	153.86
2002	15.32916	80.53	47.928	7,559.73	1.52	157.50
2003	7.347195	64.78	48.441	9,178.17	1.07	157.31
2004	9.250558	76.50	48.767	7,348.34	0.82	158.55
2005	6.438517	82.80	49.297	7,520.47	0.62	192.44
2006	6.059428	119.02	49.73	10,557.89	0.85	253.49
2007	6.59113	150.78	50.033	8,246.21	0.64	305.79
2008	6.764473	163.98	50.225	8,031.72	0.18	306.08
2009	8.036925	137.12	50.712	8,828.81	0.49	306.92
2010	8.005656	170.80	50.945	9,183.06	0.55	358.81
2011	5.307924	335.80	51.357	8,425.76	0.75	401.15
2012	4.230061	348.40	51.497	8,640.77	-0.04	425.98
2013	6.671335	390.40	51.707	9,320.35	0.51	157.50
2014	6.309719	343.75	51.791	10,570.47	0.82	157.31

2015	2.652693	325.19	51.841	10,432.23	0.62	158.55
2016	-1.61687	339.28	52.043	9,927.26	0.85	192.44
2017	0.805887	403.96	52.305	9,631.70	0.64	253.49
2018	1.922757	465.30	52.554	10,569.60	0.18	305.79
2019	2.208429	593.13	52.91	11,445.86	0.49	306.08
2020	-1.79425	646.79	52.887	9,761.50	0.55	306.92
2021	3.647187	620.59	52.676	10,216.82	0.75	358.81
2022	3.251681	702.98	53.633	10,556.64	-0.04	401.15